Business and Lersonal.

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For Sale-Patent Office Reports Mechanical. R. D. Cooke, 18 New Church street, New York, Send st Best Pulleys and Couplings made; secured to shafts

without keys, set-screws, bolts, or pins. Send for cata-logue. Taper Sleeve Pulley Works, Erie, Pa.

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Wanted-A chemist by a western chemical factory. Must be well posted in volumetric analysis. Address, with references, H. W. H., P. O. Box 875, New York city.

Wanted-To purchase a second-hand Disintegrating Mill. Please address, stating size and price, J. O. & E. Smith, So. Canterbury, Conn.

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Removal.-Fitch & Meserole, Manufacturers of Electrical Apparatus, and Bradley's Patent Naked Wire Helices, have removed to 40 Cortlandt St., N. Y. Experimental work

Power & Foot Presses, Ferracute Co., Bridgeton, N. J. For Best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay Sts., Brooklyn, N.Y.

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and appearance as Whole-Pulleys and Whole-Collars. Yocum & Son, Drinker st., below 147 North Second st., Philadelphia, Pa.

Skinner Portable Engine Improved, 21-2 to 10 H. P. Skinner & Wood, Erie, Pa.

Diamond Tools. J. Dickinson, 64 Nassau St., N.Y. More than twelve thousand crank shafts made by Chester Steel Castings Co. now running; 8 years' constant use prove them stronger and more durable than wrought iron. See advertisement, page 110.

Emery Grinders, Emery Wheels, Best and Cheapest, Hardened surfaces planed or turned to order. Awarded Medal and Diploma by Centennial Commission. Address American Twist Drill Co., Woonsocket, R. I.

Reliable information given on all subjects relating to Mechanics, Hydraulics, Pneumatics, Steam Engines, and Boilers, by A. F. Nagle, M.E., Providence. R. I.



It has been our custom for thirty years past to devote a considerable space to the answering of questions by correspondents; so useful have these labors proved that the SCIENTIFIC AMERICAN office has become the factorum. or headquarters, to which everybody sends, who wants specialinformation upon any particular subject. So large is the number of our correspondents, so wide the range of their inquiries, so desirous are we to meet their wants mation that we oblig employ the constant assistance of a considerable staff of acid by precipitating the latter with chalk. experienced writers, who have the requisite knowledge or access to the latest and best sources of information For example, questions relating to steam engines. boilers, boats, locomotives, railways, etc., are considered and answered by a professional engineer of distinguished ability and extensive practical experience. Inquiries relating to electricity are answered by one of the most able and prominentpractical electricians in this country. Astronomical queries by a practical astronomer Chemical inquiries by one of our most eminent and experienced professors of chemistry; and so on through all the various departments. In this way we are enabled to answer the thousands of questions and furnish the large mass of information which these correspondence columns present. The large number of questions sentthey pour in upon us from all parts of the world-renders it impossible for us to publish all. The editor selects general interest to the readers of the SCIENTIFIC AMERIquestions are of a primitive or personal nature, which do not hold their colors very well at high temperatures. be magnified? A. We presume it could be magnified.

should be answered by mail: in fact, hundreds of correspondents desire a special reply by post, but very few of them are thoughtful enough to inclose so much as a postage stamp. We could in many cases send a brief dollar or more, according to the nature or importance of the case. When we cannot furnish the information, the money is promptly returned to the sender.

M. M. F. is informed that we could not recommend any steam engine or boiler as the most economical.-J. G. McC. is informed he can only ascertain the carrying capacity of his balloon by experiment. No rule for dimensions can be given. We know no manu- was recommended by one of our agricultural contempofacturer of the kind of balloon you refer to. See reply to C. E. L.

(1) C. L. asks: 1. Can salt or sea water be so filtered through a sand beach that a well dug from one to two hundred feet from the seashore will contain cannot be removed from sea water by filtration. Land springs are sometimes struck close to the seashore, through sand or other material? A. The organic colorcompletely or in great part, by filtration through sandy soils, and contact with various rocks and minerals, but the complete purification of the water by these means depends much on the nature of the coloring matter and the degree of colorization. Granular animal charcoal readily deprives most liquids of organic coloring matters when they are allowed to filter slowly through it.

(2) W. H. C. asks if beef will keep fresh Shaw's Noise-Quieting Nozzles for Escape Pipes of and sweet treated with acetate of soda? A. The pro-Locomotives, Steamboats, etc. Quiets all the noise of cess is an excellent one. See answer to W. E. S., on p. 43 present volume of the SCIENTIFIC AMERICAN.

(3) D. W. R. asks: What kind of potash is brass, but the carbonates of potash and soda are sometimes used as a flux.

(4) B. K. D. asks: 1. When sulphuric acid is used with manganese, to obtain its oxygen, what is the appearance or condition of the remainder? A. When separated from the undecomposed manganese dioxide in the flask, manganous sulphate is of a light pink or rose color. 2. Is there any other method of obtaining the oxygen from manganese than by mixing with sulphuric acid? If so, will you please inform me of the least expensive method? A. Oxygen may also be obtained from the oxide by strongly heating it in an iron retort in a good furnace. 3. Can you inform me how much sulphuric acid is required to free the oxygen from tin cell? A. Notso tight as to bend or break the lens. 10 lbs. manganese? A. For the complete decomposition of 10 lbs. of the pure dioxide, about 11.35 lbs. of sulphuric acid (specific gravity=1.8) will be requisite, but it will be better to use an excess of the acid. These amounts will give you, if the action is completed, about 18 cubic feet of gas. 4. What are the other ingredients, or component parts of manganese, and what is the proportion? A. Manganese proper (Mn) is a metal, manganese dioxide, commonly called manganese, being a combination of that element with oxygen-(Mn O₂). The proportions are: Manganese, 548; oxygen 320. With hot sulphuric acid the reaction is:

 $\begin{array}{c} {\rm Mn}\,{\rm O}_2 \ + \ {\rm H}_2\,{\rm S}\,{\rm O}_4 \ = \ {\rm Mn}\,{\rm SO}_4 \ + \ {\rm H}_2{\rm O} \ + \ {\rm O} \\ {\rm Manganic} \ {\rm oxide.} \ {\rm acid.} \ {\rm sulphatc.} \end{array}$

(5) F. A. L. asks: Can you tell me how to remove ink stains from white marble? The ink is black Split-Pulleys and Split-Collars of same price, strength French ink, and has been spilled on a white marble mantle. A. Try a strong aqueous solution of pyrophosphate of soda. If this fails, try a solution of a few dropsof spirits of niter in a spoonful of water; apply with a feather, and wash well afterwards with water.

> (6) I. H. E. says: Will you inform me how to melt and mould rubber? A. Rubber cannot be melted by heat without partial decomposition. The gum rubber (caoutchouc) may be softened by boiling water so as to admit of being worked or moulded as desired. After working, the rubber is caused to combine with a small per cent of sulphur, which vulcanizes it.

> (7) A. K. S. says: Can you give me a recipe for making cement, one that will hold machine belts together? A. See SCIENTIFIC AMERICAN, p. 171, vol. 35. This composition is soluble in naphtha or bencaoutchouc is said to improve it.

> (8) R. L. asks how red mottled soap is made? A. The mottled appearance is produced by the addition of a small quantity of an iron salt-usually copperas,

> (9) J. H. C. asks: How can a strong solutionof laundry starch and water be clarified, and the starchy taste removed, without destroying its gelatinous properties? A. If we understand you, this may be accomplished by boiling the starch for half an hour with a slight excess of water, and straining the paste while hot. If starch is boiled for some time with dilute sulphuric acid, it is converted first into gum (dextrin) and n into g man which may be narated fro

(12) F. W. H. A. says: I cut down some trees in my garden last year, and wishing to get rid of the stumps without digging up the ground, I followed your recommendation, by boring holes 12 inches deep reply by mail if the writer were to inclose a small fee, a in them, pouring in about a pint of sulphuric acid, and then fasten them in the position which you wish them plugging. This was done both in fall and spring, but, to retain. notwithstanding, shoots are coming up from the roots (and stems a little below the surface) of all the trees. Can you suggest a cause and a remedy? The trees are (or were) fig, lilac and elder, and they seem to care as little for the sulphuric acid as "Dan'l" did for "them ere lions," A. The sulphuric acid treatment referred to not tried the experiment, but it would seem reasonable to suppose that if a sufficient quantity of the acid were used in the proper manner, it might effectually destroy the vitality of the roots. To our knowledge the surest method of getting rid of stumps is by mechanical fresh water from the filtration of the sea? A. The salt means, for which purpose there are a number of excel- friend is right, you are wrong. lent devices in the market. It has been stated that the following method has been used with good success. In which leads to the delusion. 2. Can water containing the top of the stump a number of holes, each capable of heaviest. A. You are right. coloring matter in solution be purified by filtration holding a pound or two of saltpeter (potassic nitrate) are bored, filled with the salt, and during the latter part ing mattersia water are usually destroyed or removed, of the fall kept full of water, which will dissolve the salt, and the solution formed gradually passes into the roots. In the early spring the same holes are to be filled for a week or two with kerosene oil, and finally the oilsoaked stump set fire to, when the combustion will proceed, aided by the oxygen of the niter, until the greater part of the roots are consumed, after the manner of a slow match. How far this may be matter of fact we are unable to say, but the experiment is perhaps worth trying.

(13) J. P. T. asks for a recipe for white metal that will melt at a low heat? A. An alloy of bismuth8 parts, lead 5 parts, tin 3 parts, will melt below used in melting brass? A. Potash is not used to melt 212° Fah. Bismuth 2 parts, lead 5 parts, tin 3 parts, is said to melt in boiling water. Lead 3 parts, tin 2 parts, bismuth 5 parts, melts at 197°.

> (14) H. E. asks for a recipe for manufacturing a good article of paste shoe-blacking at a moderate cost? A. Consult "Cooley's Cyclopedia of Practical Recipes," published by Lindsay and Blakiston, Philadelphia. You can judge of cost by consulting dealers in the articles you require.

> (15) F. N. B. asks: 1. How can I black the inside of a tin telescope tube so that it will not rub off or retain dust? A Thin shellac varnish and lamphlack will do. It must be a dull, dead black surface. 2. How tight should a 21% inch achromatic object glass fit in a

(16) W. B. asks for a cheap method of galvanizing iron? A. The iron is first cleaned bright by being kept for a time in sulphuric acid, then dipped in muriate of zinc, and then plunged in a bath of molten zinc

(17) E. K. says: Can you give me the name of parties publishing a directory that gives the address of all the foundrymen in the United States and Canada? A. We know of no such directory.

(18) E. A. and others, who ask about carbolic soap: Take freshly prepared cocoanut oil soap 150 parts, and fuse; then add a solution of alcohol 10 parts, carbolic acid 6 parts, caustic potassa 2 parts, oil of lemon 1 part. Mix with stirring, and pour into moulds.

(19) W. E. asks: Will you please give me the mode of preparing the peroxide of hydrogen? A. tannin 15 parts, lake 10 parts, oils of mint, aniseed, and It is prepared by decomposing the peroxide of barium with as much very cold solution of hydrofluoric or phosphoric acid as will exactly saturate the base. The baryta salt then precipitates, leaving the hydrogen peroxide dissolved in the water. The filtered solution is then concentrated in vacuo by the aid of the absorbing power of strong sulphuric acid in an adjoining connected vessel.

(20) F. S. T. asks: What is the best method for cleansing kid gloves? A. Putthem together with a sufficient quantity of pure benzine in a large stoppered vessel, and shake the whole occasionally with alternate rest. If on removing the gloves there remain any spots, rub them out with a soft cloth moistened with ether or benzole. Dry the gloves by exposure to the air, and then place smoothly between glass plates at zole, and the addition of a little naphtha solution of the temperature of boiling water until the last traces of benzine are expelled. They may then be folded and pressed between paper with a warm iron. Another way is to use a strong solution of pure soap in hot milk beaten up with the yolk of one egg to a pint of the solution. Put the glove on the hand and rub it gently with the paste, to which a little ether may be added, then carefully lay by to dry. White gloves are not discolored by this treatment, and the leather will be made thereby cleanand soft as when new.

> (21) P. J. K. asks: Is there any way of drilling a small hole in glass? I wish to suspend a pane

of glass by means of a thread or fine string. I have broken alarge amount of glass in trying to bore a small ! hole in it, but have not succeeded. A. Use turpentine, and take care when the drill is about to break its way

(23) J. M. says: I have several small pieces of walnut $\frac{1}{4}$ inch in thickness, which have become warped. How can I make them recover and retain their proper shape? A. Steam them so as to soften them,

(24) H. B. P. asks: Can you inform me whether you published during the Centennial any account of the Vienna model bakery and their processes? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 60, p. 953

(25) E. L. M. savs: A friend claims it will raries presumably well informed in the matter. We had take no stronger dam to hold a pond of 100 acres, 10 feet deep, than one of 1 acre, 10 feet deep. I claim that the larger the pond the greater the pressure, but it presses in all directions and the dam has a pressure on it, more or less, according to its length, supposing it to be the same depth in every place in both cases. A.Your

He claims that gold sinks in quicksilver because the silver adheres to it. I say it is because the gold is

(26) H. W. asks: 1. What kind of wheel and stone does the scissor and razor grinder use? A. Any free cutting grindstone will answer. The diameter from 4 to 12 inches is generally used, and from 2 to 4 inches thick. 2. What kind of an cilstone to finish the razors? A. You can obtain suitable oilstones from dealers. 3. The name of a good book for the amateur machinist and jobber? A. Address H. C. Baird & Co., 810 Walnut street, Philadelphia, Pa.

(27) B. A. W. asks how to make shellac varnish? A. Take shellac, any quantity, put it in a glass jar or tin vessel, and add alcohol to just cover the shellac. Set in a warm place, beside a stove or even in the sunshine, and in two or three days it is fit for use. If too thick add alcohol. It is not necessary to strain, as impurities will settle to the bottom of the vessel. Keep covered to keep out dust. If closely corked, evaporation of the alcohol will be very small. It can be used for wood, brass, iron, paper, etc. Experience will determine the proper thickness of the varnish.

(28) I. F. B. asks how to make straw board impervious to water? A. Try soaking in linseed oil and then cover with repeated coats of varnish.

(29) W. E. B. A. Co. say: Can you tell us how to cut off iron rods ln a more economical way than by means of a cold chisel and filing to length? A. If you have an engine lathe in your factory, run a circular saw, at a proper speed, between centers, arrange some method to hold the rods in the tool post, and cut them to gauge the proper length.

(30) H. C. McG. asks: Which way is the torpedo most destructive? Does it blow the vessel out of the water, burst it in pieces, or blow holes in the bottom? A. The torpedo, upon being exploded in contact with the side of the vessel, is intended to burst a hole in the hull and thus sink her.

(31) G. E. S. asks: How are glass water gauges cut off to proper lengths without breaking? A. Onemethod employed by mechanics is to break off the end of a round file, say $\frac{1}{4}$ inch, so as to obtain a sharp edge, then with it scratch a circle on the inside of the gauge, at the proper length, and it will readily snap off where the scratch is made.

(32) V. A. S. asks for a recipe for making tooth paste? A. Take sugar of milk 100 parts, pure orange flowers, sufficient quantity. Rub together the lake and tannin, gradually add the sugar of milk, and then the oils.

(33) H. G. H. asks for a recipe for making boot blacking. A. Ivory black 1 part, molasses 1/2 part, sweet oil ½ part. Mix and stir in hydrochloric acid ½ part, and oil of vitriol 1/4 part. Dilute tie acid with twice its weight of water before mixing. Another re-cipe is to take ivory black 4 lbs., molasses 2 lbs., sweet oil 1 lb., oil of vitriol 8 lbs. Mix and put in boxes.

(34) E. R.—The material of which you ask information is chloride of silver, and when found native is called horn silver. It is procured as a dense white flocculent precipitate on adding hydrochloric acid or the solution of any chloride to a soluble salt of silver.

(35) G. W.-The disease and remedy may depend much on the physiological condition of the individual. Apply to your family physician

(36) F. W. F. says: Send me instructions for the building of a cheap single scull shell to be made of canvas. Length about 18 feet. A. See Nos. 25, 26, 29, 30, 32, 36, 37, 39, and 42 of the SCIENTIFIC AMERI-CAN SUPPLEMENT, which give illustrations, descriptions, and proportions of boats. As your query is very indefinite, we can give no exact rules for your guidance. We presume a perusal of the papers referred to will give suitable instruction.

(37) D. H. asks: How is citric acid manufactured? What machinery is required to operate a small scales manufactured from lemon juice, which is imported in a concentrated state, produced by evaporation by agentle heat. It consists of citric acid 6 to 7 per cent, alcohol 5 some manufacturers it is allowed to partially ferment for the purpose of evaporating the clear liquor from the mucilage, or it may be clarified in the usual method by the use of albumen in the form of the white of an egg. Carbonate of lime in fine powder is then gradually added, and stirred in so long as effervescence continues. Citrate of lime forms, and after being separated by drawing off the watery liquor is well washed with warm water. It is then intimately mixed with strong sul-Is an oscillating engine properly constructed as good phuric acid diluted with 6 parts of water. After some hours the citrate is decomposed, the sulphuric acid having taken up the lime and formed an insoluble sulphate, setting the citric acid free. This, separated by decanting and filtering, is evaporated in leaden pans till liquor begins to be syrupy, or to be covered with a thin Can the edge of a razor, whetted to the keenest edge, pellicle. It is then removed from the fire, and put aside to crystalize, the mother liquor after a few days be-

(10) W. M. asks for a cement that will unite parchment paper, and will stand hot and cold water and not lose any of its adhesive properties? A. Mix ordinary glue with about 3 per cent of potassium or ammoniumdichromate in the dark. This may be used on the paper, and after exposure to light becomes perfectly insoluble in boiling water. This glue has been very largely used in Germany for joining the parchment paper envelopes of pea sausages. The strips of paper joined by this glue are dried quickly and exposed to light till the glue changes to a brownish color; they are then boiled with water containing about 3 per cent of alum till all the excess of alkaline dichromate is extracted, and then washed in water and dried.

(11) J. B. & Co. ask: Is there any way that the aniline colors red and blue can be mixed with var- in the reciprocating. Where flat surfaces work upon from the mass those that he thinks most likely to be of ish for japanning metal, or with oil to be used as paint? each other with circular strokes, trouble is experienced it attains the specific gravity 1.13. The evaporation is A. Many of the clear varnishes and oils may be col-CAN. These, with the replies, are printed; the remain- ored directly with some of the anil ne dyes by mixing the der go into the waste basket. Many of the rejected coloring material with the solvent used. These dyes

through the glass as the hole is finished.

(22) E. C. H. says: You answer that my difficulty in pouring Babbitt metal boxes is in the vent: to 6, and the remainder water, inorganic salts, etc. By this is not the case, as I have left one side of the box entirely open, and then I failed to get the box solid, the metal seeming to chill too quickly. A. Try heating the shaft and boxes, and give good ventilation.

Are the wrinkles or ridges that are rolled in tinware intended to beautify or make more firm the vessel, or are both these objects intended? A. The principal use is to strengthen the vessels; although sometimes ornamentation is only desired.

as one with guides, connecting rod, etc., for all purposes? A. One great defect is that there is more wear in the parts of the oscillating, as usually made, than in keeping them to wear equally, and consequently to afterward continued by a water or steam bath till the keep them packed steamtight.

ing evaporated as above, and again set to crystalize, and soon as long as clear crystals are obtained. To obtain pure citric acid. all the crystals should be redissolved and recrystalized, it may be several times, and the solutiondigested with bone black. A gallon of lemon juice should make about eight ounces of crystals. Limes and lemons constitute the source from which citric acid is generally made, yet it may be extracted from oranges currants, gooseberries, raspberries, tamarinds, etc. The machinery and cost of manufacture will depend upon circumstances which anyone about to go into the business can best judge.

(38) D. B. K.-Your inquiry was answered lastweek. To clean moss from trees, wash them with lye made by leaching wood ashes. To clean marble, wash with quicklime, clean, rub with fine putty powder and olive oil.

(39) Constant Reader is informed that there are many works on steam boilers and their manage ment. He had better select those he considers best adapted to his wants.

(40) W. F. B. asks for a book that describes the locomotive. He had better procure Forney's "Catechism of the Locomotive."

(41) R. S. N. asks how to thin down printers' ink which will answer to print stencils made by a sharp needle, such, for instance, as the stencils made by an electric pen? A. You can thin ordinary printing ink with linseed oil or with kerosene.

(42) G. A. S. asks: How much water is contained in 1 cubic foot of steam at 30 lbs. pressure? A. Weight of a cubic foot of steam, at 30 lbs. pressure by gauge, about 0.1079 lbs.

(43) M. M. McP. asks: Can a dirt road engine be made to run in our Texas land successfully? If you know of any, please give me the address. A. Insert a notice in our " Business and Personal " column, which is especially designed for such inquiries.

(44) I. T. W. says: I am making an engine, the cylinder being 21% inches in diameter, and 5 inches long. I have a smaller one $\frac{1}{16}$ inch diameter and 5 inches long. I have a larger one 4 inches in diameter and 7 inches long. Please let me know what horse power each engine will be, and what sized boilers will be required? A. See pp. 33, 225, vol. 33.

(45) W. B. B. says: Suppose two rifles are so charged that they will send their bullets exactly the same distance, all things being equal, which of the two would send its ball to a given point the quickest, if one man remains stationary and the other man fires from a rail cargoing at the rate of 60 miles an hour, both rifles fired simultaneously and of course at an equal distance from the mark, and fired in the direction the rail car is travelling? A. The one on the car.

(46) I. T. C. says: I am running an 11 x 20 inch stationary engine, with one 40 inch two flue boiler No. 4 is crystalized carbonate of lime-calcite.-G. S. 14 feet long. The boiler is good but not large enough M. It is pyrites. See p. 7, vol. 36.-K. R. F.-It confor the engine. I have a good 14 inch flue. If I connect tains iron, lime, magnesia, and silica-it is called it to my boiler lengthways on top, and use it as a steam drum, would it not add considerably to my boiler power? A. As we understand the proposed mode of connection. we do not think it would increase the steaming capacity of the boiler.

(47) A. M. H. asks: Can I use an engine as large as 60 inches in diameter and 12 feet stroke, and condense the steam with an inside condenser of Neither rock nor flux contains silver—the bright specks Lighthall's or some other good make, and whether I can are mica. No. 8.—The rock may contain silver; the make as much vacuum as I could form with a jet, also if sample does not. No. 9. The metal-like particles in the a jet condenser works well with water that is muddy rock are iron pyrites. No. 10 is gray ore of antimony. like our western rivers? A. Generally, surface condensers do not make quite as good a vacuum as jet condensers. If the water is very muddy, there might be some trouble in keeping the plunger of the air pump tight

(48) L. E. N. asks: Would water, if deep enough, be so compressed that an iron ball would cease to sink? A. No. See p. 208, vol. 33.

said to be viewed at an angle of 1/2 degree? A. On ac- poses.-I. W. D.-It is arragonito-a pure lime carbocount of refraction.

Please give me the names of the metals as regards of carbonic acid and lime. their expansibility with heat, heading with the most expansible? A. The principal metals are arranged, in the order of expansibility, as follows: Platinum, palladium, tempered steel, antimony, iron, bismuth, gold, copper, brass, silver, tin, lead, zinc.

Would a peg driven horizontally in an upright post at the equator, throw the same length shadow at noon as at 6 o'clock A.M. and P.M.? A. Yes.

Whatwould be the relative time of the passing of a railroad train a point, say the edge of a building situated 300 feet from the point of observation, the train being a mile away, and that point being any other distance? A. Please send a sketch, to make your meaning plainer.

(50) D. F. H. says: M. says that the proper way to set carriage axles is to set them forward. I claim that an axle to run easy should be set straight, so there will be no friction against nut or washer. Who is right? You have the right idea as we understand your que

(54) W. H. C. says: Can you tell me what will kill weeds, such as plantain, that grow around a well where it is wet and marshy? A. Perhaps the best plan would be to drain the land around the well, and fill in with stones or cement.

(55) I. W. W. asks: What pressure or resistance does mercury offer at 100°, 200°, or 300°, etc., per square inch? A. The pressure of the mercury vapor at the different temperatures is approximately as follows; 100°,0'0015; 200°, 0'0114; 300°, 0'08 lbs. per square inch.

(56) R. H. McN. says: R. B. G. asks what the pressure against the collar of a horse is, traveling at the rate of 3 miles an hour, to raise 33,000 lbs. a foot high per minute? (I should have said pulling at the end of a lever.) It makes no difference what lever he pulls at, as the rate of travel is given, and the amount of resistance. The rate of speed is 3 miles per hour = 15,840 feet, to raise 33,000 lbs. at the rate of 1 foot per minute = 1,980,000 foot lbs. per hour, which if divided by 15,840 feet (the speed of the horse) gives 125 los. of resistanceor pressure against the collar. A. We accept the correction with thanks.

J. Y. says: "If all the measures, length, surface, and capacity in the world, and all the weights, were lost, by what means could new ones be obtained to correspond exactly with those we now have?" The standard yard of the State of New York is a brass rod, which bears to a pendulum beating seconds in vacuo, in Columbia College, the relation of 1,000,000 to 1,086,141 at a temperature of 32° Fah. One third of a yard square of purewa ter at 60° Fah. weighs 621/2 lbs. We could therefore get our weights and measures perfectly. A. The restoration of the British standard of length, that is, the reproduction of the one that was burnt, was found to be impossible. Scientific men generally agree that, if a standard and all copies of it are lost, it cannot be exact ly reproduced. The weight of a definite volume of pure water has never been exactly determined, that is, the weights used as standards by different nations, when referred to water, do not exactly agree .

(57) S. R. H. asks: What can I use for filling for walnut before using shellac? A. Almost any cheap varnish will do. Scrape clean and thoroughly dry. The object is to fill the pores of the wood.

(58) J. W. G. asks for a solder to solder backs to stereotypes. A. Use common plumber's solder. and applymuriate of zinc as a flux.

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

A. R. McC.-It appears to be calamine-silicate of zinc.-W. A. N.-No. 1 is a limestone. No. 2 is clay No. 3 is bitumen mixed with clay and sand. If slate. distilled in a close retort it will yield rich illuminating gas and various oils. It may be used also as a fuel. No.4 is crystalized carbonate of lime—calcite.—G. S. augite.-Packagemarked Newburyport contains a piece of cinder and a small fragment of mica schist.-W. W. -No. 1 docs not contain copper. No. 2 is jamesonite-sulphide of antimony and lead. No. 3 is crystalized lime carbonate. No. 4 is quartz crystals. No. 5 contains only a trace of lead and no silver. No. 6 contains bismuth sulphide-bismuthine, also copper. No. 7 .----G. N.-There seems to be no patent on rose-leaf beads -the ones sent were nearly inodorous after a week .-F. A. D.-Please send more of the ore.-I. R. B.-The fragment contains fluorspar.-The contents of paper box marked F.G. seem to be a mixture of chalk and magnesia, with flour and other organic matters .-- J. M. F.-It is a variety of bituminous coal, yielding considerable ash. You should have sent a specimen of more recent mining.—D J. M.—It is an impure clay. It migh: (49) H. M. W. asks: 1. Why is the moon be used for brick making, pottery, and similar purnate. If in large quantities it might be used as a source

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects: On a Safe Filling. By C. W. On the Telegraph. By T. G. G. On a Mathematical Problem. By R. A. On Solutions of Indeterminate Problems. By H. M. On the Questions of Bacterial Origin. By S. L. N. F. On the Great Strike, etc. By I.S.C. On a Mechanic's Incog. By W. P. T. Also inquiries and answers from the following: W. A. D.-B. J. H.-G. W.-G. W. P.-J. S. A. B. HINTS TO CORRESPONDENTS. We renew our request that correspondents, in referring to former answers or articles, will be kind enough to

INDEX OF INVENTION	NS	H H H
tters Patent of the United States	were	Ho Ho
July 10. 1877.		HO
AND EACH BEARING THAT DAT	ſE,	In:
[Those marked (r) are reissued patents.]		Iro
complete copy of any patent in the annexe	d list,	La
luding both the specifications and drawings, nished from this office for one dollar. In ord	will be lering,	La La
ase state the number and date of the patent de	esired,	La La
i remit to Munn & Co., 37 Park Row, New York	city.	La La
ricultural boiler, H. Henley Irm, W. W. Climenson	192,993 192,8 6 1	La La
nalgamator, A. B. Paul	193,030 192,980	Le
le box, W. G. Beattie	192,857	Li
ke pan, C. Roberts	192,840	L
le tie, C. H. Victory	192,852	$\mathbf{r}_{\mathbf{r}}$
er, device for tapping, J. Felbel	192,851	L0 L1
er cask, J. Hoffman verage, table, J. J. Rogers	192,916 193,038	Ma Ma
liard cushion, J. S. Mansur hard register, R. M. Hoe	193,011 192,828	Ma Mi
der, temporary, I. Reynolds	193,037 192,926	M
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oks, line indicator for, I. Lopez	192,834	Oi Pa
ot and shoe heel protector, L. Richards ot cleaner, D. F. Bell	192,839 192,967	Pa Pa
ttles, packing, E. Vorster x, E. G. Gollner	192,956 192,983	Pa Pa
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ake, vehicle, W. P. Pickard	192,932	Pi Pl
eech-loading firearm, Wesson & Cutter	193,060	Pl Pl
ck, Greenawalt & Anderson	193, J 42 192, 98 6	Po Po
1sh, Lawrence & Holmes	192,833 192,829	Po
rglar alarm, J. Israel rial caskct, J. Maxwell	193,902 193,014	Pu
tter, dish, C. Van Skelline	192,955 193,016	Pu
axle box, G. Williams	193,064 192,915	Pu
coupling, J. Johnston	192,870	Pu Pi
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eese, manufacture of, Baltz & Prindle	192,963	Sa Sa
urn, H. E. Pendleton	192,838 192,990	Sa Sa
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ton cleaner, Thomas & Robertson	192,951	Sc Sc
tivator, H. P. Kynett	192,992	Sc Se
rry comb, C. A. Hotchkiss	192,059 192,918	Sh Sh
h warmer, J. H. Wright	192,974 192,958	Sh Si4
or check, J. Alexander	192,889 192,895	So
op light, C. Henry	192,994 7,788	Sp
g boiler, O. Smith	192,946	St
vator, R. Schmidt	192,940	st: St
ercising machine, I. W. McGaffey	192,836	St St
terminator, ground squirrel. H. Dryer ace post, N. T. Dye	192,905 192,818	St St
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th wheel, S. P. Stillman earms, sight for, M. B. White	192,949 193,061	St St
eescape, C. Henry eescape, T. K. Ricketts	192,995 192,936	Τε
e extinguisher. W. W. Crooker	192,862	Ti
berman's apron. A .I Tower	193 054	10

		[1100031 10, 10]	<u>/·</u>
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AND EACH BEARING THAT DATE [Those marked (r) are reissued patents.]	S. '	Insstand, W. J. Thorn	92,849 92,948 92 929
A complete copy of any patent in the annexed	list,	Knife scourer, C. V. Hadley	92,865 92,885
ncluding both the specifications and drawings, will	l be	Lamp, W. McCarthy 11 J.amp burner, W. Silvester 1	93,015 92.945
blease state the number and date of the patent desired	red,	Lamp chimneys, attachment for, G. W. Martin 19 Lamp trimmer, E. Stone	93,013 93,053
ind remit to Munn & Co., 37 Park Row, New York cit	y.	Lap link, L. E. Burdin	92,972 92,966
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Dish warmer, J. H. Wright	2,958 2,889	Sign, street, P. A. La France 1 Soap and shaving box, combined, A. Hopfen 1	.98,006 .92,997
Drop light, C. Henry	2,994 7,788	Soldering machine, Brooks & Gornall 1 Spark arrester, W. Rushton	92,813 .91,841
Egg boiler, O. Smith	2,94 6 2,909	Stamp, postage, D. G. Beaumont	52,914 52,893
Elevator, R. Schmidt	2,940 2,907	Station indicator, J. W. Graydon 1 Stirrup, W. B. Conway 1	92,985 92,976
Exercising machine, I. W. McGaffey	2,836 2,905	Stock feeder, A. W. Prather	92,876 92,879
Fence post, N. T. Dye	2,818 2,965 2,005	Stove, C. Lyman	92,925 91,911
Fifth wheel, S. P. Stillman	2,949 3.061 ⁺	Stove, E. A. U. FOX	.92,804 .92,814
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Forge, Canedy & Larson	a,039 2,975 2,910	Tranways, T. H. Day	92,904 92,832
As process, A. W. Wilkinson	3,0 6 2 2,944	Vehicle body, T. Tostevin	92,912 192,953 192,969
as retorts, T. Ubil	2,884 2,971	Vehicle wheel, M. J. Racer 1 Vehicle, G. M. Peters (r)	.92,934 7.789
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Grate, G. B. Mershon	2,018 2,022	Waste, cleansing, etc., C. W. Smith 1 Wind wheel, J. P. Preston	92,990 92,844 92,999
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Hay rake and loader, W. Ingledue	3,000 3,046	10,092PARLOR TABLESP. P. Kuehborth, Buffalo, 10,093CUFFE. A. Litchfield, Somerville, Mass.	N. Y.
Heating purposes, T. F. Rowland	2,988 2,928	10,094.—CLOCK CASES.—H. J. Muller, New York city [A copy of anyone of the above patents may be have	y. ad by
Hog trap, C. R. & J. W. Rutledge	2,939 2,891	remitting one dollar to MUNN & Co., 37 Park Row, York city.]	New

tion.

(51) B. says: In an argument with a friend on the subject of " Revolutions of a Wheel," he claims that the hub goes faster than the rim or outward part of the wheel, on the ground that the hub receives the first of the power of motion. On the other hand, I claim that there is no distinction, that when one part moves or receives motion, the whole does. A. It is a question here. All such questions, when initials only are given of terms. As the outer portion of the wheel makes as many revolutions as the hub, it necessarily goes through a greater distance in a given time.

(52) A. Y. asks: What is meant by a circular inch? Is it 1 inch in diameter? Why divide by the decimal 0'7854 to get the area? How is this decimal got? What is the area of a valve that is 2 inches square? A. Youshould consult some elementary work on geometry.

(53) Southern Subscriber asks: What must tobacco leaf be sprinkled with before being cut, and what process is necessary, after cut, toobtain a good acceptable flavor? A The flavoring ingredients are a matter of taste. Molasses, glycerin, cascarilla bark, and anise seed are some of the materials employed.

name the date of the paper and the page, or the numbe of the question.

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.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published 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 is given.

Hundreds of inquiries analogous to the following are sent: "Who publishes books on bricklayers, etc.? Who publishes books suitable for amateur mechanics? Who makes a small, good, portable steam engine? Where can springlevels be obtained? Who makes and sells egg incubators?" All such personal inquiries 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 that column. Almost any desired information can in this way be expeditionaly obtained.