Business and Lersonal.

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,

Two valuable Patents for sale for Boot and Shoe Seam Rubbing .Testimonials, The best in use. W. Manley, Rochester, N. Y.

Use the Patent Improved Sheet Iron Roofing and Drip Crimped Siding made by A. Northrup & Co., Pittsburg, Pa. Seald for circular and prices.

Novelty Makers address Fred, E. Heimig, 92 1st St., Louisville, Ky.

Writing made easy. See advertisement of D. Mackinnon & Co., page 157.

 ${\bf Jack\ screws\ cheap. Circular\ free.\ Guthrie\ Bros., Galva, III.}$ A. L. Jones' Self-Regulating Steam Trap. Most reliable one made. W. E. Kelly & Bro., General Agents, 46 Cortlandt St., New York.

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

For Sale-One 2d Hand Planer and Matcher, Tompkins' make. Planes 24 in., match 12. 2 sets 14 in. knives and 2 sets matcher knives. Matcher heads and spindles new. In first class order. Sold for want of use. Price \$200. Full particulars on application. Address Lock Box 24, Clyde, N. Y.

Magneto Call Bells for Telephone Lines. The Best. No battery required. Bunnell, 112 Liberty street, N. Y. Write to E. & F. Gleason, 56 Canal street, Philadel-

phia, for standard wood tools,

Sperin Oil, Pure. Wm. F. Nyc, New Bedford, Mass. Power & Foot Presses, Ferracute Co., Bridgeton, N. J.

Telephones.—J.H.Bunnell, 112 Liberty St., New York. Bolt Forging Machine & Power Hammers a specialty. Send for circulars. Forsaith & Co., Manchester, N. H.

Catalogue of Scientific Books. Mailed free on application. E. & F. N. Spon, 446 Broome St., New York.

Pulverizing Mills for all hard substance and grinding

National Steam Pump. Simple, reliable, and durable.

Send for catalogue. 46 Cortlandt St., New York.

J. C. Hoadley, Consulting Engineer and Mechanical and Scientific Expert, Lawrence, Mass.

For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, \$350. Forsaith & Co., Manchester, N. H. Boilers ready for shipment, new and 2d hand. For a good boiler, send to Hilles & Jones, Wilmington, Del.

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

All kinds of Saws will cut Smooth and True by filing them with our New Machine, price \$2.50. Illustrated cut out.
Circular free. E. Roth & Bro., New Oxford, Pa. (3) J

Hydraulic Presses and Jacks, new and second hand. E. Lyon & Co., 470 Grand St., N. Y.

Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N. J.

The Cameron Steam Pump mounted in Phosphor Bronze is an indestructible machine. See ad. back page

1,000 2d hand machines for sale. Send stamp for descriptive pricelist Forsaith & Co., Manchester. N. H. Presses, Dies, and Toolsfor working Sheet Metals, etc.

Fruit and other Can Tools. Bliss & Williams, Brooklyn, N. Y., and Paris Exposition, 1878.

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.

Bound Volumes of the Scientific American.—I will sell bound volumes 4, 10, 11, 12, 13, 16, 28, and 32, New Se ries, for \$1 each, to be sent by express. Address John Edwards, P. O. Box 773, New York.

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

Solid Emery Vulcanite Wheels-The Solid Original mony, 15.5; bismuth, 15.5. 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.

Best Wood Cutting Machinery, of the latest improved kinds, eminently superior, manufactured by Bentel, Margedant & Co., Hamilton, Ohio, at lowest prices.

Water Wheels, increased power, O.J.Bollinger, York, Pa. We make steel castings from $\frac{1}{4}$ to 10,000 lbs. weight, 3 times as strong as cast iron. 12.000 Crank Shafts of this steel now running and proved superior to wrought iron. Circulars and price list free. Address Chester Steel Castings Co., Evelina St., Philadelphia, Pa.

list). Models, experimental work, and machine work generally. D.Gilbert & Son, 212 Chester St., Phila., Pa. Holly System of Water Supply and Fire Protection for

Cies and Villages. See advertisement in Scientific American of last week. Kreider, Campbell & Co., 1030 Germantown Ave.,

Phila., Pa., contractors for mills for all kinds of grinding. teeth of Gear Wheels, Pratt & Whitney Co., Manufacturers, Hartford, Conn

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,400 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

The Turbine Wheel made by Risdon & Co., Mt. Holly, N.J., gave the best results at Centennial tets.

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

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

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

NEW BOOKS AND PUBLICATIONS.

Gems of American Scenery. The White Mountains. New York: Harroun & Bierstadt. Price \$3

This attractive little book marks a new departure in bookmaking, and one which cannot fail to commend itself to many. Its illustrations are stereoscopic views printed in permanent black by the Albertype process, a flap of the cover carrying the lens required for seeing the views stereoscopically. Thus we have in one compact volume a stereoscope (which may be used also with detached views), two dozen unfading views of the more striking bits of White Mountain scenery, and a series of brief descriptions of the scenes displayed. The novel idea has been carried out so successfully that it is quite safe to predict the speedy as well as wide and useful application of the plan to other than scenic illustration. In mechanical and scientific works, for example, especially those intended for the young, stereoscopic illustrations, showing the objects with actinic accuracy and solid, cannot but be exceedingly advantage-Such illustrations would be as much superior to the carbon-printed photographs now coming into use. as the latter are superior to the old-fashioned woodcuts and lithographs.



- (1) C. O. B. asks: 1. Can a short line of telegraph be run by burying plates of copper and zinc in the ground, and if so, how would I proceed? A. Yes; but a number of plates would be required, and they would have to be buried in earth that is constantly moist. It would be better to use two or three gravity cells. 2. What would perpetual motion be? Must it be independent of the power of magnetism and gravitation? A. Perpetual motion is believed to be an impossibility. Permanent magnets and gravitation are the mainstays of seekers for perpetual motion. 3. Was there ever a wheel or other piece of mechanism made purposes. Walker Bros. & Co., 23d and Wood St., Phila. to run by permanent magnets and gravitation? A. No. For the most durable and economical Paint for cars, 4. Could not a few very large cells be used for producroofs, bridges, iron, brick and wooden buildings, address ing the electric light, since the larger the cells the Pittsburg Iron Paint Company, Pittsburg, Pa. greater the quantity of electricity, hence the more heating power? A. Yes, but medium sized cells are generally used. 5. Would not ground wires sunken at different places around a building, and connections made to flues, spouts, and other ironwork of the house, be a good protection against lightning? A. Yes, if the wires were attached to large plates or bunches of metal scrap buried in moist earth. 6. Would a soft iron wire connecting both ends of a Speight permanent magnet tend to retain its magnetism? A. Yes, but heavy armatures would be better.
 - (2) "Lowell" asks how to remove India ink from the flesh. A. The particles of carbon must be
- (3) J. G. says: I have three points through which I wish to draw a section of a circle whose radius Lathes and Machinery for Polishing and Buffing Metals. is too large to admit of being drawn by either compasses or trammels. Can you give me any practical means of



accomplishing this object? A. Suppose that A D C are the points through which the arc of circle requires to be drawn. Take two strips of wood, E D and G D, of which one edge must be planed true. Place them so that their planed edges lie even with the three points, as shown in the cut, beveling them off at the ends where they meet (at D). Then fasten the ends together by nailing a piece across the joint at D, and nail on a brace, F. Drive a nail in the points, AC. A pencil held against the strips (at any point), while the frame is moved laterally and against the nails at C D, will describe the arc required, as shown by the dotted lines.

(4) J. W. B. asks: What composition is used in casting stereotype plates? A. Lead, 69; anti-

(5) J. E. J. asks: 1. Will small holes in the coating of a Leyden jar cause an escape of electricity? A. No. 2. Will a cracked Leyden jar contain electricity? A. If the crack is in that portion of the jar that is covered with timfoil the electric fluid will probably pass from one coating of the jar to the other.

Some time ago I made a paper tube from a long, narrow strip of newspaper, turned down the large end, and it into a bottle, intending to experiment with it after-Diamond Engineer, J. Dickinson, 64 Nassau St., N.Y. cid, amber colored liquid, with that peculiar odor ob- piece, copper 95, tin 3, zinc 2; weight, 48 grains. Machine Cut Brass Gear Wheels for Models, etc. (new it (the bottle) had been standing near the fire all day, vol. 37, SCIENTIFIC AMERICAN. What kind of gas is it, or what is the viscid substance? A. When woody or vegetable fiber is subjected to destructive distillation the products, pesides illuminating gas, are chiefly water, pyroligneous acid (wood vinegar), creosote, wood spirit (methylic alcohol), and as th temperature rises, various hydrocarbons, as p naf-Cutters, shaped entirely by machinery, for cutting fin. The character of the product depends upon the nature of the fiber distilled and the temperature employed.

- (6) A. H. P. L. asks: What is used to stick tinfoil to a jar, in making a Leyden jar? A. Usc alcoholic shellac varnish, of the consistency of molasses.
- (7) J. E. T. writes: Having found Dr. Lionel Beales' and all other injections for microscopic specimens containing Prussian blue to fade, it has occurred to me to experiment with the aniline violet or blue. Will you kindly direct me to a book on this subject? I want a permanent blue or violet, or at least some way to make these colors fast. Do you know of a good book on the aniline colors, how to make them. to

means of dilute sulphuric acid. The violets require no mordants and are much less permanent than the blues; good violet by the following solution: Extract hæmaten or twelve volumes of water or glycerin. Fresh tissues require more time than those which have been hardened in alcohol or chromic acid. You may consult Reiman's "Aniline and its Derivatives," Calvert's "Coal Tar Colors," and Schutzenberg's "Traite de Materiel Colorante.'

- burned. A. Heated to whiteness the diamond burns readily in oxygen; also in air, but more slowly.
- (9) T. H. asks what to use in making aniline black ink that will give it a beautiful gloss. Try a concentrated solution of borax 1 part, and shellac parts, in boiling water.

How can I make the fiquid plating used for polishing silver? By slightly rubbing on silver it gives it a splen did polish. The liquid you mention is doubtless the 'magic silver plating fluid" we have so often referred to in these columns—an aqueous solution of mercuric chloride (corrosive sublimate) and nitrate. The luster of the film of quicksilver amalgam formed when it is applied to the metallic surfaces is fictitious, and soon disappears. The preparation is very poisonous, and several cases of mercurial poisoning have resulted from its use on spoons and similar articles.

- (10) F. D. can make a good mucilage as follows: Dissolve 202s. of dextrin in 602s. of hot water, and add 1 oz. or more of acetic acid.
- (11) G. P. S. asks how ginger ale extract is made. A. (1) Bruised ginger, 34 oz.; boil for half an hour in 1 quart of water, replacing the water lost by evaporation. Strainthe extract, evaporate it four fifths, and add sugar, 1 lb.; cream of tartar, 14 oz.; lemon juice, 1 fluid oz. For use dissolve in one gallon of water. (2) Boil 11/6 lb. of bruised ginger in 3 galions of water, strain and concentrate as before, and add sugar 20 lbs.; lemon juice, 1 pint; honey, 1 lb.; sufficient for 18 gallons. (3) Powdered sugar, 2 drachms; powdered ginger, 15 grains; bicarbonate of soda, 26 grains. Mix, and wrap in a blue paper. Tartaric acid. 30 grains; wrap in a white paper. For use dissolve each in half a glass of water, and mix.

How can I make carbonic acid gas by the bicarbonate process? A. Mix together 14 parts of bicarbonate of soda, and 15 parts of tartaric acid; both perfectly dry and powdered; on contact with water this powder evolves carbonic acid briskly.

- (12) M. N. asks how to make a good, cheap in the cold in a well stoppered vessel, and occasionally agitate until solution is effected.
- (13) H. W. M. asks why exploring expedito 1,500 revolutions per minute. tions are not sent to the South Pole. A. The South Pole is more inaccessible than the North Pole. It is now in the glacial stage.
- (14) H. S. D. asks how to make a cheap, practical acoustic telephone which will operate over two miles of wire. A. You will find description of a good acoustic telephone on p. 75 of current volume in answer to No. 28, but it cannot be recommended for the distance named. A telephone of the Bell form would do much better.
- (15) A. H. L. asks: 1. Is gas carbon expanded by thepassage of an electric current? A. We think not to a perceptible degree. 2. If not, how is the receiving diaphragm vibrated in Edison's telephone? A. Edison's receiver is substantially the same as the Bell telephone. 3. What are the material and the thickness and size of the sounding board in the microphone? vented from crossing it? A. No.
- strong hot aqueous solution of soap, and after a short time with hot solution of alum or aluminum sulphate What will drive away or destroy mould in a cellar?

A. Lime whitewash. (17) G. E. D. asks: What is the composi-

near it cut a hole. I then lit the small end, but instead tion and weight of the dime, three cent, five cent, and with a cloth. After standing a day or two it may be of lighting the gas which came out at the hole, I turned one cent pieces? A. Dime: silver 900, copper 100; weight, 2.5 grammes; five cent pieces; copper 75, nickel bind the edges. wards; when I took up the bottle some time after I 25; weight, 77:16 grains; three cent piece has the same found that the gas had resolved itself into a heavy, vis- composition as the five; weight, 30 grains; one cent

Can coke be used as a substitute for carbon plates in gas was not absorbed by any moisture in the bottle, for the galvanic battery? A. See pp. 198 (2), and 203 (2),

- (18) R. P. G. asks for the process of bluing $_{\parallel}$ 32, Scientific American, current volume. watch and clock springs, screw heads, etc. A A very regular temperature is required for bluing steet. The articles must be polished, and buried in wood ashes heated to about 550° until desired color is obtained.
- tery to produce any light with charcoan points? If so, how best prepare battery? A. You may get a very small light from ten cells of Grenet battery. 2. Canany. thing but glass jars be used for battery? A. Coat wooden boxes with the following mixture, melted: 2 parts of wax, 10 parts of common rosin, 2 parts of red lead, and 1/4 part of gypsum. 3. What size wire is best to connect telephones without magnets? A. A thread is better than a wire for an acoustic telephone. If wire is used it should be No. 36.
- use them, and especially to prevent the blue or violet | phragm, 21/4 inches, is made of tin-type, with the collo- | turpentine oil at 310° Fah.

from fading? A. In common with other aniline colors dion scraped off. The helix is made of 34 oz. of copper the aniline blues and violets are not permanent dyes, wire No. 40, silk insulated and covered with shellac varthough the blues are among the most permanent of this nish. It is placed on the south pole of the magnet, and class of dyes. For dyeing animal tissues blue the color is wound right handed. The line wire is about 30 yards (soluble or Nicholson blue) may be dissolved in hot wa- long. It is iron, not galvanized, No. 17. The ground ter rendered slightly alkaline with borax, and the full connection is made by filling a hole with zinc and tin tint developed and fixed upon the dyed substance by scraps, and several feet of wire are placed on it, and then one half a peck of salt. The wire in the ground is not the same size as my line wire. A. The trouble the fading cannot be avoided. Tissues may be stained a probably lies in your ground connections. For the distance named a return wire, we think, would answer toxylin, 4 drachms; alum and potassium sulphate, 2 better than the ground. 2. How near will I have to put drachms; water, 2 fluid ozs.; mix, filter, and dilute with my diaphragm from the magnet? I put it about the thickness of cardboard. I have failed to get any sound from it. A. The magnets are properly adjusted.

- (21) L. F. K. writes: In a recent issue of the Scientific American I saw directions for making an acoustic telephone. I made one, but hefore beginning work on it doubted whether the sealing wax would (8) J. M. asks whether a diamond can be hold the plate against a taut line, and the event proved me to be correct. I then placed a gum ring between the plate and wood, and secured the plate to the wood with a few brads, and the apparatus worked more satisfactorily than a Bell telephone, with which I had experimented. I wanted to put up "iny own make," but the difficulty is that about 20 feet of the line at each end is exposed to the air, and this arrangement cannot be altered. Any twine that I can use will not last more than a few weeks. Can you suggest any preparation of the twine that will enable one to use it, say, fora few months? A. To secure the diaphragm to the wood a good quality of scaling wax may be used successfully by heating the diaphragm and applying a little of the sealing wax near its periphery. Shellac 4 parts, pitch 2 Venice turpentine 1 part, melted together, make a goodcementfor this purpose. Twine may be rendered more durable by boiling it first in a strong soap solution and then in strong solution of alum.
 - (22) J. A. B. asks: What is the best and most economical way of extracting the grease and oil contained in the scrapings, trimmings, etc., of leather? It contains about 50 per cent of tallow and oil, and in some cases more. A. You may digest the waste for several hours with enough carbon disulphide to cover it, pressing outthe excess of liquid on removal; repeat with more waste, and when the solvent becomes nearly saturated draw it off, and subject the solution to distillation in a hot water or steam bath-the solvent being recovered by a suitable condenser, and the oil and fatty matters remaining in the still.
 - (23) A correspondent suggests that railway engineers be provided with telephones, so that in case of accident they might be connected with the telegraph wires and thus establish a communication with the sta-
 - (24) L. T. S. writes: I send by mail a piece of stone containing a fine yellow dust. What is it? A. The rock very probably contains nothing of value; the glimmering particles are mica.

Can you tell me how to make a small exhaust blower large enough to take sawdust from a circular saw table furniture polish. A. Pale shellac, 3 lbs.; mastic, 6 and dust from an emery wheel of small size? A. ozs.; alcohol of 90 per cent, 3 quarts. Digest together | For blower see reply to C. M. B. (27) in No. 5 of current volume. Connect your exhaust pipes with the center of the fan casing. The fan should make from 1,200

- (25) H. P. asks for a recipe for an indelible ink to use on a linen stainp. A. See p. 27 (31) current volume, and p. 107 (37).
- (26) E. P. asks how to use an acid that produces a frosted appearance upon glass. The name I know the acid by is "white acid." A. The acid you refer to is hydrofluoric acid—produced by heating powdered fluorspar and strong sulphuric acid together in a platinum or leaden retort, and absorbing the gaseous product in cold water contained in a bottle of gutta percha. Warm the glass, cover it with a uniform film of wax or paraffin, through which to the surface of the glass the design is afterward etched with a steel point, then expose the surface to the acid or acid gas.

Can you tell me how to make photographs transparent, and then varnish them, or by any other means render them capable of being exposed to air and light with-A. We do not know that dimensions have been given.
4. Would ferrotype platework if the current were preto remain in water until thoroughly soaked, then place it between blotting paper and let it remain until just (16) S. K. O. asks: What can I waterproof a canvas tent with? A. Saturate the material with a picture with good starch paste and lay, face down, on the glass. Commence in the center of the picture, and rub outward toward the edges to dispel all air and excess of paste, care being observed not to get paste on the back of the print. While rubbing keep the paper damp with a sponge. When dry lay on a heavy coat of castor oil, and after a time rub off the excess of oil colored. Cover the back with a thin plate of glass, and

- (27) G. G. C. asks how rubber printing type are made? I know how to make rubber stamps, but do not know how they make solid rubber type. How do they make the single letters? A. The prepar is moulded by pressure while warm, using steatite powderon the moulds, and vulcanized as described on p.
- (28) F. R. A. writes: I wish to make etchings on zinc plates, that is, I wish to make a drawing on zinc with some ink that will resist sulphuric or muriatic acid so I can obtain a relief plate. What are the (19) J. A. G. asks: 1. Can electricity be ingredients of such an ink? A. Genuine asphaltum, 1 produced in sufficient quantity from an ordinary bat- part; oil of turpentine, 4 parts; dissolve and add lampblack to bring it to the proper consistence.
- (29) C. B. H. writes: A cement used for cementing leather indicates by its smell that sulphide of carbon is the solvent used. How can I ascertain whether it is the di- or bi-sulphide? A. The bisulphide and disulphide are the same. 2 How can I test the cement for oil of turpentine? A. Expose a quantity of the solution in a shallow vessel over the water bath to a temperature of 110° Fah. for some time. If turpentine oil is present it can be recognized by its odor in (20) A. B. C. asks: 1. What is the trouble the residue from which the more volatile sulphide has with my telephone? I use a magnet 51/2 x 1/6. The dia- been expelled. Carbon disulphide boils at 110° Fah.,