orless and transparent; and as the passage of the chlorine is continued, a hard brittle resin is the result. The substance consists of—

Carbon	29·55
Chlorine	66·82
Hydrogen	3·39
	99·76

This gentleman has also remarked that the paraffins having the highest melting point are those which are most easily acted upon by the gas.

Iodine dissolves in paraffin, imparting to it a beautiful violet color, which becomes brown as the paraffin solidifies; but the action of this element upon the hydrocarbon is very feeble, no apparent decomposition taking place after prolonged heating for many hours.

By the action of strong nitric or sulphuric acids, M. Campion discovered a new body, which he calls paraffinic acid, and describes it as a bright, transparent liquid, of a very inflammable nature.

Strong nitric acid yields a series of interesting compounds, lately studied by Schorlemmer and others.

Mr. Fordred informed me some years ago that, when paraffin is acted upon by sulphuric acid to which a few crystals of permanganate of potash have been previously added, the action is so violent that light and heat are involved, and even at times accompanied by explosion. The best way of trying the experiment is to heat up the acid and permanganate in a tube, and drop a small piece of paraffin in the warm liquid. When they are all three placed together in the tube and heated up, the action is not nearly so violent. Success does not always attend the experiment, but it can be tried. The decomposition convinces us that the word paraffin (little affinity) is slightly a misnomer.

Paraffin is insoluble in water, very sparingly soluble in alcohol, even when boiling, more so in ether, exceedingly in naphtha, sulphide of carbon and aniline.

When heated with sulphur at a moderately high temperature, it is decomposed, carbon separates, and abundance of sulphuretted hydrogen is evolved. This fact may be of interest to chemists, as affording a ready source of this indispensable reagent in the laboratory. The two substances, the paraffin being in large excess, are heated together in a flask, when a steady and copious flow of the gas is obtained, and the characteristic action of the gas upon lead salts will be seen by the experiment.

With the regard to the beautiful translucency of paraffin, which, in spite of certain drawbacks, has made this body such an unusual favorite as a means of light, Mr. MacIvor informs me that, if, when melted, it is cooled very gradually and subjected to a slight and steady pressure, it becomes actually transparent, like ice, but that a blow, or even a scratch, will alter its molecular structure, and cause it to re-assume its normal appearance. As this change is also produced upon re melting it, however cautiously, that triumph of manufacture in this department of industry, namely, making a transparent candle, is yet in the distance.

Mr. Gellatly has shown that the specific gravity rises with the melting point of paraffin. Thus paraffin melting at about 60° Fah. has only a specific gravity of 0·823; at 128° Fah., which may be considered a very good average (rather high, perhaps), it has a specific gravity of 0·911; and a specimen of an extraordinarily high melting point (176° Fah.) was as high as 0·940, more than 10 per cent above that at 90° Fah.

Paraffin is obtained in large quantities by distillation from oil shales.

To Render Glass Opaque or Frosted.

According to *Dingler's Journal*, a sheet of ordinary glass, whether patent plate or crown does not matter, is cleaned; and if only portions of it are to be frosted, those are left bare, while the others are protected by mechanical means in any simple manner. Some fluor spar is rubbed to a fine powder and mixed with concentrated sulphuric acid, so as to make a thin paste, and this is then rubbed by means of a piece of lead upon those parts of the glass required to be rendered opaque. A fine frosted outline or design may thus be produced upon a sheet of smooth transparent glass. To finish the operation, the glass is gently heated in an iron vessel covered with a funnel passing up the chimney, to get rid of the noxious fumes that are given off; on cooling, the plate is washed with a dilute solution of soda or potash, to remove any acid yet remaining, and is then rinsed in water. Focusing glasses for the photo camera, and development glasses for pigment printing, can be prepared in this way at very little expense.

Decline of Medical Study in France.

The *Union Medicale* says that in France the number of medical students, as well as that of practitioners, is on the decline, the medical recruital, both in civil and military life, becoming more and more difficult. Medical studies have now become so long and laborious (the physical and chemical sciences being now far more than mere auxiliaries, and forming an important part in the preparation for examinations) that the student, after his laborious and costly career, finds, on getting into practice, that he has no effective protection from the encroachment of charlatans and parasites.

OIL and repair the harness. Unbuckle all the parts and wash clean with soft water, soap and a brush. A little turpentine or benzine will take off any gummy substance which the soap fails to remove. Then warm the leather, and, as soon as dry on the surface, apply the oil with a paint brush or a swab. Neat's foot oil is the best. Hang up the harness in a warm place to dry, but do not let it burn.

Railroads in Europe and America in 1873.

	Railroads, Miles.	Population.	Area, Sq. Miles.
United States	71,565	40,232,000	2,492,316
Germany	12,207	40,111,265	212,091
Austria	5,865	35,943,592	227,234
France	10,333	36,469,875	201,900
Russia in Europe	7,044	71,207,794	1,992,574
Great Britain, 1872	15,814	31,817,108	120,769
Belgium	1,301	4,839,094	11,412
Netherlands	886	3,858,055	13,464
Switzerland	820	2,669,095	15,233
Italy	3,667	26,273,776	107,961
Denmark	420	1,784,741	14,453
Spain	3,401	16,301,850	182,758
Portugal	453	3,987,867	36,510
Sweden and Norway	1,049	5,860,122	188,771
Greece	109	1,332,508	19,941

NEW BOOKS AND PUBLICATIONS.

THE CARPENTER'S AND BUILDER'S ASSISTANT AND WOOD WORKER'S GUIDE. By Lucius D. Gould, Architect and Practical Builder. Fully Illustrated. Price $3. New York: A. J. Bicknell & Co., 27 Warren street.

This well gotten-up volume will be practically useful to any carpenter or builder who will read it. It is not so elaborate a work as Tredgold (to whom Mr. Gould makes his acknowledgments), but is likely to be more used by mechanics and workmen than that complete and valuable, but somewhat complicated manual. Mr. Gould's work will well repay attentive perusal.

ROPP'S READY RECKONER AND COMMERCIAL CALCULATOR. By Christian Ropp, Jr. Price $1.00. Bloomington, Ill.: Published by the Author.

Mr. Ropp is a practical farmer, and hence is well posted as to how much mathematics farmers need in the routine of their business. He also appreciates the value of time, and doubtless is aware of the puzzling which very frequently takes place over long sums in obstinate fractions, when the farm accounts are made up. Hence, he proceeds in a practical manner to make a rough road smooth, and produces the work before us, a handy little volume in pocket-book shape in which is condensed an immense amount of useful information, in the shape of short cuts through calculations which ordinarily bristle with a formidable array of perplexing figures. There are grain tables, showing the corresponding prices of bushels and hundredweights, and time, interest, wages, and lumber tables. The book also contains clear explanations, of contractions in the various processes of arithmetic, of measures of all sorts and kinds, of bookkeeping, and, in fact, so much, and in so small a space, that we despair of enumerating all, and leave the reader to the pleasure of discovering for himself when he buys the book. There are several blank pages to serve for memoranda, a pocket for papers, and a silicate slate for rough notes. Altogether, it is a very useful manual, and one which must be a great assistance both to the farmer and the business man.

BABBITT'S HEALTH GUIDE. Price $1. New York: Published by E. D. Babbitt, D. M., 437 Fourth Avenue.

A philosophy of cure, founded on the idea that healing elements are potent in proportion as they are subtle and refined, and weak in proportion as they are gross; that sunlight, electricity, and especially the still finer life forces, being subtle next to spirit itself, are the most potent to heal, while mineral substances, being from the coarsest department of Nature, are the weakest and least penetrating. This constitutes the law of power. The law of harmony is stated to be a nicely balanced contrast of elements. Magnetism, or the warm positive principle, and electricity, the cold negative principle, are stated to be the propelling principles of the universe, and these are combined equally to bring about harmony and health. Too much of the cold principle in the human system brings about chills, paralysis, and chronic diseases—too much of the warm principle, fevers and inflammatory diseases. While sunlight, baths, food, clothing, the social relations, etc., are explained and commended, a strong magnetic hand is considered the most potent of all instruments for charging a feeble system with a new life power, and for equalizing ill balanced conditions. Directions are given for the practice of manipulation, and the treatment for one hundred different diseases, without drugs.

THE APPRENTICE, or First Book for Mechanics, Machinists, and Engineers. By Oliver Byrne, Mathematician and Civil, Military, and Mechanical Engineer, etc. New York: A. J. Fisher, 98 Nassau street.

A new edition of a book which is well enough known to the engineering profession, but which presupposes an apprentice of a very advanced mathematical education. The reduction of all the results to units of work is an especially commendable feature in this volume, and its first few chapters are full of practical ideas, clearly expressed; but the profuse employment of the calculus hinders the value of the book in the hands of those for whom it was ostensibly written.

SKIN GRAFTING. By R. J. Levis, M.D., Surgeon to the Pennsylvania Hospital and to the Wills Ophthalmic Hospital.

Dr. Levis has done much valuable service to therapeutic science in studying and utilizing this process, which, together with the now much practised transfusion of blood, opens up the question as to whether the whole corpus may not ultimately be reconstructed.

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]

From March 17 to March 28, 1874, inclusive.

BOOK SEWING MACHINE.—H. G. Thompson, Milford, Conn.
CARTRIDGE CARRIER.—J. H. Black, Columbia, Pa.
CASTOR.—J. H. Redfield, New York city.
CLOTHES' HOOK.—C. G. Cole, Bennington, Vt.
COMPRESSED AIR APPARATUS, ETC.—W. E. Prall, Washington. D. C.
DRESSING STONE.—A. S. Gear, Boston, Mass.
SIGNAL LANTERN.—T. A. Davies, New York city.
TELEGRAPH.—M. Gally, Rochester, N. Y.
TELEGRAPH, ETC.—G. d'Infreville *et al.*, New York city.
THRUST BEARING.—C. Godfrey, Huntington, N. Y.
TREATING HYDROCARBON OILS.—R. A. Chesebrough, New York city.

Recent American and Foreign Patents.

Improved Combined Blind and Sash Fastener.

William O. Pond, Mobile, Ala.—This is a combined fastening for blinds or shutters and for window sashes, consisting of an adjustable fastening bar attached to the blind, a stationary hook in the casing, and a hinged hook attached to the sash. As the sash is lowered, the hook catches into the stationary hook automatically, and securely fastens the sash down.

Improved Combined Car Starter and Brake.

William T. Beekman, Petersburg, Ill.—This invention, which is designed more especially for application to street cars, has for its object to utilize the force expended in braking the cars, for the purpose of storing power to be subsequently used as an aid to propulsion. To this end a friction clutch, a chain pulley, and ratchet mechanism are employed, and a spring, these elements or devices being so combined and attached to the axle, wheel, and draft bar, that whenever the brake mechanism is brought into action the spring will be compressed correspondingly to the force thus expended or necessary to overcome the momentum of the car and reduce its speed, or bring it to rest. The power thus stored is immediately or remotely available in starting or propelling the car.

Improved Combined Seed Drill and Fertilizer.

John F. and Samuel C. Thomas, Adamstown, Md.—This invention consists in bringing the discharge spouts of seed and manure near the ground and one around the other, so that the seed and manure will be left on the ground in close proximity but not in contact, thus avoiding the destruction of the vitality of any of the seeds; in protecting the reciprocating stirrer of the hopper by an apron; in combining with each endless carrier an angle gate to regulate the feed; and in combining with a seed gate a spring-held spool which will allow the gate to yield to a stone or other hard substance.

Improved Heating Apparatus for Sleighs, Carriages, etc.

Thomas H. Price and Theodore F. Wade, Lafayette, Ind.—The object of this invention is to provide an improved foot-warming attachment for sleighs, carriages, etc. It consists in a metal case containing the burners, which is applied to the sleigh or carriage bottom, and provided with a concave top that forms also the bottom of a box from which heated air is discharged upward through its perforated top. Said perforated top is practically a part of the sleigh bottom. The invention also includes a heat-conducting bar arranged beneath the concave bottom of the air heating box for the purpose of equalizing the distribution of heat, and thereby securing a better effect with the consumption of a given quantity of oil or burning fluid.

Improved Bracket Insulator for Telegraph Wires.

Charles L. Le Baron, Pensacola, Fla.—The insulator is preferably rectangular in form, made of glass or other suitable non-conducting material, and has a closed slot to adapt it to be hung on a spike, and an open slot, at right angles to the closed slot, to receive the line wire. The wire is put in the slot before the insulator is hung on the spike, and tie wires may, in many cases, be dispensed with.

Improved Telegraph Wire Insulator.

Charles L. Le Baron, Pensacola, Fla.—The insulator is made of glass, circular in form, and has a circumferential groove to receive the tie wire that supports the line wire, and end cavities to increase the distance electrically between the conducting wire and spike, which latter passes through the insulator longitudinally.

Improved Surface Planer.

William C. Margedant, Hamilton, O.—This invention consists of the combination in surface-planing machines with a single rotary tool, of two tables, a single piece subjacent, and an upper one formed in two sections the whole adjustable together vertically, and one of the upper independently adjustable, horizontally and vertically, so that the warp may be taken out of one piece of timber on the upper table, while another is being surface planed on the lower table.

Improved Package Envelope.

Charles C. Kelly and Julius Cobb, St. Paul, Minn.—This invention relates to the construction of package envelopes with a view to making them more secure and reliable. It consists in providing the body with end and side flaps, connecting tongues, and slits.

Improved Torch and Fire Kindler.

Robert Wiehle and Christian Feuchter, Ironton, O.—This superior kindler is formed of cornstalks soaked in petroleum, then dried, and next dipped in melted rosin, and finally wrapped in paper, which latter subserves important functions.

Improved Surface Planer.

Charles E. McBeth and William C. Margedant, Hamilton, O.—This invention consists in combining, with a part table and its adjustable slide, a socket holder arranged to slide and be held at various points of adjustment.

Improved Reverberatory Furnace for Roasting Ores.

Ernst Helligendorfer, Belmont, Nev.—The object of this invention is to so improve the grates of reverberatory and other furnaces that a clear fire, free from smoke and of the highest oxidizing power, is obtained by currents of heated air, which are introduced between and sidewise to the gases of combustion, so that the caking of the roasted ore is prevented and the grate applied effectively to roast silver ore, galena, and zinc blende. The invention consists in the introduction of partitions of cast iron plates between and at both sides of the grate, parallel to the grate bars and the fireplace, extending as high as the fuel is accumulated on them.

Improved Boot Stretcher.

John C. Compton and Henry V. Hartz, Cleveland, O.—This invention consists in combining, with a two part grooved toe piece and an inclined instep piece, a single slide having tongues and incline; and also in combining a hollow toe and heel piece with a pivoted bar susceptible of being locked at several points of adjustment.

Improved Molding Machine.

William C. Margedant, Hamilton, O.—This invention consists in a sticker bed formed of two frames and two sections, both of the latter adjustable horizontally, so that the same machine may be employed as a sticker, molder, shaper, matcher, surface planer, or sand-papering machine; also in feed roll arbors having hollow sockets, the former being thus allowed to slide in and out of the latter; also in combining yokes, weighted levers, connections, and end slotted levers, to compel the feed rolls always to remain in a horizontal plane at all altitudes to which they may be raised by the subjacent timber; also in combining slotted plates and frames with bolts, to enable the fence to be adjusted in various positions; also in a filling piece sliding under the table sections, and apertured to receive the shaft of a shaper or other head.

Improved Awning.

Charles L. Barnes, New York city.—This invention is an awning composed of concentric or telescopically movable sections, of wood or metal; one or more of which sections is provided with ventilators, which are closed in an automatic manner as the sections are drawn into each other.

Improved Spring Clasp for Stocking Supports.

Edward Halser, San José, Cal.—This invention relates to a new form of clasp for use in attaching stockings to elastic or other straps, whereby they are supported from a waste band or belt.

Improved Wheel Plow.

Isaac B. Green, Gillespie, Ill.—The plows are secured to the rear parts of two bar or double beams, the bars of which are connected and held at the proper distance apart by blocks of the requisite thickness interposed between them, and to which they are secured. The forwardends of the plow beams may be raised and lowered to adjust the plows to work shallower or deeper in the ground. Means are provided to keep said plow beams always in line, and prevent lateral movement of the plows. By loosening wedges the standards and beam may be moved laterally to adjust the plows further apart or closer together, as may be desired, and by removing pins the plow beams may be detached and exchanged, so as to throw the soil toward or from the plants, as circumstances may require.

Improved Car Brake.

Daniel T. Casement, Painesville, Ohio, at present residing at the Fifth Avenue Hotel, New York city.—The brake shoes are located between the wheels, and are fitted between stays, projecting down to the car body, to rise and fall freely directly above the rails. Spring brake bands are attached to the ends of bars and extend up over the wheels to fastening and adjusting screw and nuts, so as to be pressed on the wheels by said bars at the same time they (the bars) are pressed down. By the screw and nuts the springs can be readily adjusted to bear with the requisite force on the wheels while the shoes bear on the rails, or to cause them to lift and hold the shoes at various hights from the rails.

Improved Fire Escape.

David Demarest, New York city.—This is an improved fire escape, so constructed as to enable the occupants of one house, in case of fire, to escape into the adjoining house, and thus pass into the street. Two curved plates slide upon each other, so that they can be contracted and expanded, and are provided with stops to prevent them from becoming detached. The lower plate is provided with lugs to rest against the window frame. One of the inner lugs is provided with a clamp. The plates are of such a length, and of such a curve, that, when the inner end of one plate is secured in the window of one house, the free end of the other plate may reach and enter the window of the adjacent house. To the under side of the outer end of the first plate is hinged a brace, which swings down and rests against the side of the house. The other plate is pushed out by means of a rod. The plate is secured in the window of the adjacent house by a pin, to rest against the inner side of the window frame. A rope is provided which has a hook with a sharp point attached to each end, which hooks are designed to be passed through the windows of the adjacent houses and be hooked upon the window frames, so that the rope may serve as a hand rope for persons passing from window to window.

Improved Fire Escape.

John Gerken, New York city.—In a block which is provided with a strap hook are formed three holes, through which a rope is passed. The edges of the holes are beveled to prevent cutting the rope. In using the device, one end of the rope is secured in the room from which the person or thing is to be lowered. The device is then passed out of the window, and the person or thing to be lowered is connected with the hook. Some one upon the ground grasps the rope, and, by holding it tightly, allows the block to slide down the said rope, lowering the person or thing slowly and safely, a slight tightening of the rope being sufficient, at any time, to stop the block in its descent.

Improved Pneumatic Telegraph.

Augusto Guattari, Castellamare, Italy.—This invention relates to pneumatic telegraphs, and consists of an improved instrument adapted to serve either as transmitter or receiver, so that by means of two such instruments, placed at different stations and connected by a single air-conducting tube, messages may be transmitted in either direction. This instrument has but one dial, which serves to indicate both the signals sent and received, so that the same instrument is made to answer both purposes, thereby dispensing with one of the instruments required in all other pneumatic telegraphs, and thereby lessening the cost of the apparatus.

Improved Butter Worker.

Andrew Jackson Dibble, Franklin, N. Y.—A stand of triangular form contains the butter-working bowl, said bowl having a hook-like projection at the small end, projecting down into a notch in the top of the stand to hold the bowl from being displaced by a revolving lifter shaft. The latter is arranged under the bowl near the front end, for raising it up thereat to make the requisite descent toward the escape passage for the buttermilk, under which is a spout to conduct the milk away. The butter-working implement consists of a cigar shaped piece of hard wood, with an elongated pivot pin at one end, a handle at the other end, the oblique transverse blades on one side, formed by notches made in the body of the implement, and a longitudinal blade. The pivot pin is entered in a hole at the lower end of the bowl for a fulcrum, and is manipulated at the other end by the operator in all suitable ways for pressing, cutting, spreading, and gathering the butter by the blades.

Improved Cuspadore.

John C. Milligan, South Orange, N. J., and Joseph Musgrove, Woodhaven N. Y., assignors to Lalance and Grosjean Manufacturing Company, New York city.—This invention is a cuspadore made in two parts, having their necks held tightly but detachably together by a screw or bayonet joint, so that the contents are not spilled in case of the receptacle upsetting.

Improved Car Coupling.

Aaron K. Kline, Readington, N. J.—The head of the coupler falls behind shoulders on the mouth of the drawhead, and is secured to draw the cars, the head being forced up over said shoulders when the cars run together, and the neck of the rod falling down in the narrow space between, as in other couplings of this character. In order to uncouple the cars without going between them, a depressing lever is used for forcing the inner end of the coupler down; for raising the opposite end of the coupler out of the drawhead; also for tilting it up so that it will slide inward and engage its end under a catch, to hold the coupling up level for coupling self-actingly. This lever is operated by a double pawl, arranged above it on a cranked rock shaft, which may be turned by the operator standing at the side of the car or on the platform, or a rod may extend from the crank up to the top of the box car.

Improved Dice Box.

Randolph S. Mains, New York city.—This invention relates to the construction of glass dice boxes in which the dice are confined but always visible, so constructed that the glass cover may be readily removed for the purpose of changing the dice or converting the box to other purposes; and it consists of a case having a glass cover and a removable base, which are readily disconnected, and a glass bottom or bed.

Improved Knife and Fork Scourer.

William H. Bowerban, Brooklyn, N. Y.—This invention consists in an improved instrument for scouring and polishing knives and forks, formed by the combination of the lead or other soft metal plate with the head of the handle, made with a flat lower side, an inclined forward end, and a rounded projection upon its top. The scouring and polishing is done with scouring brick by rubbing it upon the knives and forks with the instrument. The flat part is used for scouring and polishing the knives, and the rounded top projection for the forks, its form enabling it to readily enter and follow the curves of the forks, so as to operate upon their entire surface. When thus used, the grains of brick dust embed themselves in the lead plate and are thus held so as to operate more effectively upon the article.

Improved Smelting Furnace.

John H. Latey and John D. Williams, Salt Lake City, Utah Ter.—This invention consists in combining an adjustable draft pipe with the moistening tank, into which the smoke of the smelting furnace is passed, so that the draft pipe may be adjusted to a higher or lower point therein.

Improved Feed Regulator.

Richard J. Williams, Ottumwa, Iowa.—A little below the lower end of a spout is a revolving disk, on a shaft which projects up through the spout, and has a pulley for turning it. Above this disk is a vertically sliding tube, which is connected to a rock lever which communicates with a vertically moving and revolving shaft, so that, as the shaft rises and falls, it will shift the tube down and up, and vary the discharge of the grain from the tube. This shaft extends down into the passage from the hopper to the spout leading to the hopper of the mill stones, and has a spiral disk thereat, which will rise when the stone hopper is full and the grain backs up into the hopper, and, by forcing the sleeve down, shut off the escape from the scouring and drying cylinder, and retain the grain therein until wanted.

Improved Waterproof Joint for Roofing Boards.

John Beazley, Houston, Texas, assignor of one fifth his right to Stewart and Barziza, same place.—The side edges of the boards are rabbeted somewhat dovetailing, so that the two parts lap together, and leave the sides of the boards flush with each other. The lower outer corner of the rabbet of one board is beveled, thus leaving an interior hidden groove which readily conducts off any water that may enter from the outside.

Improved Chair Back.

George F. Perrenet, Rockport, Texas.—This invention is a chair back having an extension and a clamp, having a lug. These are connected by a ball and socket joint, which allows the back free play in all directions laterally. At the upper part of the back is a strip adapted to pass round the arms at the shoulders, and button fast over each quarter, so as to hold the sitter straight up to the chair back, and prevent the stooping forward to which students are so much inclined; and about the middle of the back, upon the inside, is a vertically adjustable pad, to rest the middle of the back against.

Improved Cooking Stove.

Peter J. Ackerman, Paterson, N. J.—This stove has a fire chamber and an oven chamber placed at right angles, the latter higher than the former. A warming chamber is placed in the rear of the first, and under the flue of the second, and is inclosed by the plates

Improved Upholsterers' Pinchers.

Joseph A. Boller, Chicago, Ill.—This invention is an improved pinchers for stretching webbing upon sofas, chairs, and other articles of furniture, and is so constructed that it may be used without danger of scratching or marring said furniture. The invention consists in the pinchers having the outer sides of their jaws flattened to adapt them to receive pads. The free end of the webbing is doubled and grasped by the pinchers, which are operated with one hand to stretch and hold the webbing while it is being tacked with the other hand, the pads protecting the work from being marred.

Improved Revenue Guard for Cigar Boxes.

Wilhelm Wohltmann, New York city.—It is proposed to have finely engraved paper strips, to be issued by the Revenue Department with the stamps, and corresponding with them in numbers, one or more of which strips shall be extended across the box from end to end, after it is filled, but before the cover is closed down. The strips are to be pasted on the outside of the ends, so that they will be broken when the cigars are taken out by the retailer or consumer. The word "empty" may be printed on the stamp, and the seller is required to add thereto the date when the box becomes empty. This, it is believed, will effectually prevent manufacturers from committing frauds in the matter of revenue by filling boxes again without putting on a new stamp; because if the paper strips—which need not be broken to show the cigars after opening the box—are ruptured, it will be evidence to the inspectors that the box has been filled again without applying a new stamp, for with each new stamp issued there will be the accompanying paper strips.

Improved Miter Box.

Peter Suydam, New Brunswick, N. J.—Saw guide holding tubes are mounted on a swinging block, which is under the bottom of the box. The block is pivoted in the axis of one tube, which is in the side piece, to swing horizontally either way from the transverse line along a circular bar. A flange is fastened to the latter at any point by a clamp nut. The circular bar has stops placed around its curve at such points that the swinging block there secured will cause the saw to cut square or octagonal miters. Into these stops a spring clip rises up from either side, and so holds the block as desired.

Improved Well Tube Check Valve.

Meredith B. Squires, Tidioute, Pa.—This invention consists in placing a check valve above the working valve in the tubing of oil, salt, or other wells, which is made wider than the tubing, so that the stuffing box for guiding the valve rod may be tightly and firmly applied therein during the working of the valve, and easily withdrawn for repairs, with the valve rod if required. A spiral spring, which is attached to the valve rod, acts with its lower end on the top of the stuffing box, and forces the same tightly in its seat during the working of the valves.

Improved Machine for Cutting Cube Sugar.

Henry Schnitzpan, Brooklyn, N. Y., assignor to Carsten Sierck, Hoboken, N. J.—The object of this invention is to produce a machine for cutting the disks of sugar into cubes or blocks. The invention consists, mainly, of a disk feeding apparatus, in connection with sector-shaped cutters, with diagonally arranged curved blades, to which the disks are consecutively fed, and then cut by the downward motion caused by sliding guide pieces connected with the driving shaft. The blocks are dropped during the downward motion of the cutters, and, in case any should be retained, forced out by an arc-shaped spring plate, with clearing pins applied back of the cutter knives.

Improved Device for Protecting Horses' Tails.

Franklin E. Howard, Geneseo, N. Y.—This invention consists in a bag formed of leather, cloth, or other material impervious to mud, the same being slitted to form lapping edges, and adapt it to be readily applied or removed from the tail.

Improved Horse Power.

Samuel H. Moor, Springfield, Mo.—This invention consists of a contrivance of multiplying gears. The motion is equally divided between a disk and a ring, and both unite their forces on a transmitting shaft, but on opposite sides of it, each having the other for its bearing or resistance to its counterforce, so that a considerable measure of force is utilized, which, in ordinary arrangements, is lost on the bearings.

Improved Mechanism for Propelling Railway Cars.

Alfred Speer, Passaic, N. J.—One of the two cars to be coupled together is constructed at the end on a convex curve, struck from the axis of the pivot bolt by which the two cars are coupled, the radius being equal to half the short diameter of the cars. The other car is concaved to correspond, so that when the cars are closed together, they will swing relatively to each other, without opening cracks at the joints, thus making a continuous unbroken sidewalk, on which people may walk as on a continuous floor. An endless flange projects downward from the middle longitudinal timber of the car, to which the power is applied by the friction rolls upon the upper ends of vertical shafts rising up from below, and nipping it on both sides between them. These rolls may be faced with india rubber, if preferred, to increase the friction. Springs may also be used to press them on the flange. The flange is matched with beveled ends where the sections meet at the joints of the cars, so that there will be a continuous action on the flange, as the driving wheels pass the end of flange, the wheels griping the one end of the flange before they have let go the other. A full page engraving of Mr. Speer's novel system of railway propulsion, on which this device is an improvement, was published in April, 1872, in the SCIENTIFIC AMERICAN. Mr. Speer is an applicant before our State legislature, this winter, for a charter permitting him to construct an endless traveling sidewalk, on his plan, in the city of New York.

Improved Mode of Extracting Silver from its Ores.

James Douglass, Jr., Quebec, Can.—This is a process of utilizing the waste liquors of the ordinary ore-chloridizing process, by allowing the insoluble matters contained in said liquors to precipitate, and then evaporating the clear supernatant liquid to obtain the soluble chlorides, which are reapplied in treating fresh ore. In an experiment recently made in a mill at Georgetown, Col., a filtered solution of salts, of 12° Baumé, contained 44 3-7 grains of saline matter in an ounce of solution, the chlorides being chiefly chloride of zinc and undecomposed chloride of sodium. This saline matter, mixed with ore in the proportion of 1 part of the salt to 8 parts of 80 ounce silver ore, chloridized it as perfectly as when 1 part of chloride of sodium was mixed with 10 parts of ore. In this mill each pan contains 75 gallons of liquor; and 35 pansful of this strong saline solution, or 2,625 gallons, are thrown away daily, and with it 2,051 pounds of salts, almost as serviceable for chloridizing fresh ore as chloride of sodium. This mill is now preparing to evaporate these waste liquors by means of the waste furnace heat, and the manager thus expects to save, at trifling cost, more than half the salt heretofore consumed. Mr. J. O. Stewart, of Georgetown, Col., is willing to give information with regard to the use of this patent.

Improved Candlestick.

David Bourland, Madisonville, Ky.—This invention is constructed to hold the candle securely until it is entirely consumed, and to prevent the difficulty arising from the lower end of the candle sticking fast in the socket of the candlestick, so that it cannot be raised by the pusher. The candle is inserted in pivoted clamps, held together by springs inside the post of the candlestick.

Improved Chair.

Isaac I. Cole, Hillsdale, N. J.—This invention is a chair made of several parts, which are obtained by pressing several layers of veneer of suitable size and thickness into forms of corresponding shape. The grain of the middle layer runs crosswise to that of the outer layers, and so alternately in similar manner if a greater number of veneers are used. The chair may be made of three parts, the seat part extending up over the back, and both extending down to form feet, and the feet spaced and braced by other portions.

Improved Spoon Holding Attachment

Winfield S. Dennett, Saco, Me.—This invention consists of a little spring clip arranged to fasten on the upper edge of a pan or pot by springs, and hold a spoon by another spring, the said holder being made of sheet metal by stamping out a blank in dies and bending to form springs. The object is to provide a convenient means of holding a spoon, used from time to time for mixing the contents of the pan, so that it will not slide down into the pan while not in use, and thus save the cleaning of the spoon in order to lay it down after it is used.

Improved Station Indicator.

John Mulligan, 154 East 119th street, New York city, assignor to himself and William C. Fellows, Poughkeepsie, N. Y.—This invention relates to the construction and arrangement of certain parts for adjusting the tension on the apron as it is wound from the upper reel to the lower; and for connecting the clock mechanism with the reels, also disengaging it therefrom and otherwise relieving the reels of all stops or impediments to free rotation for rewinding the apron on the upper reel. When the cord is pulled a rod will be momentarily raised, thus sounding the bell to give notice to the passengers, and simultaneously freeing the reels so that the clockwork will revolve them till again arrested by the clock engaging on a pin.

Improved Water Tank for Fireproof Safes, etc.

Edward H. Parker, Poughkeepsie, N. Y.—This invention consists in providing a water tank for safes, etc., with a valve having shouldered head disk-closed recess, and a melting mixture, with an outer protecting layer The tank, being closed air and water-tight, is placed into the safe or vault In case of fire, the increase of temperature to about 150° Fah. will melt the wax melting mixture, and it will run out of the recesses, the hydrostatic pressure forcing at the same time rubber disks from inner openings and allowing the water to escape. The upper valves of the tank admit the air so that an uninterrupted flow of water is established.

Improved Ice Cream Freezer.

George P. Herndon, Tupelo, Miss.—This invention has for its object furnish an automatic freezer, and consists in a vibrating tub or vessel containing the sheet metal cream holder between which a space is formed to receive the ice, and in the peculiar mechanism for imparting the vibratory movement.

Improved Telegraph Apparatus for Cable Use.

William Edward Sawyer, Washington, D. C.—The apparatus is intended as a substitute for those now in use on marine lines or cables, and is so constructed that every movement of the needle is utilized, so that a message requiring 136 movements of the needle with the present inatruments requires but 34 with this.

Improved Hand Stamp.

Adolphus G. Leming, Waldron, Ark.—The upright cylindrical casing is rigidly connected to the base by a horizontal flange extension and screws A vertical central perforation of the bottom of the casing corresponds with a larger aperture of the base, and guides the main shaft of the machine in its up and downward motion. The casing has a vertical slot which guides the projecting arm of the shaft, and has also at its upper end U-shaped stationary arms. The ends of the arms are recessed to admit rods which are pivoted to them. Band springs are firmly applied to the arms, and bent in such a manner as to act on the rods to force them outward. To the outer ends of rods is laterally pivoted the inking roller. On the downward motion of the shaft, the inking roller passes over the type bed, and then upward along the inking plate, while at the same time the type bed is stamping the object. On the upward motion of the shaft the inking roller passes again over the inking plate and forward over the type bed. The inking roller thus passes twice over the type bed and inking plate, and inks, therefore, the former more completely than if passing only once, so that, consequently, more uniform impressions are produced.

Improved Steam Engine.

Albert E. White, St. Paul, Minn.—This invention consists in the mode of introducing and exhausting the steam into and from the cylinder, whereby all valves are dispensed with. A sleeve or interior cylinder is fitted into the outer cylinder, which sleeve receives a slight rotating motion by means of cams at each end of the cylinder, actuated by mortises in each end of the piston. This movement of the sleeve serves to change the ports at the end of each stroke. There is a port in each end of the sleeve. By this manner of construction an engine is produced without valves. The sleeve, being perfectly balanced, is turned without undue friction, and the steam is introduced and exhausted regularly.

Improved Fly Trap.

Dixwell Lathrop, La Salle, Ill.—Bait is placed in the box, to which the flies and insects readily find access. The inner chamber is lighted by windows in its sides, and the flies, instead of returning the way they entered, fly upward, and, finding their escape cut off, and seeing the full light of day above them, readily pass, through an opening and tube, into a cup against a glass cover, from which they drop into the liquid in the cup, which kills them.

Improved Water Wheel.

Charles Redfield, New York city.—The cylindrical case and open bed piece are connected together, and have a cover. The water wheel shaft has two spiral blades carried in opposite directions around it, attached to a rotary cylinder, to which are rigidly attached the buckets, so that the buckets, the shaft, and this cylinder may revolve together. This greatly relieves the retarding friction of the water, that usually strikes the stationary cylinder in which the buckets move, and augments the velocity or power which is usually generated by a given current of water.

Improved Canning Apparatus for Fruit, etc.

Andrew K. Shriver, Baltimore, Md.—This invention consists in a process of heating closed cans by steam, the pressure of the heat expansion from the inside being counterbalanced by the steam pressure on the outside.

Improved Chipbreaker for Planing Machines.

William C. Margedant, Hamilton, O.—This invention relates to the pressure bar or chip breaker used in planing machines for holding down the lumber, so that, as nearly as possible, a uniform surface may be presented to the revolving blades of the cutter.

Improved Cartridge Filling Machine.

Lester A. Beardslee, Little Falls, N. Y.—This invention relates to means whereby sportsmen and others may, with convenience and despatch, load the quantity and kind of ammunition preferred into the ordinary cartridge cases which are bought at wholesale or retail for that purpose. It consists in a hollow plunger having a funnel-shaped top, and fitted to be worked up and down in guides by means of a hand lever; also in a cartridge shell holder which is adjusted upon its bed into proper position to allow the hollow plunger to enter it by means of a converging groove in the bed plate of the machine. The ammunition, being placed in the funnel end of the plunger, passes therethrough into the cartridge shell that is placed beneath it in the shell holder. The plunger not only serves to conduct the ammunition to the shell, but also serves to ram down the wad.

Improved Skate.

J. Dwight Kellogg, Jr., Northampton, Mass.—This invention relates to means for fastening skates rigidly to the foot in a convenient way, in a short space of time, and so that all tendency to work loose is removed. The invention consists in attaching the clamps to two hinged plates that support the ball of the foot, and in thereby utilizing the weight of the skater to tighten and retain the skate in its true position. It also consists in the use of sliding clamps that can be readily adapted to different sized boots and shoes. It also consists in avoiding any play of the skate on the foot, when both are lifted, by a novel mode of locking the plates that hold the clamps.