

## 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.*

Cotton Belting, Rubber Belting, Leather Belting, Linen Hose, Rubber Hose. Greene, Tweed & Co., New York.

Wanted.—To manufacture small wood work for patent. Hall & Son, Prompton, Pa.

D. A. Smith, of Greencastle, Pa., will sell either part or his entire patent for improved windmill, on easy terms. This is a splendid chance for capitalists. See illustration in the SCIENTIFIC AMERICAN No. 9, last volume.

Our goods rank first for quality, safety, and durability. Please compare them with any other make, and if not found better and cheaper, quality considered, we will bear the expenses of the trial. Lehigh Valley Emery Wheel Co., Lehigh, Pa.

Metal Pattern Letters to put on patterns of castings, all sizes. H. W. Knight, Seneca Falls, N. Y.

Wanted.—Light castings to make—Sewing machines, car boxes, school furniture, water closets, etc., etc. We do good work. Lehigh Stove Manuf. Co., Lehigh, Pa.

The following letter will be of interest to railroad companies and others using steam:

CHICAGO AND GRAND TRUNK RAILWAY CO., LOCOMOTIVE DEPT., FORT GRATIOT STATION, June 16, 1883.

Dear Sirs: The Westinghouse air pump on Engine 73 was packed with Asbestos Wick Packing Nov. 11, 1882. Since that time I have run the engine 27,900 miles on passenger trains. The packing was examined to-day, and apparently will be good for a year longer. The stuffing box nuts have been screwed up one-quarter turn on the air cylinder, and one turn on the steam side during that time, and I have never noticed it leak any.

Yours truly, C. B. CONGER,  
Engineer Engine 73.

To H. W. Johns Mfg. Co., New York.

Soapstone Packing, Empire Gum Core, and all kinds of Engine Packing. Greene, Tweed & Co., New York.

Contracts taken to manuf. small goods in sheet or cast brass, steel, or iron. Estimates given on receipt of model. H. C. Goodrich, 66 to 72 Ogden Place, Chicago.

Brush Electric Arc Lights and Storage Batteries. Twenty thousand Arc Lights already sold. Our largest machine gives 65 Arc Lights with 33 horse power. Our Storage Battery is the only practical one in the market. Brush Electric Co., Cleveland, O.

Engines, 10 to 50 horse power, complete, with governor. \$50 to \$550. Satisfaction guaranteed. More than eight hundred in use. For circular address Heald & Morris (Drawer 127), Baldwinville, N. Y.

Best Squaring Shears, Timmers', and Canners' Tools at Niagara Stamping and Tool Company, Buffalo, N. Y.

Lathes 14 in. swing, with and without back gears and screw. J. Birkenhead, Mansfield, Mass.

Five foot planers, with modern improvements. Geo. S. Lincoln & Co., Phoenix Iron Works, Hartford, Conn. The Best.—The Dueber Watch Case.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent Agency, 361 Broadway, New York.

Farley's Directories of the Metal Workers, Hardware Trade, and Mines of the United States. Price \$3.00 each. Farley, Paul & Baker, 530 Market Street, Phila.

Improved Skinner Portable Engines. Erie, Pa.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description. Send for catalogue.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Lists 29, 30 & 31, describing 4,000 new and 2d-hand machines, ready for distribution. State just what machines wanted. Forsyth & Co., Manchester, N. H., & N. Y. city.

"Abbe" Bolt Forging Machines and "Palmer" Power Hammers a specialty. Forsyth & Co., Manchester, N. H.

Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

25' Lathes of the best design. G. A. Ohl & Co., East Newark, N. J.

"How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 84 John St., New York.

Wanted.—Patented articles or machinery to make and introduce. Gaynor & Fitzgerald, New Haven, Conn.

Water purified for all purposes, from household supplies to those of large cities, by the improved filters manufactured by the Newark Filtering Co., 177 Commerce St., Newark, N. J.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock Mfg. Co., 80 to 88 Market St., Chicago, Ill. For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Am. Twist Drill Co., Meredith, N. H., make Pat. Chuck Jaws, Emery Wheels, Grinders, automatic Knife Grinders. American Fruit Drier. Free Pamphlet. See ad., p. 414.

Brass & Copper in sheets, wire & blanks. See ad., p. 413.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

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

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

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 414.

Gear Wheels for Models (list free); Experimental Work, etc. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Sewing Machines and Gun Machinery in Variety. The Pratt & Whitney Co., Hartford, Conn.

20,000 Duc Spherical Elevator Buckets, sizes 3/4 to 17 inches, constantly on hand. Telegraphic orders filled. T. F. Rowland, sole manufacturer, Brooklyn, N. Y.

First Class Engine Lathes, 30 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

Straight Line Engine Co., Syracuse, N. Y. See p. 413.

Ice Making Machines and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 142 Greenwich Street. P. O. Box 3033, New York city.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y. Drop Forgings. Billings & Spencer Co. See adv., p. 382.

See New American File Co.'s Advertisement, p. 372.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 382.

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

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

Steam Pumps. See adv. Smith, Vaile & Co., p. 382.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 397.

The Sweetland Chuck. See illus. adv., p. 398.

Catalogues free.—Scientific Books, 100 pages; Electrical Books, 14 pages. E. & F. N. Spon, 35 Murray St., N. Y.

Knives for Woodworking Machinery, Bookbinders, and Paper Mills. Taylor, Stiles & Co., Riegelsville, N. J.

## NEW BOOKS AND PUBLICATIONS.

MAGAZINE OF AMERICAN HISTORY. For June. Historical Publication Company, 30 Lafayette Place, New York.

The second historical paper on Wall Street appears in this number, reaching down to the time of the occupation of New York by the general government. Some of the illustrations are quaint reproductions of century old scenes. An account of recently found manuscripts of Benjamin Franklin and a finely engraved portrait of the philosopher add to the interest of the number.

THE STRENGTH OF MATERIALS. By Thomas Box. E. and F. N. Spon, London, and 35 Murray Street, New York.

The author says, in his preface, that two special objects have been kept in view throughout the work—that the rules and data shall be correct and trustworthy, and that their application to practice shall be clearly understood; for which purpose every rule has been illustrated by example worked out in detail. Where theory did not bear the test of experiment, the theory was cast aside and rules from the empirical tests substituted. It appears to be a very thorough and practical book and has a copious reference index.

A CENTURY OF ROUNDELS, AND OTHER POEMS. By Algernon Charles Swinburne. R. Worthington, 770 Broadway, New York.

This is a volume of something more than 100 pages containing one roundel on each leaf—a blank page between—the paper being "hand wove," given with ample margin. Admirers of Mr. Swinburne as a lyrical writer will be gratified with this collection, as he has been very exact in modeling each page poem on a certain lyrical rule, and shows all his peculiar faculty in the use of words to produce a rhythmical effect.

A TREATISE ON ELECTRICITY AND MAGNETISM. By E. Mascart and J. Joubert. Translated by E. Atkinson. Thomas De La Rue & Co., 110 Bunhill Row, London.

This volume is the first of two, and is based on a course of lectures delivered by Professors Mascart and Joubert in the College of France on the theory of electricity and magnetism. The authors, in a preface, consider this volume as an "Essay on the Mechanical Theory of Electricity." It is divided into four parts: static electricity; electrical currents; magnetism; and electro magnetism. The problems are fully elucidated by text, and are so arranged progressively as to lead the student gradually from the rudiments on to a thorough understanding of the theory, so far as it is treated in this volume.

## Notes &amp; 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.

Wherever 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 times should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines 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 the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) J. M. asks for a receipt for making common gold solder. I make plain rings with gold:

	Dwt.	Grs.
Coin gold .....	10	12
Fine silver .....	8	18
" copper .....	10	18

and would like a solder that would not turn black. I use silver solder, but it is not satisfactory. A. For

common gold solder take of the composition used for the rings 10 dwt., pure tin 1 dwt. This will make a solder that will flow easier than the stock composition. If it does not flow easy enough, add a little more tin. If you wish the solder of exactly the same color as the stock, you make the composition the same as the stock and substitute 2 dwt. tin in place of 2 dwt. silver. Some use zinc in place of tin, but zinc is an oxidizable metal and only suitable for very low compositions.

(2) G. W. F. asks for a receipt for making a black copying ink to be used on a hektograph. I am not allowed to use colored inks, but can use black. A. Nigrosine black. .... 1 part.  
Water .....

This will make a black ink suitable for use with the hektograph. In order to make it copy add more glycerin, gum arabic, or sugar.

(3) C. P. writes: I would like to know if it is better to paint a tin roof. If so, what kind of paint do you use? A. Use a metallic paint, such as an iron oxide paint.

(4) I. B. T. asks if there is any solvent for celluloid from which it will deposit unchanged on evaporation or by precipitation. Can celluloid be softened in hot water so as to be worked under the rolls or by press? A. There is nothing in which celluloid can be dissolved and reprecipitated without its being altered. Celluloid can be softened somewhat by treatment with hot oil or water.

(5) W. A. C. asks: What is the specific gravity of ivory, and what does an exact cubic inch weigh? A. Ivory, specific gravity, 1.822; 1.654 ounces is the weight of 1 cubic inch.

(6) W. W. S. H. asks: What is the horse power of an engine, cylinder 12 inches diameter by 30 inches stroke, making 120 revolutions, steam pressure 120 pounds? A. About 130 horse power.

(7) J. A. asks: 1. How can I prepare some fine chromo pictures I have for framing without glass? A. Use ordinary picture copal varnish. 2. Give me a good varnish for fine engravings, so that they too may be framed without glass. 3. Can these pictures be generally framed without glass. A. Can these pictures be attached to cotton or linen cloth? A. They can be pasted on mounts if desired.

(8) H. S. W. asks how hollow rubber balls are made. A. Two flat (round, or pear shaped) pieces of rubber of suitable size are cut, and after being cemented together the crude ball is filled with water. The balls thus formed are placed in a mould and heated in a vulcanizer. The water expands and presses the sheet rubber against the sides of the mould.

(9) J. W. H. writes: I frequently have small castings of iron which I would like to make malleable, or by some simple process toughen them. Can you help me? A. If the castings are hard or chilled upon the edges, they can be annealed by packing in a cast iron or sheet iron box or old crucible, with fine sand mixed with about one-quarter pulverized charcoal, so that the air does not get to the castings, heat the whole to a low red heat and keep at that temperature for one, two, or three hours, according to the size of the pieces of castings to be annealed. Then withdraw from the fire and let the whole cool gradually; unpack when nearly cold. The manufacture of regular malleable castings cannot readily be conducted on a very small scale.

(10) C. S. F. writes: 1. It has been stated to me that an engine would not exert the same tractive force to start a load as it would after it started, that a locomotive would not exert as many pounds of force in the coupling link when standing with the steam turned on as after it had got in motion. A. It will do so unless the drivers slip. 2. That a one horse power engine would not start a street car that one horse would start. How is it? How many pounds of tractive force do street car companies require of their horses; they require them to draw the car through the trip whether they are weak or strong, so the labor required of each must be precisely the same. A. The tractive force of the engine is not exerted in the same way as with a horse. The horse power of an engine is based on what a horse can do for eight hours continuously and not what he can do for a jerk; for an instantaneous pull a horse could probably do three times as much as on continuous work.

(11) J. B. asks: What is the name of the stone used in the first cut in concaving razors? A. The razorgrinder's first cut stone is called the "Wickersly stone." It comes from Wickersly, Eng.

(12) S. S. B. asks whether Babbitt metal is now more generally used in the main journals of engines than brass. A. Yes, taking all classes of engines. 2. I run an engine 16x28 with a 7 inch shaft, 80 revolutions, and 70 pounds pressure; the main pillow block has a cast iron cap (no Babbitt) with cast iron side pieces filled with Babbitt places in small rectangles, bottom of journal all Babbitt. Is this a better journal than one containing brasses side and bottom? A. No; good brass boxes with sufficient bearing surface are best.

(13) J. G. writes: We are constructing a yacht as follows: Two cigar shaped barrels, placed side by side, will constitute the hull. Each will be 20 feet long, 2 feet diameter at center, 1 foot at ends; each end supplemented with a pointed piece of solid wood. The beam is 10 feet. What will it carry, and how much will be the displacement? A. If one-half immersed, the two will displace, as an elliptical spindle, 0.91 ton, and as a parabolic spindle 0.96 ton.

(14) J. L. G. asks: Could an arrangement be made on the principle of the injector that would fill an air chamber with air and furnish air enough to run a compressed air engine? Do you think it would be possible to make such an arrangement? A. It is possible to make a water injector that would compress air to a moderate pressure, but would probably cost more than to use the water directly for power. Compressed air is now furnished by hot air engines for use at a

distance. Water blowers are used in Europe for furnaces where great pressure is not required. They are constructed upon the same principle as the injector, using gravity or the natural descent of water for the initial power.

(15) J. B. H. writes: I had a silver headed cane; in order to reduce the size of it I put it in nitric acid until it was about one-half the size. Now, will you please tell me what to do, so as to get the silver which was taken off. There are about three-quarters of an ounce of the silver dissolved in 4 ounces of acid? A. Precipitate the silver with dilute hydrochloric acid or sodium chloride, and fuse the resulting precipitate with alkaline carbonate in a sand crucible.

(16) L. F. M. M. asks whether milk, fresh or boiled, has any constipating effect. A. The effect of milk upon the human system depends largely upon the individual peculiarities of the person. Its general effect is a constipating one, brought about by the casein contained in it, which is not easily digested, and also by the production of a large amount of mucus, which has a similar effect.

(17) C. E. H. writes: I am building a new brick house, and should paint one side to protect it from rain and wind. I am told I can economize oil and paint by putting on one coat of crude petroleum and another coat of oil paint. Will this do as well as the ordinary way of two coats of paint? A. The use of petroleum is not to be recommended. It is difficult of drying, and a coat of paint cannot be satisfactorily put over it. It is best to use two coats of paint.

(18) D. W. writes: I find in No. 22, June 2d, on inquiry for method of drilling glass. "Glass can be drilled as easily as soft iron and with a common drill by using a saturated solution of gum camphor in alcohol and equal part spirits turpentine; keep this about the cutting edge of drill, and in filing glass keep the file wet with it." Can you give me a formula for white or nearly white varnish for maps on common drawing paper? A. Dissolve shellac by heat in 8 parts of water and 1 of pearl ash. Precipitate by chlorine, and dissolve in a rectified spirit. The following is recommended for drawings: Dextrine 2 parts, alcohol one-half part, water 2 parts. The drawings should be prepared by applying two or three coats of thin starch or rice boiled and strained through a cloth.

(19) W. D. G. writes: I read of a "gauge cock and low water alarm" which depends for its action on the temperature of the water remaining constant at 212° while that of the steam is higher. The statement seems to be well substantiated, but I have always supposed, and do still, that the water and steam in a boiler both attained the same degree of heat; will you please inform me through your Notes and Queries which is correct? A. The water and steam inside the boiler are nearly of the same temperature. The water in the alarm part of the gauge cock has little or no circulation from the boiler, and remains cool until low water allows steam to enter.

(20) C. H. F.—1. We would not recommend you to risk strengthening your boiler by patching up with braces. Get a new one of copper made by a coppersmith, No. 16 copper, brazed. 2. A good strong metal for a small engine may be made with an alloy of 1 pound copper to 2 ounces tin and 1 ounce zinc.

(21) A. H.—The method of making rubber stamps is described as follows: Have a vulcanizing apparatus with a thermometer and a lamp under it, such as dentists use; have an iron printing frame, in which you lock up the type for all the names which you wish to reproduce in rubber, and of such a size that the plaster mould made from it can be placed inside the vulcanizer. This mould is made like an ordinary stereotype mould, by first oiling the type and then pouring the plaster over it; when set, take it off carefully, and do not let it dry, but proceed at once by placing on top of the mould a piece of sheet rubber (vulcanized rubber). Then have two iron plates, one for placing on top of the sheet rubber and one below the plaster mould, and which by proper screws can be pressed together and squeeze the rubber on the mould. Back up the rubber with a few sheets of paper, so as to prevent it from sticking at the back of the iron plate. After screwing down sufficiently immerse the mould and rubber in the water in the vulcanizer, screw the cap on, and heat to 300° Fah., then let it cool, open the vulcanizer, take out the mould and rubber, and remove the rubber carefully from the mould. This will be easily done if you have put the mould while still wet in the vulcanizer. Cut up the rubber so as to separate the various names, glue them to handles, and your rubber hand stamps are finished.

(22) A. W. B. writes: I have found it very difficult to make a perfect matrix for rubber stamps. What is the best material to use? Have used plaster, pure, but it is apt to break the fine lines. Is anything used to toughen it? What can be used to make the type leave the plaster freely? Is pure rubber used, and if so, how? I have dissolved it in bisulphide of carbon, but have had trouble in getting it to form a complete shape, as I think the rubber is lighter than the bisulphide, so that it does not seem to enter into the lower parts of the letters. I mean that when it hardens it has formed a sort of thick skin over the mould, but seems to rise away from the lower parts of the letters. I did not know but some composition was used that could be melted and poured in hot. A. The plaster mould is best made by taking the very finest of plaster of Paris and sprinkling it into water, and stirring until the mixture is of the consistency of thick cream. If the mould or type is oiled with a little sweet oil or boiled linseed oil, the type can be readily removed. Vulcanized rubber is used. See the process as given in detail elsewhere in this number. It must be understood that experience or proper manipulation is essential to good results. See page 3794, SCIENTIFIC AMERICAN SUPPLEMENT, No. 251.

(23) E. C. asks: What is the mixture of metal for the manufacture of chilled cast iron rollers used in roller mills; also the method of chilling them? A. Chilled rolls are generally made from "charcoal pig" No. 3, but some roll makers claim to have some