

# Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. XIV.—No. 26.  
(NEW SERIES.)

NEW YORK, JUNE 23, 1866.

\$3 PER ANNUM  
IN ADVANCE.

## Improved Bolt Cutter.

If "time is money," all saving of the time employed in any process of manufacture is economy in cash; all improvements, therefore, in time-saving machinery are valuable. The ordinary bolt cutter is worked by reverse motions, entailing a loss of power and of time. The improvement here illustrated is intended to thread bolts by a continuous motion and at one operation.

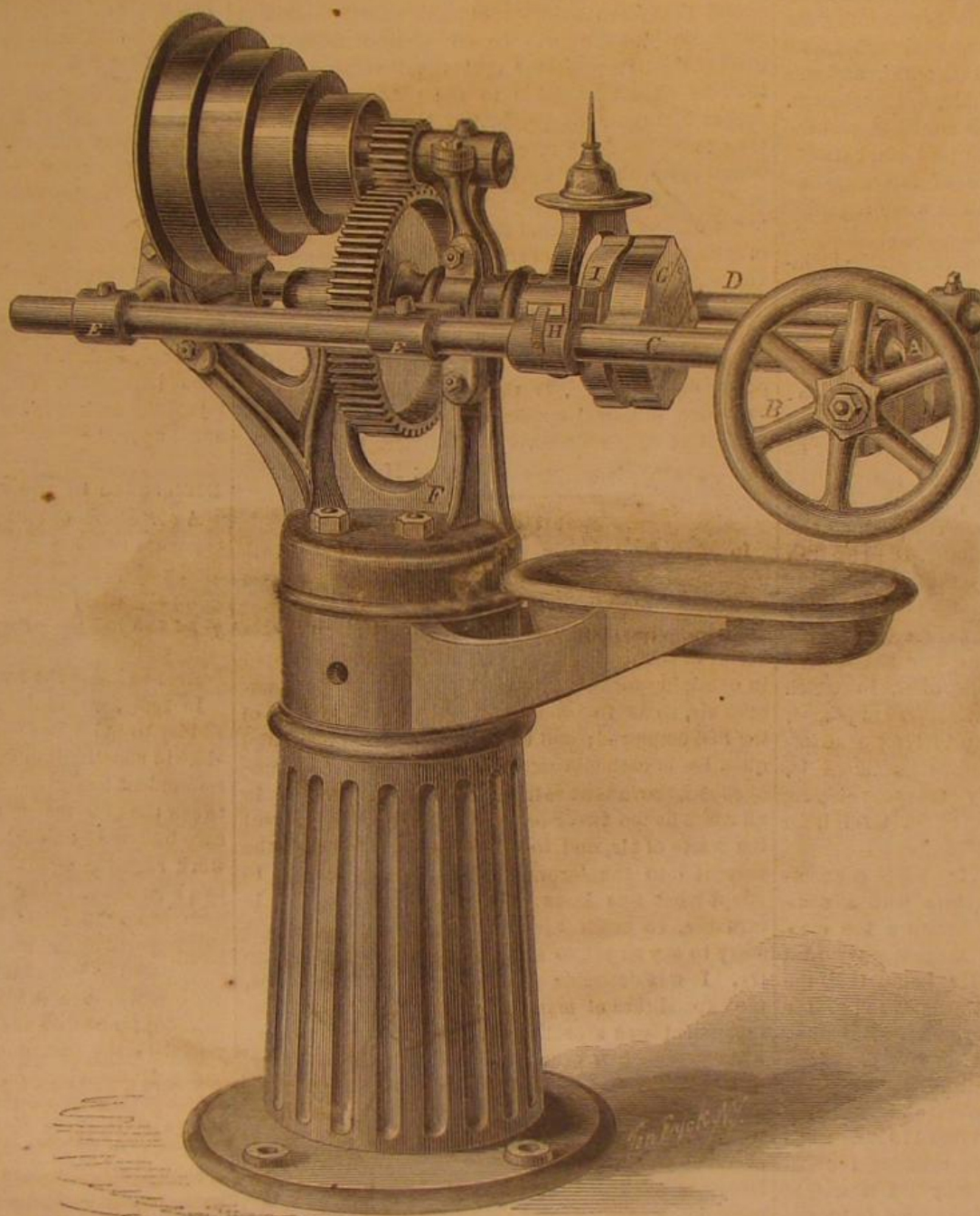
At A is a vise, the jaws of which are opened and closed by a right and left screw, worked by the hand wheel, B, which may be placed on either side of the vise to suit the convenience of the workman. The vise is secured to the sliding bars, C and D, which traverse horizontally through the bearings, E, which form part of the frame, F. The cutting dies are formed in two pieces, or parallel sections, secured together in such a manner that one starts the thread and penetrates the scale, and the other finishes the cut. They work in a dovetailed slot across the face of the head, G, which is secured to a hollow spindle to which motion is given by the pulley and gears.

At H is a stop or pawl, held in place by a spring, and intended to catch in one of the ratchet teeth on the disk, I, which turns freely upon the hollow mandrel. In the face of this disk, next the die head, is cut an ellipsoidal channel, or cam groove, which receives strong studs connected with and moving the dies. It will be seen that by turning the disk, I, the dies can be opened and closed. By means of an adjustable feather on the bar, C, not shown, which at the ends rises into inclined planes, the pawl is operated.

The operation is simple. When the blank is secured in the vise jaws, the bars being drawn forward, the pawl will be released and forced by the spring upon the ratchet, stopping the disk, I, for one-fourth of a revolution, when a cam upon the head, G, drives back the pawl. The stoppage of the disk has opened the dies and the blank can be introduced to whatever distance it is to be threaded. The sliding back of the rod, C, with the feather, again releases the pawl, and the stoppage of the disk another quarter of a revolution closes the dies; the pawl is thrown back and the cutting goes on automatically and rapidly.

It will be seen that after adjusting the feather on the bar, C, for the length of the bolt to be cut, the only work of the attendant is removing and replacing the blanks, so that the work goes on almost continuously, the dies opening automatically to receive the bolt, closing in the same way, and being held firmly to their work until the blank is threaded.

The machine is simple, strong and compact. The application and adjustment of the shifting feather cannot be shown, but will be readily understood by a practical mechanic. It is seated in a slot cut in the bar, C. It is manufactured by Sweet, Barnes & Co., of Syracuse, N. Y., to whom all orders should



SWEET'S BOLT CUTTER.

be addressed, or to Wm. A. Sweet, President of the Onondaga Steel and Cutter Works, Syracuse.

**NITRATE** of silver, which is so extensively used in photography, is by no means sold in the shops in a pure state, and photographers who wish to procure superior copies should, therefore, purify it. The following is Mr. Maxwell Lyte's process for the purpose:—The trade article is first partially purified by crystallization; it is then redissolved to saturation in boiling water, and 1 per cent of nitric acid is added. The liquid is constantly stirred while cooling. A crystalline powder is gradually deposited, which is collected on a filter and washed with water acidulated with 10 per cent of nitric acid. The salt thus obtained is chemically pure.

**PETROLEUM** has been struck at Gadsden, Ga., at a depth of 237 feet.

## WOOD TURNING AT HIGH SPEED.

We have received a communication on this subject from E. J. W., Lenox, Mass, which we have not space to publish in full, but make an abstract of the main points. He says his foot lathe runs at a speed of 700 turns per minute, but he finds that for wood of two inches in diameter and under, and for brass, a speed of 3,600 is far preferable, as the gouge or chisel is less liable to catch, and the work produced, much more satisfactory. He sends us a pulley chuck for wood, which is simply a disk of brass with a groove for a round belt, having a hole through the center, and three steel points or spurs secured equidistant from the center and each other, designed to hold the wood to be turned. With it is a punch of brass or other metal, having at one end, a flange or disk, from the center of which projects a steel pin long enough to pass through the center hole of the chuck and pierce the wood to form a center. The chuck is placed on the end of the stick to be turned, the spur of the punch inserted, and a smart blow with a mallet brings the disk of the punch in contact with the face or reverse of the chuck, and forces it home. The chuck may then be driven by a large pulley overhead, or it may be secured to the lathe spindle if the speed is high enough. He speaks highly also of the facility with which wet or green wood can be turned. His suggestions may be valuable to amateur turners.

## THE NORTH LONDON RAILWAY.—With but 12

miles of line, and with trains working over 8 miles of connecting lines, or 20 miles in all, the North London Railway Company now have 54 locomotives, mostly of the heaviest class. The newer passenger engines, of which we have given a description in a recent number of *Engineering*, weigh 42 tons, of which 30 tons are on four coupled wheels. These engines have 17 inch cylinders, 24 inch stroke, 5 feet 9 inch wheels, and carry regularly a pressure of 160 lbs. per square inch. Mr. William Adams, the company's engineer, builds his own engines at the company's works at Bow, and twelve additional engines are now on order there.—*Engineering*.

THE newer the coal, in a geological sense, the less its calorific power; as the coal becomes older and approximates to anthracite in composition, the amount of carbon increases, while the oxygen decreases. Hence the cause.



(From the British Journal of Photography.)

**A Powerful Source of Artificial Light.**

One of the most brilliant discoveries made within the last few years, has just been made public by its inventor, who has not only discovered a new principle in electrical science, but has applied it to the construction of a machine which, by means of the carbon points, will give light of much greater brilliancy than has hitherto been produced by man. The present apparatus is made on a grand scale, but it remains to be seen whether a small machine cannot be made to work by hand, whereby the electric light can be produced at the mere cost of the labor and the carbon electrodes. So powerful is the current of electricity evolved by the present apparatus, that ordinary photographic paper, at two feet distance from the light, blackens in twenty seconds to the same degree that it will darken by exposure for one minute to the direct rays of the noon-day sun on a clear morning in the month of March.

This invention was first made known to the public by Professor Faraday, a week or two ago, at a meeting of the Royal Society. The paper containing the information was a very long one, sufficient to fill more than a whole number of this *Journal*, and was written by the inventor, Mr. H. Wilde, of Manchester. Some notes of the substance of its contents, and the marvellous effects produced by the powerful currents evolved by the apparatus, will be of interest, considering the promise of the invention when regarded from a photographic point of view.

Mr. Wilde first made a large hollow metallic cylinder with sides of iron, separated by a thick diaphragm of brass. This composite cylinder had its metallic parts bolted together by screws of brass. Permanent magnets could be placed over the cylinder, so that their poles would bite and make good contact with the opposite iron sides. The internal diameter of the cylinder was 1½ inches. The four or five horseshoe magnets which could be placed over it, each weighed about one pound, and would each sustain a weight of ten pounds. Thus, when the magnets are mounted over the cylinder, the two iron sides of the latter become virtually the poles of one very powerful magnet. The armature is a long solid bar of soft iron, made to revolve inside the hollow portion of the cylinder. This solid bar has a deep longitudinal groove on each side of it, in which groove the insulated wires of the armature are placed, so that the latter has still a cylindrical form externally. It will be noticed that this arrangement is, in principle, that of the ordinary magneto-electric machine, though somewhat differing in form from those of the usual construction.

With apparatus thus arranged, Mr. Wilde connected the terminal wires of the armature with a common tangent galvanometer, to measure the electricity evolved as each permanent magnet was added to the outside of the cylinder. He found that the electricity produced was in direct proportion to the number of magnets on the cylinder. But now comes the wonderful part of the discovery. When the induced current of electricity from the armature was passed round an ordinary electro-magnet—the soft iron bar—the latter actually lifted 178 lbs., while the four permanent magnets on the cylinder, the original source of the power, would only lift a weight of 40 lbs. The effect here produced seems to be out of all proportion to the cause, and it will be seen what an important bearing the discovery has upon the law of the conservation of energy. Having made this first step, Mr. Wilde constructed a second cylinder larger than the first, and placed outside it electro-magnets instead of permanent magnets, the two machines being then worked together, and the current generated by the first being employed to excite the electro-magnets of the second. By this arrangement twenty four inches of No. 20 iron wire, 0.04 inch in diameter, were made red hot. Lastly, a machine with an iron armature ten inches in diameter was made, the total weight of the whole apparatus being four and a-half tons. The three machines were then made to work together, the armature being driven as before by steam power, the results proving most astonishing. Pieces of cylindrical iron rods, each a quarter of an inch in diameter, and fifteen inches in length, were melted by the current, which also melted fifteen feet of No. 16 iron wire, 0.065 of an inch in diameter, and

made twenty-one feet of the same wire red hot. Mr. Wilde says:—"The illuminating power of the electricity from the intensity armature is, as might be expected, of the most splendid description. When an electric lamp, furnished with rods of gas carbon half an inch square, was placed at the top of a lofty building, the light evolved from it was sufficient to cast the shadows from the flames of the street lamps a quarter of a mile distant upon the neighboring walls. When viewed from that distance the rays proceeding from the reflector have all the rich effulgence of sunshine. Lastly, as already stated, photographic paper is blackened in twenty seconds by this artificial light, to the same extent that it can be darkened by sunlight in a minute.

Such is the substance of the wonderful discovery made by Mr. Wilde. It is evident that its value to the photographer is a question of expense, there being no doubt as to its utility. As the most economical proportions of the parts of such machines become better known by experience, it is to be hoped that the maximum of light and minimum of mechanical power will be so altered from their present relative positions that the invention will be to some extent available to the photographer, and render him more independent of the weather. With the exception of the mechanical power, the expenses connected with the working of the apparatus are nominal. Ordinary wear and tear, the consumption of the carbon points, and the gradual burning away of the contact places of the necessary commutators, are inexpensive items, offering no impediment to the general use of the machine. Whether the expense of the mechanical power can be reduced so as to make the invention commercially available in the photographic world, is the only question hanging over one practical application of this, one of the noblest scientific discoveries of modern times.

WILLIAM H. HARRISON

**Smelting Iron.**

In a paper recently read to the Association of Foreman Engineers, of London, Mr. Oubridge traced the history of iron smelting from the very earliest periods, in the course of which he said that the great secret of economical and effective smelting consisted in obtaining for the purpose a rapid current of common air, so as to produce complete combustion of the fuel employed; and the speedy creation of a large quantity of carbonic oxide gas was the consequence of such an arrangement. The blast pipes should in all cases fit the tweezer holes closely, so as to prevent the waste of air, and to direct the full force of the current into the furnace. It was all desirable to adopt what was known as the "drop bottom" in furnaces, so much used in America, and he was sorry to say as yet so seldom adopted in this country. It was desirable to lessen, as far as possible, the expenditure of manual labor, and this last arrangement was essentially a step in that direction. After a man had been engaged in working a furnace for several hours, it was rather hard to give him the task of raking it out and quenching it. By means of the drop bottom this might be accomplished in a few minutes, whereas it was a laborious and tedious process in the other case, and much more costly.

**Preparation of Chrome Yellow.**

The preparation of a good chrome yellow is rather difficult, and frequently the product obtained, instead of preserving its light canary color, becomes gradually orange colored. This change of tint greatly damages the beauty of the color, and consequently its value; it may, however, be altogether avoided, by leaving the precipitate of chromate of lead for some time in darkness. The reason why this orange tint is so easily produced is, that while the neutral chromate of lead, which constitutes chrome yellow, is of a light canary color, the basic salt, commonly called chrome red, is orange colored; but the former, like nearly every salt of lead, has a certain tendency to pass to the state of basic salt, whence arises a change of color, more or less marked, which is especially produced when acetate of lead has been used to prepare the chrome yellow. This alteration is less to be feared when nitrate of lead is employed, and when the solution of this salt, poured into that of chromate

of potash, is rather less in quantity. Nitrate of lead is perhaps too expensive for every case, but it gives a purer, and, above all, a less orange product than the acetate.

**Cork Springs for Cars.**

In the published proceedings of the Franklin Institute, we find some remarks about the use of cork in the place of india-rubber for freight cars and other heavy vehicles:—

"The cork used for these springs is of the commonest description, harsh, hard, and full of fissures. It is cut into disks of about eight inches diameter, each pierced with a central hole. Previous, however, to cutting, it is soaked in a mixture of molasses and water, which gives it some softness and renders it permanently moist. A number of these cork disks are placed in a cylindrical cast-iron box, a flat iron lid or disk is placed over them, and by hydraulic pressure is forced down so as to reduce the thickness to one-half. A bolt is then run through box, corks, and cover at the center, and a nut being screwed on this, holds all in place, when the press is relieved, and the box of compressed cork, disks, or cork spring, is ready for use.

"One of these springs, placed in a testing machine, under a weight of 20,000 lbs., shows an elasticity suggestive of compressed air in a condensing pump. One would expect, from the appearance of the material, that, under heavy pressure, it would be pulverized or split into shreds, especially if this pressure was assisted by violent shocks, but in fact no such action takes place.

"A pressure which destroys india-rubber, causing it to split up and lose its elasticity, leaves the cork unimpaired, and, with the machinery in use, it has even been impossible, with any pressure attainable, to injure the cork, even when areas of but one inch were acted upon."

**Difference in the Operation of Locomotives**

A correspondent states that on a certain railroad there are two locomotives running, using the same kind and quantity of oil and tallow, and having the same attention, the cylinders of one of which "gum" so as seriously to interfere with its economical working, while the other remains perfectly free. He desires to know the reason for the difference.

In reply, we would premise that it is an impossibility to build two machines which shall be exactly alike in construction and working. Whether our correspondent has given all the conditions common between the two machines we much doubt, but if the care bestowed on each is the same, the conditions of work required equal, and the construction of the two locomotives alike, we cannot see why one should gum while the other remains free. In such cases theory is of little worth. A practical test by exchanging the work and workmen of the two locomotives will give more satisfactory results than any opinion formed on such insufficient data as is furnished in the communication, such opinion being at best only a conjecture.

**Artificial Production of Goiter.**

The cause of goiter is said by M. Maumene, a French chemist, to be the presence of fluorides in the water of certain regions. He has proved this experimentally. He gave a dog fluoride of potassium for five months, and at the end of this time he noticed a peculiar swelling in the neighborhood of the neck. His experiments were not then continued further, owing to the escape of the dog: but when the animal was recaptured, some three years afterward, the swelling was still as apparent as at first, though M. Gaillet, a Rheims physician, did not think it sufficiently prominently marked to justify him in calling it goiter. M. Maumene states that in all countries where goiter is prevalent fluorides prevail in the water.

M. GAILLARD suggests the making of a safety lucifer match by dipping the stick into melted sulphur after the application of the phosphorus. The sulphur being insoluble in water, and not melting below 110° centigrade, would hinder the phosphorus from doing any harm if the matches were dropped into food; and the greater friction necessary to ignite such a match would be a safeguard against accidental ignition.



## PHENIC ACID.

What is it? We answer that it is carbolic acid, hydrate of phenyl, phenol, phenic alcohol, spyril, salicene or mineral creosote, ( $C_{12}H_6O$ , HO) (?). It has as many aliases as some of our notorious thieves, and under one or another of them is constantly getting into the newspapers. It was first christened carbolic acid by Runge, a German chemist, who discovered it in 1834. But it is not properly an acid; it is not sour, does not redden litmus paper, nor does it combine with alkalis any sooner than with acids; hence the names phenol, etc. In commerce—for it is sent to every part of the globe—the original name is still retained; but phenic acid sounds and looks more scientific, and is, therefore, commonly used in books.

Phenic acid, when pure, occurs in beautiful transparent needle-form crystals. If the crystals be exposed to the air, in a few minutes they absorb a very small quantity of moisture, and are transformed into an oily liquid, which is slightly heavier than water. Although the solid acid is so eager for water, it is satisfied with a very little, and is but slightly soluble in water. It has a burning taste and a powerful and persistent odor, which people call smoky. It dissolves freely in alcohol, ether, and oils, and is itself a powerful solvent of gum, resins, sulphur, and phosphorus. We cannot more briefly indicate its more useful properties than to say it is often called creosote, and that it is as like the genuine creosote as two peas. It is a poison to all animals and plants, and is especially destructive to insects and their eggs. All vermin hate the smell of it and get away from it as fast as they can. But although it is certain death to the animal, it is kind to the dead body, for it may preserve that forever; any kind of flesh which has been impregnated with phenic acid refuses to decay and return to dust. When decay has commenced, by putrefaction or fermentation, phenic acid will stop it instantly, and prevent its recurrence.

The chief source of phenic acid is gas tar, while the genuine creosote is found in wood tar. Both are separated in substantially the same way. Phenic acid is probably as powerful an antiseptic as creosote, and for many purposes is a cheap substitute. Those who understand smoking hams can have an idea of what the power of creosote is. How much creosote is there in a ham weighing fifteen pounds? Creosote is a very expressive word; it is derived from Greek words which mean "flesh preserver."

When nitric acid and phenic acid are brought together, picric acid, a splendid dye for yellow and green on silk and wool, is the result. Phenic acid, in the very crude form of gas tar and dead oil, has been used for preserving timber, and by the farmers for killing vermin. In the pure state it is generally known to physicians and is used by many of them.

Phenic acid is now much talked about as a disinfectant and especially in connection with the rinderpest. But its virtues as a disinfectant are doubtful. It promptly prevents the decomposition of matter which generates foul odors, but it acts slowly and poorly on the odors already existing. If it destroys an odor, it leaves itself in the place of it, and to most people will smell quite as "loud." The first odor of phenic acid is tolerable, but when continued it becomes exceedingly unbearable; it is quite the reverse of vice.—

"A monster....." etc

## THE MANUFACTURE OF BEET SUGAR.

Sugar is a modern product, so far at least as it has become a common condiment. In ancient times the product of the bee served inefficiently the purposes to which sugar is now universally adapted. The natives of the peninsula of India appear however to have known of its use, as also did the Chinese, from time immemorial. Indeed the word "sugar" is from the Sanscrit. That, however, used by the Chinese was probably the product of the sorghum. The sugar cane is a native of hot climates, and only within or near the tropics does it flourish, although it has been raised as far north as the Carolinas and Kentucky. But even in the localities most favorable in the United States for its growth and maturity, the necessity of replanting every three years, and the exposure to frosts and unfavorable seasons, have always made it an uncertain crop.

A substitute for the sugar of the tropics has

always therefore been a desideratum. In the Northern States the maple is extensively cultivated for its saccharine sap, which, however, does not produce an article equal to the imported. The sorghum is found also to thrive well in this section, and the sugar and sirup from the Chinese cane has become an important production. Lately the attention of the people has been drawn to the beet as a product, which yields sugar in good paying quantities. In France, Belgium, the Zollverein, Russia, and Austria, the product of sugar from the beet for the year 1859, was estimated at 357,500 tons, at a cost, adding the manufacturer's profit, of from 9 to 11 cents per pound. On light dry soil the yield of the white or sugar beet is very large, and the manufacture of the sugar from it is not complicated nor difficult, requiring only care in the process of granulation. The establishment of its manufacture in France is due to the first Napoleon, who endeavored in this, as in other articles, to render his people independent of foreign importations. Through a long series of years it was encouraged and protected by premiums and duties discriminating in its favor, until at the present time it competes successfully with the imported sugars, although not specially protected.

From what data we can obtain, there appears to be no reason why its production and manufacture cannot be successfully prosecuted in this country. The juice from the beet cannot be so effectually separated by compression as from the cane, and to remedy this, one of two processes are employed, either by cutting or grinding the root and then subjecting it to pressure, or by maceration in water. This latter process, however, necessitates additional labor in the subsequent processes of filtration, concentration and granulation. These are similar to those pursued in the manufacture of cane sugar, consisting of boiling, evaporating, draining, crystallizing and claying. The refuse is of use in the manufacture of potash, the sirups are used as food, and the coarser sirups as a basis for the distillation of alcohol.

## MISCELLANEOUS SUMMARY.

**TO PRESERVE ICE.**—Put it in a deep jug, cover it with a plate, place the vessel on a pillow stuffed with feathers, and cover the top with another pillow carefully, thus excluding the external air. Feathers are well known bad conductors of heat, and consequently the ice is preserved from melting. Dr. Schwarz says, that, in this manner, he has preserved six lbs. of ice for eight days.

The following is an easy method of detecting whether the red color of wine is artificial or otherwise:—A small piece of bread or of sponge which has been well washed is dipped into the wine and then placed in water. If the color is artificial the water will be at once colored; otherwise the color will not be apparent for half an hour.

It is estimated that upward of 800,000 sewing machines have been manufactured in the United States since Mr. Howe introduced his invention, and that several millions of dollars are invested in the business. The Wheeler & Wilson Manufacturing Company employs a capital of \$1,000,000.

The Sheffield file cutters, to the number of about 4,000 have been on a strike for several weeks. In the mean time a great impetus has been given to file cutting by machinery.

The vacuum pan was patented in England in 1812 by E. C. Howard, and the royalties paid under this patent for several years amounted to £200,000 per annum.

It has been ascertained that ozone is developed by the mechanical action of blowing machines producing strong currents. This fact may, in part, account for the healthy action of wind.

**STEEL CANNON.**—Krupp, as we understand, is making a cast-steel cannon of 50 tons weight, to be exhibited at the Paris Exhibition. This is about the weight of the American 20-inch army guns, the naval guns, of the same caliber, weighing about 45 tons.

The biggest piece of work ever done by the Water Department of Philadelphia is now in progress. Workmen are now engaged in connecting the forty-eight inch water main laid from Fairmount water works to Corinthian avenue with the turbine wheels.

**THE ATHENS (Ga.) CULTIVATOR** says the "probability is that the wheat crop throughout the Union will be considerably less than a full one. It will be considerably diminished at the South by rust, beside the injury sustained by the severe winter; at the North it suffered greatly in many sections from the latter cause. Corn, though backward, looks well. Winter oats were badly killed out last winter, and are a very short crop in this section. Cotton, we hear, had accounts of from every quarter. Bad seed, planted in wet weather, hurried and indifferent preparations, hail storms, and beating rains, make the prospects of the growing crop very gloomy."

Another account says:—"Wheat in upper Georgia is believed to be out of danger and is promising well. Cotton is not promising. There will not be a fourth of a crop. Planters are still plowing up and planting corn."

An eccentric German physician recently died, leaving in his will what he considered a secret for increasing the years of our life. His own age was 109, and he attributed it to the fact that he always slept with his head to the north, and the rest of his body, as nearly as possible, in a meridional position. By this means, he thought the iron in his body became magnetized, and thus increased the energy of the vital principle. This idea is quite old; mention was made of it in the SCIENTIFIC AMERICAN many years ago.

**TO WASH CALICO WITHOUT FADING.**—Infuse three gills of salt in four quarts of water; put the calico in while hot, and leave it till cold, and in this way the colors are rendered permanent, and will not fade by subsequent washing. So says a lady who has frequently made the experiment.

**VARNISH FOR PAINTINGS.**—Take mastic, 6 ounces, pure turpentine,  $\frac{1}{2}$  ounce, camphor, 2 drachms, spirits of turpentine, 19 ounces; add first the camphor to the turpentine; the mixture is made in a water bath; when the solution is effected, add the mastic and the spirits of turpentine near the end of the operation; filter through a cotton cloth.

The lands along Oil Creek are estimated at a bona fide cash value of two hundred and fifty millions of dollars. Many portions of these lands have been sold at prices that would bring the whole at the same rate to this sum in the aggregate. The distance is but little over fifteen miles, and the valley narrow throughout its entire extent, so that an idea can be readily formed of the immense wealth contained in its bosom.

A USEFUL cement is made by taking two parts of finely sifted unoxidized iron filings, mixing them with one part of perfectly dry and finely powdered loam, and kneading the mixture with strong vinegar until a perfectly homogenous plastic mass is formed. When the cement is ready for use. It must be made as wanted, for it quickly hardens, and once set is never fit for use again. The cement is said to resist fire and water.

The Southwestern (England) Railway Company possesses a monster engine, named the *Colossus*. It has been built to draw a train of eighty loaded wagons eighty miles in three hours, each loaded wagon weighing about ten tons. It can drag nearly one thousand tons, from London to Southampton with almost the speed of a bird flying.

**ROUND STEEL SHOT.**—Large contracts for round steel shot are now being carried out at Sheffield, for the Admiralty, by Messrs. Cammel & Co. [limited], John Brown & Co. [limited], and Messrs. Firth & Sons. Pot-steel is the sole material used, and the steel spheres, about 9 inches in diameter, are swaged out in blocks under the steam hammer.

A VARIABLE star has been discovered in the constellation of the Northern Crown, and has been carefully observed at the United States Naval Observatory in Washington. The daily rate of decrease is about four-tenths of a magnitude, and it has changed from the second to about the eight magnitude.

A FLUTELESS flutist is spoken of in Havre, France, as performing wonderful things. He makes a flute out of his left hand, which he holds to his mouth, using the right hand of stops. The notes he produces are not to be distinguished from those of the real instrument.

The *Mechanics' Magazine* says that coal oil is a better article for preserving sodium and potassium than naphtha. In coal oil, soda keeps its luster for months and years, while in the purest naphtha it is dimmed in a few days.



## SHOULD THERE BE A PATENT LAW?

It is said that the present Attorney General of England has vaguely intimated that the law of patents should be abolished. Sir William Armstrong has also expressed the same opinion, and some writers have ventured to urge such views, but the mature judgment of mankind is averse to so radical a proposition.

In a recent number of *Newton's London Journal of Arts*, we find this subject ably discussed in the report of a sub-committee appointed to consider the defects of the British patent system, from which we make some extracts:—

Many of the objections urged against patents on the ground of monopoly may be urged against other property of perpetual instead of limited duration.

The claims or rights of the inventor to own such property may be likened to those of the first finder or first occupant, and rest on the same principle as other property. The author of a book or of an invention has an undoubted right to keep it to himself; but if he thinks fit to publish the book or invention for the use of others, without which publication the book or invention would be valueless, exclusive property in such book or invention is gone, except so far as it may be retained or restored by municipal law. Much learning has been bestowed in support of the so-called natural right of an author, whether in a book or in an invention; but the sub-committee consider the question of such a legal natural right to have been long ago settled in the negative, and that the right of an author or inventor is the creature of municipal law.

The sub-committee cannot recognize any distinction in principle between the product of the brain as embodied in a book, picture, or statue, and an invention in the arts and manufactures; substantial differences, however, exist in dealing with such property. No property exists in an idea unless clothed or embodied in some material form; the protection to such property consists in the right to exclude others from multiplying copies. What is a copy may, under certain circumstances, give rise to serious difficulty. Not only must an idea be embodied in a material form as the basis of property, but the boundary or limits of that property must be defined. It has been urged as an objection to any patent law that it deals or attempts to deal with subjects incapable of being defined. What cannot be accurately defined is not the subject of property.

The eye or the ear can judge of the identity or similarity of two books, maps, pictures, or pieces of music; but an invention, embodied in a machine or a chemical process, admits of variations according to equivalents known or unknown. The imperfection of language, and the disposition to adopt forms of expression which may include or exclude as much as possible, as occasion may require, add to the difficulty; hence the necessity of some control in the creation of property to be protected by legal proceedings at the option of a party interested in checking or defeating rivals. The public have a direct interest in preventing the creation of rights which may be improperly used; hence the expediency of some check on the indiscriminate issue of patents.

The interest of the public in the maintenance of a patent law, not the interest of the inventor, is the real question. The object of the patent law is to create, to call into existence, the trade, which, when so created or called into existence, shall be free; the duration of the monopoly given by the patent law being the time necessary for that purpose, which may and must differ in various cases. Property in each special invention is the only means hitherto devised for stimulating invention and rewarding the inventor. Invention, like poetry, may exist as a natural gift. Special instances may be referred to, in which a book or an invention might have been called into existence, or created, without the stimulus of copyright or patent right, or expectation of reward; but book making and invention may be followed as a legitimate business and means of livelihood, and of creating property to be transmitted to posterity. The poetry of Milton might have been recited to admiring audiences, but the capital to produce the first edition would not have been forthcoming if no property had existed in the product; that is, if there had been no exclusive right to the multiplication of copies. Watt might have exhibited his applications of the laws of heat and economy of fuel in the steam engine; but a Boulton would not have applied capital to call into existence the elaborate machinery by which our mines are drained, and looms driven, and railways worked, had there been no property in the product of the capital necessary for its existence. It has been often said, in reference to invention, that a Boulton is necessary for the development of a Watt; and no one acquainted with the history and progress of invention in this country, with the results of the labors of a Crompton, a Paul, and an Arkwright, can fail to recognize the fact that an unlimited amount of labor and capital is employed on the faith of the property to be created by its successful application. The dreams of the alchemists and searchers after perpetual motion laid the foundation of modern chemistry, and produced many mechanical equivalents. The authors of many most useful inventions have died in poverty, amid the wealth which their labors have created; but the public have reaped the benefit of those labors, which the patent system stimulated, however delusively.

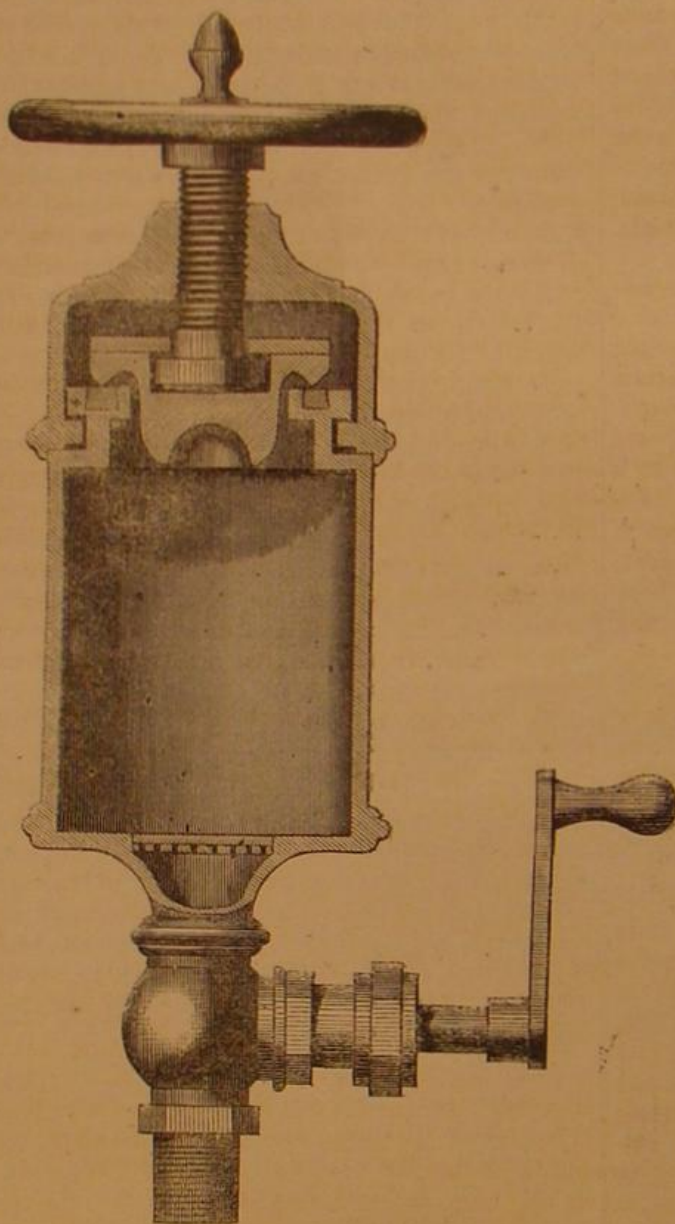
## Manufacture of Gold and Silver.

A correspondent from Indiana desires to know what would be the best use to which the discoverer of a method of making gold and silver could put his knowledge. We hardly know how to reply. If his object was selfish, he should keep the process a secret; and if he desired to benefit mankind in general, it is doubtful if giving it publicity would be a boon to the world. If the precious metals could be procured as

easily and become as plenty as iron, their value would fall below that of this common metal, because they are not intrinsically as valuable as iron for the use and comfort of mankind. Gold and silver have certain qualities superior to similar qualities in iron, but in the really useful qualities, iron is the most valuable.

## STORER'S OPEN-TOP SUET LUBRICATOR.

This instrument is used for supplying lubricating matter to the cylinders of locomotive steam engines, steam pumps, etc. Its distinctive feature is the movable top, which renders it capable of receiving suet or other fatty matter in bulk, which is gradually melted and fed in as required. Oil or melted tallow may be used in it, but they are carried off very rapidly, and, besides, are generally adulterated—sometimes to such



an extent that we have seen the valves, piston, etc., of a steam engine so badly eaten in a few months as to make it necessary to replace them.

It is asserted that suet only costs about forty per cent as much as good oil, so that it is an item of importance to use it as a lubricator.

Some twelve hundred of these cups are in use, all giving perfect satisfaction. The instrument will be readily understood by the accompanying engraving. The common globe valve at the bottom controls the steam opening and regulates the supply. The cover at the top is attached to the bowl with the clutch, as shown, forming an abutment for the screw, which, pressing on the loose valve, makes a joint on a ring of soft metal confined in a dovetailed groove. A very slight pressure is needed to make a tight joint. This is a very simple and efficient device, and it might be used for many other purposes.

It was patented Nov. 24, 1863, and March 13, 1866. Messrs. Cameron & Geoghegan, of 199 and 201 Center street, New York, are the manufacturers.

## Manufacture of Crucibles.

Larkin, in his "Brass and Iron Founder's Guide," gives the following information on the above subject:—

The manufacture of crucibles is a branch of the potter's art, requiring great care to insure success; and, until lately, was at the best a very uncertain process. The chief requisites in a good crucible are,

refractoriness in the strongest heats, capability of withstanding the corrosive effects of any substances that may be ignited in them, and the effects of sudden alterations of temperature. They must also be composed of a material sufficiently solid in its texture to prevent the passage of the solid metal through its pores.

The composition producing pots of the best quality is formed by pure fire clay mixed with finely ground cement of old crucibles, to which is added a portion of black lead or plumbago. The clay is prepared in the same manner as observed in pottery generally. The vessels, after being worked to the proper conical shape, are slowly dried, and then baked in a kiln.

The composition used in the Royal Foundry of Berlin is formed of eight parts in bulk of Stourbridge clay and cement, five of coke, and four of graphite or plumbago. Crucibles manufactured from this mixture are capable of withstanding the greatest possible heat in which wrought iron melts, being equal to from 150° to 155° Wedgewood. They also bear sudden cooling without cracking. In the Berlin foundry they have been employed for twenty-three consecutive meltings of seventy-six pounds of iron each, which perhaps is the most complete and trying test that could be adopted.

Another composition is as follows:—8 lbs. Stourbridge clay, 4 lbs. burned clay cement, 2 lbs. coke powder, and 2 lbs. pipe clay; the whole being compressed in molds while in a pasty state.

The Hessian crucibles from Great Almerode and Epteroode, resist the action of fluxes, and are tolerably lasting. They are made from a fire clay containing a small amount of iron, but no lime. This is incorporated with silicious sand. These crucibles are rather porous, but they resist the effect of saline and leaden fluxes, and are not liable to crack, but they melt below the fusing point of bar iron.

The black lead crucibles bear a much higher heat. Their composition is two parts of graphite and one of fire clay; this is mixed into a pasty mass by means of water. The crucibles are baked slightly in the kiln, but are not completely hardened until put into the furnace for use. They are of a smooth surface, and are consequently suitable for gold and the precious metals generally. These crucibles are perhaps the very best yet manufactured, and many of the brass founders throughout Europe, and for aught I have yet seen to the contrary, all the brass founders of America, are adopting them in preference to the ordinary clay ones. Mr. Anstey's patent process for the manufacture of

crucibles is as follows:—2 parts of finely ground raw Stourbridge clay, and 1 part of the hardest gas coke, previously pulverized, and sifted through a sieve of one eighth of an inch mesh, are mixed well together with water. This mixture is molded on a revolving wooden block somewhat similar to the process pursued in pot throwing, a gage being used to regulate the thickness of the pot, and a cap of linen placed upon the core previous to the application of the clay in order to prevent its adhering when removed. The pot is then dried in a gentle heat, and is not thoroughly completed until required for use. It is then warmed before a fire, and laid in the furnace, with the mouth downward—the heat of the fire having been previously lowered by the application of fresh coke. It is gradually brought up to a red heat, reversed, and fixed in its proper position in the furnace, and is then ready to receive the charge of metal.

**CURE FOR DAMP WALLS.**—The following is stated to be a good remedy for damp walls:—Three quarters of a pound of mottled soap to one gallon of water. This composition to be laid over the brick-work steadily and carefully with a large flat brush, so as not to form a froth or lather on the surface. The wash to remain twenty-four hours, to become dry. Mix half a pound of alum with four gallons of water, leave it to stand for twenty-four hours, and then apply it in the same manner over the coating of soap. Let this be done in dry weather.



## THE WAY FELT HATS ARE MADE.

At 101 Cliff street, in this city, is situated the hat-body manufactory of H. A. Burr. It is a large fire-proof building, filled with machinery, which is driven by a double cylinder beam engine of 400 horse-power. There are some half-a-dozen other similar establishments in the country, and they have all grown up from a simple invention, which has revolutionized the important art of making hats.

All felt hats, and the bodies of all silk hats, except a few cheap, heavy, woolen ones, are made of fur—mostly of the fur of hares and rabbits. When the several fibers of fur are crossed and entangled together in a sheet, and the sheet is then subjected to a peculiar rolling motion, the fibers are drawn more and more closely together, giving to the sheet a homogeneous character and considerable strength. Such a sheet is called felt, and the process of forming it is called felting. It has been stated that the fibers of fur are barbed or serrated, and that their hold on each other in felt is due to the interlocking of the teeth or barbs. On examining some rabbit's fur under a compound microscope, we were unable to discover any thing more than an irregular roughness, though the fibers seemed to be formed in short joints, somewhat like sugar cane.

Formerly the forming of a hat body was a laborious and tedious process, requiring some two hours' labor by a highly-trained and skilled workman. The proper quantity of fur was weighed, and divided by the scales into two equal portions. One of these was placed upon a table about six feet in length, which was situated in front of a window and protected by a vertical board at each end from lateral currents of air. The fur was then beaten up and arranged in order by means of a bow, formed of wood and catgut, and somewhat resembling a large fiddler's bow. The workman held his bow in his left hand, and drawing the string with his right, let it snap down upon the pile of fur, at the same time giving a peculiar twist to the bow to throw the fur into a pile or sheet of triangular form. This was pressed down flat and laid one side, and the other half of the fur was treated in the same manner. A sheet of paper, similar in form to the sheets of fur, but somewhat smaller in size and with one angle rounded, was then laid upon one sheet of fur, and the edges of the fur were bent over the edges of the paper on two sides and the rounded angle, the second sheet of fur was laid upon these, the whole was turned over, and the edges of the second sheet were rolled like the first. The edges of the two sheets, thus lapping, were subjected to a gentle rolling motion to partially felt them together. After a little further rolling of the whole mass, the paper was removed, and, by repeated dipping in hot water and rolling, the body was brought to the form of a hat, a wooden block of the latest fashion being introduced in the proper stage of the process.

About twenty years ago, Mr. Henry Augustus Wells, of this city, conceived the bold and original idea of a process for forming hat bodies, vastly easier and more rapid than the one above described, which was then in use all over the world. After years of expensive experiment, and many ingenious improvements by Mr. Burr and his partner, the plan of Mr. Wells was made practically successful, and by it all hat bodies in this country are now made.

Thin sheets of brass are punched full of small holes, about 64 to the square inch, and these sheets are brazed together in the form desired for hat bodies—that is, the form of a cone with a hemispherical summit. This is placed upon an air-tight box within which revolves, at high velocity, a spiral fan, drawing the air through all the holes into the cone, and blowing it out through a hole in the floor below; the cone at the same time slowly rotates around its vertical axis. A machine, placed in proper proximity, and furnished with a rapidly-rotating brush, beats the fur into a cloud, and blows it through a narrow vertical slit at the end of a wedge-shaped funnel, in a thin, attenuated stream, directly upon the rotating brass cone. The inward current of air draws the fur upon the outside of the cone in a sheet, with the fibers as completely crossed and interlocked as they can be by the most skillful bowing. A square foot of wet canvas is now dropped over the rounded top of the cone, and another piece of the same material is

wrapped around it—the slow rotation of the cone making this wrapping a quick and easy operation. The whole is then covered with a second brass cone, (a little larger than the interior one, and perforated with larger holes), and is removed to a platform, and lowered into a kettle of hot water. The fur is instantly soaked by the water, which causes the fibers to adhere together with sufficient strength to form a bag that may be handled. The platform is then raised, the outer cone and the cloths removed, the inner cone inverted, and the fur loosened around the edge, when it falls upon the table in the form of a frail conical bag. Ten of these bags, or "bats," are laid in a pile, rolled in a cloth, and subjected to sufficient rolling motion to felt them strong enough to be sent to the hatters.

Fur for hat bodies is imported mostly from Germany, though some comes from Scotland. It is now worth four dollars a pound in this market; there is about an ounce in a fleece, and it takes from one to four ounces to make a hat body. Mr. Burr has made, at his establishment in this city alone, 10,000 bodies a day—1,000 an hour—for three months in succession. The fur is cut from the pelt by hand, and is imported in paper bundles. Formerly, the hair was all pulled from the skin before the fur was cut, by pressing it between a knife blade and the thumb of the workman, but now it is all cut off together, and the hair is rapidly separated by a machine, which also was invented in this country.

To form a hat body of sufficient thickness, and yet to have it as light as possible, it must be thicker in some parts than others—the rim and the junction of the rim and top with the sides being thick, and the other portions thin. By varying the width of the slit through which the fur is blown upon the rotating cone, the thickness of the several parts is adjusted to any desired scale with the utmost nicety, while by the steady rotation of the cone upon its axis the thickness of each part around the hat is made perfectly uniform.

Mr. Wells sold his patent for \$30,000 to four men, and it ultimately came wholly into the possession of Mr. Burr, who has three or four other establishments besides the one in this city, and who receives a royalty of two cents on each hat manufactured by other parties. Some time since one of his licensees having made money enough, and having become old, Mr. Burr bought him out for \$90,000. Mr. Burr is now selling out his machinery with the intention of retiring from business, having, he says, money enough to carry him through if he dies in any reasonable time.

The patent was granted on the 25th of April, 1846, and has been extended for seven years, so it expires next year. During the first fourteen years more than 46,000,000 of hat bodies were made on the machines, and for the last ten years no apprentice in this country has been taught the art of bowing fur—the machines having entirely superseded the old process. A man would form five bodies a day with the bow; by the machine three men and a boy will make 400 a day. Considering the extent of the business of manufacturing hats, and the completeness of the revolution wrought by this machine, it may, perhaps, be classed among the great American inventions.

**TO CLEAN SILVER.**—In one of his lectures before the London Society of Arts, Dr. F. Grace Calvert gives the following "simple method of cleaning silver or silver plate, without the trouble of employing rouge or other cleaning powder, which, besides rapidly wearing off the metal, takes up much time. It consists in plunging for half an hour the silver article into a solution made of 1 gallon of water, 1 lb. hyposulphite of soda, 8 oz. muriate of ammonia, 4 oz. liquid ammonia, and 4 oz. cyanide of potassium; but, as the latter substance is poisonous, it can be dispensed with if necessary. The plate being taken out of the solution, is washed, and rubbed with a wash leather."

**A BLACK INK,** not corroding steel pens, and neutral, may be prepared by digesting in an open vessel, 42 ounces of coarsely powdered nutgalls, 15 ounces of gum senegal, 18 ounces of sulphate of iron (free from copper), 3 drachms of aqua ammonia, 24 ounces of alcohol, and 18 quarts of distilled or rain water. Continue the digestion until the fluid has assumed a deep black color.



## Coffee, Still Nearer Perfection.

MESSERS. EDITORS:—I feel rather diffident in writing on the subject of coffee-making, after the subject has been so ably handled by Professor Seely; yet I may possibly obtain a hearing in the matter, without being deemed intrusive, when I state that years ago, after many experiments, I succeeded in obtaining the most perfectly delicious coffee ever before tasted by myself or friends, it retaining its aroma in an eminent degree, and, at the same time, possessing all the strength of extractive matter desirable. This method of making coffee I subsequently published in the *Household Journal*, in its column of recipes.

I claim, and believe, that I was the first to discover and make coffee in the manner I am about to describe, which, although somewhat similar to the method pursued by Professor Seely, is, I think, more easily practiced by all persons desiring to do so.

Take, say a teacupful of freshly-ground coffee, one-half of which is to be put in a coffee pot, placed on a stove, and a sufficient quantity of warm (not boiling) water poured thereon, when it should be allowed to boil about five minutes, and then placed on the back of the stove for a few seconds.

The other half of the coffee may be put into a pitcher with a metallic cover, or a coffee pot used on the table only, and the liquid portion of the coffee which has been boiled poured therein, when, as the old ladies say, it draws in a similar manner to tea.

I thus, without any alteration of the form of the coffee pot, or the addition of strainers, really obtain all that is obtainable, of both the aroma and healthful extractive matter of the coffee used; at least by the use of ordinary culinary utensils.

The coffee which was in the pitcher, or table coffee pot, is either left therein, or at once placed in the cooking pot, where it is boiled the next morning, and half a teacupful again put into the table coffee pot, which is treated in like manner, thus proceeding in regular routine. In very warm weather, however, the coffee thus saved to be boiled should be kept in a cool place, as a few hours in a warm atmosphere is sufficient to cause the inception of fermentation, which gives an unpleasant flavor to the next morning's brewing.

I may remark, in conclusion, that no coffee should be used that has been roasted more than forty-eight hours before; and, in fact, coffee just roasted, but allowed to get cold before grinding, is always the best—which is the method pursued in Cuba, where they make a very delicious coffee from inferior berries,

JAMES M. JARRETT.

Brooklyn, N. Y.

## Is the World Growing Larger?

MESSERS. EDITORS:—Is there not reason to think that the earth is daily increasing in size? Is there not an action taking place on its surface analogous to that which occurs in a plastic cell when placed in circumstances favorable for its development? To illustrate this thought. We plant a little acorn weighing a few grains in the ground. In the course of time, it becomes the large oak, weighing thousands of pounds, and spreading its branches far and wide in every direction. This oak gets its weight and bulk principally from the air we breathe, and remains upon the earth thousands of years, perhaps, and undergoes a great many changes before it is finally restored to the atmosphere, even if this event ever does take place. So animals derive their weight and bulk partly from the air they breathe into their lungs and partly from the vegetable productions which they devour. When animals die, their bodies, it is true, are partly decomposed into gas, and restored to the atmosphere, but they are principally seized upon and appropriated by growing vegetables, which in their turn are devoured by other animals. It thus seems to me that the earth, through the agency of its animals and vegetable productions, must be daily increasing at the expense of the atmosphere by which it is surrounded. In other words, the plants and animals of the earth are all the time appropriating to themselves the elements of the atmosphere and forming out of them new compounds which remain upon



the earth an almost indefinite length of time before they are decomposed and restored to the atmosphere. This idea is illustrated in our coal mines. All coal was originally wood, and like all wood, was formed principally at the expense of the elements of the atmosphere. This coal has remained upon the earth millions of years, perhaps, and now at length men urged on by their necessities, are digging it up, and by burning it, restoring it in the shape of carbonic acid, to the atmosphere, from which it originally came. No one, it seems to me, can doubt that the earth is larger now than it was when this coal existed in the form of wood. Although the world may be increasing now, it does not follow that it will continue to increase for all time; sooner or later an equilibrium will be established between the amounts of elementary principles which the earth takes from and restores to the atmosphere. But at present, in my opinion, it is like a growing animal; its absorption exceeds its waste. In a word, our planet is not yet a full-grown earth; it is merely an "earthling."

W. H. B.

Baltimore, Md.

[This theory of the increase of the size of the world by accretion is not new. We do not know that any practical good can result from a discussion of this subject.—Eds.]

#### Bill to Tax Inventors.

MESSRS. EDITORS:—As you have opened your columns to the opponents of the bill imposing a fee upon an appeal to the Examiners-in-Chief in the Patent Office, you will doubtless admit a few words in its favor. The reasons for the bill are evidently not understood.

Until within a year the functionaries alluded to have been able to dispose of the appeals nearly as fast as they came in. On more than one occasion their register has been cleared. But for the last ten months the cases have increased at a much more rapid rate, and they are now between three and four months in arrears. This is not owing mainly to the interruption occasioned by the retirement of two of the Board, as has been suggested. The business brought before them has greatly exceeded what it was before; it is more than can be properly transacted, and is continually enlarging. Unless some remedy can be found for the evil it must soon become intolerable. It is so serious that a suitor remarked, a short time since, that he had better give five hundred dollars than to suffer the delay to which he had been subjected. If it can be checked in any better way, it would be gratifying to learn it. But no other has been devised than that of imposing a small fee upon the appeal. This will probably afford the needed relief. You cannot find another tribunal, or court of revision, which is not protected by the imposition of fees, and by the liability to costs, from being compelled to spend their labor on causeless appeals and frivolous proceedings. But it has become the practice to take an appeal to the Examiners-in-Chief in nearly every rejected case, without regard to its merits. The attempt is made continually where not the slightest reason exists for anticipating that the action of the primary Examiner will be reversed. But it costs less to carry up the question than to investigate it. There is a chance, and it involves no expense. Not a day passes when some utterly trivial case is not presented. It must be examined with care, nevertheless, and all the papers be read up, before its worthlessness is ascertained. A small fee will save a large part of this useless labor, and enable the Examiners-in-Chief to devote their attention to more important business, and to dispatch it with suitable expedition.

It has become quite common, moreover, to find appeals urged upon grounds, and accompanied with explanations, of which the primary Examiner never heard. To bring the application before the Appeal Board is gratuitous, and a more favorable hearing is anticipated. This has contributed to the burthen of the Board, to say nothing of its injustice to the primary Examiner.

Complaint has been made of the hardship of having to pay ten dollars to get an application thoroughly examined. To secure this end in every instance, the primary Examiners must be depended upon. It can never be accomplished by any one Board, however capable. In order that they may be able to consider with proper care the questions submitted to

them, there must be some limit to the number of these questions. If they are required to take cognizance of all that arise, they must necessarily determine them without due investigation, or they must remain undecided. The cry will then be for a gratuitous appeal to the Commissioner, and then to the Judge of the Supreme Court, in order to obtain a "thorough examination."

The true theory of the Patent Office is, that the applications should be investigated to the utmost by the primary Examiner. In order to secure uniformity in their decisions these should be revised by the Examiners-in-Chief. It is manifest that neither should have any more duty imposed upon them than they can well discharge. The primary Examiners may be increased from time to time, as the emergencies of the Office demand. But there can be but one Board of Revision. Their business must be kept within reasonable bounds. And this can only be effected by requiring a fee upon appeals to it.

SCRUTATOR.

Washington, June 7, 1866.

[We publish our correspondent's letter with pleasure, and fully recognize the fairness of his statements; but they do not alter our opinion as to the injustice of increasing the tax on applicants. The point of our objection is this: that inventors now pay enough for all the privileges extended to them at the Patent Office; and we suggest, that if the present Appeal Board cannot examine all the cases brought before it, let the law be amended to increase the fee. The present large surplus fund will justify at least two additional \$3,000 appointments; or, what would suit us just as well, if you please put on this \$10 extra tax for appeal, but reduce the fee on applications to \$10 each, making a total fee of \$30 for the patent when issued. There are some people who have great skill in imposing burdens upon others, but it never occurs to them to propose relief.—Eds.]

#### Atmospheric Resistance to Railroad Trains.

MESSRS. EDITORS:—At a meeting of the Massachusetts Institute of Technology, the atmospheric resistance to railroad trains was shown. A set of cars, made of pasteboard, with the engine of the usual form and shape, was placed upon a horizontally revolving cam, attached to a vertical shaft, driven round by the force of a given weight; the time of the revolutions was measured by an instrument beating seconds. Then the proposed improved form of car and engine (which improvement consisted in the conical shape given to the front part of the engine, same shape also to the rear end of the last car, spaces between the cars covered with canvas, with some other lesser changes from the common form), was placed upon the same rotating arm. The result showed, with the same power applied and same weight of cars and engine, a saving of twenty-five per cent in speed, which is, of course, equal to a gain of twenty-five per cent of running expense—certainly a most important item for railroad directors and railroad stockholders to inquire into. The same has also been tried by the same parties with hand cars, upon some of the roads in Massachusetts, with equally favorable results.

SQUARE SOAP BUBBLE.—Professor Rogers, President of the Institute of Technology, in experimenting upon the properties of the film formed by soap and water, found that various curious shapes were produced. He dipped a form of wire in shape of a hollow cube into soap and water, with a little glycerin added. On taking this out the shape of the film was that of two inverted pyramids, with the apex of each in the center; then blowing a small bubble, and placing it in the center, a beautiful square or cubical bubble appeared. Any one can easily try this with soap and water alone, but the film is stronger with a little glycerin added. Many other shapes of wire produce other beautiful forms at will. C. C.

Boston, June, 1866.

#### Abuse of the Franking Privilege.

MESSRS. EDITORS:—I would like to inquire under what law a Member of Congress is at liberty to frank the business circulars of any firm through the United States mails?

Every inventor in this country that receives a patent for an invention, also receives a circular from a certain patent-soliciting firm in Washington, mailed

free, under the frank of an M. C. printed on the envelope. And not only every inventor receives one circular, but if a man is unfortunate enough to receive more than one patent, he receives a circular for each patent, as I can testify, having received three within the last three weeks. Any person accustomed to looking over the weekly list of patents granted can judge how much matter is thus carried free in a year, and the above probably is not more than one-half of the number of those same circulars that are sent in that way.

It seems bad enough that a Member of Congress should have the right to lumber up the mails with a mass of political documents that very few care a fig for, but when it comes to taking contracts to send business circulars by the thousand, it seems to have a "bad look," to say the least. If it is all right, please inform your readers, as probably many have been struck by the same idea that has hit

AN INVENTOR.

Springfield, Mass., June 2, 1866.

[The abuse of the franking privilege, of which our correspondent complains, is carried on to a considerable extent. Some patent agents in Washington, we understand, are not unwilling to practice this system of cheating the postal revenue. It is all wrong, and no honorable firm will resort to it. During the months of April and May we purchased at the New York post office over \$600 worth of postage stamps. The frank of some accommodating M. C. would be a valuable saving in our office.—Eds.]

#### Hand Lathe Tools.

MESSRS. EDITORS:—In your admirable journal (to which I was introduced, to my infinite gratification, at Birmingham during the meeting there of the British Association) I see (Dec. 23d, page 402, Fig. 6) a handle to hold the various pieces for turning brass and iron in lathes.

I have a very small lathe, and turn only little trifles, and I am anxious to know whether these are made for such small amateur work. About twenty pieces, or tools, right and left, for common plain inside and outside work, would suffice, adapted to one handle.

If you could kindly, and without the slightest inconvenience, obtain for me the information as to such things being manufactured for small work, and what the cost of the handle with twenty pieces would be, I shall be extremely obliged. I do not require any extra finish, but the better the material the better they will answer my purpose. I can pay your agent here any expenses the inquiry may entail.

I trust we shall see at Paris many specimens of America's wondrous ingenuity. Your Patent Office must truly present a glorious spectacle to those who can appreciate such things.

THOMAS INGLE.

The Viletta, Hants, Emsworth, England, April 19, 1866.

[The tools alluded to by our correspondent can be purchased in Sheffield, Birmingham, Manchester, or, in fact, any town of note in England where mechanics' tools are sold.—Eds.]

#### Petroleum as a "Damaging" Lubricator.

MESSRS. EDITORS:—In your issue of the 9th inst. is copied an item, going the rounds, that petroleum stains on printers' cloths are ineradicable, and that 6,000 cases have been rejected from this cause. As an article like this in your paper causes injurious effects among persons not wholly conversant with the points at issue, please allow me to give a few facts relative to the subject.

Our manufacturers, employing fine machinery particularly, have found, by a thorough system of tests, that coal oils are superior to sperm oils in the ratio of 100 to 84, a discovery extremely satisfactory from the great difficulty heretofore of obtaining regularly a grade of sperm or whale oil of uniform density, free of gum and foreign mixture. I can safely assert that nearly every large mill in New England is now using coal oils as a lubricator, without having yet discovered that it produces a stain on the cloth, more difficult to eradicate than is made by any other oil.

It is due, therefore, to the community at large that such statements should not be permitted to circulate without prompt refutation. C. M. S.

New York, June 11, 1866.



## Measuring Logs.

MESSRS. EDITORS:—In your issue of May 12th is a communication from Mr. Heber Wells in regard to scaling logs to ascertain the number of feet in boards they contain. He gives his rule, which a moment's reflection will show to be incorrect, for a sixteen-foot log, twelve inches through, sawed into one square stick, would make only about 90 feet, which he makes 144. By his rule a twelve-foot log 24 inches in diameter will make but 216 feet, while all printed scales give 300, and it will always make that amount.

After near thirty years' experience in measuring logs and making and measuring lumber, I find no more perfect rule than the following: Multiply the length of the log in feet by half the number of inches in diameter, minus 4, and that product by the same number, divide that product by 4. Example—Log 12 feet by 24 inches—

$12 \times 10 = 120 \times 10 = 1200 \div 4 = 300$ , amount of lumber.

The above rule is correct for an average lot of logs. If the logs are all small, less than 4 inches should be taken for slab; if very large, more than 4 inches should be allowed. Can you or any of your readers give me the reason why that mode of reckoning will produce that result? I have never found any one that could give me the information. Some of the printed tables are reckoned by this rule.

P. RHOADES.

Hannibal, N. Y., June 10, 1866.

HEALING SOAP.—A. A. Constantine, No. 59 Liberty street, has prepared a very excellent soap which is highly spoken of as a successful remedy for diseases of the skin. The basis is tar, which possesses healing properties. We have tried the soap, and like it very much.

Mr. Constantine also manufactures a laundry soap, which is also a very fine article.

CARE OF HARNESS.—Many persons owning harness do not wash or oil them once a year; consequently the leather becomes hard, dry, and rotten. A harness for service needs about two applications of neat's foot oil a year, but it should be washed as often as once in three or four weeks in strong Castile soap-suds, and kept in a dry place away from the dust.

ROSES, as soon as the flowers have opened and bloomed one day, should have the decaying flower cut away; cutting back to a good strong bud, from which will come a new stem and flowers. Attention to this practice of cutting will keep plants blooming almost continuously.

AN alloy consisting of ten parts of cast iron, ten of copper, and eighty of zinc does not adhere to the mold in casting, and it is of a beautiful luster when filed and polished. The most fractious metals are melted first, and the zinc last, in making it.

The bill to pay Assistant Examiners, for services rendered by them as Principals, has passed Congress and now awaits the signature of the President. We are glad to chronicle this tardy act of justice.

## NEW INVENTIONS.

The following are some of the most prominent of the patents issued the present week, with the names of the patentees:—

GUN.—W. G. OLIVER, Buffalo, N. Y.—This invention has for its object the guarding against the accidental discharge of the gun when carried with the hammer down; and it consists in combining a self-acting spring guard with the hammer.

WEIGHING SCALES.—JESSE S. LAKE, Smith's Landing, N. J., and EZRA B. LAKE, Bridgeport, N. J.—The object of this device is to furnish a weighing scale which shall indicate both the weight of the article and its value. It consists in combining with the beam or lever of a weighing scale a calculated table so graduated and arranged as to show the value of the amount weighed at a given price per pound.

FLAX DRESSING MACHINE.—DAVID S. ABBOTT, Cuba, N. Y.—This is a machine for dressing flax and hemp, and it consists in several novel features, the principal one of which is the form of the blades of the breakers, such blades being made with curves near their ends so as to throw the flax toward the middle of the bench and prevent it from getting outside of the arms and winding up on the shafts.

IMPROVEMENTS IN FLUING MACHINES.—MRS. HENRIETTA H. COLE, New York City.—This invention relates to machines for making "fluting trimming," so-called, and it consists principally in so arranging one or two fluted rollers between which the material is passed, that the pressure of such roller thereon can be adjusted or released at pleasure, according as may be found necessary or desirable.

WATER METER.—ELI H. SPENCER and ERNEST L. MEYER, Elizabeth, N. J.—In this water meter two cylinders and sliding valves are employed, the valves working in a valve chamber common to both of them, and all being arranged together in a box in whose rear side is placed the water supply pipe.

LAMP CHIMNEY.—H. C. APPELBY, Conneaut, Ohio.—This invention consists in constructing a glass chimney for lamps with corrugations fluting or the like, running spirally around the chimney, whereby the chimney will have a better capacity for expansion, and therefore be less liable to break than ordinary glass chimneys.

VACCINATOR.—HENRY MINTON, M.D., Brooklyn, N. Y.—This device consists in the arrangement of a puncturing tube in a barrel which contains a spring, in combination with a plunger passing through the puncturing tube, and provided with a momentum spring, so that when the puncturing tube is filled with the vaccinating matter and drawn back in the barrel against the action of the spring contained therein, and then released, after the barrel has been placed on the spot where the vaccinating matter is to be introduced, the tube punctures the skin and the plunger flies out, overcoming the power of the momentum spring, and causes the matter contained in the puncturing tube to discharge into the wound opened by said tube.

BALANCED CUT-OFF VALVE.—B. T. MCKINLEY, Falmouth, Ky.—This invention relates to a rotary valve which revolves on a seat at the bottom of a cylindrical chamber, in combination with a cut-off valve fitted into the cylindrical chamber over the main valve, and provided with a balance piston in such a manner that by means of said piston both the cut-off and the main valve are relieved from the pressure of the steam, or balanced, and by turning the cut-off valve in the direction against that in which the main valve revolves, the steam can be cut off at any desired point of the stroke, or shut off entirely, without any effect on the exhaust, which goes on without interruption.

DEVICE FOR KEEPING MEATS, ETC., UNDER BRINE.—JOHN BURGMAN, Concord, N. H.—This invention relates to an apparatus for keeping pork, beef, and other salted or pickled meats as well as fish, under brine while in barrels, firkins or the like. The invention consists in providing a circular or any other proper-shaped platform with a series of dogs so arranged and operating that the platform may be thrust down so as to place the meat below the brine, and there held by the dogs catching against the side of the barrel—a proper means for liberating them being provided.

DEVICE FOR TRIMMING MITERS.—ALBERT JOHNSON, Putnam, Conn.—This invention relates to a device for trimming miters and planing them after being sawed, so as to render the surfaces smooth and true, and admit of a close joint being formed. It consists of a bed connected to a base by means of joints so arranged as to admit of the bed being adjusted in a more or less inclined position, according to the bevel required in one direction, this bed has an adjustable rest upon it to give a proper bevel to the work in another direction; also in a peculiar application of a plane to the device whereby it is retained in proper position so as to insure the work being done in a perfect manner.

PICTURE HOLDER.—WILLIAM WALKER, New Haven, Conn.—In this holder, frames of a uniform size and shape are provided for the several pictures, and are so arranged side by side in two series within a suitable box or casing, that by turning a pedestal or handle attached to the box, the several picture frames in regular order and succession will be made to pass from one row to another, bringing each in turn to the outside of each row or series, and in position for being viewed.

CORN SHELLERS.—WM. GILMAN, Ottawa Ill.—This invention relates to a corn sheller, patented by F. N. Smith, on June, 1843, whereby the efficiency of the sheller is greatly increased and many other important advantages secured.

TREATING WOOL.—P. S. HAINES, Newburgh, N. Y.—The object of this invention is to facilitate the picking and carding of wool, and also to facilitate its treatment or disintegration by any other machines as well as by means of pickers and carding machines.

CULTIVATION OF STRAWBERRIES.—B. FULLER, Norwich, Conn.—The object of this invention is to improve the cultivation and raising of strawberries, and other plants and vines, and it consists in the use of a peculiarly formed and constructed vase made of earthen or pottery ware, or other suitable material.

MEDICAL COMPOUND.—P. ROSENBLATT, Greenville, Tenn.—This invention relates to a medical compound especially intended for the cure of dyspepsia, lung and liver complaints, and other species of indigestion.

MACHINE FOR GUMMING AND PRINTING ENVELOPES, ETC.—THOMAS V. WAYMOTH, New York City.—This invention relates to a machine for gumming and printing the blanks for envelopes, wrappers and other similar articles.

SWAGING THE ENDS OF THE BLANKS OF SCREW AUGERS.—RUSSELL JENNING, Deep River, Conn.—This invention is designed to facilitate the manufacture of screw augers as patented by this inventor Jan. 30, 1855, and reissued Oct. 3, 1865. The object is to swage the ends of the blanks in such a form that the heads of the augers may be subsequently made without welding any portions thereto, the metal being so disposed or distributed by the swaging, as to admit the spur, lip, and cutting edges of the augers being all produced at one operation.

BUCKLE.—I. N. PLOTTS, New York City.—This invention consists in constructing the buckle frame of a continuous rod or strip of metal and in attaching to the said frame a transverse bar, which is fitted to slide to and fro on opposite side strips of the frame, whereby a very cheap and efficient buckle is produced.

CATTLE POWDER.—JOHN S. ANDERS, Northwater, Pa.—This invention relates to a mixture which is intended as an antidote against various diseases of horses and cattle in general, and which has proved to be a preventive against the cattle plague.

FASTENINGS FOR BOXES.—H. T. BARKER, Napa, Cal.—This improvement consists in the mode or device for fastening a box for the transportation of fruit and for other purposes, by means of a slot and catch on one side or end of the box, and an upright bolt and nut turned with a key, on the other side or end, to secure it.

FAST FASTENER.—J. W. ELLIOTT, Leicester, Mass.—This device is a combination of a spring bolt for sash fastenings which is operated by a hinged lever which acts as a cam, by which the face of the bolt is withdrawn from the jaw of the window frame.

MACHINE FOR SANDPAPERING WOOD WORK.—J. H. WONDERLY, Williamsport, Pa.—This is an adjustable table which supports the wood, above which is a revolving disk faced with sandpaper and supported by a bracket in such a manner that it may be brought over any portion of the wood to be operated upon. The disk is put in motion by means of belts and pulleys attached to the bracket. A chest surrounds the disk, and from said chest the air may be exhausted by means of a fan which is connected with the chest by means of a series of tubes passing along the brackets, and so jointed as to move with it. The dust is by this means drawn into the chest and carried away from the wood.

MEDICAL COMPOUND.—PETER EISENHUTH, Monroe, Mich.—This compound is a balsam which is an excellent remedy for colic, pains in the limbs, for all kinds of cold, coughs, fever, weak eyes, sea sickness, frost and fresh wounds; being applicable both externally and internally. It also cures the buzzing in the ears in a short time.



S. O., of Colorado.—Your suggestion to Aerostats to employ condensed gas is not new. This plan is well understood by all who are familiar with ballooning experiments.

F. W., of Wis.—If you have a taste and aptness for the business, become a mechanic. No profession is more honorable or useful.

W. P. B. C., of Wis., suggests that readers of the SCIENTIFIC AMERICAN keep a small book to note the pages containing useful recipes and other matters for reference. As he intimates, it would save them trouble and us the annoyance of repeated questions. The suggestion is a good one.

T. R., of Sing Sing, is informed we do not prepay postage on the paper. The rule to find the gears for screw cutting can be obtained from any manual on mechanics. We give a brief one. Divide the number of threads in the leading screw with that proposed to be cut. The quotient shows with the divisor the proportion between the gears. There is no perfect solvent for vulcanized rubber. The best is spirits of turpentine or petroleum naphtha.

R. C., of Conn.—Cimeg's process with Rochelle salt is commonly considered to be the best for silvering glass with pure silver. You may find this and all the other plans in the back volumes of this paper.

E. H., of Conn.—Micaceous ore is not used as a substitute for plumbago in making crucibles. It sometimes looks and feels like plumbago, but a crucible made of it with sand and clay would melt in a kitchen fire.

G. A. L., of N. Y.—Send your address and we will mail you a pamphlet which will inform you how to obtain a patent. The expense of engraving we cannot tell without seeing your model.

A. F., of Ohio.—We have found no difficulty in whitewashing over old paint. A pound of glue in about ten gallons of whitewash will aid in making it durable. One year ago we applied such a composition to an old house and it still looks and wears well.

G. B. C., of Ill.—We do not think *verbatim* reports of Prof. Doremus's lectures have ever been made. The most interesting and novel experiments were published in the SCIENTIFIC AMERICAN.

C. W., of Mass.—The ends of lead pipe are joined with plumbers' solder, which is made with two parts lead to one tin. The process is called "wiping a joint," and requires a certain degree of dexterity acquired by experience. The metal is used at a certain stage of temperature nearly approaching congelation, and is daubed and smeared over the surface much as wet clay would be.

Reader, of Mass.—The substance formed in your fusible plug is doubtless scale, which is deposited on brass as well as iron. The rough appearance on removal is doubtless owing to corrosion. Galvanic action would have a tendency to repel scale. We have seen shellac dissolved in ammonia. Booth to the contrary notwithstanding.

J. E. C., of Ohio.—An experiment tried by Mr. Charles Emery, of the U. S. Navy, showed that the injector was not economical as a means of supplying water.

S. M., of Ohio.—Vegetable parchment is made by immersing paper for a few seconds in a mixture of 2 parts sulphuric acid and one part water. The mixture is used at the temperature of 60°, and immediately on removal the parchment is thoroughly rinsed in clear cold water.

C. A. B., of Conn.—Clay is silicate of alumina. Add the clay to diluted sulphuric acid and boil; you thus produce sulphate of alumina. To this last add a solution of carbonate of potash and impure alumina is precipitated. Dissolve this alumina in hydrochloric acid and to the solution add ammonia; the precipitate which now appears is pure alumina. If your object is to procure only a small quantity of alumina, you will succeed easiest by extracting it from alum.

A. B., of Mass.—The Amlens about which you inquire is in France. A letter addressed to the society will reach its destination.

Inventors or manufacturers of first rate quartz crushers; also machines for raising gravel, etc., from river bottoms, are requested to communicate with Samuel M. Carter, Spring Place, Ga.

TRAPPER'S GUIDE.—S. N. Newhouse, Oneida, N. Y. Price 75 cents.

An interesting pamphlet of over 100 pages on the capture of fur-bearing animals, has just been published by the Oneida Community, Oneida, N. Y. The book contains illustrations of a great number of fur-bearing animals, with a description of their habits, where they may be found, how to catch the various species, and the best trap for the purpose.



**Improved Tubular Evaporator.**

This is an improvement designed to supersede the use of the steam evaporator and to simplify the reduction of saccharine juices to sirups. The inventor claims that it is equally adapted to the evaporation of cane juice, sorghum, and maple sap, and it appears as well applicable to beet juice. The manufacture of sugar is becoming more and more important every year. The desolation caused in our sugar-producing States, by the war, has left us too nearly dependent upon foreign production, and every means to utilize our own saccharine-producing plants, by cheapening the process of the manufacture of sugar, is worthy careful consideration. The demand for "sweetening," by sour humanity, in every period from infancy to old age, is additional reason for giving prominence to an improvement like that under consideration.

The outside of this evaporator is composed of wood, this being a non-conductor and economizing the fuel as well as retaining the heat. The first pan, or defecator, A, is capable of holding from fifteen to one hundred gallons, and is provided with nine copper flues, three in a series. The sap or juice is received into it in a continuous stream from the mill, through the pipe, B, and is brought to the boiling point at the end nearest the fire, thus carrying the scum back convenient for skimming. From the defecator it is brought into the front or main pan, C, by a gate, situated midway between the top and bottom of the defecator, to avoid the scum on the top and the sediment at the bottom. The sap is brought here in close contact with the copper fire box and made to boil more rapidly than in any other evaporator. When the sap has reached 25° Baume, it is passed by a similar gate to the finishing pan, E, parallel to the defecator. This pan is furnished with one series of flues, of wood, six in number, near the bottom. Here the product and process is entirely under the operator's control, by means of a damper under the fire box, which will shut off the hot air and admit a current of cold air at will, producing the same effect as removing the pan from the fire in other evaporators. The defecator is also furnished with a similar damper, handle shown at F, by which the heat in either of these receptacles is absolutely controlled.

After the sirup is finished it is passed into the cooler, G, by the gate, H. This extends under the defecator and finishing pan, and will hold and cool the sirup as fast as it is made. After becoming sufficiently cool, which process is facilitated by the longitudinal opening, I, which permits the steam and heat to escape, it is drawn off into barrels by the cock, J. The grate of the fire box (door shown at K), is hung on hinges so that its contents can be instantly dumped into the ash box, if the evaporator is used as a stationary, or on the ground, if portable. The smoke arch, L, collects the smoke after passing through the flues and discharges it through the stack, M.

It is claimed that this evaporator has every advantage possessed by the steam evaporator, and yet can be furnished at one-eighth or one-tenth the cost. It is portable and can easily be moved from place to place by a boy. The heating surface to which the sap is exposed is four or five times greater than in other evaporators, and it requires only one-half the fuel used in others to accomplish the same amount of work. It requires no masonry, and is complete in itself.

Patented May 1, 1866, by B. R. Hawley. Application pending through the Scientific American Patent Agency on other improvements. For further information

address Marvin, Washburn & Co., assignees and manufacturers, Alton, Ill.

**MERSHON'S WATCH KEY.**

Some persons take about as much care of a watch as they would of a cast-iron grindstone. Half the injuries to this delicate machine, requiring the repairer's skill, are the result of carelessness. But the most careful will, at times, make a mistake, and

simple than some other ratchet keys, and is not liable to get out of order; the hand does not require to be removed from the key at each turn, which frequently injures the watch by "canting" the pipe. Only two teeth are made on the ratchet, as in winding a watch it is done by half revolutions.

This invention was patented Nov. 24, 1863, by R. S. Mershon, assignor to himself and John M. Harper, 308 Chestnut street, Philadelphia, to whom all communications should be addressed.

**WORKINGMEN'S ASSOCIATIONS.**

Among our workingmen are temporary combinations and more pretentious organizations for raising the price of work and shortening the hours of labor; and we have, also, trades' unions, designed for mutual protection against the aggressions of capital and the interference of outside pretenders. These combinations may be useful in their way. They may, if they do nothing more, bring the employer and employed in close contact, enable them to understand each other better, and throw new light upon their new relations. We cannot believe that there is, necessarily, any antagonism between capital and labor, but that what is for the best interests of the one is also for the best interests of the other, however much appearances or present circumstances may seem opposed to such an idea.

But what is more needed are associations among men of the same branch of business, including in their membership both workmen and employers, and having for their main object a comparison of experiences and discoveries. Hardly a single member of such an association would be found who could not, in some particular, add to the general fund of information. Unworthy jealousy and competitive prejudice should not be allowed to interfere with the free interchange of opinions and information. There are associations for this object located in our principal cities which are of great advantage to those who avail themselves of their investigations; but there is no reason why similar associations on a smaller scale, perhaps, should not exist in every small town or village. The comparison of results at mechanics' fairs is productive of great benefit, and we cannot see why a more frequent comparison of the processes by which these results are attained should not be equally beneficial. This is a matter entirely within the control of our mechanics, and we hope the suggestion will be considered.

**NOVEL MODE OF TREATING COFFEE.**

Under the above caption we published, on page 359, a brief review of a reported trial upon a suit brought by Wm. Newell against Ezra Wheeler & Co., of this city, to enforce a contract based upon a patent granted to Mr. Newell in Nov., 1857, for an apparatus for polishing and cleaning coffee. Our article stated that one of the features of the process consisted in running the coffee through black lead, which gave to it a shiny metallic appearance.

The report published in the SCIENTIFIC AMERICAN was condensed from a more lengthy one that appeared in the *Herald* of May 15th.

Upon examination of Mr. Newell's patent, above referred to, we find that it was an error to state that the process consisted in part of running the coffee through black lead. Mr. Newell's invention consists in polishing coffee by subjecting it to the combined action of heat and friction, no mention being made in the patent of the use of black lead. We consider it due to Mr. Newell that the erroneous impression should be removed, and we take pleasure in making the correction.

**HAWLEY'S TUBULAR EVAPORATOR.**

none is more common than that of attempting to wind the wrong way. This invention is designed to obviate these mistakes by rendering them impossible, and at the same time to furnish a more convenient key than those in common use. The construction and operation of this key can be seen by the accompanying illustrations.

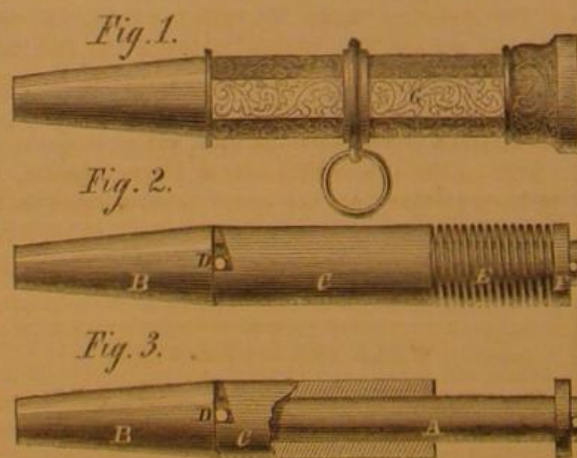


Fig. 1 represents the key perfect. In Fig. 3 will be seen a central shaft, A, attached to a pipe, B, and having a sleeve or tube, C, upon it. The lower portion of the sleeve forms a ratchet of two teeth, which catch upon the pin, D. By turning this sleeve to the right, the pipe is made to revolve by means of the ratchet and pins, while, by a reverse motion, the incline of the ratchet slides over the pin, and the sleeve only is turned. The spring, E, Fig. 2, holds the sleeve to the pins, but allows a lateral motion on reversing the revolution. The spring is held in place by the collet, F, and the whole is inclosed by the ornamental case, G.

The advantages of this key are obvious. It is more



# THE Scientific American.

MUNN &amp; COMPANY, Editors &amp; Proprietors.

PUBLISHED WEEKLY AT  
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

Messrs. Sampson Low, Son &amp; Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions for advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

Messrs. "The American News Company," Agents, 121 Nassau street, New York.

Messrs. American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

Messrs. Trubner &amp; Co., 60 Paternoster Row, London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XIV., No. 26. [NEW SERIES.] Twenty-first Year.

NEW YORK, SATURDAY, JUNE 23, 1866.

## Contents:

(Illustrations are indicated by an asterisk.)

*Sweet's Bolt Cutter.....	423	Atmospheric Resistance to	423
Wood Turning at High Speed.....	423	Railroad Trains.....	423
A Powerful Source of Artificial Light.....	424	Abuse of the Franchising Privilege.....	428
Smelting Iron.....	424	Hand Lathe Tools.....	428
Preparation of Chrome Yellow.....	424	Petroleum as a "Damaging" Lubricator.....	428
Cork Springs for Cars.....	424	Measuring Logs.....	429
Difference in the Operation of Locomotives.....	424	New Inventions.....	429
Artificial Production of Glycerine Acid.....	425	Notes and Queries.....	429
The Manufacture of Beet Sugar.....	425	*Hawley's Tubular Evaporator.....	430
Miscellaneous Summary.....	425	*Merrison's Watch Key.....	430
Should there be a Patent Law?.....	425	Working Men's Associations.....	430
Manufacture of Gold and Silver.....	425	Novel Mode of Treating Coffee.....	430
*Storer's Open-top Suet Lubricator.....	426	The Scientific American—A New Volume.....	431
Manufacture of Crucibles.....	426	The Non-recoil Gun—A New Principle in Explosives.....	431
The Way Felt Hats are Made.....	427	What the South Needs.....	431
Coffee Still Nearer Perfection.....	427	Patent Claims, 432, 433, 434.....	431
Is the World Growing Larger?.....	427	Advertisements.....	436, 437, 438
Bill to Tax Inventors.....	428	Index.....	438, 439, 440, 441, 442

## THE SCIENTIFIC AMERICAN—A NEW VOLUME.

The present number closes Vol. XIV. of the new series. The next number will appear in a new dress of type, and be greatly improved in clearness and beauty of mechanical execution.

The SCIENTIFIC AMERICAN has become an authority in the specialties of science and mechanics, and we shall endeavor to maintain that character for it and add to its influence. Its editors are selected for their practical knowledge of the subjects comprised in their respective departments, as well as for their ability to present those subjects in a clear and comprehensive light. A practical, analytical chemist devotes his time to the chemical and mineralogical department; the scientific department is in charge of a thorough and competent scientist, and the mechanical is managed by a gentleman whose long practice and experience makes his opinions valuable.

Apart from the editorial labor, we believe that the valuable suggestions and practical information frequently embodied in the contributions of correspondents, add immensely to the advantages of the paper to all classes of our producing and investigating readers. Our recipes are intended to be reliable, and in reply to inquiries for information we endeavor to present the facts, or, where discovery has not demonstrated them, to suggest a course which may lead to their elucidation. In short, we intend to make this journal a *valde mecum* to the mechanic, the scientific investigator, and the worker in all branches of productive industry.

With this number, as with many previous numbers, we send out a supplement. We find it necessary, often, to give our readers more than we promise in order to enable them to keep pace with the march of improvement. The supplement will be found to be not the least valuable portion of our paper, particularly to those who preserve the numbers for reference.

## THE NON-RECOIL GUN—A NEW PRINCIPLE IN EXPLOSIVES.

Experiments have been made in England with tubes open at each end, used as a means of propelling a ball, or bolt, by the explosion of gunpowder, or gun-cotton, which seem to involve a principle in the resistance of gases not hitherto investigated.

We do not propose to assume the task of explanation, at least just now, but to state the facts, with our own suggestions, and leave our correspondents

at liberty to give their theories, or the results of their experiments. It would seem that if the experiments in England have been fairly conducted (as we have no reason to doubt) the discovery may be made one of great value, especially in naval guns.

A Mr. Harding has been experimenting with open steel tubes, in which he inserts a charge of gunpowder backed by a felt wad, and, at a short distance in the rear, another felt wad, leaving an air space between. On the top of the charge of powder or cotton is a ball, in immediate contact with the charge. The charge is ignited in the usual manner, at the rear end, and the effect on the ball seems to be equal to that of a gun with a breech, while the wads are thrown out at the rear end of the tube, torn into lint, and the tube has no recoil.

These are, in brief, the facts in relation to this experiment, and it now remains to ascertain upon what principle the action of the explosive gases is expended mainly on the projectile and not on the breech wads. Between the charge and the ball there is no inclosed air space, but between the charge and the end wad there is. The resistance of the end wad must be equal, or nearly so, to the force exerted upon the projectile, yet one presents but a slight mechanical obstruction, while the other has the resistance of gravity and the column of air between it and the muzzle of the gun.

In commenting upon this experiment the law relating to the transmission of sound in waves forces itself upon our attention, but does not seem to explain satisfactorily the facts involved in these trials. The only solution which seems at all promising is that of the wedging or transverse jamming of the particles of compressed air between the two wads. It is known that a gun barrel can be burst by a slight obstruction placed in the muzzle, confining the air above the projectile and charge. But in this case the fracture is not always toward the muzzle, where the greatest compression would be likely to occur, but at the breech, the strongest part. We can account for this only on the supposition that the temporary obstruction at the muzzle compels the particles of the explosive gas to force themselves upon those immediately in front, thus producing a strain upon the walls of the tube.

In the case of an open breech, temporarily closed by wads inclosing an air space, the air thus confined is compressed, and finding no immediate exit or release, we may consider the globular particles of the air to be forced into wedge-shaped or cone-like forms, thus pressing laterally against the sides of the tube and forming, for an instant, a diaphragm of resistance as a substitute for the solid breech. It is well known that waves of sound can be propelled only at the rate of 1,100 feet per second, while the velocity of a ball propelled from a gun by an explosive is about 1,600 feet per second. There is therefore a loss of time between the movement of the ball and that of the resisting wads. In other words, the compressed atmosphere confined between the two wads behind the charge, does not have time to resist or recover from the sudden compression until the projectile is driven from the gun.

This matter is a fruitful source of speculation, but we have neither time nor space to investigate it further at present. It is worthy attention, as on it may depend valuable improvements in gunnery and new discoveries in science.

## WHAT THE SOUTH NEEDS.

The Macon (Ga.) *Citizen*, in a recent article, urges the necessity of capital and labor to rebuild the waste places of the South, and while it strongly advises the young men of the country to turn their attention toward developing the natural resources of that section, favors the invitation of capital and intelligent labor from Europe and the North. It, however, unnecessarily, we think, while stating that "we want the ingenuity and practical science of the Northern mechanic and artisan, and their indomitable industry and perseverance," exhorts them to "lay aside their intense radicalism and come down to this land of flowers and beauty," etc.

The *Citizen* is in error in supposing that the "Northern mechanic and artisan" are intense radicals. The radicalism that has cursed both sections of the country, North and South, and hindered the development of our natural resources and the pro-

gress of internal improvements, does not belong to the really producing and improving classes in either section. Fanaticism and its twin brother, intolerant bigotry, are to be found rather among political demagogues and not among the brain, brawn, intellect, and muscle-users of the country. Their mission and object is a nobler one than that of exciting or prolonging the influence of sectional and unworthy prejudices. The country is more dependent to-day upon the peaceful and beneficent influences of the mechanic and the capitalist, for future prosperity and future harmonious development, than upon President or Congress. It is gratifying to see that journals published in the South are willing to aid in the consummation of a union such as a community of interests and a harmony of objects will secure.

The South needs "reconstruction." Not so much a reconstruction of her political fabrics, but a material reconstruction. There are churches, dwellings, stores, shops, and bridges to be rebuilt; machinery to be introduced, cotton, wool, iron, and wood to be manufactured; mines to be delved, roads to be built, rails to be laid, ships to be constructed, and farms to be worked. Millions of wealth, now latent and unemployed, await only the magic hand of labor, guided by intelligence, to bless the people of the South, the country, and the world. The *Mobile Times* says:—"The South wants population—industrious population—working population. Where is this population to come from?" We answer, from the North and West. Will they be welcome? We answer, yes. It is only those interested to keep up a show of power who deny it. Northern and Western men, with good habits, with industry, with capital, are wanted. We have to fill up the room of one million blacks and one million whites slaughtered during the war. They were producers, and must be replaced.

"The Northern and Western man who comes among us as an equal, is not only welcome, but he is desired. He will populate our cities, he will cultivate our fields, he will develop our mineral resources. If he is a capitalist, he will build up our trade."

We believe it is the interest as well as the duty of our mechanics and capitalists to aid the South, by contributing of their wealth, their energy, enterprise, labor, and perseverance, to develop its natural and artificial advantages. Every useful immigrant from the North and the West will, we doubt not, be welcomed and find remunerative employment and investment, as well as a pleasant home. No work could be more patriotic, while none would be more profitable. The great need of the country now is a permanent settlement of the difficulties which engendered the bitter feelings that led to the war, and the removal of the jealousies, animosities, and prejudices which have grown out of the war. No agency could be more powerful to this end than the penetrating and peaceful influences of the constructive arts. By a union of means and of labor, and a common purpose of material improvement and internal development, the people of the two sections would become thoroughly acquainted and mutually attached.

After all, the mechanic and workingman are the true civilizers of the world. Their influence, although not so demonstrative and pretentious as that of government officials, is much more permanent and far-reaching. With an immigration of our intelligent mechanics into the South we expect to see the problem of "reconstruction" solved without the aid of politicians.

MINING BUREAU.—We have received the prospectus of the "Mining Bureau of Montana," an association of gentlemen organized at Virginia City for the purpose of giving information concerning the mining resources of that territory. It appears to be based upon the right principles, and if managed according to the plans laid down, it will be a valuable agency to those who may wish to invest in mining operations.

OBLIQUE BELTS.—It sometimes happens that it is necessary to lead a belt obliquely from a pulley or flywheel, and in such cases much trouble is frequently caused by the strap slipping off. This can, in very many instances, be prevented by fastening a strap of thick leather, of a less width than the belt, around the center of the rim of the flywheel or pulley. The leather strip may be secured by counter-sunk copper screws passing through it, and tapped into the rim of the wheel.—*Engineering*.





ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JUNE 12, 1866.

Reported Officially for the Scientific American.

**Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

#### 55,446.—FLAX-DRESSING MACHINE.—David S. Abbott, Ischua, N. Y.:

I claim, 1st, Making the blades of the beaters of flax-dressing machines with a curve that rises towards their ends, substantially as described.  
I also claim making one of the boxes for the journals of the apron-roller, S, movable, so that that roller can be taken out and cleaned at pleasure, substantially as described.  
I also claim the clamp, H, constructed substantially as described, applied to the feed-table of a flax-dressing machine.

#### 55,447.—PORTABLE GAS-STAND.—Boyd Allen and John Riddell, Boston, Mass.:

We claim, 1st, The sliding portable gas stand, constructed and operating substantially as described.  
We also claim the combination of the stuffing-box with the inner end of the sliding-tube, as and for the purpose specified.

#### 55,448.—SEAT AND COUCH FOR RAILROAD CARS.—Horatio Allen, New York City:

I claim, 1st, The combination with the floor and sides of a railroad passenger car of couches of a rhomboid form, placed diagonally to the length of the car, as herein described, and constructed of two seat-pieces, A, A', two corner-pieces, E, E', and two central pieces, F, F', and supported by frames and legs, said couches being convertible into a pair of seats, by putting out of the way the two corner-pieces, E, E', and securing in a vertical position the two center-pieces, F, F', by the cap piece, G, said pair of seats having a relative position diagonal to the length of the car, all substantially in the manner and for the purpose herein described.  
2d, The combination with the seats, herein described, and sides of a railroad passenger car, of upper couches of rhomboid form placed diagonally to the length of the car, as herein described, and constructed of a frame supported as herein described, all substantially in the manner and for the purpose herein described.

#### 55,449.—MEDICINE.—John S. Anders, North Wales, Pa.:

I claim a cattle powder made of the ingredients herein specified, and mixed substantially as set forth.

#### 55,450.—LAMP CHIMNEY.—H. C. Appleby, Conneaut, Ohio:

I claim a spirally corrugated or fluted glass lamp chimney, constructed substantially as shown and described.

#### 55,451.—PAPER BOSOM AND COLLAR.—James C. Ames, Northampton, Mass.:

I claim a new article of manufacture, consisting of a paper bosom and collar combined, when constructed as herein shown and described.

#### 55,452.—COMPOSITION OF IRON AND OTHER METALS.—Wm. M. Arnold, New York City:

I claim the composition produced by the mixture of the ingredients above described, when made substantially of the proportion and in the manner herein contemplated and set forth.  
I also claim the preparation of an alloy adapted and intended for use in the manufacture of my final composition, and which alloy is composed of copper, tin, zinc, and antimony, in the proportions above contemplated and set forth.

#### 55,453.—BOLSTER FOR WAGONS.—D. L. Babcock, St. Charles, Minn.:

I claim the metal cap, B, constructed substantially as shown, and applied to the bolster of ordinary wagons and similar vehicles, as and for the purpose set forth.

#### 55,454.—CURTAIN FIXTURE.—Jacob B. Bailey, New York City:

I claim, 1st, The cord-ring, e, formed with a groove around its periphery for an endless cord, an opening through it for the curtain roller to pass entirely through to its bearing and with teeth to penetrate said roller, as and for the purposes set forth.  
2d, The combination of the semi-circular shoe or bracket, h, with the cord ring, E, and roller, b, for the purposes set forth.  
3d, The friction spring for the curtain-roller formed by slitting the end of the said roller and introducing it within a ring or bracket, as set forth.

#### 55,455.—FASTENING FOR FRUIT-BOXES.—Henry T. Barker, Napa, Cal.:

I claim the arrangement shown and described, consisting of the headed catch at the slotted end of the lid and the threaded bolt at the other end upon which the lid is screwed by the nut.

#### 55,456.—RAILROAD SWITCH.—Joseph Bradt, Avon, N. Y., and James Hayes, Rochester, N. Y. Ante-dated March 6, 1866:

We claim the combination of the lifting tread-lever, I, with the ribbed chair or chairs, H, having seats, d, d', which correspond in number and position with the several diverging rails, E, C, D, when arranged in connection with the ordinary switch-lever, E, and connecting-rod, G, substantially as and for the purpose herein specified.

#### 55,457.—MODE OF SUSPENDING CARS ON SPRINGS.—Alfred Bridges, Newton, Mass.:

I claim, 1st, The guide-pieces, e, e, combined and arranged relatively to the supporting-bar, E, box, C, axle, b, springs, D1, D2, and suspension-rods, G1, G2, or their respective equivalents, substantially as and for the purpose herein set forth.  
2d, The jaw or frame, I, bar, H, suspension-rods, G1, G2, supporting-bar, E, springs, D1, D2, and axle-box, C, or their respective equivalents, combined substantially in the manner and for the purposes herein set forth.  
3d, The method of locking the jaw or frame, I, upon the removable bar, H, by flanges, h', or their equivalents, so as to resist horizontal strains without throwing such strains on the bolts, J, J', or their equivalents, substantially as and for the purposes herein set forth.  
4th, The arrangement of the shelves, C1, C2, which support the springs, D1, D2, so as to swing near, but not in contact with, the upright inner faces, h, of the inclosing frame, substantially as and for the purpose herein set forth.

#### 55,458.—DUST RANGE OR RECEPTACLE.—Alden Brigham, Coldbrook, Mass.:

I claim a dust range and receptacle as a new article of manufacture, the same consisting of a box with top flanges whereby it is held in the floor and sliding-bottom and register-cover, all the parts being constructed and arranged for use as set forth.

#### 55,459.—ARTIFICIAL LEG.—Jesse Bringham, Philadelphia, Pa. Ante-dated June 1, 1866:

I claim, 1st, The bolts, C, as described and for the purpose set forth.  
2d, The swivel-box, E, in combination with the bolt, C, and rubber packing, H, as specified and for the purpose set forth.

#### 55,460.—LOCK.—B. V. M. Breuse, Kokomo, Ind.:

I claim, 1st, The combination of the pointed key, K, and the spring obstacle plate, N, substantially as described.  
2d, The combination of the toothed key, K, with the spring tumblers, H, H', spring bolt, C, with notches, I, I', arranged and operated substantially as described and represented.  
3d, The combination of the notched spring-bolt, C, with notch, d, and the spring tumbler, F, arranged and operating substantially as described and represented.

#### 55,461.—CENTRIFUGAL MACHINE.—John D. Browne, Cincinnati, Ohio:

What I claim in the construction of a centrifugal sugar separating machine is the separate or variable motion of the screen and distributor, as herein substantially described.  
I also claim the oblique or spiral deflector as herein described and for the purpose set forth.

#### 55,462.—BED-BOTTOM.—Daniel W. Burbank, New York City:

I claim, 1st, The combination of a double helical spring, C, C, with the double-headed mandrel, O, O, and the arm, E, E, when the coils of the spring are wound apart so that no part touches another part, substantially as specified.  
2d, The enlarged loop, D, in combination with the slat, B, and mandrel, O, as specified.  
3d, The double hook, N, N, in combination with the spring and rail, as specified.  
4th, The corner lock, L, L, K, in combination with the frame slats and springs, substantially as set forth.

#### 55,463.—DEVICE FOR KEEPING MEAT UNDER BRINE.—John Burgum, Concord, N. H.:

I claim, 1st, The platform or disk, A, provided with dogs, B, or their equivalent, constructed and arranged so as to operate substantially in the manner specified.  
2d, The combination of the dogs, B, platform, A, collar, C, and connecting link, b and b', or their equivalent, substantially as herein specified.

#### 55,464.—MODE OF STARTING CARS.—W. H. Butler and R. G. Hatfield, New York City:

We claim, 1st, The combination and arrangement of the body of a vehicle, loose and portable upon the truck which supports said body, and movable thereupon by means of rollers, roller-sheaves, wheels, pulleys, or their equivalents, substantially as and for the purpose herein described.  
2d, The combination of the frame, A, with the guide, D, springs, F, flanges, E, small wheels, C, and body, B, substantially as described and for the purpose set forth.

#### 55,465.—DENTAL IMPRESSION CUP.—O. B. Buttles, Milwaukee, Wis.:

I claim combining with a dental impression cup an inner rim or flange, a, for preventing the wax or other impressed material from moving or slipping in the cup, as the latter is being removed from the mouth, substantially as described.

#### 55,466.—COOKING STOVE.—Gardner Chilson, Boston, Mass.:

I claim the arrangement of the separate heat-saving plate within each of the oven-flues and case of the stove, so as not only to perform its function of saving heat, as described, but to gradually diminish the smoke-passage through the flue, in manner as specified.  
I also claim the combination and arrangement of the arched chamber, G, with the oven, the vertical flues at the back of the oven, and with the three flues arranged beneath and against the oven, in manner as explained.  
I also claim the combination and arrangement of the bay, A, and its side opening and its closing slide with the stove-body and with the grate-journal, as described.

#### 55,467.—REAPING AND MOWING MACHINE.—Morell Clark, Castalia, Iowa:

I claim the arrangement of forked bar, C, bar, D, forked finger-bar, E, and journals, c, c, in combination with the axle, A, bevel-wheels, F, G, shaft, H, wheels, I, J, shaft, K, crank-pulley, L, pitman, M, and sickle, N, constructed and operating in the manner and for the purpose herein specified.

#### 55,468.—MACHINE FOR CURVING THE BACKS OF BOOKS.—John E. Coffin, Portland, Maine:

I claim, 1st, The combination and arrangement of the cams, F, G, H, I, J, and K, in the main shaft, C, in the manner and for the purposes before described.  
2d, The combination of the shaft, M, the truck, o, the cog-wheels, v and x, the screws, Z, the sliding boxes, y, the posts, L, the segment-levers, k, and the adjustable pressure-bar, O, as and for the purpose described.  
3d, The combination of the cam, F, lever, N, link, Q, lever, R, regulator, M, h, and sliding mold, f, as and for the purposes described.  
4th, The combination of the cam, G, lever, g, shaft, P, levers, I, links, J, segment-levers, I, and segment-levers, K, and the pressure-bar, O, as and for the purpose described.  
5th, The combination of the cam, I, lever, r, frame, p, p, supports, c, c, and sliding frame, s, s, for the purpose of raising the jaws under the pressure-bar and pushing the book through the jaws so it can be easily removed.  
6th, The combination of the cam, J, shaft, S, levers, t, t, links, u, u, toggles, Z', Z', links, e', e', posts, L, L, as and for the purpose described.  
7th, The combination of the cam, K, lever, o', shaft, T, lever, p', link, e, frame, p, p, sliding frame, S, S, screws, b, b, and bar, m', for the purpose of adjusting the position of the book and presenting it to the operations of the pressure-bar.  
8th, The combined use and arrangement of a solid adjustable pressure-bar, O, with the jaws which rise under the bar when the bar is in operation.  
9th, The use of the clasp-holder, d, the screws, e', e', and the hinges or joints, r', r', as and for the purpose specified.

#### 55,469.—FLUTING MACHINE.—Henrietta H. Cole, New York City:

I claim the upper roller of a fluting machine in boxes or bearings, resting upon spiral or other suitable springs, and moving upon guides, in combination with adjustable weighted levers for holding such boxes or bearings down, when arranged together and so as to operate substantially in the manner described and for the purpose specified.

#### 55,470.—SEEDING MACHINE.—Byron D. Cook, Clarendon, Mich.:

I claim, 1st, The arrangement of the converging wings, w, upon the shafts, S1, S2, in such manner as to scrape seed or fertilizing material from each side and towards the center of their respective discharge apertures, O1, O2, substantially as herein set forth.  
2d, The employment of the converging wings, w, in combination with the revolving agitator, E, the vibrating clearing fingers, f, and the distributor, D, arranged and operated relatively with each other and with the rest of the machine, substantially in the manner and for the purposes herein described.

#### 55,471.—WASHING-MACHINE.—Elisha H. Cook, Clarendon, Mich.:

I claim, 1st, The employment of the suspended beaters, B, constructed with boxes, V, to contain weights, in combination with the perforated partition-board, P, substantially as and for the purposes herein described.

2d, The mode of actuating the suspended beaters aforesaid, by means of the crank-shaft, S, and cam, C, in combination with an adjustable roller, D, the same being operated in connection with the hangers and standards herein described, substantially as and for the uses specified.

#### 55,472.—PLOW-COLTER.—Jacob Custer and Charles Rowland, Clinton, Ill.:

We claim the construction of a self-supporting colter in the form of an arch resting on its abutments, the share and post, and which, from its peculiar construction and application, is reversible and equivalent to two single colters, which form one arch, or are of a circle.

We also claim the construction of the rod in combination with the colter, which rod passes to the beam and descends to and down at each side of the colter in the form of a fork, substantially as shown and described.

#### 55,473.—MOSQUITO-NET.—J. G. De Coursey, Philadelphia, Pa.:

I claim, 1st, A net, A, in combination with elastic cords or bands, one of which is applied to each edge of the net, as and for the purpose described.

2d, In combination with the above, I claim the perforated corner strips or plates, B, of metal or other equivalent material, for the purpose specified.

#### 55,474.—MEDICAL COMPOUND.—Peter Eisenhut, Monroe, Mich.:

I claim a medical compound made of the ingredients herein specified, and mixed together substantially as and for the purposes set forth.

#### 55,475.—SASH-FASTENER.—J. W. Elliot, Leicester, Mass.:

I claim, 1st, The combination of the bolt, A, plate, C, spring, F, and lever, H, the whole being constructed and arranged to operate as herein described, so as to constitute a sash-lock and sustainer.

2d, The combination with the bolt, C, and lever, H, of the fulcrum, h, and lever, c, permitting the ready attachment and detachment of the lever, as and for the objects specified.

#### 55,476.—FARM GATE.—William Elliott, Stockport, N. Y.:

I claim, 1st, Employing the inclined railway, D, in combination with the cords, pulleys, and posts, arranged substantially as and for the purpose herein described.

2d, The combination of the knee-levers, d, d', with the drop-catch, h, arranged substantially in the manner and for the purpose set forth.

3d, The combination and arrangement of posts, pulleys, and cords, as or substantially as herein described, when employed for opening and closing gates of any other construction.

#### 55,477.—PORTABLE DOOR FASTENING.—Levi S. Enos, Almond, N. Y.:

I claim the portable door fastening, constructed as herein described, as a new article of manufacture.

#### 55,478.—ANIMAL TRAP.—Josiah B. Fairchild, Covington, Ky.:

I claim the folding-doors, a, armed with prongs, d, the springs, c, and trip-floor, f, in combination with the body, A, of the trap, all constructed and operating as above described and for the purpose set forth.

#### 55,479.—DRAUGHT-PIPE FOR LOCOMOTIVES.—James M. Foss, Concord, N. H.:

I claim the draught pipe as made with two or any other suitable number of holes, b, b, arranged in its rear, and having a visor, c, to each, and with the front of the pipe closed and its lower end open, substantially as described.

#### 55,480.—DEVICE FOR EXPELLING WATER FROM THE HOLDS OF VESSELS.—Thomas W. Fox, New London, Conn.:

I claim the combination of the semi-cylindrical vacuum producer, Fig. 4, with the tube, A, when they are constructed, fitted together, attached to the vessel and used substantially as herein described and set forth.

#### 55,481.—GATE.—Patrick Freeman, Benton county, Iowa:

I claim the reel or revolving part of the gate upon the shaft, A, together with the locking bolts, r and p, substantially as and for the purpose herein specified.

#### 55,482.—VASE FOR CULTIVATING STRAWBERRIES.—Reuben B. Fuller, Norwich, Conn.:

I claim, 1st, The vase, A, made substantially as herein described, and for the purposes specified.  
2d, In combination with the above, I claim the use of the vessel or pot, E, or its equivalent, as and for the purpose described.

#### 55,483.—PRUNING-HOOK.—Michael Gates, Paw Paw, Mich.:

I claim communicating a "drawing cut" movement to the chisel, C, by bending its bar as at a, and operating it between guides, in connection with the hook, A, and its attached stock, substantially in the manner and for the purpose herein described and set forth.

#### 55,484.—CHURN-DASHER.—A. J. Gibson, Cincinnati, Ohio:

I claim, 1st, The churn-dasher, A, constructed with two truncated cones, placed base to base (one or more of which may be united, forming a more extended dash as shown in the drawings), as above described and set forth.  
2d, The churn-dasher, A, in combination with the churn-handle, B, for the purpose above specified.

#### 55,485.—CORN-SHELLER.—William Gilman, Ottawa, Ill.:

I claim, 1st, The rail, O, placed just in front of the open end of the cylinder concave, I, for throwing or deflecting the corn escaping from the said concave to the screen or riddle, J, arranged substantially as described.

2d, The front rail, D, in combination with the rail, O, substantially as and for the purpose specified.

3d, The combination of the deflector rail, O, screen, J, and fan or other suitable blower, when arranged together and so as to operate substantially as described, and for the purpose set forth.

#### 55,486.—CLOTHES-WRINGER.—R. Gipson, Shelby, Ohio:

I claim the arrangement of the shaft, D, sleeve, a, rugs, C and C', in combination with the bridge-tree, B, gearing, D', D' and H, H', operating as and for the purpose set forth.

#### 55,487.—HARVESTER RAKE.—William F. Goodwin, Washington, D. C.:

I claim, 1st, The standards, G1 and G2, and cap, G, arranged for the purpose and to operate in the manner substantially as described.

2d, The cam, M, flange, q, yoke, Y, bar, I, guide-box, D, link, L, crank, S3, journals, S1 and S2, rod, S, bar, F, with its projection, F, and stud, E, arranged to operate in the manner and for the purpose substantially as described.

3d, The pulleys, P and P', chain, N, shaft, C, and crank, C', arranged to operate in the manner and for the purpose substantially as described.

4th, The bars, B1, B2, B3, B4, B5, and B6, constructed and arranged to form the jointed arm, B, to operate in the manner and for the purpose substantially as described.

#### 55,488.—ROCK DRILL.—John Greives, Brooklyn, N. Y.:

I claim the drill constructed of a central polygonal rod with cutting point and angular sectional cutters bolted to the sides of said rod, substantially as herein specified.



# 55,489.—WOODEN MAT FOR CARS.—Warner Groat, Green Island, N. Y.:

I claim a wooden mat for railroad cars and for other similar or suitable purposes, composed of wooden slats, A, spaced or retained at a proper distance apart by washers, B, and bolts, C, substantially as herein shown and described.

# 55,490.—APPARATUS FOR TREATING WOOL FOR PICKING, CARDING, ETC.—P. S. Haines, Newburg, N. Y.:

I claim the perforated steam-pipe, F, constructed and located as described, and continued beyond the line of its perforations and connected to a water-pipe to run off the water of condensation continuously, substantially as set forth.

# 55,491.—CHURN.—Alexander W. Hall, New York City:

I claim providing for the operation of the swinging dasher, G, by means of a pendulum weight applied outside of the churn and in connection with the said dasher, substantially as herein set forth.

# 55,492.—REVOLVING DESK.—Charles Hope, Springfield, Mass.:

I claim the revolving desk herein described, constructed with the standard, B, supporting and forming a pivot for the part, A, and having these and the other parts arranged substantially as shown and described.

# 55,493.—CONSTRUCTION OF SCREW-TAPS.—Bennet Hotchkiss, New Haven, Conn.:

I claim forming reamers, taps, and dies, substantially in the manner and for the purpose herein set forth.

# 55,494.—TRANSFER SWITCH.—Horatio Willard, Plainfield, Ind., assignor to himself and George F. Adams, Indianapolis, Ind.:

I claim pivoting the movable or transfer section of track at one end and attaching the other end to a segmental tie or bar, formed as shown and resting on friction rollers so arranged as to raise the suction from its bed, for the purpose substantially as set forth.

# 55,495.—HOOP-SKIRT WIRE.—Stillman Houghton, Worcester, Mass.:

I claim as an improved article of manufacture skirt hoop-wire, first covered with a fibrous material and then a braided plated wire covering or casing applied thereto, substantially as shown and described.

# 55,496.—INVALID BEDSTEAD.—Eugene Hutchinson, Manchester, N. H. Ante-dated June 1, 1866:

I claim, 1st, The combination of the bed-supporting frame, D, the back elevator, G, the bedstead frame, A, and mechanism, substantially as described, for operating or moving the said frame, B, so as to elevate the frame, G.

I also claim the combination of the auxiliary frame, E, and its elevating mechanism, substantially as described, with the bedstead frame, A, and the back elevator, G.

I also claim the combination of the frame, E, and its elevating mechanism, the bedstead frame, A, the back elevator, G, the frame, D, and mechanism for operating the latter as described.

I also claim the combination of the leg-rest or frame, F, the frame, E, the back elevator, G, the elevating frame, D, and the two bedstead frames, A, B, the whole being constructed and applied together in manner and so as to operate substantially as explained.

# 55,497.—SAW-MILL.—E. P. Irons, Baltimore, Md.:

I claim, 1st, The described mode of connecting the elastic saw bands, g, g', to the walking beam by rods, f, f', attached at points, e, at the opposite ends of the beam from that upon which the said bands, g, g', are lapped, substantially as described.

2d, The manner substantially as herein described of attaching the flexible wire cords or bands to the ends of the saw by means of the stirrups, q, in combination with the jaws, t, t, the adjustable gibs, u, u, and guides, U, the parts arranged and operating substantially in the manner and for the purpose set forth.

3d, The combination of the connecting-rods, V, bell crank, K, K', graduating connecting-rod, k, lever, M, feed hand, m, rag-wheel, o, and shaft, L, with pinions and racks arranged and operating substantially as and for the purpose set forth.

4th, The manner of graduating the length of the cut or feed by means of the graduating connecting-rod, K, moving up and down on the arm, K', of the bell crank-lever, so as to be moved a long or short distance, for the purpose and substantially in the manner set forth.

5th, The combination of the adjustable steel arming-plates, x, with a connecting-rod, k, arranged and operating as herein set forth, for the purpose of compensating for wear, and allowing lost motion to be readily taken up, as set forth.

# 55,498.—DIE FOR SWAGING THE ENDS OF AUGER-BLANKS.—Russell Jennings, Deep River, Conn. Ante-dated Dec. 19, 1865:

I claim the swaging of the ends of auger-blanks so as to have thick masses or portions, c, c, at the sides thereof, with a central thick portion for the pintle, by means of dies constructed substantially as described, for the purpose of enabling the heads of augers to be formed or swaged at one operation, and so avoid all welding and joining of parts, as set forth.

# 55,499.—MACHINE FOR TRIMMING MITER-JOINTS.—Albert Johnson, Putnam, Conn.:

I claim the adjustable bed, C, in combination with the adjustable bar or seat, E, and the plane, H, substantially as and for the purpose set forth.

# 55,500.—KNOB LOCK.—Frank G. Johnson, Brooklyn, N. Y.:

I claim the movable tumbler-case, C, in combination with a knob, A, having a stationary ranged guard, B, applied to it, substantially as described.

# 55,501.—BOLT-HEADING MACHINE.—Edward Kaylor, Pittsburg, Pa.:

I claim forming the head on square-head bolts by means of a machine constructed and operating substantially as herein-before described, by staying up the iron with a heading tool between two side dies which at the same time advance and compress the iron as and while it is being stayed, and then compressing the other two sides of the head by another pair of dies which advance and compress the opposite sides of the head as the first pair recede, the operation being repeated until the head is properly formed.

# 55,502.—METHOD OF PRESERVING EGGS.—Augustus G. and E. E. Kyle, Newville, Pa.:

We claim the within-described compound as a packing for preserving eggs, substantially as set forth.

# 55,503.—WEIGHING SCALE.—Jesse S. Lake, Smith Landing, N. J., and Ezra B. Lake, Bridgeport, N. J.:

We claim, 1st, The combination with the beam or lever, C, and beam or partition, H, of a weighing scale, of the scales, M, N, O, constructed and arranged substantially as described and for the purpose set forth.

2d, The combination of the cylinder, J, and cog-wheel, I, with the toothed end of the beam or lever, C, substantially as described and for the purpose set forth.

3d, The combination with the cylinder, J, and beam, K, of the weighing scales of the tables, P, R, S, constructed and arranged substantially as described and for the purpose set forth.

# 55,504.—APPARATUS FOR MOLDING CASTINGS.—P. W. Lamb, Albany, N. Y.:

I claim the cams, J, and cam-shafts, I, in combination with the box, A, frame, B, and cope, D, arranged substantially as herein set forth for the purpose specified.

# 55,505.—GATE HINGE.—Henry Last, West Lebanon, Ind.:

I claim an improved double-jointed gate hinge, constructed and arranged substantially as herein described and for the purpose set forth.

# 55,506.—ROPE-GUARD.—Obadiah B. Latham, Seneca Falls, N. Y.:

I claim the combination of a metallic knob with a rope of whatever material composed, such knob being concave in its inner surface, to allow for the expansion of the rope, fastened and operated in the manner described.

# 55,507.—COMPOSITION FOR WATER-PROOFING.—John D. Lee, Trenton, N. J.:

I claim the mixing of the ingredients and the applying them to boots and shoes to render them impervious to water, as herein described.

# 55,508.—CHURN.—E. O. Leonard, Binghamton, N. Y.:

I claim the combining and arranging of the body and dasher, substantially as herein recited, so that the body and the dasher may be operated as described.

# 55,509.—APPARATUS FOR MAKING COFFEE.—Friedrich Liesche, East New York, N. Y.:

I claim, 1st, The combination of the suspended vessel, C, weighted frame, D, curved tube, G, strainer, H, and stationary vessel, F, the whole arranged with regard to a lamp or other burner, substantially as herein set forth for the purpose specified.

2d, The lever, k, and spring or weight, m, n, operating in combination with the movable vessel, A, to extinguish the lamp or burner when the said vessel is raised, in the manner substantially as herein set forth.

# 55,510.—PAINT.—H. A. and D. E. Longsdorf, Mechanicsburg, Pa.:

We claim the compound composed of the ingredients herein named, and mixed together in or about the proportions described, for the purpose specified.

# 55,511.—SPECULUM.—Charles Leutz, Philadelphia, Pa.:

I claim the described improvement in speculums, consisting in the use of the springs, I, I, and notched pins, G, G, or their equivalents, when arranged relative to each other and to the leaves, A, A and F, F, substantially as and for the purpose specified.

# 55,512.—FRUIT JAR.—John Letchworth, Philadelphia, Pa.:

I claim the cap, B, made of thin metal, and having internal projections made by external indentations, the whole being applied to the neck of a jar, substantially as described.

# 55,513.—SQUEEZER.—John Letzkus, Pittsburg, Pa.:

I claim the combination of the top upset, p, lower upset, f, and drums, e and n, with the main shaft, S, geared directly or indirectly to the inner circumference of the lower upset, the whole being arranged and operating for the purpose of squeezing puddler's balls, substantially as herein-before described.

# 55,514.—MACHINE FOR TUNNELING ROCK.—Thales Lindsley, Rock Island, Ill.:

I claim, 1st, The drill-gauge, substantially as and for the purposes specified.

Further, the ram-guide, in combination with said gauge, the ram, and the drill-wheel, substantially as herein specified.

Further, constructing the drills and the drill-shafts, and connecting the same, substantially as set forth.

Further, the combination of the compensating springs with the drill-shafts, substantially as set forth.

Further, the drill-shaft-guides and the notched collars between the compensating springs, substantially as specified.

Further, the water-pipes and jets in connection with the drill-wheel and ram, substantially as set forth.

Further, the combination of parts forming the drill-wheel, substantially as set forth.

Further, the grooved collar upon the long ram-sleeve and the clutch attached to the rear face of said drill-wheel and working into said collar, substantially as herein specified.

Further, the ram and the ram-hammers, substantially as herein specified.

Further, the wedge index, in connection with said hammers, or their equivalents, together with the splitting apparatus, substantially as set forth.

Further, the cam-wheel and its adjustable cams for working the drills, substantially as set forth.

Further, the drill drill, and the collar upon the long ram-sleeve, which serves as its guide, constructed and arranged substantially as described.

Further, the non-revolving of the ram-sleeve aforesaid, and the non-revolving of the short ram-sleeve of the rear frame of the machine, as specified.

Further, the combination of the valves receiving the compressed air to the ram-cylinders, and the valves discharging it from them with a hand-lever, so as to control the action of the ram, etc., by a touch of the engineer, substantially as set forth.

Further, the construction of the platforms upon the legs of the machine, substantially as described.

Further, the supporting of the machine upon friction-wheels, beveled upon their face, substantially as set forth.

Further, moving the drilling apparatus back and forward by means of the ram-cylinders and their connections, substantially as set forth.

Further, moving the ram back and forth at any velocity desired by the engineer, by means of the ram-cylinders and their dependencies, substantially as specified.

Further, moving the machine by means of said ram-cylinders, and the toggle-levers, substantially as set forth.

Further, the toggle-levers and their necessary appendages, substantially as set forth.

Further, the bracket drill, constructed and operating substantially as specified.

Further, the hauling out of the debris by means of the drag-pulley and its appendages, substantially as specified.

Further, also the hauling out of the debris by means of the ram, and the tackle and clamps appended, substantially as specified.

Further, the combination whereby the ram and the drill-wheel are united and revolved, substantially as set forth.

Further, in combination with a machine, constructed substantially as herein set forth, the method of leveling the same transversely of the tunnel, and of adjusting it to the grade line of the excavation, as herein specified.

Further, the combinations by which the ram-cylinders operate without the oscillating cylinders or in conjunction with them, and vice versa, by which the bracket drill works independently of the drill-wheel, or simultaneously with it; by which the drag-pulley hauls rock independently of, or contemporaneously with, the snag-pulley, and vice versa; by which the drill-wheel revolves without the cam-wheel or in conjunction with it; by which the ram-cylinders through the toggle-levers may move the machine forward and backward, whilst the oscillating cylinders through the drag-pulley are hauling out rock from the heading; by which the drills are kept home to their work and at the point of maximum action, and by which the bottoms of the concentric channels are kept relatively in the same plane, whatever the disparities in the hardness of the rock cut; by which the ram is permitted, at the will of the engineer, to move independently back and forth and without shock to the machine from the oscillations; by which the drills for the heading are kept cool, the dust from them laid, and their minute chips swept out of the concentric channels into the common drain; by which a drain is cut in the bottom of the tunnel parallel with, and directly under, the axial line of the same, by which the machine progresses forward and backward with or without the convenience of a railroad, and by which the tunnel, adit, etc., are supplied with an abundance of fresh air and water; by which, finally, the drill-wheel, the cam-wheel, the ram, the bracket drill, the drag-pulley, the snag-pulley, the ram-cylinders, the oscillating cylinders, and other parts may operate concurrently and otherwise; all of which substantially as presented.

# 55,515.—BOOM-CONNECTION FOR MASTS.—Bartholomew McGrath, Gloucester, Mass.:

I claim, 1st, The mast and boom-connection, as composed of the clamps, F, F, the curved-rod, C, its screws and nuts, and the arms, D, D, arranged substantially as specified.

2d, The combination of the wheel, E, with the clamps, F, F, the curved-rod, C, its screws and nuts and the arms, D, D, the whole being arranged as explained.

# 55,516.—STEAM ENGINE.—William Louis Winans and Thomas Winans, London, England:

We claim the arrangement of the propelling-shafts, e, between the piston-rods, c, c, mounted in suitable bearings on the cylinders, a, or frames attached to the cylinders, the cylinders being placed directly below the propelling-shafts, whose cranks work down alongside of the cylinder or cylinders, for the purpose herein set forth.

# 55,517.—HAND CORN PLANTER.—David McKanna, Madison, Wis.:

I claim, 1st, Operating the seed-slide, D, by means of the inclined-rod, b, when placed at one end of the slide, as shown and described.

2d, The combination of the stationary bar, B, having the groove, H, therein, the bar, C, provided with the slot and the inclined rod, b, and slide, D, all arranged and operating as set forth.

# 55,518.—BALANCED CUT-OFF VALVE.—B. F. McKinley, Falmouth, Ky.:

I claim the adjustable cut-off valve, E, and balance-piston, F, in combination with the revolving valve, C, constructed and operating substantially as and for the purpose described.

# 55,519.—BROOM-HEAD.—Charles Messenger, Chicago, Ill.:

I claim making the head in two parts, as described, in combination with the ring, K, springs, N, teeth, H, as and for the purpose set forth.

# 55,520.—BREECH-LOADING FIRE-ARM.—Isaac M. Milbank, Greenfield Hill, Conn.:

I claim, 1st, A swinging breech in combination with a transverse turning bolt, beveled on one side to enter a recess and acting to retain the breech by a partial turn of said bolt, substantially as set forth.

2d, The lever, h, for turning the bolt, e, of the swinging-breech, in combination with the hammer, g, the parts being fitted substantially as specified, so that the discharge of the hammer shall insure the proper turning of said bolt, as set forth.

3d, The latch, i, in combination with the lever, h, and turning bolt, e, as set forth, whereby the said latch is disconnected from the lever by the closing of the breech, as set forth.

4th, The spring, K, in combination with the turning-bolt, e, and swinging breech to effect the locking or partial locking of the breech as soon as closed, as set forth.

5th, The claw or retractor, n, formed with or attached to the supporting block, g, in combination with the swinging breech-block, as and for the purposes specified.

# 55,521.—VACCINATOR.—Henry Minton, M.D., Brooklyn, N. Y.:

I claim the puncturing-tube, b, and plunger, d, in combination with the springs, h, i, trigger, K, and barrel, A, constructed and operating substantially as and for the purpose described.

# 55,522.—SLEIGH-BRAKE.—J. J. Moore, Little York, N. Y.:

I claim the tongue, B, working in a slot in the bar, C, being provided with the rods, h, b and f, f, the same connected to join spurs, h, h, when arranged and used substantially as and for the purposes herein set forth.

# 55,523.—AUTOMATIC HELIOTROPE.—Leopold F. Morawetz and Charles Volkmar, Baltimore, Md.:

We claim, 1st, The axis, A, adapted to revolve on one or more fulcra, so that it can be adjusted to a position parallel to the axis of the earth, in conjunction with a solar instrument, substantially as specified.

2d, The driving-wheel, O, applied at a suitable point on the axis, A, in combination with a weight or its equivalent, and with or without an escapement, substantially as described.

3d, The construction of the main revolving axis of the heliotrope so that it supports a solar camera for photographic and other purposes, and revolves said camera, as well as permits it to be revolved, in such manner that the main supporting axis and the camera may be brought into any required angle of inclination with relation to each other, substantially as described.

4th, Automatically moving an optical or solar instrument in the plane of the daily course of the sun, and synchronous with the sun, so that the solar rays shall fall directly or continually with the same angle of incidence upon a certain point of said instrument, by means substantially as herein specified.

# 55,524.—NICKING SCREW-HEADS.—George S. Morris, Taunton, Mass.:

I claim the improved two-nicked screw, having each of its nicks made so as to increase in width as it approaches the circumference of the head of the screw, the same being substantially as and for the purpose specified.

# 55,525.—PHOTOGRAPHIC APPARATUS.—Emile Muller, New York City:

I claim the apparatus for holding vases or other uneven objects for the purpose of photographing thereon, substantially as herein-before described.

# 55,526.—FANNING-MILL.—John Mumma, Middletown, Ohio:

I claim, 1st, Constructing the fans, e', with curved ends for gathering the air, and concentrating the blast in the manner described.

2d, The deflecting board, C', upon adjustable shaft, a', arranged so as to be set and retained in any desired position by means of the exterior handle, d', in the manner and for the purpose described.

3d, The combination of the toothed feeding-roll, Q, with the hopper, arranged and operated as described.

4th, Shaft, R, and fingers, e, vibrated by the arm, e, and cam, S, in the manner and for the purpose described.

5th, The shoe, F, in combination with spring, g, and cams, S, on shaft, P, operating in the manner and for the purpose described.

6th, The combination of the double tapering tappet or cam, L, with adjusting blocks, 4, and spring, i, in the manner and for the purpose specified.

7th, The adjusting roll, T, arms, m, and staples, n, in combination with the shoe, suspending wires, h, for regulating the motion of the shoe in the manner described.

8th, The combination of the journal-blocks, V, W, the bolt and thumb-screw, r, with the friction rubber-block interposed as described, for the purpose specified.

9th, The combination of the wires or rods across the inner end of the shoe, with the clamping-rod and thumb-screw, X, for securing the slaves and screens in the manner substantially as described.

10th, The arrangement of the india rubber blocks in the sides of the casing, B, adjustable by set screws, Z, to regulate the vibrations of the shoe and obviate wear and noise in running the mill, as specified.

11th, The combination of the shoe, F, rock-shaft, R, cams, S, and spring, g, with their connecting and regulating mechanism, operating substantially as set forth for the purpose specified.

# 55,527.—GAS-INHALER.—Cuthbert L. Munns, Philadelphia, Pa.:

I claim the hollow tube, C, in combination with the reversible plug, with its ball-valve, and the ball-valve, O, the whole being constructed and operated substantially in the manner and for the purpose set forth.



**55,528.—HORSE HAY-FORK.**—John K. O. Neil, Kingston, N. Y. :

I claim, 1st, Operating the lines or fingers of a grapping-fork by means of a rod connecting said lines or fingers with a pivoted cross-lever, said rod being pivoted to both lines and lever at a distance from their centers of motion, as set forth.

2d, The cross-lever, C, in combination with the arms, B, B', fingers or lines, A, A', and connecting-rod, D, as and for the purpose described.

**55,529.—BABY-WALKER.**—P. Pallissard, Aroma, Ill. :

I claim the arrangement of the hoop, A, supported by the casters, wheels, F, F', and connected with the ring, E, by the supports, B, B', having screw-threads cut upon their ends for the ready adjustment of the ring, E, to the height of the baby, the whole being constructed and operated substantially in the manner and for the purpose set forth.

**55,530.—FRUIT BASKET.**—Jesse K. Park, Marlboro, N. Y. :

I claim the combination of the warp-bands, D, with the interwoven web or filling, E, passing up and down, and bent over the upper edge of the basket to form the binding, substantially as herein set forth for the purpose specified.

**55,531.—VALVE.**—Jefferson Peabody, Dixmont Center, Maine :

I claim the improved valve-box as made with the case, A, series of valve-guides, D, D', stops, E, E', arranged with respect to the valve, B, and the opening, C, of its seat, substantially in manner as described.

**55,532.—REFRIGERATOR FOR COOLING OIL, ETC.**—Charles F. Pike, Providence, R. I. :

I claim, 1st, The construction of parallel open-mouth pipes or tubes fastened to the ice-box or receptacle, A, and water-tank, C, in combination with the ice-box or receptacle, A, and also in combination with the water-tank or receptacle, C, substantially as herein described and for the purposes herein-before set forth.

2d, The application of the pump or pumps, as herein described, for the purposes of keeping up an artificial circulation by raising the water from the water-tank, C, and throwing it into the ice-box or receptacle, A, and the using of the water so raised and thrown into the ice-box or receptacle, A, substantially in the manner and for the purpose herein-before stated.

**55,533.—BUCKLE.**—I. N. Plotts, New York City :

I claim a buckle having the bar, B, with its eyes, a, a', encircling the sides of the frame, A, arranged to slide to and fro, in the manner and for the purpose herein described.

**55,534.—MEDICAL COMPOUND.**—Peter Poucin, Minneapolis, Minn. :

I claim the medical compound composed of the ingredients united in the proportions and manner as above set forth.

**55,535.—LAMP.**—Charles F. Rees, Millersville, Penn. :

I claim the combination of the lamp and stand, J, K, L, N, with its vessel, B, spout, I, and arrangement of the cylinders, A, C, and rings, E, G, in the manner and for the purpose set forth.

**55,536.—DIE FOR FORMING METAL HEADS ON HARNESSE NAILS.**—F. Reynolds and F. L. Hilbright, Newark, N. J. :

We claim, 1st, The half-dies, B and C, constructed as described, in combination with each other and with the block, A, substantially as and for the purpose set forth.

2d, The combination of the lever, F, with the block, A, and with the half-die, B, substantially as described and for the purpose set forth.

3d, The combination of the spring, G, with the block, A, and with the lever, F, substantially as described and for the purpose set forth.

4th, The combination of the wedge-stop, E, with the block, A, and with the half-die, C, substantially as described and for the purpose set forth.

**55,537.—CAR COUPLING.**—Nathaniel Robbins, Jr., Rockport, Mass. :

I claim in combination with the link and the draw-bar, a mechanism, substantially as described, or its equivalent, for enabling a person without going between the cars or taking a position where he will be liable to be crushed by and between them, to control and direct the link with respect to its entrance into the mouth of another draw-bar, as specified, such mechanism being the arm applied to the link and the rod or rods arranged on the draw-bar, the whole being as set forth.

**55,538.—HANGING WINDOW-SASH.**—Augustus Roehrig, Williamsburg, N. Y. :

I claim the arrangement of a sinuous wire, d, in the frame, A, in combination with three or more staples, a, b, c, fastened in a zig-zag line in the sash, B, substantially as and for the purpose described.

**55,539.—STEAM GENERATOR.**—Robert E. Rogers and James Black, Philadelphia, Pa. :

We claim one or more water-spaces or jackets surrounding or in combination with the boiler, a, constructed substantially as herein recited, said water-spaces or jackets having or not the tubes for circulation and exposure to heat, and being provided with fire-tubes or not, substantially as described and for the purposes set forth.

**55,540.—MEDICAL COMPOSITION.**—P. G. Rosenblatt, Greenville, Tenn. :

I claim the medical compound composed of the ingredients and mixed together in about the proportions herein described.

**55,541.—TELEGRAPHIC REPEATER.**—C. H. Rudd, Sandusky, Ohio :

I claim the posts, G, L, with the spring, M, post, K, and extension of the lever, E, beyond the line of the post, F, F', so arranged as to enable me to use extra force, for holding the relay closed, when said extra power is obtained from the main current, which is unemployed just at the time when needed, substantially in the manner and for the purpose set forth.

**55,542.—COTTON-GIN.**—H. V. Scatlergood, Albany, N. Y. :

I claim the cylinder having a surface consisting of rounded needle-pointed teeth so curved and arranged as that the point of each tooth approaches nearer to its next preceding tooth than at any other point thereof, substantially in the manner and for the purpose above described.

**55,543.—BAG FRAME.**—Albert J. Sessions, Bristol, Conn. :

I claim slitting or cutting the strip, substantially as described so as to form one-half of a bag-frame in one piece of metal.

**55,544.—ALARM FUNNEL.**—Joseph Sholl and John Collins, Burlington, N. J. Ante-dated May 28, 1866 :

We claim the combination of the funnel, A, with its tube, b, the rod, C, with its float, D, and the bell, H, as and for the purpose described.

**55,545.—MANUFACTURE OF STONE, CEMENT, AND PLASTER.**—Frederick Rensome, Ipswich, England :

I claim, 1st, The manufacture of artificial stone, cement, or plaster, by mixing silicate of soda or potash with quick-lime and chalk, or sand or clay or other similar substance, substantially as described.

2d, The manufacture of artificial stone, cement, or plaster, by mixing together in a paste, chalk, or sand or other suitable

mineral in a powdered state, soluble silicate and a soluble salt of an alkaline earth or of aluminum or iron, substantially as described.

**55,546.—LAMP BURNER.**—Willard H. Smith, New York City :

I claim, 1st, The metal-plate or its equivalent, with points between the two pieces of cork entering both as represented, as and for the purpose set forth.

2d, The two parts, A and B, constructed and combined as and for the purpose set forth.

3d, The mode of fastening the wick-tube to the said metal-plate and of fitting the same snugly in the said cork or other non-conductor, so as to hold the same firmly in its place without touching the metal-plates inclosing the non-conductor either above or below, as set forth.

4th, The combination of the parts, A and B, filled with cork or other non-conductor, fastened together by means of the metal-plate as shown in Fig. 4, as set forth.

5th, The combination of the sleeve, G, and the tips, E and F, as and for the purpose described.

**55,547.—WATER METER.**—Elihu Spencer and E. L. Meyer, Elizabeth, N. J. :

We claim, 1st, A water-meter made and arranged substantially as above shown, that is to say, consisting of two cylinders having a common valve-chamber between them, within which valve-chamber are placed two slide-valves, operated substantially as described by means of a shaft rotated by proper connections from the pistons of the cylinders, such shaft carrying a worm, E, which rotates a gear-wheel, F, whose spindle carries a fixed index, all as above set forth.

2d, Combining the said apparatus mentioned in the preceding clause with an inclosing box, A, in the manner substantially as above shown.

**55,548.—APPARATUS FOR GENERATING WASHING GASES FOR INHALATION.**—A. W. Sprague, Boston, Mass. :

I claim, 1st, The combination of the float, F, and vessel, E, with the lever, H, or its equivalent, as and for the purpose described.

2d, The perforated conical projections, C, formed in the tube, B, or its equivalent device, substantially as and for the purpose specified.

**55,549.—LOCK.**—Martin Staehelin and Henry Young, Port Chester, N. Y. :

We claim the swinging-frame, E, applied in combination with the shot-bolt, B, latch, C, and key, D, substantially as and for the purpose set forth.

**55,550.—HOSE PROTECTOR.**—Isaac H. Stone, St. Louis, Mo. :

I claim the combination of the rails, A and A', with the hollow beam, B, the dogs, c, and spurs, c', forming a secure protection for hose during the entire length of its passage over railway tracks, as set forth.

**55,551.—HARVESTER RAKE.**—Ole O. Storle, North Cape, Wis. :

I claim, 1st, Bevel wheels, 5, and segmental wheels, 6, and pinion, 4, in combination, constructed and operated substantially as and for the purpose described.

2d, Guide-wheel, 18, in combination with guide-truck, 19, and rake, 14, substantially as and for the purpose described.

**55,552.—NIPPLED CARTRIDGE FOR BREECH-LOADING FIRE-ARMS.**—Thomas L. Sturevant, Boston, Mass. :

I claim the combination and arrangement of the tongue, D, with the nipple, C, and the charging tube, A, arranged substantially as specified.

**55,553.—CURRY-COMB.**—Miles Sweet, Troy, N. Y. :

I claim, 1st, A series of comb-bars, A, formed with perforations, b, and fastened together by collars, d, and rivet-bolts, c, extending through the said collars and comb-bars, substantially as herein described.

2d, A series of perforated comb-bars, A, fastened together by rivet-rods, c, and collars, d, and with the rivet-rods forming a shank, m, for a handle, substantially as herein described.

3d, A series of perforated comb-bars, A, fastened together by rivet-rods, c, and collar, d, and having one or more of the collars extending beyond the end of the comb-bars, substantially as herein described.

4th, A series of single perforated comb-bars, A, fastened together by rivet-rods, c, and collars, d, and having a back-plate, P, secured to the said comb-bars, substantially as herein described.

**55,554.—PLANKING CLAMP.**—Joseph C. Thomas, Kennebunk, Maine :

I claim the combination of the screw, a, the nut, C, the rotary head, g, the two chains, D, D', and the hooks, E, E', the whole being constructed, arranged, and applied to the stock, A, provided with the screw, B, substantially as and so as to operate as and for the purpose herein-before specified.

**55,555.—AIR-TIGHT BURIAL-CAR.**—Charles Timmerman, Amsterdam, N. Y. :

I claim, 1st, The use and arrangement of the tongue pieces, E and F, and corner-plate, D', for connecting and fastening the bottom and upright parts of the case together, substantially as described.

2d, Constructing the cover or upper part of the burial case of iron and wood in combination, substantially as described.

**55,556.—DOG CHURN.**—Franklin Traxler, Scottsburg, N. Y. :

I claim, 1st, Communicating a vibrating movement to the arm, b, by means of a cam-wheel, G, applied to the shaft of the tread-wheel, said wheel acting upon rollers, c, c', the bearings of which are allowed to have a movement independent of the arm to which the wheels are attached, substantially as described.

2d, The pivoted bearing-plate, d, having rollers, c, c', applied to it, in combination with a vibrating arm, b, or its equivalent, and a cam-wheel, G, substantially as described.

3d, The construction of the main supporting frame of triangular supports, A, A', horizontal beams, B, B', and a stall, E, substantially as described.

4th, The combination of an inclined tread-wheel, D, cam-wheel, G, rollers, c, c', vibrating arm, b, pitman, a, and vibrating lever, F, arranged and operating substantially as described.

**55,557.—COAL ELEVATOR.**—John P. Tucker, South Reading, Mass. :

I claim the combination of the slotted arm, E, the curved lever, H, provided with the tripper, C, the director, J, the scoop, I, and the rope, K, with the gallow-frame and its discharging chute, the whole being arranged and made to operate substantially as above set forth.

**55,558.—HOUSE BELL.**—Andrew Turnbull, New Britain, Conn. :

I claim the cast-metal hub, c, having the eyes, g, and rod, h, firmly secured therein, in combination with the spiral spring, n, detents, m, plate, a, and bell, d, substantially as and for the purpose described.

**55,559.—STEERING APPARATUS.**—J. B. Van Deusen, New York City :

I claim, 1st, The interposition between the tiller and the rudder-head of a steering apparatus of a spring or springs, operating substantially as and for the purpose herein described.

2d, The combination of the inner and outer ring with their radial projections, and india-rubber or other springs, substantially as and for the purpose as herein fully described.

**55,560.—DIE FOR WELDING LINKS INTO CHAINS.**—Frederick Van Patten and Oren A. Anthony, Hion, N. Y. :

We claim forming the dies, E and F, with two or more cavities for the reception of two or more links, as and for the purpose specified.

**55,561.—PICTURE-HOLDER.**—William Walker, New Haven, Conn. :

I claim, 1st, A holder for pictures, cards, and for other analogous purposes, consisting of a series of frames, or their equivalents, placed one in front of another, but in two rows or sections, when such frames are so connected through any suitable mechanism with the outer casing or box in which they are arranged, or with a pedestal or other portion of the same, that by either revolving such casing or box, or its pedestal or other portion thereof so connected, the said picture frames, in regular order and succession, can be brought to the end of each row or section in proper position for being viewed, substantially in the manner described.

2d, The combination of the reciprocating sliding carrier-plate, H, with the transverse sliding-plate, K, when both connected with and operated by a common revolving disk, E, of the box or casing, A, or its equivalent, and arranged with regard to the double row of frames, B, so as to act upon the same, substantially in the manner and for the purpose specified.

**55,562.—MACHINE FOR GUMMING AND PRINTING ENVELOPES.**—Thomas V. Waymoth, New York City :

I claim, 1st, The hinged table, B, which swings back and forth on arms, a, to operate in combination with the gummer, D, substantially as and for the purpose described.

2d, The movable separator, G, in combination with the gummer, D, substantially as and for the purpose set forth.

3d, The endless apron, H, in combination with a suitable mechanism, imparting to it an intermittent motion, and with the reciprocating carrier, F, and gummer, D, constructed and operating substantially as and for the purpose described.

4th, The finger, V, and rollers, K', in combination with the apron, H, and carrier, F, constructed and operating substantially as and for the purpose set forth.

**55,563.—SNAP-HOOK.**—R. L. Webb, New Britain Conn. :

I claim the employment of the spring, d, passing around the heel or joint formation, when both ends are secured to the outside edge of the hook-shank and the latch without a pivoted joint, substantially in the manner as and for the purpose described.

**55,564.—HOT-AIR FURNACE.**—Edward Webster, Hartford, Conn. :

I claim, 1st, The employment of the plate, j, in combination with the arrangement of the exit flange or pipe, t, substantially as and for the purpose described.

I also claim the case, u, constructed as described, in combination with the dish, v', tube, w, and cover, v'', substantially as and for the purpose described.

**55,565.—APPARATUS FOR MOLDING PEAT.**—Edward Weissenborn, Hudson City, N. J. :

I claim, 1st, The combination of a reciprocating ram, F, having a hammer-like action, the compression-box, E, and the open-bottomed mold or molds, c, substantially as and for the purpose herein specified.

2d, The cylinder, B, and its piston, in combination with the ram, F, compression-box, E, and mold or molds, c, substantially as and for the purpose herein set forth.

3d, The construction of the partitions, b, b', of the mold-frame with sharp cutting upper edges, substantially as and for the purpose herein described.

4th, The open-bottomed mold or molds, c, constructed with a downward taper, substantially as and for the purpose herein specified.

**55,566.—CHURN.**—Amos Westcott, Syracuse, N. Y. :

I claim, 1st, The use of dasher-paddles having their faces beveled or cut away diagonally, substantially in the manner and for the purpose above described, when combined with the main shaft, as above described.

2d, The manner of connecting the main shaft with the gearing and body of the churn, in combination with said shaft and the dasher-paddles, constructed substantially as and for the purposes above described.

3d, The combination of the parts mentioned in the preceding claims, constructed as above described, with the fan-wheel or blower, substantially as above described.

**55,567.—CASTER FOR SEWING MACHINES.**—John N. Wilkins, Chicago, Ill. :

I claim the combination of the leg with the forked plate, A, and the wheel by means of the screw and lug, substantially as specified.

**55,568.—WARDROBE AND BEDSTEAD.**—Levi Wing and David Myers, Chicago, Ill. :

We claim the combination of the wardrobe, A, provided with its regular and distinct compartment for wearing apparel, and the bedstead, E, arranged so as to fold into a recess in the rear part of said wardrobe, substantially as herein specified and shown.

**55,569.—SHEEP-SHEARS.**—Tobias and John W. White, Adrian, Mich. :

We claim, 1st, The employment in a pair of sheep-shears of a central blade, c, arranged in such relation to the two blades of an ordinary pair of sheep-shears as to effect the object herein specified.

2d, The combination of the guard, D, with the central blade, C, and stops, g, g, on the blades, A, A, substantially as specified.

3d, Attaching the shank of the central blade by a screw and nut, or an equivalent thereof, which will permit of the said shank, and the central blade also, being removed from the shears at pleasure.

**55,570.—MACHINE FOR SAND-PAPERING WOODWORK.**—J. H. Wonderly, Williamsport, Pa. :

I claim, 1st, The combination of the cap, d, or equivalent jointed connecting pipes and exhaust fan, operating substantially as described.

2d, The adjustable table, B, provided with the sliding-frame, p, having the inclined planes, s, s, and the regulating screw, C, arranged and operated substantially as shown and for the purpose set forth.

**55,571.—SCREW-CUTTER.**—Moses M. Young, Chelsea, Mass. :

I claim, 1st, The improved arrangement of the guide, C, or its application directly to the die, B, and so as to project therefrom, as specified in combination with the application of the die to the stock so as to enable the two to be separated without the necessity of first detaching the guide or centralizer from the die.

I also claim the combination and arrangement of chip-discharging passages, k, k, with the guide and the die applied together, as set forth.

**55,572.—PAINT-MILL.**—George Philip Zindgraf, Philadelphia, Pa. :

I claim, 1st, Rounding the shoulder, r, of the part, q', of the mill-spindle, N, and forming a rounded recess or cup in the top of the rind, q, into which the rounded shoulder, r, is received, substantially as and for the purpose herein specified and described.

I also claim the extension of the mill-spindle up through the balance-rynd of the lower running stone, so as to attach the feeding-screw thereto, as specified.

**55,573.—VALVE-ARRANGEMENT FOR ORGANS, ETC.**—Moritz Baumgarten, assignor to himself, Jacob Heller, G. C. Clarke, A. S. Keeler, and Morris Steinhert, New Haven, Conn. :

I claim the arrangement of the rod, L, provided with packing



collars, a, in combination with the valves, D, E, and F, more or less, substantially in the manner and for the purpose herein described.

**55,574.—SPRING BED-BOTTOM.**—Charles B. Bristol, assignor to himself and Philippe Koch, New Haven, Conn. :

I claim the combination of the spiral or helical springs, C, C, etc., when placed horizontally with the connecting-rods or hooks, b, b, etc., or their equivalents, and the frame, A, A and A', A', when the whole is constructed, arranged, and fitted for use substantially as herein described and set forth.

**55,575.—OSCILLATING ENGINE.**—Felix Brown, assignor to A. & T. Browne, New York City :

I claim, 1st, The rock-shaft, J, and arm, I, or other equivalent mechanism, in combination with the links, b, b', arms, g, g', valves b, b', and oscillating cylinder, A, constructed and operating substantially as and for the purpose described.

2d, The arms, a, links, p, and studs, q, in combination with the exhaust-valves, c, c', and with the oscillating cylinder, A, constructed and operating substantially as and for the purpose set forth.

**55,576.—MITER-BOX.**—Daniel Bull, assignor to himself, C. D. Vaughn, and F. A. Gibbs, Amboy, Ill. :

I claim, 1st, The parallel moving saw-guide frame arranged, constructed, and operating substantially as and for the purpose set forth.

2d, Arranging the slotted self-adjusting cylinders or rollers in aches, e, e, or their equivalents, in combination with the parallel moving frame and the stationary frame, all constructed and operating substantially as described.

3d, The adjustable gauge-stops, I, in combination with the saw-guide frames and the lugs or pointers, p, all constructed and arranged substantially as described.

4th, The combination of the index-plate, m, cross-tie, H, n, parallel moving frame and notched segment, C2, and support, C3, substantially as described.

5th, The combination of the segment notched-plate, C2, support, C3, parallel moving saw-guide frame and combined thumb-catch and lever or link, F, all constructed and arranged substantially as described.

6th, The stationary saw-guide frame constructed with a self-adjusting roller, in combination with the parallel moving saw-guide frame, also constructed with a self-adjusting roller and with a front-board or piece, D, D, the said parts being applied together on a miter-box, which is constructed and furnished with the apertures described, substantially as set forth.

**55,577.—BLIND-FASTENER.**—H. M. Clark, assignor to Charles Blanchard, Meriden, Conn. :

I claim the combination of the slotted bar, E, pin, A, the wheels, C and D, and the knob, B, or its equivalent, constructed and arranged to operate together substantially as herein described.

**55,578.—PIPE-WRENCH.**—Durfee W. Coggeshall, assignor to George E. Church, Providence, R. I. :

I claim the pipe-wrench made substantially as described, viz. : of the lever and hinged jaws or clasp, provided with the tooth, a, and bearing, f, and combined and arranged in manner and so as to operate substantially as and for the purpose as herein-before described.

**55,579.—CANVAS-STRETCHER.**—Chauncy Dowd, New Haven, Conn., assignor to H. W. Gear, New York City :

I claim the swivel-buttons, c, and eccentric abutting plates, d, in combination with the strips, a, b, of the frame, A, constructed and operating substantially as and for the purpose described.

**55,580.—CARRIER OF BRAIDING MACHINES.**—Otis E. Drown, assignor to Darius Goff and Darius L. Goff, Pawtucket, R. I. :

I claim combining the weight constructed as described, to be lifted from the bottom by the surrounding bight of the yarn with the pawl, constructed as described to slide on a separate guide, and permitting the weight partially to pass it before being lifted to let off more yarn, substantially as described for the purpose set forth.

I also claim the combination of the hooks or guides, r and s, as described, with the tension-weight constructed as described, with the groove or hook, t, on one side of the bottom thereof for receiving the yarn, substantially in the manner described and for the purpose set forth.

**55,581.—FRUIT JAR.**—John Focer, assignor to W. and S. A. Whitney, Glassboro', N. J. :

I claim the thin metal-ring, D, having screw-threads adapted to similar threads on the cover, B, and neck, A, of a preserving jar, all substantially as and for the purpose herein set forth.

**55,582.—KEY FOR LOCKS.**—Porter A. Gladwin, Boston, Mass., assignor to himself and Horace M. Lee, Dorchester, Mass. :

I claim the within-described safety-guard for locking keys, consisting of the shank, B, in combination with the hook, C, substantially as described.

**55,583.—BRICK MACHINE.**—Isaac Gregg and Charles Green, assignors to Isaac Gregg, Philadelphia, Pa. :

We claim operating the alternating "sweeps or mold clearers," of the said brick machine by means of the device consisting of the lever arms, D, D' and H, H', and the bars, E, E' and F, and the fixed joint, G, in combination with the two rock-shafts, C, C', and lever-arm, I, the same being constructed, arranged, and applied to operate together, substantially as described.

**55,584.—ICE-CREEPER.**—Augustus S. Hadaway, assignor to himself and W. S. Hadaway, Plymouth, Mass. :

I claim the combination of the wire, F, the toggle-lever, L, and the plate, D, all for the purpose set forth, and substantially as specified.

**55,585.—PRESERVE CAN.**—Friederich H. Lanter, back, assignor to himself and Newman S. Wax, Boston, Mass. :

I claim the combination as well as the arrangement of the ring, D, and its stud, c, and curved arm, d, with the staple, C, and the hinged loop, E, applied to the body of the can, as specified, the cover of the can being provided with an annulus, b, of india-rubber or its equivalent, and the whole being substantially as herein-before explained.

**55,586.—MODE OF DRIVING PILES.**—John McClay, assignor to himself and J. W. Bliss, Hartford, Conn. :

I claim the yoke or clamp, d, constructed as described, and operating as set forth.

**55,587.—ASH-SIFTING DEVICE IN COOKING-STOVES.**—Edward Mingay, Boston, Mass., assignor to the Boston and Maine Foundry Company, South Reading, Mass. :

I claim my improved construction of the sifting-hod, as described, and the arrangement of it and its chamber so as to extend directly underneath the grate, in order to cause the coals or ashes, when discharged from the grate, to pass vertically into the hod without first falling on an inclined plane or such a spout leading into such hod as to require the said ashes to be raked from it into the hod.

**55,588.—SAFETY-STOP FOR GUN-LOCKS.**—W. G. Oliver, assignor to himself and C. K. Remington, Buffalo, N. Y. :

I claim the combination with the hammer of the gun-lock of

the automatic spring-guard, so arranged as, in its normal position, to engage with the hammer and act as a detent thereto, and relieved from the same for the purpose of cocking by pressure towards the stock, substantially as described.

**55,589.—BOTTLE-STOPPER.**—Thomas Primer, New London, Conn., assignor to Henry W. Putnam, Bennington, Vt. :

I claim the combination of the collar, a, hook, b, rigid cross-piece, d, tapering mass of soft material, e, and tie, c, arranged substantially as and for the purpose herein specified.

**55,590.—PHOTOGRAPHIC BATH.**—Robert E. Sisson, Wickford, R. I., assignor to Cyrus H. Moore and Asa Sisson, North Kingston, R. I. :

I claim the use of the independent false bottom, B, in combination with a photographer's bath, substantially as and for the purposes described.

**55,591.—TOY TOP.**—F. O. and William W. Tucker, Meriden, Conn., assignors to themselves and H. C. Stiles, New Haven, Conn. :

We claim, 1st, The arrangement of the ballast ring, D, substantially in the manner and for the purpose specified.

2d, The combination of the two cords, L and P, with the hooked tube, F, and barrel, E, constructed and arranged to operate substantially in the manner and for the purpose specified.

**55,592.—PHOTOGRAPHIC PROCESS FOR COPYING DRAWINGS, ETC.**—William Willis, Birmingham, England, assignor to Vincent Brooks, London, England :

I claim the improvements in processes for copying or reproducing, by the agency of light, drawings, engravings, lithographs, and photographs, and written and printed documents, herein described—that is, preparing the sensitive surface to be acted upon by light by the use of a solution containing a chromate mixed with an acid which will combine with the oxyd of chromium formed by the action of light, and with the organic base used for development, and developing the picture by means of aniline, pyrolyl, and other organic bases which, when applied either in the state of vapor or liquid, are oxydized by the chromic acid and form therewith a dark-colored compound.

**55,593.—ANCHOR.**—Peter Dinzey, St. Bartholomew, West Indies :

I claim, 1st, The shank, A, with its branches, a, a', in combination with the adjustable fluke, B, the whole being constructed and arranged substantially as and for the purpose specified.

2d, The combination with the above of the cross-pieces, c, c', for the purpose described.

**55,594.—ELECTRO-MAGNETIC ATTACHMENT TO RULING MACHINES.**—E. D. Averell, New York City :

I claim, 1st, The circuit break, consisting of a metallic lever and finger, with a piece, n, of non-conducting material, in the hub of the lever, and a spring, l, or its equivalent, the whole applied and operating substantially as herein specified, in combination with a galvanic battery, or other generator of an electric current, and a ruling machine.

2d, The lever, R', and finger, V, applied in connection with the lever, R, and finger, I, substantially as and for the purpose herein specified.

3d, The rollers, Q, Q', applied in connection with the levers, R, R', and fingers, I, I', and adjustable relatively to the cloth, B, and rollers, D, D, substantially as and for the purpose herein described.

4th, The combination of the posts, L, L', adjustable about their axes, the arms, M, M', and the rods, N, N', carrying the foot-pieces, P, P', rollers, Q, Q', circuit-break, R, and lever, R', substantially as and for the purpose herein specified.

5th, The foot-pieces, P, P', carrying the rollers, Q, Q', circuit-break, R, and lever, R', adjustable relatively to the rods, N, N', or other equivalent supports, by screws, g, g, substantially as and for the purpose herein set forth.

## RE-ISSUES.

**2,280.—POTATO-DIGGER.**—L. Aug. Aspinwall, Albany, N. Y. Patented Nov. 14, 1865 :

I claim, 1st, The screen or screens, F, F', having a lifting movement and vibrating one from front to rear, and, when two are used, vibrating alternately.

2d, The combination of such screen or screens with a plow, having an uninterrupted passage for the earth over its entire upper surface, substantially as set forth in the above specification.

**2,281.—APPARATUS FOR STRAINING PAINTS AND OTHER MATERIALS.**—Luman Bishop and Stephen Brewer, Cortlandville, N. Y., assignees of Luman Bishop. Patented Feb. 20, 1866 :

We claim, 1st, The strainer, G, or its equivalent, as and for the purposes herein shown and described.

2d, The combination of the strainer, G, with the tube, F, and piston, B, substantially as and for the purpose described.

3d, The lateral apertures, H, H', or their equivalents, in combination with the tube and piston, substantially as and for the purpose herein described.

**2,282.—CYLINDER-POLISHER.**—George Cowing, Seneca Falls, N. Y. Patented April 14, 1863 :

I claim the expanding arms, A, A, in combination with the vulcanized scourers, B, B, substantially as described.

**2,283.—PIPE-TONGS.**—Allen Beach, Boston, Mass., assignee of Henry H. Gilmore, Medford, Mass. Patented April 6, 1858 :

I claim, 1st, Constructing either member of a pair of pipe tongs with a slot or its equivalent, so that by the relative adjustment of the jaw and pivot the "grip" of the tongs can be accommodated to various sizes of pipes, substantially as herein described.

2d, The combination of an inclined plane or planes, or the equivalent thereof, with the slotted jaw, for the purpose described.

**2,284.—CAPING WOOD SCREWS.**—Charles T. Grilley, New Haven, Conn. Patented April 20, 1853 ; and extended for 7 years :

I claim the application to a nicked screw-head of a cap already nicked and folding the same upon and around said screw-head by compression, substantially as described.

**2,285.—TANNING.**—Judson Schultz, Ellenville, N. Y. Patented April 3, 1866 :

I claim the treating of hides or skins substantially as herein described.

**2,286.—BLANK FOR SHOE-PEGS.**—Benjamin F. Sturtevant, Boston, Mass. Patented Aug. 16, 1859 :

I claim as my invention the new article of manufacture herein described, which is a peg-blank, having essential characteristics substantially such as herein set forth.

**2,287.—CLOTHES-WRINGER.**—Wm. B. Rhoads, assignee by means assignments of Nelson B. White, South Dedham, Mass. Patented March 4, 1862 :

I claim, 1st, The combination with rolls of a wringing machine of bevel cog-wheels for transmitting motion from one roll to the other, substantially as described.

2d, In a machine for wringing clothes, I claim the bevel-gears, K and N, with I and m, and shaft, b, operated by the groove, F, arranged substantially as described, and driven by any power in combination with rollers of india-rubber or other suitable material, as set forth.

3d, In a wringing machine, I claim a "purchase" cog-wheel, that is to say, a cog-wheel of any form, mounted upon an independent axis, and employed to give motion to the gearing or other devices which rotate the rolls.

## DESIGNS.

**2,332.—TRADE-MARK.**—Samuel E. Barney, assignor to the Elm City Company, New Haven, Conn.

**2,333.—BRACKET.**—John H. Bellamy, Charlestown, Mass.

**2,334.—LADY'S TUCKED PAPER COLLAR.**—J. M. Flagg, Providence, R. I.

**2,335 and 2,336 (2 cases).—TRADE-MARK.**—H. Fletcher, assignor to the Fletcher Manufacturing Co., Providence, R. I.

**2,337.—COOK'S STOVE.**—C. Harris and P. W. Zoiner, Cincinnati, Ohio.

**2,338.—PARLOR STOVE.**—C. Harris and P. W. Zoiner, Cincinnati, Ohio.

**2,339.—COAL STOVE.**—C. Harris and P. W. Zoiner, Cincinnati, Ohio.

## PATENT OFFICE.

### PATENTS GRANTED FOR SEVENTEEN YEARS. MUNN & COMPANY.

In connection with the publication of the SCIENTIFIC AMERICAN have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past twenty years. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office ; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after so many years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the office, I always observed a marked degree of promptness, skill, and fidelity to the interests of your clients."

Ex-Commissioner Holt says:—"Your business was very large, and you sustained and justly deserved the reputation of marked ability and uncompromising fidelity to the interests of your clients."

Ex-Commissioner Bishop says:—"I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys."

**EXAMINATIONS.**—If an inventor wishes our opinion in regard to its probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an opinion, without examination at the Patent Office, we make no charge, but if a

**PRELIMINARY EXAMINATION AT THE PATENT OFFICE** is desired, we charge the small fee of \$5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over ELEVEN THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us by express, charges prepaid, a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

**PATENTS ARE GRANTED FOR SEVENTEEN YEARS**, the following being a schedule of fees:—

On filing each Caveat.....	\$10
On filing each application for a Patent, except for a design.....	\$15
On issuing each original Patent.....	\$20
On appeal to Commissioner of Patents.....	\$20
On application for Reissue.....	\$30
On application for Extension of Patent.....	\$50
On granting the Extension.....	\$50
On filing a Disclaimer.....	\$10
On filing application for Design (three and a half years).....	\$10
On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$30

In addition to which there are some small revenue stamp taxes, Canadians have to pay \$500.

**FOREIGN PATENTS.**—Messrs. MUNN & CO. have had more experience than any other solicitors in this country in procuring foreign patents, and have old established agents in London, Paris, Brussels, Berlin, Vienna, and other large cities. Foreign business should never be entrusted to other than experienced agents.

Messrs. MUNN & CO. give special attention to the preparation of Caveats, and to the prosecution of the EXTENSION OF PATENTS, REISSUE OF DEFECTIVE PATENTS, REJECTED CLAIMS, INTERFERENCES, AGREEMENTS, AND CONTRACTS, in reference to Patents, and will advise patentees when their rights are infringed in reference to bringing suits against INFRINGERS. In connection with a Patent Lawyer of eminent ability, they prepare and conduct cases in the United States Courts. Indeed, there is no branch of Patent business which MUNN & CO. are not prepared to undertake.

If an inventor wishes to apply for a patent, all he has to do is to write to us freely for advice and instruction, and he will receive prompt attention. If his invention contains any patentable features, he can depend upon getting his Letters Patent. All communications considered confidential. Send models and fees addressed to

MUNN & CO.,  
No. 37 Park Row.

**PATENT CLAIMS.**—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.



## NEW RATES OF ADVERTISING.

Forty cents per line for each and every insertion, pay-  
able in advance. To enable all to understand how to calculate the  
amount they must send when they wish advertisements published  
we will explain that eight words average one line. Engravings will  
not be admitted into our advertising columns, except on payment of  
one dollar a line each insertion, and, as heretofore, the publishers  
reserve to themselves the right to reject any advertisement they may  
deem objectionable.

**PARTIES HAVING FLOUR PACKERS FOR SALE**  
will address (1st) OLIVER J. BOLLINGER, Glenrock, Pa.

**WANTED.**—\$30 PER MONTH  
Paid to Agents to introduce our New \$15, \$18, and \$20 Sewing Ma-  
chines, Ke. chum's Patent. Address with stamp,  
MONADNOCK SEWING MACHINE CO.,  
Winchendon, Mass.

**I WANT SMALL SPIRAL SPRINGS.**—MANUFAC-  
turers please send your address to  
J. H. MARTIN, Hartford, N. Y.

**TWIST DRILLS—ALL SIZES FOR STUBBS'S WIRE**  
and Machinist's use, on hand for sale by  
LEACH BROTHERS, 102 Liberty street, New York.

**FOR SALE CHEAP.**—12 NEW FINE-COMB SAW-  
ing Machines adapted to any style Horn or Rubber Comb. A  
rare opportunity. Address  
J. H. PRATT,  
86 Chambers street, New York.

## SWEET'S REPORT ON COAL!

Now Ready:  
**SPECIAL REPORT ON COAL, SHOWING ITS DISTRIBUTION,  
CLASSIFICATION AND COST.**  
Delivered over Different Routes to various Points in the State of  
New York, and the Principal Cities on the Atlantic Coast.  
By S. H. SWEET.  
Late Deputy Engineer and Surveyor of the State of New York.  
Transmitted to the Legislature March, 1865. 1 vol. 8vo, cloth,  
with maps. \$3.00.

D. VAN NOSTRAND, Publisher,  
192 Broadway, New York.

**STATE RIGHTS OF A VALUABLE PATENT FOR**  
Sale. Apply to S. H. HARRISON, No. 62 Center street.

**INCORPORATIONS EFFECTUALLY PREVENTED BY**  
Winan's Incorporation Powder. Cost 3 to 5¢. 11 Wall st., N. Y.

**PATENT FOR SALE.**—PERPETUAL CALENDAR  
Trade Emblem Pins, Keys, Charms, and Tablets, sixty saleable  
patterns. H. C. FOOTE, 15 Light street, New York.

**PLATINUM.**—IN ALL FORMS, FOR ALL PURPO-  
ses, wholesale and retail. H. M. RAYNOR, Importer, 748  
Broadway, New York. Scrap and Ore purchased.

**HOW TO PREVENT BOILERS AND STEAM PIPES**  
from Rusting. Use Temple's Liquid a few days before Stop-  
ping. Address A. TEMPLE, Bridgeport, Conn.

**THE PHRENOLOGICAL JOURNAL FOR JUNE.**  
Contains Portraits of Hon. Solomon Foot, Thomas Jefferson,  
Aaron Burr, Constance Emily Kent, Jenny Lind, a Group of Moquis  
or Utah Indians, with upwards of twenty illustrations and sketches  
of character; also Practical Physiognomy, Love and Lovers, Mar-  
riage and Divorce, Celibacy, Revelation and Science, Your Likeness,  
Strong Men, Hints to Preachers and Sextons, Physical Culture, True  
Politeness, How to Talk, Fashions, etc. \$2 a year, or 20 cents a num-  
ber. A new volume, the 44th, begins with the next number. Ad-  
dress,  
FOWLER & WELLS,  
339 Broadway, New York.

**\$10,000 WORTH OF PUMPS, HYDRAULIC**  
RAMS, etc., of every description.  
Best makers in store, and will be sold at a large discount, by  
J. B. FULLER,  
No. 8 Dey street, New York.

**CHARLES A. SEELY, CONSULTING AND ANALY-  
tical Chemist,** No. 26 Pine street, New York. Assays and  
Analyses of all kinds. Advice, instruction, reports, etc., on the  
useful arts.

**WANTED.**—A PRACTICAL ENGINEER, OF 20  
years' experience, desires to engage with some reliable Min-  
ing or Manufacturing Company as Mechanical Superintendent.  
First-class References in New York, Brooklyn, and Boston.  
Address  
L. S. H.,  
West Sutton, Mass.

## GOVERNORS.

**THE GILLESPIE GOVERNOR COMPANY, OF BOS-  
ton,** are now manufacturing  
GILLESPIE'S PATENT HYDRAULIC GOVERNOR,  
for Water Wheels of every description.  
After a test of five years' service, this Governor has proved itself far  
superior to any other hitherto in use; practical in accomplishing for  
Water Power the same as a Cut-off for Steam Power.  
Every Machine guaranteed to give entire satisfaction to the purchaser,  
or no sale.  
Office 13 Kilby street, Boston, Mass.

JOHN S. ROGERS, Treasurer.

For sale in New York by J. E. STEVENSON, 40 Dey street, and GEO.  
TALCOTT, 69 Liberty street.

A few of the many testimonials which the Company has re-  
ceived, in regard to the operation of their Governors, were published  
May 19, 1866, in No. 21 of this paper, to which reference is made.

## IRON PLANERS, JUST FINISHED, FOR SALE.

One 20-foot Bed 48x48 inches.  
One 12 " " 36x36 "  
Two 8 " " 30x30 "  
Two 6 " " 24x24 "  
Two 4 " " 20x22 "

All New and First-Class Tools, for sale low and ready for immediate  
shipment, by  
J. B. FULLER,  
8 Dey street, New York.

**NYE'S IMPROVED DAMPER.**—THIS ARTICLE, JUST  
patented, is one of great practical utility, which every con-  
sumer wants, and which has been pronounced by the most scientific  
and practical men to be superior to anything of the kind before  
produced—being adapted alike to anything of the kind before  
produced, and must meet an immense sale throughout the country.  
State, County, and Town Rights for sale. Apply to either of the  
undersigned.  
S. R. NYE,  
P. O. BATES, Barr, Mass.  
WM. B. HAMMOND, Petersham, Mass.  
or H. CARRUTH & CO.,  
46 Hanover street, Boston.

**STATE RIGHTS OR HALF THE ENTIRE RIGHT OF**  
Smith's Patent Fire-Lighter for sale. A useful article, wanted  
for daily household consumption. The best and most convenient  
ever got up for the purpose. A small box a few inches square will  
light more fires than a barrel of shavings. People are obliged to  
have something to light their fires with, so they generally keep shav-  
ings upon their premises for this purpose, which no person, cau-  
tious against accidental fires, would do, were these Fire Lighters  
manufactured and for sale.

Wholesale profits 300 or perhaps 400 per cent, each transaction.  
N. B.—If a reasonable price be not offered soon, he will accept a  
Partner with a moderate cash capital.

Address  
J. SMITH,  
Providence, R. I.

**VAN DE WATER CELEBRATED WATER WHEEL**  
for sale at the Eagle Iron Works, Buffalo, N. Y.  
Send for Circulars.  
DUNBAR & HOWELL.

**SETTING VALVES.**—FOR FIVE DOLLARS I WILL  
give full written directions for setting locomotive valves. Hav-  
ing had several years' constant practice, I can give practical infor-  
mation that cannot be found in books. Address JOHN ASKWITH,  
Chicago, Ill.

**BUERK'S WATCHMAN'S TIME DETECTOR.**—IM-  
portant for all large corporations and manufacturing concerns—  
capable of controlling with the utmost accuracy the motion  
of a watchman or patrolman, as the same reaches different  
stations of his beat. Send for a circular.

J. E. BUERK,  
P. O. 1,057, Boston, Mass.

MORANDI'S PATENT  
CHARCOAL FUEL SAVER!

Just the article for the warm season,  
with the least possible heat, and the  
smallest amount of expense—not to  
exceed two cents per hour.  
Samples can be obtained of the sub-  
scriber.  
Also State and county rights for  
sale, by

F. MORANDI,  
No. 65 Union street,  
Boston, Mass.

**IMPORTANT TO MANUFACTURERS AND IN-  
VENTORS.**—SMITH & GARVIN, No. 3 Hague street, New  
York, Machinists and Model Makers, are now ready to make pro-  
posals for building all kinds of Light Machinery, Manufacturers'  
Tools, Models, etc. Satisfactory reference given.

**MACHINERY AND MACHINISTS' TOOLS.** ALL  
kinds, including the LEONARD & CLARK PREMIUM  
LATHE. Also, Steam Engines, Saw Mills, Wood Cutting Machin-  
ery, etc., etc. Steamboat and machinery repairing at the  
QUASSACK MACHINE SHOP, Newburgh, N. Y.

**VOSSMARK & MEISSNER, CONSULTING AND**  
Mechanical Engineers and Brokers of Machinery, furnish  
Calculations, Estimates, General Working and Patent Drawings.  
Particular attention paid to the practical development of new in-  
ventions.

**SOMETHING NEW.**—MOORE'S PATENT.—FOR  
Sale.—The Patent Right of a Horse Hay Rack. The model can  
be seen, and all information given, at  
JOHN FORGE'S,  
133 Center street, New York.

**TO WRENCH MAKERS.**—FOR SALE, UPON  
reasonable terms, a valuable patent on a Pipe-Wrench. Ad-  
dress,  
A. B., New York City, Box 773.

**CLEMENS'S CIRCULAR SAW MILL.**—MANU-  
facturers, or parties wishing to engage in the manufacture of  
the best Saw Mill ever invented and put in practical operation,  
can obtain a license to build the same, with complete working  
drawings, upon application to the inventor.

G. H. CLEMENS,  
Post office Box 2,442,  
Cincinnati, Ohio.

**WANTED.**—LADIES OR GENTLEMEN IN EVERY  
town or village can exchange a few hours' labor for a few dol-  
lars in money by securing an agency to distribute the American  
Pen Fountain. Particulars sent free or sample ten cents. Apply to  
HADLEY & PIERCE,  
47 Hanover street, Boston, Mass.

**REYNOLDS'S TURBINE**  
WATER WHEELS!

REYNOLDS'S PATENT SWEEPS THE FIELD! New Improve-  
ments; Low Prices; Does not Clog; Has no Complications of Gates  
or costly Flume Work; Compact for Shipment; Great Water Saver;  
THE ONLY WHEEL THAT EXCELS OTHERS. Gold Medal  
awarded by American Institute for Superiority. Agents wanted in  
every county.  
Late TALCOT & UNDERHILL, No. 95 Liberty street.

**WANTED.**—A SITUATION BY A MACHINIST WHO  
has been accustomed to superintend Bolt Cutting Machines;  
also hot pressed Nut Machines. Has worked both solid and open  
dies for bolt cutting. Address  
SAMUEL COBURN,  
Box 624, Pittsburgh, Pa.

**WANTED.**—THE EXCLUSIVE AGENCY OF A LATE  
and useful Patent for sale by State rights—price about \$1000  
for United States. If article suit will pay all expenses of making sale.  
Answers must describe patent, date of issue, and price. Address  
KENYON & CO., 15 Broadway, New York.

Refer to JACOB MILLER, Director Citizen's Bank N. Y.; A. SHER-  
MAN, President First National Bank, Glenn's Falls, N. Y.; GEORGE  
HARVEY, President Farmer's Bank, Fort Edward, N. Y.

**VALUABLE AMERICAN AND ENGLISH PATENTS**  
sold for cash on commission. We have the best paying patents  
in this market, for sale. Agents can make \$5,000 a year. Address  
KENYON & CO.,  
151 Broadway, New York.

**WHEELER & WILSON, 625 BROADWAY, N. Y.**—  
Lock-stitch Sewing Machine and Button-hole Machine. Its

**WIND MILLS.**—SELF-REGULATING, FOR PUMP-  
ing, Grinding Grain, and other purposes, from one to thirty  
horse power. Also, ORVIS'S AMERICAN FARM MILL for Grind-  
ing, manufactured by the  
EMPIRE WIND MILL MANUFACTURING COMPANY,  
Syracuse, N. Y.

**M. BAILEY & CO., PROVISION BROKERS, NO.**  
40 West Fourth street, Cincinnati. Orders for Provisions,  
Lard, Tallow, Grease, Oils, etc., carefully and promptly filled.

**FOR PATENT SCROLL SAWS, PATENT POWER**  
Mortising Machines, Tenoning, Boring and Doweling Machines,  
Sash, Blind and Door Machinery, of the latest and most improved  
description, address J. A. FAY & CO., Cincinnati, Ohio.

**STEAM ENGINES—WITH LINK MOTION, VARIA-  
BLE automatic cut-off, of the most approved construction; Mil-  
Gearing, Shafting, Hanger, Etc. Address M. & T. SAULT,  
New Haven, Conn.**

IMPORTANT TO MANUFACTURERS USING STEAM  
FOR POWER.

KELLEY & LAMB'S Improved Steam Engine Governor, the only  
Governor that will give the same speed, with high or low pressure  
of steam, or the Engine being light or heavy loaded—is considered  
by those who have used it to have no equal, and is warranted to  
give satisfaction. Send for Circular.

LAMB, COOK & CO., Proprietors,  
Slatersville, R. I.

**A STRONG TOOL.**—VERY SUPERIOR IRON PLAN-  
ers, 4 1/2x2; 6 1/2x2 1/2; 8 1/2x3 feet. Send for Circular before pur-  
chasing. (23 5\*) L. E. OSBORN & CO., New Haven, Conn.

**SAWS! SAWS!! SAWS!!!**  
WOODROUGH & McPARLIN  
MANUFACTURERS OF  
PATENT GROUND SAWS,  
Dealers in Files, Gummets, Boring, etc.  
OLD SAWS REPAIRED PROMPTLY.  
Works, Hamilton, Ohio.  
Warehouse, No. 10 West Second street, Cincinnati, Ohio.

**ENGINEERING SCHOOL, FRANKLIN, N. Y., HAS**  
full equipment, and offers thorough instruction. Special ad-  
vantage—the small cost of living. For Circulars address  
G. W. JONES, A. M.

**OXY-HYDROGEN STEREOPTICONS; OXY-CALCI-  
UM STEREOPTICONS, DISSOLVING LANTERNS,  
MAGIC LANTERNS, Etc. Etc.**

A Large Assortment of American, European, and Foreign Photo-  
graph Views for the sale! A Priced and Illustrated Catalogue,  
containing 15 Cuts and 56 Pages, will be sent free by Mail on appli-  
cation.

WILLIAM V. McALLISTER,  
728 Chestnut street, Philadelphia.

**GODDARD'S BURNING MACHINE WORKS,**  
Office, No. 3 Bowling Green, New York,  
manufacture the  
Patent Steel Ring and Solid Packing  
BURNING MACHINES,  
Patent Mestizo Wool-burning Pickers, Shake Willows, Wool and  
Waste Dusters, Gessner's Patent Gigs, Etc.  
Orders respectfully solicited, and prompt attention given, by ad-  
dressing  
C. L. GODDARD,  
No. 3 Bowling Green, N. Y.

**WANTED.**—A FIRST-CLASS COACH BODY MAKER.  
Address Box 357, Cincinnati, O.

**\$150 A MONTH! NEW BUSINESS FOR AGENTS.**  
(19 13\*) H. B. HAW, Alfred, Me.

**TWO INVENTORS.**—  
J. B. TURCHIN & CO., Patent Office 92 and 94 Dearborn street,  
Chicago, Ill. Patents procured, etc. Branch Office in Washington.  
Direct Agencies in Europe. Unusual facilities to procure and sell  
Patents in France, and particularly in Russia.

**UNION IRON WORKS, RHINEBECK, N. Y.**—  
Manufacturers and Dealers in Cotton and Woolen Machinery  
of every description. Card Clothing, Belding, etc. New York Office  
91 Maiden Lane.

**\$10,000. I HAVE AMERICAN AND FOR-  
eign Patents recently issued, on an arti-  
cle much in demand. The business is a monopoly. I desire to send  
models to the Paris Exposition, and will sell one half interest in my  
Foreign Patents giving a party a rare opportunity to make money.  
Address for particulars,  
"O. W. T., Care W. B. & Co.,"  
53 Broadway.**

**TURNING TOOLS.**—MY SUBSTITUTE FOR THE  
slide rest meets with approval from practical men. It is in-  
tended for small lathes and light work; will bore out any hole six  
inches in diameter and two and a half inches deep; will face flanges,  
turn a piece in the chuck, or round out a curve. Price \$10.  
EGBERT P. WATSON, Box 773, New York.

**GREAT ECONOMY IN FUEL IS OBTAINED BY**  
CARVALHO'S IMPROVED STEAM SUPERHEATER. Prim-  
ing is prevented, and PURE Steam furnished to the Engine. Highly  
superheated steam, of any temperature, for Manufacturing or Chemi-  
cal purposes, produced when required. Is easily attached and very  
durable. Address HENRY W. BULKLEY, 57 Broadway, N. Y.

**LENOIR GAS ENGINES, FROM HALF HORSE TO**  
Four Horse-power. Manufactured at the DRY DOCK IRON  
WORKS, No. 435 East Tenth Street, New York.

**TO DYERS AND INK MANUFACTURERS.**—THE  
Cheapest form in which you can buy "Tannin" for making a  
Black Dye, or Ink, is N. Spencer Thomas's Extract of Hemlock  
Bark. It also colors a beautiful Tan Color. Price only Ten Cents  
per pound. Send for a Circular. Address the Manufacturer,  
N. SPENCER THOMAS,  
Painted Post, Steuben county, N. Y.

**FINE POWERFUL DOUBLE-LENS MICROSCOPES,**  
of which Prof. Hensford of Harvard University, says:—"It  
works well, and you have got it up very neatly." Free by mail for  
65c. "The Square Lens Microscope," 50c; "Little Wonder," 40c.  
One of each for \$1. J. EDWIN KING, Box 2,552, Boston, Mass.

**IMMENSE IMPROVEMENT IN STEAM.**—W. C.  
HICKS'S PATENT STEAM ENGINES save 75 per cent in space,  
weight friction and parts, with great economy in steam. Adapted  
to all uses. For circular address the  
HICKS ENGINE CO.,  
No. 88 Liberty street, N. Y.

**WOODWORTH PLANERS—IRON FRAMES TO**  
Plane 18 to 24 inches wide, at \$120 to \$150. For sale by S. C.  
HILLS No. 12 Platt street, New York.

**FOR BEDSTEAD AND FURNITURE MACHINERY,**  
Pressing, Shaping and Molding Machines, address J. A. FAY  
& CO., Cincinnati, Ohio.

**ENGINE LATHES, NEW AND SECOND-HAND, 16**  
to 48 inch swing 5 to 20 feet bed, first-class tools. Scroll and  
Screw Chucks, all sizes, Stubbs' Twist Drills and Sockets, Stocks and  
Dies, Ratchets, Hammers, and all kinds of Machinists' tools, in  
store, at the lowest rates, by  
J. B. FULLER,  
No. 8 Dey street, New York.

**SETS, VOLUMES AND NUMBERS.**  
Entire sets, volumes and numbers of SCIENTIFIC AMERICAN  
(Old and New series) can be supplied by addressing A. B. CO., Box No  
773, care of MUNN & CO., New York.

**MODELS, PATTERNS, EXPERIMENTAL AND**  
other Machinery, Models for the Patent Office, built to order  
by HOLKE & KNELAND, Nos. 5, 8, 530, and 52 Water street,  
near Jefferson. Refer to SCIENTIFIC AMERICAN Office.

**MANUFACTURERS OF TEXTILE FABRICS,**  
DUTCHER'S PATENT TEMPLES, adapted to weaving all  
kinds of goods. Also,  
THOMPSON'S PATENT OIL CANS,  
for oiling Machinery; neat and economical. Furnished by  
E. D. & G. DRAPER, Hopdale, Mass.

**PATENT POWER AND FOOT-PUNCHING PRESSES,**  
the best in market, manufactured by N. C. STILES & CO.,  
West Meriden, Conn. Cutting and Stamping Dies made to order.  
Send for Circulars.



**NEW PHYSIOGNOMY; OR, SIGNS OF CHARACTER**—as manifested through Temperament and External Forms, and especially in the Human Face Divine. With more than 1,000 illustrations. By S. B. WELLS, Editor of the PHRENOLOGICAL JOURNAL. In one volume, handsomely bound, \$5. Address FOWLER & WELLS, No. 389 Broadway, N. Y.

This work systematizes and shows the scientific basis on which each claim rests. The "signs of character" are minutely elucidated, and so plainly stated as to render them available. It is in the delineation of individual character that the system finds its most useful application. The various races and nations are described: The Teuton, Celt, Scandinavian, Greek, Mongolian, Indian, Paragonian, African, etc. has each his representative. Portraits, in groups, of distinguished persons of ancient and modern times, with biographical sketches and delineations of character, render the work of interest to all. DIVINES, ORATORS, STATESMEN, WARRIORS, ARTISTS, POETS, PHILOSOPHERS, INVENTORS, PUGILISTS, SURGEONS, DISCOVERERS, ACTORS, MUSICIANS, etc., are given. It is an ENCYCLOPEDIA of biography, acquainting the reader with the career and character in brief, of many great men and women of the past 1,000 years and of the present—such, for instance, as Aristotle, Julius Caesar, Shakespeare, Washington, Napoleon, Franklin, Bancroft, Bryant, Longfellow, Barnes, Irving, Rosa Bonheur, Theodosia Burr Cobden, Bright, Lawrence, Bolivar, Whately, Thackeray, Dow, Knox, Richelieu, Hopper, Buckle, Dickens, Victoria, Wesley, Carlyle, Motley, Mill, Spencer, Guthrie, Thompson, Alexander, etc. Every feature of the book, where practicable, has been illustrated with neat and finely executed engravings. AGENTS WANTED. 25 2

**THE VALUABLE MILLING PROPERTY, IN THE** City of Richmond, at the corner of Arch and Eighth streets, known as the "FRANKLIN PAPER MILLS,"

for Lease or Sale. At the request of the owners, we offer for Lease for a long term of years, the above valuable property, the buildings on which were destroyed by fire April 3, 1863. The lot contains an acre, and is supplied with water from the basin of the James River and Kanawha Company, at an annual rent of three hundred dollars. It has ample water power, which can be applied at three different points, and is never affected by freshets in the river. The property is also supplied with pure Spring Water, conveyed to it through iron pipes. The stone and brick walls are still standing, and contain a large quantity of valuable materials suitable for rebuilding. The site is admirably adapted for a first-class paper mill or flouring mill, or other manufacturing purpose, and being in the heart of the city, is believed to be the most valuable mill-site on the market, for the reason that the water rent is cheap and the power superior. For thirty years before its destruction by fire, it was successfully worked as a first-class paper mill. Should a purchase of the property be desirable, by an incorporated company, or an association of capitalists, the owners would be willing to take stock therein to the amount of the purchase money. Terms Accommodating, and made known on application to HARRISON, GODDIN, & APPERSON.

P. S.—Northern Capitalists wishing any further information in regard to this truly valuable property, are referred to Messrs. Harrison, Goddin, & Co., No. 18 New Street, N. Y. (25 2) H. G. & A.

**FOR SALE CHEAP.—THE COPYRIGHT OF AN ENTIRELY** new article that pays a profit of 800 per cent. Particulars can be had of the Proprietor, F. C. FLOYD, Post-office box 1204, Boston Mass. 19

**WATER WHEELS.—VALENTINE'S PATENT IMPROVED** Turbine is Superior to the Journal Turbine, combining freedom from choking up, cheapness, and durability with great economy of water. Send for Circular. VALENTINE & CO., Fort Edward, N. Y. 15 3

**STEAM BOILER EXPLOSIONS PREVENTED BY** the use of Ashcroft's Low Water Detector. Over 5,000 in use. Send for Circular. JOHN ASHCROFT, 50 John street, N. Y. 15 12

**TOBACCO CUTTERS, HAND MACHINES, SUITABLE** for Tobacco Dealers and Growers. Will cut chewing and smoking. Manufactured by J. THOMPSON, 25 2

**1,500 AGENTS WANTED TO INTRODUCE THE** most useful Labor-saving Machine known: RIP, CROSS-CUT, AND CROCK SAW COMBINED. Self-feeding. Warranted to do the work of three men. Send for Circular. (19) WM. H. HOAG & BRO., 222 Pearl street, N. Y.

**R. BALL & CO.,** SCHOOL STREET, WORCESTER, MASS., Manufacturers of Woodworth's, Daniels's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood. 25 52

**BURGH'S MODERN MARINE ENGINEERING—** APPLIED TO PADDLE AND SCREW PROPULSION. By N. P. Burgh, Engineer. PART V. NOW READY. To be completed in Fifteen Monthly Parts, and Illustrated with 30 correctly Colored Plates and numerous wood cuts. Price \$1 50 each part. D. VAN NOSTRAND, Publisher, 192 Broadway, New York. 25 1

**FOR SALE.—CLAYTON'S PORTABLE CIDER MILL,** Patent of July 11, 1865, illustrated in the Scientific American May 5, 1866. It has no equal. Rights for sale. Address W. & L. CLAYTON, Walnut street, between 36th-st and Darby road, West Philadelphia, Pa. 1\*

**TO PATENTEES AND DEALERS.—BRASS, TIN, and** Zinc Goods, of all descriptions, made and introduced to the Trade, Cutting and Stamping Dies, Tools, and Machinery, to order. Prompt attention and satisfaction guaranteed. J. H. WHITE, Newark, N. J., Late with Edward Miller, Meriden, Conn. 25 4\*

**INCORUSTATION IN STEAM BOILERS.—TEMPLE'S** Liquid removes and prevents Scale from forming. Prevents Corrosion of the Iron. Price reduced. Address A. TEMPLE, Bridgeport, Conn. 25 12\*

**10,000 AGENTS WANTED, MALE OR FEMALE—** in every Town, County, and State—to sell Todd's Perpetual Lamp Wick. Samples sent for 20c; two for 30c. Address, or call on MURPHY & COLE, 81 Newark Avenue, Jersey City, N. J. 25 11

**LOUIS J. CLAUDE, MECHANICAL AND CIVIL ENGINEER,** will be in Europe, principally in England, for the next twelve months, and will be prepared to undertake any Engineering work, collect any information required as to Public Works, Manufactures, or Patents, at reasonable rates. Address, care of A. S. WHITON, 19 Broad street, New York. Refers to Julius W. Adams and E. Worthen, 128 Broadway; A. Craven, Engineer Croton Water Works, New York. 25 2\*

**TWENTY-FIVE PER CENT OF THE COST OF FUEL** Saved annually by the use of Hair and Wool Felt as applied and for sale by JOHN ASHCROFT, 50 John street, New York. Send for Circular. 25 12\*

**STEAM AND WATER GAGES, GLOBE VALVES and** Cocks, Steam Whistles, Steam and Gas Fitters' Tools, Oil Well Machinery, etc. Wrought Iron Pipe and Fittings, for sale at the lowest rates by JOHN ASHCROFT, 50 John street, New York. Send for Circulars 25 12\*

**TWO POWERFUL HYDRAULIC PRESSES FOR** Sale by T. W. KRAUSE, 74 and 76 West Washington street, Chicago, Ill. 25 11

**TO RAILROAD COMPANIES AND MACHINISTS.—** Lathes, Planes, Shapers, and Drill Presses of the most improved design and construction, on hand, for instant delivery. E. & A. BETTS, Wilmington, Del. 25 1

**WANTED.—A PARTY TO BRING OUT AND IN-** troduce two new Shuttle Sewing Machines (wheel and drop feed). Also, to assist in taking out two or three other Patents. For further information, address Y. L. MELONE, Oxford, Ohio, (date of Granville, Ohio.) 25 3\*

**PIPE & BOLT CUTTERS, WITH DIES AND TOOLS,** in Store, ready for delivery. Steam and Water Pipe, Valves, and all kinds of Steam and Water Fittings, for sale low by J. B. FULLER, No. 8 Dey street, New York. 25 4

**CIRCULAR AND GANG SAW MILLS OF THE MOST** approved construction. Grist Mills and Mill Fittings, Wood Working Machinery of all descriptions, in store and for sale low by J. B. FULLER, No. 8 Dey street, New York. 25 4

**IRON MANUFACTURERS' GUIDE.** LESLEY'S (J. P.) IRON MANUFACTURERS' GUIDE TO THE Furnaces, Forges, and Rolling Mills of the United States, etc. 1 thick 8vo volume. Plates..... \$8 00. Published and for Sale by JOHN WILEY & SON, No. 535 Broadway, New York. 25 2

Fresh supply of MURPHY'S CHEMISTRY, 2 vols. 8vo, cloth, \$25 00. 25 2

**CIRCULAR SAWS,—** WITH EMERSON'S PATENT MOVABLE TEETH. Require less power, less skill, less files, saw smoother and better, cut less kerf, the saw always retains its original size. Send for descriptive pamphlet, containing information of value to all parties interested in lumber and sawing of any description. Address AVERCAN SAW COMPANY, 2 Jacob street, near Ferry street, N. Y. 25 4\*

**CAN I OBTAIN A PATENT?—FOR ADVICE AND** Instructions address MUNN & CO., No. 37 Park Row, New York or TWENTY YEARS' Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN \$5 a year. 50,000 Patent Cases have been prepared by M. & Co. 25 4

**J. A. FAY & CO.,** CINCINNATI, OHIO. Patentees and Manufacturers of all kinds of PATENT WOOD-WORKING MACHINERY of the latest and most approved description particularly designed for Sash, Blind and Door, Wheel Kelly and spoke, Stave and Barrel, Shingle and Lath, Planing and Resawing Mills, Etc. Navy Yards, Ship Yards, Railroad, Car and Agricultural Shops, Mills, Etc. Warranted superior to any in use. Send for Circulars. For further particulars address J. A. FAY & CO., Corner John and Front streets, Cincinnati, Ohio. Who are the only manufacturers of J. A. Fay & Co.'s Patent Wood working Machinery in the United States. 4 1v

**PORTABLE AND STATIONARY STEAM ENGINES,** 5 to 250 Horse-Power. New and Second-hand with or without Boilers, of all kinds, ready for immediate delivery. Shafting, Belting, Pulleys, Hangers, Mill Machinery of all kinds, in store and for sale low, by J. B. FULLER, No. 8 Dey street, New York. 24 4j

**A GERMAN METALLURGICAL ENGINEER, WHO** has completed his Academic as well as Practical Studies and who has been, for several years, in the most accomplished and extensive Iron Works in Germany, wants a situation. He is also very well acquainted with the manufacture of coke, and could make himself useful as a chemist. Address "ENGINEER," at Mrs. William Kobbé's, Leonard street, New York. 1\*

**FOR SALE.—A NEW PATENT RIGHT, (March 1866.)** on an IMPROVED WEATHER STRIP OR MOVABLE TILE, adapted to French or Casement windows and doors, opening inwards. May be constructed of wood or metal. See description of a cut illustrating the improvement in the Scientific American of June 9th. Apply to E. C. EVANS, Cabinet Post-office, Montgomery county, Pa. 25 2\*

**LENOIR PATENT GAS ENGINES.—WITHOUT FIRE,** coal smoke, or noise. Operated by petroleum, or coal gas. Ignited within the cylinder by the electric spark. Half-horse to four horse-power for pumping, sawing, turning, hoisting, grinding, etc. With portable gas generators for farms and plantations. Manufactured exclusively at the LENOIR GAS ENGINE WORKS, 435 East Tenth street, near Avenue D, New York. 25 10

**PATTERN LETTERS AND FIGURES (METALLIC)—** For Foundrymen, Machinists, Pattern Makers, and Inventors, for lettering Patterns, etc. All sizes, wholesale and retail. KNIGHT BROS., Seneca Falls, N. Y. 20 10\*

**THE AMERICAN TURBINE WATER WHEEL, PAT-** ented and manufactured by Stout, Mills & Temple, Dayton, Ohio, possesses new and valuable improvements, and remedies defects which exist in all other wheels classed under the name of turbine. Per cent of power equal to overshoots guaranteed. For descriptive circulars address STOUT, MILLS & TEMPLE, Dayton, Ohio or Oliver, Bro. & Co., agents, 45 Liberty street, N. Y., where sample wheels may be seen. 18 8\*

**KEEP YOUR CARRIAGES AND WAGONS PROPER-** ly washed, thereby saving 50 per cent of the wear, and making them run easy and still. Use the Patent Washer Cutter, for cutting carriage washers, pump packing, etc. KING & SMITH, Middletown, Conn. 18 10\*

**\$250 A MONTH MADE WITH THE BEST STEN-** OGRAPHIC TOOLS. For samples and prices address E. H. PAVN, Pavn's Block, cor. Church and Cherry sts., Burlington, Vt. 18 11

**ROCKWOOD & CO., PORTRAIT, LANDSCAPE,** and mechanical photographers, 839 Broadway, New York. This establishment received two Medals, the highest Premiums awarded at the last Fair of the American Institute, for mechanical photographs. Models, letters-patent, and drawings photographed. 19 3m

**THE CELEBRATED "SCHENCK" WOODWORTH** Planers, with new and important improvements, are manufactured by the Schenck Machine Co., Matamoras, New York. T. J. B. SCHENCK, Treas. JOHN B. SCHENCK, Pres't. 17 11

**GOULD MACHINE COMPANY,** NEWARK, N. J. IRON AND WOOD-WORKING MACHINERY, STEAM FIRE ENGINES. SEND FOR A CATALOGUE. 13 13

**AMERICAN PEAT COMPANY.—THIS COMPANY,** having the right to operate under five patents, are now selling Machinery and Territorial Rights to the same, to manufacture fuel of the best description for steam or domestic use. 12 26\*

**\$1500 PER YEAR, paid by SHAW & CLARK,** Biddeford, Me., or Chicago, Ill. 19 12\*

**CAMDEN TUBE WORKS (OFFICE AND MANUFAC-** tory Second and Stevens streets, Camden, N. J.), Manufacturers of Wrought Iron Welded Tube of all sizes; Pease's Improved Gas Pipe, Screwed Machines for both Hand and Power; Pipe Vises, Stocks, Dies, Taps, Reamers, Tongs, and all other tools used by steam and gas fitters. Also Upshot Drill Presses for both hand and power, constantly on hand and ready for delivery. 22 4\*

**WOODWORTH PLANERS, BARTLETT'S PATENT** Power Mortise Machine, the best in market. Wood-working Machinery, all of the most approved styles and workmanship. No. 24 and 6 Central, corner Union street, Worcester, Mass. 17 11\*

**STEAM GAGES—BATES'S PATENT—GOVERNMENT** and City Standards.—The cheapest and best steam gages ever offered in this market. Also Water Gages, Marine Clocks, Registers, Etc. Model making and repairing promptly attended to. Call and Examine, or send for circular before purchasing elsewhere. KEEN BROTHERS, No. 218 Fulton st. REFERENCES.—Messrs. Hopper and Douglas, U. S. Inspectors; Capt. Lord, M. P. Inspector; Messrs. T. D. & Bafferty, No. 4 Dey street; New York S. E. Works, Twenty-third street, E. R.; Wash. J. Works, Newburgh. 20 11

**PORTABLE STEAM ENGINES—COMBINING THE** maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 300 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOATLEY & CO., Lawrence, Mass. 1 11

**ANDREWS' PATENT CENTRIFUGAL PUMPS.—CA-** PACITY from 50 to 40,000 gallons per minute. For draining and irrigating lands, wrecking, coffer dam, condensers, cotton, wool and starch factories, paper mills, tanneries, and all places where a large and constant supply of water is required, these pumps are unequalled. They are compact, require little power, and are not liable to get out of order. For descriptive pamphlet address 1 11 W. D. ANDREWS & BRO., No. 414 Water street, N. Y.

**FOR DANIELLS'S PLANING MACHINES, CAR MOR-** TISING, Boring Machines, Car-Tenoning Machines, Car Planing and Beading Machines, Etc., address J. A. FAY & CO., Cincinnati Ohio 3 1y

**IRON PLANERS, ENGINE LATHES, DRILLS AND** other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 11\*

**OIL! OIL! OIL!** For Railroads, Steamers, and for machinery and burning, PEASE'S Improved Engine Signal, and Car Oils, endorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American," after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 and 63 Main street, Buffalo, N. Y. N. B.—Reliable orders filled for any part of the world. 111

**PRESSURE BLOWERS.** PRESSURE BLOWERS—FOR CUPOLA FURNACES, Forges and all kinds of Iron Works. The blast from this blower is four times as strong as that of ordinary fan blowers and fully equal in strength to piston blowers, when applied to furnaces for melting iron. They make no noise and possess very great durability, and are made to run more economically than any other blowing machine. Every blower warranted to give entire satisfaction. Ten sizes, the largest being sufficient to melt sixteen tons of pig iron in two hours. Price varying from \$40 to \$345. FAN BLOWERS, from No. 1 to No. 45, for Steamships, Iron Mills, Ventilation, Etc., manufactured by B. F. STURTEVANT, No. 72 Sudbury street, Boston, Mass. 1 11

**ANDREWS' PATENT OSCILLATING ENGINES.—** Double and Single Engines, from 1/2 to 125-horse power, finished at short notice. These engines leave the shop ready for use; require no special foundation; are compact, light and simple, and economical of power. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO., No. 414 Water street, N. Y. 1 11

**IMPORTANT TO RAIL ROAD TRAVELERS.—** THE PORTABLE RAILWAY REPAIR-BOX OR POCKET-BERTH. Patented July 4th, 1865. SUBSTANTIAL, SIMPLE, COMPACT. By means of the above invention, Railroad travelers may sleep at their pleasure, and ride days and nights continuously without experiencing fatigue. To Railway Companies, Railroad Agents, and Hotel Proprietors a liberal discount is made. Agents wanted in all the principal cities. Address JOHN R. HOOLE, Selling Agent, 19 13\*

**IMPORTANT TO MANUFACTURERS AND INVENT-** ORS.—SMITH & GARVIN, No. 3 Hague street, New York. Machinists and Model Makers, are now ready to make proposals for building all kinds of Light Machinery, Manufacturers' Tools, Models, etc. Satisfactory reference given. 22 4\*

**PEQUOT MACHINE CO.,** MYSTIC RIVER, Conn., Manufacture the most improved LOOMS FOR WEAVING TAPES, BINDINGS, WEBBING, RIBBONS, ELASTIC GOODS, AND ALL KINDS OF NARROW FABRICS. 23 8\*

Our Looms will run faster, do more work, are less liable to get out of order than other kinds, and are warranted superior to all others in every respect. Supplies of all kinds furnished for the same. 23 8\*

**TOWERS' ALCOHOL PROCESS OF TANNING.** Patented Dec. 1865; requires but one-third the time necessary by any other process. It will tan the heaviest hides in less than two months. It will make better leather and more of it. Calfskins tanned by it will average a quarter of a pound more weight than can be obtained by any known process. The leather is better. Everyone knows the preservative effect of alcohol upon all animal matter. It is applicable either to limed or sweated skins or hides. From sweated skins can be made upper leather as pliable and sole leather as easily sewed, as any limed leather in the market. No complicated or expensive machinery is needed. Any tannery may be adapted to the use of this process, for less than one hundred dollars. Specimens of the leather and the operation of the process may be seen, and any further particulars obtained, at the office, No. 30 Hanover street, Boston. L. FREDERICK RICE, Agent. 21 13\*

**PORTABLE ENGINES, SUITABLE FOR THE OIL** Regions, from 5 to 20-horse power, with large fire place independent steam feed pump, steam gage, and improved water heater. The most complete and best engines in the market. For particulars address WM. D. ANDREWS & BRO., No. 414 Water street, N. Y. 1 11

**STIMPSON'S SCIENTIFIC STEEL PENS. PATENT-** ed March 20th, 1866. Agencies wanted in every city of the Union. For Terms address WM. B. STIMPSON, 24 2\*

**CASTINGS—STOVE AND LIGHT MACHINERY, ALL** varieties on short notice and at low rates. Freehold Iron Foundry and Machine Shop, Freehold, N. J. Orders received by 22 4\*

**OAKLEY & KEATING, 184 Water street, New York.**

**OLMSTED'S PATENT FRICTION CLUTCH PULLEY** is adapted to any machine that runs with a belt and especially to the driving of lines of shafting where it is desirable to occasionally stop a whole line without stopping the main line. Its distinguishing features are simplicity, durability and adjustability, as it can be adjusted to set in motion heavy bodies gently, or to speed up instantly. Parties wanting these Pulleys are invited to correspond with WM. M. BETTS, Sole Proprietor, Stamford Machine and Tool Works, Stamford, Conn. 19 13

**ANDERSON & SCHERMERHORN, PATENT AND** Model Makers, Gearing Cocks, Valves and Engine. Patterns of every description. Rear No. 47 Ann street, second floor 21 4\*

**IMPORTANT TO COTTON AND WOOLEN SPINNERS.** William C. Davol's patent mode of working the cam shaft with other valuable improvements, on Sharp & Roberts' Self-acting Mule. The above mentioned improvements can be seen on application to MARVEL DAVOL & CO.'S Machine Shop, Office on Pond street, Fall River, Mass. 23 4\*



**ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.**—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton and Stationary Steam Engines, Shafting, Pulleys, Gearing, Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON, 164 Duane street, cor. Hudson, New York. 10 ly

**IRON CASTINGS AND STEAM BOILERS.**—THE HINKLEY AND WILLIAMS WORKS, No. 416 Harrison avenue, Boston, are prepared to manufacture common and gun-metal castings, of from ten pounds to thirty tons weight, made in green sand, dry sand or loam, as desired; also Flue and Tubular Boilers, and "Hinkley's Patent Boiler," for locomotive or stationary engines, warranted to save a large percentage of fuel over any boiler now in use. 13 6\*

**THE MOST VALUABLE MACHINE FOR BUILDERS** and Carpenters, Furniture, Carriage, Agricultural Implement, Sash and Door, Waived and Straight Moulding, and Piano Manufacturers, complete for all kinds of irregular and straight work in wood, hard or soft, superior to all others, having the capacity of 20 good mechanics, called the Variety Moulding and Planing Machine. We own 9 patents covering the valuable inventions for machines with upright mandrels. We hear there are parties manufacturing machines in France on some one or more of our patents. We caution the public from purchasing such infringements. Our patents secure to us the machine with either iron or wooden table through which are two upright mandrels, having cutters in each head held by a screw nut; also, combination collars, saving 75 per cent in cutters, feed table to plane and cut, irons outside the cutters, preventing wood from taking undue hold. Also guards acting as plane stocks, making it safe for a boy to run.

These machines are manufactured for America and Europe, only at the Hamilton Machine Works, No. 211 East Twenty-second street, New York. All communications addressed there will receive prompt attention. Agents solicited. Send for circular giving full description 15 13\*

**GROVER & BAKER'S HIGHEST PREMIUM ELASTIC** Stitch Sewing Machines, 495 Broadway, New York 1 tf

**STEAM BOILERS CLEANED AND KEPT CLEAN.**—N. SPENCER THOMAS'S Extract of Hemlock Bark. Cheapest and Best article ever discovered for removing and preventing Scale in Boilers. Acts like a charm. Price only Ten Cents per pound. Send for circular. Address the Manufacturer, N. SPENCER THOMAS, Painted Post, Steuben Co., N. Y. 20 row 1f

**CLOCKS FOR TOWERS, OFFICES, ETC., ALSO** Glass Dials for Illuminating. Address 73 Bow\* JOHN HERRY, Oakland Works, Sag Harbor, N. Y.

**SCHOOL OF THE MASSACHUSETTS INSTITUTE OF** Technology, Boston.—A professional school for the Mechanical, Civil, or Mining Engineer, Practical Chemist, Builder, and Architect; also provides a general education founded upon the Sciences, Modern Languages, and Mental and Political Philosophy. Requisites for admission:—Arithmetic, Algebra, Geometry, English Grammar, Geography, and the rudiments of French. Examinations for admission, June 4 and Sept. 20. Special students admitted to partial courses without examination. For catalogue apply to 6 13 row\* WM. P. ATKINSON, ry Secreta

**FOR WOODWORTH PATENT PLANING AND** MATCHING MACHINES, Patent Siding and Resawing Machine, address J. A. FAY & CO., Cincinnati, Ohio. 3 ly

### THE HARRISON BOILER—A SAFE STEAM BOILER.

This new steam Generator, combines essential advantages in Absolute safety from explosion, in first cost and cost of repairs, durability, economy of fuel, facility of cleaning, and transportation, not possessed by any other boiler.

It is formed of a combination of east-iron hollow spheres,—each 8 inches in external diameter, and 1/4ths of an inch thick, connected by curved necks. These spheres are held together by wrought iron bolts with caps at the ends. The form is the strongest known: Its strength to resist internal pressure very great—unweakened as it is by punching or riveting, which lessens the strength of the wrought iron boiler plate about forty per cent. Every boiler is tested by hydraulic pressure at 400 pounds to the square inch. It cannot be burst under any practicable steam pressure.

Under pressure which might cause rupture in ordinary boilers, every joint in this becomes a safety valve. No other steam generator possesses this property of relief, under extreme pressure without injury to itself, and thus preventing disaster.

It is not affected by corrosion, which soon destroys the wrought-iron boiler. Most explosions occur from this cause. It has economy in fuel equal to the best boilers, arising from the large extent and nearness to be fire of its heating surface, as also from the waved line of this surface which, thoroughly mixing the gases, induces better combustion, and breaking the flame, causes the heat to be more effectually absorbed than in the ordinary tubular or cylinder boiler.

It gets up steam quickly, and with little fuel. It produces superheated steam without separate apparatus, and is not liable to priming or foaming.

It is easily transported, and may be taken apart so that no piece need weigh more than eighty pounds. In difficult places of access, the largest boiler may be put through an opening one foot square. It is readily cleaned inside and out. Under ordinary circumstances, it is kept free from permanent deposit by blowing the water entirely out, under full pressure once a week. It requires no special skill in its management. Injured parts can be renewed with great facility, as they are uniform in shape and size. When renewed the entire boiler remains as good as new. The greater part of the boiler will never need renewal, unless unfairly used.

A boiler can be increased to any extent by simply adding to its width, and being the multiplication of a single form, its strength remains the same for all sizes. It has less weight, and takes less than one-half the ground area of the ordinary cylinder boiler, without being increased in height.

Any kind of fuel may be used under this boiler, from the most expensive to refuse coal dust.

Drawings and Specifications free of charge. For descriptive circulars or price address JOSEPH HARRISON, JR., Harrison Boiler Works, Gray's Ferry Road, Adjoining U. S. Arsenal, Philadelphia. 18 13\*

**BOLT, SPIKE, AND RIVET MACHINES.**—2,000 Bolts of any length, with head of any shape used in the trade, made from inch round or square iron, or under that size, are made per day of ten hours, by one man and boy, on Hardaway's Improved Patent Bolt Machine.

Our Spike Machine, for simplicity, durability, quality, and quantity of work turned out, is unequalled.

Our Rivet Machine is simple, durable, and does good work.

Shop and Territorial Rights for sale by Assignees of Hardaway & Sons. WHITE & BUTTERWORTH, P. O. Box No. 292, Baltimore Md., Office No. 2 Exchange Building. 17 tf

**A MESSIEURS LES INVENTEURS.**—AVIS IMPORTANT Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français peuvent nous adresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO., Scientific American office, No. 37 Park Row New York

### JUST PUBLISHED—THE INVENTORS' AND ME

**CHANIC'S GUIDE.**—A new book upon Mechanics Patents and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to Sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations, 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO., No. 37 Park Row N. Y. 15 tf

### ATMOSPHERIC TRIP HAMMERS.

Persons intending to erect, or those using hammers, are invited to call and examine Hotchkiss's Patent Hammer, made by CHARLES MERRILL & SONS, No. 556 Grand street, New York. They are very simple in construction require less power and repairs than any other hammer. The hammer moves in vertical slides; each blow is square and in the same place. For drawing or swaging they are unequalled, and many kinds of die work can be done quicker than with a drop. They are run with a belt, make but little noise, and can be used in any building without injuring the foundation or walls. The medium size, for working 2 to 4 inch square iron, occupy 28x56 inches floor room. Send for circular giving full particulars. 6 tf

**"POWER-LOOM WIRE CLOTHS" AND NETTINGS,** of all widths, grades, and meshes, and of the most superior quality, made by the CLINTON WIRE CLOTH COMPANY, Clinton, Mass. 10 52\*

**IMPROVED STATIONARY AND PORTABLE STEAM** Engines and Boilers, also Saw Mills, Cotton and Hay Presses, Corn and Flour Mills, on hand and in process of construction.

Marine Engines, Iron Steamers, Light-draft River Boats, Barges, Iron Bridges, Tanks, and general iron work constructed to order. Address T. F. ROWLAND, Continental Works, Greenpoint, Brooklyn, N. Y. 9 26\*

**FOR PATENT STAVE AND BARREL MACHINERY** Shingle Machines, Etc., address J. A. FAY CO., Cincinnati, Ohio. 4bt f

### Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anweisung, die Erfindern das Verhalten anzeigt, um sich ihre Patente zu sichern, herausgegeben, und versenden solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mitteilungen in der deutschen Sprache machen. Stützen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen selbst man zu adressieren an:

Munn & Co., 37 Park Row, New-York.

Auf der Office wird deutsch gesprochen. Dasselbe ist zu haben:

### Die Patent-Gesetze der Vereinigten Staaten.

nebst den Regeln und der Geschäftsführung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in der Vereinigten Staaten sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Ratsschläge; ebenfalls nützliche Winke für Erfinder und solche, welche Patente zu erwerben wünschen. Preis 20 Cts., per Post 25 Cts.



### ILLUSTRATIONS.

Anchor tripper, Gibson's.....	390
Bed, spring, Cronk's.....	46
Bedstead, invalid, Furman's.....	354
Beefsteak crusher, Doyle's.....	102
Belt stretcher, Rogers's.....	51
Bit fastening, Gordon's.....	242
Bit for horses, Baker's.....	79
Blacking box holder, Jelliffe's.....	91
Blacking boxes, method of riveting, Painter's.....	297
Blind fastener, self-adjusting, Dowell's.....	294
Bolt cutter, Seaman & Thomas's.....	350
Bolt cutter, Merriman's.....	328
Bolt cutter, Sweet's.....	423
Bolt header, Davis's.....	190
Boring machine, portable, Allison & Bannan's.....	398
Boring tool, Koch's.....	99
Box iron, Bidwell's.....	319
Bridge, combination, Lockwood's.....	175
Brick machine, Gard's.....	238
Buckle, safety, Hartman's.....	63
Broom head, Silvers's.....	178
Buckle, Frye's.....	318
Button, Barnum's.....	51
Callipers, registering micrometer, Soper's.....	218
Caloric engine, Ericsson's.....	318
Car axles, rolls for making, Cooper's.....	14
Car spring, Douglass's.....	6
Car wheels, system of rolling, Vanstone's.....	47
Carpet fastening, Andrews & Burnham's.....	319
Carriage jack, Woodworth's.....	195
Carriage wheel, Curtis's.....	292
Carte de visite frames, machine for bevelling, Bedell's.....	143
Centre board, Hall's.....	242
Chair, nursery, Rainey's.....	292
Cherry stoner, Van Kanel's.....	236
Chimney top, Horton's.....	58
Churn, Ryerson's.....	406
Churn, White's.....	342
Cider mill, Clayton's.....	295
Clamp for stretching shoe uppers, Shaw's.....	362
Condensing and moulding mill, Leavitt's.....	95
Connecting link, Kirk's.....	115
Corn harvester, Butterworth's.....	142
Coupling, shaft, Waterhouse's.....	214
Cradle, self-rocking, Helmkamp's.....	314
Crotch, Bugbee's.....	314
Culinary vessel, Dembois's.....	382
Dish stand, Lamb's.....	374
Doubletrec, Dowell's.....	294
Dough kneader, Loveland's.....	118
Drilling and pumping machine, Clapham's.....	375
Evaporator, sorghum, Skinner's.....	254
Evaporator, tubular, Hawley's.....	430
Fishhook, Livermore's.....	102
Fodder cutter, Schooley's.....	392

Foot press, Stiles's.....	254
Forge, mist, Gould's.....	102
Fractures, apparatus for the reduction and retention of, Latta's.....	255
Fruit can, Illig & Neuberger.....	378
Fruit jar, Chrysler's.....	282
Furnace for puddling iron, Williams's.....	191
Gage, standard steam, Keen Bros.....	378
Gage, steam, Low's.....	315
Gage cock, Broughton's.....	54
Gage cock, Walker's.....	14
Gas heater, Birkey's.....	162
Governor, automatic stop, Gardner & Robertson's.....	126
Governor, self-closing, Brown's.....	322
Grate, elliptic, Habermehl's.....	67
Grinder and drill, Soper's.....	86
Grindstones.....	223
Grooving tool, Taylor's.....	167
Hammer, atmospheric, Hotchkiss's.....	258
Hay band machine, Parmelee's.....	210
Hay fork, Garrett's.....	179
Hay fork, Reynolds's.....	131
Hay raking and loading device, Healy's.....	391
Hen's nest, Campbell's.....	122
Hoisting machine, Marvin's.....	79
Horse rake, Adelsberger's.....	62
Horse rake, Hardgrove's.....	78
Hot-air furnace, moist, Dayton's.....	239
Hub, metallic, Abbott's.....	214
Jar arrester, McNamee's.....	162
Lamp trimmer, Kerosene, Brooks's.....	126
Lock, Stafford's.....	110
Lock, hoop, Quant's.....	158
Lubricator, open-top suit, Storer's.....	436
Mail bags on railway trains, apparatus for delivering and receiving, Chavanne's.....	275
Mandrel, expanding, Critchley's.....	522
Millstones, method of ventilating, Kemp's.....	562
Mowing machine attachment, Frailey's.....	18
Oars, rigged, Smith's.....	50
Oil cup, Hare's.....	54
Oil wells, packing for, Fowler's.....	150
Oil wells, packing for, Fowler & Morgan's.....	102
Oiler, Broughton's.....	130
Orchestron, Pries's.....	158
Oven, annular, Hoffman's.....	414
Oven, steam, Whitlock's.....	255
Paddle wheel, Choate's.....	342
Paddle wheel, radiating, Haight's.....	134
Paddle wheel, self-feathering, Keene's.....	374
Pea sheller, Lewis's.....	174
Pencil sharpener, Shaver's.....	131
Petroleum as fuel.....	82
Pipe, Jeanne's.....	292
Piston packing, Goodfellow's.....	136
Plow, sulky, Pratt's.....	94
Plows, Green's.....	115
Pressure test, Justice's.....	174
Pulley, friction, Brown's.....	354
Pump, Bellingrath's.....	150
Pump, Hooker's.....	214

Railway check, Thomas's.....	246
Refrigerator, Esquilmaux, Bunn's.....	422
Road scraper, Blodgett's.....	336
Ruler, parallel, Smith's.....	206
Saw gage, gang, Tracey's.....	114
Saw mill, hand, Talpey's.....	2
Saw, scroll Talpey's.....	220
Saw, device for centering, Rand's.....	258
Sawing machine, Logan's.....	246
Sawing machine, shingle and barrel head, Low's.....	407
Scissors sharpener, Russ's.....	38
Sewing machine, the Florence.....	1
Sewing machine, motion for, Folsom's.....	274
Sewing machine, three-stitch embroidery attachment for the Wheeler & Wilson.....	159
Shears for plate iron, Hornig's.....	15
Shingle roofing, the Burlington.....	374
Ships, method of ventilating, Wells's.....	194
Shock arrester, Ladenberger's.....	314
Show case, cigar and tobacco, Brown's.....	222
Skates, parlor and ice, Plympton's.....	182
Spinning rollers, Hall's.....	6
Spoke-tensioning and felly-boring machine, Dole's.....	282
Steam, apparatus for superheating, Carvalho's.....	98
Swarm alarm, Snell's.....	46
Tea or coffee pot, condensing, Beaumont's.....	342
Thrasher and separator, Brown's.....	182
Thrashing machines, gearing for, Hubbell's.....	142
Tile machine, Evans, Collins & Smedley's.....	127
Toggle joint and screw press, Griffin's.....	392
Trap, steam, Wilson's.....	19
Tube expander, McConnell's.....	70
Type-setting and type-distributing machine, Alden's.....	22
Valve, balanced slide, Richards's.....	31
Valve, globe, Powell's.....	95
Valve, globe, Chesley's.....	179
Valve, safety gas, Jacobs's.....	410
Valve, slide, Green's.....	338
Valve gear, Woodruff's.....	334
Vise, bench, Jones's.....	411
Wagon brake, Hamilton's.....	335
Wagons, shifting top for, Morse's.....	190
Washing machine, Lutes's.....	339
Washing machine, hand, Van De Mark's.....	38
Washer, improved, Hickman's.....	294
Water cooler, Hopkins's.....	274
Water elevator, Perrine's.....	6
Water wheel regulator, Lakin's.....	236
Watch key, Remington's.....	354
Watch key, Mershon's.....	430
Weather strip, Evans's.....	406
Wood, apparatus for preserving, Robbins's.....	111
Wrench, screw, Conner's.....	406
Wrench, screw, Furlong's.....	110
Wringer and mangle, combined, Palmer's.....	19

### MISCELLANY.

Absorption, the physics of.....	95
Academy of Sciences.....	274
Acid in spring water, sulphuric.....	211
Acid, new method of making sulphuric.....	166
Acid, phenic.....	425
Activity of Pittsburgh, industrial.....	239
Advertisement, a telling.....	300
Advertising, advantages of.....	21
Aeronaut, ascent and return of the.....	381
Aeronautical society of Great Britain.....	290
Agates.....	150
Agent, a new intensifying and toning.....	326
Agnew, note from Dr.....	148
Air by compression, heating of.....	193
Air, inspiring of.....	79
Air in wine tuns.....	261
Air, sealing.....	211
Air, the flickering of hot.....	164
Album for porcelain pictures.....	282
Album machine, the.....	23
ALGONQUIN and WINOOSKI, the official report of the chief engineers.....	149
Alloys and their discovery, fusible.....	30
Alloys, composition of.....	261
Amalgamating, improvements in gold and silver.....	229
American Institute, the.....	118
Ammonia as a manure, the use of.....	81
Anæsthetic, a new—another use for petroleum.....	297
Apprentice answered, an.....	68
Apprentice seeks information about his trade, an.....	30
Arms, breech-loading.....	222
Art, extension of the photographic.....	130
Artificial limbs.....	215
Artisan wells of Chicago, the wonderful.....	94
Arts found, one of the lost.....	332
Asbestos.....	422
Association for the prevention of boiler explosions, the.....	195
Astronomers, a suggestion to.....	21
Axle grease, costly.....	198

### C

Cable, the new.....	115, 190
Caloric, bottled.....	398
Cannon in Europe, American breech-loading.....	210
Can, milk-preserving.....	196
Car axle, a crystalline.....	244
Car wheels, casting.....	68
Car wheels, casting—Invention wanted.....	84
Cars, cork springs for.....	424
Carbon through animal and vegetable life, the circuit of.....	71
Cast iron on melted cast iron, cold.....	132, 163, 231, 245, 390
Cast steel, working.....	36
Cast steel—magnesium crucibles.....	265
Cascade of light, the.....	250
Cascade of light in Boston, the.....	244
Castings smooth, to make iron.....	212
Cattle plague, etc.....	14, 69, 225, 396
Cavendish society.....	215
Cavern under Lancaster, Pa., probable existence of a great.....	228
Cement, gutta-percha.....	340
Champagne and its production.....	48
Channel ferry, the proposed.....	130
Challenge, water wheel.....	69
Chemistry, the practical value of agricultural.....	198



Chinese workmen.....	208	Gears, referred to.....	209	Mint, the British.....	146	Railway, the Broadway subterra-	135	Wagon, in Pittsburgh.....	85
Chloride of lime for vermin.....	115	Gears, table for the teeth of.....	185	Mistake, a slight.....	381	*Railways for streets, elevated.....	318	Walnut, the finish of unvarnished.....	85
Chloroform—describing a circle.....	230	Gear wheels.....	148	Model from Freeport, Ill., destroy-	16	Razor, shaving with a wooden.....	317	Water factory in Illinois, a.....	117
Cholera coming, the.....	87	Genius, another tax on.....	323	Molders, co-operative.....	265	Razors.....	317	Watch hands, how to color red.....	197
Cholera, cure for.....	230	Geology of the central railroad.....	71	Molders, hints to.....	163	Readers, a word to our youthful.....	157	Watches, winding.....	212
Cholera, treatment of.....	230, 231	Geological periods, length of.....	212	Molders, query for.....	116	Reciprocating with the Canadas.....	34	Water freeing at a depth of twenty-	178
Cholera, the.....	230	Gilders' composition for frames, etc.....	148	Monads, the ironclad.....	243	Reformers, city.....	303	Water, granite scheme for supply-	71
*Chuck, spur.....	339	Glass, thallium.....	345	Money market, the way it is sup-	86	Reformers, city.....	303	Water supplied to cities, filthy.....	21
Chrome yellow, preparation of.....	424	Gleanings from the Polytechnic.....	371	Modon, all things in.....	279	Reformer, revised, the.....	300	Water wheels, a question in rela-	21
Chrome, to tighten a scroll.....	197	Glutinous substances, on a method of drying.....	411	Modon, the crank.....	5	Rifles for sportsmen, breech-load-	359	Water wheels for the South.....	240
Cigar ship at sea, a.....	301	Gold and silver, manufacture of.....	256	Motor, exhibition of a new electro-	263	Rolling mills, Pittsburgh.....	180	Weights and measures, probable	303
Cigar steamer, launch of Winans's fourth.....	199	Gold and silver, production of.....	260	Motors, hydraulic.....	363	Ropemakers work, how.....	362	Weights and measures, the decimal	304
Cigar vessels not perfect yet.....	150	Gold from solutions, to recover.....	424	Movement, recent photographic.....	362			system of.....	304
Cipher writing.....	361	Gilder, artificial production of.....	300	Music Hall, new.....	410			Well, a sulphur.....	306
*Circle with a pencil, to strike a.....	163	Grenade, hand.....	223					Whisky, a large yield of.....	54
Claterns, steam in cemented.....	244	*Grindstones.....	223					Whistles as signals on trains.....	323
Cloth, stain amiable, rendering.....	62	Grocery, the right kind of a.....	21					Whitewash, a good.....	325
Cloth and substitute.....	289	Gun-cotton, storage of.....	396					Williams, death of C. Wye.....	316
Coal fields, exhaustion of British.....	15	Gunpowder.....	4					Wire drawing, new patent process	365
Coal, its use and abuse.....	15	Gutta-percha and india-rubber, decay of.....	36					in.....	365
Coal, the theoretical and actual power of a pound of.....	103							Wire manufacturing, large.....	178
Coating iron with copper—secret processes.....	149							Witch hazel, a believer in.....	163
Coffee, a novel mode of treating.....	359							Witch hazel, the truth in regard to.....	228
Coffee, novel mode of treating.....	430							Wood, Burnettizing.....	119
Coffee, how to make.....	357							Wood turning at high speed.....	422
Coffee, Liebig on.....	129							Work for boys.....	344
Coffee, still nearer perfection.....	427							Works, new and valuable scientific	21
Coffee, to prevent the loss of aroma in roasting.....	345							Workmen coming to America, Eng-	228
Coin and feather in vacuo, a.....	350							lish.....	228
Collodio-bromide of silver plates, on the manipulation of.....	208							Workingmen's associations.....	430
Collodion without bromine, photog-	68							Workingmen, education of.....	339
Colors from coal tar.....	178							Workshops, discipline of the.....	95
Commissioner of Patents, report of the.....	176							Workshops, fire-proof.....	159
Commissioner of Patents, report, remarks on.....	199							Workshops of Clinton, Mass., the.....	146
Compass in iron ships, deviation of the.....	220							Workshops of Manchester, Eng-	160
Convention, continental telegraph-	81							World growing larger, is the.....	427
Convention, continental telegraph-	81							World move, how fast does the.....	353
Cooking academy, Prof. Biot's.....	72								
Correspondence, our special.....	378								
Cotton crop, estimates about the.....	394								
Court houses, the foulness of.....	238								
Crank motion, the.....	69								
Cranks, a question of.....	69								
Cream, burying.....	150								
Cresosote for preserving timber.....	36								
Criminal war, projectiles used during the.....	244								
Croquet, the game of.....	362								
Crucibles, manufacture of.....	436								
Crucibles, making in molds.....	24								
*Cryptography.....	295, 395								
Currency, Clark on the.....	150								
Currency delusion, the.....	243								
Curiosity made useful, a natural.....	294								
Curtains for theaters, steel.....	75								
Cylinder, a large steam.....	35								
D									
Day changes, where the.....	228								
Dead letters at auction, sale of.....	33								
Developer, another ne.....	380								
Dies, hardening.....	320, 330								
Disinfectants and the cholera.....	343								
Disinfectants, Dr. Volcker on.....	145								
Disease, popular remedies for.....	280								
Do it well.....	215								
Dome, lighting up of the Capitol.....	97								
*Drawing, mechanical.....	379								
Drill for hard wood, the best.....	340								
Dust from shops, drawing.....	212								
Dyeing, a new process for indigo.....	281								
E									
Earth, a body falling through the.....	319								
Economy, system a means of.....	425								
*Elbow, to turn an.....	163								
Electricity from combing the hair.....	244								
Electricity in a cotton mill.....	258								
Electricity in deep sea sounding.....	234								
Electricity to paddle engines, ap-	243								
lication of.....	243								
Electricity, two kinds.....	357								
Electrotyping, preparing casts for.....	50								
Engine, a new gear-cutting.....	2								
Engine, a petroleum.....	84								
Engine, Baird's simplification of the screw.....	361								
Engine shop in France, the largest.....	147								
Engine, the Avery.....	164								
*Engine, the Lenoir gas.....	259								
Engines and boilers, patching.....	203								
Engines, experiments with traction.....	225								
Engines, improvements in gas.....	366								
Engines, tank.....	19, 54								
Engines, traction.....	36								
Engines, hot.....	303								
Engineers, incompetent.....	412								
Engineering job, a stubborn.....	382								
Engineering, modern marine.....	304								
Enterprise in China, American.....	300								
Enterprise, newspaper.....	148								
Enterprise, Western.....	148								
Examiners' pay, increase of.....	317								
Excursion, the European naval.....	337								
Exhibition, Austrian industrial.....	72								
Exhibition, Australian intercol-	362								
onial.....	362								
Exhibition in Brazil, agricultural.....	365, 369								
Exhibition, report on the French.....	110								
Exhibition, the great Paris.....	25, 71								
Exhibition, what to send to the French.....	167								
Experiments, a brilliant series of.....	247								
Explosions, prevention of steam-	52								
boiler.....	128								
Explosions, record of boiler.....	128								
F									
Factories, hours of labor in Eng-	103								
lish.....	103								
Fair, exhibitors at the French.....	87								
Family, a happy.....	151								
Farmer's club.....	151								
Feed for low-pressure boilers, heat-	23								
ing.....	23								
Felt-cutting machinery.....	116								
Fire arms, breech-loading.....	322								
Fire, St. Elmo's.....	322								
Fishhooks, how they are made.....	336								
Fleet, failure of the machinery of the new screw.....	344								
Flower seeds, planting.....	179								
Flue, collapse of an English.....	324								
Flues, weakness of large.....	276								
Fly wheels for long shafting.....	215								
Food and its adulterations.....	375								
*Foot lathe.....	3, 18, 31, 50, 66, 85, 95								
Fortifications, granite and iron.....	35								
Franking privilege, abuse of the.....	426								
France, new things in.....	213, 261								
Freights, improved facilities in rail-	379								
road.....	334								
Fuel, water.....	334								
G									
Galvanic battery, a cheap.....	284								
Gardening, items for lovers of.....	326								
Gas explosion.....	339								
Gas lighting.....	37								
Gas mains, wrought iron.....	46								
Gases, utilization of blast furnace.....	177								
Gears, on.....	193								
H									
Hate are made, the way felt.....	427								
Hay in the mow, weight of.....	98								
Health and how to keep it.....	96								
Heat, one thing about.....	104								
Heat of steam, utilizing the.....	293								
Heat through water, the passage of.....	183								
Holst, a steam.....	266								
Housekeepers and others, useful hints to.....	166								
How does he do it?.....	340								
Hydrogen, sulphureted.....	345								
I									
Ice, a steam car upon.....	54								
Ice, formation of anchor.....	237								
Ice-making apparatus, Keller & Henderson's.....	67								
Ice, strength of.....	206, 244								
Implement, a new war.....	336								
Incarnations, Mr. Winans on.....	82								
Industry, New England.....	387								
Information wanted.....	151								
*Injector, the Giffard.....	211								
Ink, indelible.....	256								
Ink, permanent for writing in re-	378								
lief on zinc.....	378								
Insurance company, the Midland steam boiler.....	263								
Insurance companies, prosperity and adversity of.....	87								
Internal revenue commission, re-	103								
port of the.....	103								
Invention, a spiritual.....	282								
Invention, novelties in.....	364								
Invention, use of an.....	148								
Inventors.....	302								
Inventors, bill to tax.....	428								
Inventors, taxing.....	320, 322, 343, 360								
Inventors for appealing from one set of examiners to another set, bill to fine.....	320								
Investment, a paying.....	362								
Iron, an experiment with clean.....	260								
Iron, exceedingly hard.....	62								
Iron, rusty.....	163								
Iron, smelting.....	424								
Iron, some facts in relation to.....	16								
Iron, straightening.....	68								
Iron, the maximum strength of.....	212								
Iron workers, African.....	164								
Ironclads, English.....	7, 361								
Ironclads, the French.....	177								
Ironclad navy, French.....	285								
Iron-plating of granite forts.....	15								
Items.....	197								
J									
Jack at Westminster, a steeple.....	163								
K									
Kangaroo on a tread-mill.....	257								
Ketchup, mushroom.....	193								
L					</				



- Blind fastening, etc. 122, 217, 387, 435  
Blind slats, machine for wiring 104  
Blind slats, tenoning 310  
Blind split machine 122  
Blinds, machine for boring 121  
Block disengaging hook 158  
Blower, steam, etc. 89, 187, 249  
Blow pipe 201, 249  
Boats, detaching from davits 225  
Boat, 270, 417  
Bobbin for spinning 42, 330  
Bobbin, web 250  
Boiler feeder 170, 290, 370, 418  
Boiler for culinary purposes 332, 384  
Boiler furnace, steam 218  
Boiler flanges, machine for turning 403  
Boiler heads, machinery for forming flanges upon 385  
Boilers, guard plate for 155  
Boiler thimble 393  
Boiler tube 327  
Boiler tubes, apparatus for cleaning 187, 202  
Boiler tubes, tool for cutting off 217, 419  
Bolt 137  
Bolt fastening 307, 327  
Bolt-heading machine 120, 123, 153, 170, 217, 267, 308, 433  
Bolt, spring 403  
Bolt, screwing machine, etc. 8, 121  
Bolt, sash and door 420  
Bolts, machine for making 234  
Bone black, purifying 369  
Bones for manure, etc., mode of grinding 350  
Bonnet frame 216  
Books, machine for curving the backs of 432  
Boom jaws, guide for 357, 403  
Boot and shoe 37, 147  
Boot blacking, etc. 120, 184  
Boot crimp 120  
Boot-jack, etc. 288, 386  
Boots and shoes, machine for making, etc. 153, 169  
Boots and shoes, process of preparing wood for 327  
Boots and shoes, mode of securing tips to 201  
Boots and shoes, piping for 250  
Boots, crimping 234  
Boots, cutting uppers for balmeral 57 (2)  
Boots, mode of lacing 184  
Book-leaf turner 41  
Bosom and collar, paper 416  
Bottle filler 412  
Bottle, graduated 122  
Bottle handle 107  
Bottle stopper, etc. 104, 154, 185, 317, 387, 421  
Bottles, frame for securing liquor and other 235  
Bottles, tool for holding glass 387  
Bottling liquid, apparatus for 185  
Bouquet holder 216  
Bow irons for carriages 73  
Box rail, railroad 10  
Boxes, detecting check 384  
Bradawl handle 122  
Braiding machine 187, 171  
Braiding machines, carrier for 435  
Braiding machines, yarn-delivery apparatus for 416  
Bran duster 120  
Branding tool 90  
Brazier for cooking stoves or ranges 136  
Bread and meat cutter 268  
Bread, apparatus for making aerated 91  
Bread, the manufacture of 11  
Bread, soap, and black lead, machine for cutting 188  
Breast collar 74  
Brick machine, etc. 88, 90, 152, 189, 202, 248, 289, 330, 347, 350, 363, 399, 386, 402 (2), 416 (2), 417, 419, 420 (2), 435  
Bride, safety, etc. 88, 416  
Bridges, method of turning 416  
Bristles, machine for combing, etc. 154, 289 (2), 349  
Bridge 156, 288  
Bronze powder, manufacture of 248  
Broom 40, 310, 420  
Broom clasp 10, 385, 418, 419  
Broom corn and sorghum strip-pers 200  
Broom head, 11 (2), 16, 25, 41, 57, 104, 106, 108, 216, 217, 233, 248, 249 (2), 267, 269, 287, 289, 307, 309, 327 (2), 329, 347, 349, 369, 385, 418, 433  
Broom heads, stocks for 417  
Brush (various kinds) 75, 168, 309, 326, 330, 347, 357, 402  
Building block 185  
Bugle, horn, cornet, etc. 187  
Buckle, 5, 26, 75, 88, 137, 138, 139, 268, 327, 347, 370, 385, 401 (2), 418, 434  
Buckle clasp 403  
Buckles, machinery for making 10  
Bucket, elevator 40  
Bucket for wells, self-lifting 400  
Bullets for small arms 248  
Bullets, machine for molding 185  
Bulion, process for refining 217  
Burglar alarm, 185, 186, 201, 203, 328, 348, 402, 419  
Burning fluid 187, 251, 290 (2), 347  
Burial bar, air-tight 327  
Burial case 154, 160  
Burner, hydro-carbon 218  
Burrishing machine 106  
Butter mold 290  
Butter worker 202, 326  
Button, 130, 138, 187, 233, 289, 290, 327, 348, 368  
Button attachment for apparel 309  
Button fastening 288, 349  
Button-hole cutter 249  
Button, swivel 217  
Buttons, apparatus for securing to fabrics 169 (2)  
Buttons, machine for pressing glass 267
- C**  
Cable stopper 418  
Cage for hoisting purposes, etc. 347  
Calculating machine 57  
Calipers 26, 57  
Camp stool 121  
Canal propulsion, device for 187  
Candy, manufacture of 269  
Cane mill 386  
Cane stripper 267, 384  
Can for tea, sugar, etc. 10, 310  
Cans, apparatus for expelling air from 267  
Cans, manufacture of 296  
Canvas stretcher 435  
Canteen and lunch box 122  
Capstan by steam, working a 153  
Carbonic acid from mixtures of gases, method of separating 400  
Carbonic acid, method of charging water with 400  
Carbonic acid gas, method of preserving and storing 400  
Carbureting machines, apparatus for forcing air into 247  
Caramel, manufacture of dry 203  
Carpet bag 170  
Carpet bag frame 417  
Carpet lining, fastener, stretcher, etc. 8, 42, 168, 184, 327, 402 (2)  
Car axles, machine for determining the load of 139  
Car break 25, 40, 74, 103 (2), 123, 167, 185, 200, 203, 218, 235, 287, 308, 324, 400  
Car coupling 8, 10, 25, 75, 90, 137, 153, 181, 186, 203, 248 (2), 249, 252, 310 (2), 367, 385, 386, 401, 417, 434  
Car seat, spring, truck, etc. 202, 216 (2), 218, 307 (2), 310, 402, 418, 420  
Car wheel for lubricating purposes 385  
Car wheel, etc. 106, 138, 153, 184, 309  
Cars, mode of stopping and starting 338, 432  
Cars on railways, improved method of propelling 348  
Cars on springs, mode of suspending 432  
Cars, wooden mat for 433  
Carriage, etc. 248, 307, 329  
Carriage axles, device for lubricating 310  
Carriage bows, attaching props to 369  
Carriage doors, landau 187  
Carriage seat, spring, wheel, hub, top, etc. 26 (2), 42, 88, 90, 121, 168, 170, 202, 232, 248 (2), 308, 309, 310, 350 (2), 369, 384  
Carriages, attaching and detaching breeching straps from 41  
Cart 184  
Cartridge 11 (2), 107, 238, 416  
Cartridge cases, machine for making 310  
Cartridge, metallic, etc. 168, 310  
Cartridges, priming 201  
Carding machines, card for 330  
Casks, barrels and kegs, manufacture of 402  
Caster for furniture 26, 121, 419  
Casters to furniture, mode of attaching 104  
Castings, method of making molds for 417  
Castings, apparatus for molding 433  
Cast iron, method of combining wrought iron with 384  
Cattle, device for watering 202  
Cavalry accoutrements 74  
Cellars, apparatus for draining 248  
Cement, etc. 42, 105, 187  
Centrifugal machine 137, 253 (2), 432  
Ceramic ware, mode of securing photographic pictures on 123  
Chair, etc. 9, 131, 122, 186, 310, 369, 370, 384 (2)  
Chair and walker for children 348  
Chairs, construction of 290  
Chain, elastic 120  
Chain hook or cable 120  
Chain links, machine for stamping 307  
Chains, die for working links into 414  
Chamber pot, etc. 105, 249  
Charcoal, animal 234  
Chase, printer's 42  
Check book 251  
Cheese box, etc. 330, 402  
Cheese, manufacture of 267  
Cheese, preparing for market 186  
Cheese, turning 186  
Cherry stoner 370  
Chess board 170  
Chimney cap 89, 106, 216  
Chimney holder and fastener 120  
Chisels, holder for 269  
Cholera, method of treating 232  
Chronographs, electro-ballistic 43  
Chuck 369  
Chuck, etc., screw-cutting 105, 154  
Churn 42, 74 (2), 75, 104, 105, 106, 122, 152, 154, 170 (2), 200, 201, 217 (2), 218, 232, 233, 234 (2), 248, 266, 269, 289, 367, 327, 350 (2), 384 (3), 417 (2), 418, 419, 420, 433 (2), 434 (2)  
Churn, etc. 233, 287, 309, 384 (2), 401, 402, 413, 432  
Cider mill 89, 137, 412  
Cigar lighter, gas-jet 403  
Cigar machine 9, 58, 168, 385, 403  
Cigars, machine for making fillers for 330  
Clamp, molder's, etc. 48, 58, 154, 184 (2), 266, 327, 380, 417, 420, 434  
Clasp, etc. 56, 168, 234, 250, 289  
Clay, machine for grinding 268  
Clutching iron 403  
Clock, calendar 309  
Clock escapement 326  
Clock, musical 309  
Cloth, machine for cutting 367  
Cloth, manufacture of enameled 58  
Cloth-measuring machine 120  
Cloth, machine for fulling and finishing felted 42  
Cloth, composition for stiffening felted 402  
Clothes boiler, drainer, etc. 11  
Clothes drier 216, 235, 250, 267, 368, 385, 403  
Clothes sprinkler 171, 370, 387  
Clothes wringer, 26, 42 (2), 121, 169, 200, 350, 369, 432  
Clothes wringer, etc. 138, 185, 200  
Clutch, etc. 11, 24, 106  
Coal ashes sifter 122  
Coal dust, mode of utilizing 137  
Coal for welding iron, desulphurizing 152  
Coal hod 169, 218  
Coal sifter 216  
Coal minerals, etc., method of mining 371  
Coal oil burners, apparatus for cooking by 388  
Coffee, apparatus for making 433  
Coffee, making, etc. 203, 385  
Coffee mill, pot, etc. 26, 200, 201 (2)  
Coffee dam 270, 416  
Coffin 121  
Coffin handles 25  
Coin holder 401  
Coin tie 309  
Collar and neck tie 418  
Collar and neck tie supporter 267  
Collar, waterproof 233  
Collars, men's 104, 420  
Comb 104, 420  
Composition for waterproofing 433  
Composing stick 386  
Concentrator 288  
Condenser, etc. 234 (2), 288, 329, 402  
Confectionery, manufacture of 326  
Connecting-rod joint 122  
Cooking apparatus by lamps, portable 327  
Cord into a series of united skeins, machine for winding 120  
Cords, machine for weaving a covering for 218  
Cork and other materials, waterproofing 330  
Corkscrew 250  
Corks in bottles, method of fastening 187  
Corks, machine for cutting 9, 58, 385, 400  
Corn from the cob for table use, machine for stripping 250  
Corn horse for stacking corn 8  
Corn ground for planting, machine for marking 26  
Corn, machine for husking 9  
Corn on the cob, method of preserving and drying green 268  
Corn planter, 9, 100, 105, 121, 122, 169, 201 (2), 233, 289, 308, 330, 347, 350 (2), 385, 420  
Corn sheller 74, 152, 248, 366, 419  
Cornstalk cutter 105, 268  
Corset and bustle, combined 327  
Corset busk clasp 251  
Cotton and other fibrous substances cleaning 58  
Cotton, bleaching stained 249  
Cotton bale tie 88, 268, 367, 419  
Cotton, etc., picker house for opening and cleaning 401  
Cotton gin 43, 57, 73, 252, 269, 350, 434  
Cotton, linen and other fabrics, to prevent them burning, solution to be applied 329  
Cotton picker 105, 169, 201, 233, 369, 417  
Cotton seed machine, etc. 26, 75, 105 (2)  
Cotton seed planter 105, 218, 386, 419 (2)  
Countersink 154  
Counting machine 152  
Cough syrup 307  
Coupling (for various purposes) 56, 73, 88, 89, 103, 121, 137, 184, 154, 201, 263 (2), 309, 347, 403 (3), 419  
Court plaster, preparation of 327  
Cow and sheep rack 338  
Cow milker 384  
Cows upon railroad tracks, shooting gravel at 369  
Cradle 88, 416  
Cradle, baby walker and 40  
Cradle, self-rocking 370  
Cradle, stool and chair 420  
Crane 186  
Cranks and rods, machine for bending 203  
Cracker machine 416  
Cravat 232  
Cream paste, etc., press and strainer for 152  
Crimping machine 398  
Croquet, apparatus for parlor 402  
Croquet 384  
Cross head 330  
Crucibles, apparatus for molding 399  
Culinary cabinet 216  
Cultivator 9, 25, 26, 40, 73, 74 (3), 89, 90 (2), 106, 121 (2), 122, 155, 190 (2), 138, 154 (2), 170, 218, 269 (2), 217, 232, 233 (2), 234, 248, 250, 268, 269, 287 (2), 307, 308, 309, 326, 327, 348, 350, 366, 369 (2), 384, 402, 403, 416, 419  
Cultivator and gang plow 401  
Cultivator blades, mode of attaching 348  
Cupola furnace 152, 330, 348, 403  
Curry comb 434  
Currying, process for preparing stuffing for 420  
Curtains, blinds, and maps, mode of hanging 137  
Curtain fixture 10, 105, 250, 251, 329 (2), 418, 432  
Cutting box 185  
Cutting machine 418  
Cutter grinder 289  
Cutlery 11, 136  
Cutlery, edge tools, etc., substance for making 26  
Cutlery, metallic handle for 235  
Cut-off and horse-power indicator, adjustable 330  
Cut-off, rain-water 400
- D**  
Dairy house 234  
Damper regulator and indicator 75  
Darning spoon 139  
Dead bodies, apparatus for preserving 337  
Decanter stopper, self-acting 401  
Deflector for car windows, portable 73  
Dentistry 330  
Dental drill, chair, etc. 9, 203, 217, 250, 419  
Dental impression cup 452  
Derrick 137  
Desk, reading 433  
Desk, revolving 385  
Desk, school 26, 238, 417  
Developing stick 153  
Dies (various kinds) 267, 328 (2), 350, 368, 385, 420  
Dinner pall 370  
Diseases in vacuum, medical apparatus for 348  
Disinfecting apparatus 310  
Disinfecting composition, etc. 327, 385  
Dyspepsia, compound for the cure of 290  
Dish drainer and dryer 187  
Dish stand 137  
Dish-washing machine 234  
Distilling, etc. 42, 218, 248, 249, 287, 308, 310, 400  
Distillation, etc., apparatus for 88, 328  
Ditching machine 42, 216, 251, 267, 287, 370  
Doffer comb of carding engines, means of operating the 400  
Doll, fancy 154  
Dolls, process for manufacturing 327  
Door bell, latch, etc. 57, 73, 74, 166, 122, 123, 218, 232, 248, 417  
Door fastening, portable 432  
Door for puddling and other furnaces 269  
Door knob to spindles, adjusting 401  
Dough roller, etc. 8, 37, 74, 152  
Dovetailing machine 416  
Draft equalizer, three-horse 10  
Drawing roller, etc. 43, 368  
Drawings, etc., photographic process for copying 435  
Dredging boats, steam 418 (2)  
Dress elevator, manufacture of 233  
Drill (various kinds and for various purposes) 41, 68, 88, 218, 248, 288, 290, 310  
Drilling machine 168, 185, 201, 302, 288  
Driving apparatus of metal or wood into the ground 155  
Drop-light fixture 403  
Drying or evaporating device 309  
Dust and ashes from air, apparatus for removing 186  
Dust range or receptacle 432  
Dust screen for stove and furnace doors 138  
Dyes and colors, manufacture of 386
- E**  
Earth borer 104  
Eaves trough, etc. 121, 288, 369  
Edge plane for boots and shoes 169  
Edge tools, machine for holding and grinding 251  
Egg beater, etc. 26, 41, 232, 251, 308, 329, 369 (2)  
Eggs, method of preserving, etc. 74, 218, 433  
Electric pile, secondary 250  
Elevator 186  
Elevator, coal 434  
Embroidery, imitation 11  
Emery wheels, process of making 156  
Engine, rotary, air, etc. 73, 75, 200, 232, 270, 288, 290, 308, 401, 417, 435  
Engine and stamping machine, spring and weight piston for 26  
Envelope and letter sheet, combination 10  
Envelopes for bottles and jars, manufacture of 290  
Envelopes, machine for gumming and printing 424
- F**  
Essential oils, machine for extracting 154  
Evaporator 25, 41, 121, 137, 184, 302 (2), 217, 232, 269, 288, 310, 327, 332  
Evaporators, adjuster for 232  
Evaporating solutions of salt, sugar, etc. 268  
Exercising machine 269  
Expanding tool 9  
Extracts, apparatus for making 41  
Eyelet 89, 138, 203, 420  
Eyelet machine 90, 187, 267, 270, 310, 339  
Eyelet stock 350  
Fabric for carpets and other purposes 168  
Fabric, waterproof 170  
Fabrics, etc., instrument for punching 417  
Fabrics, machine for making netted and lace 26  
Facing for stair treads 202  
Fan, etc. 75, 369, 370  
Fan blower 201  
Fanning mill 168, 433  
Fastening for garments 217, 233, 400  
Faucet measure 138  
Fire-arms, nipped cartridge for breech-loading 434  
Faucet, self-inserting 417  
Feed apparatus for steam generators 75  
Feed cutter 201  
Feed rack, portable 249  
Feed water apparatus, etc. 268, 385  
Feeder, automatic boiler, etc. 75 (2), 107, 186, 206  
Felly clamp and spoke support for carriage wheels 10  
Fence (various kinds of) 25, 73, 74, 138 (2), 153, 154, 168, 184, 201, 232, 249, 309 (2), 370, 387, 400, 401, 418  
Fence posts, device for driving 168  
Fence posts, machine for boring 24  
Fibers, process for disintegrating 203 (2)  
Fibrous substances, process for bleaching 90  
File blanks, machine for rolling 185, 327  
File clasp for documents, etc. 106  
Files, machine for cutting 155, 170, 200, 202, 249, 350  
Files, process for hardening 122  
Filter, etc. 25, 216, 232, 329, 385  
Filtering, etc. 249, 327  
Fire alarm 252, 309  
Fire-arm, breech-loading 26, 41, 57, 58, 104, 136, 137, 139, 153, 169, 170, 201, 234, 235, 307, 349, 367, 382 (2), 385, 433  
Fire-arm, magazine 171 (2), 290, 387  
Fire-arm, revolving 10, 25, 26, 29, 41, 58, 90, 235, 269, 287  
Fire-arms, cartridge retractor for 75, 88, 152  
Fire boxes for steam generators 171  
Fire engine and pump 310  
Fire-killing composition 216  
Fire-lighting attachment for stoves 9  
Fire, mode of extinguishing 368  
Fire screen 368  
Fireplace 107, 153, 269  
Finger nails, instrument for cutting 350  
Fishhook 11, 57, 310  
Fishing tackle 367  
Flat iron 136 (2)  
Flax, cotton, etc., treating 169  
Flax-dressing machine 432  
Flax, machine for preparing 11, 416  
Flax-spinning machine 123  
Flax for spinning 269  
Flax for boats 233, 266  
Flax attachment for furniture 232  
Floor cloth, manufacture of 41  
Floor cloth 370  
Floor barrel 370  
Floor packer 400  
Floor sack 26  
Flour sifter, etc. 9, 11, 26, 42, 43, 58, 104, 153 (2), 216, 249, 288, 307, 349, 350, 369, 384, 387  
Flouring mills, bolt for 57  
Flower pot, supporter for 89  
Flues for setting open boilers 56  
Fluid regulator 329  
Flush bolt 328  
Fluting machine 249, 432  
Fly and mosquito bar 201  
Flyer boards for spinning frames 89  
Flyer for spinning machinery 233  
Flying machine 387  
Fodder cutter 385  
Foot press 234  
Foot scraper 288  
Foot warmer 8, 137  
Forging apparatus 122  
Forging, shearing, and punching device 416  
Forks, machine for forming the shoulders on 216  
Fountain, portable 10, 347  
Frames, machine for preparing oval, etc. 217, 385  
Fruit and vegetables, preparing for preserving 184  
Fruit box, device for opening 432  
Fruit cans, device for opening 385  
Fruit cans, machine for making tin 385  
Fruit jar, basket, etc. 10, 40, 42, 89, 120, 136, 201, 232, 250, 289, 307, 329, 348, 349, 350, 367, 400, 402 (2), 416, 433, 434, 435  
Fruit ladder, extension 369  
Fuel, artificial 41, 120, 132, 137, 167, 375, 419  
Fuel, composition for 330  
Funnel, alarm 434  
Fur blower 187  
Fur, process for treating 88  
Furrowing machine 122, 138  
Furnace 56 (2), 329, 400  
Furnace for treating auriferous ores 235  
Furnace grate 90  
Furnace grate bars 269  
Furnace door 10  
Furnace door regulator 152  
Furnaces, regulating draft 402  
Fuse, safety 24
- G**  
Gage cock 187, 248  
Gage lock for steam generators 217  
Gaging rod 310  
Galley, printer's 42  
Galvanic battery, etc. 138, 421  
Game, social 248  
Gas apparatus 154, 233, 419  
Gas, apparatus for preparing nitrous oxide 329  
Gas, apparatus for carbureting 288  
Gas burner 309, 386  
Gas burners, regulating attachment for 349  
Gas fixtures, attachment to 267  
Gas-heating apparatus 267  
Gas generator, etc. 252, 418  
Gas, generating and supplying illuminating 419  
Gas inhaler 433  
Gas, manufacture of illuminating 170, 171  
Gas regulator 170  
Gas retort 170  
Gas stand, portable 432  
Gases, apparatus for inhaling 420, 434  
Gases, method of delivering liquid 122
- H**  
Hair, apparatus for crimping 156, 232  
Hair curling fluid 307  
Hair, imitation of braided human 307  
Hair, instrument for parting ladies' 201  
Halter apparatus, tethering 368  
Halter, neck rope 9  
Hame 268, 270  
Hammer, atmospheric 329  
Hammer, power 170, 329, 439  
Hand saw 88  
Handle for coffee, spice, and other small mills 368  
Handle for milk can, etc. 249  
Hanger for shafting 326  
Harness nails, die for forming metal heads on 434  
Harness snap 367  
Harpoon, rocket 309  
Harrow, etc. 25, 90, 267, 288, 329, 350, 369, 387, 418  
Harvester, 9 (2), 58, 73 (2), 89, 104, 106 (4), 120 (2), 136, 152, 153, 168 (3), 169, 170, 187, 200, 132, 249, 251 (2), 268 (2), 287, 328 (2), 329, 330, 350, 368, 369, 384, 386 (2), 417, 420  
Harvester cutter 401  
Harvester crank motion 329  
Harvester rake, 9, 130, 152, 186, 200, 201, 233, 251, 270, 287 (2), 310, 336 (2), 329, 369, 384, 400 (2), 432, 434  
Harvesters, construction of finger bar for 400  
Harvesters, dropper for 235  
Harvesters, etc., pitman head for 421  
Harvesters, manufacture of guard finger for 367  
Harvesters, pitman couplings for 216  
Harvesters, raking and binding attachment for 367, 419  
Harvesters, ratchet attachment for 384  
Hatchway door 288, 326  
Hat and cap band, india-rubber 270  
Hat block 349  
Hat bodies, machine for felting 123  
Hat-forming machine 202  
Hat-pressing machine 267  
Hats, apparatus for pressing, etc. 187, 232, 234  
Hats, apparatus for pounding, etc. 153, 250  
Hay and pruning knife 105  
Hay and straw cutter 249, 309  
Hay, apparatus for preparing for market 384  
Hay fork 89, 329  
Hay loader 57, 233, 290, 388, 400  
Hay, machine for raking and loading 138, 168, 233, 298, 329, 401  
Hay press, etc. 10, 25, 74, 133, 154, 309, 386  
Hay rack 367, 388, 385  
Hay spreader 11, 251, 248  
Hay wagons, loading attachment for 89, 385  
Head block for saw mills 232, 327, 329, 369  
Head block for holding boots and shoes 152  
Head lights, etc. 239, 368, 384  
Head lights, reflector for 184  
Head for picture nails 154  
Head rest, portable 58  
Heat by combustion of fuel of various kinds, mode of raising 200  
Heat-generating apparatus for cooking purposes 418  
Heat radiator 385  
Heater for chimneys 266  
Heater, smoke consuming 368  
Heedle-motion, etc., for looms 36, 387  
Hedge cutting machine 186  
Hedge-plant grab 287  
Heel breasting machine 185  
Heel call 71  
Heel cutter 121  
Heel polishing machine 122, 123 (2)  
Heliotype, automatic 433  
Hemp brake 168  
Hemp or flax, or flax waste, in a silver of longer staple, enveloping 328  
Hen's nest 132, 369  
Hides, apparatus for treating, etc. 418  
Hinge 10, 25 (2), 139, 232, 249, 309, 350, 433  
Hinge and lock, trunk 369, 389, 384  
Hitching post 421  
Hoe, etc. 43, 74, 196, 217, 297, 358, 485, 419  
Hoes, rakes, etc., device for attaching handles to 387  
Hog scald, portable 26  
Holsting apparatus 25, 26, 329, 389  
Hominy mill 249  
Hook and button, combined 420  
Hoop skirts, clasp for 138



- Hoops of compressed bales, machine for securing and tightening..... 370  
 Hoops of wood, machine for colling..... 370  
 Hop vines, training..... 370  
 Horse collars, machine for forming..... 168  
 Horse hay fork, 9, 57, 74, 88, 155 (2), 187 (3), 216 (2), 217, 250, 269, 288, 389 (2), 390, 416 (2), 420, 434  
 Horse power..... 154, 184, 218, 250, 329  
 Horse rake, 57, 75, 88 (2), 106, 122, 201, 308, 310, 330, 349, 384, 386 (2), 452, 329  
 Horse rake teeth..... 152, 329  
 Horseshoe, 26, 40, 56, 267, 270, 327, 387, 400, 416, 419  
 Horseshoe calking vise..... 251  
 Horseshoe nail..... 58, 74, 310  
 Horseshoe-nail machine..... 58, 74, 310  
 Horseshoes, attaching sole to..... 385  
 Horseshoes, calks for..... 58, 330  
 Horseshoes, device for forming..... 58, 330  
 Horseshoes, etc..... 58, 330  
 Horseshoe, machine for heading..... 402  
 Horses, elastic cushion and guard for the feet of..... 327  
 Horses and carriages, mode of releasing..... 57  
 Horses kicking, apparatus to prevent..... 385  
 Horses, method of attaching shoes to..... 403  
 Hose, covering for..... 201  
 Hose protector..... 434  
 Hot-air engine..... 105  
 Hot-air furnace..... 139, 152, 153, 370, 434  
 Hub, metallic for vehicles..... 104  
 Hub or spool for curtain rollers..... 233  
 Hubs, machine for boring..... 202, 232, 430  
 Hub boxes, mode of preparing molds for..... 417  
 Hubs, securing boxes in..... 348  
 Hydrant..... 154, 284, 287, 384, 402, 419  
 Hydrant stop cock..... 251  
 Hydrocarbon vapors, machine for charging air with..... 169  
 Hydro-carbons, apparatus for burning liquid..... 252  
 Hydro-carbons, separating..... 146
- I**  
 Ice creeper..... 38, 485  
 Ice pick, etc..... 351, 384  
 Illuminating apparatus..... 348  
 Incrustation in steam boilers, method of preventing..... 27  
 Index, universal..... 349  
 India-rubber gutta-percha compound, colored..... 42 (4)  
 Indicator for steam generators, water..... 402  
 Induction coil..... 74  
 Injector, feed-water..... 403  
 Ink, etc., manufacture of..... 169, 218  
 Inkstand..... 56, 251  
 Inner sole..... 153, 416  
 Insects, composition for destroying..... 106, 348  
 Iron and steel, process, etc., for refining..... 88, 250  
 Iron and steel, plating..... 26  
 Iron and steel, apparatus for the manufacture of..... 137 (2)  
 Iron and other metals, composition for..... 432  
 Iron, composition for coating..... 217  
 Iron chips, turnings, etc., mode of melting and aggregating..... 301  
 Iron holder..... 88  
 Iron, manufacture of..... 139  
 Iron, machinery for rolling..... 185  
 Iron, process for hardening..... 26  
 Isinglass, purifying..... 249
- J**  
 Jaw for brooms and gaff for vessels..... 328  
 Jack, hydraulic..... 90, 106  
 Jack, pegging..... 75, 328  
 Jars, mode of grinding the mouth edges of glass..... 202  
 Jars, sealing ring for preserving..... 40  
 Journal box..... 11, 133, 183, 308  
 Journal boxes, composition for, etc..... 25 (3), 168  
 Journals, lubricating..... 419  
 Jug top..... 187
- K**  
 Kaolin, etc., apparatus for washing..... 328  
 Kettle bottom..... 402  
 Key..... 367, 435  
 Key in locks, fastening..... 401  
 Keyboard for organs, etc..... 251  
 Kilm, drying..... 136  
 Kite..... 42  
 Knife cleaner, sharpener, etc., 8, 27, 40, 137, 216, 268, 309 (2), 348, 350, 57, 123  
 Knitting machine, 10, 11, 185 (2), 202, 218, 254, 370, 387, 401, 416, 420 (2), 421  
 Knitting machine burr, self-lubricating..... 400  
 Knitting machine needle..... 9, 104  
 Knitting machines, stop motion for..... 418  
 Knitting machines, take-up mechanism for circular..... 420  
 Knob latch..... 89, 218, 234, 251  
 Knob lock..... 433  
 Knuckle joint..... 170, 184
- L**  
 Label, direction..... 203  
 Labels to bottles, applying..... 266  
 Lace paper, manufacture of..... 238  
 Lacing device..... 139  
 Ladder..... 369  
 Lamp (various kinds), 42, 73, 105, 107, 122, 153, 187, 200, 234, 250, 287, 330, 385, 400, 402, 416, 417, 419, 434  
 Lamp burner, chimney, wick, etc., 10, 41, 90, 138, 154, 217, 249, 250, 267, 269 (2), 287, 310, 400, 417, 419, 432, 434  
 Land roller, etc..... 288, 323, 329  
 Land..... 41, 57, 185, 267, 284  
 Last..... 204  
 Latch fastening..... 40  
 Latch, gate..... 418  
 Lathe (for various purposes), 9, 90, 170, 185, 218 (2), 250, 288, 289, 309, 420, 432  
 Lathe chuck..... 232  
 Lathes, device for securing the tail stocks of..... 186  
 Laths, machine for cutting..... 300  
 Leather splitting machine, 251, 266, 289, 349  
 Leather, artificial..... 27  
 Leather (various things relating to), 135, 153, 169, 170, 267, 349, 370, 401  
 Leather, harness, etc., blacking for..... 202  
 Leggins..... 170  
 Lemon squeezer..... 152  
 Lens..... 42, 403  
 Lenses, combination for photographic purposes..... 42, 403  
 Letter and paper file..... 200, 267  
 Letter boxes..... 248  
 Let-off for looms..... 154, 290  
 Level, etc..... 9, 24, 232, 267  
 Leveling streets, machine for..... 170  
 Lever scale, bent..... 401  
 Lever power for windlasses, etc..... 307  
 Libraries, system for..... 41  
 Library step ladder..... 90
- M**  
 Magnesium for burning, method for preparing..... 311  
 Mail bag..... 420  
 Mail bags, apparatus for receiving and delivering..... 378  
 Mail lock..... 200  
 Mail pouch or box..... 360  
 Mail, apparatus for sprouting..... 200  
 Mail, elastic..... 152  
 Manacles..... 153  
 Mangle and wringer, etc..... 348, 348  
 Marble, machine for cutting and finishing..... 367, 368  
 Mariner's compass..... 269  
 Marking stock..... 307  
 Marking wheel..... 89  
 Mash machine..... 248  
 Masts, boom-connection for..... 433  
 Match compound..... 233  
 Mat, table..... 420  
 Measuring distances, instrument for..... 232  
 Measuring funnel..... 368, 326  
 Meat and vegetable chopping machine, etc..... 122, 310, 336, 396, 416, 420  
 Meat under lime, device for keeping..... 42  
 Meal safe..... 9  
 Medical compound, etc., 56, 73, 74, 136, 154, 217, 248, 268, 287, 307, 327, 348, 386, 401, 402, 403, 416, 432 (2), 434 (2)  
 Medicines, apparatus for administering..... 267  
 Metal, apparatus for punching corrugated..... 349  
 Metal brand, machine for perforating..... 202  
 Metal, machine for spinning..... 350  
 Metal, manufacture of plated..... 138  
 Metals, apparatus for rolling..... 368  
 Metals from other substances, apparatus for separating..... 269  
 Metals from ores, apparatus for separating..... 416  
 Metallic bar, ribbed..... 384  
 Meter, water..... 234  
 Microscope..... 210  
 Milk can..... 152, 216  
 Milk, condensing..... 26  
 Milk, method of preparing vacuum vessels for condensing..... 386  
 Milk shelf..... 234  
 Mill Mick..... 152  
 Mill stones, hammer or buhr for facing..... 311  
 Mill stones, method of ventilating..... 234  
 Milling tool..... 234  
 Mirror, hand..... 137  
 Mirror for photographic purposes, solar..... 407  
 Miter box..... 435  
 Mitering machine..... 403  
 Miter-joints, machine for trimming..... 10  
 Mitten and stocking, machine-made knitted..... 307  
 Molasses faucet..... 90, 153  
 Molasses, manufacture of..... 269  
 Mold for casting flanged pipe..... 250  
 Mold, pipe..... 184  
 Molds, machines for preparing axle-skeln..... 417  
 Molding and casting apparatus..... 369  
 Money drawers, catch for..... 420  
 Mop..... 238  
 Mop head, wringer, etc., 88, 153, 283, 250, 308, 330, 384, 402, 420  
 Mordant..... 309  
 Morocco, machine for graining..... 328  
 Mosquito guard, etc., 217, 310, 349, 367, 432  
 Motion, converting rectilinear motion into rotary..... 41  
 Motion, mechanism for obtaining intermittent rotary..... 217  
 Motion, treadle..... 186  
 Motion, transmitting..... 106  
 Motive power..... 105, 310, 387, 418  
 Motor, water, etc..... 122, 163  
 Movement, mechanical..... 217, 386  
 Mowing machine..... 26, 105, 186  
 Mowing machine guards, manufacture of..... 351  
 Mowing machines, track-clearer for..... 307  
 Muff..... 252, 416  
 Mule..... 56, 186, 367  
 Music, apparatus for turning the leaves of..... 58  
 Music stools, means for attaching legs to..... 248  
 Musical instrument..... 58, 218, 267, 323  
 Musical staff..... 136
- N**  
 Nail extractor..... 401  
 Nail machine..... 122, 386  
 Nail plate feeder..... 270  
 Napkin rings, machine for embossing..... 348  
 Napkin, table..... 233  
 Neck tie..... 137, 302, 216, 348, 350  
 Neck yoke..... 367  
 Needle wrapper..... 384  
 Needles into paper, machine for stitching..... 267  
 Newspaper file..... 317  
 Nozzle for fire engines..... 200, 301, 417
- O**  
 Offal, deodorizing..... 169  
 Oil, apparatus for collecting floating..... 289, 402, 419  
 Oil and water to assist the combustion of coal, etc., apparatus for applying..... 310  
 Oil and other wells, grab for..... 121  
 Oil cloth, apparatus for printing..... 43
- P**  
 Oil cloth, instrument for cutting..... 90  
 Oil cup, lubricating..... 290  
 Oil from leather, etc., method of extracting..... 327  
 Oils from streams, apparatus for collecting floating..... 202, 419  
 Oil from wells, etc..... 90, 384  
 Oil for lubricating..... 105, 170, 309  
 Oil, paraffine, wax, etc., apparatus for bleaching..... 136  
 Oil, process of extracting from minerals..... 105 (2)  
 Oil, refrigerator for cooling..... 434  
 Oil tank, etc..... 308, 310  
 Oil, treating..... 385  
 Oil, treating..... 385  
 Oil wells, balance beam for the boring of..... 332  
 Oil wells, collecting light oils from..... 385  
 Oil wells, electro-magnet, etc., for..... 26, 169, 187, 289  
 Oil wells, mode of securing pipes and bolts in..... 133  
 Oil wells, method of boring..... 308, 351  
 Oils, method of purifying hydrocarbon..... 311, 386  
 Oiler..... 184, 329, 348  
 Optical instrument..... 348  
 Ordnance..... 403  
 Ordnance, breech-loading..... 185  
 Ore crusher, separator, washer, etc..... 156, 202, 367, 384  
 Ores (various processes and applications relating to) 11, 24, 74, 88 (2), 89, 123, 168, 169, 216, 234, 251 (2), 287, 329, 350
- Organs, etc., valve arrangement for..... 434**  
 Organ, etc..... 138, 170, 171  
 Organs and melodions, knee swell for..... 106  
 Organs, mechanism for operating swell or reed..... 154  
 Oven for annealing iron..... 138  
 Oven, steam..... 90  
 Oyster boats, dredge roller for..... 416  
 Oyster cracker..... 349  
 Oxbow pin..... 170  
 Ox yoke..... 309
- P**  
 Packing, elastic..... 348  
 Packing for pump pistons..... 326  
 Padlock..... 9, 402 (2)  
 Paddle wheel..... 185, 267, 421  
 Paint..... 433  
 Paint and drug mill..... 184, 434  
 Paint, composition..... 218  
 Paint, method of applying to surfaces..... 328  
 Paper boards, pipes, etc., manufacture of..... 290  
 Paper boxes, fastening for..... 155  
 Paper boxes, machine for making..... 121  
 Paper bosoms..... 168, 170, 249  
 Paper bosom machine..... 121  
 Paper clamp..... 121  
 Paper collars, etc., 88, 138, 152, 157, 329, 388  
 Paper collar machine..... 154, 310, 349, 387  
 Paper collars, button holes for..... 269  
 Paper cutting machine..... 11, 201  
 Paper for postage stamps..... 187  
 Paper for telegraphs, machine for punching..... 400  
 Paper holder..... 106  
 Paper, manufacture of..... 26, 27, 200, 384  
 Paper neck tie..... 384  
 Paper pulp (various methods and materials for making, etc.) 27 (4), 41 (2), 36 (4), 132, 171, 185, 201 (2), 249, 327 (2), 348, 385, 387 (2), 420  
 Paper, roll for pressing, sizing and calendering..... 56  
 Paper tin..... 367  
 Paring, cutting and coring machine..... 252  
 Paste for bookbinders, etc., prepared..... 154  
 Pea and bean sheller, etc., 106, 287, 385  
 Peaches, machine for cutting and stoning..... 249  
 Peat, apparatus for molding..... 434  
 Peat machine, etc., 56, 122, 185, 186, 235 (2), 266, 270, 307, 309, 329, 366, 384, 418  
 Peat machine, material for dusting the molds for..... 185  
 Peat, method of preparing and feeding to furnaces..... 289  
 Peg rasper, etc..... 302, 367  
 Pegs for shoes, manufacture of..... 249  
 Pen..... 248  
 Pen for weaning calves..... 248  
 Pen-handle tubes, machine for finishing the ends of..... 330  
 Pen holder springs, machine for forming..... 328  
 Pens, manufacture of..... 218  
 Pencil pocket..... 201  
 Pencil sharpener..... 42  
 Pentagraphic machine..... 369  
 Pepper box..... 348  
 Percolator..... 269  
 Percussion caps, machine for varnishing and lining..... 121  
 Percussion fuse for explosive shells..... 42  
 Petroleum burner for cooking purposes..... 42  
 Petroleum, car for transporting..... 267, 269  
 Petroleum, composition for coating vessels for..... 216  
 Petroleum, distillation of..... 201  
 Petroleum, method of deodorizing..... 250  
 Petroleum, refining..... 9 (2), 329  
 Petroleum, still for..... 187  
 Petroleum, vessel for..... 73, 311  
 Photography..... 153  
 Photographic apparatus..... 90, 435  
 Photographic bath..... 435  
 Photographic lenses, mode of combining..... 88  
 Photographic pictures, process and composition for printing..... 267  
 Photographic printing frame..... 270, 329  
 Photographic rest..... 421  
 Photographic sensitizing box..... 41  
 Piano (various things relating to) 9 (2), 153, 250, 329, 348  
 Pickerstaff arrester for looms..... 107  
 Pickerstaff of looms, means of operating..... 269  
 Picture holder..... 434  
 Pigments, manufacture of opaque..... 384  
 Pile fabric..... 384  
 Piles, mode of driving..... 425  
 Pins, device for feeding..... 202  
 Piners, lasting..... 74  
 Pipe, mold for casting..... 370  
 Pipe, manufacture of water..... 10  
 Pipe, steam, water or other..... 327  
 Pipes, machine for pressing lead..... 418  
 Pistol and pocket knife, combined..... 233  
 Piston packing, etc..... 139, 153, 235, 367  
 Piston, steam engine..... 10  
 Piston rods for deep wells, wooden..... 106  
 Pitcher, beer..... 403  
 Plane, carpenter's..... 122  
 Plane, saw rebate..... 269  
 Planes for making blind slats..... 420  
 Planing machine..... 233, 330, 348, 417, 419, 430  
 Planter and seeder..... 123  
 Planter, hand corn..... 89, 251, 308, 387, 433  
 Plants, box for propagating..... 233  
 Plants, implement for setting out..... 250
- Plated ware, fastening handles to..... 250**  
 Plow beams, metallic fastening for..... 137  
 Plow clevis..... 88  
 Plow collar..... 432  
 Plow, rotary, gang, steam, etc., 8 (2), 25, 41 (2), 42 (2), 56, 73, 75, 90, 121, 123, 136, 137, 138, 139, 155, 170, 181 (2), 196, 200, 217 (2), 232, 233 (3), 248 (2), 249, 266, 269, 289, 307 (2), 310, 320, 330, 367, 369, 370, 386, 400, 401, 417, 418  
 Plows, attachment in..... 251  
 Plowshare..... 248  
 Plug to prevent barrels from bursting..... 184  
 Ing, safety..... 152  
 Pocket book..... 152  
 Pole and thill for carriages, etc..... 233  
 Polishing wheel..... 267  
 Portfolio..... 216  
 Postage stamps, etc..... 27, 251  
 Potassa and soda, putting up and preserving caustic..... 122  
 Potato digger, etc., 9, 26, 121, 168, 184, 217, 386, 403, 418, 419  
 Potato rot, mode of preparing potatoes to prevent..... 201  
 Pottery ware, machine for making..... 104  
 Powder, composition for core..... 233  
 Powder flask charger..... 88  
 Power, transmitting..... 270, 417  
 Press..... 26, 137, 250  
 Press, copying..... 74  
 Press for striking up metal..... 418  
 Press, gluing..... 418  
 Press, printing..... 170  
 Presses, bed for lithographic..... 217  
 Preservative..... 139  
 Preserve can..... 435  
 Printing, typographic..... 248  
 Printing wheels, etc., construction of..... 417  
 Propeller, etc., 10, 57, 105, 252 (2), 347, 370  
 Propeller wheel..... 216, 269  
 Pruning hook, etc..... 43, 106, 432  
 Pruning shears..... 400  
 Puddling furnace..... 168  
 Pulley, clamp..... 205  
 Pulley, coupling or clutch..... 10  
 Pulley for fishing boats, self-adjusting..... 138  
 Pulley, self-stopping..... 217  
 Pulleys, construction of..... 251  
 Pulverizing and furrowing device..... 26  
 Pump, rotary, railway, oscillating, 10, 25 (2), 26 (2), 42, 56, 57, 73 (2), 74, 106 (2), 120, 121, 122 (2), 152, 153 (2), 185, 200 (2), 201 (2), 216, 218, 233, 251, 267, 270, 288 (2), 336 (2), 327 (2), 329 (2), 347, 349 (2), 350, 363, 384, 385, 387, 400, 402, 418, 419, 420  
 Pump filter..... 89  
 Pump pistons, packing..... 58  
 Pump valve..... 11  
 Pumps, adjustable packing for..... 41  
 Pumps in deep wells, protecting..... 347  
 Pumps, pressure head for siphon and force..... 250  
 Punch, hand..... 216  
 Punch mixer and egg beater..... 287  
 Punch, spring..... 234  
 Punching machine..... 10, 168, 337
- Quartz comminuter..... 289**  
 Quartz crusher, mill, etc., 8, 9, 10, 106 (2), 135, 153, 154, 168, 203, 217, 248, 347, 348, 402
- R**  
 Rail for railroads..... 233, 250, 384  
 Rails, machine for welding ends of railroad..... 123  
 Rails, roll for manufacturing three-headed railroad..... 327  
 Railroad axle box, car, truck, frog, wheel, brake, chain, switch, etc., 25, 43, 75, 57, 58, 88, 89, 106 (2), 153, 168, 184, 202, 203 (2), 217, 218, 234, 243, 249, 250 (2), 267, 307, 310 (2), 348, 349, 366, 369, 384, 386  
 Railroad cars, heating and ventilating..... 402  
 Railroad cars, mode of starting..... 10  
 Railroad cars, seat and couch for..... 432  
 Railroad cars, ventilating window for..... 9  
 Railroad spikes, instrument for drawing..... 419  
 Railroad station indicator..... 56, 153, 249  
 Railroad tickets, machinery for printing..... 403  
 Range, cooking..... 329  
 Razor strops, composition for..... 56  
 Reach for lumber wagons..... 104  
 Reaping and mowing machine..... 89, 186, 200, 202, 328, 384, 421, 432  
 Reaping machines, binding attachment for..... 89  
 Rectifying apparatus..... 269  
 Reel for grain binders..... 153  
 Reel, coat or hat..... 184  
 Hooks, fastening for ball..... 202  
 Hoop skirt..... 121, 138, 339, 387, 417  
 Hoop-skirt wire and frames..... 138, 433  
 Refrigerator, etc., 104, 121, 185, 186, 307, 330, 401  
 Register, passenger..... 418  
 Register, lumber..... 418  
 Registering apparatus..... 139  
 Reservoir for wells..... 248  
 Retort for generating gases from oils..... 309  
 Rivet or bolt cutter..... 419  
 Riveting machine..... 384  
 Rocking chair and fan..... 121  
 Rocker for chairs, detachable..... 153  
 Rock drill, etc., 10, 45, 105, 168, 184 (2), 217, 248 (2), 249, 310, 330, 386, 387, 400, 417 (2), 432  
 Rock, machine for tunneling..... 433  
 Rods, parallel or other..... 25  
 Roller for wringers..... 88, 351, 400  
 Roller for destroying insects, garden..... 233  
 Roller temple for looms..... 332, 311  
 Rollers for spinning machine..... 290  
 Roofs, composition for painting metallic..... 329  
 Roofing..... 136, 187, 188, 201  
 Roofing cement..... 184 (2), 201  
 Roofing compound..... 216  
 Roofing tubing, tanks, waluacoting, boats and other structures, material for..... 26  
 Roots for feed, machine for cutting succulent..... 402  
 Rope machine..... 56  
 Rope guard..... 433  
 Row lock..... 418  
 Rubber, apparatus for filling molds for hard..... 42  
 Rubber, manufacture of hard..... 249  
 Rubber, manufacture of, for dental purposes..... 10  
 Rubber, mold for vulcanizing..... 186  
 Rubber or gutta percha for articles of dress, hard..... 270  
 Rubber packing..... 348  
 Rudder..... 370, 388, 389, 387  
 Ruler..... 10, 123, 287  
 Ruler, blotter, and paper cutter combined..... 268  
 Rulers, parallel..... 138
- S**  
 Sacks, paper..... 136  
 Saddle and harness..... 270  
 Saddle seat, harness..... 418  
 Saddle, spring..... 268  
 Saddle tree..... 106  
 Saddle trees, crupper loop for..... 170  
 Sad iron..... 136, 309, 349  
 Sad iron holder..... 208  
 Sad irons, hand projector for..... 384  
 Sail..... 416  
 Sail board, self-locking..... 90  
 Sails, apparatus for reefing fore-and-aft..... 126  
 Sails, bending fore-and-aft..... 403  
 Safe..... 56, 122  
 Safe and table, provision..... 290  
 Saline meter pot..... 58  
 Salmometer..... 58  
 Saltpeter, manufacture of..... 41  
 Salve..... 247  
 Sand bars from rivers, method of removing..... 201  
 Sand box for locomotive engines..... 201  
 Sand distributor for railroad cars..... 10  
 Sand, machine for sifting..... 216  
 Sand paper, manufacture of..... 42  
 Sand paper holder..... 200  
 Sand pump..... 26, 368, 384  
 Sandal, adjustable..... 370  
 Saponifier..... 268  
 Sash supporter, fastener, etc., 58, 75, 90, 120, 123, 268, 269, 308, 326, 338, 384, 386 (2), 387, 400, 402, 417, 432  
 Sash, greenhouse..... 25  
 Shashes and frames for windows..... 41  
 Sashes for ventilating windows, device for operating..... 370  
 Saw..... 201, 370, 419, 420  
 Saw-filing machine..... 309, 398  
 Saw-grinding machine..... 200, 251, 370  
 Saw-mill..... 288, 432  
 Saw-mills, head block for..... 126  
 Saw set..... 90, 133, 438  
 Saw teeth, swage for sharpening..... 416  
 Saw teeth, tool for upsetting..... 289  
 Saws to their handles, manner of attaching..... 105  
 Saws, feed roller for circular..... 89  
 Saws to their arbors, mode of attaching circular..... 369  
 Sawing machine, 42, 73, 105, 121, 233, 250, 267, 289, 350, 401, 403  
 Sawing staves..... 43  
 Scale beam..... 348  
 Scale for weighing..... 186, 433  
 Scale in boiler tubes, tool for removing..... 351  
 Scissors..... 251  
 Scoop for excavating..... 350  
 Scoop, weighing..... 217  
 Scoop, sifter, grater and holder..... 367  
 Scraper and knife and fork cleaner..... 262  
 Scraper, barn-yard..... 328  
 Scrapers for railroads, snow, ice and mud..... 287  
 Screen for wool driers..... 104  
 Screw and bolt..... 138  
 Screw blanks, machine for threading, etc..... 309, 384  
 Screw cutting machine..... 402, 434  
 Screw for stools, etc..... 368  
 Screw top..... 307  
 Screw heads, nicking..... 433  
 Screws, capping wood..... 417  
 Screws, machine for nicking..... 249  
 Screws, machine for shaving wood..... 249  
 Screws, machinery for forging..... 367  
 Screws, tacks, etc., casting heads upon..... 154  
 Scroll biscuit, apparatus for making..... 73, 105  
 Scroll sawing machine..... 26  
 Scrubber and tender..... 347  
 Scrubbing machine..... 90  
 Sealing boxes, etc..... 234  
 Sealing for fruit cans and other vessels..... 309  
 Seat and back for chairs..... 327  
 Seat for harvesters, etc..... 310  
 Seat for vehicles..... 217  
 Seats to beds of vehicles, attaching..... 218  
 Seeding machine, drill, planter, etc., 26, 88, 90, 108, 123, 137, 188, 184, 187, 217, 249, 329, 384, 387, 387, 402  
 Seeding raisins, machine for..... 368  
 Settee and table..... 308  
 Sewer..... 349  
 Sewing machine, 10, 42, 107 (2), 169, 203, 218, 251, 349, 367, 385, 387, 402  
 Sewing machines (various attachments for and improvements in) 8 (2), 9, 11, 120 (2), 139, 152, 169 (2), 170, 171, 201, 234 (2), 267, 270, 308, 328, 349, 368, 370, 384, 387, 400, 434  
 Sewing thread upon spools, winding..... 43  
 Sextant..... 367  
 Shade for gas burners and lamps..... 287  
 Shade, heating..... 386  
 Shade hook..... 307  
 Shaft for drilling..... 122  
 Shafts, lubricating vertical..... 130  
 Shank laster..... 105, 120  
 Sharpener and polisher, knife and scissors..... 420  
 Shears, sheep and other, 165, 133, 216, 348, 434  
 Sheathing for iron vessels..... 290  
 Sheep and other animals, machine for catching..... 268  
 Sheep holder and shearing table..... 382, 383, 416  
 Sheep, machine for shearing..... 270  
 Sheep rack, 42, 89, 217, 367, 388, 389, 401, 419  
 Sheet iron, furnace for annealing..... 387  
 Sheet iron, manufacture of..... 216, 233  
 Sheet iron, improved method of neutralizing acid for..... 348  
 Sheet iron plates, method of treating..... 139  
 Sheet metal boxes, machinery for manufacturing..... 11  
 Sheet metal can..... 184  
 Sheet metal spouts, machine for swaging..... 234  
 Sheet metal to each other, mode of attaching the sides of..... 387  
 Sheet metal, seams for..... 260  
 Sheet metal ware, dies for the manufacture of..... 42  
 Shelf, folding..... 9  
 Shelf, rack and stove..... 233  
 Shelf, explosive..... 105  
 Shirt bosom pattern..... 170  
 Shirt collar..... 136  
 Shirt fastener..... 26  
 Shirts, paper..... 329  
 Ship building..... 75  
 Ships' boats, apparatus for lowering..... 400  
 Ships' lights, means of closing..... 25  
 Ships' pumps, means for working..... 348  
 Ships, means of protecting the bottoms of..... 232  
 Ships' windlasses, device for operating..... 367  
 Shipper device..... 74  
 Shingle..... 58



Shingle machine, etc., 123, 207, 288, 289, 349

Shoe, etc., 75, 88, 283, 400

Shoe binding, manufacture of, 418

Shoe binding, tape, etc., machine for winding, 418

Shoe brushes, 350

Shoe jacks, 38, 307, 326

Shoe lacing, 183

Shoe lacing cutter, 308

Shoe soles, machine for grinding and amalgamating machines, 73

Shoes, manufacture of india rubber, 384

Shooting boards, carpenters, 153

Shot and cartridge pouch, 308

Shot, device for separating, 58

Shoulder brace, 121

Shovel and tongs combined, 187

Shuttle-box motion in looms for weaving figured fabrics, 50

Shuttles, fastening, etc., 56, 249, 400

Shuttle and bobbin for looms, 330

Shuttle, tating, 418

Shuttles for looms, manner of rating, 217

Sieve, 42

Sieves, machine for making wire, 420

Silk from living spiders, mode of obtaining, etc., 58

Snap, comp. and, 347

Snap, filter, 250

Snap, pound or cup, 310

Skate, 73, 90, 106, 188, 322, 327

Skewers, machine for making, 300

Skin hoop, 152

Skin hoops, machine for attaching clasps to, 385

Skin lifters, ladies', 347, 403

Skin, skeleton, 120, 250

Skin wire, 152

Skiving machine, 366

Slate frame, 234

Sled, 152

Sleeves and leggings, attachment for sleigh brake, 438

Slinging arm, 370

Slitting machine, 154

Sluice box, 270

Sluice for propelling vessels, 153

Sluice for quartz mill, 251

Snap machine, 200, 216, 400, 416 (2), 434

Soap, 268

Soap mold, 249

Soda fountain, portable, 74

Soda, paper, 186

Soda water apparatus, 234

Sofa and crib, 417

Soles, waterproof, 234

Solder, compressed rod, 307

Solder, machine for the manufacture of rod, 307

Soldering iron, 235

Solutions, process for evaporating alkaline, 216

Solutions, vial for holding, 418

Sore eyes, remedy for, 418

Sorghum cane stripper, 90, 250, 369

Sorghum, curing, 328

Sorghum evaporator, 185, 309, 328

Sorghum funnel, 326

Soring machine, 418

Spade and fork combined, 200

Spark arrester, 106

Spectacle bow, joint of, 326

Spectacles, manufacture of lenses for, 27

Specula for uterine disease, 73

Speculum, 433

Spelling, machine for teaching, 152

Spice sifter, 152

Spike, 43

Spike extractor, 73

Spikes, machine for rolling, 350

Spikes, tool for making, 370

Spinning machine, 347, 368

Spindles in spinning frame, mode of driving, 403

Spirit level, 137, 350

Spiral stair, 170

Spittoon, 9, 200, 350

Spoke machine, etc., 88, 250

Spokes in wagon wheels, machine for setting, 26

Sponge cup, 152, (2)

Spoon, invalid, 106

Spoon, steel metal, 348

Spring, bed, 248, 387

Spring balance, 386

Spring, carriage, 418

Spring for cars, pneumatic, 57

Spring furniture, 10

Spring, vaginal, 419

Springs, attachment for upholstering, 308

Springs for wagons, rubber, 25

Sprinkler, 367

Square and level, combined, 347

Squeezer, 433

Stair carpet pad, 248

Stair rod, etc., 218, 367

Staging for buildings, 266

Stamps, numbering, 400

Stamping head, 139

Staple, 326

Stove machine, etc., 202, 249, 267, 288 (2), 416

Steam and water motor combined, 330

Steam, device for superheating, 400

Steam engines, 9, 42, 58, 74, 122, 189, 154, 184, 248, 249, 250, 268, 385, 396, 401

Steam engines, packing slide valves for, 420

Steam engines, piston head for, 419

Steam gage, 58, 120, 201, 215

Steam gage cock, 122, 136, 303

Steam generator, 40, 90, 200, 216 (2), 222, 244, 249, 252, 250, 309, 351, 368, 369, 402, 416, 420, 434

Steam generators, try cock for, 217

Steamships, rotary, etc., 201, 217

Steam superheater, 184, 349

Stamp, hand, 152

Steel and other metal, process of annealing, 138

Steel, apparatus for tempering, 387

Steel, casting, 421

Steel, composition for welding and refining, 185

Steel for safes, manufacture of, 249

Steel, manufacture of, 217

Steel, process of tempering, 329

Steel, process for making, 154, 249

Steel springs, compound for tempering, 26

Steering apparatus for vessels, etc., 400, 416, 434

Steering apparatus, etc., 184, 268, 270, 288, 370

Stencil brush, 270

Stencil plate, 90

Step block for carriages, 217

Step for spindles, 267

Step ladder, 248, 329, 417

Stereoscope, 133, 400

Stereoscopic apparatus, 43

Stereotype block, 307

Stereotype plates, mechanism for setting type in making, 74

Still for distilling salt water, 122

Stirrups, 132

Stirrup fastening, safety, 25

Stocking-heel protector, 307

Stone, artificial, 120

Stone, cement and plaster, manufacture of, 434

Stone and root digger, 289

Stone-dressing machine, 287

Stone for power printing, mode of preparing, 347

Stones for grinding and polishing, artificial, 350

Stop cock, 216, 249, 327

Stopper for bottles, 232, 250, 300

Stoppers from oyster cans, device for removing, 289

Stoves (various descriptions of), 10, 11, 25, 41, 53, 73, 90, 105 (2), 136, 216, 234, 250 (2), 288, 289, 307, 310, 327, 329, 330, 348 (2), 368, 370 (2), 384, 385 (3), 388, 416

Stoves, attaching and hinging covers to, 203

Stove, ash-sifting device for cooking, 425

Stoves, attaching for cooking, 234

Stove burner for gas, 307

Stove blacking cutter, 251

Stove door, 387

Stovepipes and water conductors, mode of connecting joints of, 349

Stovepipe damper, 122, 136, 185, 249, 269, 270, 309, 386, 387, 401

Stovepipe drum, 106, 152, 184, 186, 187, 267 (2), 287, 385, 420

Stovepipe elbows and dies for producing the same, 136

Stovepipe thimble, 403, 417

Stop adjuster, 9

Stop for steel railway cars, extension holding, 200

Straps for vests, adjustable back, 308

Strawberries, vase for cultivating, 432

Straw cutter, 89, 196, 232, 328, 348

Straw cutting knife, 330

Straw, machine for pressing, 148

Street sprinkler, 248

Street-sweeping machine, 169

Stump extractor, 104, 200, 216, 309, 402, 418

Submarine explorer, 330

Suction drill, 418

Sugar cane mill, 419

Sugar, centrifugal machine for draining and cleaning, 330

Sugar evaporator, 73

Sugar in refineries, machine for stirring and dissolving, 349

Sugar, manufacture of, 121

Sugar, machine for making cube, 184

Sulphur, process in refining, 349

Sugar mill, 88, 39, 326

Superheating apparatus, 369

Supporter, abdominal, 416

Switch and frog for railways, combined, 250

Switch, railroad, 432

Switch for replacing cars upon tracks, 330

Switch stand for railroads, 384

Switch, transfer, 433

Swing, 270

Swing jack for railway cars, 25

Swivel shackle, 402

Sword and pistol, combined, 123

Table cover, 329

Table cutlery, manufacture of, 224

Table, extension, 42

Table, folding, 329

Table fork, 348

Table leaf support, 216

Table stand for articles of food, 42

Tables, machine for jointing the tops and leaves of, 185

Tack and nail machine, 201

Tackle block, 169

Tackle for raising sunken whales and other bodies, 250

Tailors' measure, 137, 184 (2)

Tag needle, 249

Tank, portable for oils, etc., 233

Tank, self-feeding water, 288

Tanning, etc., 11, 26, 122, 139, 250, 347

Taps, construction of screw, 433

Tap and reamer, expanding, 288

Tar, apparatus for burning, 310

Tassel hook, 169

Teakettle, 347

Teakettle covers, fastening for, 216

Teeth,