

ciently satisfactory to induce proprietors to substitute them wholly for the old furnaces in even a single mill. The Danks patent is upon details; but the inventor is certainly entitled to much credit for skillfully proportioning them, and even more for his perseverance and tact in overcoming those difficulties that usually impede, for many years, the progress of the most meritorious inventions.

The ordinary process of puddling consists in melting cast iron upon the hearth of a reverberatory furnace and stirring it until the carbon has been burned out, and other impurities have passed into a slag; and malleable or wrought iron then remains. Many attempts have been made to substitute machine for manual labor in the process, but none have been hitherto successful, and, all over the civilized world, puddling is done by the same old process; and the severity of the labor, together with the intensity of the heat to which the workman is exposed, makes the life of the puddler a short one and the process comparatively expensive.

The Danks puddling furnace has an ordinary furnace grate, but, instead of the large chamber of the reverberatory furnace, a barrel shaped vessel receives the charge of pig metal, and through this the flame passes to the chimney. The metal once melted, the barrel is caused to revolve by steam power, and as the fluid metal flows around the interior, the carbon which it contains and the accompanying silicon are oxidized by contact with the passing oxygen in the furnace gases, and with that of the iron ore with which the barrel is lined. Gradually it loses its fluidity, becomes viscous and finally puggy, and is then malleable iron. One end of the barrel is movable, and that being removed, the great "ball" of spongy iron, weighing 600 to 700 pounds, several times the weight of an ordinary puddle ball, is taken out, carried, by tongs suspended from an overhead railroad, to the squeezers, where it is rolled and compressed into a billet of quite compact iron, and thence to the "muck train" of rolls in which it is given the shape of a long rough looking bar, which only requires additional rolling to convert it into such "merchant bar" as we see in the market. The process was a very interesting one to us, and the contrast between this and the ordinary method, so far as the comfort of the workman is concerned, was very marked and very gratifying. So satisfactorily have these furnaces done their work here that they have displaced all of the old furnaces in these works. English iron masters have considered the improvement so important and desirable that they some time since sent a commission to this country to determine the real value of this furnace.

The commission brought over many tons of the worst, as well as of some of the best, British irons and puddled them here. Their report is one that will interest and please every friend of American manufacturing industry. We saw very good iron which had been made from Yorkshire pig, and from even worse Welsh cast iron; and, during our visit, the furnaces were working with *stove scrap*, which is, probably, generally about as poorly adapted for the purpose as any iron that can be found; judging from the appearance of the bars produced, it made a good iron. Whether this particular furnace will ever become generally used is uncertain, and even a matter of little consequence to the world; but it is eminently desirable that, in some form, a machine may perform this very simple and yet essential detail in the process of iron making, and, at the same time, reduce its cost and relieve the workman from one of the severest tasks known in the arts.

THE CINCINNATI WATER AND GAS WORKS.

After visiting the water works, where we found five steam engines engaged in supplying the city with water, and where we were especially interested in the working of the largest—a great machine, 100 inches in diameter of cylinder and of 12 feet stroke of piston—we accepted the invitation of Mr. E. M. Breese, the engineer of the city gas works, and, under his guidance, examined that great establishment very minutely. Space will not, however, allow of a description of this or of other interesting establishments which may be found at Cincinnati. Some idea of the magnitude of the city itself is afforded by the facts, learned at the gas works, that they consume annually about 1,250,000 bushels of coal, making 700,000,000 of cubic feet of gas. Such a quantity of coal would warm, for the winter, the houses of about 6,000 New York mechanics, and the volume of gas made annually is perhaps four times as great as that of the 6,000 houses taken together.

R. H. T.

SLICING APPLES.

The wholesomeness of the apple as an article of food is not as widely known as it deserves to be. The fruit not only contains large quantities of nutritive matter, but has valuable antiseptic qualities which exercise the most beneficial effects on the system. In order to prepare apples so as to have them available for use at any time, a correspondent suggests the following method: A hole of about the size of an ordinary apple is cut in a block of wood. On the under side of the orifice, seven shoe knives are arranged, edges up, in such a manner that the middle blade is the lowest, the pair on its either side on a higher plane, the next pair higher and so on—so that the edges form a curve. The knives are also inclined so that the edges are nearer together than the backs. A follower is fitted into the curve thus made, and is attached to the block of wood by a hinge on one of its sides; to the other, a handle is affixed. To make the plan clear, we should judge that the instrument, as described by our correspondent, resembles a lemon squeezer, with knife-blades substituted for the perforated cup in which the lemon is usually placed. The apple, being placed in the orifice, is pressed down by the follower upon the knife edges. It is

thus cut into slices which fall through the openings between the blades. In this manner, we are informed, a bushel may be sliced in two or three minutes. The slices are then spread upon a grass plat and "hayed" in the sun—covering them or raking them together at night. When thoroughly dried they may be stored away, when they will keep without spoiling for any length of time.

RECIPES AND EXPERIMENTS.

The following recipes and experiments have not been practically tested by the editor of the SCIENTIFIC AMERICAN, but are published for the benefit of readers who may desire to try them. The editor would be glad to be informed of the results of such trials.

BLEACHING FEATHERS.—First clean from greasy matter, then place the feathers in a dilute solution of bichromate of potassa to which a small quantity of nitric acid has been added. The greenish deposit of chromic sesquioxide which ensues may be removed by weak sulphurous acid, when the feathers will be left perfectly white.

RENDERING CLOTH WATERPROOF.—Put half a pound of sugar of lead and a like quantity of powdered alum into a bucket of soft water. Stir until clear and pour off into another bucket—into which place the cloth or garment. Soak for twenty four hours and hang up to dry without wringing. This process is said to be very effective.

FILTER FOR CISTERN WATER.—Perforate the bottom of a wooden box with a number of small holes. Place inside a piece of flannel, cover with coarsely powdered charcoal, over this, coarse river sand, and on top of this, small pieces sandstone.

ZINC WASH FOR ROOMS.—Mix oxide of zinc with common size and apply it with a brush, like lime whitewash to the ceiling of a room. After this, apply a wash, in the same manner, of the chloride of zinc, which will combine with the oxide and form a smooth cement with a shining surface.

HARDENING WOOD FOR PULLEYS.—After a wooden pulley is turned and rubbed smooth, boil it for about eight minutes in olive oil, then allow it to dry, after which it will ultimately become almost as hard as copper.

TO CLEANSE WOODEN FLOORS.—The dirtiest of floors may be rendered beautifully clean by the following process: First scrub with sand, then rub with a lye of caustic soda, using a stiff brush, and rinse off with warm water. Just before the floor is dry, moisten with dilute hydrochloric acid and then with a thin paste of bleaching powder (hypochlorite of lime); let this remain over night and wash in the morning.

MUCILAGE.—Glue, water and three per cent of nitric acid adheres well to metallic surfaces.

PRESERVING STUFFED ANIMALS WITHOUT ARSENIC.—Rub the flesh side of the skin with a composition of 1 lb. tobacco ashes, $\frac{1}{2}$ lb. alum, 2 lbs. dry slaked lime.

CLEANING OIL PAINT.—Whiting is better than soap. Use warm water and a piece of soft flannel. Afterwards wash clean and rub dry with chamois.

MAKING CITRIC ACID.—Treat fresh lemon juice with powdered chalk until all the acid is neutralized. Citrate of lime will be precipitated, which wash and then decompose by means of diluted sulphuric acid. A precipitate of sulphate of lime will then be formed while the citric acid dissolves. Filter, and the citric acid will deposit itself in crystals when the concentrated liquid cools.

VERMILION PAINT.—The tendency of paint made from vermilion (cinnabar or sulphide of mercury), when mixed with white lead, to turn black or brown in a short time may be obviated by mixing with the dry paint, before adding the oil, one eighth of its weight of flowers of sulphur.

CLEANING GLASS.—The lenses of spectacles or spy glasses that have come scratched or dimmed by age may be cleaned with hydrofluoric acid diluted with four or five times its volume of water. The solution should be dropped on a wad of cotton, and thoroughly rubbed on the glass which should afterwards be well washed in clear water. Great care must be exercised in handling this acid, as it eats quickly into the flesh, often producing painful and obstinate sores.

PAINTING ZINC.—Oil paint may be made to adhere to sheet zinc by coating the latter with a composition of one part nitrate of copper, one part chloride of copper and one of sal ammoniac, dissolved in sixty-four parts of water; add to the solution one part hydrochloric acid. This should be left from twelve to twenty-four hours to dry. It acts also as a protection to the metal against atmospheric influences.

TO RENDER CORKS OR STOPPERS AIR TIGHT.—This can be accomplished by covering with a cement composed of red lead or finely powdered litharge mixed with undiluted glycerin.

What Fifty Thousand Dollars Will Buy.

The following advertisement appears in the daily papers, and we give it publicity, free of charge, for the benefit of all who have fifty thousand dollars to invest in perpetual motions:—

0,000 WILL BUY ONE-FOURTH INTEREST IN A NEW AND wonderful invention, self-acting Engine of great power, which I get from vacuum or air cylinder, attached to an endless chain or band, rising up through a tank or column of water from 10 to 500 feet high, or more if desired. I shall give a full explanation and give it away to all the world, and trust to its sense of justice for my recompense, if I do not find some one to take an interest in it. Address J. W. SHIPLEY, Inventor, box 371 Saratoga Springs Post Office, N. Y.

This beats Niagara Falls, where we have a perpetual motion, in the form of a column of water three quarters of a mile wide and several feet thick, falling 160 feet, and presenting a force of millions of horse power. Would it not be cheaper for the inventor to avail himself of this natural column of water, and in it test the practicability of his machine, before going to the expense of erecting a special column 500 feet high, as he suggests?

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin, \$4 00 a year. Advertisements 17c. a line.

Coal at wholesale. If in need, write L. Tower, 71 Broadway, N. Y.

I will purchase part or entire interest in a real practical patented invention. Will be at office of Samuel F. Bartol, 221 Pearl Street, New York city, August 9th and 10th.

Wanted—Small Rotary Engine, $\frac{1}{2}$ H. P. or less. D. C. Pierce, Portage, Cal. Co., Mich.

Machinery Paint, all shades. Will dry with a fine gloss as soon as put on. \$1 to \$1.50 per gal. New York City Oil Company, Sole Agents, 116 Maiden Lane.

For Sale Cheap—A quantity of 18 gauge iron plates, half inch wide, one inch long, with round ends and punched with a 1-16th inch hole at each end. Also, a lot of small leather scraps. F. C. Beach & Co., 131 & 133 Duane Street, New York.

Sweetser's Blacking and Brush Holder—illustrated in Scientific American, May 18, 1872. Best thing for Stove or Shoe Blacking. Needed in every household. Rights for sale. E. H. Sweetser, Box 317, Salem, Mass.

State Rights for Sale on improved Wardrobe-Bureau and Writing Desk combined. Patented June 11, 1872. Address John H. F. Lehmann, 62 Heater Street, New York city.

Hoisting, Pumping, and Mining Engines, from 5 to 40 H. P. J. S. Mundy, No. 7 R. R. Avenue, Newark, N. J.

Wanted—A Good Second Hand Box Board or Strait Stave Machine. F. R. Smith, Bennington, Vermont.

New Pat. Perforated Metallic Graining Tools, do first class work, in less than half the usual time—make every man a first class Grainer. Address J. J. Callow, Cleveland, Ohio.

Wanted—A Party to Manufacture, on royalty, Patent Self-acting Horse Holders. Those having facilities for making Carriage hardware preferred. Address Abm. Quinn, 280 Marcy Av., Brooklyn, L. I.

In the Wakefield Earth Closet are combined Health, Cleanliness and Comfort. Send to 36 Dey St., New York, for descriptive pamphlet.

Lenoir Gas Engine—Wanted, the address of any agent in this country of the Lenoir Gas Engine, or of any person who has one imported within two or three years. Address, P. R., Box 493, Newport, R. I.

Platina Plating—Alb. Lovie, 729 N. 3d St., Philadelphia, Pa.

Steam Boiler and Pipe Covering—Economy, Safety, and Durability. Saves from ten to twenty per cent. Chalmers Spence Company foot East 9th Street, New York—1202 N. 2d Street, St. Louis.

Gear Wheels, for Models; also Springs, Screws, Brass Tube, Sheet Brass, Steel, &c. Illustrated Price List free by mail. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Brick and Mortar Elevator and Distributor—Patent for Sale. See description in Sci. AMERICAN, July 20, 1872. T. Shanks, Lombard and Sharp Streets, Baltimore, Md.

The Berryman Manf. Co. make a specialty of the economical feeding and safety in working Steam Boilers. Address I. B. Davis & Co., Hartford, Conn.

The Berryman Heater and Regulator for Steam Boilers—No. one using Steam Boilers can afford to be without them. I. B. Davis & Co., Hartford, Conn.

Wanted—Melter. Permanent situation, at good wages, to a good, experienced Iron Melter. Address C., Iron Founder, Cleveland, O.

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

Dickinson's Patent Shaped Diamond Carbon Points and Adjustable Holder for dressing emery wheels, grindstones, etc. See Scientific American, July 24 and Nov. 20 1869. 64 Nassau st., New York.

It is better to purchase one of the American Twist Drill Company's Celebrated Patent Emery Grinders than to wish you had.

Flouring Mill near St. Louis, Mo., for Sale. See back page.

State Rights on improved Cigar Moulds for Sale. Patented June 25, 1872. Inquire of Isaac Guthman, Morrison, White Side Co., Ill.

For Machinists' Tools and Supplies of every description, address Kelly, Howell & Ludwig, 917 Market Street, Philadelphia, Pa.

The best recipes on all subjects in the National Recipe Book. Post paid, \$2.00. Michigan Publishing Company, Battle Creek, Mich.

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

We will Remove and Prevent Scale in any Steam Boiler or make no Charge. Two Valuable Patents for Sale. Geo. W. Lord, Phila., Pa.

Peck's Patent Drop Press. For circulars address the sole manufacturers, Milo, Peck & Co., New Haven, Ct.

For Hydraulic Jacks and Presses, New or Second Hand, send for circular to E. Lyon, 470 Grand Street, New York.

For Marble Floor Tile, address G. Barney, Swanton, Vt.

Old Furniture Factory for Sale. A. B., care Jones Scale Works, Binghamton, N. Y.

Steel Castings to pattern, strong and tough. Can be forged and tempered. Address Collins & Co., 212 Water Street, New York.

Portable Baths. Address Portable Bath Co, Sag Harbor, N. Y.

All kinds of Presses and Dies. Bliss & Williams, successors to Mays & Bliss, 118 to 121 Plymouth St., Brooklyn. Send for Catalogue.

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

Williamson's Road Steamer and Steam Plow, with Rubber Tires. Address D. D. Williamson, 32 Broadway, N. Y., or Box 1809.

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

Boynton's Lightning Saws. The genuine cut \$500 challenge. Will cut five times as fast as an ax. A 6 foot cross cut and buck saw, \$4. E. M. Boynton, 80 Beekman Street, New York, Sole Proprietor.

Better than the Best—Davis' Patent Recording Steam Gauge Simple and Cheap. New York Steam Gauge Co., 46 Cortlandt St., N. Y.

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

For hand fire engines, address Rumsey & Co., Seneca Falls, N. Y.

To Ascertain where there will be a demand for new Machinery, mechanics, or manufacturers' supplies, see Manufacturing News of United States in Boston Commercial Bulletin. Terms \$4.00 year.

18,000 Blows a Minute

Can easily be given with our new machine for reducing SEWING MACHINE NEEDLES.

It is universally acknowledged to be the best and most practicable machine ever invented for reducing metals; doing the work very much faster than any other machine, and it will run for years without any perceptible wear. Our machines are operated on an entirely new mechanical principle, discovered by Mr. Hendryx—a principle which produces the most perfect mechanical arrangement for a rapid motion ever yet invented; the dies can be made to strike twenty thousand positive blows a minute.

We are now prepared to furnish our machines at a reasonable price, to any or all parties who may want a very superior machine for reducing sewing machine needles, for pointing wire, for wire drawing, or for swaging any articles where a very rapid stroke is required.

Sewing machine needle makers will find it greatly to their advantage to call on us and see our machine in operation, as the introduction of our machine into the art of needle making will cause the plan of swaging needles to entirely supersede the old plan of milling, for it not only makes a great saving in the cost of making the needles, by greatly lessening the cost of reducing them, besides saving more than half of the wire used in making milled needles, but the process of swaging makes a needle which is far superior to a milled needle—for, in reducing needles by the milling process, all of the best of the wire, the outside, is cut off and wasted, the poorest part of the wire, the core, only being used; while the swaging process, by condensing the particles of metal, makes the part of the needle which is reduced far superior to the wire itself.

Our machine is fully covered by good valid patents in this and foreign countries. Communications by mail will receive prompt attention. Call on or address Webster & Hendryx, Ansonia, Conn.

Facts for the Ladies.—Mrs. J. Brewer, Stamford, Ct., bought her Wheeler & Wilson Lock-Stitch Machine in 1863; earning the first two years her rent and household expenses for self and child, and \$710 in the savings bank; has six of the original dozen needles. See the new Improvements and Wood's Lock-Stitch Ripper.

The Queen of all Sewing Machines.—In speaking of the merits of the New Wilson Under-Feed Sewing Machine, it is sufficient for us to say that we think the invention of this machine marks one of the most important eras in the history of this country; and when we consider the influence it has upon the social well-being of the masses, it is difficult to conceive of an invention of more importance. It has a beautiful, noiseless movement; it makes the genuine "Lock-Stitch" alike on both sides, and does to perfection all kinds of plain and fine sewing; it needs no commendation; its rapid sales, the increasing demand, and the many flattering testimonials from those who have used it, is sufficient proof of its merits. The want of a sewing machine is deeply felt in every household, and as the Wilson Sewing Machine, on account of its extreme simplicity and less cost of manufacture, is sold at a much lower price than all other first-class machines, it is meeting with the extensive patronage that it so justly deserves. Salesroom, 707 Broadway, New York; also for sale in all other cities in the United States.

Notes & Queries.

[We present herewith a series of inquiries embracing a variety of topics of greater or less general interest. The questions are simple, it is true, but we prefer to elicit practical answers from our readers.]

1.—**HAIR DYE.**—Will some one give a recipe for hair dye such as barbers use, that smells like bad eggs?—G. H. J.

2.—**IVY.**—What are the actual advantages or disadvantages of ivy growing on brick walls?—J. H. L.

3.—**THE MAGNETIC POLE AND THE MERIDIAN.**—In erecting a sun dial, I am obliged, for want of proper instruments, to use a compass or to observe the pole star to find the meridian. I am aware that the compass, except on the line of no variation, points to a spot some distance from the north pole (to the east, I believe.) Moreover, the pole star is not exactly over the north pole of our earth. Will some one tell me exactly how much the needle deviates, in this longitude (23° 30' W. of Washington) from the true north, and how far the pole star is from the zenith of the north pole?—L. H.

4.—**COMPOSITION FOR MATCHES.**—Will some one inform me how to make a friction match composition which will not dissolve in damp weather, and will not be very expensive?—C. B.

5.—**INCREASING THE POWER OF BOILERS.**—I have a plain boiler 28 feet by 30 inches, driving an engine of which the cylinder is 6 inches by 30 inches. The boiler works at from 50 to 60 pounds on the square inch, and the engine at 50 revolutions a minute, and her fly wheel is 7 feet in diameter. I do not get power enough, and I think by increasing the size of the pulley on the main shaft, and running the engine at 65 or 70 revolutions, I can obtain the requisite work. But the boiler will not supply the necessary steam; and how can I make it generate more, or use what I now get to greater advantage? My feed water is heated by the exhaust steam till the feed pipe is too hot to hold in the hand. I have seen a device consisting of hollow grate bars, etc., but it is too expensive. Would it be safe to attach anything to the bottom of the boiler, or would an improved feed water heater answer?—J. S. P.

6.—**THE EARTH'S ORBIT.**—Is the distance of the sun from the earth greater in summer (say July) than in winter (say January) or not?—O. F.

7.—**PURE VINEGAR.**—One of your subscribers is very anxious to know about vinegar, whether we must eat eels that can be seen with the naked eye, or whether we can have good vinegar without the large animals. With a glass, I have found, in cider vinegar, large and lively eels; other specimens showed skeletons without life, and others, of good quality, a clear reddish liquor with a little sediment without skeletons or life. Can we have vinegar without eels?—J. E. H.

8.—**STEEL QUERIES.**—Is the fact, that a small blade of steel can be ground and brought to a perfect cutting edge, evidence that the quality of the steel is good? Also, is bar steel, as it is sold, hammered enough to stand well for making light dies, or does it require forging?—W. L. G.

9.—**POWER FOR FAN.**—Can any one tell me how heavy a weight it will take to run a fan (18 inches in diameter by 13 inches long, with 4 arms) one hour? The weight is to fall ten feet and the fan to run 150 revolutions per minute. What is the rule for the calculation?—A. D. L.

10.—**MASS MOTION AND HEAT.**—W. H. P., in answering I. E., query 18, page 385, last volume, gives the equivalent of force in units of heat. Will he or some one else say whether there are any mechanical or chemical means by which force can be converted to heat, or what the nearest approach in practice is to the theory? I have asked this same question in another shape last winter, when I was in Nebraska, where there was plenty of force and very cold weather, which forcibly impressed me with the need of such a converter.—I. L.

11.—**TEMPERATURE IN ICE HOUSE.**—My ice house is built above ground, of two pens of logs, the space (two feet) being filled in with old wet sawdust. It is floored and covered with dust. The temperature is 140° or 150°. My ice all melted. Some knowing ones say it should have been ventilated. Will you please inform me in your paper the cause of the high temperature, and was it want of ventilation that caused the ice to melt?—J. C. MCC.

12.—**SPONTANEOUS COMBUSTION.**—One evening last week came in from the road (I am an engineer) and laid my overalls in the tender

box; they were very greasy. The next morning I opened the box, and found the entire contents a mass of fire. My fireman was cleaving off the stack a day or two ago with a piece of waste saturated with linseed oil. After completing the job, he laid the waste in his tender box, and on opening it, in eight or ten hours after, he found it burnt out, the same as mine was. Were these cases of spontaneous combustion? I related the above circumstances to a professor in a college, and he said they were not cases of spontaneous combustion, as there were but four cases in the known world. If they were not caused from spontaneous combustion, what were they?—W. F. C. S.

13.—**EXPANSION OF LOCOMOTIVE BOILER.**—What is the use of the angle irons at the side of the fire box, which are slotted to allow the boiler to expand on the frame when the back braces, bolted to the boiler and frame have no slots, or other provision to allow the boiler to expand? Do not the braces or frame spring? If not, what does give, as the boiler certainly expands when fired up?—W. F. C. S.

14.—**EXTINCTION OF CAB LAMP ON A LOCOMOTIVE.**—What causes my cab light to go out when I blow the whistle?—W. F. C. S.

15.—**NOISE OF A LOCOMOTIVE.**—What causes the rumbling noise, which a person can hear for three or four miles and feel in every bone of his body, when I drop the front damper and pull up the back one, or when my engine is working hard on a grade?—W. F. C. S.

16.—**SETTING BOILERS.**—I am an engineer, and my boiler arch stands north and south. The boiler is 41 feet long with a 5 foot shell, 64 flues. My grate (Tupper) surface is 3½ feet wide and 5 feet long. From the door to the bridge wall is 6½ feet. My fire passes through the boiler, back over the top and enters the smoke stack, 50 feet high, built of brick. My fuel, shavings and sawdust principally, is pushed into the arch with the head of a rake, the arch door being on a level with the floor. The ash pit extends about the distance of a foot beyond the front plate of the arch, and the draft is taken through that aperture to the under side of the grate. In order to economize fuel, I fire very often, the average being 28 times an hour. I run mostly with closed damper. The damper in the chimney does not fit perfectly close, and the one in the draft plate in the front of the door is generally kept ajar by the dirt getting underneath it. My grate becomes in the morning a cherry red, and sometimes before the day closes becomes a white heat. I have terrific carbon explosions; they occur oftentimes in putting in a half bushel of fuel, and seldom when the dampers are shut. I have been recommended to keep up a sharp blaze in the rear of the arch as a kind of gas-burning fire, but it gives me no relief. These explosions usually take place about two minutes after the fuels put in, and sometimes so powerfully as to raise the draft plate, which weighs 300 pounds. These explosions are more terrific when burning sawdust or matching chips than when burning surface shavings. I endeavor to keep my grates constantly covered, and therefore pack my fire closely as possible. Can any one tell me the cause of the explosions and the remedy? Is there a remedy other than letting more cold air strike the grate?—J. D. H.

17.—**WOODEN RAILWAYS.**—My attention has been called to an article in your issue of July 20 headed "Wooden Railways," and from your suggestions I am induced to believe that such railways would be best adapted to the short roads now in contemplation throughout this State. The great cost of iron railways has, in a measure, deterred individuals from embarking in such enterprises, and more especially does this apply to this portion of the State, which is just beginning to recover from the effects of the war. The citizens of this vicinity of our town, which is situated on the banks of the Mississippi, are canvassing the subject of building a railway to the Bayou Macon hills, at a point some 20 miles in the interior. The country through which this road would run is almost entirely uninhabited, owing to the annual overflow from the Mississippi. Previous to the war, when the levees were up, it was the largest cotton producing portion of our (Carroll) parish. As is usual on the Mississippi bottoms, the country is perfectly level, and little grading would be necessary. The country is thickly wooded, and the timber peculiarly adapted to any purposes requiring strength and durability. My object is to obtain all the information I can with reference to the cost of this wooden railway for the distance mentioned, the character of rails, cross ties, etc., as well as the cost and style of locomotives and cars best adapted to the same. Any suggestions your readers may make will be thankfully received.—C. M. P.

18.—**EFFECTS OF FRICTION ON A RUNNING BELT.**—In oiling a bearing, I have to put my arm through a belt. I often hear a snapping noise when I bring my oiler near the band, and when I take it away the noise would cease. (I used a copper oiler when I first noticed it.) I placed my ear close to the band and soon I felt a snapping sensation, as though something was pricking me. I placed my fingers close to the belt and there was a peculiar feeling like that of being pricked by nettles. I supposed it must be electricity, and I took some notice of it; when I held the nozzle of my oiler close to the band a fine stream, or shower, of oil would come out of it and fly to the belt. If I held it on the outside of the belt, it would go around into the inside of the belt before it would strike it. When I held the oiler between the belt, the oil would fly in a circle. The sound would be loudest after the machinery had been standing still for a space of time, and when it was coldest. A pricking sensation was distinctly felt, and oil would flow more freely from the oiler. I found a feeling, when I placed my face to the half of the band that came from the driver, different from the one felt when I placed it to the half that went to the driver. What makes the difference in the sensation? What makes the oil come out of the oiler, and why will it not fly on to the outside of the belt as well as on the inside? It was a leather belt four inches wide and about thirty feet long; and I notice it made some difference whether I used a tin oiler or a copper one, the copper one giving the best results, probably because it was a better conductor.—J. T.

Answers to Correspondents.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

ALL reference to back numbers must be by volume and page.

BENDING WROUGHT IRON PIPE.—J. V. R., of N. J., will find a successful method described on page 122 of Vol. XXVI. of the SCIENTIFIC AMERICAN.

HERMAPHRODITIC POULTRY.—I address you a few lines to ask a question regarding a chicken that is on my place. In 1871, it laid and hatched two broods of chickens; it commenced crowing in the fall; in the winter it was a little stupid; in the spring it assumed the form and performed the offices of a fully matured rooster. The above can be substantiated by good authority, or the chicken can be produced. I would like to hear from you through your valuable paper, as it is a freak in nature that I don't understand. Answer: We advise our correspondent to produce the chicken and arrange with Barnum for its public exhibition. A chicken matinee in this city would be a novelty and doubtless draw a crowd.

DRIVING POWER OF RUBBER BELT.—In your issue of July 27, page 58, the driving capacity of a two ply rubber belt is given as one horse power for every two inches in width, when the belt travels at the rate of 1,500 feet per minute. This, I think, is a low estimate; from my own observations I am satisfied that a two ply belt, running at the above speed, will drive double that amount of power without injury, or one horse power for every inch in width, and a three ply will do the same with every three quarters of an inch in width.—W. A. L. K.

SKIN DISEASES.—To C. N., query 7, page 41.—The trouble comes from your liver. Take podophyllin pills, one every evening for two weeks; if the bowels become too relaxed, omit an evening.—M. B. E., of Pa.

BLACK INK.—To M. W. H., query 2, page 58.—Take tannic acid, 20 grains, and a similar quantity of gallic acid; dissolve in 2 ounces water. Then take copperas crystals and Monsel's salt of iron, each 15 grains, and dissolve in 2 ounces water. Mix the two solutions and add 2½ drams of mucilage and 2 drops oil of cloves. This ink will cost one dollar a gallon.—H. J. H., of Mich.

INK.—Let M. W. H. (query 2, page 58) make a strong decoction of logwood, and add a little chromate of potash. No gum required.—E. H. H., of Mass.

DISSOLVING GUTTA PERCHA.—R. J. (query 7, page 58), should use bisulphide of carbon.—E. H. H., of Mass.

WATERPROOFING PAPER PULP.—To W. R. H. (query 10, page 58.—Try a larger proportion of resin than usual, and when the paper is dry, pass between hot rolls.—E. H. H., of Mass.

CRYSTAL GLASS.—To G. T. P., query 15, page 58.—The following mixture will give good results: Carbonate of potash, 112 parts; red lead, 224 parts; sand (washed and burnt), 386 parts; saltpeter, 14 to 28 parts; oxide of manganese, from one fourth to three fourths of a part. Mix thoroughly and melt together.—E. H. H., of Mass.

HARDENING OF RAIN WATER.—To B. D. A., query 16, page 58.—Your trouble arises from the water, dissolving the lime of the cement used in the cistern. If the cement be painted, so as to protect it from the solvent action of the water, you will no longer be annoyed by its hardness.—E. H. H., of Mass.

"A MISER OF TIME."—If the writer over the above signature, in your issue of July 27th, will try the ECLIPSE PAPER FILE, illustrated in No. 18, Vol. XXV. of the SCIENTIFIC AMERICAN, his complaint will be silenced.—A. S., of Ala.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

WHIFFLETREE DRAFT EYE.—Edward E. Tompkins, Slog Sing, N. Y.—This invention furnishes an improved draft eye for whiffletrees, which consists of a stem which is screwed into the end of the whiffletree, and which receives the eye of the tug. To the outer end of the stem is swiveled a cross head or button, upon the side of which is formed a toe or eccentric. The cross head is turned into line with the tug eye and the latter passed over it, when the pressure of the sides of the eye upon the eccentric forces it into one end of the eye, and thereby brings the cross head at right angles to its length; thus rendering it impossible for the tug to be accidentally detached, however much it may swing about.

PLOW.—Alexander Rickard, Schoharie, N. Y.—This invention has for its object to improve the construction of shovel plows, so as to make them more generally useful, and consists in providing the foot of the plow standard with an adjustable shoe which admits of being set so as to bear squarely upon the bottom of the furrow at whatever angle the plow may be working in the ground. The plow thus draws steadily instead of hopping along upon its point when adjusted to run deep in the ground. The shovel is made with adjustable wings, which are secured to the stationary wings by bolts which pass through slots in the former, so that they may be set out or in as desired. Upon the central upper part of the shovel is formed or attached a colter to divide the soil as the plow is drawn forward and make it work easier in hard ground.

WINDMILL.—Arent Geerlings, Holland, Mich.—This invention relates first, to a new arrangement of devices for adjusting the wings automatically to take the breeze more or less, according to its force, so as to maintain a uniform rate of speed; and, secondly, to a new construction of the wings themselves; the same being bent forward at their forward edges and rear corners so as to cause the wind to pass inward and be discharged at their rear inner corners.

BRAKE FOR LIGHT MACHINERY.—John M. Cayce, Franklin, Tenn.—This invention is more particularly applicable to sewing machines, where it is employed to regulate the speed of the needle. It consists of a cam attached to a sleeve which is placed on the shaft which drives the needle. The cam is operated upon by a spring lever which can be adjusted to have the required tension to a nicety. By means of the sleeve, the cam can be adjusted to operate in any part of the revolution, and thus retard or not the movement of the needle, as desired.

TOY SCROLL SAWING MACHINE.—Samuel N. Trump, Rossville, Md.—The invention consists in holding the lumber with clamps while it is fed against the saw which then cuts in a straight or curved line.

PUMP.—Wilson Barnes, Maquoketa, Iowa.—This invention consists mainly in a pump whose hollow parts are made of wrought iron galvanized tubing, the sections being connected together by internally threaded couplings.

SHOE FASTENING.—Chas. E. Chincock, New York city, and Christian G. Schneider, Washington, D. C.—The invention consists in an arc-shaped loop and extension applied to fasten and then hold the shoe securely buttoned.

SELF REGULATING FEED AND TELTAL FOR MILL BURNS.—John D. Mines, Mofatt's Creek, Va.—The invention consists in feeding grain into the eye of a mill burr runner through a reciprocating tube, cup, and vibratory funnel, in causing the vibratory funnel to operate the feed tube, and in providing the grain supply spout with a flexible valve attached to a lever operated from the discharge funnel, so as to ring a bell when the flow of grain ceases.

BRICK MACHINE.—Daniel Hess, Des Moines, Iowa.—The invention consists chiefly in the employment of a yielding or self adjusting upper inclined plane or track, for operating the upper series of pressing devices whereby injury or breakage of the surrounding parts is prevented if the molds are too densely packed or contain a foreign substance, as the inclined plane will in such an event rise and allow of the passage of the pressing devices without injury and be immediately returned to its normal position by the action of a weighted lever connected with the same.

COUPLING.—James Higgins, Montague, Mich.—The invention consists in a metallic coupling, formed of two reversely crooked hooks, and a sleeve which is tapered in the direction of the shanks of the hooks. The coupling is intended for use with the standing rigging of small vessels and in attaching wooden traces or shrouds without nails, rivets, or screws.

SIDE SADDLE TREE.—Dudley M. Oliver, of Charleston, Ill.—The object of this invention is to improve the construction of side saddles, and it consists in a new arrangement of the pad bar and horn, whereby a shoulder is left in front of the horn, to which a leather spring is nailed. The seat is rabbeted so as to receive the straining piece. The tree is made of wood and covered as usual, and is stayed by strips of metal.

COCOA NUT GRATER.—William H. McCall, of Philadelphia, Pa.—This invention furnishes an improved machine for grating cocoa nuts, which consists in a cylindrical grater revolved within a box. The nut is placed in a hopper at the top so as to rest on the grater, and at the bottom of the box is a drawer to receive the grated nut.

COMBINED BUGGY POLE AND SHAFTS.—Gottlieb Stiener, of Deedsville, Ind.—This invention relates to combined thill and pole attachments for vehicles, of which some have already been patented, and consists in a new mode of combining the shafts or thills and double tree so as to form a very strong pole of the shafts when connected together.

MACHINE FOR CORRUGATING METAL.—John Moffet, of New York city.—This invention consists of a set of preparatory dies and a set of finishing dies for making square corrugations; the corrugations are formed by a preparatory operation, in which a set of oval dies form an oval groove in the iron about as deep as the finished groove is to be, and then the groove is completed by an operation of the finishing dies. When the final action upon the corrugation takes place, the finished shape is firmly retained, so that the subsequent action of the preparatory die does not draw the stock back and disfigure the completed corrugation as when a single set of dies is used to make the corrugation at one operation.