Business and Lersonal.

The Charge for Insertion under this head is \$1 a Line Wanted-A man thoroughly acquainted

with Light Brass Work, making Dies, use of Machinery &c. A. P. Smith, Rock Falls, Whiteside Co., Ill.

1 H.P. Engine and Boiler complete. E Nicholson, 64 Center St., Cleveland, Ohio. Inventors and Patentees, send me your names and addresses. Don't neglect it. Henry Connett

Jr., Madison, Ind. For Inventors-Valuable information recently published.-Book of Instruction and Documents explaining a new System for the sale of Patent Rights. Plain directions and practical advice, showing how to sell Patents by improved methods. Price \$3. Send stamp for circular and table of contents. S. S. Mann & Co. cor. Linden Ave. and Hoffman St., Baltimore, Md.

Dean's Steam Pumps, for all purposes; Engines, Boilers, Iron and Wood Working Machinery of all descriptions. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Stove Patterns to order-Also, for sale a variety of new Styles. E. J. Cridge, Troy, N. Y.

For Sale—Steam Saw Mill, Foundry, Ma chine and Blacksmith Shop, 75 Acres Land, three Dwellings, situated at Marydell, Md. & Del. R. R., Md. Price \$10,000, Cash. Address W. W. McKnett, Marydell, Md.

Car Coupling Patentee. T. & J. W. Meikle's address wanted by Jas. Robertson, 205 Cambridge St., East Cambridge, Mass.

L. & J.W. Feuchtwanger, 55 Cedar St., N.Y., Manufacturers of Soluble Glass, Water Glass or Silicates of Soda and Potash in all forms and quantities.

Wanted-Good, Cheap, 35 H.P.Tubular Boiler. Send price to J. Grindrod, 67 First St., Albany, N. Y Makers of Cultivator Wheels and Shovels

address Farley Machine Co., Farley, lowa Wanted-One 20 Horse Power Locomotive Boiler, in good order. Price must be low. State all dimensions, age, and where it can be seen. Address Box 2132. L. M'1'g Co., N. Y.

Parties man'f'g Power Pipe Screwing and olt Cutting Machines, send circulars to L. M'f'g Co., Bolt Box 2132, P.O., N. Y.

Pulleys, Shafting, Couplings, Adjustable Hangers, &c. Send for price list to Tully & Wilde, 20 Platt Street, New York.

Treatises on "Soluble Glass," \$1 per copy ; on "Nickel," 50c. per copy ; on "Gems," \$2 per copy ; on "Fermented Liquors," \$3.12 per copy. Mailed free by L. & J. W. Feuchtwanger, 55 Cedar St., New York

Buy Gear's Wonderful Paneling Machine, Boston, Mass.

Millstone Dressing Diamond Machines Simple, effective, economical and durable, giving un versal satisfaction. J. Dickinson, 64 Nassau St., N.Y. uni

Nobody will buy the metal Truss with its pitilessiron Finger. The New Elastic Truss, 683 Broad-way, New York, holds the rupture casy till cured. Pressure all around the body

Temples and Oil Cans. Geo. Draper & Son Hopedale, Mass.

Wanted—A good Second hand Drop of mediumsize. Address P. O. Box 2,253, New Haven, Conn. Abbe's Bolt Machines and Palmer's Power Hammers a specialty. S. C. Forsaith & Co., Manches-

ter.N.H. Daniel's Planer for sale, 2d hand. Planes 14ft.x27in. Price \$210. Forsaith & Co., Manchester, N.H.

For my newly improved Portable Engine, from 2 to 6 H. P., address L. G. Skinner, Erie, Pa. (late Chittenango, N. Y.).

Vertical Tubular Boilers—All sizes. Send forpricelist before purchasing. Lovegrove & Co., 121 South 4th St., Philadelphia, Pa.

"Superior to all others"—for all kinds of work-Linnet & Co.'s French Files. They are better, forged, better cut, better tempered, and cheaper than English files. Send for Price-List. Homer Foot & Co. 20 Platt St., New York.

Price only three dollars—The Tom Thumb Electric Telegraph. A compact working Telegraph ap paratus, for sending messages, making magnets, the electric light, giving alarms, and various other purposes Can be put in operation by any lad. Includes battery key and wires. Neatly packed and sent to all parts of the world on receipt of price. F. C. Beach & Co., 260 Broadway, cor. Warren St., New York.

Rue's "Little Giant" Injectors, Cheapest and Best Boiler Feeder in the market. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Gear's Machinery Depot is the largest known. Boston Mass.

L. & J.W. Feuchtwanger, 55 Cedar St., N.Y. Importers and Manufacturers of Chemicals for Mechan ical arts.

Protect your Buildings-Send for testimo-nials. N. Y. State Roofing Co., 6 Cedar St., N. Y. We have no connection with N. Y. Liquid Slate Roofing Co (or City Oil Co.), who copy our circular.

Drawings, Models, Machines—All kinds made to order. Towle & Unger Mf'g Co., 30 Cortlandt St., N.Y.

By touching different buttons on the desk of the manager, he can communicate with any person in the establishment without leaving his scat. The Miniature Electric Telegraph-Splendid for offices, factories, shops, dwellings, etc. Price only \$5, with battery, etc. complete for working. Made by F. C. Beach & Co., 260

Brown's 507 Mechanical Movements, price one dollar and ten cents, post paid to any addre will save any inventor a hundred times its cost. This work is so valuable that the Royal Museum of Brussels asked and obtained permission to republish it in the French language. Brown & Allen,258 Broadway, N.Y., Publishers.

Partners Wanted-We want to find one or wo good careful Managers who have capital, to buy an interest in 746 Acres Big Nuddy Coal, heavy Timber and Farm land, who shall superintend the Farming, a Saw Mill and Coal Shaft. Safe investment. See "Iron Age" for Jan., 1874. Address Dobschutz & Abend. Belleville. Ill.

For Solid Emery Wheels and Machinery, send to the Union Stone Co. Boston, Mass., for circular For best Presses, Dies and Fruit Can Tools, Bliss & Williams, cor. of Plymouth & Jay, Brooklyn, N.Y.

Hydraulic Presses and Jacks, new and sec-ond hand. E. Lyon, 470 Grand Street. New York.

Steam Fire Engines, R.J. Gould, Newark. N.J. Peck's Patent Drop Press. For circulars, Idress Milo, Peck & Co., New Haven. Conn. Small Tools and Gear Wheels for Models, List free. Goodnow & Wightman, 23 Cornhill, Boston, Ms.

Brass Gear Wheels, formodels, &c., made to rder, by D. Gilbert & Son, 212 Chester St., Phila., Pa.

All Fruit-can Tools, Ferracute, Bridgeton, N.J. Lathes, Planers, Drills, Milling and Index achines. Geo. S. Lincoln & Co., Hartford, Conn. Machines.

For Solid Wrought-iron Beams, etc., see ad-vertisement. Address Union Iron Mills, Pittsburgh, Pa., orlithograph, etc.



R. A. C. is informed that the manufacture of rubber stamps has been already patented.-T. S. is informed that we have not heard of M. Lebarre's experiments on hydrögen.—B.'s mathematical query is not in-telligible to the general reader. What are the relative values of \ll and \flat ?—W. J. will find full directions for the preparation of nitro-glycerin on p. 138, vol. 29.—P. will find full explanation of the bisulphide engine on pp. 199. 247, vol. 27, and p. 144, vol. 29. The reports he asks for have not been received.—S. R. S. will find directions for plating brass and copper with silver on p. 320, vol. 24. Nickelplating is described on p. 177, vol. 25, and p. 91, vol. 29 .- S. S. should address President Morton at the Stevens Institute of Technology, Hoboken, N. J.-G. B. ON. will find a recipe for aquarium cement on p. 267, vol. 25.-H. M. P. is informed that the pressure resulting from the fall of a body has been fully discussed in these columns, and we do not propose to re-open it. -W. F. B. will and directions for tempering files on p. 235, vol. 24, and in the answer to F. W. H., on page 59.

P. S. asks: How can I get rid of vermin which infest the plumage of my canaries? A. Give the birds a bowl of water to bathe themselves in occasionally. Do not use very cold water.

J. A. H. says: I want to obtain a large quantity of pulverized metallic zinc, as fine as it is possible to makeit. Please suggest a suitable means of accomplish-ing it. Its granulation by melting and pouring into water does not afford me a sufficiently fine product. A. Zinc becomes very brittle at high temperatures, and can be reduced to a fine powder by pounding.

H. G. Y. asks: Can I obtain a rapidly mov-ng current of air through a 4 inch tube 100 miles long, the power being a 50 horse power engine at each end of the tube, with an 8 x 4 feet cylinder containing a fan, to produce force at one end and suction at the other? 1 propose to use a fanning mill which admits air at the side, to obtain the suction. If not one hundred miles, please state how far I can do it. A. We do not know of any experiments that give data for the conveyance air to such a distance. You will find the subject treated in Weisbach's "Mechanics and Engineering."

A. G. asks: 1. What is the best liquid for dissolving India ink for drawing? 2. Would chloring bleach a drawing without in juring the ink? The paper is brown through excessive handling. A.1. Water, or water to which a little alcohol has been added. 2. We would advise moistening the drawing and then exposing to the fumes of burning sulphur, and finally passing through pure water. Any treatment of this kind of courserequiresgreat care.

K. W. M. asks: In reference to your an-swer to J. M., on page 316, vol. 29, I would ask: 1. What numbershould the wire for the respective helices be? 2. What number should the iron wire for the core be? 8. What causes the iron bar to revolve? 4. Could not a tube, made of baked wood and varnished, be substituted for the glass tube? 5. Could I make the helices of common copper wire by placing cotton cloth between each layer of wire? A. 1 and 2. You can easily find the number, which is a trade matter, and the cost, from a hard-ware dealer. The outside helix should be made of the finest copper wire you can manipulate, and the interior one of ordinary stout wire. 3. The successive attrac-tions of the interior bar. 4. Yes. 5. Not so as to make an effective apparatus. You ought to get the wire already wound from a philosophical instrument maker.

M. E. H. says: I am building a small pleasure boat 25 feet long. With machinery in, she is to draw but 6 inches water. Is there any form of a propeller that can be used with advantage in 6 inches water, and yet have power enough to drive a boat of that size four or five miles an hour? Her machinery is to be worked by hand. A. Possibly you can manage it with two

L. W. E. asks: What is carbolate of lime? A. Carbolate of lime sacompound formed by the union of carbolic acid and lime. Although not a powerful acid, carbolic acid combines with bases, as carbonic, sulphuric and nitric acids do, forming salts called carbolates.

W.P.asks: How can I color the wool on tanned sheep skins for making mats? A. You can use any of the ordinary dyes for wool. For blue, use Prus-sian blue with a persalt of iron or tin as a mordant. For red, use cochineal, madder, or logwood with a tin mor-dant. For yellow, use turmeric or annatto. Splendid shades may be obtained by using the aniline colors.

G. F. P. D. says: 1. What is the cost of Gramme's electric light machine illustrated in your journal, page 351, vol. 29? 2. You say (in describing Mr. A. Ladiguin's exhausted glass tube, in which he produce the light) that he makes use of but one carbon point. Is the other terminal metallic, and is it near the carbon tip, as is the case when the usual two carbon points are used? A. 1. We do not reply to questions of a business nature 2. There is no other terminal. Our description is perfectly clear on this point.

E. L. asks: 1. How can I estimate the per-centage of acetic acid (approximately) in a given weight of the common gray commercial acetate of lime? 2. Is acetate of lime used indirectly in the manufacture of Paris green? A. 1. You can estimate approximately, if sufficient care be used, as follows : To a filtered solution of the commercial acetate, add carefully a solution of oxalic acid until a precipitate ceases to be produced. Pour off the solution of acetic acid and carefully neutral. ize with a weighed amount of dry carbonate of soda, in powder, adding by degrees until effervescence ceases Every 51 grains of dry carbonate of sola used are equiv-alent to 51 grains of anhydrous acetic acid. It is necessary, of course; to weigh accurately the sample to be tested. 2. It is used indirectly in the manufacture of what is known as Scoweinfurt green.

A. W. C. asks: How can I dissolve iodide or bromide of potassium in absolute sicohol and concentrated sulphuric ether mixed in equal proportions without using more water than just enough to dissolve the lodide or bromide, or (better still) without any water at all? I can succeed in dissolving the salt in the alco-hol; but no matter how carefully I add the ether to the solution, the salt will be precipitated. I wish to dissolve i to 10 grains of salt in each ounce of the ether and alcohol. A. If potash is the essential ingredient desired in solution, you might try other salts of potassium, bearing in mind the properties peculiar to each particular salt.

W. R. S. asks: How can I make gold and silver ink, that can be used in a pen or a hand stamp? 2. Can I use the Tom Thumb battery for learning tele graphy? 3. Can you furnish me with back numbers of your paper? A. 1. A gold ink is made by grinding fine goldpowderwith a littlegum water. Theyellow bisul-phide of tin or bronze powder may be used instead of gold. Silverink is made in the same way, by using pow dered silver. 2. Yes. 3. Yes, generally.

A. L. McC. asks: Is there any instrument orchemical preparation which will enable me to dis-cover buried gold and silver? A. There is no known means of indicating the position of your treasure. Your only chance of success is to keep digging.

A. R. asks: What metal expands most with ast heat? A. Mercury. least heat?

C. C. F. asks: How can I make variously colored fires? A. Red fire: Sulphuri part, sulphuret of antimony 1 part, niter 1 part, dried nitrate of strontia 5 parts. Blue fire : Tersulphuret of antimony (orpiment) 1 part, sulphur 2 parts, dry niter 6 parts. This is the Bengal blue light. Green fire: Boracic acid 10 parts, sulphur 17 parts, chlorate of potash 73 parts. Yellow fire: Sulphur 16 parts, dry carbonate of soda 23 parts, chlorateofpotash 61 parts. Violet fire: Charcoal8 parts, sulphue 10 parts, metallic copper 15 parts, chlorate of pot sch 30 parts. Orange fire: Sulphur 14 parts, chalk 34 parts, chlorate of potash 52 parts. Purple fire: Lampblack, realgar and niter, of each 1 part, sulphur 2 parts, chlo-rate of potash 5 parts, fused nitrate of strontia 16 parts. By parts are meant equivalent proportions, ounces, pounds, etc. The different ingredients are to be sepa-rately reduced to powder, sifted through lawn, and kept in well corked wide mouthed bottles until used. Care must be exercised in handling, especially the chlorate of potash, when in contact with combustible materials. The materials must be carefully mixed on a sheet of paper with a wooden stirrer with a light hand, avoiding excessive friction. They should not be mixed long be-fore using, as they are apt to deteriorate by long keep-ing and even to infisme spontaneously. The nitrate of strontia, alum, saltpeter and carbonate of soda, before being weighed, should be heated until their water of crystallization is driven off and they fall to powder.

J. T. says: 1. Supposing we have two boil-ers, both connected with a steam chest. The steam in both is to be at 40 lbs. pressure. If the steam is admit-ted from one boiler to the steam chest, the pressure, of course, will be 401bs. A friend of mine contends that if the steam benow admitted from the other boiler in ad-dition, it will raise the pressure to 80 lbs. I, however, maintain that the volume will be increased but not the pressure, by the addition of one or any indefinite num-ber of boilers. Who is right? 2. Supposing that the first boiler is amply large enough to drive a certain engine, and the feed pipes, valves, etc., in proper proportion, could the addition of another boilerincrease the power? 3. I happened to state to the same party that a certain piece of machinervin a cotton mill revolved at the rate of 1,200 to 2,000 revolutions per minute. He thought that nothing could be made to stand such a speed. I say that that speed has been more than doubled. Please to state what is the greatest speed that has been attained by an object of say 12 inches diameter. A. 1. You are right. 2. No. 3. Circularsaws of 12 inches diameter are fre-quently run at a speed of 3,000 revolutions per minute.

J. F. A. asks how to make malt vinegar. A. Make a mixture of malt and barley, mash with water, and ferment as in brewing. Put in barrels placed endways, and tie over the bungholes with canvas; keep in the dark in a well-ventilated place, moderately warm. Leave till the acetous fermentation is complete; this will take some weeks or even months. Then run off into two large casks, and put in some green twips or cuttings of grape vines. Fill one of the casks wholly, and let the other be % full. The fermentation will recommence and the acetification proceed more rapidly in the last named cask, consequently it will be the sooner ready for use. As you consume it, replace the quantity drawn off with vinegar from the other cask. If you make it on a large scale, you can use several pairs of casks in this manner

D. C. says: I have two boilers, connected together. I wish to supply the second with steam from the first, in which the pressure is 100 lbs. I want 50 lbs. pressure in the second. The connecting pipe has an area of one squareinch. How large a hole should I cut in the second to keep it at 50 lbs, allowing for pressure of at-mosphere? Would the velocity of steam through pipe be that due to 50 or 100 lbs. pressure? A retwo volumes of steam at 50 lbs. as powerful as one volume at 100 lbs.? A. See article on " Efflux of Steam," page 113, vol. 29. Two volumes of steam at 50 lbs. pressure are more powerful, or are capable of doing more work, than one volume of 100 lbs.

C. I. asks for a recipe for bronzing green. A. Dissolve2 ozs. nitrate of iron and 2028. hyposulphite of soda in 1 pint water. Immerse the articles in the pickle till the required shade is obtained; wash with water, dry, and brush.

C. C. asks: 1. Is there a salve that will cure corns in a short time? 2. What is a good polishing powder for house use? A. 1. Take powdered verdigris 1 dram, savinoint ment, 7 drams. Mix and apply on soft rag. 2. For polishing plate, take jeweller's rouge ½ lb. prepared chalk ½ lb.: mix and use with water.

A. J. C. says: I suffer very much from cold feet, the soles seem to be the most affected. My woolen stockings get damp, but I hardly think it can be sweat feet: the soles A. A vigorous walk of a few miles every day would prob ably remove your difficulty.

J. A. L. asks: Is there any residual magnetism in Gramme's electric light machine. producingresistance and necessarily heat, as in Wildeand Ladd's machine? The armature is retarded and heated by the above machines, which is a serious defect. A. We think not.

J. C. D. wants us to illustrate Siemens' steammotor, believed to bevery applicable to theminor industries, such as sewing machines, the lathe, etc. A. Wepublishedan engraving of it a few weeks ago

H. U. says: I have been a subscriber to our valuable paper for a considerable time, and I find all sorts of questions answered through your columns. Ihave agreen parrot, one of the yellow head-ed kind, with red wing butts. What is the best way to teach it to talk? Is there any other way than merely talking to it? A. You might use the speaking machine to teach your parrot. Set the machine so that it will repeat "how do you do," and keep it slowly run-ning all day with the parrot in the same room. Next day set the machine on "good morning." and so on, chang-ingthe words daily. Yourparrot, if a good talker, would soon become well educated. An enterprising person might do a good business, we think, by opening an institution for the instruction of parrots. A class of a hundred birds might be simultaneously taught by means of a single machine.

T. C. asks: 1. How many species of moles are there known to naturalists? 2. Have all of them eyes? 3. Have snails eyes? 4. Have fishes, that live in watery caves, eyes? A. 1. The best known are talpa, found in Europe and AAIa; scalops and condylura, in North America; chrysochloris, in Africa; and urotrichus, in Japan and North America. 2. Yes. 3. Yes, situated at the extremities of the longer tentacles. 4. Fishes and all other animals lose their eyes if they are perpetually in the dark.

W. H. S. asks: How can I remove stains from marble? A. Make a paste of equal parts of car-bonate of potash and whiting with boiling water, apply, and leave on for three days. Then wash off with soap and water. To re-polish, use tripoil in water, and then putty powderin water.

J. H. T. asks: 1. How is gunpowder made? 2. What is oil of rhodium? A. 1. Take powdered salt-peter 75 parts, powdered willow charcoal 15 parts, sulphur 10 parts, mix well, add enough distilled water to make a paste, and grind till thoroughly incorporated. Leave in a cake to dry; granulate and dry by a steam pipe at a heat not over 130° Fah. 2. This is derived from the wood of a species of *rhodoriza*, and is much used for adulterating otheressential oils. Its preparation on a small scale is not likely to be successful.

W.T.V. asks: What kind of sizing can be applied to the surface of cloth to smooth the surface, stiffen the cloth, and at the same time render it waterproof? A. Try the elastic varnish described on p. 282 vol. 29.

J. M. B. asks: Is there such a thing as an adding or an adding and multiplying machine? A. The British government has now in operation a " difference engine," for facilitating calculations of avera-ges, etc. We do not know of any other which is at work.

W. R. asks: What proportions of bismuth, block tin, and lead are required to make bismuth solder, forplumbers' joints on block tin pipe? How hot can f use the solder without melting the pipe? A. You can make a solder of two parts, by weight, of lead and one part of tin, which melts at about 100° below the point of fusion of tin.

Broadway, corner Warren St., New York. The Scientific American establishment, New York, is fitted with these instruments.

-Three 8x12 hori-Engines for Sale Cheapzontal stationary; one 12x18; one 5x8. Also, one second hand f and 8 ft. Planers: 2-8 ft. 20 in. swing Engine Lathes; 1-6ft. 15in. hand. Enquire at D. Frisble & Co., New Haven, Cona.

For the best Small Portable Engine in market, address Peter Walrath, Chittenango, N. Y.

Brown's Coalyard Quarry & Contractors' Apparatus for hoisting action verying material by iron cable W.D. Andrews & Bro. 414 Water st.N.Y.

Mining, Wrecking, Pumping, Drainage, or irrigating Machinery, for sale or rent. See advertisement, Andrew's Patent, Inside page. Irrigating

Parties needing estimates for Machinery f any kind, call on, or address, W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Iron Steam Boxes for Stave Bolts & Veneer Cutting Machines. T. R. Bailey & Vail, Lockport, N.Y.

Boult's Unrivaled Paneling, Variety Mold-ng and Dovetailing Machine. Manufactured by Battle Creck Machinery Company, Battle Creek, Mich.

screws, partly submerged.

J. F. says: I have seen a clock, which ap pears to consist of a glass plate, 24 x 30 inches, three six teenths thick, set on two wooden bases. There is a gas burner over this glass plate and two fine wires leading from the gas pipe to the wooden bases. There is nothing on the glass but the two hands, one on each side of the glass. How is its action maintained? A. We have seen a clock answering to this general description, which received its motion from a weight in the end of one of the hands, this weight being moved by delicate mechan ism, so that its leverage was continually changing.

C. N. J. asks: 1. What is the usual width and depth of the water in canals? 2. Is steam ever used to propel canal boats, and in what manner? 3. What objections are there to the general use of the ordinary propeller wheel, of a size to suit a canal boat? 4. What is the average speed of a loaded canal boat drawn by two borses? 5. What horse power would it require to drive such a boat, loaded, at the same speed, with steam ap plied to a proper sized propeller wheel? A. 1. The dimensions of different canals vary from 6 to 9 feet in depth, and from 5C to 70 feet wide. 2. Yes, both by tugs and by engines in the boais. S. None that we know of except the excessive slip usual with canal boats of For Bolt Forging Machines, Bolt Holding ordinary form. 4. One and a half miles an hour, we t Vises to upset by hand. J. R. Abbe, Manchester, N.H. Heve. 5. Probably from three to four times as much. ordinary form. 4. One and a half miles an hour, we be-

S. B. asks: If a man takes out a patent for a washing machine, can another make it himself and use it in his own house for his own use only? Has he the right to do it without being liable to an action for infringement of the patent? A. No person has a right to make or use a patented article for his private purposes without consent of the patentee.

E. C. O. asks: 1. Does such a thing exist as a perfect vacuum? 2. A friend claims that a window 5 x 6 gives more light than two windows 8 x 3. I claim that they are equal. Which is right? A. 1. See article entitled "A Perfect Vacuum," on page 400, vol. 28. 2. Other things being equal, your friend is right.

S S asks. How can I make the best violet If the second se logwood is strong, the ink is purple.

H. W. M. asks: How can I drill holes in plate glass? Answer: Keep the cutting edges of your d-ill wet with turpentine.

J. F. A. asks: How is heel ball made? A. Belt together bees wax 1 b., suct 4 ozs., and stir in Yory black 4 ozs., lamp black 3 ozs., powdered gum arabic 2 ozs, powdered rock candy 2 ozs. Mix and, when partly cold, pour into tin or leaden molds.

H. B. asks: How can I make sailors' clothing waterproof? Answer: There are various processes for waterproofing cloth: 1. Moisten the cloth on the wrong side, first with a weak solution of isinglass, and whendry with an infusion of nut galls. 2. Moisten with a solution of soap, and another of alum. 3. A simple method of rendering cloth waterproof without being airproof is to spread it on a smooth surface and to rub the wrongside with a lump of beeswax (pure and free from grease) until it presents a slight, but even, white or grayish appearance. A hot iron is then passed over it; and the cloth being brushed while warm, the process is complete.

H. G. T. asks: Is there anything better and cleaner than black lead and tallow as a lubricant for friction wheels or brakes? A. We think not.

J. M. C. asks: What work gives the best information on the working and setting of slide values so as to obtain the best results? A. Auchincloss on "Link and Valve Motions." We have never seen the other work you mention.

F. A. M. replies to J. H. M., who has difficulty in firing his boller with sow dust: have been firing under boilers, very similar to yours, but not so large, in a steam saw mill. I burned all the sawdust that was made. The chimney is sheet iron of 18 or 20 inches diameter, 60 feet high; the furnace was not intended for burning sawdust; but as the draft is very strong, it burns freely. In places where a strong draft cannot be had with a chimney of that hight, 10 or 15 feet should be added, with about 36 more grate surface than for wood and if the grate bars are gast in half cylinders of 6 inches diameter, full of 3/ or 3/ inch holes, and the sawdust thrown in moderately, with now and then a piece of slab, I think you will find no difficulty in burning the sawdust. The furnace does not need to be any different in construction (otherwise than having more grate sur face) from ordinarily built furnaces, unless the sawdust is so wet and the draft so poor that it would be neces sary to use the wet tan furnace. 2. You say in an-swer to a correspondent that the S shape of a pipe between a steamgovernor and boiler is to hold water is it absolutely necessary that it be bent at all? I see that the gage will work when there is nothing but steam in the pipe; but have not had time to experiment on it. A. 1. These remarks about burning sawdust will proba bly be very useful to many of our readers. 2. The object of having water in the pipe is to prevent the heat ing of the spring of the gage, which is apt to become injured if the steam is brought into direct contact with it

M. H. says: I wish to place a fountain in front of my house, to throw a jet 3 or 4 feet high. How can it be worked? A. Probably your simplest plan will be to have a tank in an elevated position, such as the upper part of your house, to supply it.

P. & B. say: In a worm wheel and worm the worm to be 8% inches on pitch line, and the whee to be 30 inches diameter, with 4 inches face and 1 inch pitch. The tops of the teeth and bottom space are to be circled for worm to fit. Small sized wheels are made in this way, but we think it impossible to make so large a one as this. What do you think? A. It depends entirely upon your shop facilities.

L. C. D. asks: "What do you mean by the mean pressure in pounds per square inch, in calculating the power of steam engines? A. The steam pressure in a cylinder ordinarily varies at different parts of the stroke, and the mean pressure per square inch during the stroke is the mean of all these various pressures.

T. C. H. asks: 1. How can I explode four blasting charges, placed 3 feet apart, at a depth of 12 feet simultaneously, using either powder or dualin? 2. Will you give me a recipe for making and using dualin for blasting rock? 3. How many tuns of gold and sliver quartz will four stampers crush per day of 10 hours? 4 Is copper found in any kind of granite rock? A. 1. If you use powder, you must arrange the trains or fuses so that; they will all explode at the same time. If dualin is used, it can be exploded by electricity. 2. Dualin is made from paper stock, saturated with nitrate of potassium, and oried in a furnace, then ground and mixed with nitro-glycerin. 3. They are made of different sizes. By writing to a manufacturer, you can obtain full informa tion as to capacity. 4. We think not.

F. W. H. asks: How should files be properly tempered? A. In tempering files, it is necessary to make some provision so that the delicate teeth shall not beinjured by the heat. The following method is frequently employed: The files are covered with some sticky substance, and drawn through common salt They are then heated, until the salt just begins to melt, when they are plunged into cold water. This is an operation requiring care and experience, as the file is apt to become bent. It is finally cooled in oil, to prevent rusting.

F. B. asks: Do you know of a standard work on windmills? Could I construct a small one to drive a circular saw about 14 inches diameter? A. You will find information on this subject in Fairbairn's "Mills and Mill Work." Professor Rankines "Steam Engine and other Prime Movers," and Weisbach's "Mechanics and Engineering."

A. C. asks: What would be the value of a two caratdiamond? A. It is difficult to give a general price for diamonds, as they vary much in quality. A good diamond weighing one carat, will cost, perhaps two hundred dollars; cne weighing two carats, fromsiz to eighthundred dollars; threecarats about one thou sand dollars. We recently saw a very beautiful dia-mond, weighing nine and a haif carats, which was valued at ten thousand dollars.

J. A. H. asks: How much engine power shall Irequire for a boat 28 feet long, 7 feet wide, to draw about 2 feet of water? I want to run it at 12 mile per hour. A. Probably from 25 to 30 horse power.

J. T. C. asks: What are the advantages or disadvantages connected with the use of superheated steam? A. Nearly any standard work on the steam enginctreats of the subject. We could not discuss the matter intelligibly in this limited space.

J. R. asks: What would be a perpetual motion? Some say it is a machine that runs for ever without repairs, and others that it is a machine that creates its own power by itself, and starts itself. A. A perpetual motion machine, in the common acceptation of the term, is a contrivance that contains its motive power within itself. For instance, if a lathe, that was formerly driven by an engine, should suddenly start up

C.O. says: A friend has a mining operation in his control, which is now run by a twelve horse team engine, which hoists a bucket of ore, weighing 600 lbs., 200 feet to the surface: it also works a lift pump rod 200 feet. He is going to sink the shaft 100 feet, making the total depth 300 feet. In discussing the feasihility of the 12 horse engine to perform the extra work, it was claimed by one of us that the extra work to be performed by the engine is merely the weight of the extra 100 feet of wire rope attached to the ore bucket and the extra weight of raising the 100 feet of water in the pipes, and that the engine would not feel any greater strain on its ability to do the work than it has at present. The other party claims that if it takes 12 horse power to raise 600 lbs. ore 200 feet, and to pump 200 feet water up through 200 feet of pipe, it will necessarily take 50 per cent more, or18 horse power, to raise 600 lbs. of ore 300 feet, and to pump the water \$00 feet. It was agreed to submit it to your decision, and to abide by it, the loser to pay one year's subscription to your journal. A. The very important question of time seems to have been lost sight of in this question. If 50 per cent more work is to be done in the same time, it will take 50 per cent more power, but f the work is to be increased 50 per cent, and the time is increased in the same proportion, the original power will suffice.

J. T asks: 1. What is the best packing for a piston rod? The engine runs 120 revolutions per min-ute. 2. What makesa safety valve hang or stick, and prevents it blowing off? It is set to blow off at 100 lba, but does not do it. If I push it up a little, it blows off right. A. 1. Probably an ordinary packing obtained from a reliable manufacturer will work satisfactorily 2. Fromyour statement, it would appear that the weight is not properly adjusted, since by raising the valve a lit tle, you increase the area upon which the steam acts.

S. F. H. savs: It is said that the same amount of water will drive a water wheel more power fullyinnight time than in day time. Is it so? If so why? A. Wehavenever seen this statement verified.

J. S. P. asks: How can I season staves in a short time? A. There are quite a number of methods for seasoning timber rapidly, acting either on the prin-ciple of removing the sap, or forcing in some chemical that will coagulate the albumen. Creosote is used in England to a considerable extent.

J. E. B. asks: 1. Is it practicable to use the slide rest of a small lathe as a plane for lightsmall work, brass and steel, by means of a tool set perpendicularly to the bed of the lathe? All motions of the lathe are given directly by hand. 2. Would such occasional use be apt to overstrain or rapidly wear out the feed screw, or the nut of the slide rest through which it passes? A. Such work is occasionally done on lathes, but it is apt to injure the slide rest.

R. M. R. says: I have an engine of 2 x 4 inches, set up to run a 10 inch swing lathe, and a grindstone. 1. Do you think the engine is large enough for the work? How many revolutions should it make per minute, and how heavy a pressure of steam will it re-quire to do the work? 2. I have a boiler 10 x 20 inches with cast iron heads % inch thick, the shell being three sixteenths inch thick. I do not think it is large enough to run the engine, and the maker says that it would be unsafe to put tubes into the cast iron heads. Can you advise me what to do under the circumstances? A. 1. The engine might do the work, ifrun with a pressure of 50 or 60 lbs., at a speed of from 200 to 300 revolutions per minute. 2. Probably you cannot make the present boil er answer your purpose.

W. B. L.—To provide yourself with a min-eral rod, cut a suitable forked sapling, and make it of weight and length to suit your hand. They are all alike, andare of no value.

C. M. asks: 1. What is the difference be-tween chloride of lime and chloride of calcium? 2. What is the difference between washing sods and the sods used for making soda powders? 3. What is Spanish pepper? 4. How is gun cotton exploded? 5. What are the proportions of alcohol, ether and pyroxylin used in making collodion? 6. How is binoxide of manganese procured? 7. How can I make phosphide of calcium? A. 1. Chloride of lime is a misnomer. It consists of a mixture of hypochlorite of lime, chloride of calcium and water. Chloride of calcium is a combination of chlorine and calcium only, without the hypochlorite of lime, which gives to chloride of lime or bleaching powder its peculiar properties. 2. Washing soda is a monocarbon acte of soda, containing but one equivalent of carbonic acid, while the other, called the bicarbonate, contains twice as much carbonic acid. 3. You probably mean Malegaeta pepper, a name sometimes given to "grains of Paradise" or Guinea grains. 4. Gun cotton will explode at a heat of 300°. 5. Pyroxylin and rectified alco-hol of each 1 part, rectified ether 19 parts. 6. It is an abundant mineral production. and is ground for use 7. By passing the vapor of phosphorus over small fragments of lime, heated to redness in a porcelain tube

Use care T. D. McC. says: On page 385 of volume 29, you give a recipe for a fertilizer. How much should be applied per acre for potatees; and how is it to be used, in the hill or broadcast? A. Either way, and the amount depends on the condition of your soil. Try a small quantity and increase as needed.

A. P. asks: 1. In the case of a book, what is protected by a copyright, the title or the whole mass of literarymatter? 2. Must a book be completed as to printing, binding, etc., before being entered for copy right? 3. What are the conditions on which copyrig protection is accorded to foreigners resident in the United States? A. 1. Copyright protects the printed matter as a whole. 2. No; only the title must be specified. 3. Authors of books, resident in the United States can obtain copyright protection on the same conditions as citizens.

J. R. S. asks: What is the best way to smooth out engravings that have become wrinkled by being rolled and sent through the mail? A. Roll then the other way and then submit them to pressure.

W. W. says: I see you recommend your querists to use plaster of Paris for attaching the glasses of kerosene lamps to metal bases. For some years past I have used melted alum for this purpose. I put a piece of alum on to a fire shovel, lay the shovel on the fire till the alum is melted, and then apply with a thin piece of wood. It hardens in a few minutes and is far better than plaster of Paris, as kerosene will not loosen it.

G. writes to say that he has built several steam boats, and now owns one, which he considers to be nearer perfection than any he has yet seen. A description of it may answer the needs of some of our correspondents. She is built with double hull, or rather two half hulls, placed 8 feet apart and decked entirely over the space between the hulls, as well as over the hulls, on which are seats and a railing around the entire boat except the stern. The paddle wheel is between the hulls, towards the stern. The boat is very light and strong. Thehullsare well fastened together, two inch beams running across both hulls, which are 35 feet long and of 3 feetbeam. She is driven by a belt from a caloric engine, costing twenty cents per day to run it, and a boy 12 years old can fire up and run her. She carries, comfortably, 30 passengers; her speed isfrom5 to 6 miles perhour. From this you will see that she possesses two desirable qualities in a pleasure yacht, economy and perfect safety.

M. D. asks: 1. If a cylinder 6 inches in diameter and 2 feet long (with an inch pipe attached to the bottom of the cylinder, passing thence down 20 feet below into water) be filled with steam and suddenly condensed, how full will the cylinder be of water? 2. How many cubic inches of water at 60° are required to condenses cubic foot of steam at 1 lb. pressure? 3. If a man covers an invention with a caveat and then manu-factures and sells. and finds that he has a good thing, and a second party also sees that it is a good thing and manufactures and sells it, and then the first party gets it pat ented: Can the first party come down on the second party as soon as the patent is issued ? 4. Can the first party claim that the second party infringed upon his rights, priorto the date of the patent? 5. Are small cast steel castings as strong and durable as wrought iron for trimming wood work? A. 1. We think it would be completely filled. 2. Atleast seven. 3. We think so. 4. No. 5. In general, no.

W.says: I am running two old boilers, л and the steam from them enters into a boiler steam dome by means of 2 pipes. 1. I generally run them at 50 lbs. pressure by the gage on steam pipe to boiler, and my employer tells me there is only 25 lbs. on each boiler. because pipes from boiler to steam dome are double the area of steam pipe. Is he right? If a gage were placed on each boiler, would it not indicate 50 lbs.? 2 Howwouldyou fix 2 boilers so that the gage would in dicate double the pressure on each boiler? 3. When my enginemakes 100 revolutions per minute, with 2 fee stroke and 50 lbs. pressure, with no cut-off, how much water does she use, the cylinder being 10 inches diame ter? A. 1. He is wrong. 2. You could make the gage in dicate double the pressure by having a weak spring or by graduating it wrongly. 8. If the cylinder is 10 inches in diameter, and 2 feet stroke, its capacity in cubic feet disregarding clearance, is about 1.09 cubic feet. A cubic foot of steam, at the given pressure, weighs about 0.15697 bs. Hence, in each stroke, the engine uses about 1.09 $\times 2 \times 0.15697 = 0.185$ lbs. of water. This calculation doe not take into account the steam required to fill the clear ance spaces, and the losses from leakage, radiation and condensation.

M. says: In an inclined tunnel a full truck of wash dirt ascends while an empty truck descends Sometimes the chain, which is attached to the whim and draws up the full truck, breaks, and consequently the truck dashes back and strikes against a stick of timber or some other obstacle underground. How can the load-ed truck be prevented from running down the incline when the chainbreaks? A. By having a stop arrange which will come into play when the chain breaks.

C. A. W. asks: How can I melt vulcanized rubber without injuring its qualities? A. This will have to be a matter of experiment. The vulcanizedrub-ber can be exposed to heat in a suitable vessel without access of air. A safety tube should be attached to allow of the escape of any gas or vapor generated during the operation.

M.J. S. asks: 1. What is the proportion of mercury necessary to make a perfectinc for a Bunsen battery? 2, What are the ingredients of hair dye? Is it injurious to the head? 3. There is a powder, sold un-der the name of kerosene oil rectifier, which is said to prevent the lamp from exploding or the chimney from breaking. Is it good for anything? A. 1. To amalgam ate a zinc plate for a battery, wet with dilute sulphuric acid and then rub mercury over the surface till a bright coating is produced. 2. The numerous preparations sold as hair dye have generally a basis of lead or silver Bismuth, pyrogallic acid and certain astringent vegeta-ble juices are also sometimes used. When properly applied, we have never heard that they are particularly in-jurious to the hair. 3. Do not trust any powder sold for the purpose of rendering impure kerosene inexplo sive. Buy only the best oil from the best makers. Good kerosene is not explosive and will not readily take fire. The only way to prevent lamp chimneys from breaking from heat is to see that they are properly annealed. This can be done by placing the chimney in cold water, which is to be gradually brought to the boiling point and then W. McK lowly allowed to cool, when the chimney is remo

X asks: How can I make a spectroscope? I have a double convex lens, a fint glass prism, and an ashromatic telescope with a glass 1% inches in diameter Will the lens and telescope answer? If so, how shall I arrange them with regard to the slit, etc.? A. You can make a spectroscope with one telescope, but it will not be a veryefficientinstrument. We advise you to look up the subject in some standard work, such as Ganot's Physics."

D. N. B. asks: Is there a small water wheel built to use as little as 8 gallons water per minute? A. You can easily make one of tin.

O. C. H. asks: How can I gild letters on marble? A. Apply first a coating of size, and then sev-eral successive coats of size thickened with finely powdered whiting, until a good face is produced. Be sure to let each coat become dry, and rub it smooth with fine glass paper before applying the next. Then go over it thinly and evenly withgold size and apply the gold leaf, burnishing with an agate. Several coats of leaf will be necessary to give a good effect.

W. W. asks: When were the first iron ves-sels built? A. The first iron vessels were three steamers, built for the trade between Liverpool and Glasgow. by Mr. William Fairbairn, in 1830-31.

J. A. V. says, in reply to several correspond-ents who have asked about echoes in buildings: It has been mentioned in the SCIENTIFIC AMERICAN that echoes in rooms were prevented in England by stretching wires across the room. 6 inches apart. Our judiciary tried it in the county court room, but failed, as the distance between wires was at least 4 feet. It is very probable gest, the vibration of the wire will stop the reverber ation from the ceiling; but it will not prevent the horizontal reflection against side walls and the surfaces posite and to the rear of the pulpit. The remedy in this case is to raise the seats gradually as in the parquets of theaters, and have the rear seat at least as high as the mouth of the speaker. A simple remedy, for a plain meeting room, is to canvas the walls and ceilings on half inch strips of wood, and paper them in imitation of becovered with shades or blinds.

H. G. C. says that C. M. A. will find that one great cause of the unsteady flame in his German study lamp will be that burned particles of wick adhere to the edge of the metallic rim which surrounds the flame and the one which is inside the wick. These particles ilame up and go out with great rapidity and often make the light uscless. The rims must be cleaned frequently. Another reason is that sometimes the waste oil fills up the cup at the bottom, cutting of the supply of air. Goodchimney, cleanlamp, and evenly trimmed wick will give good light if the lamp is all right.

J. H. P. says that J. F. W., who asked how to straighten vulcanite squares, should warmthem care fully and place them between two perfectly smooth sur-faces, applying considerable pressure, and leave them till cold. If the surfaces be true, the squares will be true also.

C. H. H. says that J. K. W., who has diffi-culty in using sawdust as fuel, should build his furnaces after the following plan: Space for cold air to enter each furnace, 20 x 28 inches. Space between boilers and bridge wall, 10 inches. Size of smoke stack for each boller, 22 inches x 36 feet. Do not fill up the chamber behind the bridge wall.

J. B. says, in reply to C. R., who asked as to a race between the Niagara and the Agamemnon: Such a race took place the morning after the first Atlantic cable parted. The accident occurred about 3 A. M., a little after sunrise. "We all started back to England; at 12 M. we could just see the Agamemnon's topsail yards above the horizon astern."

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

C. C. A.-1. The mineral enclosed is iron pyrites or sulphide of iron; of no value unless found in large quantities. Pyrites is so called from a Greek word meaning fire, because it will strike fire with steel.

C. R.-This mineral is a mixture of two ores of copper. The green colored portion is the carbonate of copper, and the dark bronze parts the sulphurct of copper. We cannot give its relative value without particulars as to location and accessibility.

O. D. asks: What is the double royal cubit of the Temple of Karnak ?-T. G. asks: Canyou inform me how the chocolate colored stain is produced on Swiss wood ornaments ?-E. L. A. asks: How can I reduce bone to a plastic state, and what will bleach it so that it will look like ivory ?- A. R. asks : Is there anything that will make cotton goods take dye as readily as silk and wool do ?-J. A. F. asks: How can I whiten plano keys?

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 Sore Throat Remedy. By S. C. E.

On Mysterious Rappings. By A. F. C. On Ignition by Compressed Air. By C. C. A. On Red Ants. By A. S.

On Ventilating the Senate House. By

without any assistance and continue to move, that would be a veritable case of perpetual motion.

J. B. B. asks: 1. What are the objections . with or without oxyge to using hydrogen, with or without oxygen, as a substi-tute for coal gas for illuminatingpurposes? 2. Does the gas produced by the decomposition of water by means of magneto-electricity contain an approximate equivaient of the power expended in producing it, in light, or potential power, if used in a gas engine? A. 1. We do of any objection to its use in connection with oxygen. Used by itself, it lacks illuminating power. 2. Yes

W. L. B. asks: What will be the force be square inch upon a water pipe when the notice of the wateris instantly stopped, the pipe being horizontal, 50 feet long and 2 feet in diameter, and filled with water under a pressure of 50 pounds per square inch, moving at the rate of 2 feet per second? What will be the force of the shock, if the water is instantly stopped. In pounds per square inch? A. Disregarding friction, the shock at the bottom of the pipe will be the same as that given by a trip hammer moving with the same velocity, and hav ing a weight equal to the weight of water in the tube plus the weight due to the additional pressure of the water.

A. R. M. says that O. S., who enquired how heat a house satisfactorily, should follow out care fully the plans and modification recommended by Rutarin his work on ventilation. Proper heating is insep arably connected with proper ventilation. The "one large register over the furnace, which is in the cellar.' open into the hall; from the latter, transom should be constructed so as to introduce the supply of sheated air into the tops of adjacent rooms, while at the same timeexhaustion should be provided below. either by means of open fire places (low down) into chimneys. or into a foul air duct running under the floors and lead ing to a common chimney. By this method an ample supply of pure, fresh and warm alr may be obtained and a uniform temperature maintained. This plan has of late beenverygenerally adopted in the Westin new nubd private buildings, and with most satisfactory results, both in an economical and sanative point of view.

W. J. asks: What are the methods of join-ing the rails at their ends on the best American and En-glish railways? A. By rail joints and fish plates. Many kinds have been illustrated in our columns.

C. C. A. asks: 1. Are nickel five cent pieces specie? 2. Does the governmentissue the old fashioned five cent silver coin? 3. Of what power is the engine at the Chicago water works? A. 1. All solid coin that has passed through the mint is specie. 2. Not at present. 3. Probably over a thousand horse power.

L. F. J. asks: Are eye stones alive or not? My opponent claims that they are, because some will move while others will not, and I claim that they can not be alive, for the reason that the treatment they un dergo, being taken from the open air and corked in air tight vessels, is in opposition to every law of animate creation. The particular ones under discussion have been kept corked up in glass bottles for over thirty years. A. Eye stones are simply bits of smooth peb bles, and when placed in the eye, are made to move about by the involuntary motions of the eyeball. Any specks in the eye stick to the stone when they come in There is no more life in the eyestone ontact with it than in any other piece of rock.

C. W. H. asks: Suppose a section of ex-naust pipe be made of alternate joints of charcoal iron and common iron will the charcoal last longer than the common iron? If so, why? A. Probably the charcoal iron, being more homogeneous, will last the longer.

On Animal Electricity and Magnetism. By J. H.

On Friction Gears. By B. N. O.

Also enquiries from the following : A. C.-T. G. V.-T. B. W.-T. W.-W. M. D.-J. C. C.-T.-N. L.-H. H. T.-J. M.-O. R.-G. W. K.-W. H.-J. H. C.-J. M. F.-C. S. N.-C. H.-G. W. M.

Correspondents in different parts of the country a Who makes metal mail boxes, to put on gate posts, etc.? Where can pin-making machines be obtained? Who makes the cheapest and most durable local telegraph battery? Where can I obtain a small printing press for amateur use? Who makes machinery for blocking tin and galvanized iron, for cornices and other ornamental work? Makers of the shove articles will probably pro mote their interests by advertising, in reply, in the SCIEN TIFIC AMERICAN.

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.