(85) Our dwelling has an exposed wall which is damp inside, especially in rainy weather. It is covered with a coat of roughcasting (mortar), but does not seem to have the desired effect. Will you inform me of a remedy for this dampness, excluding wood?—A. J. C.

(86) Will you kindly inform me the method and machinery used in preparing the wood for the manufacture of matches, and wood best adapted for the purpose?—M. C. H.

(87) We have a hot water heating apparatus in our establishment. Any time in cold weather when fire is rushed we can turn air cock on a radiator and obtain a gas, igniting and burning with the characteristic hydrogen flame. The boiler manufactures this water gas whenever there is a good hot fire. May not steam boilers manufacture this same gas, and would that not be one of the reasons of the many unaccountable explosions?—F. S. W.

(88) I have nearly completed an electric motor one-half size of one you described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Will you please inform me how many volts electromotive force will be required to operate it?—J. M. A.

(89) The size iron wire to use on an induction coil 6 inches in length, also the size copper wire and how many coils each way. Is a No. 2 Grenet battery sufficient to operate a coil of that size?—W. S. P.

(90) How is granite iron or tin ware made, that is, how is the color and gloss put on, and can other colors, such as red, blue, or white, be put on in the same way? And is there a patent on making such wares?—T. G. A.

(91) I have some galvanized wire netting nailed on frames on which I dry glue. The galvanizing has worn off and the wire rusted, and I want to find some solution with which to cover the wire to keep rust off the glue. Can you give it to me? Of course I could have it regalvanized, but the expense of taking wire off frames and nailing on again is too much.—W. H. B.

(92) Can I work 25 gallons silver solution with 3 cells of Wollaston batteries containing 4 gallons each, zincs to be 6 by 18 inches? Copper plates the same size. How can I produce a bluish black on brass that will be durable? I have seen some that was copper plated, and that was blacked, especially on smoke jacks of lamps in cars. Is it absolutely necessary to quick articles of brass or copper before placing them in bath, in order to produce good results?—S. B. R.

(93) 1. What is the first thing that moves on the locomotive, the valve or the piston, after the steam is admitted, that is, after the throttle is opened? 2. What moves first, the crossheads or the engine (locomotive)? 3. Place the engine on the back dead center, right side, with the reversing lever down in the corner (forward motion), now reverse the lever to the extreme back motion (but do not move the engine), is the valve on the right side in the same position as it was before she was reversed?—A. M. S.

(94) 1. I have a telephone line about ¼ of a mile, of No. 30 hard phosphor bronze wire. Will you tell us if that size wire (phosphor bronze) will carry current enough from battery, or the magneto call bell, to ring a bell at that distance? 2. How many cells, say the largest, of Dr. Gassner's dry battery will it require to instantly heat a No. 30 platinum wire to white heat?—C. B. H.

(95) How many, and what, are the constant movements of the ocean's waters?—S. P. E.

(96) What is the horse power of 200 gallons of water per minute over a 25 ft. fall, and what would the same be of a 50 ft. fall?—L. M. M.

(97) Please inform me which side of a belt is proper to turn next to a pulley—the smooth side or rough?—A.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

(1) In issue of December 22, (1) G. W. asks for a recipe for hardening soles of shoes. If a pair of new shoes has the soles made warm by holding them near a fire or stove, and then varnishing them with copal varnish, drying them, warming, and applying a second and third coat, the leather will become waterproof, and very hard, lasting about twice as long as if not thus treated.—D. P.

(15) Speed of House Fly.—The maximum rate of speed in flight of the common house fly (*Musca domestica*) is 53·35 meters per second.—R. B.

(32) Preventing Condensation of Moisture on Tin Roofs.—A tin roof should have placed under the tin a layer of shoddy sheathing paper, such as is used to make into tarred felt, but without the tar. This will prevent the condensation of moisture upon the lower side of the tin. The tin should be thoroughly painted upon both sides with Prince's metallic paint and linseed oil, half boiled and half raw. More tin roofs are destroyed by condensed moisture upon the lower, unpainted side of the tin than in any other way.

(32) To Prevent Dripping Ceiling.—Use tarred paper between tin and ceiling boards. This will tend to overcome the dripping by preventing too great chilling of the upper layer of air. Ventilation from the highest point of the roof will also alleviate the trouble.—X.

(32) J. A. B.—Preventing Moisture on Roofs.—Yes. Anything that will prevent the contact of the moist inside air with the cold tin. Tarred roofing paper is the best. If not attainable, hardware or carpet paper will answer the purpose.

(33) Lacquering Brass.—Caustic soda lye will loosen lacquer. The articles to be lacquered must be warm and perfectly clean. A finger touch will mar the work. Use alcoholic solution of shellac.

(33) About Lacquers.—Clean the brass work of instruments by boiling in caustic soda water, if convenient, otherwise soak in alcohol and wipe. For aluminum lacquer, dissolve bleached shellac in the best, or 95 per cent alcohol. Heat all work to about 212° before lacquering, use a broad camel's hair brush, work quickly and place the work in a hot oven or over a spirit lamp for a few minutes, to glaze the surface of the lacquer. To deaden the gloss on instrument work: Clean perfectly free from grease with soda water, rinse, and dip in a bath of nitric acid 1 part, water 4 parts, for from 2 to 5 seconds; rinse off the acid in hot water, dip again in hot soda water and in hot clean water to leave the surface perfectly from acid. Dry in sawdust. Color lacquers with dragon's blood and saffron to the required depth.

(34) Rules for Size of Wire for Given Current, etc.—1. There are several such rules founded on the heating of the wire. The English Board of Trade rule allows 1,000 amperes per 1 square inch sectional area. Of course this is well within the safe limit, and is often exceeded in practice. 2. The wire on a line should be as large as possible, as its resistance consumes energy. The armature of a dynamo requires a considerable number of turns of wire to give electromotive force at reasonable speed of rotation, and cannot well be made of large enough dimensions to use heavy wire. 3. Practical rules are obtained for the different types of machines. A true theoretical rule is yet a desideratum. 4. Yes.

(35) Circular Saw Practice.—You cannot work a saw from the shaft of your engine, as the speed is insufficient. You do not give enough particulars forrest of query to be intelligently answered.—Sawmill.

(35) X. L., Boilers and Belts.—If you carry 60 lb. pressure in your boiler and can run the engine at 150 revolutions per minute, you can make your saw available only by belting, so as to give it 1,000 revolutions per minute. At the above pressure and speed the engine should indicate 30 h. p. If your boiler is large enough, it will furnish steam for this power. You give us no data to compute the boiler power. It should have 300 square feet of heating surface to stand up fairly with the above speed. If you can run your saw at the above speed with the saw in good order, you should turn out 12,000 feet of pine lumber per day of 10 hours, or in proportion for less speed.

(36) In answer to R. D., No. 36, in your issue of December 15, we would say that we have a cell of the "gelatine battery" manufactured by the H. B. Cox Electric Company, of New Haven Conn., which has been ringing a bell in our office ever since September 6, and has not stopped yet—a total of 106 days. And it seems to vibrate as strongly now as any time in the past 60 days.—G. S. A.

(36) Bronzing Steel.—Expose cleansed objects to vapor of a heated mixture of concentrated hydrochloric and nitric acid for a few minutes and then heat to 572° to 662° F. until bronze color appears. Cool rub with vaseline and heat until latter is decomposed, and repeat process if necessary. Heating polished steel will develop the blue color.

(36) Bronzing and Bluing. — Steel spectacle frames are blued by placing them, polished and perfectly clean, in a muffle or oven heated to exactly the temperature necessary to bring out the exact color, which is between 500° and 600° F. The frames are laid on little racks, so that the heat will strike every part alike. The workmen watch for the color. When obtained, the rack is withdrawn and cooled in a cold air blast. The bronze frames are plated with a very thin coating of brass and heated in the same way as for bluing, but at a less temperature. A bronze color is also obtained by a higher polish on the steel and heating to a straw color, about 350° to 400°.

(37) Leather Tanning without Bark.—In 1877 Knapp patented a process for using iron salts. It is described in Davis' manufacture of leather.

(38) Your jars are very small for your purposes. Use a zinc plate well amalgamated and a carbon plate about ½ inch from the zinc. Excite with electropoion fluid (bichromate potash, sulphuric acid, and water). For each candle power you would need two or three such cups, and they would soon be exhausted.—Electric.

(39) Copying Writing without Blotting.—You may use too much water. The secret of success consists in using just the right amount.

(40) Luminous Paint.—It is best to buy it ready made. The SCIENTIFIC AMERICAN SUPPLEMENT, No. 249, describes the manufacture.—P. P.

(41) Burning Stumps, and Maple Sirup.—Bore holes in stumps and fill with kerosene or nitrate of soda and water. After long standing ignite them.—Filter maple sirup through bone-black to improve color. Before boiling filter through cotton drilling.—M. M.

(42) Coloring Gas Tar.—No powder is known that will color gas tar.—Gas Engineer.

(43) Sighting Rifles.—The sights are adjusted by the maker to cause their line and the axis of the barrel prolonged to intersect, as nearly as possible, at the different ranges for which the back sight is calibrated. Your question implies too broad an assertion, as with fixed sights no such fact obtains except at a single range. Even with the finest sighted pieces it is doubtful if such a requirement is practically applied.—Creedmore.

(43) Gun Sights.—The trajectory of the bullet makes an arched curve on the vertical plane of the sights. The sights are set to meet the curve at a certain distance, and are not parallel with the bore. Thus the setting of the sights for a 100 yard target are lower at the breech than for a 200 yard target. The distance of the front sight from the center of the barrel has no connection with the adjustment of the aim.

☞ Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

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Rivet set and header, W. Lowe 394,779
Rivet setting machine, C. M. Platt 394,722, 394,723
Rivet setting machine, A. M. White 394,743
Roadway or pavement, G. S. Lee 394,583
Roller mill, J. R. Beynon 394,814
Rolling car wheels, machine for, H. W. Fowler 394,565
Rolling mill, W. H. Appleton 394,635
Rotary cutter, G. H. Wesseling 394,803
Rotary engine, J. M. Farmer 394,684
Rotary engine, R. H. Heenan 394,922
Ruling machines, attachment for paper, G. Schwemlein 394,941
Sash balance, J. H. Jenkins 394,698
Sash fastener, J. J. Reed 394,936
Saw swaging device, L. O. Harris 394,570
Scaffold and fire escape, convertible, L. Maurer 394,781
Sewing machines, barring device for buttonhole, W. A. Knight 394,580
Shade fixture, M. Thiel 394,737
Shears for cutting oval plates, P. H. Laufman, Jr. 394,776
Show rack, T. F. McGann 394,595
Sifter, household, R. Kaiser 394,862
Signaling apparatus, electric, G. F. Milliken 394,784
Silk and method of and apparatus for making the same, artificial, H. De Chardonnet 394,559
Skirt supporting spring, L. Moschcowitz 394,593
Sleigh, A. H. Sawyer 394,726
Smoke preventing furnace, D. P. Kayner 394,655
Snap hook, C. E. McClintock 394,598
Soap manufacture, M. O'Hara 394,660
Sodawater apparatus, Cleeve & Parker 394,834
Soldering in vacuo, machine for, W. R. Drueck 394,840
Spoon hook, J. Wood 394,632
Spring. See Skirt supporting spring. Wagon bolster spring.
Station indicators, device for actuating, W. A. Turner 394,799
Stay, garment, S. S. Williamson 394,746
Steam engine, J. T. Case 394,911
Steam engine, double-acting, J. T. Case 394,675
Steam generator, H. H. Hyland 394,574
Steam generators, device for feeding water to, W. Burnham 394,827
Steam generators, water raising connection for, W. Burnham 394,822, 394,824
Steam generators, water returning appliance for, W. Burnham 394,830
Steam jacket connection, W. Burnham 394,825
Stenciling machine, J. A. C. Hamill 394,690
Stereotype finishing machine, C. T. Murray 394,594
Stone or marble drill, R. A. McHenry 394,787
Store service apparatus, J. T. Cowley 394,557, 394,835
Stove for cars, steamboats, etc., M. L. Teaff 394,795
Stove lid, W. A. Martel 394,706
Stoves, summer piece for, J. H. Keyser 394,702
Strainer, milk, G. Trubel 394,798
Strap connection, C. J. Luce 394,780
Straw stacker, G. W. Stephan 394,666
Street or station indicator and card displaying device, W. A. Turner 394,741
Suspender end, Pell & Knox 394,721
Switch. See Railway switch.
Switch or circuit changer, W. W. Griscom 394,568
Telegraphy, P. F. Jamieson 394,697
Telephone exchange system, J. F. Casey 394,833
Telephone exchange system, Durant & Bailey 394,914
Telephone system, J. F. Casey 394,832
Temperature regulator, L. F. Easton 394,568
Tie. See Railway tie.
Tile, glass, W. Buttler 394,910
Tongue support, J. M. Barr 394,752
Tongue support, W. D. Napier 394,982
Top prop, L. Anderson 394,549
Tool holder, electro-therapeutic, A. H. Bacon 394,807
Traction engine, G. T. Glover 394,851
Tramway, electric, M. H. Smith 394,621
Tramway, rope, J. W. Reno 394,724
Trap. See Fly trap.
Treadle, J. H. Whitney 394,626
Tubes, machine for expanding and trimming, J. Andersen 394,548
Type writing machine, F. H. Perry 394,607
Upholstering, chairs, F. G. Johnson 394,578
Valve for radiators, air, J. L. Judg 394,860
Valve, steam engine, J. P. Lisk 394,930
Vehicle, electro-magnetically propelled, W. L. Stevens 394,735
Vehicle spring attachment, M. V. B. Waldorf 394,624
Vehicle top, A. Woeber 394,804
Vehicle, two-wheeled, J. P. Barker 394,751
Vehicle wheel, G. Olsen 394,718
Vehicles, driving gear for electro-magnetically propelled, W. L. Stevens 394,734
Vehicles, platform spring for, S. R. Gardner 394,686
Velocipede, G. Staeber 394,890
Veneer from logs, machine for cutting, F. L. Wilson 394,898
Vending apparatus, H. Bailey 394,904
Ventilator, F. G. Johnson 394,577
Vise, E. Stoecklin 394,793
Wagon bolster spring, L. Pulliam 394,985
Wagon brake, H. W. Falk 394,846
Wagon jack, W. T. Brown 394,820
Washing machine, D. H. Benjamin 394,672
Washing machine, W. J. Davidson 394,913
Washine machine, C. Hammons 394,646
Watch regulator, E. F. L. Grandjean 394,919
Watch, stop, A. L. Piquet 394,933
Water by steam, apparatus for raising, W. Burnham 394,826
Water gauge, F. L. McGahan 394,870
Water motor, H. E. Trumble 394,740
Watering troughs, device for heating, D. J. Hadley 394,689
Weather strip, J. Lathrop 394,864
Weighing apparatus, J. Marquardt 394,869
Welding apparatus, portable electric, E. Thomson 394,892
Welding furnace, H. C. P. Le Pan 394,865
Well sinking machine, Overton & Ingersoll 394,719
Wheat heater or temperer, W. N. Schindler 394,618
Wheel. See Barrow wheel. Fifth wheel. Metal wheel. Vehicle wheel.
Wheel making machine, A. E. Quintal 394,608
Whiffletree coupling, S. Beers 394,811
Window shade bracket holder, A. B. Dunkle 394,644
Wire stretcher, A. J. Burbank 394,674
Wood carving and moulding machine, C. L. Goehring 394,766
Wood, machine for cutting and shaping, C. L. Goehring 394,762
Wood or other material, producing figures on the surface of, C. L. Goehring 394,767
Wool drying apparatus, Nelson & Bowen 394,713, 394,714
Wrapping machine, package, W. S. Jarboe 394,772
Writing on unruled paper, apparatus to aid in, E. P. Glascock 394,849

DESIGNS.

Bicycle frame, J. M. Starley 18,820
Bracket, C. H. Harkins 18,814
Cash register cabinet, W. G. Schickner 18,819
Casket handle, D. Leonard 18,816
Curtains, draperies, etc., fabric for, C. Wheeler 18,823
Handle for cutlery, F. R. Kaldenberg 18,815
Watch bridge, C. W. Ward 18,821, 18,822
Watch case, F. & H. Parker 18,817
Weighing machine case, H. A. Schneekloth 18,818

TRADE MARKS.

Bitters, W. F. Colby 16,101
Canned salmon, Aleutian Islands Fishing and Mining Company 16,098
Coffee, compound for mixing with, G. Dey 16,102
Extracts for food, flavoring, J. B. Clark 16,100
Flour, wheat, Smith & Frantz 16,107
Oil, cylinder, F. B. Hower 16,104
Perfumery, Foote & Jenks 16,103
Pianoforti and pianinos, C. Bechstein 16,099
Sardines, F. Reiset 16,106
Soap, A. Marsh 16,105
Typewriting machines, ribbons for, J. Underwood & Co 16,108

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