

Business and Personal.

The Charge for Insertion under this head is \$1 a line.

Foreman wanted, in a Manufacturing Foundry 14 miles East of St. Louis. The right man can have reasonable wages and a chance to buy an interest in the business, if desired. Address Pump and Skein Company, Belleville, Illinois.

I want the sole or part agency of Can. of a few specialties that are protected by patent or cheap manufacture. Address, for two months, A. F. Cass, L'Original, Ont.

Wanted—Several first class machinists. Good wages to the right men. Address, stating terms, &c., Oneida Community, N. Y.

Inventors or parties having, for sale, Machines for digging Potatoes, send illustration and description to D. G. Penfield, Flushing, L. I., N. Y.

Inventors who desire to have their inventions and patents introduced and represented in Europe by a gentleman of experience and integrity, should address K., Box 2979, New York Post Office.

To Capitalists and Manufacturers of Edge Tools—Address John G. Cobb, Shoe Heel, N. C., as he has obtained a Patent for a Valuable Tool which he wishes to sell or have manufactured on Royalty.

Turner Wanted—Good chance for a man with small capital. Address Box 318, Keene, N. H.

Yeast—Rights on Sale for Making the White Rizing Yeast. This yeast is made from Rice and Wheat, is a substitute for Eggs in making Cake, etc. Makes a whiter, lighter, and sweeter Bread, etc., is five times quicker than Yeast Cake. Address E. Wall, 36th street, near 4th avenue, South Brooklyn, N. Y.

Wanted—Buyers and Manufacturers to buy Rights all over the United States of my Patent Combined Scissors and Tape Line. For Drawings and Specifications, with full particulars, address Margaret J. Stubblings, Box 430, Youngstown, Ohio.

\$3,500 will buy 1/2 Patents Wilcox Self-Sealing Fruit Can, patented March 19, 1872. Special and State Rights for Sale. Address A. A. Wilcox, 400 Chestnut Street, Philadelphia, Pa.

For Sale—Cook and Rymes double drum Molding Engine and Boiler, complete, in good order—each cylinder 6 H.P. Apply to John A. Lighthall, Room 7, 5 Bowling Green, New York.

For Sale—A pair of 40 inch Blacksmith's Bellows—Berrian, maker—in good order. Price \$25. Erie Basin Engine and Pump Works, foot Van Brunt Street, Brooklyn, N. Y.

State Rights for Sale, or work on royalty, valuable Patent on Boiler Feeders. Must be seen to appreciate. Address E. Brockway, Haverstraw, N. Y.

For Sale—New Patent for Refrigerator and Beer Cooler, etc., combined. Enquire of or address G. Nuss, 55 1st Avenue, New York City.

The New Remedy retains the Rupture in ease and comfort, night and day, till cured. Sold cheap. Fitted without charge, by the Elastic Truss Co., 638 Broadway.

Key Seat Cutting Machine. T. R. Bailey & Vail.

Buy Boulton's Patent Moulder for all kinds of Edge and Surface Moulding on Wood. B. C. M. Co., Battle Creek, Mich.

For Sale—Two New Locomotives, Cylinders 16x24—gauge 4 ft 3 1/2 ins. Can be delivered in 30 days. Also, three Second hand Dummies, weight 7 tons—Cylinders 7x10—good order. Address Geo. W. Grice, 135 South Fifth Street, Philadelphia, Pa.

Portable Hoisting and Pumping Engines—Ames Portable Engines—Saw Mills, Edgers, Burr Mills, Climax Turbine, Vertical and Horizontal Engines and Boilers; all with valuable improvements. Hampson, Whitehill & Co., Newburgh Steam Engine Works, Depot 38 Cortlandt Street, New York.

The Cornell University, Ithaca, N. Y., offers liberal and practical courses for agriculturists, architects, civil engineers, master mechanics, mechanical engineers, agricultural and manufacturing chemists, printers, veterinary surgeons, etc., with laboratories, draughting rooms, farms and work shops. In agriculture and mechanic arts, various courses are provided to meet wants of all students; also general courses in arts, literature and science preparatory to the other professions. Over five hundred free scholarships. Next year begins Sept. 8. For Registers, with full information, address as above.

Buy Boring and Sawing Machines of Gear, Boston, Mass.

Treatise on "Soluble Glass," new edition just out, \$1, mailed by L. & J. W. Feuchtwanger, 55 Cedar Street, New York.

Hydrofluoric Acid, for Etching and Cleaning Glass, put up in all size Lead and Rubber Bottles, for sale by L. & J. W. Feuchtwanger, Chemists, 55 Cedar Street, New York.

Manganese Black Oxide, for Steel M'ct's and Oil Boilers, for sale by L. & J. W. Feuchtwanger, 55 Cedar Street, New York.

Write to L. & J. W. Feuchtwanger, New York, for all Crude Minerals, Metals, Ores, Drugs and Chemicals, at lowest rates.

Lathes, Planers, Drills, Milling and Index Machines. Geo. S. Lincoln & Co., Hartford, Conn.

Scale in Steam Boilers—How to Remove and Prevent It. Address Geo. W. Lord, Philadelphia, Pa.

Williamson's Road Steamer and Steam Plow, with rubber tires. Address D. D. Williamson, 32 Broadway, New York, or Box 1809.

Buy Gear's Improved Variety Moulding Machine. Ware Rooms, Boston, Mass.

Root's Wrought Iron Sectional Safety Boiler, 1,000 in use. Address Root Steam Engine Co., 2d Avenue and 28th Street, New York.

Catalogue on Transmission of Power by Wire Rope. T. R. Bailey & Vail.

No Bolts, no Keys, no Set Screws used in Coupling or Pulley Fastening. Shortt's Patent Couplings, Pulleys, Hangers and Shafting a Specialty. Orders promptly filled. Circulars free. Address Shortt Manufacturing Company, Carthage, N. Y.

Cabinet Makers' Machinery. T. R. Bailey & Vail.

Belting—Best Philadelphia Oak Tanned. C. W. Army, 301 and 303 Cherry Street, Philadelphia, Pa.

For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

All Fruit-can Tools, Ferracute, Bridgeton, N. J.

To Manufacturers—Built expressly to rent, New Brick Building, 60x300 ft., 3 stories high, divided by fire proof walls, with ample water power. Room and power in quantities to suit. Address Industrial M'fg Company, Rock Falls, Whiteside Co., Ill.

Gauge Lathe for Cabinet and all kinds of handles. Shaping Machine for Woodworking. T. R. Bailey & Vail, Lockport, N. Y.

Covering for Boilers and Pipes. The most economical and durable article in use. Took first prize at American Institute Fair. Van Tuij Manufacturing Company, 528 Water Street, New York.

Five different sizes of Gatling Guns are now manufactured at Colt's Armory, Hartford, Conn. The larger sizes have a range of over two miles. These arms are indispensable in modern warfare.

The Olmsted Oil is the best; it is self-lighting, strong and cheap. All Hardware and Tin Houses have it.

Machinists—Price List of small Tools free; Gear Wheels for Models, Price List free; Chucks and Drills, Price List free. Goodnow & Wightman, 28 Cornhill, Boston, Mass.

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

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

Bookkeepers should try the Olmsted Patent Bill File and Letter Clip. They are admirable for all papers. Save their cost in one day's business. Sold by all Stationers. J. H. White, Newark, N. J., Sole Manufacturer.

Peck's Patent Drop Press. For circulars, address Milo, Peck & Co., New Haven, Conn.

For best Presses, Dies and Fruit Can Tools Bliss & Williams, cor. of Plymouth & Jay, Brooklyn, N. Y.

Parties desiring Steam Machinery for quarrying stone, address Steam Stone Cutter Co., Rutland, Vt.

Boring Machine for Pulleys—no limit to capacity. T. R. Bailey & Vail, Lockport, N. Y.

Brown's Coal Yard Quarry and Contractors' Apparatus for hoisting and conveying material by iron cable, W. D. Andrews & Bro., 414 Water St., N. Y.

Stave & Shingle Machinery. T. R. Bailey & Vail.

The Best Smutter and Separator Combined in America. Address M. Deal & Co., Bucyrus, Ohio.

Damper Regulators and Gage Cocks—For the best, address Murrill & Keltzer, Baltimore, Md.

Cheap Wood-Working Machinery. Address M. B. Cochran & Co., Pittsburgh, Pa.

Steam Fire Engines, R. J. Gould, Newark, N. J.

Sure cure for Slipping Belts—Sutton's patent Pulley Cover is warranted to do double the work before the belt will slip. See Sci. Am. June 21st, 1873, Page 389. Circulars free. J. W. Sutton, 95 Liberty St., N. Y.

Moles & Queries

J. M. C. asks: How can I make a permanent and brilliant green for the edges of blank books?

C. R. C. asks: Are buttons made from rice in imitation of pearl?

H. R. asks for a recipe for a composition marble, and for tinting and veining the same.

W. H. asks: How can I make some sort of alarm to wake me at night which will not make sufficient noise to wake the rest of the family?

D. & M. ask (1) how to prepare zinc so that it will hold paint without breaking or scaling, and receive a fine finish. 2. How are ornaments fastened on metallic cases without screws or tacks?



B. S. asks: 1. Where is the crank pin of a locomotive when the cross head is exactly midway in its travel? 2. I have heard of instances of the lower flues in a locomotive boiler being burned while the upper ones were unharmed. What is the cause of that? 3. When an engine is pulling a train, where is the actual center of the drivers? I have been told that it was at the point where they came in contact with the rail. Answers: 1. It depends on the length of the connecting rod. When the cross head is at the center of the stroke, the connecting rod, if detached from the crank pin, would swing to the center of the driving wheel, so that you can lay down any particular case to scale and determine what you want to know. 2. Probably on account of scale or mud. 3. So far as we know, the actual center of a driving wheel is always the same.

C. H. M. asks: Having an ordinary steam gage, showing pressure of 70 lbs. per square inch, would a steam gage representing 2 square inches show double the amount of pressure? Answer: It would, if graduated in the same manner, and having the same sized spring as the first. But in practice, as steam gages are made, both would register alike.

W. W. A. says: We have trouble with the gate to our reservoir. There is 25 feet head. Will a gate, substantially like the circular dampers sometimes seen in stoves, answer a good purpose? If not, what will be better? Answer: If the moving parts are inside, it would be difficult to open the gate; and if they are on the outside, a great deal of water will leak through, when the gate is closed. There are several good gates in the market, and you can obtain particulars by communicating with a plumber or hydraulic engineer.

H. C. M. asks whether a photographer is liable to suffer in health in consequence of handling the necessary chemicals; and if so, are there any means of avoiding this by filtering the air inhaled while using the poisonous chemicals? Answer: There is nothing about the practice of photography that is necessarily injurious to health. The handling of the chemicals, if ordinary care is taken, is not deleterious. The apartment should of course be ventilated.

S. M., Jr., says: I claim that, if two balls of the same diameter, one made of wood or any other light substance, and the other of a heavy substance such as iron or lead, are dropped from the same height at the same time, they will reach the ground together, while my friend claims that the iron or lead ball, being the densest, will reach the ground first. Which is right? Answer: You had better try the experiment. We think the lead ball will reach the ground a little the sooner; though in a vacuum, they would both fall together.

J. H. K. asks: What is the cause of water gathering on the outside of a pitcher filled with ice water? Is it the water passing through the pitcher, or is it the moisture of the atmosphere condensed upon it? Answer: When the water in the pitcher is colder than the surrounding air, the moisture in the air is condensed in the form of dew upon the outside of the pitcher. If the water is as warm or warmer than the air, no condensation takes place.

T. H. and J. P. D. ask what phosphorescence is, its cause, etc. Answer: There exists some difference of opinion among scientific men, but the best authorities consider it a slow oxidation of phosphorus, since experiments prove phosphorescence impossible in a vacuum. Phosphorus, in the state of slow combustion which takes place on exposing it to the air at ordinary temperatures, gives off acid vapors, which shine in the dark with a faint bluish light, hence the term phosphorescent has been extended to all bodies which exhibit a similar luminosity, from whatever cause it may arise. Familiar examples are phosphorescence of dead and decaying wood (fox fire) and of putrid fish. Some plants also emit in the dark a faint continuous light, probably arising from the combustion of some substance, such as a hydrocarbon, emitted from them. A more familiar kind of phosphorescence is that exhibited by many living animals, as by the glow worm and fire fly, and the numberless small marine animals which give rise to the phosphorescence of the sea at night. In nearly all phosphorescent plants and animals, the phosphorescence appears to be due to chemical action, in fact to a slow combustion; for it increases in brightness in pure oxygen, and ceases altogether in a vacuum. The female glow worm (*lampyris noctiluca*), whose abdomen is divided into 6 segments, shines on the under part of the last three abdominal rings. Within these is found the luminous matter, a yellowish white transparent substance, consisting of ramifying fibers and granules of an organic structure, heavier than water, yellow and opaque when dry, and consisting principally of a material which exhibits the chemical properties of soluble albumen. Dr. T. L. Phipson has given the name of noctiluca to this substance, and we published his description on page 257 of our volume XXVIII.

T. C. W. asks: What will soften hard water, in order to make it fit for washing clothes without injury to the fabric? Answer: You can soften the water by adding carbonate of soda—washing soda—as long as a whitish precipitate is formed. Let it settle and draw off the clear water above. Sometimes simple boiling will render the water after settling fit for washing.

F. R. asks: What is zopissa? Answer: Zopissa is the patent name of a patented compound in which we believe that pyroxilin or gun cotton is a prominent ingredient. In the opinion of the inventor, it is a marvelous substance.

A. asks for a touchstone for testing gold. Answer: The material commonly employed as a touchstone, and generally known by that name, is a species of quartz, colored dark by bituminous matter, of which large quantities are found in Saxony, Bohemia, and various other localities. Black flint slate will serve the same purpose. A set of needles or bars, of various degrees of fineness, are rubbed on the stone, and a acid is applied to the streaks made by the needle and by the piece of jewelry to be tested. If the jewelry is not so good as the test needle, the streak made by it will dissolve first. Nitric acid of a specific gravity of 1.2 is commonly employed for testing gold.

H. M. asks: 1. Will a type setting machine that will only set two sizes of type be useful, and how many type should it set per hour? 2. On a locomotive, why do they have two eccentrics to each valve, when, by fastening the slotted piece on a pivot in the middle and the eccentric rod at one end, and by moving the valve rod up or down, the slot would produce the same effect with greater simplicity? 3. Are all the advertisements in the Scientific American of reliable parties, and are we sure of getting the worth of our money by sending to them? 4. Please give me a good recipe for making ice cream. Answers: 1. A good workman sets about 80 type ems per hour. A machine should beat that. If it sets two kinds of type, all the better. It depends upon the kind of work you wish to do. 2. If only one eccentric is employed for the forward and backing motion, it must be free to revolve partially upon the shaft. It is not enough to move the valve to the backing position; the eccentric must be shifted also; and it is generally considered more convenient to have two eccentrics. 3. We endeavor to exclude all advertisements from unreliable parties, but some little latitude is given to advertisers, every manufacturer thinking his own goods the best. In buying articles with which you are not practically acquainted, it is best to obtain advice from some reliable agent. 4. The best ice cream is said to be made of pure cream, sugar, and flavoring extract. We consider ourselves good judges of the quality of the manufactured article, but do not know much of the details of making it.

A. B. L. says: In the engraving of the Scott & Morton revolving steam engine (in your issue of April 15) I see a bearing on both sides of the cylinder in which the cylinder revolves. I would like to know how the bearing between the cylinder and fly wheel is supported, seeing that all means of supporting it is cut off by flywheel, crank pin, and piston? Answer: This bearing is attached to the hub of the flywheel, and is supported by the wheel bearings.

E. B. says: In view of the coming aerial voyage of Messrs. Wise and Donaldson, I submit to you the following propositions: 1. That a rocket shoots up when fired. 2. That a cannon, when fired, is thrust backward. 3. That at a recent trial with a new fire ladder (as stated in your paper) the same was driven backward by the stream of water, suddenly issuing from the hose on the top of the ladder. The moving effect in these cases is caused by pressure against the atmosphere; and if such heavy bodies are moved by it, how much more would this be the case with aerial crafts, which are floating in the air, and are thus without any weight? It would be difficult to apply steam or gas, but I believe that a rotary blower, built of as light material as possible, would produce a stream of compressed air, strong enough at least to serve as a rudder. A spherical form of the balloon would, however, not be practicable, as any propelling power ought to be concentrated, and should govern the craft equally. I therefore would suggest a form wherein the balloon consists of two separate gas bags, the boat being between them. This scheme of course can be worked out in many different ways, but I believe that a rotary blower driven by hand with the help of a flywheel would answer the purpose admirably. Answer: The power that could be produced in this way would be entirely inadequate. We have heard a much better plan proposed. It is to produce frequent discharges of some light and powerful explosive, such as nitro-glycerin, and thus guide the balloon in any desired direction.

T. B. Jr. says: 1. I have a small steam engine cylinder 3 inches in diameter and 6 inches between ports. What boiler and what sized feed pipe will it require? 2. What power would it have, and (3) would it be enough to run a small lathe? 4. I also wish to know what a pattern for such a cylinder would cost. Answers: 1. About 25 square feet of heating surface, steam pipe about 1/2 inch area. 2. About one horse power. 3. Yes. 4. Write to a model or pattern maker.

W. S. M. asks: 1. What is the best plan of annealing cast steel, to make it very soft without injury? 2. Suppose a well formed boat runs at 10 miles per hour with 10 horse power, how many horse power would be required to drive it at 15 miles or 5 miles per hour? Please explain the increase of power required for the increase of speed. 3. I would like to have directions as to the proper size, power, and speed of well shaped boats. Answers: 1. Heat to a cherry red, and allow the steel to cool very slowly, either covering it with hot ashes, or keeping it in the fire in which it was heated, allowing the fire to die out gradually. 2. The general law is that the horse power varies as the cube of the speed. On this assumption, the horse power required will be: For 15 miles an hour, 33 1/3; for 5 miles an hour, 1 1/3. 3. We will probably soon give some general proportions for small boats, and would be pleased to hear from such of our readers as have been building small steamers.

C. P. T. asks: What can I put into tonic beer to make a heavy foam when poured into the glass from the bottle? I put it up with carbonic acid gas, like soda water. I have tried gum arabic, isinglass, eggs, hops, etc., but they do not give the foam that I wish for. Answer: Try adding enough sugar or sirup to give it consistency. We would not advise adulterating with any chemical.

S. G. Jr. says: I have seen some specimens of paper which had been made extremely hard. It was said to have been done by soaking the paper in a solution of chloride of zinc. I have tried it, with weak and strong solutions, and on different kinds of paper, but have failed to get any hardening results. I also saw some pieces of gaspipe, with screws and sockets, which was made out of paper. Answer: The property that chloride of zinc has of hardening paper was first discovered accidentally by Dr. E. Böhm in 1849. This gentleman was filtering a concentrated solution of chloride of zinc through filtering paper, when he noticed that the paper became thick and strong. He suggested that it might be rendered very useful, but little attention was paid to it until 1853, when T. Taylor took out an English patent for its use in making parchment paper. The solution used was as thick as sirup, and made perfectly neutral by adding the oxide or carbonate of zinc. The specific gravity is then 2.10. The action on the paper is stronger when heat, from 60° to 212° Fahr., is employed. When several sheets are prepared and pressed together they unite to form one. The ammonia sulphate of copper is now highly recommended.

C. F. E. says: Our water contains iron, calcium, sodium, potash, alumina, silica, and magnesia, as basic elements, with chlorine, sulphuric and carbonic acids as non-basic. One gallon of the water, as it flows from the well, contains 480 grains of solid matter, after evaporation by heat. This residue, after reaching a certain point of condensation, gives up a portion of the carbonic acid which is held in the water in combination with bases as bicarbonates. Can it be used with safety in a fire engine? Is it a good way to blow off a certain portion with a surface blow-off, say, every five minutes while running, and after stopping blow off all the water and fill up with fresh water from river? Answer: We are afraid to recommend the use of this water. Still, with some good scale preventive, such as the tannate of soda, it might be safely employed. But in the boiler of a steam fire engine, the spaces are so small that it is always best to use pure water, when practicable.

C. R. C. asks how chalk crayons are made; what amount of pressure is necessary, and if any substance other than pure chalk is used? Answer: There are numerous recipes for the manufacture of chalk crayons. One of the simplest is as follows: Pipe clay and the finest prepared chalk, equal parts, or pipe clay alone. Coloring matter according to tint desired. Mix into a paste with mild pale ale. Various substances are sometimes used to give the chalk a clay consistency, as Castile soap, shellac, gum arabic, etc. To give the crayons solidity, manufacturers use a cylinder two or three inches in diameter, open at the top and bottom, the lower end being secured over a perforated plate, having holes of the size of crayon desired. A tight fitting solid piston, moved equally by a screw, forces the soft mass through the holes in long fingers, which are afterwards cut into pieces and dried. The coloring matters used are indigo, Prussian blue, yellow ochre, carmine, vermilion, etc.

S. G. asks: Was the meteoric display, which occurred last August, at midday, and seen by most of the citizens of Lexington, Ky., noticed at any other place? Have astronomers or scientists given an explanation of the phenomenon? Was it connected with Biela's comet, which must have been near the earth at that time? Answer: Meteors are comparatively rare between August 11 and September 4. A shower "on the 29th and 30th of August at midday, lasting from noon until four o'clock," is very unusual. We have not heard of such a display elsewhere. If seen again this year please let us know.

S. B. D. asks: 1. Is it possible to make any use of iron after it has been burnt, such as old grate bars? 2. Is there any way of reducing old rusty scraps of sheet iron into cast iron? 3. Could a blast furnace be worked on a small scale with a hand bellows, profitably, if coal and ore were plentiful and cheap? Answers: 1. It can be re-melted. 2. Yes, in an ordinary blast furnace. 3. Not unless labor were very cheap, also.

E. C. B. says: An amount of oxymuriate of tin has become much diluted with water. How can it be precipitated and returned to its metallic state? Answer: The protochloride of tin, commonly known by dyers as tin salt, is soluble in water, but by contact with the air a white precipitate of oxychloride of tin is formed, which remains suspended in the solution, giving it a milky appearance. If this is the oxychloride that you refer to, you will find that it is soluble in an excess of hot muriatic acid. From this solution tin may be precipitated in the metallic state by a strip of zinc, the tin forming gray laminae or a spongy mass. Some manufacturers of tin salt mix sal ammoniac with it to prevent the precipitation of the oxychloride.

Ig. asks: 1. Is there any reward offered by this or any government for the discovery or invention of perpetual motion, and if so, how much? 2. Would the inventor of such a device derive any great benefit therefrom? Answers: 1. No reward is offered. 2. We think not. But you may try it practically. Put your seat within a tub and pull steadily at the handles. This is the simplest form of perpetual motion. In other forms, cog wheels and levers are arranged to pull against themselves. This is the "idea" in all perpetual motion machines, and no advantage can result.

H. asks: If a tug boat can tow a ship at a certain rate, can the same engine, being placed in the ship, be made to propel her at the same rate? Or does the engine, by being in the tug, have more power to move the ship than if it were in the ship itself? Answer: See our editorial columns in this issue.