

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

The best results are obtained by the Imp. Eureka Turbine Wheel and Barber's Pat. Pulverizing Mills. Send for descriptive pamphlets to Barber & Son, Allentown, Pa.

Fuller & Stillman, Chemical Engineers and Assayers, 40 Broadway, New York

Steam Tug Machinery, Engines, Boilers, Sugar Machinery. Atlantic Steam Engine Works, Brooklyn, N.Y.

The Secret Key to Health.—The Science of Life, or Self-Preservation, 300 pages. Price, only \$1. Contains fifty valuable prescriptions, either one of which is worth more than ten times the price of the book. Illustrated sample sent on receipt of 6 cents for postage. Address Dr. W. H. Parker, 4 Bulfinch St., Boston, Mass.

The Baker Blower runs the largest sand blast in the world. Wilbraham Bros., 2319 Frankford Ave., Phila., Pa.

Cut Gears for Models, etc. (list free). Models, working machinery experimental work, tools, etc., to order. D. Gilbert & Son, 212 Chester St., Philadelphia, Pa.

Magnets, Insulated Wire, etc. Catalogue free. Goodnow & Wightman, 176 Washington St., Boston, Mass.

Forsyth & Co., Manchester, N. H., & 213 Center St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Wright's Patent Steam Engine, with automatic cut-off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

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

H. Prentiss & Co., 14 Dey St., New York, Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list.

The Horton Lathe Chucks, prices reduced 30 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Linen Hose.—Sizes: 1½ in., 20c.; 2 in., 25c.; 2½ in., 29c. per foot, subject to large discount. For price lists of all sizes, also rubber lined linen hose, address Eureka Fire Hose Company No. 13 Barclay St., New York.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.

Bradley's cushioned helve hammers. See illus. ad. p. 142.

Band Saws a specialty. F. H. Clement, Rochester, N. Y.

Sheet Metal Presses, Ferracut Co., Bridgeton, N. J. Eagle Anvils, 9 cents per pound. Fully warranted.

Vertical Engines. F. C. & A. E. Rowland, New Haven, Ct.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Noise-Quelling Nozzles for Locomotives and Steamboats. 50 different varieties, adapted to every class of engine. T. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

Stave, Barrel, Keg, and Hoghead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

New 8½ foot Boring and Turning Mill for sale cheap. A first class tool. Hilles & Jones, Wilmington, Del.

The New Economizer, the only Agricultural Engine with return flue boiler in use. See adv. of Porter Mfg. Co., page 78.

Cooper Manufacturing Company, Mt. Vernon, Ohio, Manufs. of Stationary, Portable, and Traction Engines, Saw Mills, Grist Mills, Mill Machinery, etc. Engineers and Contractors. Circular free.

Millstone Dressing Diamonds. Simple, effective, and durable. J. Dickinson, 64 Nassau St., New York.

The Improved Hydraulic Jacks, Pumps, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

Drop Hammers, Die Sinking Machines, Punching and Shearing Presses. Pratt & Whitney Co., Hartford, Ct.

Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

Hydraulic Cylinders, Wheels, and Pinions, Machinery Castings, all kinds; strong and durable; and easily worked. Tensile strength not less than 65,000 lbs. to square in. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., and 33 Liberty St., N. Y. city, U. S. A.

Steam and Gas Fitters' Tools a specialty. Send for circulars. D. Saunders' Sons, Yonkers, N. Y.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co.

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

The Asbestos Roofing is the only reliable substitute for tin; it costs only about one-half as much, is fully as durable, is fire-proof, and can be easily applied by any one. H. W. Johns Manufacturing Company, 87 Maiden Lane, New York, are the sole manufacturers.

Book free to Inventors. Address C. A. Shaw, Boston.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y.

Wanted.—A place is desired by a man of experience and with good references, in charge of experimental machinery. Parties having machines to develop or under way, are invited to correspond or talk with William A. Lorenz, 363 Macon St., Brooklyn, N. Y.

NEW BOOKS AND PUBLICATIONS.

THE NEW YORK HERALD WEATHER SERVICE. 1877-78-79. 8vo, paper, pp. 34.

This pamphlet sketches the development of the Herald Weather Bureau, and gives a list of the storm warnings cable by it to Europe and the manner of their fulfillment, with other cognate information.

GEOLOGICAL SURVEY OF KENTUCKY. N. S. Shaler, Director.

The late publications of this survey embrace the following: Iron: the impurities which commonly occur with it, and their effects. By Wm. B. Caldwell, Jr. Report on the Limonite Ores of Trigg, Lyon, and Caldwell Counties. By Wm. B. Caldwell, Jr. Notes on the Yellow Fever Epidemic, at Hickman, Ky., during the summer and autumn of 1878. By John R. Proctor.

ANALYSES OF THE SUGAR QUESTION. By Henry A. Brown. Saxonville, Massachusetts. Paper, pp. 42.

Mr. Brown, formerly Special Treasury Agent of the United States, discusses the very complex sugar question as an expert, and reaches the conclusion that the present sugar tariff ought to be modified. By making the following "moderate changes" he believes that the consumption of sugar would be enormously increased, while the revenue from sugar food would still be ample, without injuriously affecting any public or national interest: First, the classification of melado as not above No. 7 Dutch standard sugar. Second, abolish the additional 25 per cent ad valorem on all sugar. Third, strike out the words "after being refined" in the section relating to colored sugars. Fourth, all sugars under No. 10 D. S. in color, containing 92 per cent or more of crystallizable sugar, to pay the same duty as sugars above No. 10 and not above No. 13 D. S. in color.

PROCEEDINGS OF THE ENGINEERS' CLUB OF PHILADELPHIA. Edited by Charles E. Billin. Vol. I., Nos. 1 and 2.

No. 1 of this new journal embodies the principal papers and more important topics of discussion brought before the club during its first year. No. 2 covers the proceedings of the forepart of the current year. The club starts off with vigor, and the character of the papers presented justifies the hope, if not the prediction, that it will live long and prosper. The proceedings are published at the rooms of the club, No. 10 North Merrick street, Philadelphia.

LIFE AND WORK OF JOSEPH HENRY. By Frank L. Pope. New York: D. Van Nostrand. 12mo, paper, pp. 31.

This puts in an attractive and keepable form Mr. Pope's sketch of the life and discoveries of Professor Henry (having special reference to the development of the electric telegraph), first printed in the Journal of the American Electrical Society.

DARWINISM AND OTHER ESSAYS. By John Fiske. London and New York: Macmillan & Co. 12mo. Price \$2.

The dozen detached essays here brought together are well worth preserving. Mr. Fiske is always outspoken, bright, and suggestive; and he has a happy faculty of seizing upon and setting plainly forth the vital points of a critical discussion. Several of the essays have a historical rather than an immediate interest to those who have kept up with the drift of recent thought; still as a part of the literature of evolution they are worth keeping. The book is well made and has a good index.

HINTS TOWARD A NATIONAL CULTURE FOR YOUNG AMERICANS. By S. S. Boyce. New York: E. Steiger. Price 25 cents.

We should be glad to see this little work (little in size but great in spirit and promise) in the hands of every American parent, teacher, and pupil. It is too much to hope that the traditions of the schools can be displaced by the spirit of true, practical, scientific, and industrial culture, without the waste and misdirection of a large portion of the childhood of many generations. But we believe that the good time is coming, though remote, and the general circulation of Mr. Boyce's Hints would do much to hasten it. The hints to young men on self culture and on growth by culture, are especially sensible and valuable.

TEACHER'S HAND BOOK TO ACCOMPANY AVERY'S ELEMENTS OF NATURAL PHILOSOPHY. New York: Sheldon & Company. 1879.

This little book is chiefly remarkable for the proper emphasis it lays upon the truth that no science teacher can hope to do justice to his work without keeping a constant watch upon the current literature of science. The progress of discovery is so rapid that the most carefully prepared treatise is liable to become deficient in essential particulars before it is published. It may be "up to date" when it goes to press, and antiquated when it leaves the bindery; and the teacher who trusts entirely to his text books is not only sure to be behind the time in the matters of technical information, but is also necessarily lacking in general knowledge, in practical intelligence, and in that affluence of every day facts and suggestions which the true teacher must possess.

ESOP'S FABLES. Printed in pronouncing orthography. Published by C. W. Knudsen. South Norwalk, Conn.

Forty fables from the versions of the Rev. Thomas James and Mary Godolphin, printed phonetically to show the application of the English Demotic Alphabet, and to call attention to the spelling reform movement. Though of the opinion that none of the alphabets yet suggested will be the accepted one when English print becomes phonetic, as it is sure to be sooner or later, we believe that efforts like Mr. Knudsen's should be encouraged. They tend to familiarize the rising generation with phonetic print, and thus indirectly break down the absurd prejudice that prevails in favor of our current misspelling, simply because it is familiar.

SEARCY'S LESSONS IN PHONOGRAPHY. By W. E. H. Searcy. Philadelphia: J. B. Lippincott & Co.

The author, a practical law reporter, offers his book as a contribution to the common cause of phonography

He has drawn his material from all available phonographic sources, and claims to have stripped the subject of all unnecessary mockery and useless verbiage, retaining only such principles and introducing such "improvements" as seem to him needful for the work of verbatim reporting. How far he has succeeded in his aim it is impossible to say without mastering a multitude of hooks and other stenographic devices, which seem to one practically familiar only with Pitman's system, as fearfully numerous.

SCIENCE LECTURES AT SOUTH KENSINGTON. Vol. II. London: Macmillan & Co. Price \$1.75.

These South Kensington lectures set forth in fairly non-technical style the latest results in several departments of science, as understood by English scientists of high rank. The subjects treated are: Polarized Light, by W. Spottiswoode; Thermal Conductivity, Thermodynamics, and the Velocity of Light, by Professor Forbes; Balances, by H. W. Chisholm; Geometrical and Engineering Drawing, and Light House Illumination, by Professor T. F. Pigot; The Laws of Fluid Resistance, by W. Froude; The Bathometer, by Dr. Siemens; Instruments for Experiments on Sound and Temperament, evidently by Dr. W. H. Stone, though no names given; Sensitive Flames as Illustrative of Sympathetic Vibration, by Professor Barrett; Apparatus for Physiological Investigation and for Physiological Chemistry, by Drs. Burden Sanderson and Lauder Brunton; On Eudiometers, by Professor McLeod; and Technical Chemistry, by Professor Roscoe.

ELEMENTARY LESSONS ON SOUND. By Dr. W. H. Stone. London: Macmillan & Co. cloth, pp. 191. Price 80 cents.

As an elementary text book this work of Dr. Stone's presents several admirable features. It is well digested, compact, and better illustrated than works of the size are apt to be. The frequent summaries of facts and principles are tersely expressed and serviceable. And the book is well indexed. As a whole the work is peculiar in the fullness of the information given in the neglected field lying between acoustics and music—neglected, that is, in ordinary text books. The marked deficiency of the book is in respect to the more recent developments and applications of sound in connection with the phonograph, the telephone, the microphone, and the like. Though imprinted 1879, there is little to indicate that it was not written more than a twelve-month earlier.

COMMERCIAL ORGANIC ANALYSIS. By Alfred H. Allen, F. C. S. Vol. I. Cyanogen Compounds, Alcohols and their Derivatives, Phenols, Acids, etc. London: J. & A. Churchill.

The first volume of a practical work which has no rival in English. Its scope is aptly described in the subtitle: A treatise on the properties, proximate analytical examination, and modes of assaying the various organic chemicals and preparations employed in the arts, manufactures, medicine, etc., with concise methods for the detection and determination of their impurities, adulterations, and products of decomposition. Mr. Allen appears to be competent to the task he has undertaken, and claims to have tested in his own professional experience the correctness of the methods given. The book is well made and printed in good type.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) P. M. asks: 1. Is zinc a mineral or compound metal, and where found? A. Zinc is a metal, seldom found pure. The existence of native zinc seems still to need confirmation. The chief ores are the silicate and oxide. The largest mines of this metal in the United States are in Sussex county, New Jersey. 2. Is tin a mineral or compound metal, and where found? A. Tin is a metal; reported as occurring with the Liberian gold; also in the Rio Tipuani valley, in Bolivia, but probably only an artificial product. (D. Forbes, Phil. Mag., iv., xxix. 133, xxx. 142.) The principal ore of this metal is cassiterite or tinstone, found largely in Cornwall, England—not in this country. 3. What are brass and pewter composed of? A. Brass is an alloy of copper and zinc. Pewter is an alloy of tin and lead, common, 82 tin to 18 lead; fine, 5 tin to 1 of lead.

(2) H. L. V. N. writes: In connection with the "new optical delusion" in the SCIENTIFIC AMERICAN, for August 9, and explanations of same in August 30, I would call attention to one of a similar character, and very, almost unpleasantly, common occurrence. If a person looks intently at a swiftly moving body, such as a train of cars, nearby, and then looks at a stationary body, as the ground, the whole surface of the stationary body will appear to move around several axes with a peculiar compound sinuous motion.

(3) E. H. asks if anything has been discovered which will remove freckles, either instantaneously or by repeated applications? A. A solution of corrosive sublimate, either pure or mixed with cyanide of mercury, is commonly employed for the removal of freckles; but

a collodion, containing ten per cent of its weight of sulpho-carbolate of zinc, has given excellent results without being accompanied by any of the dangers attending the use of the mercurial solution. The following formula is an excellent one: Sulpho-carbolate of zinc, 1 part; collodion, 45 parts; oil of lemon, 1 part; absolute alcohol, 5 parts. Consult your physician in regard to application.

(4) G. P. A. asks: 1. Will ordinary clay, such as is used for flower pots, answer for the porous cells of a galvanic battery? A. If well burned, yes. 2. How may commercial zinc be purified for use in a battery? A. Pure zinc is prepared by distilling a mixture of zinc oxide and charcoal. The oxide must be purified by solution in an acid, and precipitation therefrom by a dilute alkali. See Wagner's Chemical Technology. New Jersey zinc is pure enough for ordinary battery purposes.

(5) J. R. H. asks: 1. Do gum belts require any dressing? A. No. 2. What kind of couplings are the safest and most durable for main shafts where belts run in all directions from it? A. Flange couplings and bolts. 3. Can dust from emery belts used for polishing wood be removed from each belt and the room as it is made: if so, by what means? A. Yes, by the use of an exhaust fan. 4. Is there any known composition or paint which, if applied to tin valleys and roofs, will prevent leaking? A. Some of the so-called India rubber paints may answer.

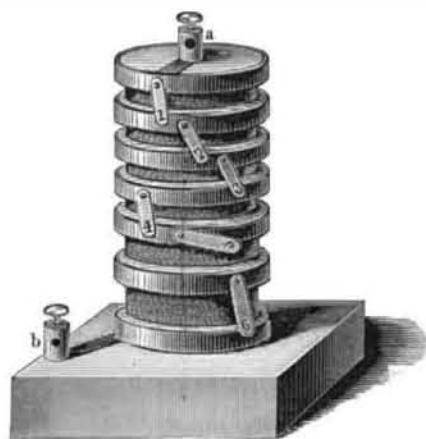
(6) C. C. asks (1) how to find the horse power of an engine. A. See p. 267 (4), Vol. 46, of the SCIENTIFIC AMERICAN. 2. What is the difference between a high and low pressure boiler; please explain and oblige? A. There are certain forms of boilers which are designated in the trade as low pressure or high pressure, but any form of boiler can be used as a low or a high pressure boiler, if it have strength proportionate to the pressure of steam to be carried.

(7) C. G. & Co. ask: Will a band saw run on wooden pulleys for sawing oak plank 2 inches thick or for sawing wagon fellicies? A. The pulleys would answer for a time, but the wood would shrink and swell under the influence of the weather, and give constant trouble.

(8) H. M. D. writes: To ascertain the amount of power it takes to drive a certain number of machines, can it not be done by putting them all at work at their full capacity and then throw off the main belt, leaving them all ready to start to work as soon as there is power enough applied, then take a cord or belt, and make one end fast to one arm of the main pulley and throw the other over on the outside and wind around, then hang on weights enough, on the lower end of the cord to start the machinery at its usual speed, then weigh the weights? It seems to me that the above method is a correct one to ascertain the correct amount of power used. A. If you can accomplish it as you propose, it will give you the amount of power; but we think you will find it a difficult thing to do.

(9) B. B. M. asks (1) for a receipt for making mustard for table use. A. 1. Salt, 1½ lb.; scraped horse radish, 1 lb.; garlic, 2 oz.; cloves, 2 oz.; hot vinegar, 2 gallons; macerate in a covered vessel 24 hours, strain and add flour of mustard, q. s. 2. Mustard, 3 lb.; salt, 1 lb.; vinegar, grape juice, or white wine, to mix. 2. What is the rule for getting the weight of hay in bulk as in a mow? A. A solid cube of dry hay, 10 feet square, weighs about one ton.

(10) A. R. M. asks how to make a cheap rheostat. A. Eisenlohr's column of resistance, shown in the accompanying cut, is inexpensive and very convenient. It consists of a cylinder of mahogany or other compact wood, having about nine grooves cut in it. The cylinder is saturated with paraffine or varnished with shellac, and the spaces between the grooves are bound with brass bands. A little brass bar, turning on a screw, is made to extend from one ring to the other, as shown; these bars must be slightly bent so as to press



with some force upon the bands. Covered wire of a known resistance is wound in these grooves, the shortest length containing the given unit once or an even number of times. The length of the coils of wire in the successive grooves increases from 1 to 9; the ends of each wire are soldered to the two nearest bands, the upper band being connected with the screw, *a*, and the lowest with *b*. When this column is inserted in a circuit, the current passes from one ring to another through the bars, whose resistance is inconsiderable, but when one of the bars is turned aside, as shown in the engraving, the current passes through the intervening coil.

(11) W. W. M. asks: Where can manganese in the metallic state be obtained; can it be melted in a plumbago crucible, either by itself or in molten copper? A. Metallic manganese is not a commercial article, but small quantities of it may be purchased from dealers in rare chemicals, etc., at \$1 per gramme. In appearance it somewhat resembles iron, but is usually much harder, and requires a very strong white heat to effect its fusion. In small quantities the metal will alloy with copper at a high temperature, if protected from the air by powdered carbon. 2. I obtained some

of the ore in a comminuted state, and was told that it could not be melted. I put some of it, with some borax for a flux, in an anthracite coal furnace, and obtained something like the inclosed sample. Is it of any value? A. The sample probably consists of the double borate of manganese and sodium, used in Germany as a substitute for litharge in the manufacture of paint driers, jaspers, etc. It would hardly command a remunerative return here.

(12) W. C. B. asks: How much more (if any) than its own weight, can a railroad engine start on a perfectly level track, assuming that there is no slack between the engine and cars? A. It depends upon the style and proportions of the locomotive, number of drivers and diameter, proportion of weight on drivers, and steam carried, also the style of the cars in the train.

(13) J. W. M. asks: How many feet should the piston head of a steam engine travel per minute? A. There is no fixed rule for the speed; it depends upon the length of stroke and the work that is to be driven, in other words, the speed of the piston is adapted to the work to which the engine is applied.

(14) C. E. B. writes: I am running an engine in a saw mill, driving wheel 20 feet, drum on saw shaft 2 feet, engine makes about 35 revolutions per minute. Can I increase the capacity for work by double gearing; if so, I would like to reduce the driving wheel to 16 feet? A. No, it would be better, if you wish to reduce the pulley to 16 feet, to increase the speed of the engine proportionately.

(15) L. M. D. asks: 1. What is the best way to pack the screw shaft of a toy propeller? A. Pack with cotton wicking. 2. What should be the dimensions of cylinder for running the boat, which is two and a half feet long? A. From 1 inch to 1 1/4 inch diameter, and 2 inch to 2 1/2 inch stroke. 3. What is the best shape of boiler? A. A vertical tubular.

(16) J. C. M. asks: 1. In a flour belt it is usual to put on two widths of bolting cloth: what would be the objection to putting on three? A. Two, three, or four are used; it is common to put on three; it depends upon the number of grades you wish to turn out. 2. I have built my dam V shaped, sharp part down stream; would that shape cause the water to rise less on the abutments? A. In strong currents there will be less rise on the shore abutments. 3. At what speed should an overshot water-wheel run? A. 4 to 8 feet per second. 4. Can a horse pull as much 500 feet from his load (on a level with his shoulders) as if within 5 feet? A. Yes, all other things being equal; but if there is 500 feet of rope dragging on the ground, its friction is a part of the load.

(17) W. N. R. writes: In a late number, p. 267, SCIENTIFIC AMERICAN, you gave a simple method of finding pressure in steam boiler with weight at a certain point on lever. Now, will you please give as simple a method of finding the point at which to place the weight so that steam will blow off at any required pressure? A. 1st, Multiply the pressure per square inch by the area of the valve; the product is the total weight required upon the valve. 2d, Divide this total pressure by the weight to be hung on the valve lever; the quotient is the number of "leverages" which you must give the weight from the fulcrum. Suppose 100 lb. steam and 12 inches area of valve: then total pressure on the valve is 1,200 lb.; and if the weight be 80 lb., then $1200 \div 80 = 15$ "leverages." Now, if the distance from fulcrum to center of valve be 3 inches, then the weight must be set at $3 \times 15 = 45$ inches from fulcrum, or 42 inches from center of valve. Of course this does not take into account the effect of the lever or weight of the valve.

(18) E. F. W. asks: Can you inform me of a place where engineering ability is appreciated and paid for, and where men are obliged to be engineers who have charge of engines? A. We know of no such paradise. The ability of a competent engineer is not appreciated. So long as men will employ any one at low wages who can stop and start an engine, so long real engineers will not be put in their proper place.

(19) J. S. A. asks: 1. How fast an engine, with cylinder 3 1/4 inch diameter and 3 inch stroke, and 80 or 100 lb. of steam, and connected with paddle shaft by gears (bevel), would propel a flat-bottomed skiff 15 feet 6 inches long and 30 1/2 inches wide, and drawing 5 or 6 inches of water? A. If geared 3 or 4 to one, would probably drive the boat about 5 miles per hour. 2. What would be the dimensions of the boiler to supply 100 lb. steam, and how thick should the iron or steel plates be of which it is constructed to safely withstand the pressure and at the same time be as light as possible? A. The size of your boiler and thickness of iron depend upon the speed you run the engine and the design of the boiler.

(20) M. B. writes: We have placed a hydraulic ram to force water to the barn, a distance of 1,300 feet, and 40 feet rise and 2 feet fall for a 2 inch feed pipe 40 feet long. We had at first a No. 4 ram, which furnished but a 1/4 inch stream, and have now placed a No. 5 ram, which will not strengthen the stream. We were advised to place a 3/4 inch discharge pipe, which we did. I would like to know if it would not throw a stronger stream with 1/2 inch pipe, and work more freely. A. According to the tables the ram should have 1 inch pipe instead of 3/4 inch. Apply to the maker of the ram for advice. 2. How much water is contained in the air chamber? A. The quantity of water in the air chamber will depend upon the pressure under which the water is delivered.

(21) J. N. T. asks: What is a suitable size of engine for a boat 35 to 40 feet long and 8 feet beam? A. A high pressure engine of 8 inch cylinder and 9 or 10 inches stroke will give your boat good speed.

(22) B. T. L. asks: 1. Supposing a horse attached to an empty wagon runs rapidly around a sharp curve, which wheels of the wagon bear hardest on the ground? Or, in other words, if the velocity be sufficient to raise any of the wheels from the ground, from natural causes which will be raised, the inner or the outer wheels? A. Inside wheels. 2. If a man be in a wagon rapidly turning a curve, will he, to preserve his balance, instinctively lean toward the outer or inner edge of the curve? A. Toward the inner side of curve. 3. Why, on railroad curves, is the outer rail raised several inches

above the inner? A. To counteract the effect of centrifugal force in running the curve.

(23) C. R. J. asks: Will black lead do for a substitute for gas coke in batteries? A. Yes, Professor Silliman, Jr., used it in the Grove form of battery as a substitute for platinum, in 1842. Gas carbon is found to answer a better purpose.

(24) L. H. H. asks: 1. Does a low pressure engine gain power by condensing its steam? A. Yes, the gain is considerable. 2. Are high pressure engines made with walking beams? A. Yes, in great numbers.

(25) "Tropic" asks if there are furnaces made to burn petroleum oils (that could be used instead of coal or wood in hot climates) sufficient to heat a large-sized fruit evaporator continuously, and where such can be got. A. There are several petroleum furnaces now in the market, one of which would doubtless answer your purpose. See "Business and Personal" column. 2. Can you inform me if any material can be had that would absorb the moisture from the saturated air in a large sized drier so that the heat may be confined and yet the water or vapor disposed of? A. We know of nothing likely to be of any practical service in this connection. 3. Do you know of any of the refiners of petroleum oils do or will prepare the "petroleum jelly" made with digested soap wort and refined kerosene oil? A. "Petroleum jelly," or vaseline, is manufactured on a large scale. It is a proprietary article.

(26) T. F. writes: We have a natural supply of water at an elevation of about 100 feet and 1,500 feet distant from the center of our village, and we propose bringing the water down in pipes for the purpose of extinguishing fires. The main pipe will enter the main street at right angles, and a branch run not to exceed half a mile, and as it is not probable that we can have hydrants near enough together, or have hose enough to bring more than two streams of water to bear upon one building, now what size should main pipe and branches be, or rather, what is the smallest size that can be used and make it effectual, and of what size should the hose and the discharge nozzles be? A. The larger the pipes the less the loss of head by friction. We think the main pipe should not be less than 6 inches, and the branch pipes, 4 inches diameter.

(27) A. W. S. asks what is put upon microscopes to keep them from tarnishing. I have just made one and wish to know what lacquer to put on it. A. A thin coating of fine alcoholic shellac varnish applied to the work, which has been previously warmed, will preserve the color of the brass. The color of the lacquer may be heightened by adding turmeric or dragon's blood, or both. 2. How can I resilver or re-coat the back of a concave mirror or reflector for microscope? A. See article on silvering glass in SUPPLEMENT, No. 105. 3. I am a brass finisher by trade, and would like very much to know how yellow brass may be made to keep its color without appearing varnished. A. A thin varnish of white shellac or a coating of collodion will do this. It will retain its color for a long time without a protective coating of any kind, if the finish is sufficiently fine. A light film of gold is the best possible coating for fine brass work.

(28) D. J. T. O. asks for a good receipt for making wine for home use out of our common grapes. A. Put 20 lb. of ripe, fresh picked, and well selected grapes into a stone jar, and pour on them 6 quarts of boiling water. When the water has cooled enough, squeeze the grapes well with the hand; cover the jar with a cloth, and let it stand for three days; then press out the juice, and add ten pounds of crushed sugar. After it has stood for a week, scum, strain, and bottle it, corking loosely. When the fermentation is complete, strain it again and bottle it, corking tightly. Lay the bottles on their side in a cool place.

(29) J. S. writes: 1. I propose making an electric motor, and would like to use in its construction the Camacho electro magnet, as illustrated in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 182, page 2,900. Is the yoke made of iron or wood? A. Iron. 2. If of iron, would pieces of ordinary gas pipe, soldered to the yoke, do for the tubes? A. Gas pipe will do, but it must not be soldered. The iron of the yoke must make a good contact with the iron of the tubes. 3. Would 3/4 inch (outside diameter) gas pipe be too large for first, or inside tube? A. It would be better to use a smaller size, say 1/2 inch. 4. Must the inside of each outer tube press tightly against the insulated wire of each inner tube? A. It need not necessarily press tightly, but the space between the two should be small. 5. The battery will be close to the magnets: will No. 16 cotton covered wire be suitable? A. Yes. 6. I propose making the cores five inches long, and use three or four thick tubes: how thick should the yoke be? A. 1/2 inch. 7. If four tubes are used in each core, about what attractive force would such a magnet exert, at a distance of 1/2 of an inch, with a battery of 12 elements (large size), such as is illustrated and described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 149, page 2363? A. It would be difficult to estimate the attractive force of such a magnet without knowing more of its construction and the circumstances under which it is used.

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

G. A. B.—No. 1. Limonite, a very fine iron ore. No. 2. Clay, aluminum silicate, containing much silica. If properly washed, of some value for the production of cheap pottery ware. No. 11. Hematite, an iron ore of good quality. No. 12. Chiefly iron pyrites, sulphide of iron. No. 10. Partially altered calcium carbonate, calc spar, containing traces of strontium carbonate and manganese oxide. No. 8. Ferruginous limestone. The other specimens are limestones. No. 6 will probably yield the best lime.—J. M. G.—It is a syenitic gneiss rock of little value.

COMMUNICATIONS RECEIVED.

On Boiler Explosions. By R. H. B.
Plan for the Darien Canal. By C. A.
On Fire Alarms and Fire Escapes. By W. A.
A Positive Discovery. By T. B. M.
On the Holloway Process. By L. C.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were
Granted in the Week Ending

August 19, 1879,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Auger, spoke tenon, R. W. Eaton 218,721
Bag holder, W. B. Allen 218,654
Bale tie, D. D. Cohen 218,712, 218,713
Bale tie, C. W. Shepard 218,734
Bale ties, device for applying, C. P. Higgins 218,740
Bale tying machine, C. P. Higgins 218,741
Baling press registering device, B. Smith 218,645
Barrel cleanser and washer, C. Glismann 218,621
Bed bottom, J. P. Randle 218,696
Bed, cabinet, F. Koskul 218,678
Bird cage, J. Maxheimer 218,738
Bolt trimmer, W. Butler 218,706
Boot and shoe counter stiffeners, machine for moulding and shaping, G. F. Moore 218,763
Bottle or can fastener, W. Doyle 218,719
Bottle stopper, W. Beardsley 218,698
Box and package filler, C. E. Bolton et al. 218,658
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Brick mould and brick press box, T. & J. Clifford 218,711
Brow band, R. Manning 218,755
Brush handles, clamp for securing, A. J. Hinds 218,743
Bug destroyer, R. H. Spalding 218,789
Button and stud, P. Nerney 218,638
Button and stud, W. E. Robinson 218,688
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Button, suspender, M. J. Racer 218,772
Calendering machine, G. E. Marshall 218,756
Can or vessel for containing oil and other liquids, M. Stransky 218,792
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Car starter, H. Turner 218,647
Cars, heating and ventilating, W. E. Prall 218,685
Carriage, child's, F. Lavancy 218,679
Carriage top prop, J. Ives (r) 8,857
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Checker and button maker, W. L. Parmelee 218,640
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Churn, S. K. Ferguson 218,669
Churn, W. H. Sterns 218,790
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Cinders into building material, conversion of, J. Pechmann 218,768
Clasp for fastening packages, J. H. Weaver 218,652
Clay mill, W. G. Merrill 218,760
Coffee and spice mill, A. Shepard (r) 8,866
Coffee crushing roll, J. C. Chambers 218,664
Coffee mill, F. Hasdentel 218,627
Colter hanger, plow, A. H. Burlingame 218,617
Corn from the cob, cutting green, Burt & Dunn (r) 8,854
Cotton and hay press, J. Rossell 218,777
Coupling for shafting, tubing, etc., A. Faust 218,723
Detergent compound, C. Kahn, Jr. 218,676
Easel, J. H. Stratton 218,791
Enameling bricks, compound for, D. W. Clark (r) 8,855
Envelope, packet or sample, J. H. Weaver 218,650
Ethyl-chloride, making, J. F. Gesner 218,671
Evaporating furnace, A. Shoemith 218,785
Explosive compound, A. Monnier 218,702
Fan attachment, A. H. Watkins 218,649
Fare box money drawer, F. Schlegel 218,781
Fare register, G. E. Hart 218,735
Faucet, J. G. Hess 218,739
Fence, A. G. Hulbert 218,747
Filterer and cut-off, combination, H. R. Love 218,635
Fire back, W. T. Bracherry 218,616
Fire escape, T. McCabe 218,680
Fire kindler maker, A. F. Temple 218,794
Fish trap, W. J. Henderson 218,737
Fluting machine, H. Albrecht 218,696
Fork, C. W. Robinson 218,642
Fruit jar fastener, R. R. Richardson 218,687
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Gas retort furnaces with ignited coke from the retorts, device for feeding, F. A. Sabbaton 218,689
Gas retort lid fastening, J. Green 218,672
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Grain binder, S. H. Richardson 218,774
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Hydrocarbon burner, T. B. Dexter 218,619
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Leather fastening strip, G. W. Copeland 218,665
Leveling instrument, J. Clark 218,710
Lightning conductor, G. W. Cain 218,703
Liquid cooler, J. H. Schroeder 218,782
Lock, W. H. Garlock 218,728
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Measuring machine, surface, J. H. Williams et al. 218,802
Meat can, cooked, W. S. George 218,729
Milk, centrifugal machine for creaming, Lefelt & Lentsch 218,753
Milk cooler, F. W. Moseley 218,765
Mill burr dress, L. Strayer 218,793
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Organ, J. L. De Good 218,618
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Pipe wrench, W. Newcomb 218,639

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Propeller, vibrating, J. L. Nevers 218,766
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Pulley crane for clothes lines, Raisbeck & Green 218,773
Pump bucket, chain, E. Hoyt 218,746
Pump, direct acting, J. H. Gray 218,731
Pump operating mechanism, J. J. Verckler 218,694
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Punch, conductor's ticket, H. Schilbach 218,780
Railway crossing, H. Jeffrey 218,632
Railway signal apparatus, electric, C. D. Tisdale 218,693
Railway support, elevated, F. A. Williams (r) 8,860
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Raker, self, J. Bordwell 218,615
Reclining chair, adjustable brace, C. J. Petersen 218,769
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Refrigerator, C. B. Shaw 218,783
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Rowing exercise machine, J. W. Heenan 218,736
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Safe spindle, J. D. Bruner 218,704
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Spark arrester, M. Rumely 218,643
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Spool, H. Eldridge 218,722
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Stamp, perforating and canceling, W. S. Greene 218,622
Steam boiler, E. A. & W. E. Wood 218,695
Steam boiler cleaner, H. Poe 218,771
Steam engine, Cope & Maxwell 218,666
Stove, J. G. Smith 218,788
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Telegraph, fire alarm, W. Fix 218,724
Telephone and microphone switch, A. E. Briggs 218,702
Telephone, electric, H. L. Roosevelt 218,775
Telephone, speaking, G. M. Phelps 218,684
Telephone, mechanical, Billings & Maxwell 218,707
Terret, C. T. Griley 218,623
Thill coupling, A. P. Johe 218,675
Thrashing machine, Bitner & Gentzel 218,657
Thrashing machine feeder, Norton & Edgar 218,688
Timber, solution for preserving, E. Bouvier 218,659
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Toy pistol, A. Blewett 218,699
Trace supporter, C. A. Brooks 218,703
Traction engine, C. G. Cooper 218,714
Treadle and hand lever, H. R. Saunders 218,779
Trimming, G. Simon 218,786
Trucks, spring equalizer for car, J. J. Thomas 218,796
Vehicle, C. M. Murch 218,637
Vehicle spring, J. Hironimus 218,628
Ventilating sewer pipes and water closets, L. Uilo 218,791
Violin, E. E. Mollenhauer 218,761
Wagon, road, C. W. Saladee 218,690
Washing machine, J. H. Craig 218,717
Washing machine, B. J. Williams (r) 8,861
Washing machine, wool, etc., J. Petrie, Jr. 218,770
Wick tube, H. McConnell (r) 8,858
Windmill, C. H. Cary 218,662
Windmill, L. C. Coriell 218,715
Window frame machine, W. H. H. Kesler 218,751
Window ventilator, J. E. Lloyd 218,754
Wood, process and apparatus for preserving and curing, W. D. Grimshaw 218,624

TRADE MARKS.

Beefsteak tenderer, F. E. Clark 7,597
Calf skins and kips, Loeb & Brothers 7,666
Cigars, cigarettes, plug, and fine cut chewing and smoking tobacco and snuff, Dohan, Carroll & Co. 7,604
Cut smoking tobacco, M. Mandelbaum 7,599
Diaries, J. Gladding & Son 7,595
Dress shirts, cotton and woolen shirts, undershirts, and collars, H. Wallach's Sons 7,608
Flour, T. J. Cox 7,601
Kid and lamb skin gloves, G. Cramer 7,602
Medicinal preparation, J. B. & E. A. Griffith 7,593
Preparation for the toilet, H. C. Parker 7,600
Sewing machine, St. John Sewing Machine Co. 7,607
Smoking tobacco and cigarettes, J. R. Day & Bro. 7,598
Starch for laundry use, Glen Cove Starch Mfg Co. 7,605
Watches and watch movements, A. Saltzman 7,596
Whisky, I. Massman & Co. 7,603
Whiskies, A. Hoffheimer 7,594

DESIGNS.

Carpet, J. Fisher 11,335 to 11,340
Carpet, E. Fisher 11,341 to 11,352
Carpet, C. W. Swapp 11,353 to 11,355
Printed fabrics, J. B. Altamus 11,354
Scarf pin, J. L. Remlinger 11,359
Toy savings bank, Keyser & Rex 11,358
Umbrella tip cup, W. H. Blake 11,356
Watch charm, W. Ludlum 11,357

English Patents Issued to Americans.

From August 8 to August 12, inclusive.

Barbed fence wire, manufacture of, A. Cary, N. Y. city.
Bed bottoms, C. D. Flynt, Brooklyn, N. Y.
Boiler fue, regulating draught in, A. C. Harrison, Philadelphia, Pa.
Burnishing screw heads, machinery for, C. D. Rogers, Providence, R. I.
Carding engines, J. Abbott, Philadelphia, Pa.
Clasps, B. Greig, New York city.
Deaf, instrument for, R. S. Rhodes, Chicago, Ill.
Glazed surface, treatment of, W. Gibson, N. Y. city.
Governor, automatic for marine engines, C. W. Cooper, New York city.
Grinding machine for cards of carding engines, B. S. Roy, Worcester, Mass.
Motors, Molera & Cebrían, San Francisco, Cal.
Plaster and pad therapeutic, R. M. Kennedy, Pittsburgh, Pa.
Sewing machine, carpet, J. Hess, San Francisco, Cal.
Ventilating buildings, apparatus for, F. L. Norton, New York city.
Veneer cutting machine, H. T. Bartlett, New York city.
Window cleaning chair, Anna Dormitzer, N. Y. city.