

**GRANT AND WILSON.**

We have engaged the services of Mr. A. H. Ritchie, of world-wide reputation as an artist, to produce for THE INDEPENDENT, as speedily as possible, and for our exclusive use, a superb STEEL ENGRAVING of Hon. Henry Wilson, a companion picture to that of President Grant, already known to tens of thousands of our subscribers in every section of the country. This new and magnificent engraving—size 19 by 24 inches—will be ready for delivery during the coming month. On and after this date, therefore, we will present these two fine steel engravings of Grant and Wilson for every new yearly subscriber sent us, with the money—\$2.50. They will be delivered at our office, or sent by mail, postage paid, at the option of the subscriber. These engravings are printed on separate sheets of fine pasteboard, suitable for framing. They will be carefully rolled on wood, warranted to arrive in good order and to give entire satisfaction, or they may be returned and the money positively refunded.

Let every true hearted Republican, every friend of Grant and Wilson, and every political organization in the country, promptly send us for these beautiful and desirable pictures, produced by one of the most celebrated artists in the world—the author of the “Emancipation Proclamation” and “Authors of the United States,” etc. Engravings of this class sell at the print stores at from \$2 to \$5 each. Both will be given away, together with THE INDEPENDENT for one year, to any person who will, as before stated, send us the name of one new subscriber and \$2.50. We shall register the names and deliver the engravings in the order in which they are received. Books are now open. Any person may act as agent. Address HENRY C. BOWEN, Box 2757, New York City.—Advertisement.

**Notes & Queries.**

[We present herewith a series of inquiries embracing a variety of topics of greater or less general interest. The questions are simple, it is true, but we prefer to elicit practical answers from our readers.]

- 1.—MILK SOURD BY A THUNDERSTORM.—Can any one give me the scientific reason why milk turns sour during a thunderstorm?—H. C. R.
- 2.—PHOTOGRAPHS FINISHED IN OIL.—How shall I prepare the surface of a photograph on plain paper to prevent the sinking in of oil colors?—G. W. T.
- 3.—TORPEDOES.—How are the toy torpedoes, in balls of paper, made?—L. C. T.
- 4.—WELDING STEEL AND COPPER.—Is there any process by which steel and copper can be united, as steel and iron are united in cutting tools, etc.?—J. E. S.
- 5.—STANDARD MEASURES.—What is the exact length of an inch? Barley corns are not all one length.—P. E. McD.
- 6.—PICTURE CLEANING.—What kind of a wash or preparation should I apply to oil paintings for the purpose of cleansing or regenerating them?—C.
- 7.—COOLING WATER.—I wish to know of a simple method of cooling lake water (heated daily by the sun) without the use of ice, for drinking, also the best method of purifying it.—J. A. C.
- 8.—ADULTERATION OF TURPENTINE.—I sold a customer some spirits of turpentine to paint with. He insists that benzine is mixed with it. I never heard of such an adulteration. How can it be detected by any means other than trying the specific gravity?—G. B.
- 9.—TAR FLOORS.—I wish to know how to remove the unpleasant smell arising from a basement floor that has been laid (for over two years) with a composition of coal tar and sand.—H. P. T.
- 10.—BACK GEARS.—I am making a lathe, with a 2 feet bed, 6 inch swing, and mandrel five eighths inch in diameter. I wish to know the proportions of back gear, and how to make it for a lathe of the size mentioned. The cone pulley on the mandrel is 1 1/2 and 3 inches. The band wheel is to be 2 feet in diameter to the 1 1/4 inches. How large should it be to the 3 inches to keep the belt tight?—F. H. J.
- 11.—CASE HARDENING IRON.—In case hardening iron with bone and leather shavings, should the shavings be used more than once? Should acid (vinegar) water, salt water, or clean cold water be used to cool the articles in?—R. K.
- 12.—BLASTING UNDER WATER.—How can I protect powder from the wet in blasting under water? I wish to make a few blasts where the water is from 10 to 18 inches deep.—A. A. P.
- 13.—LEAD IN WATER.—There has been a great deal said in your paper about water being poisoned by passing through lead pipe. Cannot it be obviated by substituting rubber tubing in many instances? Will some one who knows, give us his ideas on the subject, and tell us if the use of rubber would be practicable for wells and cisterns?—J. M.
- 14.—PHOSPHIDE OF CALCIUM.—Can some of your readers inform me of a cheaper and more convenient way of preparing phosphide of calcium than that described by J. S. on page 386 of Vol. XXVI?—X. R. C.
- 15.—CASE HARDENING MALLEABLE IRON CASTINGS.—Can some one tell me the best method of case hardening, by the quantity, malleable iron castings about one inch square? I want to harden one sixteenth of an inch deep if possible. How long ought they to stay in the fire?—W. A. S.
- 16.—UNITED STATES COINAGE.—When did the issue of the series of large United States coppers and of the United States half cents begin and cease, and what were the years in which they were not coined, if any? When did the circulation of the small United States cent with an eagle on one side begin, and for how many years was it coined?—F. R. E.
- 17.—CANARIES AND VERMIN.—I wish to know how to get rid of lice or vermin in canaries, without injury to the birds.—D. F. W.
- 18.—MIRROR.—Is there any solution or composition, which can be put on tin or any similar substance, that will not blister or crack if brought within two inches of the blaze of a lamp, and at the same time will reflect the light?—G. L.
- 19.—TAKING IMPRESSIONS BY RUBBING.—I want to know how to make impression paper. I have seen some by which one may take the picture of a leaf, by just rubbing the leaf on it and then rubbing the impression on paper or stone.—S.

**Answers to Correspondents.**

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 100 a line, under the head of “Business and Personal.”

- ALL reference to back numbers must be by volume and page.
- J. B., of N. C.—We publish three of your queries. The others are business enquiries. See notice at the head of this column.
- PRESERVING NATURAL FLOWERS.—L. L., of Mass., is referred to pages 201 and 281 of volume XXVI. The last method is an excellent one.
- REMOVING INK STAINS.—W. W. R., of N. Y., has omitted to send his recipe.

**BURNING GLASS QUERIES.**—E. E. S. will not gain any warmth by concentrating the sun's rays and then dispersing the heat through a current of air. The answer to the second query will depend on the size of the glass, the power of the sun, and the temperature of the atmosphere, none of which can be predicated.

**ELECTRO-CHEMICAL TELEGRAPHY.**—In your issue of May 25, on page 347, I find an interesting description of an electro-chemical copying press, the invention of Signor Zuccato, of Padua, Italy. Now I would like to ask you and the readers of your paper if the principle of that press cannot be used to transfer *fac simile* telegraphic messages? Let the varnished steel plate or writing tablet have inserted, vertically within it, from beneath, the ends of a multiplicity of wires separately insulated; the finer the writing, the finer and more numerous the wires should be; then let these wires, bound together as a cable or in the most suitable manner, be the conductors of the electricity to the sheets of copying paper specially prepared and damped with a solution of prussiate of potash. Would not any writing made by removing the varnish upon the tablet be represented in dotted lines upon the copying paper, at the distant station, immediately upon the occurrence of the electrolytic action communicated by the wires? The greatest objection to which this would be liable would probably be the cost of the connecting wires. Will not some inventor immortalize himself by removing this objection, and give to the world an instantaneous copying telegraph?—J. W. K., of Col. Ter. Answer: The plan of telegraphy above suggested is very old. It was, we believe, first put into operation by Alexander Bain.

L. S. H., of La.—The apparatus you designate “a pump or ram” is neither the one nor the other. According to your drawing and description, it is simply an apparatus for obstructing the flow of the water in its passage from the upper pipe to the lower one. It would not work automatically, for the reason that the escape of water from the bottom of a vessel does not produce a vacuum in the upper part.

**TEACHING CHILDREN THE ALPHABET, ETC.**—K. is informed that his idea is already in use, apparatus of the kind being for sale in every toy store.

**WATERPROOFING MUSLIN.**—W. H. J., query 11, page 385, Vol. XXVI, can obtain the material for a light waterproof tent of the American Waterproofing and Manufacturing Company, 176 Broadway, N. Y.

**POWER FOR SEWING MACHINE.**—W. W. S., of Miss., should know that the power requisite to drive a machine depends on the material being sewn; and the machines of different makers all vary as to the power required.

**WATERPROOFING MUSLIN.**—Query 11, page 385.—W. H. J. will have some difficulty in finding a means of thoroughly waterproofing his tent without adding much to its weight. Two recipes for processes applicable to muslin are given on page 105 of your volume XXVI, but none of the alum solutions will continue to resist long and heavy rains. The India rubber treatment described on page 266 of Vol. XXIV, is effective, but it will increase the weight of the cloth.—D. B., of N. Y.

**PHOSPHORESCENT OIL.**—Query 5, page 385.—H. W. B. should put a piece of phosphorus, the size of a pea, into a white glass vial, and pour in boiling olive oil till the vial is one third full, and cork up. When light is required, remove the cork for an instant. The air entering will cause the phosphorus to burn and a light will be obtained. As it fades, admit more air. This vial will last for six months without requiring any more phosphorus. I have seen this contrivance used, in depots of inflammable commodities and explosives, in Paris, and light sufficient for the use of keepers, warehousemen, and others is afforded by it.—D. B., of N. Y.

**FUTURE HUNTING PROSPECTS.**—At present it would be hard for O. K. to make his living out West by his rifle; if there are no laws against hunting, it is to be hoped that fifty years hence men will not be so cruel as to hunt and fish for amusement. The birds have been killed so that in many places the trees are being destroyed by worms. O. K. will be much more likely to know what the West is in half a century if he will exchange his rifle for a spade and pick.—L. S., of the West.

**ACETIC ACID.**—To F. O. R., query 8, page 370.—Put a quantity of acetate of soda or acetate of potash into a retort, and thereon pour its own weight of sulphuric acid diluted with twice its bulk of water. Connect retort with a receiver, which keep cold by water flowing over it, or in some other way. On heating the retort by a spirit lamp or gas flame, the acetic acid will soon begin to distil nearly pure.—E. H. H., of Mass.

**OXYGEN IN SULPHURIC ACID.**—To J. T., query 4, page 370.—One ounce or 480 grains of sulphur requires 1,800 cubic inches, or a little over one cubic foot of oxygen for its oxidation in forming sulphuric acid.—E. H. H., of Mass.

**FORCE OF FALLING BODIES.**—To J. E., query 12, June 8.—The hammer will strike with a momentum of 160164.5472 pounds. The formula is

$$\text{the square root of } (4 \times 64 \cdot 33) = 160312 \text{ velocity.}$$

Then

$$4 \cdot 426 \times 6000 \times 160312 = 160164 \cdot 5472.$$

Or, multiply the fall in feet by 64.33; the square root of the sum is the velocity; and multiply the weight in pounds by 4.426 and that by the velocity, and you have the momentum.—E. E. W., of W. Va.

**FLAVORING EXTRACTS.**—To E. R. T., query 9, page 370.—Powder the vanilla pods in a mortar with a quarter of a part of white lump sugar; then digest for a day or two with strong alcohol. Pour off the clear essence, and place the mud in a funnel whose stem is loosely closed with cotton wool; now pour over it alcohol until the whole flavoring principle is extracted. Mix the liquors together and you have the essence or extract of vanilla. Extract of lemon may be made by dissolving one part of essential oil of lemon in eight parts of alcohol; or by macerating the thin outside yellow rind of lemons in alcohol and then filtering.—E. H. H., of Mass.

**TRANSFERRING MOTION.**—I would say, in answer to W. F. W.'s query, June 8, page 385, Vol. XXVI., that a belt run with a half twist from a vertical to a horizontal shaft will answer the purpose; but he should have a flange on the lower end of the pulley on the vertical shaft to keep the belt from slipping off when loose. He may have some trouble at first in getting the pulley on the vertical shaft to the right height; but if he fastens the pulley with a set screw, he can move it up or down as the running of the belt will indicate.—H. C. R., of O.

**HYDROGEN LAMP.**—C. C. W., of Ill., having read the many inquiries, on this subject, which we have published, forwards us the following excellent directions: Use chemically clean sulphuric acid and pure water—one pound of water to one fourth pound of acid. Put the water first in a clean bottle or jar, and drop the acid into it very slowly, shaking it at intervals to mix it. Let the mixture get cold before putting it in the jar, as the mixing of the two generates heat. Hang the cone of zinc, by the brass wire, inside of the inner glass vessel, which is the gas receiver; then pour the mixture in the jar. Never put in at one time any more than the occasion calls for. Unscrew the gas ejector on top, and by holding the lever down, permit all the air to escape out of the gas receiver; and as soon as the air escapes, the acid rises and fills the space, and at once commences to act upon the zinc; and as soon as the acid commences to act on the zinc, let the lever back and screw on the gas ejector. Always keep the sponge in the thimble protected while the air is being let out of the gas receiver. As the gas forms, it drives the acid down until, getting below the zinc, action ceases. As fast as the gas is let off, the mixture, which has been displaced, rises, and again coming in contact with the zinc, evolves a fresh supply of gas. Light the gas, first time, till the sponge in the thimble glows red hot. Afterwards it will ig-

nite of itself. Never use sulphur or potash matches, but a slip of wood or paper. To get a light: Wait until the gas has lighted and then light the wood or paper. If the small hole where the gas issues becomes clogged clean it with a stiff bristle. After long use, if the acid does not attack the zinc, it needs a new supply of mixture. If the zinc has disappeared, renew that. The sponge in the thimble must be kept well protected all the time. The arch shape must be preserved, not broken or pressed down. When it wants renewal, remove the wire ring in front which keeps the sponge in its place. By actual test, one fourth pound of acid and one pound of water is mixture enough to make gas for 10,000 lights. One cone of zinc will last long enough for 20,000 lights; and the sponge in the thimble will last long enough (if not broken or pressed down) for 40,000 lights.

**NEW PATENT LAW IN CANADA.**

By the terms of the new patent law of Canada (taking effect September 1st, 1872) patents are to be granted in Canada to American citizens on the most favorable terms.

The patent may be taken out either for five years (government fee \$20), or for ten years (government fee \$40) or for fifteen years (government fee \$60). The five and ten year patents may be extended to the term of fifteen years. The formalities for extension are simple and not expensive.

In order to apply for a patent in Canada the applicant must furnish a model, specification and duplicate drawings, substantially the same as in applying for an American patent.

American inventions, even if already patented in this country, can be patented in Canada provided the American patent is not more than one year old.

All persons who desire to take out patents in Canada are requested to communicate with Munn & Co., 37 Park Row, N. Y., who will give prompt attention to the business and furnish pamphlets of instruction free.

Messrs. Munn & Co., have had twenty-five years experience in the business of obtaining American and Foreign Patents for inventors; they have special agencies in nearly all countries where patents are granted. Moderate charges and prompt attention may always be expected.

MUNN & CO., 37 Park Row, N. Y.

**Recent American and Foreign Patents.**

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

**MANUFACTURE OF SIRUPS.**—Joshua C. Wood, Larissa, Texas.—This sirup is made from what is known as mustang or post oak grapes, sugar and water being added to the juice, and a certain mode of treatment pursued to insure the best results.

**COTTON PRESS.**—Wm. Bradley, West Point, Ga.—1st. The invention consists in combining with a screw press and follower, an arch thrown diagonally above the top of press, so as to allow the follower to be turned transversely thereacross and thus afford free entrance, on each side, to the ingress of cotton. 2nd. It consists in combining, with a laterally adjustable press follower, a gage guide which gages the distance to which the rotating follower may go, then arrests it, and finally guides it down into the press box.

**RAILROAD GATE.**—Hiram Conrad, New Columbia, Pa.—The invention consists in causing a projection from car or truck to strike a bar, turn a rock shaft and cause a weight to release a lever. The weight then falls and raises the gate by a projection on its rear. The wheel now forces down a pivoted bar and causes the weight to rise, while the next car that passes strikes the opposite bar, releases catch, and allows gate to fall by its own gravity. This device is applicable to a carriage or wagon road with but little change.

**MEANS FOR FEEDING AND GIGGING BACK THE LOG CARRIAGE OF CIRCULAR SAW MILLS.**—Allan Talbott, Richmond, Va.—The invention consists in improved means for feeding up and gigging back the log carriage of circular saw mills, whereby springs, catches and other contrivances are rendered unnecessary. This causes the machine to be much less liable to get out of order and enables the sawyer to control the carriage with equal facility from either end of the mill.

**ELASTIC WASHER.**—Caspar Dittman, Leacock, Pa.—The invention pertains to improvement in the construction of elastic washers of the class wherein the rubber or other packing is enclosed so as to be protected from injury by reason of the torsional action of the nut. The invention consists in the arrangement of a face plate or follower, having a radial tube to receive the screw bolt, in connection with a socket, for holding the elastic packing, whereby the packing is preserved from injury.

**SOLDERING IRON.**—Nathaniel G. Numsen, Baltimore, Md.—The invention consists in making a soldering iron in three parts which consist respectively of a tube, cap, and holder, arranged so as to form a new and improved article of manufacture.

**AERATED WATER FOUNTAIN.**—John C. Johnson, Louisville, Ky.—This invention consists of a crystal fountain for mixed water and air jets, in which a hollow water cylinder and air compression chamber for supplying the motive power, together with an air pump for compressing the air, are combined with the air mixing pipes and cocks and other apparatus of the fountain, and all inclosed in an ornamental case, which is adapted to be moved from place to place without incurring any disturbance or the necessity of changing the water connections. It also comprises a cluster of bent pipes of glass to be used in place of the jets commonly discharged into the air, through which the mingled water and air are forced alternately up and down, producing scenic effects of great beauty.

**GRAIN DRYER.**—Frederick H. C. Mey, Buffalo, N. Y.—This invention furnishes an improved apparatus for drying grain, which takes the wet grain, dries it by the application of hot air in such a way that it cannot burn or scorch it, and then cools it by the application of cold air, delivering the grain dry and cool, ready for storage or shipment. It consists in the combination of a peculiarly constructed drying chamber, through which the grain is made to pass while exposed to currents of heated air, a cooling chamber, in passing through which the grain is exposed to a blast of cold air, and a furnace. Fan blowers, elevators, and other adjuncts are also employed to effect the operation.

**MOWING MACHINE.**—John Clarridge, Mount Sterling, Ohio.—In this invention the driving shaft carries a wheel in the face of which is formed a zigzag groove. In this groove is placed a friction roller, which is attached to one end of a sliding bar in such a manner that the bar is made to slide backward and forward longitudinally as the wheel is turned. The motion thus set up in the sliding bar is conveyed by means of a pivoted lever to the pitman which drives the cutter bar. The sliding bar is made with a joint, so that it may be bent aside and thereby disengage the roller from the groove. This joint is opened and closed, and the bar held in place horizontally, by a slide which is controlled by the driver. The bar is held in place vertically by being made to slide between friction rollers.

**INSIDE BLIND.**—James Wright and Thomas Thompson, Elizabeth, N. J.—This invention consists in the employment of a jamb, hinged at one or more joints so as to fold over a pocket or chamber, into which all the slats of the blind, after being folded upon one another in the usual manner, are turned. By this construction the blinds are not only folded and turned into a pocket, as is usually done, but, being covered and protected by the jamb, are not subject to defacement by the deposit of dust and other causes. The size of the room is not appreciably affected by this construction, as the jamb need only extend one inch beyond the plane surface of the walls.

**WHIFFLETREE FASTENING.**—Charles Ahrenbeck, Navasota, Texas.—The invention relates to the means by which single trees are attached to a double tree, and consists in hinging two hooks to a staple that is attached to one end of a double tree, while said hooks are held together at their bases by a recessed and intermediate guard plate.

**PROTRACTOR AND PARALLEL RULER.**—William L. Athrop, of Tallahassee, Florida.—This invention relates to a new instrument which is convenient for draftsmen, surveyors, etc., for laying out angles of suitable degree, and providing parallel lines of any desired inclination. It consists, principally, in an ordinary semi-circular protractor which is provided with a detachably pivoted radial arm carrying a vernier at its further end which nicely fits the convex edge of the protractor. A ruler is provided with a longitudinal slot, so as to slide along the arm. By the use of certain rods and cross bars, the instrument is converted into a parallel rule.

**HOSE CART.**—William E. Shaw and Charles A. Ashley, of Stockton, Cal.—This invention comprises numerous improvements in the construction of hose carts, by which they are rendered lighter, simpler in construction, and consequently less expensive to build. The improvements are so varied in their nature (occupying seven claims in the patent) that we cannot afford the space necessary to allude to them in detail.

**PUMP.**—Charles Wilson, of Bridgeport, Conn.—The object of this invention is to combine the advantages of a submerged with those of an elevated pump. A pump of suitable construction is supported within a reservoir of cylindrical or other shape. This reservoir is firmly secured upon the cover of the well. A pipe extends from the cover down to the lower part of the well into the water contained therein, and is provided with a check valve at its top. The reservoir is made of metal, glass, or other material so as to be practically air tight. As the pump is worked a partial vacuum is first created within the reservoir and water drawn into the same from the well until it has risen to the bottom of the pump. The water is then drawn into the pump and discharged in regular streams from its spout.

**SASH BALANCE.**—Benjamin Frazee, of Newark, N. J.—This invention consists in an improved method of balancing sashes, which is substantially as follows: But one sash line is used for both sashes; one end of the line is attached to one side of the lower sash and the other end to the upper side of the upper sash; the line is carried vertically up from either sash and passed over pulleys fixed in the top of the window frame in such a manner that the right of the line hangs down in a cavity in the wall on one side of the frame. A pulley, to which is attached the balance weight, is hung in the right and completes the arrangement.

**CHAIR BACK AND CRADLE END.**—Thomas W. Moore, of New York city.—The object of this invention is to form a chair back or cradle end without connecting rounds, either vertical or horizontal, and it is accomplished by constructing it of horse shoe like parts which are bent over and made to overlap, or interlace, or both, before their two ends are securely connected with the back rail of the chair or end rail of the cradle.

**EXTENSION TABLE RAIL.**—Lorenz Lotz, of Brooklyn, N. Y.—In this invention, the extension rail is composed of two or more sections, the upper and lower one of which are attached to the ends of the table in the usual manner. Where the sections slide one over the other, they are formed with longitudinal grooves over which are laid iron plates so as to form longitudinal recesses partially covered. In these grooves and partially covered recesses, lips and hooks projecting from transverse plates attached to the opposing sections are made to slide. The sections are thus guided and held in place to slide freely, and the wood rails are prevented coming in contact.

**PLOW.**—John S. Hall, of Pittsburg, Pa.—This invention furnishes an improved hill side plow, which is simple in construction and convenient in use, being easily and quickly adjusted as a right or left hand plow, and securely and firmly held in place when adjusted. The plow point is made triangular in its general form; two of its sides are made flat to serve alternately as a base and landside; the third side is concave to adapt it to serve as the forward part of the mold board in either adjustment. An angle plate is formed upon or attached to the rear end of the point at the angle between its plane sides, the wings of which plate serve alternately as base and land side. The standard has a brace formed upon or attached to it, which projects to the rearward and curves downward. The lower ends of the standard and brace are pivoted to a rod, the forward end of which is attached to the rear part of the point near the angle between the plane sides thereof. The rod extends back along the angle of the base plate, and its rear end is attached to a transverse plate or flange. The mold board, which is double, is hinged to the forward edge of the standard. An angular bar is secured by the ends to the mold boards. The upper edge of the end parts of the bar is made straight, and horizontal to receive and fit against a shoulder formed upon the rear edge of the brace. Upon the lower edges of the end parts of the bar are formed recesses to receive the corners of the flange. Lever latches are pivoted to the rear side of the bar near its ends, in such positions that when either wing of the double mold board is moved up against the side of the brace, the end of a latch takes hold of the edge of the shoulders of the brace, and locks the various parts of the plow securely together. By this construction, by raising the free end of the latch, the parts of the plow will be released, so that it may be conveniently turned or adjusted to turn the furrow in the other direction.

**FILTER.**—James Brady, of New York city.—This invention consists of a cooler and filter in which a vertical division of a cylindrical vessel is made to provide an ice chamber alongside the water chambers. It is constructed of sheet metal or other suitable material, with an upright partition forming the ice chamber alluded to, and is open at the top. A pan, of about half the depth of the water space, is let in at the top of the vessel, and a second pan, half as deep as the first, is set in that—dividing the water space into three chambers. The upper part has a fine wire filter in its bottom through which the water passes into the lower one; this is provided with one or more sponge filters, and from them the water drops into the lower part of the vessel, from which it is withdrawn by a cock.

**EASY CHAIR.**—Dexter S. Rice, of Portland, Me.—This invention relates to a new manner of locking the hinged back of an easy chair in a suitably inclined position, and also to a novel arrangement of the footrest for the same. It consists in a hinged back to which the arms are pivoted, and slats in the side chair rails in which the lower parts of the upright arm posts can be fixed, by pins, at various distances from the front of the chair. The arms are thus made to support the back at any required inclination. The foot rest is composed of several boards hinged together, with the top board hinged to the front of the chair. It can be set in any desired position by means of braces, and can be folded away when not in use.

**INDIA RUBBER PISTON PACKING.**—Isaac B. Harris, of Edinburgh, Scotland.—Piston packing formed from canvas coated with india rubber has hitherto been manufactured by rolling strips of it into straight flexible cords or ropes, either round or square. From these straight lengths pieces are cut off of varying lengths, as required, and bent round to form rings to embrace the piston rod. This mode of fitting in or applying the packing is very troublesome, and it is often put in unequally tight, and afterwards unequally crushed. To avoid these inconveniences the object of the present invention, which consists in coiling the lengths of packing (prepared as heretofore, and while in a soft, uncured, or unvulcanized state) upon mandrels, each into a spiral (like bell pull springs), and submitting them, while retained in that form by bands or otherwise, to vulcanization. This operation gives the lengths a permanent spiral or helical set. The advantages of this form are important; for a piece of several convolutions can be cut off and expanded into fewer convolutions, or into a single ring; or a single convolution may be contracted into a greater number of convolutions, always retaining the circular form, and thus the packing will always be ready to be formed into rings to fit piston rods of various sizes more perfectly, and with more smoothness and regularity than heretofore.

**FOLDING CHAIR.**—John C. Compton, of Clarksville, assignor to himself and Baltus Pickel, of Trenton, N. J.—This invention relates to a new arrangement of folding chair, whereby, without increasing the cost of manufacture, the chair may be folded together for transportation, and still be sufficiently strong and durable when in position for use. The invention consists in connecting the front legs, by means of pivoted arm rests, with the chair back, and in locking the parts in position by means of an overlapping ledge on the front of a folding seat.

**ANIMAL TRAP.**—Lewis E. Ingersoll, of Columbus, Pa.—The invention consists in forming a trap for animals with two reception rooms, in each of which one animal may be alternately caught and delivered into a rear chamber, while the trap is set automatically and alternately, in each room, a given number of times, or until the tension of a spring and cord have been exhausted.

**PORTABLE STORE COUNTER.**—This invention furnishes an improved store counter, which is so constructed that, while it serves all the ordinary uses of a counter, it may be opened out to receive goods, to enable them to be readily removed from the store in case of fire or for other purposes. The base of the counter is a box about eight or ten feet long and from three to three and one half feet wide. It is made with an open top, and with close bottoms, sides, and ends. The top of the counter is made with downwardly projecting moldings around the edge of its lower side, so as to fit upon the top of the base. To the bottom of the base, legs are hinged, of such a length as when extended to raise the counter to a suitable height. To the bottom are also attached pivoted rollers, upon which, when the legs are folded, the counter may be supported and rolled from place to place. To the upper parts of the ends of the base are attached by hinges peculiar combinations of hinged boards, the nature of which will be best understood from the use they are put to. When employed as a counter, the boards are folded down into the base, the cover is put on, and the hinged legs are extended. When, in case of fire or other cause, the goods are to be removed, the boards are unfolded and form a receptacle in which the goods to be removed are packed. The counter is then rolled away.

**BOTTLE HOLDER.**—William O. Pond, of Mobile, Ala.—This invention relates to an improved box for holding bottles which are intended for transportation or preservation. It consists in making the box with wooden or metallic sides and ends, and with wire top and bottom, the wires being so stretched that the necks of the bottles fill smaller openings in the lower part, while the bases of the bottles fit larger openings in the upper part of the receptacle. By this arrangement, all kinds of bottles and jars can be closely packed and securely held in position without danger of breakage, the wires being sufficiently elastic to preserve the bottles from injury, even if the boxes exposed to jars or rough treatment.

**BOILER TUBE SCRAPER.**—Jacob Hobday, Jr., of Ansonia, Conn.—The object of this invention is to lessen the difficulty of removing dirt and incrustations from boiler flues. It consists of an improved scraper of the following construction: A spring, triangular in cross section, is bent spirally into the form of a double cone and ingeniously attached to the end of a rod which passes through it. The spring forms the scraper, and a handle of any required length may be screwed on to the rod.

**BORING TOOL.**—Frank S. Allen, of New York city.—This invention consists of a boring tool with cutting parts of two different sizes, for "double boring" brush blocks; its particularly devised with reference to cutting with the least possible friction, so as to allow of running a great number in a gang together for boring all the holes of a block at once without overstraining the block or the driving gear. It consists also in the mode of construction employed. A round rod of steel is taken and milled down at one end to the intended size of the smaller boring part. A longitudinal groove is cut by a milling tool from the point as far up as may be necessary, and the lips of the larger boring part are then swaged out by a suitable tool which is forced into the groove while the bit is laid in a die of suitable shape.

**BEE HIVE.**—Jonathan B. Staunton, of Ellicottville, N. Y.—This invention relates to an improvement in the class of hives which are constructed with a view to controlling the formation of new colonies of bees as to time and numbers, which obviates the necessity of swarming by forming new colonies, without removing the comb frames or disturbing the bees, without danger from their stings, and without in effect changing their habitation; it consists in the construction and arrangement of certain parts by which uniform diffusion of temperature, sound, and odor is secured throughout the entire brood chamber, together with thorough ventilation.

**POTATO DIGGER.**—DeWitt C. Thomas, of Easton, N. Y.—The invention consists in spading the potatoes from a row, together with their surrounding soil, and transferring both dirt and potatoes over an axle and upon a rotating sieve, by which they are separated and the potatoes emptied in the rear, or into a receptacle there placed to receive them. 2d. It consists in combining with a rotary digger a subjacent plow that mellow the ground in advance of the spades. 3d. It consists in mechanism by which all the parts are raised, lowered, locked, or unlocked, simultaneously and by the driver. 4th. It consists in side guards to retain the potatoes on the sieve and compel them to be discharged in a straight line behind the digger.

**CONDUCTOR'S PORTABLE FARE AND CHANGE BOX.**—James S. Hagerty, of Baltimore, Md.—The invention consists in a fare box with a safety chamber from which the fare cannot be removed when it has been dropped thereinto; it is carried on the left arm, whose hand easily manipulates the valve; it has separate and separately covered chambers for receiving different sized packages of tickets, and is also provided with chambers for the convenient location of money. In a word, it meets a want which has been long felt by the city railroad men, and they will doubtless quickly avail themselves of a portable fare box so ingenious and calculated to be so useful.

**MACHINE FOR TURNING CARRIAGE AXLES.**—Jonathan Grundy Aram, of Cordova, Ill., assignor of one half his right to Robt. S. Williams, of same place.—This invention consists in the use of a cutting tool, a reciprocating carriage or fulcrum, a screw shaft and ratchet mechanism, arranged in connection with a suitable pattern in such a manner that the figure of the pattern is made to control the operation of the cutting tool and thereby produce the shape required in the axle.

**CHEMICAL COMPOUND FOR DESTROYING NICOTINE IN TOBACCO.**—Samuel O. Bentley, of Canton, Ohio, assignor to himself and J. C. Kelly, of same place.—This invention furnishes an improved chemical compound for destroying the nicotine in cigars and smoking tobacco so as to make them non-poisonous, and at the same time to improve them by making them mild and pleasant to the taste. In preparing this compound, are taken tannic acid, one ounce; granulated nitrate of potash, one dram; powdered English valerian root, one dram; powdered nutmeg, one dram. These ingredients are thoroughly mixed, and to the mixture is added half a pint of pure water or sufficient water to case one hundred cigars. It is designed to be sprinkled upon the tobacco.

**EXTENSIBLE AXLE BOX.**—Charles Ahrenbeck, Navasota, Texas.—The invention consists in forming an axle box with an adjustable tube which may take up the wear on its ends and enable the wheel to be always and easily retained in its true relative position to axle. It is found by coach makers and those who let vehicles for hire that there is great end wear on the axle box, and that unless this play is quickly remedied the wheel is caused to wobble, subsequently to wear the box unequally, and in a short time to make it practically worthless. By the use of the extensible box this difficulty is obviated, while the axle box is made to last much longer and the wheel to run always with a uniform friction.

**WIND WHEEL.**—Newell P. Mix, of Columbus, Ohio.—This invention has for its object to improve the construction of wind wheels, so as to enable them to be more conveniently controlled, and make them more reliable in operation. A horizontal shaft, to which the sails are attached, is provided with gearing in the ordinary manner for transmitting the motion to the machinery to be driven. To the outer end of the shaft are attached wings, six, more or less, in number, and one of which we describe. Two radial arms are securely attached to the end of the shaft, and to the outer ends of the arms are pivoted the ends of a bar, to the forward edge of which are attached the jansor sails. The pivots of the bar are arranged at the rear edge of the ends, so that the centrifugal force engendered by the revolution of the wheel may tend to throw the wings out of the wind. To the inner side of the pivoted bar, near its forward edge, is attached a short arm, to the outer end of which is pivoted the outer end of a connecting rod, the inner end of which is pivoted to the outer end of a short arm, attached to a hub which oscillates upon the shaft. A spring is placed within the hub and one end connected with the hub. The other end of the spring is attached to the shaft, around which it is coiled in such a direction that its tension may tend to hold the sails to the wind. By this construction, by turning the hub toward the tension of the spring, the sails will be turned from the wind. A bent lever is pivoted at its angle or bend to the side of the hub. The outer end of the lever passes through an eye bolt or staple attached to the side of the end of the shaft which serves as a fulcrum. The inner end of the lever is inclined in such a direction that, when pressed toward the outer end of the shaft, it may turn the hub in such a direction as to turn the wings from the wind, the wings being again turned to the wind, when the lever is released, by the tension of the spring.

**GRAIN SEPARATOR.**—David Y. Milligan, of Shelbyville, Ill.—This invention prevents the fan in a grain separator from driving the dust and chaff back to the conveying spout and thereby defeating the purposes of the machine. It consists in the interposition of a protecting cap between the fan and conveying spout, and in the application of a reactionary fan which drives the light matter upward and away from the conducting spout; also in the use of an adjustable slide for regulating the opening to the second fan. The invention is applicable to such separators as are connected with thrashing machines.

**THRILL COUPLING.**—William Bailey, of Utica, N. Y.—In this invention the thrill is coupled to the two jaws of the draw iron, between which it is placed, by means of a pin. This pin is square in cross section, and passes through one of the jaws and into the other, and through a box in each jaw, and also through the thrill. The boxes are round, so that they readily turn in the jaws. As the thrill is raised or lowered, the boxes turn in the jaws and receive the wear. A cover is confined to the side of the jaw through which the pin passes by a pivot on which it turns, and by a dovetail fastening at the end of the jaw. When the cover is closed, it effectually shuts in the pin and keeps it in place. When the cover is raised, the pin may be removed by means of a nail or a wire inserted in a hole in the opposite jaw; but it cannot come out when the vehicle is in use, and only when the thrills and the cover are in a particular position.

**GAS MACHINE.**—Joseph Kaufman, of Jackson, Miss.—This invention relates to a new machine for generating illuminating gas from a mixture of hydrogen and carbon; and consists in a novel general arrangement and distribution of parts of which the following are the most prominent: A convenient vessel is filled with diluted sulphuric acid, and a gas holder is suspended above by a crane so that it may be raised or lowered into the vessel. This holder is weighted by an inner perforated tube which contains iron filings or shavings. Upon the holder being let down, and the air expelled, the production of the gas commences. As it is formed the weight of the holder forces it through a pipe into a gasoline holder or carburetter, and, thence, through a condenser to the service pipe.

**HOPPER FOR BLAST FURNACE.**—Dennis Bauman, of Parryville, Pa.—This invention consists in a hopper provided with a double inclined valve, movable thereunder, so as to feed the fuel simultaneously to the circumference and intermediate space of the fire box. The hopper is constructed so as to present an annular opening at its bottom. This opening is closed by an annular valve suspended from an overhanging lever. The valve is formed of two circular inclined planes, the inner one of which slopes toward the center and the outer toward the circumference. Upon lowering the valve, the fuel is fed by the outer inclined plane to the circumference of the fire box, and by the inner to the central space.

**WASHING MACHINE.**—John P. Packer, of Flemington, Pa.—This invention furnishes an improved washing machine which is simple in construction, inexpensive in manufacture, convenient in use, and effective in operation. It may be conveniently applied to an ordinary wash tub. It consists of a board or frame which lies on and is attached to the bottom of the tub. In the center of this board is hinged or pivoted a broad lever which is pierced with holes and terminates in a handle at the top. On one side of this lever is hinged an ordinary corrugated wash board, and on the other a plain wash board. They lean against opposite sides of the tub. The washing is effected by moving the lever from side to side so as to press the clothes against one or other of the two boards, squeeze the water out of them, and allow them to fall back again into the water to become saturated.

**PITMAN CONNECTION FOR HARVESTERS.**—Hiram Howe, of Houston, Minn.—This invention furnishes an improved device for connecting the pitman to the cutter bar of harvesters and mowers, which is so constructed as to almost entirely prevent friction and wear, and which, should there be any wear, will allow of ready adjustment. The end of the pitman (or a short bar welded to it) is formed like a cross. An arm attached to the cutter bar is formed like the letter T, and notched in the center of the top. The side arms of the T are knife edged gudgeons. The connection is made thus; The notch is placed so as to rest against the end of the cross, and eye bolts are placed on the gudgeons and fastened with nuts to the side arms of the cross on the end of the pitman.

**STOVE PIPE COUPLING.**—James T. McKim, Remington, Ind.—The invention consists in dispensing with wire or rivets and facilitating the putting together and taking apart of stove pipes by combining a draw band with a pivoted strap and disk. It is not only extremely simple and therefore little liable to get out of order, but is singularly effectual for the purpose intended.

**HYDRAULIC CEMENT.**—David O. Saylor, Allentown, Pa.—This invention relates to a new manner of treating the argillo-magnesian limestone, which is found along the Appalachian range of mountains and is used for manufacturing hydraulic cement. It consists in the mixing of raw stone, which has been reduced to an impalpable powder, with said material after the latter has been burnt; by which means several of the valuable ingredients lost in the limestone during the burning process are restored to it, and valuable properties of which the raw stone is possessed are added.

**WINDOW SHUTTER.**—Henry Besse, Delaware, Ohio.—In this invention the window shutters are arranged to slide laterally either in recesses in the walls, or on the outside of the walls. A screw shaft is provided for each tier of shutters. These shafts may have a continuous screw thread from end to end, or a thread for each shutter separate, screw nuts thereon being so constructed that they may be attached to the shutter and be made to engage with any part of the screw shaft. They are supported on journals at their ends and on intermediate bearings if necessary. The shutters are suspended on the screw shafts, and supported and guided by grooves at the bottom. The screw shafts are revolved by means of pulleys and cords connected with a drum. This drum is so constructed and arranged that it receives the cords from any required number of screws—say for two or more stories or tiers of windows—and by revolving it, by means of a crank or otherwise, all the screw shafts are revolved, and all the shutters moved simultaneously.

**WHIP.**—Alfred B. Kiersted, New Haven, Conn.—This invention produces an economically manufactured whip stock, of improved elasticity, strength and durability, which is especially adapted to jointed or socket whips in which the parts are united by screw joints. A skeleton whip stock, made by firmly connecting the weighted handle with the screw tip by means of a steel core, is filled out and completed by surrounding or filling the space between the handle and the tip of the stock with suitable filling material, such as rubber, whalebone, rattan, or wood, or by a combination of some or all of these substances, the parts composing the filling being united by cement or attached to any other suitable manner. When thus filled, the whip stock is finished by weaving upon it an exterior envelope of fibrous material.

**WHEEL PLOW.**—Wells C. McCool, Guthrie Center, Iowa.—This invention furnishes an improved sulky or riding plow which is simple in construction, convenient in use, inexpensive in manufacture, and may be readily adjusted to cause the plow to run deeper or shallower, or to take more or less land, as may be desired. It consists principally in a draft bar or equalizer of peculiar construction, which is connected with the front cross bar of the sulky, and, also, with the plow beam, as follows: The cross bar has numerous holes formed in it to receive the belt by which the rear end of the draft bar or equalizer is connected with it, so that the bolt may be conveniently shifted to cause the sulky to run more to the right or left, as may be desired. The equalizer is bent at right angles, and in its free or upright arm are formed several holes to receive the bolts by which a clevis and hook, either or both, are secured to the arm for the attachment of the draft, so that it may be regulated at will. The clevis and hook are bolted to the side of the upright arm, so that by changing them from one side to the other the draft may be adjusted to cause the plow to take more or less land. To the forward end of the plow beam is attached a clevis which is connected with the equalizer by a swivel, so that the plow may be drawn directly from the equalizer entirely independent of the sulky, and so that it may be turned about freely without interfering with the equalizer or sulky. To the plow handles is attached a rest to receive the driver's feet when required to assist in steadying the plow. By this arrangement the driver, by simply moving forward upon his seat, causes the plow to run deeper in the ground, and by moving backward he makes it run out of the ground.