

TO INVENTORS.

An experience of more than thirty years, and the preparation of not less than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. In addition to our facilities for preparing drawings and specifications quickly, the applicant can rest assured that his case will be filed in the Patent Office without delay. Every application, in which the fees have been paid, is sent complete—including the model—to the Patent Office the same day the papers are signed at our office, or received by mail, so there is no delay in filing the case, a complaint we often hear from other sources. Another advantage to the inventor in securing his patent through the Scientific American Patent Agency, it insures a special notice of the invention in the SCIENTIFIC AMERICAN, which publication often opens negotiations for the sale of the patent or manufacture of the article. A synopsis of the patent laws in foreign countries may be found on another page, and persons contemplating the securing of patents abroad are invited to write to this office for prices, which have been reduced in accordance with the times, and our perfected facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN.

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.

Vertical Engines, 10 to 15 H. P., thoroughly well made. John Hartwick & Co., 47 Gold street, New York.

Magic Lanterns and Stereoscopes of all prices. Views illustrating every subject for public exhibitions. Profitable business for a man with a small capital. Also lanterns for college and home amusement. 74 page catalogue free. McAllister, Mf. Optician, 49 Nassau St., N. Y.

Jarvis Patent Boiler Setting burns wet peat, screenings without blast. A. F. Upton, Agent, 48 Congress St., Boston, Mass.

Patlock.—Valuable patent just issued for sale. See advertisement, page 333.

Valuable Patent for sale.—See Protractor illustrated in SCIENTIFIC AMERICAN of October 26. F. L. Cook, Fairfield, Iowa.

1-16 to 1-8 Steel Figures, \$1.00; Alphabets, 3.00. S. M. York, Cleveland, O.

Now is the best time to paint, and the best and most economical materials to use are H. W. Johns' Asbestos Liquid Paints, which are prepared in sixteen newest shades and standard colors.

The Young America Scroll Saw beats the world. Interstate and International Mechanical Exchange. Explanatory circular free. A. S. Gear, Manager, 20 E. 13th St., N. Y. U. S. A.

Engine Lathes, 8 ft bed, 19 in. swing, on hand and finishing; price low. F. C. & A. E. Rowland, N. Haven, Ct. Steam, Water, Gas, Valves, Hydrants. Prices reduced. Send for catalogue. Chapman Valve Mf. Co., Boston.

2d hand Steam Yacht wanted. Box 6, Gardenville, N. Y.

Oswego Starch Factory, October 28, 1878. H. W. Johns—Dear Sir: We have several acres of your Asbestos Roofing on our buildings; the first roof put on fifteen years ago is in good condition, and for our business we prefer it to any other. You will please send us at once sufficient to cover twenty-eight squares. Yours respectfully, T. Kingsford & Sons.

The Goddard Emery Wheel. Best, strongest, and cheapest. Satisfaction guaranteed. E. A. Goddard, General Sales Agent, also dealer in Machinists' Supplies, 176 Fulton St., N. Y. city. Send for catalogue.

The Lathes, Planers, Drills, and other Tools, new and second-hand, of the Wood & Light Machine Company, Worcester, are to be sold out very low by the George Place Machinery Agency, 121 Chambers St., New York.

13 in. Surface Gauge, \$2.00. S. M. York, Cleveland, O.

Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J.

Rubber Hose, Steam Hose, Suction Hose, Linen Hose, Cotton Hose. Greene, Tweed & Co., 18 Park Place, N. Y.

For the best advertising at lowest prices in Scientific, Mechanical, and other Newspapers, write to E. N. Freshman & Bros., Advertising Agents, 186 W. 4th St., Cin., O.

Valuable Patent for Shooting Target for sale. Recently patented. Address Win. Kuehn, 499 Spring St., Buffalo, N. Y.

Manufacturers of Improved Goods who desire to build up a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign circulation.

The Lawrence Engine is the best. See ad. page 333.

For the most substantial Wood-Working Tools, address E. & F. Gleason, 52 Canal St., Philadelphia, Pa.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J.

Alcott's Turbine received the Centennial Medal.

Punching Presses, Drop Hammers, and Dies for working Metals, etc. The Stiles & Parker Press Co., Middletown, Conn.

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

Wanted.—Articles to manuf. D. J. Miller, Mohawk, N. Y.

Fine Gray Iron Castings a specialty, also Wire Workers' Pickets and Rosetts in stock. A. Winterburn's Foundry, 16 De Witt St., Albany, N. Y.

Kreider, Campbell & Co., 1030 Germantown Ave., Phila., Pa., contractors for mills for all kinds of grinding.

Latest and best Books on Steam Engineering. Send stamp for catalogue. F. Keppy, Bridgeport, Conn.

The only Engine in the market attached to boiler having cold bearings. F. F. & A. B. Landis, Lancaster, Pa.

The SCIENTIFIC AMERICAN Export Edition is published monthly, about the 15th of each month. Every number comprises most of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements, etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts.

Wheels and Pinions, heavy and light, remarkably strong and durable. Especially suited for sugar mills and similar work. Pittsburgh Steel Casting Company, Pittsburgh, Pa.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J. Books for Engineers and Machinists. Catalogues free. E. & F. N. Spon, 436 Broome St., N. Y.

Northrop's Sheet Iron Roofing makes most durable fireproof roof. Used on all kinds of buildings. Send for circular and prices. Northrop & Co., Pittsburgh, Pa.

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

Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N. J. English Agency, 18 Caroline St., Birmingham.

Vertical & Yacht Engines. N. W. Twiss, New Haven, Ct.

Diamond Tools. J. Dickinson, 64 Nassau St., N. Y.

Eagle Anvils, 9 cents per pound. Fully warranted.

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.

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

Presses, Dies, and Tools for working Sheet Metals, etc. Fruit and other Can Tools. Bliss & Williams, Brooklyn, N. Y., and Paris Exposition, 1878.

North's Lathe Dog. 347 N. 4th St., Philadelphia, Pa.

The Cameron Steam Pump mounted in Phosphor Bronze is an indestructible machine. See advertisement.

Baxter Wrenches, Blake's Belt Studs, Soap Stone Packing, Empire Packing. Greene, Tweed & Co., 18 Park Place, N. Y.

Warranted best and cheapest Planers, Jointers, Universal Woodworkers, Band and Scroll Saws, etc., manufactured by Bentel, Margedant & Co., Hamilton, Ohio.

Wheel Press, Cotton Press, Pipe Line, and Test Mercury Gauges. T. Shaw, 915 Ridge Ave., Philadelphia, Pa.

Dead Pulleys, that stop the running of Loose Pulleys and Belts, taking the strain from Line Shaft when Machine is not in use. Taper Sleeve Pulley Works, Erie, Pa.

NEW BOOKS AND PUBLICATIONS.

ESSAYS IN PHONETICS:

1. ECLECTIC SHORT-HAND. A new system adapted to general use and to verbatim reporting. By J. Geo. Cross, A. M. Chicago: S. C. Griggs & Co. 12mo. pp. 304. \$2.

2. The *Kingrapher and Stenographer*. A quarterly magazine devoted to reform in Orthography, Chirography, Stenography, Language, Education, and kindred arts and sciences. Amherst, Mass.: J. B. & E. G. Smith. Price \$1.

3. PHONOGRAPHY MADE EASY, after the French System Stenographie-Duployé. By J. A. Manseau. Montreal: Beauchemin & Valois. 24mo. pp. 110.

These various efforts to provide for English writers an acceptable substitute for ordinary long hand would seem to imply either a superabundant desire for laborious invention, or else a practical failure of existing systems of rapid writing. There can be no question that each and all of the various modifications of Pitman's phonography, and tachygraphy as well, will meet the requirements of professional stenographers admirably. But not one of them comes anywhere near meeting the everyday demands of ordinary writers. They are altogether too complicated, too hard to learn and remember; and, as none of them affords a practical method for the complete expression of English speech, it is not at all surprising that they fail to win any large degree of popularity.

Mr. Crose's new system differs from phonography in that it makes no pretense of being phonetic. He simply transliterates ordinary writing by substituting simple strokes for the letters in use. He claims another advantage in that he bases his alphabet on straight lines and (for the most part unshaded) portions of the ellipse, the easiest possible strokes to make. With short words the writing looks simple and easy; but for ordinary polysyllables a great number of contractions have to be introduced. As a stenographic system it appears to be facile and rapid, thought does not impress one as being as legible as it might be.

Mr. Brown's system has more of the look of tachygraphy. He uses no shaded strokes; has a phonetic alphabet; expresses vowel sounds cursorily; and employs a multitude of stenographic hooks and crooks. Very many of the longer words look like snarls of spiderweb; yet his disciples pronounce the writing easy and legible. With short words the writing appears graceful and fluent.

Mr. Manseau's system is an adaptation to English of a phonetic system used in France and other European countries. It is less complicated than stenographic features—that is, is more alphabetic—than Pitman's phonography, and most of the vowels may be inserted in the order of speech. Its alphabet is formed of light curves and dashes, short and long, plain and crossed, with diacritic marks to show vowel differences. Since three motions are required to make a dash, cross it, and return, nearly half of Mr. Manseau's characters take the time of three strokes, making the time and labor of writing much greater than the writing indicates at first sight. The writing looks also as though it would be less easy to execute than any of the short-hand systems now in use in this country.

Notes & Queries

(1) G. A. B. asks: 1. What would be the pressure in lbs. from 1/4 inch jet from a 1/2 inch pipe 10 feet long from a barrel of water? A. The pressure per square inch will be about 0.433 lb. for each foot in height. 2. How long would it take for the water to run

out of 32 gallon barrel from 10 feet head from 1/4 inch hole? A. The theoretical velocity of discharge is  $8.02 \times \sqrt{\text{head in feet}}$ .

The actual velocity is about 60 per cent of this, for a jet of the ordinary form.

(2) S. H. R.—Carbon is not perceptibly expanded by the passage of such an electrical current as is usually employed with the microphone.

(3) E. S. C. asks: 1. What kind of a water wheel will be best for an 8 foot fall of water running 4 cubic feet per minute? A. A small turbine. 2. Can I get power enough from such a fall and wheel to work a half barrel churn or a small wood lathe? A. We think not.

(4) R. M. T. asks: What is the best work on steam heating by radiation? A. Schumann's "Manual of Heating and Ventilation" is one of the most recent and reliable works on the subject.

(5) J. G. B. writes: Please give me the length of stroke for a small engine of 2 inch bore, the weight of a flywheel for same, and the length of the various rods connected therewith, also the size of the boiler for the same, and the number of tubes there should be in it. A. Stroke, 3 inches; connecting rod, 7 1/2 inches; flywheel, 30 lbs.; boiler, 15 inches diameter, 30 inches high, 1 1/4 inch tubes, at spaces of not less than 1/4 inch from each other.

(6) T. L. McG.—For experimental purposes we would recommend the Fuller battery or the modified form of Bunsen's known as the carbon battery. The electro-motive force of the gravity is about half that of Grove's or Bunsen's.

(7) C. J. M. asks how to complete a local circuit by the vibration of a telephone diaphragm. A. We do not think it can be done.

(8) C. E. G. asks: Will a boiler 16 x 30 inches be large enough to furnish steam for an engine 3 x 4 inches, and how fast will it drive a boat 20 feet long with a propeller 20 inches in diameter? The boiler has 20 feet heating surface, and carries 100 lbs. steam to the square inch. A. You might obtain a speed of 5 or 6 miles an hour in smooth water.

(9) J. E. S. asks: How may cotton fabric be economically rendered waterproof and strengthened? A. Saturate the goods with a strong hot aqueous solution of good resin soap, and then wring, transfer, and digest them in a second bath of alum or aluminum sulphate or acetate dissolved in hot water. Rinse and dry thoroughly at a temperature of about 80° Fah. Thus treated the fibers do not readily absorb water, but the goods are not actually waterproof.

(10) Constant Reader asks: 1. What is the difference between crown and flint glass? Of what is the best glass for optical instruments composed? A. Crown glass is prepared by fusing sand with carbonate of potash and chalk. Flint glass is a double silicate of potash and oxide of lead. 2. Can the object glass of a telescope, say 2 or 3 inches in diameter, be formed in a single piece, so as to give a good view of a distant object? A. No. 3. Is there any common article of manufacture in which the glass used is of a quality fine enough to be used for manufacturing an object glass? A. No. 4. I have a large quantity of broken glass, consisting of chemical retorts, test tubes, lamp chimneys, watch crystals, etc., and I would like to know if any of them could be used alone, or by mixing with some other substance, to produce glass of sufficient quality? A. We think not. 5. If I was to use glass free from blemishes, could I in moulding it produce an article also free from blemishes? A. Probably not. 6. Can a good lens be made by moulding the glass of the form desired and then polish on a lathe? A. No. 7. Can the proper form of the lens be obtained by taking an impression of a lens of the dimensions of the one required, so as to form a mould for the glass? How and with what could such an impression be taken of both sides, so as to form a correct mould? A. This would be impracticable. 8. If a lens cannot be produced in this way and from the glass mentioned above, of a sufficient quality for a telescope, would it be suitable for a burning glass? A. Possibly.

(11) C. B. writes: I have a 10 horse horizontal boiler, which I use sometimes steadily and sometimes only occasionally. It may stand 6 weeks or two months without being fired up. Will it rust out under such circumstances, or should the water be let off whenever it is to lie still? A. If you cannot keep it perfectly dry when not in use, leave it full of water.

(12) S. B. E. writes: I have made a Ruhmkorff induction coil, and for the size it should give more of a spark at a greater distance than it does. Will you tell me the trouble? The primary coil is composed of about 400 feet of No. 22 copper wire, and the secondary of about 1800 feet of No. 30, insulated with cotton. Does the battery used make any difference, and which kind is the best for operating a coil? The core is about 1/4 inch in diameter. I have made every part carefully, and it is a beautiful looking instrument. A. You do not state whether you have a condenser. This is very necessary to the successful working of the coil. Your primary coil would be better if made of two layers of No. 16 wire. It is probable that the insulation is defective. The primary coil should be separated from the secondary by several thicknesses of paper coated with melted rosin, to which a small quantity of beeswax has been added to render it somewhat flexible. The several layers of the secondary should be separated in the same way, and it would add to the efficiency of the coil if the layers of the secondary were covered with the rosin. Use a Bunsen battery.

(13) G. F. P. asks: Can a telephone be worked successfully 20 or 30 miles, with instruments at each end of the wire only? A. Yes.

(14) J. E. S. W. asks how to make an acoustic telephone. A. See p. 75, current volume, query 28.

(15) E. K. asks: What size should a blower be for a force blast for a cupola, 5 in. in diameter and 12 in. high, to the top of the brick, and at what speed should it be driven? A. A small piston blower would be preferable to a rotary.

Where is Knight's "Mechanical Dictionary" published, where can I get it, and what is the price? A. You can obtain it from any of the booksellers who advertise in our columns.

(16) J. S. C. writes: I am running a nest of six boilers, size 4 x 24 inches; have painted the breeching and pipes with asphaltum, but it burns off the breeching. What can I paint with that will stand the heat? A. Black varnish, made from petroleum, will probably answer your purpose.

(17) R. F. asks: Can you tell us how steam boilers are welded? A. Short lengths are welded at a time, with a portable furnace.

(18) F. H. C. asks: At what speed can the piston of a hydraulic engine be run without appreciable pound, with 50 lbs. water pressure? The question supposes a well arranged and proportioned valve motion. A. In the case supposed, we think it could have piston speed equal to that of a good steam engine.

(19) F. H. S. asks: 1. What is the proper or best length of focus for a 6 inch telescopic speculum, and what should be the length of tube? A. Make the focal length ten, and the tube eleven times the diameter. 2. Where and by whom could I get my speculum silvered, and what would be the approximate cost? A. You can find in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 105, information which will enable you to silver your own speculum. 3. What would be the cost of an eyepiece of good power already set with necessary length of sliding tubes for adjustment of focus? A. Address any of the opticians who advertise in our columns.

(20) F. P. asks if two permanent bar magnets can be so arranged as to produce current enough to start a pretty good induction coil upon the closing of the circuit, without the aid of any battery, or if they could be made to ring a small electric bell. A. If the bar magnets are very strong you might obtain a current from them by rapidly revolving opposite their poles an electro-magnet wound with fine wire. An induced current cannot be produced by means of permanent magnets without moving either the magnets or the coils in which the current is generated. 2. Is there any battery that will work good in cold weather and not eat the zincs too fast (until the connection is made) and yet will operate an electric bell or induction coil? In fact, a cheap battery, not costing over \$5. A. Yes. A Leclanché or Fuller battery will answer, but they must be subjected to a freezing temperature.

(21) D. B. W. writes: We have a telephor line 3 miles long. Could a telegraph instrument be attached and operated for a call bell? A. Yes, on a closed circuit. 2. Is there a call bell in the market that could be bought for \$3 or \$4? A. Yes.

Would a lightning rod be any advantage to a building where there is nothing to connect with but the earth? A. Yes; bury a barrel or so tin or iron scrap—or better still, a few large sheets of copper—in earth that is always moist, and connect the rods with them.

(22) J. P. S.—There are many rotary pumps in the market that are quite as durable as piston pumps.

(23) W. A. O. asks how button and comb makers soften horn so that it is soft and pliable to work. A. It is softened by immersing it for a short time in boiling water.

(24) K. J. D. asks how to make skeleton ferns or leaves. A. Place them, with a trace of yeast, in a little rain water, and allow the fermentation to proceed until the membranous portions become soft and easily washed away in a stream of water. They are bleached by dipping for a few minutes in a strong aqueous solution of sulphurous acid gas, or exposing them (while moist) in a box filled with the vapor of burning sulphur.

(25) C. R. asks: How can I make a cheap call bell to work on a telephone line of 300 feet without a battery? A. Perhaps you can jingle a bell by pulling the wire if the latter is properly supported.

(26) M. T. asks whether a double cylinder engine, cylinders 2 inches stroke, 1 inch bore, would be large enough to run a sewing machine. If large enough, how should the boiler be made, to heat by kerosene? A. The engines are of sufficient size. Make a vertical boiler 20 inches high, 10 inches diameter, with 18 or 20 1 inch tubes.

(27) A. W. G. asks: By using a breast water wheel, what number of horse power could I obtain from a stream of 2 feet head and 350 cubic feet per minute? What size of breast wheel could I obtain best results from for driving a 30 inch circular saw? A. You may obtain about 60 per cent of the power of the water. Diameter of wheel 3 to 3 1/4 feet.

(28) H. E. B. writes: Please tell me how to make a small horizontal toy steam engine. A. If you will look over our files you will find the information you require about making and managing steam engines. The proportions for small and large engines are the same.

How can I remove India ink from the flesh? A. The knife or cauterization is the only resort. Will the Great Eastern ever be used again as a passenger boat? A. We have no means of ascertaining the probable future use of the Great Eastern.

(29) C. L. writes: 1. I am about building an icehouse and wish to ask you the following questions: Can I put in a box in the end of the house (opposite the end where the ice is put in), making it airtight from the icehouse proper, with a door opening outside, to use as a refrigerator? A. It is not probable that the arrangement suggested would prove very satisfactory. See Nos. 55, 99, 116, SCIENTIFIC AMERICAN SUPPLEMENT. 2. Will it be necessary to have a ventilator from the refrigerator opening outside? A. Yes. 3. Will it be necessary to have the refrigerator lined, it being made of seasoned pine or spruce boards, which have been painted many years? A. No.

(30) J. K. asks how the mucilage on the U. S. postage stamps is made. A. The mucilage used by the government for postage stamps is said to be made as follows: Gum dextrin, 2 parts; water, 5 parts; acetic