

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.

\$3,000 a year and Horse and Wagon to Agents for selling the "Domestic Steam Clothes Washer." J. C. Miller, Pittsburgh, Pa.

Absolutely the best protection against Fire—Babcock Extin-guisher. F. W. Farwell, Secretary, 407 Broadway, New York.

Wanted—Circulars of Makers of Wooden Pumps. F. Moon, Newberry, S. C.

Hydraulic Jacks and Presses—Second Hand Plug Tobacco Machinery. Address E. Lyon, 470 Grand St., New York.

The Florence Sewing Machine Agency in New Orleans, hav-ing a large store prominently located, solicit other Agencies. Address Lock Box 170, New Orleans.

Second-Hand Books, cheap—Mechanical, Scientific and Lite-rary. For Catalogue, address Handicraft Pub. Co., 87 Park Row, N. Y.

Windmill—3 joints, self-regulating. Snow & Co., Sterling, Ill.

A thorough and experienced Mechanical Engineer, who can influence trade, desires a situation. Best references. Address "Engi-neer," Box 4000, New York Post Office.

Makers of Glass linings for pumps, please address H. J. Tib-bals, 1805 Spring Garden St., Philadelphia, Pa.

Steel Castings "To Pattern," from ten pounds upward, can be forged and tempered. Address Collins & Co., No. 212 Water St., N. Y.

To Patentees—The address of Business men throughout the Country sent for 50 cents per hundred. H. B. Todd, Plymouth, Conn.

\$1,000—Quick. Every traveler, drummer, pedlar, and can-vasser, can make it from information which costs nothing. No humbug. Address, enclosing \$3 00, C. C. L., Lock Box 3, New Hampton, N. H.

Portable Engines, Saw Mills, and Shingle Machinery. Man-ufacturers, send circulars with prices to Box 2133, Boston, Mass.

Gatling guns, that fire 400 shots per minute, with a range of over 1,000 yards, and which weigh only 125 pounds, are now being made at Colt's Armory, Hartford, Conn.

For 15 in. Swing Engine Lathes, address Star Tool Com-pany, Providence, R. I.

Machinists; Illustrated Catalogue of all kinds of small Tools and Materials sent free. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

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

Send to Cleveland M'fg Co., Cleveland, Ohio, for descriptive Catalogue of their specialties—Combination Atmospheric Ink and Mucilage Stand and Sponge Cup, Automatic Barrel Filler, Perpetual Siphon, Wilder's Galvanic Battery, &c. &c.

Manufacturers of Machinery, or any patented article which they desire to introduce into the New York market, will find a capable agent, with the best of references, by addressing S. C. Hill, 32 Courtlandt Street, New York.

Mulock Balanced Mower and the King & Mulock Pat. Steam and Water Engine, now at the American Institute Fair. Will sell Patents or arrange with manufacturers for Royalty. King & Mulock, Middletown, N. Y.

Pipe Cutters, equal to Stanwood's, for cutting off iron or brass pipe. Price,  $\frac{1}{2}$  to 1, \$2.50. Apply to G. Abbott, 31 Devonshire Street Boston, Mass.

Ashcroft's Original Steam Gauge, best and cheapest in the market. Address E. H. Ashcroft, Sudbury St., Boston, Mass.

Heydrick's Traction Engine and Steam Plow, capable of as-cending grades of 1 foot in 3 with perfect ease. The Patent Right for the Southern States for sale. Address W. H. H. Heydrick, Chestnut Hill, Phila.

The Berryman Steam Trap excels all others. The best is always the cheapest. Address I. B. Davis & Co., Hartford, Conn.

Wanted—Copper, Brass, Tea Lead, and Turnings from all parts of the United States and Canada. Dnplaine & Reeves, 760 South Broad Street, Philadelphia, Pa.

Pleasant Rooms, with Power to let at low prices, in a village of 12,000 inhabitants. Address Lock Box 129, Woonsocket, R. I.

For Sale—A Second hand 60 lb. Hotchkiss Hammer, in good order; also, a 24 in. by 6 ft. Planer. E. & R. J. Gould, Newark, N. J.

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

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

T. R. Bailey & Vail, Lockport, N. Y., Manf. Gauge Lathes.

Walrus Leather for Polishing Steel, Brass, and Plated Ware. Greene, Tweed & Co., 18 Park Place, New York.

Diamonds and Carbon turned and shaped for Philosophical and Mechanical purposes, also Glazier's Diamonds, manufactured and re-set by J. Dickinson, 64 Nassau st., New York.

Brown's Pipe Tongs—Manufactured exclusively by Ash-croft, Sudbury St., Boston, Mass.

American Boiler Powder Co, Box 797, Pittsburgh, Pa., make the only safe, sure, and cheap remedy for 'Scaly Boilers.' Orders solicited.

Gear Wheels for Models. Illustrated Price List free. Also Materials of all kinds. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Windmills: Get the best. A. P. Brown & Co., 61 Park Place, N. Y.

Ashcroft's Self-Testing Steam Gauge can be tested without removing it from its position.

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.

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

Williamson's Road Steamer and Steam Plow, with Rubber Tires. Address D. D. Williamson, 32 Broadway, N. Y., or Box 1303.

Belting as is Belting—Best Philadelphia Oak Tanned. C. W. Arny, 301 and 305 Cherry Street, Philadelphia, Pa.

Boynton's Lightning Saws. The genuine \$500 challenge. Will cut five times as fast as an ax. A 6 foot cross cut and buck saw. \$6. E. M. Boynton, 30 Beekman Street, New York, Sole Proprietor.

For Steam Fire Engines, address R. J. Gould, Newark, N. J. Brown's Coal Yard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable. W. D. Andrews & Bro., 116 Water St., N. Y.

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. Ad-dress Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

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

All kinds of Presses and Dies. Bliss & Williams, successors to Mays & Bliss, 118 to 122 Plymouth St., Brooklyn. Send for Ca alogue.

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

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

Presses, Dies & all can tools. Ferracute Mch Wks, Bridgeton, N. J. Also 2-Spindle axial Drills, for Castors, Screw and Trunk Pulleys, &c.

Answers to Correspondents.

SPECIAL NOTE.—This column is designed for the general interest and in-struction 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 references to back numbers must be by volume and page.

CLEANING BRASS.—C. G. S., and others.—See pp. 281, 298, 314 and 329, of our twenty-fifth volume.

HYDROGEN IN THE ATMOSPHERE.—F. F. suggests that the ignition, by electricity, of hydrogen in the air may be the cause of many loud thunder claps, and that the combustion may cause the additional rain which often falls after the lightning flash. Answer: The theory is not new, and has been published in many of the ordinary text books.—J. T. N., of N. Y.

DISTANCE OF THE EARTH FROM THE SUN.—Will any one of the wise people who know (?) that the earth is nearer to the sun at one season of the year than at another be kind enough to tell how they know it?—D. Answer: A very little attention to the subject will convince D. that the distance of a heavenly body can be easily ascertained, and will save him from questioning the accuracy of those who are better informed than he is. Norton gives the following method of ascertaining the dis-tance of the sun, simple enough to those who have access to the necessary instruments and books: Measure the altitudes of the upper and lower limbs, and take half their sum for the altitude of the center, and add or subtract the apparent semi-diameter of the body, taken from the *Nautical Almanac*. The observations are facilitated by using the movable micrometer wire in establishing the contact with the limb; then by turning the micrometer screw, measuring the interval between the position of the movable and that of the parallel stationary wire, and adding the measured interval to the mean of the microscope readings.—J. T. N., of N. Y.

OXYGEN AND HYDROGEN.—A. W. asks: Is it dangerous to combine hydrogen with oxygen, having the gases in separate cylinders, and a rubber tubing from the cylinders to a platinum burner? Answer: The combustion of hydrogen with oxygen can be done with safety, and is daily effected by the oxyhydrogen gas light; accidents have, however, taken place from careless handling. A mixture of the gases in a vessel in certain combinations will explode if ignited. One part of hydrogen and eight of oxygen by weight, or, in other words, two volumes of hydrogen to one of oxygen, will explode on contact with an electric spark or any red hot substance. The vessel will be seen, afterwards, to be bedewed with water, which is thus, in the language of the chemists, H<sub>2</sub>O.—J. T. N., of N. Y.

PERISHABILITY OF AIR AND WATER.—F. F. of Me., asks: Why is it that water, air, and other universal substances do not wear out? Answer: Nothing ever "wears out." It merely changes its form, appear-ance, and locality. A textile fabric has its surface abraded, but the cot-ton, wool, or silk is merely rubbed away; and even if burnt by fire, the elements of which the fibers are constituted still exist in undiminished quantity, ready to unite again to form the same substance. "Wearing out" is an absurd phrase when used in reference to Nature or Science. The quantity of matter in the universe is without doubt the same as it always was; and different substances change their characteristics only. And these changes affect water and air as well as all other matter.—J. T. N., of N. Y.

SAW MILL QUERIES.—M. M. S., of Ill., asks: What is the proper speed for a portable engine, used to drive a circular saw, the cylin-der being ten inches in diameter with a sixteen inch stroke? Also what is the power of an engine (it being new and first class) with steam at eighty pounds? What is the rule for measuring the power of engines? Answer: You do not tell us the size of your saw. If you run the engine so that the periphery of the saw travels at the rate of 9,000 feet per minute, you will have a good average speed for ordinary work. To ascertain the power of an engine, you must have the number of revolutions per minute, in addition to the other figures. Your engine, if well built, should give you half a horse power for each revolution per minute. To find the horse power of an engine, multiply the pressure per square inch in pounds by the piston speed in feet per minute, and then multiply the result by the area of the piston in inches, and divide by 33,000. Your piston measures 78.5 square inches; so 80 lbs. pressure x 23 66 feet (the travel of your piston to each revolution) x 78.5 = 167018, foot pounds, 33,000 of which are a horse power.—J. T. N., of N. Y.

POWER OF LEVERS.—G. D. asks: How much power can be obtained by a lever or series of levers 5 or 6 feet in length? Is there any rule that can be used to calculate the power that may be exerted in that way? I would make the same inquiry concerning cog wheels.—G. D. Answer: Power cannot be obtained by a lever at all. There is no contri-vance by which power can be augmented. You raise a greater weight by a lever, but you raise it through a shorter distance; the mechanical force in foot pounds is the same at both ends of the lever. The weight that can be raised at the short end of the lever by that applied at the long end varies with the position of the fulcrum, or, in other words, inversely as the pro-portion of the two parts of the lever; and the distance through which the weight is raised varies directly as the said proportion. Both levers and cog or gear wheels transmit the number of foot pounds that you apply to them, less the friction. If by a lever you raise double the weight, you may know that you raise it half the distance, that is, that it will take twice the time to raise it the whole distance. The proportions of the efficiencies of cog wheels may be found by counting the teeth.—J. T. N., of N. Y.

EXTERMINATING SNAILS.—To J. A. D., query 15, page 217.—Cement the well from the platform to the water, plastering it like the wall of a house, using the common brown cement, with about one third sand.—J. W. N., of N. J.

SAW MILL HANDS.—To G. V. V., query 5, page 202.—The chieftreason why saw mill owners cannot get men is because they will not pay over \$40 a month wages. Men who can run a mill perfectly can be had by paying them wages.—A. M., of Mo.

DISSOLVING SHELLAC.—To L. Q. B., query 3, page 217.—To an ounce of shellac in a gill of water, add a piece of borax about the size of a small hickory nut; let it simmer but not boil, and stir it gently until dissolved. After it has cooled, add water if too thick.—T. A. A., of Mass.

SAPONIFICATION OF LINSEED OIL.—To J. D. E., query 2, page 202.—If the linseed oil in the woolen cloth has become dry, you will have great difficulty in removing it by saponification with an alkali. If the cloth is valuable, probably the best plan will be to soak it in benzine

and so dissolve the varnish; you can then thoroughly wash it with soap and water.—E. H. H., of Mass.

BURNING GAS.—To M., query 6, page 217.—The more light from the argand burners probably due to a better combustion of the gas. According to a report to the London Board of Trade (SCIENTIFIC AMER-ICAN, Vol. XXV., page 369), if the illuminating power of a Sugg's argand No. 1 be taken as 100, that of the ordinary burners would range all the way from 78 to 19; the pressure of the gas was of course the same in each test, each burner using 5 feet of gas per hour. This, I think, proves that the best (for there is a difference) argand is the cheapest of burners.—P. B. T., of N. Y.

SAW MILL HANDS.—To G. V. V., query 5, page 202.—Yes; the circular saw is a difficult tool to handle, and this accounts for the in-competency of the men and failures of mill owners. The carriage ways must be level and in perfect line, and the saw lined a little into the sag. The saw, being properly hung, and the head blocks running level and true, will do good work, when the saw is properly dressed. The set of the teeth should be alike on both sides, each one cutting the same depth of chip. If you want a good saw operator, let us see your advertisement for referen-ces.—J. P. A., of Ill.

BOILER SCALE.—Let E., query 10, page 216, make a mixture of sal soda, 40 lbs., gum catechu, 5 lbs., and sal ammoniac, 5 lbs. Put one pound of the mixture for each barrel of water into the tank. If the per-severes in this treatment, he will find his scale will be removed. After the scale is once removed, sal soda alone will keep it perfectly free from de-posit of any kind. I have used sal soda for several years, and find it works charmingly. My boiler was second hand when our firm bought it, and the scale was more than an eighth of an inch thick. By the use of 10 lbs. of soda a week, I have succeeded in getting it as clean as if it had not been used a day. The boiler is as clean of scale as if new. My boiler is 26 feet long by 40 inches diameter. E. can use his judgment as to how much soda to use for his boiler; I give him the amount needed for a boiler of that size. After he has tried this, I should like to hear the result.—A. H. G., of Mo.

SLIP OF LOCOMOTIVE DRIVE WHEELS.—To C. T., query 11, page 234.—The crank pin when at its lowest point is stationary, and no power is developed at this point, as there is no motion; but the pin, through the connecting rod, piston rod and piston, forms a stationary abutment for the steam to rest against while the power is being developed against the forward cylinder head, sliding the cylinder along over the piston and carrying with it the engine to which it is bolted. While the sliding cylinder is slowly nearing the end of its stroke, and the piston as slowly begins to move on the return stroke, the crank pin makes a rapid and wide change of position to the upper part of wheel; a change in the devel-opment of the power now takes place, for now the piston itself becomes the moving mass, dashing along at a speed much greater than the moving train, carrying with it, through its connections, the crank pin. The wheel, being merely a circular lever with its pivot constantly at the point of con-tact with the rail, pushes the axle in the center forward against the box and frame, thus propelling the engine, and so on, alternat-ly pushing the train by the cylinder bolts, and by the jaws of the axle box. The power for slipping wheels or propelling engine is the same in both movements, except that there may be an excess of friction against the forward part of axle box when the piston is the mover.—G. E. F., of N. H.

GRAVITY.—J. W. T. attempts, on page 250, to answer the query 20, page 153: "Do bodies weigh more at the poles than at the equa-tor." He says "at the level of the sea there can be no difference between the weight of bodies at the equator and at the poles. If there were, the water of the ocean would sink where it was heaviest and rise where it was lightest, till the equilibrium would be restored and the weight would be the same." He further says "this is what has taken place, for the centri-fugal force due to the earth's rotation has enlarged its equatorial at the expense of the polar diameter." Now, his reasoning "If there were, etc." would be correct if the earth were not rotating, in which case it would have assumed a globular form in consequence of the molecular attraction, on the same principle on which melted metal, that hardens while falling through the air (in which case its particles are free to shift), forms globu-lar shots. But the earth is rotating, as he himself admits. By this rota-tion a new force, the centrifugal force, diminishing from the equator to-wards the poles, is generated, which would disturb or has disturbed the globular equilibrium. As he denies greater weight of bodies near the poles, he proves by his reasoning "If there were," etc., that there was no sinking in of the poles, which is contrary to the fact. In saying "this is what has taken place," etc., he admits the sinking in of the poles, in conse-quence of the rotation of the earth, which is correct. Now, if the result arrived at by a supposition is contrary to the facts, it is obvious that the supposition was wrong. So J. W. T. has erred twice, in adopting a wrong supposition and in con-tradicting himself.—E. W., of N. Y.

Communications Received.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and con-tributions upon the following subjects:

- On a New Fungus. With a Stereo-picture.—By G. B. L.
- Thermometrical Observations.—By J. P. B.
- On the Duration of Time from the Creation to the Present Year.—By H. E. G.
- On the Effects of Lightning upon Trees.—By F. H.
- On the Changing of Pay Day.—By W. B. D.
- On the August Meteoric Shower.—By J. H.
- On the Condition of Matter which Constitutes a Vacuum in Electricity.—By D.
- On the Dangers of Car Coupling.—By D. M. S.
- On Burial Customs in Bavaria.—By R. C. J.
- On Science and Religion.—By R. W.
- On a New Form of Propeller for Canal Navigation.—By A. T.

Recent American and Foreign Patents.

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

LARD COOLER.—George Carleton Cassard, Baltimore, Md.—The invention relates to that special class of machines in which melted lard is received and stirred continuously until cooled by the application of air, water, or other medium. The invention consists in immersing at intervals, within the lard receptacle, one or more hollow cylinders, or sections of cylinders, in which a're placed cooling fluids, or other heat absorbents. It also con-sists in forming the scrapers, which are employed to prevent adhesion of the lard to the cylinders, of straight vertical slats and straight springs. It also consists in combining the lard outlet valve with a rod passing through but not in contact with the rotary shaft of the machine, and operating it by means of a lever located on top of the machine.

OIL CAN.—Joshua Robinson, Baltimore, Md.—The invention consists in providing the neck of a can with an electric spout or No held thereto by an inwardly pressing spring, and also with an air chamber having apertures which facilitate the outlet of oil.

WHEEL FLOW.—William Mason, Monmouth, Oregon.—This invention has for its object to furnish an improved sulky plow. The axle is bent twice at right angles, or made with a short offset or shoulder at the land side of the frame, so that the said frame may be level while one wheel is running in the furrow and the other upon the unplowed land. The said frame is supported by and pivoted to the said axle. The forward ends of the beams of the frame are attached to the opposite sides of the rear end of the tongue.