

Evaporative Qualities of Iron, Copper and Brass in Boilers.

In a recent article on page 204, this volume SCIENTIFIC AMERICAN, we presented some very useful information on this subject from the London *Mechanics' Magazine*. It was stated from a series of experiments conducted by George Tosh, that brass boiler tubes were found to possess an evaporating power exceeding those of iron twenty-five per cent, and that copper tubes exceeded those of brass thirty-one per cent. We observed that the accuracy of the experiments was doubtful, and our doubts we perceive are confirmed by the last issue of the London *Artisan*, received by us since the article referred to was published. It contains a very good report of the discussion which was elicited by the reading of Mr. Tosh's paper before the Institution of Mechanical Engineers. At that meeting, W. B. Johnson stated that the results obtained by the author of the paper (Mr. Tosh) were very different from his experience, as he had been led to the conclusion that there was no appreciable difference between iron and brass in evaporative power. He had a good opportunity of comparing them on a large scale in "two boilers of 160 horse power each, which had been made exactly alike, excepting that one had iron and the other copper tubes. The result of the working of these boilers was about equal, and no difference could be noticed between them."

Professor Rankine stated that a series of experiments had been tried a number of years ago, by James R. Napier, with experimental boilers of copper and iron of various thicknesses heated over the same gas flame, and he found but a small difference in their evaporative power, about one-thirtieth being in favor of copper. "In all experiments of the kind," he said, "the state of the heating surface was important, that is, whether smooth or rough, clean or encrusted. The effective evaporating result or transmission of heat through metal depends on three properties—first, the resistance of the first surface (that next the fire) to absorption of the heat; second, the resistance of the internal particles of the metal to the conduction of heat; and thirdly, the resistance of the second surface (that next the water) in giving off the heat. The resistance to internal conduction is less in copper than iron, but its surface resistance is greater. It had been found in experiments very carefully conducted that when the surface became dull, the transmission of heat through all metals was about equal."

Mr. Siemens stated that Dr. Ure had proved by a series of experiments that the conducting power of copper was so good, that by increasing its thickness in a boiler, its evaporative power was not sensibly retarded, while with iron, the result was different—by increasing its thickness, evaporation was greatly retarded. On the other hand, Mr. Roberts stated he had found that the thickness of the metal in a boiler—whether of copper or iron—greatly affected the evaporation of the water. The plates, when thick, retarded the passage of heat, and tended to injure the metal by not permitting the caloric to be carried off so rapidly as it should be by the water. He found that brass tubes of No. 18 wire gage, lasted much longer than thicker ones of No. 14 wire gage, under the same conditions precisely. Mr. Craig stated he had not found much difference in practice between brass and iron tubes in locomotives, and did not know of any definite result in favor of one more than the other as to evaporative powers.

Mr. Henry Maudsley stated that in steam engine boilers—particularly marine and stationary—there were other reasons affecting the use of copper or iron beside evaporative qualities or conducting power for heat. Their durability, under exposure to rusting or corrosion, and liability to encrustations being formed in them, were questions of great importance. He had known a case of nine marine copper boilers ordered for Naples in preference to iron, because allowance had to be made for their being sometimes laid up without working, and not to suffer from rust,

as iron boilers were sometimes under the same conditions seriously injured in eighteen months, while copper boilers were not affected. The original cost and conducting power of boilers, under the same circumstances, were secondary questions to durability.

Mr. Tosh then stated that where he has had charge of locomotives and other engines for several years at Maryport, he had used a great number of brass and iron boiler tubes with apparently equal success, but brass tubes had been generally preferred for locomotives working at a high pressure, because there is less difficulty in keeping them fast in the tube plates, and encrustations are not so liable to form on them as on those of iron; and when iron tubes became leaky in the least degree, their ends were rapidly destroyed, which was not the case exactly with brass. Iron boiler tubes are now extensively employed in England, and many engineers are of opinion that no other kind should be used, but brass is still preferred by the majority.

The foregoing information on this subject—giving the substance of opinions expressed by engineers distinguished in their profession—is of much importance, and will interest our readers generally.

Laboratory—No. 2.

Equivalents.—We can no more make progress in chemistry without studying its principles and its laws, than an artist can paint a perfect picture without knowing the rules of perspective; it is for this reason that we have recently turned from the subject of experiments to that of doctrines, especially as we hope that some of our readers will at a future day give us credit for being the finger-post on their road of life which pointed to the path leading to honor. The term "equivalent" in chemistry has much the same meaning as it has in ordinary things. An equivalent means of the same value; thus, twenty shillings in silver (English currency) are equivalent to one sovereign in gold. In the laboratory, the word equivalent implies an atom of matter that is equal to another of a different kind; thus, as we learned in a previous article, that every atom of an element has a specific weight compared with another atom, this weight has, by the consent of philosophers, been denominated its "equivalent." Hence, 28 parts of iron, combining with sulphur, always unite with 16 parts of that fiery element; let the weight of the materials be in grains, ounces, or pounds, the same proportion is always there—in sulphuret of iron. You will say, for the sake of argument, "But suppose we only put 14 parts of iron to 10 parts of sulphur, they will unite." Chemical doctrine says "No," for there will be free sulphur containing no iron; in the mixture, the 14 parts of iron will have combined with 8 of sulphur, which is in the same proportion stated, for as 28 : 16 :: 14 : 8. It is thus we call 28 the "equivalent" of iron, and 16 the "equivalent" of sulphur, because we have made hydrogen as the standard of comparison, and have fixed upon 1 as its equivalent, and the base or unit of calculation in measuring the equivalents of all other bodies. A list of equivalents or atoms in weight is given in every elementary work on chemistry; it is, therefore, sufficient for us to point out the road where the philosopher's stone may be found.

Alloy for Medals, Small Figures, &c.

Herr von Bibra states that an alloy consisting of 6 parts bismuth, 3 tin, and 13 lead, is very fusible, and remarkably hard, without being brittle. The fracture does not present any crystalline appearance. When objects cast with this alloy are moistened with dilute nitric acid, and rubbed with a woolen rag, the raised portions appear bright, and the depressions dull. Some castings of medals from gypsum molds were so perfectly reproduced that writing, which could be read on the originals only by aid of the microscope, was quite distinct in the copies. It is probable that this alloy would be serviceable for typographic purposes.—*American Mining Chronicle*.

Foreign Summary.

C. D. Seropyan, of New Haven, Conn., has secured a patent in England for a mode of preparing bank notes, bills of exchange and other papers, to prevent counterfeiting by photography and its kindred processes, by using two or more colors, which do not reflect nor transmit, but absorb the chemical rays of light, one of which shall be so applied to the paper as to cover the surface with a tint of a red or a yellow shade of color, while an ink of a different color from the surface tint shall be used for printing the other parts of the note, that is, the obligatory and ornamental parts of the said surface. Where this mode of preparing notes is observed, counterfeiting by photographic or kindred means cannot be effected; for so long as the tint or ground and the vignettes and lettering remain together, a distinct impression of the latter cannot be obtained sufficiently clear and distinct to answer the purpose of the counterfeiter, because both the colors neither transmit nor reflect, but absorb, the chemical rays of light.

POWERS, THE SCULPTOR.—We observe that our distinguished countryman, Powers, has secured another patent in England for a machine for punching, stamping, or cutting metals or other substances, in which the tool can be changed very quickly, and the whole machine can be taken to pieces and re-adjusted with great expedition. Like the singularly and novel formed rasps he invented a few years since, it appears to be simple in construction and admirably adapted to the purposes for which it is designed.

ANOTHER AMERICAN TELEGRAPH.—There is a project on foot at St. Petersburg for establishing a strictly overland telegraphic company with North America. The plan has been presented to the government by a Belgian engineer, and consists in carrying a telegraphic line by Siberia, and to establish a submarine communication between Capes East and Prince of Wales, then to join the lines to those of the United States through the territories of Russia, and England.

THE LEVIATHAN.—Some idea of the immense magnitude of this monster steamer may be formed from the fact that the mere cost of completing her for sea, putting on board stores, &c., and fitting her for the trip she is expected to make to Portland, Maine, the coming summer, will amount to the enormous amount of \$600,000. No less than ten anchors are required to hold her at her present moorings, each with lengths of cable from 40 to 160 fathoms. All her masts are to be stayed by iron rope standing rigging of the most massive kind, the shrouds and stays of which are so secured at their ends through iron rings as to enable a single skilful man to cast loose all the fastenings of each mast in five minutes, in the event of disaster, though until the rings are opened, the sides might yield from the ship before the shrouds would yield.

THE ATLANTIC TELEGRAPH.—Four hundred miles of new cable are in course of manufacture to supply the loss from the failure of the experiment last year, and 300 additional miles which it has been resolved should be provided, so as to allow greater length of slack than was originally contemplated. The cost for these additional 300 miles is estimated at \$180,000. It is generally believed that the plan of joining the cables in mid ocean, instead of starting from either shore, will be resorted to. Considerable modifications are being made in the machinery, and experiments are now in progress with a view of making the machinery for paying out as nearly as possible self-acting.

NEW LUBRICATING MATERIAL.—M. Rohrig has discovered a means of removing the acid principles of fat, and thus enabling it to be applied as a lubricator for machinery, without danger of oxidizing the metals with which it comes in contact, besides freeing it from all disagreeable smell and taste, and rendering it to a consistency of castor oil. It hardly colors copper, bronze or brass, does not run like olive oil and other thin oils, and is much cheaper than the ordinary lubricating material.

Correspondents

J. C. R., of Va.—A patent cannot be obtained for any improvement but in the name of the inventor. The apparatus for extracting tannin from bark, described by you, is not new, and therefore not patentable. Vegetable oils are generally injurious to leather, and so are some animal oils. Flax, olive, and whale oils soon rot leather. Tallow and neat-foot oil make a good leather composition. Tooth powders should be avoided, if possible; they are not required if the teeth are, as they should be, kept clean.

E. B. S., of Iowa.—You will find the artificial ears to which you refer, illustrated on page 67, Vol. XII, Sci. Am.

C. O. R., of N. J.—The fine gloss on shirtbosoms can be produced by a mixture of gum arabic with the starch; but we believe that our city laundresses do it by the quickness with which they iron.

M. F. C., of Iowa.—The friction of your water-tight joints through which D passes, would alone prevent your ever obtaining perpetual motion. Turn your attention to something useful, and do not try to catch shadows.

M. A. W., of Ill.—You can precipitate iron from its solutions as sesquioxide, by adding a solution of carbonate of soda. It cannot be precipitated in a metallic state.

F. L. W., of S. C.—We could not get up nice engravings of your invention without the aid of a model to take the views from. Engravings taken from the drawings which are attached to the Letters Patent can seldom be made to illustrate an invention in so practical a manner as when the views are taken from the machine or a working model; therefore it is as important to you to furnish good material, to get up your engravings from, as it is to us.

E. C. M., of N. Y.—Your communications cannot be published. We can fill our columns with matter of more interest to our readers than what you have written.

P. A. P., of Fla.—A revolving battery intended for the use of war vessels, is not new. If you have anything new in this department it can be patented. Send us a sketch and description of it for examination.

A. H., of Wis.—The employment of a long tube through which to run out the submarine telegraph cable, has been already suggested to us.

J. J., of Ohio.—The "Railway Association" for the encouragement of inventions, to which you refer, is *non est inventus*. The squaring of the circle means the multiplying of any part of a circle into such a number as will give the exact circumference—without a remainder.

R. F. B., of Mo.—Your plan of propelling boats by two direct-acting blades working in tight boxes through the stern of a vessel, is not new, except in being placed on an incline, and being lifted out of the water at each stroke. This is not an advantageous method of operating; they should be placed horizontally.

S. R. Reed., of Buffalo, N. Y., wishes to correspond with the manufacturer of the ditching machine exhibited at the Elmira (N. Y.) Horse Fair last fall. Inventors and patentees who hide their light under a bushel must expect to be neglected, or if found at all it must be by some such method of pursuit as is adopted in this case. Such requests as Mr. Reed makes are becoming very numerous.

H. H. F., of Miss.—We are of opinion that your present patent covers the modification of your machine, as represented in the diagram you have sent us.

B. B., of Ohio.—Gloves made of stout cotton canvas, boiled in a strong solution of alum, and then dried thoroughly, should last much longer than either leather or india rubber, for handling potash. Several methods for steering vessels have been patented; see Captain Brown's, illustrated on page 265, Vol. 6, Sci. Am.

L. S., of Ind.—Your idea of conveying gas in suitable vessels from place to place, for the purpose of illuminating small villages, is very old. Many years ago a company was formed in London to manufacture illuminating gas, and deliver it to the consumers in bags at their own houses. It was a failure.

J. W. H., of Ind.—Your theory "that there are two funnel-shaped holes running into the earth from the poles, through which light and heat enter into it, to disseminate their life-giving properties, and which for forty years you have been maturing," is highly improbable. Mariners and explorers have been very close to both poles, and have not seen anything of the holes; again, the penetrative powers of light and heat have been measured, and we know exactly how they penetrate the earth. The facts are against you, and true theories can only be formed on known facts. The idea is an old one, having been first promulgated by a Prussian philosopher in the time of Frederick the Great.

L. K., of Pa.—The expansion of hot air is uniform. The pressure increases one pound for every 23 degrees of heat. The pressure is 15 pounds on the square inch, when raised to 430 degrees of temperature.

R. B. N., of Pa.—Your barn being 40x90 feet, should be protected with a lightning rod at each end, which should extend at least ten feet above the summit of the roof, and down several feet into the damp ground, or into a well of water. Unite the sections perfectly together, and fasten the rod to the barn with glass cleets, or brackets of dry wood covered with shellac varnish. The higher and thicker the rod, the more perfect will it be as a lightning conductor.

W. J. S., of —Messrs. Crum & Paul have a patent for an improved process for making bread, but we are not aware of any patented machinery of theirs for this purpose. If you had informed us in what State you reside you would have had our answer by mail several days since. There are Newports in almost every State in the Union.

J. R. S., of Va.—We advise you not to expend time and labor in experimenting with hot air engines. No power can be obtained from contracting the air—it is a mechanical impossibility.

R. D., of Mich.—Tin being dearer than copper, of course an alloy of these two metals is more expensive than brass made of zinc and copper.

E. E., of N. Y.—If the circumstances are as you state them, Mr. A. cannot secure a patent on his alleged improvement; but if his invention is new, no influence can possibly avail to prevent the issue of a patent to him.

T. M. P., of N. Y.—To stamp an unpatented article "patent right secured," would be a clear violation of the law and punishable by fine.

D. A. B., of Ala.—If your plan for forcing letters through tubes, by means of atmospheric pressure was new, we should have no confidence that it would ever succeed.

J. B. C., of Ind.—If you own the right in a patented invention for a certain territory, you can make and sell to any and all purchasers upon your own ground.

F. J. M., of Mass.—When salt water is employed for steam boilers the salt sinks to the bottom—becomes concentrated—it does not rise to the surface; and is removed either by a brine pump or blowing-off.

T. B. J., of Mass.—We are much obliged to you for your attention in sending us the extracts regarding the Russian steamer *Moscow*.

M. M. K., of Texas.—You say that owing to the long droughts of the summer and the ravages of the cutworms, no hedging has yet been tried in your State that answered the purpose, and that by a careful study of the thornshrubs of your region, you have found one that will stand these unfavorable conditions, and inquire if you can get a patent for it.

H. J. H., of Ill.—The philosophy of color is simple. Colors are not substantives, but appearances caused by reflected light, and are no more material than the light itself.

J. C., of Texas.—Silver or copper are the best metals you can use for electro-plating. You should get "Smee's Electro-Metallurgy," published by Wiley & Halstead, this city.

S. W. B., of Vt.—There are arrangements of gearing on various machines for communicating a fast or slow motion to machinery. A cone pulley is the most convenient and common, but not the absolute method.

W. H., of —Your gunpowder engine is new to us. We cannot tell you what would be the cost of it as a power. The sketch which you have sent us representing an endless belt of buckets is not a new water motor, but one that is as old as the genuine water wheel.

D. A. M., of Pa.—The number of the Sci. Am. you wanted has been sent. A millstone of 3 1/2 feet in diameter will not produce backlash so readily as one of four feet, if the revolutions of the two are equal, no matter what kind of gearing may be employed.

J. D., of N. Y.—Blocks of granite about twelve inches deep, and seven or eight inches wide, set edgewise, are now employed for paving in this city, and have been so used for a hundred years in Europe.

C. C., Jr., of Mass.—The "first" is the only edition we have seen of Minife's work on drawing. We do not know the price of pure metal cobalt, but the oxyd is sold at the rate of \$1 per ounce.

W. H. L., of Wis.—We are quite certain that your hopes for a patent are futile, and we must discourage you. When we say that we have had the same thing in our office, we mean it. If you wish to try for a patent you can always depend upon our doing the best we can for you.

D. A. S., of Wis.—Earthenware cases are among the earliest devices used for burial purposes. We published a number of articles in Vol. 5, Sci. Am., proving the popular notion "that bodies will not sink to the bottom of the ocean at great depths," to be a popular delusion.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, April 3, 1858:—

W. H. C., of Ill., \$27; J. O. of N. Y., \$305; S. & A., of Mich., \$25; J. C., of N. Y., \$30; J. & J. C. H., of N. Y., \$30; C. M. L., of Ohio, \$25; G. W. S., of Ind., \$30;

O. S., of N. Y., \$30; R. G. E., of N. Y., \$40; I. Z. A. W., of Pa., \$25; L. E., of Mich., \$24; T. H. W. & Bros., of Ga., \$30; L. F., of N. J., \$30; W. W. L., of Conn., \$30; S. T., of —, \$20; J. W. P., of Pa., \$30; W. & D., of Mass., \$25; W. D. J., of N. Y., \$25; F. B. of N. Y., \$20; F. & J., of Ohio, \$25; S. H., Jr., of Vt., \$10; N. H. S., of Ill., \$25; N. A., of N. Y., \$25; S. W., of N. J., \$25; D. B. W., of N. Y., \$30; L. T., of N. Y., \$20; H. A. N., of Mass., \$30; W. B., of N. J., \$30; J. C. D., of Ky., \$30; J. C., of N. Y., \$30; B. A. R., of Conn., \$30; J. F. K., of Ind., \$25; G. S. R., of Ohio, \$25; W. C., of N. Y., \$25; I. R. L., of Pa., \$55; C. & B., of N. Y., \$35; W. O. P., of N. Y., \$25; J. T., of N. Y., \$25; T. O., of Miss., \$25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, April 3, 1858:—

J. C. S., of Mass.; I. Z. A. W., of Pa.; W. C., of N. Y.; C. F., of N. Y.; S. & A., of Mich.; J. W. H., of R. I.; C. M. L., of Ohio; W. H. C., of Ill.; J. R. L., of Pa.; J. T. B. R., of N. Y.; C. & B., of N. Y.; F. & J., of Ohio; W. & D., of Mass.; W. D. J., of N. Y.; F. B., of N. Y.; W. O. P., of N. Y.; N. H. S., of Ill.; N. A., of N. Y.; S. W., of N. J.; M. G. F., of N. Y.; J. F. K., of Ind.; G. S. R., of Ohio; J. T., of N. Y.; T. O., of Miss.; R. G. E., of N. Y.

IMPORTANT TO INVENTORS.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the Scientific American, continue to procure patents for inventors in the United States and all foreign countries on the most liberal terms.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 68 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels.

Communications and remittances should be addressed to MUNN & COMPANY, No. 128 Fulton street, New York.

The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents:—

Messrs. MUNN & Co.—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

TWO LARGE VENEER SAWS.—BUILT IN the most thorough manner, and in good running order, will be sold very low. For particulars, address DANA JONES, care of T. C. Kimball, 266-267 West Washington Market, New York.

TURKEY YELPERS.—A TURKEY CALL OF any size and pattern can be mailed to any State in the Union by enclosing \$1 to S. SUTHERLAND, Gun-maker, Richmond, Va.

HORSE CHARMING FOR \$1 IN GOLD.—I will send the great horse taming secrets, for which many are paying large sums. No bonds required. Address JOHN M. VENN, Galt, C. W.

THE LIFE OF GEORGE STEPHENSON, Railway Engineer.—By Samuel Smiles. From the 4th London Edition. One large handsome 12mo. volume, with portrait, \$1 25. "Deep and permanent is the interest excited by this wondrous story of genius. No one can read unmoved the early struggles of this remarkable character, as they are narrated in this work. To young men faltering, it gives lessons which should supply fresh vigor. The continuous effort, the persistent valor, the daring ingenuity, and ever active intellect of this collier-boy, teaching himself, gradually making his way to the noblest positions in life—that of a great benefactor to mankind—these must be studied in the pages of this biography."—Leader. The above work just published by TICKNOR & FIELDS, Boston, Mass. Copies sent free of postage on receipt of price.

THE NATIONAL SEED PLANTER.—Patented November 10, 1857, by E. Russell, Coatesville, Chester county, Pa. This new and useful machine will plant the following seeds with accuracy and despatch:—Corn, (thirty to forty per day); buckwheat, beans, peas, rye, and sugarcane seed. The following States and Territories for sale or exchange by Zadoc C. & James S. Cochran: Illinois, Tennessee, North Carolina, Georgia, Alabama and Missouri; and the States of Maryland, South Carolina, Mississippi and Virginia, by A. D. Harlan. Also the States of Ohio, Michigan, Wisconsin, Kentucky and Texas, by W. B. Mendenhall. And the following States: New York, Iowa, Indiana and Louisiana, by H. W. Russell. For any of the above territory, address the gentlemen as above-mentioned, at Coatesville, Chester county, Pa.

MACHINE SHOP AND FOUNDRY FOR Sale at Louisville, Ky.—With the best stock of engine, pulley and gearing patterns in the city. The Finishing Shop has 12,000 square feet of room, with one large horizontal boring mill for cylinders, two vertical boring mills, turners 6 1/2 and 8 feet, one double-headed lathe, 36 feet bed, swings 40 inches, one double-headed lathe, 21 feet bed, swings 33 inches, seven small slide lathes, turns 3 to 12 inches, one planer, 12 by 3 feet square, one compound planer with circular attachment, three wood-turning lathes, three drill presses, one gear cutter, bolt cutter, vises, and a large assortment of small tools to expedite work. Foundry has 3,500 feet molding floor, with every facility. Blacksmith Shop has six forges, with requisite tools for a jobbing shop. Buildings are of brick, and none over five years old. Having made a conditional sale of the patterns and flasks, will sell the buildings and any portion of the tools, separately or together. Parties who might wish to engage in the same business, or convert it into an agricultural machine shop, can seldom meet with such an opportunity to get a bargain. Apply to or address, E. A. GARDNER, assignee of LAWSON & PEARCE.

NEW SAW-GUMMING MACHINE, FOR Re-toothed Circular and Mill Saws, &c.—This machine, as represented in our catalogue, is entirely of wrought and cast iron; it is of sufficient power to re-tooth with ease the thickest and largest saw made. Our catalogue gives a further description and will be forwarded on application. R. HOE & CO., 39 and 31 Gold st., New York.

LATHE CHUCKS.—WE WOULD CALL THE attention of machinists to a Geared Screw Chuck we are manufacturing, which is warranted to be superior to any in use. We are also building a Car Wheel Chuck, which can be fitted true to any sized face plate or boring table with ease. For list of sizes, testimonials, cuts, &c., address E. HORTON & SON, Windsor Locks, Conn.

FOR SALE.—RIGHTS IN TWO PATENTS FOR Steam Engine improvements, being a valuable variable cut-off, and practical direct connection of piston-rod with crank, effecting great saving in construction and fuel. Interests given to capitalists. Inquire of B. ACKERMANN, 710 Broadway, New York.

FIRE-ARM CHALLENGE.—MR. GILBERT SMITH'S conditions are accepted. He is likely to be my only opponent among the host of breech-loaders in this country, (Sharp's Co. and Colt also,) and his change of ground from simple accuracy to combined accuracy and endurance, are accepted, and \$3000 staked. Within 300 shots (merely to save time and labor) my challenge is open to the 23d of April, 1858, to any aspiring inventor of breech-loaders. No respect will be paid to firing for rapidity. J. C. SYMMS, 68, 1st Lieut. U. S. Ordnance, March 31, 1858. Watertown Arsenal, Mass.

CLOCKS.—TOWN CLOCKS OF ALL SIZES. Regulators and Timepieces for all purposes. Daily for illuminating. VORBERGH & CO., Agents, No. 56 Liberty street, New York. JOHN SHERRY, Manufacturer, Sag Harbor, N. Y.

CORLISS' PATENT STEAM ENGINES.—About 250, most of them from 40 to 400 horse power, are now in operation. On application, pamphlets will be sent (by mail), containing statements of responsible manufacturing companies where these engines have been furnished, for the saving of fuel, in periods varying from 2 1/2 to 5 years. Boilers, shafting, and gearing. CORLISS STEAM ENGINE CO., Providence, R. I.

CHURCH AND REGULATOR CLOCKS, models, engravers, ruling machines that work themselves, and light work done at low prices, at J. STOKELL'S Clock Factory, No. 26 Platt street, New York.

MACHINISTS' TOOLS.—A FULL SUPPLY OF every variety, and superior quality, now on hand, and made to order at short notice. Also one 8-horse upright engine, in complete order; price \$300. CARPENTER & PLASS, No. 479 First ave., New York.

DICKPOCKETS DEFEATED.—YOUR WALLET secured to your pocket by convenient Patent Locks, which are outselling everything before offered the public. Agents wanted. Send stamp to DICKINSON & BATE, Hudson, Mich.

THE WORKS OF THE AUBIN GAS CO., (General Office, No. 44 State st., Albany, N. Y.) as now perfected, are adapted to all materials and localities, and are in successful operation in villages, factories, and private dwellings. For full information as to cost, probable income of public works, &c., apply as above. For plans, &c., see SCIENTIFIC AMERICAN of March 13th.

STEAM WHISTLES.—IMPROVED PATENT—manufactured by HAYDEN, SANDERS & CO., 306 Pearl street, New York.

ANOTHER WONDER.—BALDWIN'S TURBINE Water Wheel (represented in No. 51, Volume XII, Sci. Am.) gives from 75 to 97 per cent of power according to the size of wheel and head employed. Usual sizes, with 4 to 25 feet fall, give 80 to 90 per cent. For information address S. K. BALDWIN, Laconia, N. H.

5000 AGENTS WANTED.—TO SELL FOUR new inventions. Agents have made \$25,000 on one—better than all other similar agencies together. I give away what fourteen other agencies sell. Only send address and get eighty pages of particulars, gratis. EPHRAIM BROWN, Lowell, Mass.

THE LITTLE BRICK MAKER TAKES the rough clay, previously one night in soak, tempers and molds 4,500 bricks a day, driven by one man, or horse, and attended by one man and four boys; the brick is beautiful. Thus every farmer can be his own brick-maker, as it requires only common laborers. Price \$70; if the molds are 12 x 6 x 3, price \$85. The larger machines worked by one horse, making 7,000 per day, \$150; by two horses, 14,000, \$200; by steam, 25,000 \$400. For further particulars, in a pamphlet giving full instructions on brick-setting and burning, address FRANCIS H. SMITH, Sun Building, Baltimore, Md.

SOMETHING USEFUL FOR MACHINISTS and Operatives of Machinery.—Simmons' Decimal Chart, for finding the size of wheels and pulleys for any required number of revolutions per minute—a great saving of time and lengthy calculations. Sent free for one dollar. D. G. SIMMONS, 346 West 27th street, New York.

FOR SALE THE PATENT RIGHT OF LAMSON'S Combined Tool, an engraving of which appeared in No. 23, Vol. XIII, of the SCIENTIFIC AMERICAN. Apply to the patentee, New Worcester, Mass.

J. A. FAY & CO., WORCESTER, MASS., build the best Planer and Masher in use, with wrought iron cylinder and Pitt's patent feed works. Ask all machinery agents for Fay & Co.'s "Bay State Planer," or address as above.

SAMUEL McLEROY, CIVIL ENGINEER.—Late U. S. Naval and Civil Engineer. Special attention paid to water-works with pumping power. Address "Engineer's Office," Water-works, Brooklyn, Long Island.

MACHINERY.—S. C. HILLS, No. 12 PLATT street, New York, dealer in Steam Engines, Boilers, Planers, Lathes, Chucks, Drills, Pumps, Mortising, Tanning, and Sash Machines, Woodworth's and Daniel's Planers, Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills; Johnson's Shingle Mills; Belting, Oil, &c.

SWISS DRAWING INSTRUMENTS.—A full stock of these celebrated instruments always on hand. C. T. AMSLER, (formerly Amsler & Wirz), Philadelphia, Pa.

READ—NEW CATALOGUE, (FOURTH EDITION), with two hundred and fifty illustrations of Mathematical, Optical and Philosophical Instruments, and attachment of a large illustrated sheet, representing the Swiss instruments in their actual size and shape, will be delivered, on application, to all parts of the United States, by sending 12 cents in postage stamps or money, which amount will be deducted from the bill, if an order is sent. C. T. AMSLER, Philadelphia, Pa. No. 635 Chestnut st., Philadelphia, Pa.

E. FORBES, ARTIST, 89 NASSAU STREET, New York, Mechanical and General Draughtsman on Wood, Stone, &c.

STEAM ENGINES, STEAM BOILERS, Steam Pumps, Saw and Grist Mills, Marble Mills, Rice Mills, Quartz Mills for gold quartz, Sugar Mills, Water Wheels, Shafting and Pulleys. The largest assortment of the above in the country, kept constantly on hand by WM. BURDON, 102 Front street, Brooklyn, N. Y.

HARRISON'S 30 INCH GRAIN MILLS.—Latest Patent.—A supply constantly on hand. Price \$200. Address New Haven Manufacturing Co., New Haven, Conn.

TO CONSUMERS OF ALUM.—POCHIN'S Patent Aluminous Cake, as a substitute for alum, is rapidly taking the place of alum, both in England and this country. The price per pound is about the same as alum, while the cake is 25 per cent stronger. Circulars with full particulars can be had on application to J. D. SHEFFIELD & CO., Sole Agents for the United States and Canada, 63 and 65 Beekman st., New York.

ALCOFF'S CONCENTRIC LATHE.—THIS Lathe is capable of turning under 2 inches in diameter with only the trouble of changing the dies and patterns to the size wanted. It will turn smooth over swells or depressions of 3/4 to 1/2 inch, and works as smoothly as on a straight line, and does excellent work. Price \$25, (without frames) boxed, and shipped with directions for setting up. For sale by MUNN & CO., 128 Fulton street, New York City.

SECOND-HAND MACHINISTS' TOOLS.—Consisting of 20 Engine Lathes, 9 Iron Planers, 4 Upright Drills, Hand Lathes, Chuck Lathe, Gear Cutters and Vices, all in good order, and for sale low for cash. For particulars, address FRANKLIN BAINNER, 14 Whitney avenue, New Haven, Conn.

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure, together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse, NEW YORK BELTING AND PACKING COMPANY, JOHN H. CHEEVER, Treasurer, No. 6 Dey street, New York.

NEW HAVEN MANUFACTURING CO.—Machinists' Tools, Iron Planers, Engine and Hand Lathes, Drills, Bolt Cutters, Gear Cutters, Chucks, &c., on hand and finishing. These tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address "New Haven Manufacturing Co., New Haven, Conn."

ENGRAVING ON WOOD AND MECHANICAL DRAWING, by RICHARD TEN EYCK, Jr., 128 Fulton street, New York, Engraver to the Scientific American.

WOODWORTH PLANING MACHINES.—Having over \$40,000 worth now completed, I will sell, from this time henceforth, at a very reduced price, and am ready to construct any sizes not on hand at short notice. JOHN H. LESTER, 57 Pearl st., Brooklyn, Long Island.

LAP-WELDED IRON BOILER TUBES.—Prosser's Patent.—Very simple apparatus to drill the tube-plates and set the tubes in the best manner. THOS. PROSSER & SON, 28 Platt st., New York.

SAWS.—HOE & CO.'S PATENT GROUND SAWS Plastering Trowels, &c., can be had, wholesale and retail, at the principal hardware stores, at the salesrooms of the manufacturers, 29 and 31 Gold street, or at the works corner of Broome, Sheriff and Columbia sts., New York. Illustrated catalogues, containing prices and information interesting to sawyers generally, will be sent by post on application.

WELCH & GRIFFITHS—ESTABLISHED 1830.—Manufacturers of Improved Patent Ground and Warranted Extra Fine Cast Steel Saws, of the various kinds now in use in the different sections of the United States and the Canadas, and consisting of the celebrated Circular Saw, Grain-cutting Cross Cut and Tennon, Gang, Mill, Pit, Segment, Billet and Floor Saws, &c., &c. For sale at their warehouse, No. 48 Congress street, Boston, Mass.

OIL! OIL! OIL!—FOR RAILROADS, STEAMERS, and for machinery and burning. Pease's Improved Machinery and Burning Oil will save fifty per cent, and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. "The Scientific American, after several tests, pronounced it 'superior to any other they have ever used for machinery.'" For sale by the inventor and manufacturer, E. S. PEASE, 61 Main st., Buffalo, N. Y. N. B.—Reliable orders filled for any part of the United States and Europe.

VAIL'S SPEEDWELL IRON WORKS, Morristown, N. J., manufacture Craig's Patent Double-acting Balance Valve Oscillating Steam Engines both stationary and portable, Knowles' Patent Muley, Portable Gang and Re-sawing Mills, Sugar and Chinese Cane Mills and Sugar Pans, Grist Mills, Mill Irons, Rich's Water-wheels, Forgings and Castings. Orders for the above, and all descriptions of labor-saving machinery will receive prompt attention. JOHN H. LIDGERWOOD & CO., No. 9 Gold street, New York.

SWISS DRAWING INSTRUMENTS.—A full stock of these celebrated instruments always on hand. Catalogue, 4th edition, with 250 illustrations of Mathematical, Optical and Philosophical instruments, and attachment of illustrated sheet representing the Swiss instruments in the actual size and shape, will be delivered, on application, to all parts of the United States, by sending 12 cents in postage stamps. Address C. T. AMSLER, 335 Chestnut st., Philadelphia, Pa.

WOODWORTH IMPROVED—TWO GOLD Medals have been awarded to me for my patented improvements upon the celebrated Woodworth Planing Machine. The above awards, and the large number of these machines now in operation, fully demonstrate their great superiority over all others. Machines of all sizes constantly for sale. JAMES A. WOODBURY, 63 Sudbury st., Boston, Mass.

RIGHTS FOR SALE OF A PATENT LIME-KILN which will burn less wood or coal, and more lime, than any other in use. Address A. G. ANDERSON, Quincy, Illinois.