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For Best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay \$13., Brooklyn, N.Y. Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing metals. E. Lyon & Co., 470 Grand St., N. Y.

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rubber and leather belts. Greene, Tweed & Co., N. Y. water without producing back pressure, that is, if there composed of which is used upon brasswork to prevent pose to a gentle heat for a day or two, then strain off

Chester Steel Castings Co. now running; 8 years constant down as you please by arranging the discharge as indiuse prove them stronger and more durable than wrought cated. iron. See advertisement, page 366.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Safety Linen Hose for factories, hotels, and stores, at lowest rates. Greene, Tweed & Co., 18 Park Place, N.Y.



near enough for practical purposes? A. Place a small measured and compared with its previous resistance; mirror in a level position on the ground, at a little dis- this gives the figures of a proportion from which the tance from the tree, and then step backward until you distance, in miles, is calculated; this calculation is mirror. Height of tree=

Your height X distance of tree from mirror. Your distance from mirror,

- (2) F. C. H. says: 1. I have a boiler that has 22 square feet of heating surface, contains 20 gal-Applicable as are the Varnishes and Japans of Hyatt | lons water up to water gauge, will evaporate 20 gallons of water per hour, with ordinary firing. What horse power is it? A. As we have frequently explained, there is no standard for measuring the power of the boiler, that is generally accepted. 2. I have seen men working as it ran from the cupola without receiving any burn whatever. Can you explain the phllosophy of this exinto vapor, which forms a protective covering. 3. How can the ordinary bars of cast iron (pig iron) be broken so as to be melted in a crucible or small cupola? How are very heavy masses of cast iron broken, such as cannons, heavy machinery, etc., to be remelted? A. Cast iron can be broken with blows from a heavy hammer. Dynamite has sometimes been used for large
 - the cut-off? A. Advance the eccentric until the valve gas or water pipes. has the proper lead, and then adjust the tripping ar rangement by trial.
 - (4) A. W. asks: What is the best thing for habits.
 - (5) L. M. C. asks: 1. What is steam pack ing? How is it constructed and used in the pistons of steam engines? A. It ordinarily consists of metallic rings, which are set out by the pressure of steam. 2. What course would you advise a young man twenty years of age to pursue in order to learn to be a competent steam engineer? A. He should pursue a course of instruction such as is given in our best technical
 - (6) J. W. S. asks: 1. How much advantage has the best automatic governor cut-off engines over the best throttling engines? A. You will find some notes on the subject on p. 321, vol. 30, of the Scientific American. 2. Is a valve which cuts off and admits the steam better than two valves for doing the same, one riding on the back of the other? A. Generally the clearance will be somewhat less in the case of the former arrangement, and there will be less mechanism and fewerwearing parts,
 - (7) P. G. asks: Is there any tool giving the exact length of a circle, in drawing that circle? Would such a tool be of any practical use? A. We do not know of any such instrument. It would be of some use if simple and cheap.
- (8) T. J. R. asks: 1. Would it not be a better plan if, in reducing the area of grate bars in burning as long as a uniform temperature is maintained. screenings with a blower, instead of bricking up the sides of the furnace to reduce the center over the grate bars? A. This idea is practically carried out in the dead plates or coking plates that are usually fitted. 2. valuable for strength and durability. Circulars free.

 What is the rule for finding the flow of steam through
 Pittsburgh Steel Casting Co., Pittsburgh, Pa.

 a nine into the atmosphere? A You will find rules in a pipe into the atmosphere? A. You will find rules in the Scientific American, p. 113, vol. 29.
 - (9) A. G. says: I have a 5 horse power engine and a horizontal boiler about 41/2 feet long. The boiler does not make steam fast enough. I want to burn coal dust to save fuel. Please tell me what is best to increase the draught, a blower, or shall I turn the exhaust in the firebox above the flues? Also what is best to keep the boiler from rusting? A. Try exhausting into the stack. Paint your boiler to prevent rust-There is a black varnish made from mineral oil that is largely used.
- long and 4 feet beam with an engine which has a 4 inch For Solid Wrought Iron Beams, etc., see advertise-stroke and 2 inch bore. What sized boiler will I previously diluted with two parts of water. Perforate ment. Address Union Iron Mills, Pittsburgh, Pa., for require and how many tubes? What is the greatest rate of speed I can make? A. Boiler 2 feet in diameter, 3 feet high, with from 50 to 60 square feet of heating surface. Probable speed, 5 miles an hour in smooth
- runs on the end of a shaft that is 18 inches long and 11/2 quantity of water, and apply this with a small cloth thick; it runs a belt over a 10 inch pulley. I run the large wheel by hand. Can I gain speed and save labor by putting a small cogwheel on the shaft with a larger one over it with a crank to run it? What will be the size of cogwheels that I will have to have? A. We think the present arrangement is likely to be more ef-Philadelphia, Pa., Machinists and Steam Engine Build fective than the one proposed. If you wish to have
- high pressure engine with about 2 feet stroke. In winter time we have great trouble in separating the sand, | pumice and rub with oil. being so mixed up with the frost. If we could get warm water in our hutches it would be a great benefit to us? Can we condense the steam of the engine in our hutches and will it interfere with the power of the engine, and to what extent? A. By carrying the ex. Price \$2.50 in paper covers. Sent postpaid by Munn & Cleaner; tempered and strong. Chalmers Spence Co., N.Y. haust pipe into the water, and letting the steam escape | Co. Blake's Belt Studs. The most durable fastening for through numerous small perforations, you can heat the

More than twelve thousand crank shafts made by is constant circulation. You can put the pipe as far

- (13) R. R. R. asks: How is the Atlantic cable repaired when broken in mid ocean, and how do they find the place where the break occurs? A. The calculation is based on the principle that a current of divide itself; and the current on each course will be in exact proportion to the resistance of that course as compared with the others. When the cable is laid, the resistance of the entire length is measured, and from this is calculated the average resistance per mile. Now neasure the height of a tree or other standing object water, and the resistance of the cable will be again see the top of the tree reflected in the center of the made at Newfoundland, and at "Heart's Content," and a mean of the two results is taken. Two vessels furnished with grapples sail over the place indicated until the two ends are found, when they are drawn up and wellspliced.
- (14) S. H. K. says: I have found a vege table color for the hair which makes a very natural brown or black. As I have it, it is not a fast color. When applied to the hair it can be washed off, but will not rub off. What can be combined with it to make it a fast color, or what could be applied to the hair, after in a foundry pass their finger through the melted iron the color is on, to set it? A. This can only be determined by experiment. You may try solution of chloride of tin, tannin, sumac decoction, acetate of iron, periment? A. The moisture on the skin is converted and alumina, cream of tartar, etc., applied before or after, or mixed with the dyestuff.
- (15) W. J. C. says: I have a telegraph line $\frac{1}{2}$ mile long, stovepipe wire, with ground plates 30x36 inch es: one in a well and the other buried in moist earth with its upper edge flush with the surface. How many cells gravity, 41/4 x 41/4 inches, will give a fair sound, using two common office sounders? A. Your ground connection is not sufficient, and will require about ten cup (3) J. A. M. asks: What is the method of cells, unless the magnet wire on your sounders is very setting the valves of the Corliss engine, and regulating i fine. Connect your ground wire at each end with the
- (16) L. H. McF. says: I have seen bottles oil and phosphorus prepared in such a way that when the cork is removed, admitting air, the contents making a person grow? A. Good food and good of the bottle become luminous. Please inform me what kind of oil and phosphorus, and how to incorporate them to use? A. Heat the oil (olive oil) to about the temperature of boiling water (212° Fah.) and drop in the phosphorus in small pellets. Ordinary stick phos phorus is used-it dissolves in the hot oil.
 - (17) M. R. asks: What fulminating material is used in small cartridges? A. The fulminate of mercury is generally used. To prepare it, 1 oz. of mercury is dissolved by a gentle heat in 814 measured ozs. of nitric acid (of specific gravity 1.4), and the solution is poured into 10 measured ozs. of alcohol (specific gravity 830); action soon ensues with the evolution of copious white fumes, and the fulminate is deposited in white crystalline grains, which are washed with cold water, and dried at a gentle heat. It explodes at a temperature of 390° Fah. by friction, percussion, and by contact with strong acids. For percussion caps and cartridge a little chlorate of potash, or more commonly niter, is added to the fulminate.
 - (18) I. F. D. asks: What metal will heat and cool the quickest? A. Pure cobalt, nickel and iron have the lowest specific heats.

Will ammonia act corrosively on copper or iron? A.

On copper, yes; on iron, no. Will a fluid continue to increase in pressure if confined in a vessel and kept at a degree or two above the boiling point? A. The pressure will remain constant

- (19) J. R. S. says: In order to remove sulphurous acid from an aqueous solution of gum, I find nothing available but carb. baryta, which is expensive. What is the cheapest method of removing the sulphurous acid from the solution? A. Use marble dust, as free as possible from magnesia carbonate.
- (20) F. C. says: I have a pump in my well with lead pipe 16 feet long. Sometimes the water has a sweet metallic taste. How can I test the water in the well as to whether the lead is poisoning it? Will eistern water drawn through lead pipe be affected by the pipe? A. The water is very probably contaminated. To test this pass sulphuretted hydrogen gas through a sample of the recently drawn water for some time, and observe if a black precipitate is formed; if so, lead is present, and the water should not be used for drinking or cooking purposes. Tomake the sulphuretted hydro-(10) F. C. J. says: I have a boat 16 feet gen, place in a large bottle a few small pieces of protosulphide of iron, and cover them with sulphuric acid the stopper with a bent glass tube to conduct the gas as it is formed. Lead pipe is not suitable for the
- (11) R. C. says: I have a 5 foot wheel that off window glass? A. Mix muriatic acid with an equal cushion to the spots.
- (22) C. F. P. asks how to make and apply a black japan to small iron castings that will dry soon and become very hard and durable at a small cost? A. Apply a ground of asphaltum, 3 ozs.: boiled oil, 4 quarts; burnt umber, 3 ozs, cooling thin with turpentine. Lay on three coats, and between each dry the article in an oven heated from (12) E. I. O. Co. says: We have a 11 inch 250° to 300°. Lay on several coats of varnish, drying in an oven between each, then polish with powdered

How many and what numbers of Scientific Ameri-CAN SUPPLEMENT contain the lessons on mechanical drawing? A. Professor MacCord's lessons on mechanical drawing are now published in collected book form.

its tarnishing? A. Mix equal quantities of Canada balsam with very clear spirits of turpentine until the whole is of the consistence of ordinary varnish. Apply in the usual way.

- (24) W. G. asks for (1) a recipe for gilding brass by dipping in acids? A. The gold bath is composed of distilled water, 17 pints; pyrophosphate of electricity, having two or more courses open to it, will soda, 28 ozs.; hydrocyanic acid of 1/2 prussic acid, 1/3 of an oz.; crystallized perchloride of gold, 3 oz. The pyrophosphate is dissolved in 16 pints of water, heated, filtered, and cooled. The filtered solution of the gold chloride is added, and then the hydrocyanic acid, when the whole is raised nearly to the boiling point for use, (1) J. H. asks: Can you give us a rule to if a break occurs, the current will escape through the Before entering the bath the articles should be passed through a solution of water 2; gallons; nitrate of binoxide of mercury, \frac{1}{3} oz.; sulphuric acid, \frac{2}{3} oz. 2. And for the best lye in which to soak brass articles before dipping? A. Caustic potash dissolved in 10 times its weight of water.
 - (25) M. V. asks for a process of nickel plating without a battery? A. Into the plating vessel place a concentrated solution of zinc chloride. Dilute it with from 1 to 2 volumes of water and heat to boiling. Redissolve any precipitate with a few drops of hydrochloric acid. As much powdered zinc as can be taken on the point of a knife is then thrown in. Add nickel salt (chloride or sulphate) until the liquid is distinctly green. Then put in the articles previously well cleaned with some zinc fragments. Boil for 15 minutes when the nickel coating is finished.
 - (26) J. B. U. asks for a rule for calculating the number of bricks that it will take to construct a wall? A. Allow 71/2 bricks per square foot to every 4 inches of thickness of wall. Thus a 14 inch thick wall will require 261/4 bricks per square foot.
 - (27) P. S. asks for the proper composition of fusible plugs, attached to crown sheets of steam boilers. Working pressure 70 lbs. per square inch. A. Equal parts of antimony, tin, and blamuth, melted and well mixed, make a very good safety plug. The melting point of this proportion is about 300° Fah., and this is about the temperature of steam at 70 lbs. per square inch. If you wish to carry a higher pressure, increase the proportion of tin.
 - (28) J. T. asks for a durable black ink to be made with nutgalls and copperas? A. Bruise 12 lbs. Aleppo nutgalls, boil in 6 gallons of soft water for 1 hour, adding water to replace that evaporated. Strain and boil the galls again in 4 gallons of water for 1/2 hour; strain and boil with 2½ gallons more water. Strain and mix the liquors. Add 4½ lbs. coarsely powdered copperas and 4 lbs. gum arabic in small pieces. Agitate until dissolved and filter through hair sieve. This will give about 12 gallons of fine durable ink.
 - (29) J. R. M., Jr., asks how gold and silver bronze powders are made? A. Gold bronze powder is made by melting together in a crucible over a clear fire equal parts of sulphur and white oxide of tin. Stiruntil they become a yellow flaky powder. Silver bronze powder is made by melting together 2 lbs. each of tin and bismuth, and adding 1 lb. of quicksilver. Pound all together into a powder.
 - (30) C. W. P. asks how to granulate copper in fine grain? A. Ladle the refined copper from the furnace into cold water.
 - (31) M. G. L. asks: How can I harden a wooden pulley? A. Boil for about 8 minutes in olive oiland allow it to dry.
 - (32) E. G. asks (1) for a silver bronze pow der? A. Melt together 1 oz. each of bismuth and tin, then add 1 oz. quicksilver, cool and powder. 2. How can I make blue bronze on copper? A.Clean the metal. polish, and cover the surface with a fluid obtained by dissolving vermilion in a warm solution of soda, to which some caustic potash has been added.
 - (33) F. T. C. asks: What is the so-called ' flash' used for coloring spirits? A. It consists of burnt sugar caramel, to which is added enough capsicum extract or essence of cayenne to give the liquor a flery taste. It is commonly used in flavoring vile
 - (34) M. T. L. asks for a recipe for liquid glue? A. Dissolve (with heat) 2 lbs. of glue in 1 quart of water, add 7 ozs. of nitric acid, and when cold, bottle. This is an excellent preparation to sell.
 - (35) E. P. asks for a varnish to smooth moulding patterns? A. Alcohol, 1 gallon; shellac, 1 lb., lamp or ivory black sufficient to color it.
 - (36) F. G. inquires how to make japanner's gold size? A. Melt 1 lb. of gum ammoniac, add 8 ozs. of boiled oil, and then 12 ozs, spirits of turpentine,
 - (37) .P. T. asks for a good sizing for linen? A. Crystallized carbonate of soda, 1 part; white wax, 4 to 6 parts; stearine, 4 to 6 parts; pure white soap, 4 to 6 parts; Paris white, 20 parts; potato starch, 40 parts; wheat starch, 160 parts. Boil with sufficient water to form 1,600 parts altogether, adding if desired some ul-(21) W. B. S. asks how to clean iron rust tramarine to counteract they ellowtint of the linen.
 - (38) J. A. B. asks: 1. What kind of a preparation do watch repairers use to give that fine polished appearance to the brass movements of a watch? A. For brass, Spanish whiting is mixed with clear rain water in the proportion of 2 lbs. to the gallon. Stir and let stand for a few minutes to allow the gritty portion to settle; decant off the water into another vessel and again allow it to stand. The settlings in the second vessel are mixed with jeweller's rouge and used for polishing. 2. What kind to the steel portions? A. Take a flat burnishing file, warm it and coat it lightly with beeswax. When cold wipe off as much of the wax as can readily be removed, and with the file polish the metal. This is said to be equal to the finest buff
 - (39) C. J. A. asks for a recipe for a lacquer for polished or burnished copper, that will prevent it from tarnishing when handled? A. 1 gallon methylated spirits of wine, 5 ozs. of shellac, 4 ozs. of gum sanda-(23) H. K. O. asks: What is the varnish rac, and 1 oz. of gum elemi. Mix in a tin flask and ex-

Planter, walking, J. M. Brown 196,517

and add ½ gallon of the spirit to the sediment and ings? A. Cast iron toughened by the admixture of treat as before.

wrought iron scrap.

(40) J. S. M. says: I wish to paint on porcelain or earthenware. Shall I use water colors or oil? ral tilt hammers off the same driving shafts at varying Also by what method is the finish obtained that causes first and the enamel is burnt in, in a muffle. Prepared colors for painting on china can be purchased of large paint dealers. The burning in must be done by an es

(41) J. H. M. asks how to make a gold soplaters? A. You had better gild in the hot bath. The composition is crystallized phosphate of soda, 21 ozs.; bisulphite of soda, 31/2 ozs.; pure cyanide of potassium i oz.; pure gold, transformed into chloride, i oz.; distilled water, 2; gallons. This is good for silver, bronze, and copper alloys. For wrought iron and steel the bath consists of distilled water, 2; gallons, phosphate of soda, 171/2 ozs.; bisulphate of soda, 41/2 ozs.; pure cyanide of potassium, a oz.; gold (chloride) a oz. It is not necessary to mind the weight of the chloride so long as the proper amount of gold is dissolved in aqua regia.

(42) S. B. H. asks. 1. Are north, south, east, and west relative or absolute terms? A. Relative 2. State the greatest distance that could be traveled in any direction. A. You might go around the world an same direction according to the compass.

(43) J. E. S. asks how bright crimson writing fluid is made? A. Powdered cochineal, 1 oz.; hot water, 1/2 pint. Digest, and when quite cold add ammonia 1 oz., diluted with 3 or 4 ozs. of water. Macerate for a few days and decant when clear.

(44) G. M. W. asks how to make a good article of yellow soap? A. Tallow and sal soda of each 1½ lbs.; resin, 56 lbs.; stone lime, 28 lbs.; palm oil, 8 ozs.; soft water, 28 gallons. Put soda lime and water into a kettle and boil, stirring well; then let it settle and pour off the lye. In another kettle melt the tallow, rosin, and palm oil, having it hot, the lye being also boiling hot. Mix altogether, stirring well, and the

(45) K. H. R. asks what laundrymen use use besides starch to give a smooth glossy appearance to starched goods? A. One tablespoonful of strong gum arabic solution to each pint of starch.

(46) C. S. R. says: 1. If I bore a piece of 2 through the center, with 34 inch drill, and previously plug the ends of bore, what internal pressure will the tube resist? A. About 30,000 lbs. per square inch. 2. If I fill the tube with water before closing the ends, to what degree of temperature can it safely be heated without exploding? A. A very slight rise of temperature only would be required. 3. How can the odor of petroleum and kerosene be destroyed? A. There are several patented processes, one of which consists in the use of superheated steam.

(47) C. B. L. says: I have two flywheels, each 1,000 lbs., running at the rate of 50 revolutions per minute; one is 10 feet in diameter and the other is 20 feet in diameter. Which would exert the most controlling influence on an engine, and why? A. The larger wheel would be the most effective, because its actual energy depends on the angular velocity and moment of inertia, both of which increase when the radi us is increased, other things being equal.

(48) E. C. H. says: 1. Of two engines less than 2 horse power,running at 300 revolutions,and steam pressure 80 lbs., one engine having stroke the same as diameter of cylinder, and the other having a stroke twice the diameter of cylinder, which uses steam most economically, both engines cutting off at 34 stroke? If there is a difference, please explain. A. The long stroke engine would ordinarily be the more economical of the two, on account of the higher piston speed and the less percentage of clearance in general. 2. What should be the size of engine ports of a 4×4 engine running 300 revolutions, steam pressure 80 lbs., cutting off at 1 stroke? A. Port area 1/2 square inch at least.

(49) J. D. W. asks: What is the heating surfaceof a boiler 28 feet long, 42 inches in diameter, with five 8 inch flues? A. If the tubes are the whole length of the boiler, the heating surface is about 297

(50) I. L. L. asks: What sized boat would is given. be required for an engine 2 inch bore, 6 inch stroke, with an unright hoiler 4 feet high and 2 feet in diameter and what sized screw? A. Boat 18 to 20 feet long, 5 feet beam, Propeller, 18 to 20 inches diameter, 3 feet pitch.

(51) E. A. B. asks: 1. What are ocean steam boilers made of? A. Wrought iron. 2. Are they upright and tubular? A. Horizontal tubular. 3. Are engines horizontal or upright? A. generally, in merchant steamers.

(52) F. H. R. asks: Is the pressure of a ply the wants: steam gauge diminished if it be located 20 feet from the boiler, the boiler being three horse capacity? A. Ordinarily, no, if properly located.

(53) F. H. says: 1. Can you give me a rule to find out how much packing is necessary to cover a pipe 105 feet long, diameter of pipe 3 inches, with a covering 3 inches thick; the material weighing 4 lbs. to the square foot? A. Let d=diameter of pipe, in feet. D=diameter of packing, outside, in feet. L=length of pipe in feet. W=weight of packing per square foot. Total weight required=3.1416× $\frac{d+D}{2}$ ×L×W

What is meant by cold short iron? A. Iron that is brittle when cold.

(54) H. A. P. asks: 1. How can I ascertain the horse power of a punching machine, to which steam cannot be applied for the purpose? A. Some form of transmitting dynamometer must be employed. 2. What is the relative toughness of cast steel and the best of "charcoal" iron castings? A. If you refer to tensile strength, the steel is to cast iron about as 5 to 1. 3. What

wrought iron scrap.

(55) J. C. wants to know how to drive sevespeeds? Each hammer must be independent of the it to withstand washing, etc.? A. The colors used are others, and the speed easily and immediately alterable enamels mixed with turpentine. The china is glazed to suit the heat being worked. Hammer heads are about 41/2 cwt. weight, so any suitable arrangement must be of a substantial character. Also what are the best kinds of bits and anvils, the present ones of chilled metal get soft in a very short time? A. Friction wheels or clutches will enable you to vary the speed at lution for battery gilding, such as is used by carriage pleasure. The same thing can be accomplished by using a pair of continuous cones connected by a belt. Steel facings may be used for your anvils.

> (56) W. T. B. asks: Are there any schools aching mechanical engineering, and if so, where is the best one, considering expenses? A. There are so many schools of this character that we do not feel inclined to make a comparison. We give a partial list: Lehigh University, University of Pennsylvania, Rensselaer Polytechnic Institute, Massachusetts Institute of Technology, Yale College, Harvard University, Worcester Institute, Stevens Institute of Technology, University of Illinois.

(57) N. W. H. ask3: Which of the two engines below noted will develop the greatest power? One is 8 inch cylinder, 12 inch stroke, 100 revolutions with indefinite number of times, always traveling in the 30 lbs. boiler pressure. The other is 4 inch cylinder, 6 inch stroke, 175 revolutions, with 60 lbs. boiler pressure. Both are the common slide valve type, and both cut off at ? stroke. A. Probably the first would develop about twice as much power as the second.

> (58) A. C. asks: What power can be got from a current wheel? The channel is 50 feet wide and 24 inches deep, with a fall of 24 inches in forty rods. I think of making a wheel 10 feet in diameter and 20 feet long, with 16 paddles. A. With a well designed wheel you may realize about 40 per cent of the effect of the water. This effect in foot lbs. per second=[lbs. of water passing the wheel per second X (velocity of water in feet per second)2]+644.

> (59) W. F. S. asks if moonshine has the ame effect on fish to spoil them as sunshine? A. The influence of the moon is restricted to lovers, dogs, and

In our last week's issue the answer to No. 22 of the inquiry column, 3,300 should be 33,000.

MINERALS, ETC.—Specimens have been reinch round bar iron 7 inches long, lengthways ceived from the following correspondents, and examined, with the results stated:

> M. S.-It is zinc blende, and of good quality. Judging from the sample, this ore should yield 40 per cent of zinc. It contains cadmium .- E. A. S .- The substance cannot economically be purified as suggested. If finely ground and weathered for some time, it may answer some of the purposes of whiting. This could best be determined by comparative tests .- A. B. F .-No. 1 is principally carbonate of lead. No. 2 contains much more mineral impurities than No. 1; but both contain enough lead to poison the sugar if, as we understand you, they remain together. This should be known at once.

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. By U. H. On Petroleum. By W. S. R. On a New Galvanic Battery. By E. G. A. On Matter. By W. B.

On Mica Bronze. By R. S. V.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

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

Inquiries 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 pleas ure in answering briefly by mail, if the writer's address

WANTS AND BUSINESS INQUIRIES.

Almost any desired information, and that of a business nature especially, can be expeditiously obtained by advertising in the column of "Business and Personal," which is set apart for that purpose subject to the charge mentioned at its head.

We have received this week the following inquiries, particulars, etc., regarding which can probably be elicited from the writers by the insertion of a small advertisement in the column specified, by parties able to sup-

Who makes Hyatt's patent sidewalk tiling? Who sells grape sugar? Who makes tile machinery?

OFFICIAL.

INDEX OF INVENTIONS

Letters Patent of the United States were Granted in the Week Ending October 30, 1877,

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent de and remit to Munn & Co., 37 Park Row, New York city. Advertising device, A. H. Dean 196,639

 Animal trap, J. C. Ambrose.
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 Plano, hammer, G. C. Smith.
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 Annunciator, automatic time table, L. Dart
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Steering apparatus, steam, F. E. Sickles	106 700
Stove and furnace, A. C. Rand	
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Stove leg fastening, T. H. Roberts	100 504
Sundial, A. W. Anderson	
	196,568
Tablet, rolling pocket, H. T. Cushman	
Thill coupling, D. R. Silver	190,001
Thill coupling, spring for, H. Beard	
Tobacco pouch, C. A. & N. T. Spence	
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Toy bird, C. Robinson	190,704
Toy buzz, D. T. Snelbaker	190,(13
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Vehicle axle, A. K. Stone	
Vehicle axles, splicing bar for, I. Arthur	196,620
Vehicle spring brace, M. Newton	
Ventilating passage, regulator for, H. M. Lane	190,678
Vise, Henson & Osborn Watch case spring, D. C. Voss	190,578
waten case spring, D. C. Voss	190,609
Watches, dial fastening for, L. Van Doren	196,726
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Well boring apparatus, C. B. Hewitt	196,526
Wind wheel, Lowry & Hunt	
Windmill, Gray & Knox	
Window screen, J. S. Wilson	190,046
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10,286 and 10,287.—CASSIMERES.—A. Carmichel, Wes erly R. I.

10,288 .- ORNAMENTAL SCROLL WORK FOR JEWELRY .-

L. Heckmann, Plainville, Mass.

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