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P. D. R. and several other correspondents will find full descriptions of lightning rods on the editorial pages of this issue.—H. D. E. will find directions for making an æolian harp on p. 390, vol. 26.—S. H. C. will find explicit directions for bronzing iron castings on p. 147, vol. 30.—G. M. E. will find directions for making asphalt pavement on p. 353, vol. 24.

G. W. B. asks: How can I polish meerschbaum? A. Soak first in molten tallow, then in molten white wax, and then rub with a dry rag.

W. C. D. asks: Is there any difficulty in using a coiled pipe, of 1 1/2 or 2 inches diameter, as a water heater in a furnace? The fire pot is 30 inches in diameter; and I want to use from 10 to 15 turns or coils of pipe placed within the fire pot, the pipe passing out and connecting with a hot water radiator in an air chamber outside, the water passing back from radiator and entering bottom of coil, so as to keep up a continuous circulation. I am told that steam will form at points in the coil and choke the pipe, preventing a free and steady circulation. Is this so? What size of pipe ought I to use, and what is the best form of hot water radiator? Is there anything better than a simple manifold of plain pipe? A. A much larger pipe will be necessary to enable you to secure circulation with the arrangement that you propose. The manifold will answer very well for the hot water radiator.

B. B. B. asks: In a three mile boat race, would it take any longer to turn a stake boat at the end of the first mile and a half and return, than it would to row the three miles straight ahead? A. Yes.

J. G. asks: In what part of the world was the Garden of Eden? A. No one knows.

If the earth goes round on its axis, why do we not get to the part where there is no frost or snow, or to the part where there is no summer? A. If you will consult any elementary work on astronomy, you will readily perceive the reason.

Is there anything produced that will keep coal dust cemented together so that it will stand burning to ashes before it will part? A. There are numerous patents for this purpose, many of which have been described in the SCIENTIFIC AMERICAN.

J. H. K. asks: I am engaged in an experiment that requires the use of a series of small bellows. It will be necessary they should be absolutely airtight, and, as they will be exposed (probably) to water, it is equally important they should be waterproof. Will you tell me what material to use, and how to construct them to gain these ends? Will gum cloth answer? If so, how shall I fasten it to the heads, and should those heads be of wood or leather? A. We think you can obtain rubber bottles or syringes that will be cheaper and more satisfactory than the arrangement that you propose.

W. S. P. asks: If a piston were let fall 25 feet in such a manner that it would enter an upright cylinder, would the sudden compression heat the air within the cylinder? If so, would the expansion of that heated air be great enough to throw the piston as high as the point it fell from? A. There would be some power consumed in overcoming friction, and some of the heat of compression would be dissipated, so that the useful effect would not be as great as the power exerted.

What would be the pressure of air per square inch on the inside of a hollow casting one foot square, it being heated to a red heat after being filled with cold air at atmospheric pressure? A. Professor Thurston has published a table of the temperatures and pressures of air. You can obtain it from D. Van Nostrand. Your other question is of a business character.

W. S. F. asks: When is the transit of Venus to take place? When was the last? When will be the next, or how often do such phenomena occur? A. Transits of Venus always take place in June or December. There are two transits, eight years apart, and then more than a century elapses, after which there are two more transits, eight years apart. A transit was predicted by Kepler, in 1631, but was not observed. The transit of 1639 was observed by Horrox and Crabtree, in England. The last two transits occurred on June 6, 1761, and June 4, 1789, the latter being observed from various stations, widely separated. The next transit will take place on December 9, 1874, and preparations have been made for very complete observations. The last transit during the present century will occur on December 6, 1882.

J. T. B. says: I have moved into a large frame house, which rests upon pillars four feet high, with lattice work between them, so that there is a free circulation of air; the house is lathed and plastered throughout; yet, in a few days, articles of clothing, shoes, etc., will mold if put in the closets. Please tell me the cause, and if there is a remedy for it. A. A succession of rains and damp weather will sometimes produce moldiness in closets, but in your case it is caused most probably by the fresh plastering of the house. Plaster absorbs moisture from the atmosphere for some time after it is put on, and under certain conditions of temperature will give it off in large drops and streams. It is for this reason that new walls cannot be safely painted. We remember a case in point, where the newly plastered walls of the class rooms in a school building were painted and their surfaces prepared artificially to serve as slate, to be used for writing upon in place of the ordinary blackboards. They were finished very handsomely, and the imitation was perfect; but in one week's time the paint began to run in such streams as to trickle down across the white base, and lie in black puddles on the floor. Your remedy is to keep your closets open, and let the wind blow through the house in the middle of the day.

H. A. W. says: You have been calling attention to the importance of educating the left side of the body and brain. Is it not a fact that more persons are paralyzed on the right side than the left, and may it not be accounted for by the fact that the right side is overtaxed by giving it too large a proportion of the work to be done? A. You evidently have forgotten that the left side of the brain is the index of the right side of the body. If you maintain that the left side of the brain and left side of the body are both paralyzed, it would show that the whole system was under that influence, the nervous force on the right side and the muscular system on the left side being the sufferers.

D. C. P. asks: Which will use the most coal, two high pressure engines, compounded, 12x8 inches, each cut off at half stroke, with 70 lbs. steam, with 150 revolutions per minute geared to a main shaft, its piston being 21 inches in diameter, and the engine's piston 12 inches; or a low pressure condensing engine, of dimensions equal to the task, with a good generator? A. The second would be the most economical, with the same grade of expansion as the first.

Where could I learn the millwright's trade? A. There are numerous good shops scattered over the country. It would be well for you to enter one of them as an apprentice, or in such capacity as you could arrange with the proprietor.

How can anyone enter the Bureau of Steam Engineering at Washington? We do not understand exactly what position you want. Write your wishes definitely to the Chief of the Bureau of Steam Engineering, and you will probably obtain a reply. If there is still a difficulty, you might address the Member of Congress from your district.

C. C. A.—The instrument you describe is simply a pneumatic syringe. It is not a novelty, having been shown in courses of experiments, under the subject of heat, in our schools for years.

J. A. H. asks: Why does a glass bottle burst, when you expose it to the air and lay it on red hot coals? A. It is owing to the unequal expansion of the glass when placed upon the coals.

What is the telescope principle used for? A. Your question is very indefinite. The telescope is composed of several lenses so arranged as to bring at the point of sight, objects magnified several diameters. Consult an elementary text book upon optics.

H. S. asks: My finger nails are very brittle, in fact, the least pressure causes them to break. Is there any remedy? If so, what is it? A. Bathe the nails with oil; glycerin will not answer; keep the nails cut close. If very sore, you must keep them bathed continually.

J. M. B. says: Please give a formula for calculating the proper dimensions of a fly wheel, dimensions and speed of engine being known. A. You will find rules on the subject on pp. 177 and 288, vol. 28.

J. W. M.—Your idea for an electro-magnetic engine is not a new one, and is impracticable, little or nothing being gained by its use; and instead of replacing the battery, you only lessen the reliability by complicating its machinery.

E. H. H. asks: Is there any machinery for cutting files in use, that is working successfully, and what has been the principal trouble with machine-cut files? A. There are several of such machines, machine-cut files being in common use. They are not, however, equal to hand-cut files, either in the regularity of the cut or in the quality of the cutting edge of the teeth.

G. S. asks: How can I harden thin brass wire, about the thickness of a common sewing needle or a pin, so as to make a spiral spring, by winding it over a mandrel the thickness of a common penholder? A. Harden your brass wire by hammering it lightly while it is on the mandrel after it has been wound.

What kind of glue can I use to glue thick leather on wooden rollers about an inch in diameter? A. Any kind of superior glue.

To what color must I heat a watch spring to temper it, and must it not be well hardened before tempering? A. To harden such a spring, heat it to a red heat and immerse it in oil till cold. Then fry it in equal parts of oil and tallow until the mixture will blaze on the spring. When the mixture blazes, keep dipping the spring into it, and then holding it in the flame so that the spring will blaze of itself when held away from the flame. After blazing freely, allow the spring to cool of itself.

W. G. R. asks: Will immersion in a solution of sulphate of soda be sufficient to test the effects of frost upon a sample of artificial stone? A. We hardly think it will. Try a mixture of ice and salt; this will lower the temperature to -4° Fah.

P. J. H. asks: What is the effect of a daily application of rain water and ammonia to the hair? A. If the solution of ammonia is according to the regular formula, there will be no injurious effects. Inhaling the vapor of ammonia is injurious. It is in no way detrimental to the hair.

N. D. T. asks: Is there any better substance for removing the organic impurities from cistern (rain) water than the permanganate of potash? If not, what amount should be used in purifying a tun of water, and what manipulations are required? A. Sulphate of alumina is used to purify water. If you use permanganate of potash, 4 tablespoonfuls of a saturated solution of the permanganate will be found sufficient for one tun of water; if the water retains a pink hue, put a stick or chip in it, when the color will shortly disappear. You will find a new method fully treated on page 414, *Science Record*, 1874.

D. W. S. asks: 1. Will the copper lightning rod on my house injure the water in the well in which it terminates? A. Yes. 2. The galvanized rod on my barn terminates in a half hoghead of running water. Is it safe? No. 3. Would it be safer if it penetrated the ground eight feet? A. Yes, and it would be still safer if you deposited a cart load or more of well burned charcoal at the bottom of the rod, surrounding the rod for a length of several feet with the charcoal.

C. M. asks: In your issue of July 18, in answer to D. C. C., you have not stated how much niter is to be used. A. In formula mentioned, niter is 10 parts.

What is meant by smalt? A. Smalt is pulverized cobalt glass.

What is peroxide of lead, and is it known by any more common name? A. Peroxide of lead is a heavy brown powder consisting of oxygen and lead.

Is anything mixed with the sulphur in which matches are dipped, to thin it? A. No.

J. E. S. asks: Is it a fact that the water 150 miles from the mouth of the Amazon river is suitable for drinking, or does it mix with the ocean and become brackish or salt? A. It is brackish.

What number of emery and what grade is most suitable for grinding molding tools? I make my tools on emery wheels from blanks made as planer knives are, that is, with steel faces and iron backing; and I find that wheels that manufacturers recommend are all right to cut the steel, but the iron will glaze the wheels. I want them for fast cutting. A. We advise you to consult a reliable dealer.

What would be the actual horse power of a locomotive, with two 18x26 inch cylinders, at 130 lbs. per inch, and 4 feet 6 inch drivers, making 20 miles per hour? A. The mean effective pressure of steam in cylinders is required for the solution of this problem.

G. G. McC. asks: What degree of heat is necessary for the incubation or hatching of the egg of the common barnyard fowl? A. From 102° to 104° Fah.

J. P. A. asks: What is pip among chickens? Is it injurious to the fowls? What is the hard substance on the end of chickens' tongues? A. "The pip" by some is considered a catarrhal disease producing a thickened state of the membrane lining the nostrils, mouth, and tongue; others consider that the disorder originates in a small vesicle formed on the tip of the tongue, the contents of which, being absorbed, lead to the inflammation and the thickening of the skin. The common and well known symptom is a white scale or horny substance growing upon the tip of the tongue, by which the breathing becomes partly impeded; the beak is frequently held open as if gasping for breath, and becomes yellow at its base, while the feathers on the head appear ruffled or disordered. The tongue is also very dry; and while the appetite is not much impaired, the disordered fowl can eat only with considerable difficulty, and sits in corners, pining away. The most effectual cure we have ever employed, and that, when the disease has not proceeded too far, was to tear off the scale with the nails of our forefinger and thumb; and it is not difficult, as it is not adhesive; and then Boswell recommends to fill the mouth and push down the throat a large lump of fresh butter, which has previously been well mixed with Scotch snuff. "This," says Boswell, "is a recipe which we conscientiously and confidently recommend; and again we beg to repeat, that, in our experience, we have never known it to fail, except from our own negligence in the delay of its application."—*American Poultryer's Companion*.

E. A. F. T. says: I have constructed a galvanic battery as follows: One cup of copper, 8 inches high and 6 inches in diameter, is made of very thick sheet copper. This vessel I charge with 1 part sulphuric acid to 10 parts of water. Then I insert a glass cylinder (3 inches in diameter), closed at the lower end with blotting paper. In this I insert a cylinder of rolled up sheet zinc, 1 1/2 inches diameter, and charge it with 1 part of muriatic acid and 10 parts water. The battery works very well for silver plating; would it also do for nickel plating? A. Several cells of this description may be used for nickel as well as silver plating on a small scale. How should nickel salts be prepared for plating? A. You will find a recipe on p. 51, vol. 30.

C. W. G. says: I have discovered (near the waters of Hickory Creek, Texas), some bones of enormous size; they were cropping out of the bank. One bone measured 27 inches in circumference, 1 1/2 inches from surface of bone to the marrow. One of the upper jaw teeth measured 11 inches in length and 4 1/2 inches in width. The side of the jaw from which these teeth were taken weighed 25 lbs., the teeth being, seemingly all connected together. About 5 1/2 feet away, I found the rest of the upper jaw, somewhat decomposed, though the teeth were in a good state of preservation. Can you give me the name from this description? A. No. We might, if you sent on some of the teeth. If you can obtain more data in regard to the size of the skeleton, length of body, legs, neck, etc., we might be able to answer you fully.

M. E. P. says: Please inform me how to prepare pickles so that they will keep good and retain their green color? A. Small cucumbers, but not too young, are wiped clean with a dry cloth, put into a jar, and boiling vinegar, with a handful of salt, poured on them. Boll up the vinegar every three days, and pour it on them, till they become green; then add ginger and pepper, and tie them up close for use. A permanent green color cannot be obtained without the presence of copper, and pickles so prepared are injurious.

What will prevent insects from eating wall paper? A. You do not state what the insects are. Some can only be driven away by putting poison in the paste when putting the paper on the wall.

How can I preserve citron to have it like the dried citron we buy? A. Take citron and sugar, pound for pound, and simmer until tender. Allow to dry in the sun, keeping it covered with sirup during the process.

C. C. M., Jr., says: I have just completed an electric machine, but it will not work, although every thing appears to be in good order. Rubbers are made of wood and camofans, zinc, covered or coated well with amalgam of mercury, zinc, and tin. The prime conductor is made of insulated wood, covered with tin foil which acts or should act as a good conductor of the electricity, if any were developed. The negative conductor is not insulated as most are, but is made of wood connected with the base. Perhaps I may have made a mistake in making the machine as I did. If so, you will greatly oblige me by stating it. The glass is insulated from the atmosphere by oiled silk. A. Your negative conductor, namely, the chain attached to the rubbers should be placed in connection with the earth, if the positive fluid is desired; and if the negative spark is required, the chain should be placed in connection with the prime conductor and the earth. One of the conductors must always be in connection with the earth otherwise the machine will not work.

A. C. H. asks: 1. A tank full of water has 4 outlets. If a is open, it takes 15 minutes to empty the tank, b 30, c 45, and d 60. How long will it take if all four are opened at once? A. It will take about 7 1/2 minutes. 2. Has the amount of water anything to do with pressure of the different sizes? A. Under the same pressure, a large tube will discharge more water proportionally than a small tube.

Which is the real American eagle, the one with a white head, or a brown one? A. The one with a white head commonly called the bald eagle.

How can I prepare leaves of plants so as to leave the veins only, all the soft green mass being taken off? A. Put them in water and allow to stand until the parts desired to be removed are nearly decomposed. The length of time will depend upon the kind of plant. Remove the desired parts with a camel's hair brush and dry in sheets of blotting paper. Then bleach by a preparation sold in the market for the purpose. If this cannot be obtained, use chloride of lime.

What is osmic acid? A. "The tetroxide of osmium OsO₄, commonly called osmic acid, is the volatile strong smelling compound formed when osmium or either of its lower oxides is heated in the air, or treated with nitric or nitro-muriatic acid. It may be prepared by heating osmium in a current of oxygen gas, and condenses in the cool part of the apparatus in colorless transparent crystals. It melts below 212° Fah., and boils at a temperature a little above its melting point. Its vapor has an intolerably pungent odor: attacks the eyes strongly and painfully, and is excessively poisonous. Osmic acid is dissolved slowly, but in considerable quantity, by water, forming an acid solution. It is a powerful oxidizing agent, decolorizing indigo solution, separating iodine from potassium iodide, converting alcohol into aldehyde and acetic acid," etc. (Fowne's "Chemistry.") Recently some osmic acid was presented to the French Academy; though but a small amount, it was calculated that it was enough to poison the whole world.

J. W. H. asks: If the exhaust steam from an engine contains 1/4 of the entire units of heat used in generating it, would it not be practical and economical to pump it back into the boiler? Is this idea new or old? A. The idea is neither novel nor good.

G. F. R. asks: How can I bend brass tubing without injury to the tube? A. Fill the tube with resin or with lead, before bending, and melt the same out after the bending is completed. Lead is the best.

H. Z. E. asks: 1. What is an accurate second of time, and how is it determined? A. 1. You will find table below, upon which to base your calculations. 2. Is it a natural, or artificial unit of measure? A. 2. Artificial. 3. What proportion does the ordinary yard bear to the length of a pendulum beating seconds? A. 3. The length of the seconds pendulum—that is to say, of the pendulum which makes one oscillation per second—varies, of course, with the intensity of gravity; at the level of the sea it is, according to Sabine: 39.02074 inches at the equator (St. Thomas), 39.13983 inches at London, and 39.21469 inches at Spitzbergen.

What is meant by the molecular theory of matter? A. The molecule is the smallest quantity of any elementary substance which is capable of existing in a separate form. H, for instance, represents the atom of hydrogen, while H₂, or H₂, indicates its molecule.

How does the greenback paper dollar compare with specie, as a measure of value? A. Specie is worth about 9 1/2 cents more on the dollar than paper, but its comparative value is constantly varying.

W. S. P. asks: Has the hatching of hen's eggs by artificial heat ever been a success? If so, when, where, and by what process? A. Artificial incubation is considerably practiced. You may see the apparatus in operation at agricultural and industrial exhibitions.

F. B.—For cleaning the ink (containing iron) from your blanks, try a strong solution of caustic potash.

W. B. asks: How much does pure water weigh to the cubic foot? A. Pure water weighs 1,000 ounces per cubic foot.

Will not water drive an engine as well as steam or compressed air, if supplied through a suitable pipe from a reservoir 50 feet above the engine? A. Water will drive an engine, but not so well as steam or compressed air, because of the difficulty of getting the water into and out from the cylinder with sufficient rapidity. Power from water is best utilized by means of a water wheel.

I propose to use a friction arrangement, consisting of a smooth bar, with a dog on each side to clamp the bar, and to have springs to keep the dogs on the bar. Will it work accurately? A. Your friction arrangement would, if the springs were powerful enough, drive the bar; but it would be liable to spring the bar out of true, if one spring were more rigid than the other, as is very likely to be the case.

I have an attachment for lathes by which the speed of tool travel can be changed without stopping the lathe, and can be changed from any one feed to any other in 15 seconds. It is very simple in its construction. There are two shaves running lengthways of the lathe bed, each having a number of wheels, running from large to small, on the back, on which they are keyed fast, while on the front one they are not keyed. They are thrown into action by means of a gear clamp. The clamp is made double (so as to work both ways), the levers of which (when out of motion) rest in the middle one of three notches; and when in the left hand notch, the feed is, say, 20 to the inch, while, when in the right, it will be, say, 18 to the inch. The front shaft imparts motion to the feed screw, and the back receives its motion from the main spindle, and it can be attached to any lathe. Do you think it is of any value? A. It would be highly advantageous to be able to alter quickly the feed of a lathe tool by a simple contrivance, especially in lathes whose screw serves the purpose of tool feeding as well as screw cutting. A moderate range of tool feed is, however, obtained in lathes having an independent tool feed by simply shifting the belt on the cone which drives the tool feed spindle. We are not prepared from your description to speak decisively of your arrangement, but should judge that a wide range of alteration in tool travel could be easily obtained by it.

M. A. G., in answer to several inquiries about keeping water pure in cisterns: Wooden or other cisterns constructed to receive rain water from the roof of buildings, as generally made, soon become foul, with sediment, smoke, and other impurities from the roof. In a short time the water becomes stagnant, and unpleasantly odorous. To remedy this, carry the pipe which brings the water into the cistern to within two or three inches of the bottom, thus discharging the fresh water at the bottom, and causing an entire change of water every time it rains. Then there ought to be an opening or valve of some sort at the bottom, by which you can drain out all the contents, and thoroughly rinse and scrub the inside as occasion may require. An auger hole and plug placed as to be easily accessible would answer the purpose. Such a cistern placed under a woodhouse, or in some secure place out of the reach of frost, with the outlets arranged to be reached from the cellar, and discharging the surplus water into the cellar drain, and a pipe to connect with a pump in the kitchen, will be a wonderful convenience in places where soft water is not easily obtained. I constructed one which has proved very satisfactory after six years' use, in the following manner: About four or five feet outside the cellar, and under a wing of the house, I dug down nearly to the depth of the cellar, and of the required size, say six or eight feet. The ground was a very solid clay, except the surface soil of about 18 inches. This upper portion, in the soft soil, we dug larger, perhaps a foot or more all round. In this portion I laid a stone wall in lime mortar, so that the inside was even with the lower portion of the cistern; I then placed a piece of iron pipe from the bottom of the cistern through the earth, into the inside of the cellar, with the end opening over the cellar drain, wedging the pipe in firmly with small stones and cement, and closing the cellar with a wooden plug. I then plastered the entire inner surface of bottom and side (laying a flat stone in the center to stand upon) with the cement called water lime, mixed with sand; putting on two coats and allowing time to dry; afterwards I put on a coat of clear cement very thin, with a brush, to close any little checks caused in drying. The house was then built over it. The rooms were warm and frost never troubled, and through a man hole in the floor we could go down, and with a broom thoroughly clean the inside, thus at all times having a full supply of water for all household purposes. To illustrate the importance of conveying the incoming water to the bottom, spoken of above, I note the case of a glass aquarium with a fountain in the center, which, though supplied with running water through the fountain, in a few weeks became offensive in odor, and the fish died. We then had a pipe put on conveying a portion of the water into the aquarium at the bottom, which did not interfere with the appearance or efficiency of the fountain, but caused a continuous change of water; and we had no further trouble.

D. says: In answer to several of your correspondents who wish to know how to make rubber hand stamps: Vulcanized rubber used, as prepared by the manufacturers, and can be procured in strips about 8 inches wide and about 1/4 of an inch thick, and of any desired length. The name and address should be set up in common printing type, and the type well oiled; a rim about 1/4 inch in height should be placed around the form, and dentist's plaster, mixed to the proper consistency, poured in and allowed to set; then the plaster cast is separated from the type. A piece of the soft vulcanized rubber is then cut of the size of the plaster mold and laid upon it, and both together are placed in a screw press, and heat sufficient to thoroughly soften the rubber is applied. The screw is then turned down hard and left for a short time until the rubber is perfectly forced into the mold. After the whole is cold, the rubber is separated from the model, and any irregularities trimmed off with a sharp knife; the rubber stereotype is then fastened, with glue or other cement, to a block of wood, and the stamp is ready for use.

H. R. C. sends a description of an improvement upon a leg supporter: On p. 250 of your vol. 80, in answer to "Sufferer," Dr. Chapman, of New Haven, Conn., says: A stiff and straight iron rod, flattened at each end and padded, of the length of the leg, is fastened to the outside of the leg." Now it seems to me this arrangement would be uncomfortable to wear, inasmuch as it does not allow of a free use of the knee joint. I have made a support for a number of parties which works admirably. The support is made entirely of steel except the heel covering, which is made of brass fitted to the heel. The bands placed behind the limb are three in number, covered with calfskin, and lined over a padding of thick beaver cloth with soft sheepskin. These three pieces are stitched together and extended far enough to go around the leg, where they are fastened by metal strips which button on small steel knobs.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined with the results stated:

H. W. S.—We are unable to decide what the plant is, from the flower. To analyze a plant, we must have stem, leaf, and flower, and sometimes it is necessary to have the roots also. There is no plant, to our knowledge, that is called the Thousand Dollar Plant, either in this country or in Europe. It is doubtful if the plant growing so abundantly in Texas would grow in the colder climate of Germany.—A. J. H.—It is a specimen of iron ore, containing a large percentage of silica.

J. M. K. asks: Can you tell me of the best treatment for asthma by inhalation?—A. M. G. asks: Can you give me a recipe for cleaning an oil painting from particles of paper, etc., that are stuck to it?—L. H. R. asks: What size should I make the steam ports of a cylinder 1 1/2 inches diameter x 1 1/2 inches stroke, to be driven at as high a rate of speed as possible, by an upright cylindrical boiler without any flues (10 inches in diameter x 12 inches high), capable of carrying 80 or 40 lbs. steam?—J. E. W. says: I have a great deal of trouble in obtaining a good light upon my work when engraving on bright surfaces. The reflections are so great at times as to render it difficult to follow the tracings with the graver. I have used shades of various kinds, but find no relief. What will remedy the difficulty?—A. C. F. asks: 1. With what can I size some fancy paper articles for varnishing, the paste of which would be dissolved by the common size? 2. What varnish is best for such articles? It should be nearly transparent, and not readily soluble.—S. M. T. asks: Who made the first cast iron plows used in America, and in what year were they made?—G. W. asks: What kind of varnish would be the cheapest, besides possessing strong adhesive and entirely waterproof qualities, with which to coat paper and not penetrate said paper but very slightly?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On the Tides of Lakes. By L. L.
On a Mercurial Telescope. By H. S.
On Car Ventilation. Ry S.
On a Chemical Coquette. By S. H. T.
On Worn Out Clay Soils. By G. V.
On the Influence of the Pole Star. By P. H.
On the Alcohol Question. By Z. C. W.

Also enquiries and answers from the following:

- C. M. D.—G. W. W.—H. C. A.—S. H.—L. C. J.—R. H. N.
J. O. R.—B. G.—A. H. F.—C. I. A.—H. R. C.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of enquiries analogous to the following are sent: "Please to inform me where I can buy sheet lead, and the price? Where can I purchase a good brick machine? Whose steam engine and boiler would you recommend? Which churn is considered the best? Whomakes the best mucilage? Where can I buy the best style of windmills?" All such personal enquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]
Index of Inventions
FOR WHICH
Letters Patent of the United States
WERE GRANTED IN THE WEEK ENDING
August 4, 1874,
AND EACH BEARING THAT DATE.
(Those marked (r) are reissued patents.)

Table listing inventions and their patent numbers, including items like Adding machine, Alarm, burglar, Amalgamating apparatus, Animal feta, rendering, Ash barrel, sheet metal, Ash can receptacle, Auger, earth, G. G. Collins, Axles, turning, R. Zelder, Baby walker, M. S. Holman, Bag frame, carpet, M. Schmickl, Baggage seal, J. C. Wands, Bale tie, cotton, J. G. Battelle, Bale tie, cotton, Crane & Cromer, Bale tie, cotton, A. A. Goldsmith, Barrels, cleaning, Stearns et al., Batteries, cell for galvanic, A. L. Nolf, Beds, ventilating, E. L. Roberts, Bedstead, S. P. Leake, Bee hive, T. F. Wingo, Bill file, H. B. Fox, Boiler, sectional steam, J. C. Kilgore, Bolt-heading machine, J. & J. Kennedy, Bone black, manufacture of, S. Billitz, Boots, pulling lasts from, L. Nelson, Boots and shoes, A. Colburn, Bottle stopper, E. Clark, Bottle stopper, W. E. Hawkins, Bracelet, C. Heilig, Bridges, lowering, L. Soulerin, Broiler for gas heaters, H. W. Brinkerhoff, Butter cutter, J. S. Taylor, Butter gages and cutters, S. Richards, Camera attachment, D. A. Woodward, Can for oil, etc., C. Branagrove, Can for oil, etc., G. H. Chinnock, Can for oil, etc., J. G. Evenden, Can for oil, etc., H. Heeley, Can for oil, etc., safety, Chase & Cram, Canal boats, propelling, C. Howard, Candy, manufacture of rock, J. Nossian, Car axle box, W. W. & C. T. Crane, Car axle lubricator, Bollman & Ernst, Car axle, railway, S. M. Cate, Car brake, W. H. H. Snellbaker, Car coupling, W. C. Glendening, Car coupling, B. B. Harris, Car coupling, T. J. Hubbell, Car coupling, T. T. Shotwell, Car roof, J. C. Wands, Car wheel, G. W. Mooers, Car window, L. D. Wheeler, Carbureting apparatus, E. P. Wheeler, Carbureting apparatus, Wilson et al., Carpet lining, E. H. Bailey, Carriage curtain eyelet, W. H. Stickle, Carriage, hose, J. T. Ryan, Caster, furniture, J. Johnson, Castings, grate for, C. Truesdale, Cement for leather, waterproofing, A. Mc Nicol, Chair, baby, M. B. Lott, Chair hat support, E. P. Curtiss, Churn, N. Ewing, Cloth napping machine, A. Brown, Clothes pounder, W. H. Williams, Coal screen and slater, J. Beadle, Compost distributor, Cox & Garris, Cooking apparatus, steam, I. H. Spielman, Copper ore, treating, F. Zwickl, Copper, refining, J. R. Cooper, Corn sheller, E. L. Hutchinson, Corset, C. S. Chaffee, Cotton chopper and cultivator, K. McKinnon, Cultivator, sulky, W. M. Coston, Cutter, feed, J. P. Davison, Cutterhead, B. & H. W. Pearson, Derrick for raising fences, M. Gray, Dredging bucket, J. B. Wood, Drill, ratchet, E. F. Bonaventure, Drill, dock, G. Frisbee, Elevator, W. C. Seiden, Elevator, hydraulic, A. Granville, Engine, electro-magnetic, L. Bastet, Engine, injection steam, F. W. Coy, Engine, pulp, W. Kennedy, Engines, governor for steam, P. N. Stover, Fan, automatic, Coyne & Gillilan, Fare box, J. B. Slawson, Feed water heater, etc., E. G. Frykberg, Fertilizer, distributor, D. S. Curtiss, Fire arm, breech-loading, J. W. Cochran, Fire arms, lock for, S. Rush, Fire extinguisher, D. J. Tapley, Fire kindler, R. G. Williams, Fire kindling, J. Commins, Flour pot, J. E. Landers, Forr, horse hay, G. H. Smith, Fountain, portable, W. A. Pungs, Furnace, smoke-burning, S. A. Ford, Furniture, joint for, C. T. Cleaveland, Furniture spring, W. T. Doremus, Garden scarifier, H. Vosburg, Gas heater broiler, H. W. Brinkerhoff, Gas main seal dip, B. F. Reinmund, Gases, purifying, B. Sillman, Glass furnace, J. H. Cowl, Governor, automatic fire, J. Slade, Grates, shaking, H. Adams, Halter, R. Schmidt, Harness fold, E. F. Beck, Harrow, wheel, J. F. Sayer, Harvester and thrasher, Collins & Maynard, Harvesting, corn, J. I. McClintic, Hatchway, self-closing, Staples & Holmes, Hay loader, A. Walter, Heating drum, J. R. Webber, Heel lift holder, G. V. Scott, Hog cleaning machine, N. Silvertorn, Horse clipping machine, Reynolds & Earl, Horse collar, C. B. Rich, Horseshoe nails, burnishing, D. Dodge, Inkstand, B. W. Conroy, Iron resembling spelegetisen, E. Baker, Ladder, extension, M. N. Lovell, Lamp, D. H. Chamberlain, Lock, permutation, J. Cassino.

Table listing inventions and their patent numbers, including items like Lock, seal, T. J. Craft, Locks, seal, Foote and Randall, Locomotive whistles, operating, H. Wise, Loom, M. Harriman, Loom for weaving wire cloth, C. F. Wickwire, Loom let-off mechanism, J. Smith, Lounge, convertible, W. B. Coates, Mallet for smoothing metal, Clark et al., Matting, metallic, L. Wilkinson, Medical compound, I. Saalfeldt, Meta's, cutting and shaping, C. Van Haagen, Mill feed device, grinding, G. S. Cranson, Mirror holder, W. Simpson, Molding patterns, machine for, A. Eames, Mop wringer, H. L. Ennes, Mower lawn, Crawford and Lindsay, Muff, head, A. Schulte, Neck tie retainer, F. C. Dayton, Nozzle or hose sprinkler, J. H. Fowler, Oil, manufacture of oxidized, F. Walton, Organ coupler, reed, G. B. Kelly, Packing for pltons, E. W. Lipolcott, Paper stock, pulping, H. J. Lahousse, Parer, apple, S. E. T. Dodson, Pavement, A. Blank, Peach stoner, H. Z. Young, Photo enamels, vitrified, W. F. Watson, Planoforte attachment, M. W. Hanchett, Pipes, etc., lining iron, G. Willard, Pitman, W. J. Crane, Plating tin pipes, etc., W. A. Shaw, Polishing rods, J. Illingworth, Potato coverer, L. Waitford, Press, steam cotton, E. L. Morse, Pulley shield, Allen and Miller, Pump, double acting, Saxton and Hill, Pump valve, B. F. Biggs, Radiator, J. Mason, Railway carriages, moving, C. Anderson, Railway, elevated, T. C. Clarke, Railway, elevated, J. M. Hannahs, Railway signal, electro pneumatic, A. Bernstein, Railway vacuum brake, F. W. Eames, Ribbon block, W. Obriat, Rolled metallic bars, R. P. Colton, Rolls, handling metal at the, O. C. Dewey, Roof, metallic, G. F. Ullmann, Roofing paper, R. Colby, Rudders, brace for, J. P. Foote, Sash holder, T. Hooley, Saw handle, C. R. Sligh, Saw mill, H. D., E. N., and E. T. Wicks, Screw taps, cutting, H. E. Boyd, Screw-threading tubes, J. Heap, Separator, grain, E. Davis, Separator, grain, A. Low, Sewing and cutting stand, C. A. Werden, Sewing machine, I. Manning, Sewing machine castor, Sloan and Fisk, Sewing machine quilter, J. Happe, Shirt bosom and suspenders, I. Prinz, Shoes, J. H. Hasey, Sieve, G. Wright, Sleigh, A. Streat, Sole-channelling machine, T. H. Hussey, Sower, seed and fertilizer, J. C. Sebring, Sponge for upholstering, P. S. Devlan, Steam trap, J. W. Hodges, Stone, etc., carving, C. O. Luce, Stove, base-burning, J. Spear, Stove, cooking, D. E. Paris, Stove, cooking, T. R. Timby, Stove, heating, H. H. Bennet, Stove, heating, A. Brown, Stoves, extension shelf for, A. C. Barstow, Stump extractor, J. S. Mulholen, Suspenders, H. Hubbard, Swing, A. Shoeninger, Tank for oil, etc., F. C. Wilson, Thill coupling, R. Austin, Thill coupling, Crowell and Horn, Thrashing machine, W. Christie, Toy, W. R. Withers, Toy gun, A. Steinbock, Toy puzzle, A. W. Magerhaus, Toyswing, Miller and Toecke, Trap, animal and insect, I. N. Pangle, Treadles, operating, N. Stowe, Trolling spoon bait, G. M. Skinner, Tubes, mouth piece for speaking, T. C. Smith, Type case, B. O. Woods, Umbrella, A. and W. Hill, Valve motion, G. Rickert, Vehicle, M. V. Nichols, Vehicle spring, C. H. Guard, Vehicle wheel, H. Nycum, Vehicle wheel, A. N. Price, Vehicles, umbrella holder for, G. F. Dewey, Velocipede, J. Andersen, Ventilating m'nes, G. W. Williamson, Wagon jack, J. J. Upham, Walls, securing plaster to, P. H. Power, Washing machine, S. Croft, Washing machine, S. C. Hamlin, Washing machine, C. A. Werden, Water wheel, J. Holtvoigt, Weather strip, J. S. Wertz, Well casing spear, artesian, J. S. Muenger, Whip stock rubber covering, G. H. Douglas.

APPLICATIONS FOR EXTENSIONS.
Applications have been duly filed and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned:
30,633.—FIRE ESCAPE.—E. B. Larchar. Oct. 28.
30,745.—CULTIVATOR.—N. Messenger. Nov. 11.

EXTENSIONS GRANTED.
29,490.—MILL.—C. B. Hutchinson.
29,500.—BLANK ROLLING MACHINE.—N. C. Lewis.
29,502.—PIANOFORTE.—H. Lindeman.
29,510.—CAR FLOOR, ETC.—R. Montgomery.
29,523.—CAMERA.—A. Semmendinger.
29,534.—LATHING.—B. D. Whitney.
29,551, 29,562.—BOOTS AND SHOES.—L. R. Blake.
29,576.—ENGINE PISTON.—H. D. Dunbar.
29,579.—ENGINE GOVERNOR.—R. W. Gardner.
29,593, 29,594.—REAPER AND MOWER.—A. A. Henderson.
29,649.—SEWING MACHINE NEEDLE.—F. H. Drake.

DISCLAIMER.
29,579.—ENGINE GOVERNOR.—R. W. Gardner.
DESIGNS PATENTED.
7,602.—HEATER.—J. B. Bener, Philadelphia, Pa.
7,603.—CALENDAR.—W. A. Emerson, Providence, R. I.
7,604.—VASE.—J. W. Fiske, New York city.
7,605.—PEDIESTAL.—J. W. Fiske, New York city.
7,606.—BOTTLE.—A. Gruning, New York city.
7,607.—COOK STOVE.—C. Noble, Philadelphia, Pa.