

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 SOURED 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 1½ and 3 inches. The band wheel is to be 2 feet in diameter to the 1½ 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 read 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 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 160,164.5472 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 rockshaft 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 Talbot, 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.