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Important Decision.— The United States Circuit Court has decided, in favor of the Philadelphia (Gardner) Fire Extinguisher Co., the suit brought against them by the Babcock Company for alleged infringement, declaring the Babcock patents invalid. Certified copies of the opinion of the Court can be had of the clerk. U. S. Circuit Court at Philadelphia. Philadelphia Extinguisher Co., 424 Walnut St., Philadelphia, Pa.

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For descriptive circulars, and terms to gents of new and saleable mechanical novelties, address \ger James H. White, Newark, N. J., Manufacturer of Sheet and Cast Metal Small Wares.

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J. C.'s query as to a boiler in the shape of a hali moon, and E.P. J.'s, as to a vacuum, are incom-prehensible.-J.C. H. can remedy the dampness of the walls by using the waterproof glue described on p.8, ol. 25.-N. V. H. will find directions for gilding picture frames on p. 90, vol. 80.-L. D. is informed that we re printed the recipe for mending rubber boots on p. 208, vol. 30. Figured fabrics fade in washing because they are not printed in tast colors.-H N. Jr. will find the needed information as to the weight of flywheels on pp 177, 288, vol. 28.-R. M. H. will find a description of ma king ice bymeans of heat on p. 243, vol. 80.-H.D.O. will finds recipe for squarium cement on p. 202, vol. 28 Water colors are finely powdered pigments made into cakes with wax.-C. & A. will find full descriptious of nickel plating on pp. 187, 378, vol. 28.

J. W. Z. asks: How can I preserve eggs Eggs may be preserved for any length of time by ex cluding them from the air. One of the cleanest and casiest methods of doing this is to pack them with the small end downward in clean dry salt in barrels or tubs and to place them in a cool and dry situation

G. F. P. asks: 1. Why does paint in Rockport. Texas, change color, white paint turning almost black in patches? A. The effects mentioned are such as would be produced by the presence of sulphuretted bydrogen gas, and it would be well to inves-tigate the sewerage and drainage facilities, and any spots where decaying and putrescible matters might accumulate.in order to determinewbethertberewere any sources of this deleterious gas. 2. Are chromos printe on cloth as well as on paper, and are they not more val-uable? Are not the best printed on eloth? A. The best chromos are printed on cloth, which is more durable than paper.

are decarbonized and Damascus steel? A. Damascu steel is steel made from an ore consisting of magnetic oxide of iron and silica, by the use of charcoal furnaces The name is also applied to imitations of the original Damascus steel. Decarbonized steel is steel from which portion of the combined carbon has been removed. 3. Is a breech-loading or a muzzle-loading shot gun the safer? A. Both are dangerous in the hands of careless people, and may be safely used with cautious handling.

J. L. S. asks: 1. Where can full and complete information respecting the grinding, polishing, and mounting of specula be obtained? A. We reiterate that Professor; Draper's treatise affords the most availableinformation on the construction of specula. John Browning's pamphlet illustrates the method of mount ing them. 2. Has Professor Henry Draper improved his processes for the construction of glass specula since the publication of Vol. XIV., 1864, of the Smithsonian contributions for the diffusion of knowledge? A. No. 3. What is the method at present pursued by With, of Hereford, in the construction of silvered glass specula for Browning's telescopes? A. Extra thick glass is used to avoid flexure, and imperfect mirrors are repol ished. 4. Of all the methods devised for the construct tion of specula, which produces the best results in the shortest time? A. The machine for local corrections (Draper, p. 24).

O. C. asks: 1. Why is it that people talk and write so much about the impossibility of the sun being a body of combustible material in a state of intense heat, alleging that, if such were a fact, it would long ere this have been consumed and have left a blank in space? There is no such thing as destructible mat ter, as this allegation would seem to imply, combustion being nothing more or less than the change of matte from one form to another without destroying one par ticle of it. A. The sun is really a combustible body slowly burning, but its condensation supplies more heat. The oxygen and hydrogen, which will in time form the solar oceans, are dissociated by its bigh tem erature. Eruptions throw these gases into the cooler chromosphere, they burn, and, forming water, show us steam lines in the spectroscope. 2. As the attraction of the sun is sufficient to hold all this matter within its limits, how can this destruction of the sun take place A. A velocity of 380 miles per second is sufficient to carry ejected material clear of the sun's attraction The observed velocity of projection is 500 miles. Stars therefore, are in constant interchange of missiles.

J. A. asks: 1. What is the formula for find ing the area of a lune when the width of the lune and the respective diameters of the two curves forming the lune arcs of the lune; then multiply half of each arc by its radius, and subtract the least product (the area of the least circular sector) from the greatest. The re mainder is the area of the lune. 2. Can you tell me of some of the double stars? A. A few double stars are Gamma Leonis, orange and green yellow; Delta Corvi yellow and purple; Gamma Virginis, white and yellow. Zeta Ursæ Majoris, white and green; Iota Bootis, triple Pi Bootis; Epsilon Bootis; Xi Bootis, orange and purple; Mu Boots, yellow and lilac; Delta Serpentia, Zeta Coro næ, white and blue: Epsiton Lyræ, multiple; Beta Cygui, yellow and blue. All double stars, nehulæ, and clusters are marked in Proctor's "Atlas," price \$2.50.

N. B. says: 1, I have a 2 inches achromatic object glass of 30 inches focus, with which I wish to construct a telescope. What size of eyepiece, and of what focus, should I use? What power would such a glass have? A. Use a Huyghenian, or negative eye piece, field lens abouthalf an inch diameter, ¾ inch fo us, the eye lens ¾ inchdiameterand ¾ inch focus, both lenses plano-convex, plane side next the eye. The eye lens is placed its own focal length within the focus of the fieldlens, that is, they are half an inch apart. An equivalent single lens would be half the focus of the field lens or 3 inch focus; therefore 80 inches+3 inch=80 the magnifying power of the eyepiece. 2. What is the difference (in construction) between a terrestrial and a celestial eyepiece for a telescope? A. The terrestrial eyepiece is provided with two additional lenses, to erect the image.

H. L. C. asks: Can I make a telescope, of sufficient power to show Jupiter's moons and Saturn's rings, with a double concave lens, 4 inches diameter and of 6 inches focus, and 1 meniscus lens, 4 inches in diam eter and of 6 inches focus? 1 have a double concave lens, 2 inches in diameter and of 8 inches focus, and s meniscus of the same size and focus; they are from a magic lantern. I also have a double concave. % inch in lameter and of 1% inches focus, and i double concave lens, % inch diameter and of 1 inch focus. Would these lenses do better for a telescope or for a microscope ? A. Your lenses will not answer, if your description is correct. A tolerable two inch achromatic object glass costs \$1.50, and a useful microscope, \$6.00. Either would be preferable to a chance combination of cheap lenses.

O. B. asks: 1. What advantage, if any, have the rotary engines over the ordinary piston engine, and why are they not in more general use? What is the principal objection to them? A. We have seen no ac-counts of thorough tests of rotary engines, and there fore cannot give a decided opinion upon their advan tages. 2. Suppose the wheel of a rotary engine to have % of a square inch effective pressure, and its mean dis tancefrom senter of shaft to be 1% inches, it being on der continual pressure ; how will it compare with a pis ton engine having the same area of piston and a stroke of 3% inches under the same amount of pressure, ma kingthe same number of revolutions? Would such an engine beworth bothering one's brain over provided that, for cheapness of construction, simplicity, and du rability, it will compare favorably with the piston engine now in use? A. If you can buildsuch an engine it will be worth your while to experiment. 3. How will gas do as a substitute for steam in experimenting on a small scale? A. It is used in several forms of en gines. E. F. M. asks: I. How can I protect iron which is continually in salt water from dirt and barnacles? I have tried several paints now in market, but find that they all fail to keep the iron or wood free. A The paint must be constantly renewed. 2. How can pitchortar bereduced so as to make a paint, to be used cold? A. With turpentine, we believe. 3. How can I reduce copper to the fineness of flour? Can it be done with acids? A. By heating the copper in an atmosphere of hydrogen. 4. Is the Science Record composed of the copies of the SCIENTIFIC AMERICAN? A. No. 5. How nuch will it cost to have 1 year's copy of the SCIENTIFIC AMEBICAN bound? A. In one Volume. \$2: in two vol umes, \$9.

C. A. J. says: I have a cellar about six feet deep that I cannot keep the water out of, and I wish you to tell me how and with what I can cement it to keep it dry. The cellar is dugin stiffred clay, is walled up with brick 9 inch wall, laid in Louisville. Ky., cement; the floor had cement spread upon it an inch thick, with one course of brick laid upon it, and then well grouted with cement. A. The reason the wateris forced into your cellar, notwithstanding the extraordinary precautions youhave taken to prevent it, is because of the exterior pressure the former is subjected to, in being confined in the clay surrounding their foundations and rising around the house to a head equal to the depth of the cellar. If your emove this pressure and point up the breaks, you are very likely to overcome the difficulty To do this, excavate a trench outs:de the walls, down as deep as the foundations will allow without undermiging them, and fill in with stone of all sizes up to 18 inches dismeter for about 2 feet in depth and 18 inches out from the house: then refill with the earth excavated, taking the precaution to place gravel or small stones against the wall all the way up for a few inches out. Now, from this lower deposit of stone, provide one or more drains leading away from the house and discharging at a lower level. These drainsmay he also made of stone like the one around the house, and to prevent their being filled up with dirts omestraw or carpenter's shavings may be laid over the stones. In this manner the outward press-ure may be removed; and if, when the trench is open, a coat of cement be put on the outside of the founda-tions in addition, then the prospect of a dry cellar may be reasonably indulged.

A. B. F. asks: How many cubic feet of wa ter displacement does the United States government al low per tun for river steamboats, and for sailing vessels? A. About 86 feet.

O. N. E. asks: 1. What is the best battery for silver plating? A. Daniell's constant battery is a good one. 2. How can an old broken graphite crucible be made over into a new one? A. Powder fine, mix with water into a paste, mold, and dry or bake. S. How can commercial zinc be purified so as to make suitable zincs for a battery? A. Zinc can be purified by distil-lation. 4. How much pure silver by weight is there in the United States dollar? A.A silver dollar weighs 4121/2 rains, and contains 900 parts of pure silver in 1,600; therefore , of 412 + grains will give the pure silver by weight in a dollar= $871\frac{1}{4}$  grains. As to your other question, send to D. Van Nostrand for a catalogue.

J. W. B. asks: How can I grind a double onvex lens accurately round, with a bevel on each side, to fit any sized frame? It is now done by hand. Can it bedone by machine? A. Yes, by an iron wheel fed with sand and water, or a traversing emery wheel. Glass disks are cut out by a rotating vertical metal tube, fed with emery and water.

J. K. says: It is generally considered by clentific men that the sun is a body which emits heat as well as light. Now if the sun is a hot body, why are not the upper strata of the atmosphere heated to a bigher degree of temperature than near the surface of the earth? According to the laws of heat, it decreases as the square of the distance increases: and by this law the upper strata of the atmosphere would be warmer than near the earth, which we know is not the case. Again, the annual mean average temperature of the earth in the warmest parts is 90°. The earth is 93,000,-000 miles, and Mercury \$8,000,00 ) miles from the sun. The quare of the earth's distance is more than six times that of Mercury, nearly 6% times, which would make the temperature of Mercury 6075°. It seems to me that Mercury must be in a state of fusion. I would like to knowwhy it is colder as we ascend above the sea level for a distance of five miles, if the sun is a hot body? Is not the heat which we derive from the sun caused by friction of therays of light passing through our atmosphere? A. The sun's rays are holter at great eleva-tions, but they pass through the air without warming it until absorbed and radiated from the surface. T aqueousvapor acts as hot house glass, preventing radiation.

M. J. T.—In reply to the answer given to W. M. W., which was to the effect that the end of the siphon that discharges the liquid should be on a lower level than the end into which it is drawn, M. J. T. says : "I have always supposed that a siphon would draw water to a level with the shortest leg. I don't see that it nakes any difference which is the longest, or whether they are both of a length (or on a level). A. M. T. J. is substantially correct. The liquid will runso long as the discharge end of the siphon is below the level of the liquid.

W. R. B. asks: How is danger to the eye y burning prevented in looking at the sun with a pewerful telescope? The eyepiece sun glass will not prevent the best. Is it done by a dispiragm over the object glass, or how? Of what kind of glass is the sun glass made? Could not a large non-achromatic lens be con-nected by a small over-corrected lens placed near the focus of the large lens? A. A solar eveniece may be made thus: Attacha short tube, which fits your eyepiece, at right angles to another which fits the eyepiece tube. Place a 1 inch plano-convex lens so that the center of the plane side forms an angle of 45° with the center of eithertube. Ten percent of the solar light and heat will then be reflected up to h, eyepiece, and 30 per cent will pass out of the lens. A disphragm over the objective may be used. Two sun glasses should be used to-gether, a claretand agreen one. The sun's image may bereceived upon a white sheet of paper with the full aperture.

J. M. D. says: 1. We find in Ray's "Asfying power, we must find some way to increase the light; in the telescope this is done by enlarging the object glass." In constructing a cheap home made telescope would not a cosmorama lens, 5 inches in diameter and of 72 inchestoous, he a higher magnifying nower and give more satisfaction for astronomical purposes than an achromatic lens 2 inches in diameter and of 80 inches focus? A. No, unless it were 30 feet focus. It would then bear a power of 190 only. 2. What is spherical aberration? A. Each zone of a spherical lens has a different focal plane, the outer zones baving the shortest focus. 3. Is the sewing machine an American or an English invention? A. American. Howe took bis first machine to London. X. X. O. asks: Can you tell me of any com-binations of chemicals that will remove the readish cast of hemlock sole leather and give it the appearance of oak tanning? A. Try a neutral solution of perchloride of iron.

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S. V. C. asks: Is aluminum non-magnetic? Would its presence by indicated by a deflection of the needle? A. Aluminum is non-magnetic.

O. A. F. asks: Which kind of prussiate of potash, white or yellow, did H. J. B. use in making his explosive powder? What kind of sugar is necessary? A. The ingredients are yellow prussiate of potash and ordinary white cane sugar. They must be thoroughly mixed together in a dry state.

Q. V. asks: 1. How can I make good silver ink? A. Nitrate of silver, 11 parts; distilled water, 85 parts; powdered gum arabic, 20 parts; carbonate of soda, 22 parts; solution of ammonia, 30 parts. Dissolve the carbonate of soda, and afterwards the gum (by triturstion is a mortar) in the water, dissolve the nitrate of silver in the ammonis and add to the carbonsteof soda solution. Heat gently to the boiling point; the ink, in ethers, they can be managed on each car, indepen-at first turbid, becomes clear and very dark. 2. What dently of all the rest.

J. H. P. asks: Can air brakes be applied to a train of cars if the engine is loose, or can they be applied without the power of the engine? A. In some arrangements they can only be applied from the engine;

R. H. W. A. asks: 1. Can I use foil from chewing tobacco for coating a Leyden Jar? A. Yes. 2. Please me a recipe for a cement for fastening glass to metal. A. Metals may be made to adhere to glass by a cement composed of powdered litharge 2 parts, white lead 1 part, boiled linseed oil 8 parts, mixed with 1 part of eopal varpish to a thick paste.

G. E. K. Jr. says: In answer to E. D. E. you say that the earth turns on its axis 365 times in 365 days. I supposed that it only turned 364 times, the solar day being not a revolution of the earth once on its axis, but the return of the sun to a given meridian, which I think is leas by about four minutes than a complete revolution (or sidercal day) on account of the enward motion of the earth in its orbit, which would necessarily make one day in a year if the earth did not turn on its axis at all. Am I not right? A. The tropical year, or interval between two successive passages of the sun through the mean vernal equinox, equals 365 24222 mean so, ar days, or 365-21222 sidercal days.

F. W. B. asks: 1. What chemical reaction takes place between carbolic acidand iodine, when they are mixed in solution? A. Little if any chemical action. The iodune colors the carbolic acid a dark reddish brown color. 2. Is it known whether the action of carbolic acid on iodine would produce such a change in the iodine as would alter the therapeutic action on the system? A. No.

J. H. B. asks: Can a man liftmore with a rope over a large pulley than with one over a small pulley? A. In the case of a stiff rope, yes. It is harder to bend a stiff rope over a small pulley than over a large one.

F. A. says: I am told that the coins of the United States for one particular yearare at present very scarce and valuable. Will you please tell me what year that is, and also what are the several present values of silver dollars of 1796 and 1799? A. Dollars of 1804, but three known. Dollars of 1794, veryscarce. The rest are casily procured at a small premium, if at all rubbed or indented. No dollars were coined from 1806 to 1885. Haif dollars of 1804, but one known. Of 1797, very rare. None coined from 1798 to 1800, or in 1816. Quarter dollars of 1823 and 1827, very rare. Coined irregularly until 1831. Dimes: Veryrarefor thefour following years, warled in the order of their rarity: 1804, 1797, 1802, 1802. Coined yearly from 1827. Half dimes of 1802, but three known. Of 1794 and 1803, very scarce. None coined from 1806 to 1828. Three cent pleces of 1855, very scarce, Cents of 1793, 1799, and 1805, very scarce. Note coined in a regular series. But few of the gold pleces are very rare. The quarter eagle of 1797 is most valuable.

J. P. R. asks: How much power has an engine,1 incb bore x 2 inches stroke, running at 200 revolutionsper minute? How large a boiler should I have, and what kind of metal would be best? A. See article entitled "Indicating Steam Engines," in SCIENTIFIC AMERICAN for January 31, 1874. Allow about 20 square feet of beating surface for a horse power. You can make the boiler of copper or sheet or cast iron, whichever is most convenient.

I. S. S. asks: How thick should a cast lead sphere of 36 inches diameter be to stand a pressure of 35 ibs. to ttc square inch? How thick one of 30 inches diameter? A. For the sphere, the bursting pressure is equal to the product of the tenacity of the material multiplied by the thickness, and divided by the diameter. For a cylinder, the bursting pressure is equal to the product of the first two terms, divided by the radius of the cylinder. From these rules you can find the necessary tbickness.

W. D. G. asks: Why is it that in the block and tackle every additional pulley (the pulleys being all of one size) gives an increase of power? A. It is not true that every additional pulley increases the power, but it tends to increase the space over which the force acts in overcoming a given resistance; so that the same force can overcome more resistance, but requires a longer time. Thus the power developed, which is composed of force or pressure exerted over a distance, remains the same.

X. Y. Z. asks: 1. How can I make a small crucible? A. With fire clay, or a mixture of fire clay and plumbago. Your best plan will be to buy one. 2. What is laminated steel? A. It is a mixture of steel and iron. 3. Is  $\frac{diameter}{180\times60}$ =the chord of one minute? A. No.

180,260

M. E. asks: Why is it that, after digging a hole in the ground, the dirt will not fill it up as compactly as before? A. It will, if moistened and rammed.

C. E. M. is correct as to the weight of the 40 feet cube of granite. It should have been given at about 5,333 tuns.

G. McK. asks: 1. How can I mend a hydraulic cylinder that has a very fine flaw in it? I cannot see the crack when I have no pressure on it. A. Possibly you can secare a patch with bolts, and braze the joint. 2. What is the best preparation for putting on a rope that has to run on or wrap around a small pulley under water, so as to make the rope last? A. Tar.

J. V. says: 1. We have a boiler of 40 inches diameter, 22 feet long, with two flues of 13 inches diimeter. What should be the size of stack to insure the best draft? We have 16 square feet grate surface. Would that be enough to burn sawdust, provided the draft were strong enough? A. Make the area of chimney from j(to 1:10 area of grate. 2. Which saw will cut the easier for both hard and soft wood, the one which is swaged sufficiently for clearance, or one in which the teeth are sprung for set? A. This is a question between rival manufacturers. It can readily be determined by experiment. 3. How can Imake the most durable friction wheel, for the feed of a circular saw? A. Probably cast from will be as suftable as snything.

A. T. R. asks: What is the principle on which the Giffard injector works? A. The steam imparts sufficient velocity to the water with which it comes in contact to overcome theresistanceoffered by the pressure within the boller.

Z. Z. asks: 1. What is the coloring matter of the leaves of plants? A. The coloring matters of flowers arc referred to three distinct substances by certain chemiste, one of which is a blue or rose color, while the other two are yellow. The former is produced by a compound which has been termed cyanin. Cyanin may be obtained from the petals of the violet or of the iris. To the yellow matter which is insoluble in water the name of xanthine is given, and to the yellow matter which is soluble, the name of xantheine. See article "Chromatology," *Quarterly Journal of Science*, 1873. 2. Are not the metals of the highest specific gravity the scarcest, and is not this caused by their sinking near the center of earth when the earth was in its molten state? A. The rare metals, which are also noble metals, are of great specific gravity, and many geologists have supposed that this had a close connection with their slight diffusion. But it is a theory difficult of satisfactory demonstration.

J. C. M. asks: 1. How are the salts of nickel and ammonia used for plating? A. See pp. 91, 139, vol. 39, 2. How is woodstained in imitation of ebony? A. Steep the wood for two or three days in lukewarm water, in which a little alum has been dissolved: then put a handful of logwood, cut small, into a pint of water, and boil it down to less than haif a pint. If a little indigo is added, the color will be more beautiful. Spread a layer of this liquor quite hot on the wood with a pencil, which will give it a violet color. When it is dry, spread on another layer, dry it again, and give it a third; then boil verdigris at discretion in its own vinegar, and spread a layer of it on the wood; when it is dry, rub it with a brush, and then with olled chamois skin. 3. What is your price for binding two volumes (in one book) of the SCIENTIFIC AMERICAN? A. Two dollars

W. T. says (in reply to J. H. P., who says : Astronomers tell us that the earth for ages past has been gradually cooling, but the glacial theory necessi-tates the belief that the earth was once much colder than it is at present. Has any attempt been made to reconcile the two theories?): Allow me to answer this question, Such an attempt has been made, and, it seems, very successfully, by the celebrated geologist Oscar Voi Heer. Astronomers tell us that the sun, with the earth and the other planets, is steadily progressing in space moving in a very long period around its central body very probably the star Alpha Centauri. It is almost certain that matteris not equally distributed in space and that there are regions of the heavens where there are more celestial bodies in one given space than another, and consequently these regions are warmen from the heat coming forth from the stars, which all are surrounded by glowing gases, as the spectroscope proves. But in the regions in which they are less abun dant, the temperature is colder. O. Von Heer now suggests that formerly, especially during the eocene perio the sun (with the earth) was in a region thronged with stars, and therefore the slimate on earth was warmen than it is now; and by gradually progressing to other re gions, the climate became colder and colder, until the west temperature was reached in the glacial period and that it moves now to regions that, are warmeragain. It is my opinion that the earth's heat has not affected its climate since the end of the jurassic period at least, and perhapsverymuch earlier."

J. L. R. says, in answer to F. O. C. H., who asked how to put a patch on a boiler with bolts so as not to leak: "I put one on a boiler with bolts so as ago, and it does not leak and never will. The patch was 24 bolts long and 4 wide, over where the sheets were riveted. The inside sheet was cracked from one hole to the otherforthat length. Proceed as follows: Punch or drill your holes and fit the patch to the boiler; make the holes to fit well for % bolts 1% inches long, with heads of 1 inch, made solid, and good threads. Put 4 holt and draw it tight. In putting the bolts in, have the heads square with the boiler, and hold them so; be sure not to let them turn. After screwing on the nuts, hamer the beads down hard and screw again, size hamer the patch after it is screwed tight. Caulk the same as a new boiler. It may leak a little before you get up steam; but when youget 30 lbs., and your engine started, it will betightand will stay so."

M.Y.R.says that P.andG.G.can make a good invisible ink, that will appear upon the application of water, by dissolving powdered alum in the juice of a lemon; the density of the ink is procured by the amount of alum used, but half a teaspoonful to the juice of one lemon is enough.

C. D. S. says to J. H. P., who asks if any attempt has beenmade to reconcile the glacial theory with the theory that the earth was once in a molten state: The reason assigned by Benton for the change of climate which caused the glacial epoch is that the axis of the earth may not have had the same inclination to the plane of its orbit during the glacial epoch as at present; at the early stage of the earth's existence, volcanicaction must have been much more frequent and powerful than at present, and this volcanic action may have caused an upheaval at some point of the surface, accompanied by a corresponding depression at an opposite point, which would be sufficient to alter the center of gravity to such an extent as to change the inclination of the earth's axis to the plane of its orbit. As there is no trace of glacial action within the tropice, somegeologists contend that the part of the northern hemisphere on which traces of glacial action are found

F. A. R. says, in reply to P.'s query as to hydrogen: Probably your zinc is too pure; sometimes we are compelled to use very pure zinc and sulphuric acid, and then the hydrogen will come out veryslowly, the pure zinc resisting the action of the sulphuric acid. By adding a few drops of chloride of platinum, however, the hydrogen will be produced very quickly, and probably sulphate of copper would be just as well for your purposes as chloride of platinum.

W. S. X. says, in answer to J. H. D., who asks how to reverse an engine: First make a mark on the side of the eccentric, near the shaft, with a scribe or small chisel; make a corresponding mark on the shaft at the same point, then place one point of a pair of calipers on the mark on the shaft, and with the other point find the center of the shaft on the opposite side. Then, with a scribe, mark this point also. Now unscrew the eccentric and move it around in the direction in which the engine is intended to run, until the mark on the escentric comes into line with the second mark on the shaft; then make the eccentric fast, and the engine will run in the opposite direction. It does not make any difference in what direction the crank is when the eccentric is moved.

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

A. M. G.-No. 1 is oxide of iron: No. 2, quartzose rock.

W. N. L.-These two specimens are iron pyrites.

J. W. Z.-No. 1 is clay ironstone; No.2, sandstone impregnated with oxide of iron; No. 3, the same as No. 2; No.4, brown ocher, a clay colored with oxide of iron. This might be of service as a pigment.

M. D. W.-This material is shale.

J. P. M.-Thisis an impure elay.

C. J. H.—The specimen sent is limestone. In answer to your other question: We know of no such process, but you can experiment.

G. W. S. — The sample is an impure silicate of alumina. G. & W. — One of these specimens is a fossil bone, and the other argentiferous galena. The subscription price of this journal is \$\$ per annum, in all parts of the United States.

W. R. Jr.-Your specimen is an alloy consisting of copper and zinc, in other words, brass. It is possible that a piece of brass may have accidentally fallen into the stamp copper. Native brass bas not as yet been found.

M. R. asks: 1. How are sewing machines japanned, what ingredients are used, and how are they applied ?—O.S. asks: If 2,000 feet of 6 inch iron pipe is supplied by a pump driven by 24 horse power, will it be any advantage to attach a similar pump, driven by 18 horse power, at the other extremity of the main pipe, in throwing water from a hydrant placed in the center? If so, what?-J. C. C. asks: After being drowned,how long will a person lie under water before he will rise? Is there any difference in the time between fresh and salt water ? What is the cause of the rising? If it be gas, what produces it? What is the theory of firing cannons over the water where it is supposed that a per son has been drowned ?-E. H. K. asks; In the drive wheel of the locomotive engine, where does natural philosophy place the fulcrum, the power and the weight respectively?-E. C. B. asks: What do lewellers use for ash?-J. A. McC. Jr. says: Take a tube, 3-16inch in diameter, of any length, and cut a round piece of paste board 25 inches in diameter. Make a hole in the center of the board, and insert one end of the tube in the hole:



then cut a round piece of paper of the same size as the pasteboard; place it on the pasteboard, and the other end of the tube in the mouth, and the strongest lungs cannet blow the paper off. Will you give me the philosophy of it?—B. says: I see in the SCIENTIFIC AMER-ICAN that Dr. Brown-Séquard advises people to cultivate the use of the left hand and left side of the body, thus exercising the left lobe of the brain, teaching it to think. He recommends learning to write with the left hand. Can any of the readers of the SCIENTIFICAMER-ICAN give directions for the proper holding of the penmanship?

## COMMUNICATIONS RECEIVED.

there is no trace of glacial action within the tropics, somegeologists contend that the part of the northern between the trace of glacial action within the tropics, somegeologists contend that the part of the northern between the trace of glacial action are found. The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the re-

ing machinery? Makers of the above articles will probably promote their interests by advertising, in reply, in the SOURTIPIO AMERICAN.

Several correspondents request us to publish replies to their enquiries about the patentability of their inventions, etc. Such enquiries will only be answered by letter, and the parties should give their addresses.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

[OFFICIAL.] Index of Inventions FOR WHICH Letters Patent of the United States WERE GRANTED IN THE WEEK ENDING April 7, 1874,

AND BACH BEARING THAT DATE.

[Those marked (r) are released natents ]

dvertising frame, E. A. G. Roulstone	149,340
larm, burglar, H. X. Wright	149,365
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Bed attachment, spring, J. R. Bailey	149.869
ed bottom, A. Adams	149,881
Sell. call. H. A. Dierkes (r)	5.822
Bell, door, J. P. Connell	149,875
Seilows safety valve, C. W. Dunn	149.452
Belt tightener, C. L. Work	149,429
Sinard table leveler, L. A. Hult	149,401
Blacking case, E. Schenck	149,845
Blower, rotary, L. Andrews, 2d	149,368
Soat, life, M. Cuson	149,877
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Boiler, steam, N. D. Marvey	149,295
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Soot soles, channeling, V. K. Spear	149,558
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Boot stretcher, O. F. Garvey	149,465
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ar coupling. J. F. Burner	149,000
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ar starter, W. T. Beekman	149,427
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	hemisphere on which traces of glacial action are found /	soint of oniginal papers and contributions	Filth wheel for vehicles, N. F. Melson 145,005
E. B. L. says: 1. Some of our steamboat	may have occupied a position analogous to the poles of	cerpt of original papers and contributions	Firearm, breech-loading, G. H. Ferriss 149,456
chimneys get very hot when running, and others keep	the earth at present. For a full and satisfactory expla-	upon the following subjects:	Fire arm, breech-loading, C. E. Sneider 149,352
quite cool. What are the cause and remedy? A. It is	nation of this and many other points, read Benton's	On Steam Boiler Explosions. By W. M. D.	Fire arm rebounding lock, C. E. Sneider 149,353
because of improper design in the boilers, or on account	"Lectures on Geology in America."		Fire brick stove lining, etc., E. H. Richter 149,838
of unduly forcing the fires. 2. Is there anything I can	S T same in works to H C D mba ashe	On the Attraction of the Sun and the Earth.	Fire escape, I. H. Mulford 14',328
put on pine plank to make it fireproof or incombustible?	S. I. Says, Ill reply to H. C. K., who asks	By A. D., and by A. F.	Fire kindler, J. W. Bynon 149,436
A. There are several varieties of paint that are said to	"The first engine Lever handled may on such a best on	On a Problem etc. By G. W. E.	Fire kindler, J. Newman 149,510
make wood fireproof.	the Obio sizes and the two appends were hung to the		Fire kindler, Wiehle et al 149,554
J B save · I have some voung evergreen	how and storn dools much as a hear door is hung with	On an Aurora visible in Michigan. By	Fire wood carrier, Brisack et al 149,287
trees growing under some walnut trees, but they do not	the diff wares that the batters mane of 579 timber and	B. B. S.	Flocking machine, E. C. Gould 149,390
thrive. Can you tell me the reason? A. The reason is	the underence that the battens were of 5x8 timber and	On Descention Garla in Dations De CLE	Flour bolt, J. R. Gast 149,464
that the walnuts shade the everyreens and denrive their	24 feet long. The apron was to feet long. The apron	On Preventing Scale in Bollers. By C.L.E.	Fluting roller, T. Bobjohu 149,526
roots of proper nourishment. As an antidote, remove	toon binees more bolted to ennon and dock. This method	On the Beech Blight. By D. E. R.	Flyframe, M. Fredeau 149,297
the trees where each may have abundance of air, light.	the state the timbers near each side of the best out of	On the Chameleon By HAHG	Fuel, etc., artificial, J. R. Hayes 149,396
and root space.	the way of teams, and a large slatte on deak looping		Furnace grate, G. R. Moore 149,825
	over and of timbers, sourced the appendix of when arous	On the Philosopher's Hunt, By T. H. C.	Furnace, hot air, G. W. Walker 149,422
F. H. H. asks: Why does water form an ex-	the Opposite share the slouts mes desped of let	On a Double Lamb. By J. H. P.	Furnace, tyre-heating, L. S. Rowell 149,341
.ception to the law of contraction by cold? What are	ting the appen fall on shore. The stearing on had a pin	On some Useful Peeines Br C B I	Gaiter, button, P. McNulty 149,500
the principles of its expansion when turning to ice? A.	fast in its balance conten and a hole in the outboard of	OI BOILE O BETUI Recipes, by C. D. D.	Game board, T. A. Schwennesen 149,418
One volume of water at 82° gives 1'102 of ice at the	athen appen to receive it so that both ands of the heat	Also enquiries and answers from the follow-	Gas apparatus, domestic, H. Skoines 149,538
same temperature. There is then an increase of one	could so showd "	ing	Generator, sectional steam, J. A. Miller 149,504
teach of the volume in passing from the liquid to the	could go ancad.	шg;	Glass mold, C. D. Fox 149,461
solid condition, the temperature remaining the same.	C. S. says that J. H. P. can cure the gapes	T. O'DE. P. JJ. B.S. HG. ND. F.	Glass, etc., polishing, J. Meisse 149,501
But previously fixing themselves rigidly in certain po-	in hischickens by taking a stift horsebair, some eight	Correspondents in different parts of the country ask :	Grain basket, R. S. Bartlett 149,285
sitions so as to form crystals of ice, the particles of	inches long, making a loop of it, putting it down the	Wbo makes back rests for holding lumber in a lathe?	Grain cleaning machine, S. Burger 149,435
water take up relative positions with regard to one an-	chicken's throat, and withdrawing it quickly, two or	Who sells small brick-making machines? Who sells	Guano bags, etc., waterproofing, J. H. Green 149,472
other, in which they occupy a larger volume.	three times, for as many days. This is a sure cure.	lath-splitting machines? Whomakes artesian well bor	Harness pad, J. Huber 149,400