Mop holder, W. B. Hadley 685,275
Motor, W. M. Fulton 685,269
Mowers, etc., draft bracket for, J. W. Pridmore 685,638
Music leaf turner, Shunk & Davis 685,533
Music leaf turning device, G. Culley 685,262
Musical instrument self-playing attachment, A. E. Whitehead 685,546
Musical instruments and automatic music sheet therefor, pneumatic tracker for, R. A. Gaily 685,270
Neckwear fastener, W. H. Hart, Jr 685,513
Needle holder, G. H. Wartman 685,361
Nozzle for drinking fountains, W. H. Dewar 685,675
Nut lock, P. J. Moran 685,340
Observation platform, G. Limbach 685,620
Oil burner, coal, J. G. Maris 685,407
Oil or grease, apparatus for extracting, E. Printz 685,529
Packing box or package, F. W. Dye 685,325
Packing flange, G. Huhn 685,610
Pancreas, obtaining a preparation of the, W. Weber 685,543
Paper feeding machine, W. Bridgewater 685,370
Paper weight, S. H. Huston 685,476
Peat, means for extracting roots and foreign matter from, Sims & Davis 685,651
Peat, treating and drying, Sims & Davis 685,650
Pegging machine anvil, I. Frechette 685,398
Pen, self filling fountain, R. Conklin 685,258
Photograph developing apparatus, S. Quincey 685,640
Photographic printing apparatus, A. Pickard 685,432
Photography, apparatus for submarine, L. E. Walkins 685,493
Picture frame support, adjustable, F. McIntyre 685,458
Piling, metallic sheet, G. W. Jackson 685,447
Pipe coupling, automatic, J. E. Forsyth 685,267
Pipe lifter, Odette & Gosselin 685,385
Pipe or rod carrier, T. G. Stiles 685,357
Pipe union, G. H. Schamp 685,691
Pipe wrench, W. S. Tubbs 685,655
Plastic compounds, preparing, C. Reisser 685,489
Plow, H. A. Bean 685,556
Pneumatic despatch tube apparatus, transmitter for use in, J. T. Cowley 685,674
Pool table, Genter & Besch 685,596
Printing press punching attachment, A. O. Hayes 685,490
Printing surfaces, making, C. A. O. Rosell 685,461, 685,462
Propelling apparatus, boat, D. R. Sheen 685,437
Pulley, ribbed, Galloway & Whyman 685,580
Pulp cylinder machine, H. Gaara 685,374
Pulp, reclaiming, F. A. Franklin 685,593
Pulp washing machine, F. A. Franklin 685,594
Pump rod balance, A. A. Koch 685,617
Punch, ticket, W. E. Clow 685,467
Push button support, electric, H. F. Keil 685,614
Rail joint, C. B. Mead 685,519
Rail joint, Burger & Williams 685,672
Railway cattle guard, S. A. Ruddell 685,693
Railway crossing barriers, means for automatic operation of, H. Siegmann 685,503
Railway, electric, Arno & Caramagna 685,242
Railway, marine, J. L. Crandall 685,714
Railway rail fastening, metallic, J. S. McAwley 685,523
Railway sleeper and chair, A. Anderson 685,553
Railway tie, composite, R. M. Chapman 685,392
Railway track cleaner or flanger, Martin & Emerson 685,425
Reclining chair, Davis & Sturm 685,371
Refrigerator, J. G. Ogden 685,543
Refrigerator, R. Hirsh 685,475
Revolver, C. P. O'Neill 685,292
Rheostat, T. S. Perkins 685,485
Roasting furnace, E. B. Parnell 685,344
Rolling mill, J. Fawell 685,468
Rotary engine, R. Sanderson 685,646
Rotary explosive engine, C. A. Marrder 685,722
Router, carpenter's, A. F. Schade 685,411
Rubbing and polishing machine, H. P. Gale 685,328
Rudder propeller, W. S. Avard 685,368
Sad iron, W. W. Lamb 685,423
Sash balance, A. E. Hewitt 685,331
Sash lock, J. A. Hasenpflug 685,469
Sash lock, F. B. Townsend 685,700
Saw, buck, Nicol & Lionberger 685,291
Saw frame, buck, W. Smith 685,534
Saw grinder adjusting attachment, W. A. Huff 685,609
Saw horse, M. A. Elliott 685,445
Sawmill carriage gear, E. S. Berry 685,560
Saw set, double action, Roberts & Mara 685,644
Scale, computing, H. J. Henrichson 685,330
Scrap bundling press, C. W. Bray 685,565
Scraper and grader, J. U. Sargent 685,350
Scraper and grader, road, Walker & Osten 685,657
Screw cutting tool, J. Dengler 685,264
Sealing sheet metal cans, vacuum, E. Norton 685,428
Separator. See Gas and Oil Separator.
Shade fixture, adjustable window, F. Winne 685,366
Shade roller, window, G. A. Berlinghof 685,711
Shafting hanger, A. Weed 685,312
Shafting hanging and lining up instrument, R. Kinkead 685,455
Shank stiffener machine, Rich & Reed 685,489
Sheet metal oval or circular frames, machine for making, H. A. Seymoure 685,531
Shield or protector, R. M. J. McHale 685,341
Shingle die, Palmer & Downs 685,294
Shoe horn, A. G. Williams 685,548
Sign, E. L. Nichols 685,630
Sign, transposable or changeable, L. Buckstein 685,251
Signature gatherer, J. E. Smyth 685,535
Silo door, A. Walrath 685,500
Slide gage and try square, combined, Olson & Opland 685,634
Sling support and tripping device, E. W. Wiley, Jr 685,315
Snap hook, breast yoke, A. R. Otterman 685,525
Snap, whiffletree, H. H. Brown 685,250
Soldering cans, etc., J. McGinnis 685,483
Sound recording and reproducing machine, Osten & Spalding 685,409
Sound reproducing apparatus, G. K. Cheney 685,712
Speed changing mechanism, G. A. Ensign 685,587
Speed regulator, G. Lombardi 685,518
Spike grooving machinery, L. Williams 685,416
Spike grooving machine, L. Williams 685,417
Spike making machine, O. Irwin 685,477
Square, bevel, E. C. Duncan 685,372
Square, T, J. D. Barrie 685,369
Stacker, pneumatic, G. W. Morris 685,628
Stamp mill guide, E. Major 685,622
Stamp retaining device, R. F. Herold 685,514
Steam boiler, H. L. Wilson 685,418
Steam boiler and burner therefor, J. H. Bullard 685,567
Steam engine, C. C. Worthington 685,317
Steam engine, R. H. Botts 685,563
Stock head, A. Hulsberg 685,332
Stove fuel receptacle, cooking, C. D. Orcutt 685,484
Straightening trough and delivery guide to cooling tables, P. Boyd 685,465
Strainer, A. Sidoti 685,302
Street cleaning implement, A. M. Grey 685,599
Stretcher for artists' use, S. S. Gardner 685,511
Sugar, producing, S. Duffner 685,585
Switch. See Electric Switch.
Switchboard and fuse box, M. H. Johnson 685,613
Switch controlling device, G. H. Hill 685,279
Switch throwing device, F. P. Frein 685,595
Synchronizer, automatic, J. Pearson 685,430
Table support, F. A. Millikan 685,689
Tabulating apparatus, H. Hollerith 685,608
Tamp, mechanical, W. R. Crane 685,261
Telegraph key, Shirley & Skirrow 685,301
Telegraph or other system, J. Burry 685,571
Telegraph, printing, J. E. Wright 685,390
Telephone power generator, E. Krahenbuhl 685,685
Telephone system, secrecy, F. A. Cumings 685,715
Thermo electric couple. Hermite & Cooper 685,471
Thermo electric couples, manufacturing copper sulfid rods for, Hermite & Cooper 685,472
Thill coupling, E. P. Bowles 685,564
Thill coupling and antirattler, combined, G. L. Schermerhorn 685,412
Thill coupling, anti-rattling, R. E. Sears 685,436
Threshing machine, E. T. Shelley 685,300
Ticket transfer, Sittner & Geery 685,305
Tiles, quarries, etc., manufacture of, R. Stanley 685,536
Tire or other valve, G. H. F. Schrader 685,649
Tire tightener, W. G. Williamson 685,364
Tires, composition for mending punctures in pneumatic, Scott & Nephew 685,491
Tobacco pipe, G. Stark 685,537
Tool, H. Sommerfeld 685,356
Tool, motive fluid operated, Vaughan & Johnson 685,358
Top, B. B. Ward 685,311
Toy egg, Perkins & Irwin 685,345
Tramways, automatic bucket loader for wire rope, B. C. Riblet 685,387
Tramways, automatic dumping bucket for wire rope, B. C. Riblet 685,388
Trolley, electric railway, E. R. Coon 685,575
Truck, mill, E. Whalley 685,702
Trunk, J. Longshore, Jr 685,284
Urine tester, E. A. Starz 685,538
Valve, S. Warburton 685,438
Valve gear, engine, C. Robinson 685,490
Valve, hydraulic, Anawalt & Shalkowski 685,662
Valve reseating machine, gate, F. L. Smith 685,697
Valve, safety, J. J. Tonkin 685,496
Vehicle brake, automatic, J. D. Boden 685,246
Vehicle brake, road, Allen & Schumacher 685,240
Vehicle steering device, self propelled, J. H. Bullard 684,570
Vehicle steering mechanism, A. Thompson 685,540
Vehicle wheel, C. Miller 685,627
Vehicle wheel and means for attaching rubber tires thereto, W. J. Kent 685,450
Vehicles, tank filling device for steam propelled, W. B. Mason 685,626
Vending machine, H. S. Mills 685,457
Vessel, cargo, Fernez & Breuer 685,591
Veterinary mouth speculum, E. W. Cannon 685,710
Vise, screw, C. Rauhe 685,386
Wardrobe and bedstead, combined, Bowring & Barnhart 685,248
Warp beam tension device, C. A. H. Reitsch 685,643
Wash tub cover, stationary, G. W. Everett 685,589
Watch, stop, J. Parkinson 685,635
Watchmaker's tool, R. Leusch 685,338
Water closet ventilation, W. H. Stilwell 685,493
Water purifier, J. J. Rose 685,645
Water raising and distributing system, A. D. Strong 685,495
Weather strip, B. M. Whiting 685,547
Well drilling and operating apparatus, J. Reid 685,641
Welt grooving and beveling machine, E. E. Winkley 685,365
Wheel, J. M. Rankin 685,296
Winding apparatus, yarn or thread, Rivett & Oldham 685,433
Windmill regulator, H. L. Ferris 685,716
Window, E. Bradshaw 685,466
Window tightener and holder, H. D. Trefry 685,309
Wrench, J. W. Grubbs 685,273
Wrench, F. T. Robinson 685,349
Wrench, F. Weimar 685,544
Wrench, F. T. Verharen 685,656
Wrench, G. F. Sprague 685,698
Wrench jaws, producing wrought metal, T. F. Cairns 685,256

DESIGNS.

Clamp or fastener member, M. E. Phillips 35,234
Dish, W. C. Muschenheim 35,232
Display fixture for suspenders, etc., M. Jacobs 35,247
Door check, S. L. S. Stickle 35,240
Garment supporter, F. G. Dietz 35,235
Hat holder, E. H. Stowell 35,246
Hinge member, D. W. Tower 35,238
Hoe, F. M. Solomon 35,242
Knob, D. W. Tower 35,239
Metal ware, branch arm for solid or plated, S. W. Babbit 35,241
Mustache guard, for drinking vessels, strainer, W. H. Snedeker 35,231
Pavements, marginal protecting strip for, D. & A. A. Mullen 35,249
Powder box cap and stopper, C. W. Lunt 35,233
Rug, A. Petzold ..... 35,250 to 35,252
Scraper, mud, J. N. Todd 35,243
Show case, portable, J. T. Robin 35,248
Speculum blade blank, C. J. Pilling 35,229
Spoke holder, J. Jackson 35,244
Spoons, forks, etc., handle for, G. L. Crowell, Jr 35,230
Tumblers, etc., holder for, L. M. Hooper 35,245
Vending machine case, W. D. Doremus 35,237
Weighing machine case, W. H. Pumphrey 35,236

TRADE MARKS.

Boots and shoes, Frank G. Jones Shoe Co 37,242
Boots and shoes, certain named, Commonwealth Shoe and Leather Company 37,241
Brushes, R. P. Martin 37,262
Chains, J. F. Sturdy's Sons 37,263
Cigarettes, cigars, and smoking and chewing tobacco, Universal Tobacco Company ..... 37,246 to 37,253
Corsets, corset materials, and underwear, ladies', D. Kops 37,237
Crackers, or biscuit, and cakes, Columbus Biscuit Company 37,254
Disinfectants, Societe Francaise de Desinfection 37,259
Extracts, essences, oils, waters, powders, and soaps, toilet, A. Raynaud & Cie. 37,255 to 37,257
Fabrics, certain named woven, Albany Felt Company 37,234
Feed cutters, carriers, and land rollers, Farmers Mfg. Co 37,265
Gloves, kid, F. Schmidt & Co ..... 37,238 to 37,240
Grinding and polishing machinery, Diamond Machine Company 37,267
Leather and leather goods, certain named, American Oak Leather Company 37,244
Leather, certain named, Thomas G. Plant Co. 37,245
Oil, lubricating, Signal Oil Company 37,260
Ointment, H. F. Tripp 37,258
Paints or wall finishes, cold water, Muralo Company 37,261
Soles and heels, cut, Baxter, Schenkelberger & Company 37,243
Spool cotton or cotton thread, Societe Anonyme Filature et Filteries Reunies 37,236
Steel and steel blanks, forms, shapes, and parts, Crucible Steel Company of America 37,264
Thread for sewing and for making lace, L. Jachiet 37,235
Vehicles, motors, and parts thereof, road, Ajax Motor Vehicle Company 37,266

LABELS.

"Bohemian," for malt extract, Western Brewery Company 8,747
"Bully," for cigars, American Lithograph Company 8,744
"Cof-No-Mor," for medicine, I. M. Adams 8,755
"Deliciously Stuffed Dates," for stuffed dates, Reiss & Brady 8,751
"El Falco," for cigars, cigarettes, and tobacco, American West Indies Trading Co. 8,746
"Hartford's the Best Chewing Gum," for chewing gum, Hartford Chemical Co 8,748
"Laurel," for canned goods, A. von Cotzhausen 8,752
"Our Edna," for shoes, L. Franc & Son 8,749
"Peerless Pure Breakfast Cereal," for a cereal food, P. Johnson & Co 8,753
"Penny Pudding Tablets," for pudding tablets," E. D. Basford 8,750
"Qroil," for a medical compound, C. F. Schneider 8,756
"Red Cross Salve," for salve, Red Cross Salve Company 8,758
"Sal-Nome," for an effervescent laxative salt, Nome Chemical Company 8,757
"Tar Heel Kidney Tea," for a medicine, C. D. Higgins 8,754
"Vista Del Ray," for cigars, Schmidt & Co. 8,745

PRINTS.

"Autohav Shoe," for shoes, Smaltz-Goodwin Company 415
"Our Edna," for shoes, L. Franc & Son 414
"Pittsburg Souvenir Playing Cards," for playing cards, W. J. Gilmore & Co 413

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York.

Canadian patents may now be obtained by the inventors for any of the inventions named in the foregoing list. For terms and further particulars address Munn & Co., 361 Broadway, New York.

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READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

MUNN & CO.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 1555.—For a small gasoline engine ½ h. p. with governor.

TURBINES.—Leffel & Co. Springfield, Ohio, U. S. A.

Inquiry No. 1556.—For manufacturers of gasoline engines with tube ignition.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 1557.—For manufacturers of parts of gasoline engines.

WATER WHEELS. Alcott & Co., Mt. Holly, N. J.

Inquiry No. 1558.—For manufacturers of machinery for making glass insulators for telephone and telegraph wires.

Yankee Notions. Waterbury Button Co., Waterb'y, Ct.

Inquiry No. 1559.—For a ramie defibrating machine.

Gasoline Lamps and Systems. Turner Brass Works, Chicago.

Inquiry No. 1560.—For manufacturers of electric signs.

"Perfect aluminium solder. Amer. Hdw. Mfg. Co., Ottawa, Ill."

Inquiry No. 1561.—For parties to undertake the manufacture of a special automatic electric switch.

Hoeing machine patent for sale. J. C. Hallmark, Georgetown, Tex.

Inquiry No. 1562.—For manufacturers of flagpoles.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 1563.—For the manufacturers of the Gorin multigraph.

For Sheet Brass Stamping and small Castings, writ Badger Brass Mfg. Co., Kenosha, Wis.

Inquiry No. 1564.—For parties to make a small tool with aluminium handle.

Rigs that Run. Hydrocarbon system. Write St. Louis Motor Carriage Co., St. Louis, Mo.

Inquiry No. 1565.—For transfers for use in outside advertising.

For metal articles, any kind, made any shape, write us. Metal Stamping Company, Niagara Falls, N. Y.

Inquiry No. 1566.—For manufacturers of unique advertising novelties.

Ten days' trial given on Daus' Tip Top Duplicator. Felix Daus Duplicator Co., 5 Hanover St., N. Y. city.

Inquiry No. 1567.—For up-to-date novelties.

FOR SALE.—One ½ h. p. dynamo, one ¼ h. p. steam engine. R. A. Crihfield, 225 Third Street, Lincoln, Ill.

Inquiry No. 1568.—For parties to make a quilting frame.

Kester Electric Mf'g Co's, Self-fluxing solder saves labor, strong non-corrosive joints, without acid, Chicago, Ill.

Inquiry No. 1569.—For the manufacturers of the Lotrent sliding door hanger.

Machine Work of every description. Jobbing and repairing. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.

Inquiry No. 1570.—For dealers in castings for ½ or ¾ h. p. gasoline engine for a tandem bicycle.

Manufacturers of patent articles, stamping dies, tools, light machinery. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 1571.—For manufacturers of well casings.

Designers and builders of automatic and special machines of all kinds. Inventions perfected. The W. A. Wilson Machine Company, Rochester, N. Y.

Inquiry No. 1572.—For a machine for threshing, hulling and cleaning rice.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

Inquiry No. 1573.—For brick machinery for making pressed brick.

TO MANUFACTURERS AND INVENTORS.—Send particulars and illustrations of your manufactures and inventions to Calder & Goldwater, Solicitors, Auckland, New Zealand.

Inquiry No. 1574.—For an amplifying telephone receiver.

EVERYTHING ELECTRICAL.—Prices to surprise amateur and dealer. Best small motors and dynamos made. Four cents for catalogue. T. Binford Electric Works, Department H, 934 Washington Boulevard, Chicago.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(8420) G. E. D. asks: Are the exciting balls of a wireless telegraph instrument immersed or rubbed with vaseline or other oil in the best modern methods? A. No. 2. Are choking coils used in the receivers of the instruments? A. No. 3. What would the height of the wires have to be for telegraphing the distance from one and one-half to two miles? A. We think from 20 to 30 feet will answer. 4. Is it practicable to use the instruments in a city with large buildings? A. Yes.

(8421) J. F. K. writes: In answer to F. S. (8241), issue of July 6, 1901, you say there is no destructive local action between the oxide filling and the grid of a storage battery. How is this to be explained, as there appear to be all things necessary for a galvanic cell—metallic contact between different conductors and simultaneously liquid contact between the same? This has been a difficulty of which I have not been able to get the solution. A. You will find the solution in Treadwell's "Storage Battery," page 120, price by mail $1.75. Local action is avoided by avoiding contact between the conducting grid and the liquid electrolyte. This is accomplished by having an unbroken layer of peroxide upon the surface of the grid. If this is broken by any means, the battery deteriorates by local action.

(8422) A. M. asks: Please let me know what I would need to cause the sound of a clock to be transmitted a distance of, say, 150 feet by electricity. A. A simple device would consist of a telephone transmitter in front of the clock and a receiver at the point at which you would hear the ticking.

(8423) B. F. V. writes: Will it affect the quantity of gas consumed in a building whether the gas is turned on full at the meter and partly turned off at the burners, or partly turned off at the meter and fully turned on at the burners? Assuming the same number of jets burning and the same illuminating power in both cases. A. There is a very slight difference in the volume of gas due to the pressure at the meter and the proper pressure at the burner jet, which indicates a saving of gas by the meter measurement at the higher pressure or by regulating the pressure at the burners instead of at the meter.

(8424) J. W. D. asks: 1. How long does it take to decompose one pound acidified water with a current of 100 volts? A. The time required to decompose a pound of water depends upon the amount of electricity used. If 13½ amperes are used at 100 volts it will require one hour. From this the time for any other current can be found, or the current for any other time. Water is decomposed with any voltage greater than 1.47 volts. You will see then that 100 volts is very much higher than is necessary. 2. How much does it cost to run a dynamo of 1,000 volts annually, including all expenses? A. That depends upon how many amperes the dynamo is to furnish. A dynamo giving 1,000 volts might be lighting a small village, or it might be lighting a large section of your city. The cost would not be the same in both cases.

(8425) G. G. S. asks: Please inform me as to the amount of current used by (1) ½-inch solid carbons, (2) ½-inch soft core carbons, (3) ⅝-inch solid carbons, (4) ⅝-inch soft core carbons, when used in a stereopticon on 110-volt alternating current circuit. A. Stereopticons are usually run with ½-inch carbons. We have never used one with a larger carbon. The ½-inch carbon will carry as high as 25 amperes, but 10 to 15 amperes is the usual current for such a lamp. A ⅝-inch carbon would carry 25-16ths as much current as a ½-inch carbon. The current would be proportional to the area of cross section of the carbon.

(8426) J. V. J. asks: 1. Why are open circuit telegraphs not used as often as closed circuits? A. The calling apparatus requires a closed circuit. 2. Can the duplex be worked on them? A. We do not know as to the possibility. Many things are possible which are not practicable. 3. Does an arc lamp when placed under water decompose? A. No. It heats the water. 4. Can a person get a shock from one carbon-zinc cell? A. Not from the battery alone. 5. Can an electric motor be driven both ways to advantage? A. Yes. Street car motors are reversed very often.

(Continued on page 303)

(8427) C. O. H. asks: 1. In regard to the article on wireless telegraphy in a late issue of SCIENTIFIC AMERICAN, will you please inform me at what distance it will work over land? A. This question is answered in the article referred to. It is there stated that a ½-inch coil will transmit ¼ to ½ mile over water, but that the writer has sent messages to a distance of a mile. It is also stated that messages can be sent about ten times as far over water as over land. About 1-10 of a mile is therefore the distance to which one may expect to send a message over land with a ½-inch coil. 2. Can the radiator plates be hidden from each other by trees and houses. A. Yes. 3. Also please mail me the SUPPLEMENT containing directions for making a Ruhmkorff coil which you consider the most suitable for the above. A. We can send you SUPPLEMENT 160 for ten cents. This gives full details and drawings of a coil giving a spark 1½ inches long.

(8428) N. A. B. asks: 1. How long will the glass tube have to be to make coherer described in SCIENTIFIC AMERICAN of September 14? A. Almost any length from an inch to two inches. Length not important. The drawing in the article shows a wire 1-16 inch in diameter in the tube. You can get the length of the tube in the drawing from this dimension of the wire. It is sixteen times the thickness of this wire. 2. Will a wireless telegraph work well when the instrument is higher than the point of aerial wires or when sender or receiver is higher and the other is lower? 2. Yes. The waves by which the message is transmitted go out from the transmitter in the form of spheres or rather spherical shells, up, down and in all directions. They enter the earth for a distance, but pass through the air more easily and go to greater distances, all around the transmitter, north, south, east and west. In any direction the messages can be received if one has a receiver. These messages do not go in one direction, as on the ordinary telegraph lines.

(8429) C. B. H. asks: 1. Can you give me a good formula for blue-print paper, not difficult to make? A. Take 1 gramme of citrate of iron and ammonia, and dissolve in 5 grammes of water. Make a second solution of 1 gramme of ferricyanide of potash in 5 grammes of water. Mix the two in the dark and apply to the paper. 2. In your issue of June 8, 1901, page 358, in an article on "A Whistling Arc": (a) What is a one-third M. F. condenser? (b) Is the ten-ampere arc light necessary? How large or small a current might be used? (c) What current does the storage battery give? (d) Would the ordinary telephone cell do? A. (a) A microfarad is the unit of electrical capacity. The letters M. F. are used as an abbreviation for microfarad. (b) We presume the ordinary arc lamp is implied in the article. We have not tried the experiment. (c) A storage battery gives a current which varies with the size of the plates. They are made so large that the lamps of a big station can all be lighted with it, and so small that it can be carried in the pocket to light a tiny lamp on the scarf pin. (d) We presume it would do.

(8430) W. writes: A boiler which has a 2-inch feed pipe and 2-inch check valve reduced to 1½-inch discharge, the size the pump calls for. A 2-inch pipe extends from boiler 4 feet to check valve, and also 2-inch pipe continues from check about 4 feet, when it is reduced to 1½ inches. A claims that there is one-quarter greater resistance on the pump than should be or would be if there was 1½ inch check valve. B claims it has nothing to do with it, but that if even the check valve was larger it would not affect the pump. Who is right? A. B is correct. The larger size of the check valve makes no more work for the pump. If anything, it favors the work of the pump, causing less friction and resistance.

(8431) J. M. C. asks: 1. Are there transformers made for direct currents? A. Yes. They are called rotary transformers, or converters. 2. Are 500-volt arc lamps made and operated successfully? A. No open arc light uses over 50 volts. It cannot. Inclosed arc lights use about 80 volts. Upon circuits of higher voltage as many arc lamps are put in series as will use up the voltage. On 500 volts ten arc lamps will burn in series. 3. Is there a chemical preparation or the like, by which I may be able to clean fiber of oil? A. We do not know anything better than potash. 4. By cutting off a trolley pole, say, two feet, does it increase or decrease the pressure against the trolley wire? A. It will bear harder against the wire the shorter it is. 5. Has copper ever been hardened to any great extent? A. Not in modern times. It is considered one of the "lost arts" to temper copper. 6. Do you consider the best of lightning arresters a success? A. They are considered indispensable. We do not advertise any goods in this column. 7. If there is such, what do you consider a perfect, at all times waterproof insulation? A. India rubber. 8. Has electricity, as yet, been taken from the earth? A. No more than has been put into the earth. No one has drawn it from the earth for doing work.

(8432) A. H. asks: Please describe how salammoniac is obtained or produced. A. Salammoniac is prepared from the ammonia water of the gas works, by the addition of hydrochloric acid.

(8433) M. C. A. asks: Will you please inform me what size and how many feet of wire it will take to make an electric heater, 104 volts, say 5 to 7 amperes capacity? A. Seven amperes at 104 volts require 15 ohms of resistance. For a rise of 190 degrees F. the resistance rises 40 per cent. Hence about 5-7 as much wire will be needed if you wish to raise the temperature about to that of boiling water. No. 14 iron wire may be used. This has about 65 feet to an ohm. These are approximate numbers, and you can adjust the quantity to the temperature you wish to maintain.

(8434) E. B. S. writes: I have a dynamo that gives 25 volts and will light two 16-candle power lights. Must the light be rated at 25 or will it light two 110-volt lamps and how many one candle power lamps of 100 volts will it light? A. Your dynamo, rated at 25 volts, will do anything which a pressure of 25 volts will do; but it cannot do work requiring 100 volts. It cannot light any 110-volt lamps. The lamps for this dynamo must be 25-volt lamps.

(8435) E. L. S. asks: What is the voltage of the hand power dynamo in "Experimental Science" when wound as directed with No. 16 wire on fields and No. 18 armature? What sizes of wire should be used to give an E.M.F. of 25 volts? About how much wire will be required in each case? A. The hand power dynamo gives about 3 amperes at 12 volts. The voltage would be doubled by doubling the number of turns on the field. For the field as designed, about 5½ pounds of No. 16 B. & S. wire are required, and for the armature about ½ pound No. 18 is required.

(8436) J. W. J. asks: Have you plans in any of your SUPPLEMENTS of a dynamo that will charge storage battery described in SUPPLEMENT No. 1195? If so, state what number or numbers? A. The dynamo described in SUPPLEMENT No. 600, price ten cents, will charge the storage battery of SUPPLEMENT No. 1195.

(8437) A. W. P. asks: 1. I am building a 10-inch spark coil, and wish to insulate it with some kind of oil. I have allowed an inch space between primary and secondary, in addition to a thin fiber tube enveloping the primary. I have tested linseed oil (boiled) and kerosene, finding the latter a somewhat better insulator; but the odor is more objectionable. Can you advise me on the subject? A. Any heavy petroleum oil is a good insulator for a coil immersed in it. We do not know how to get rid of the odor of any oil. If inclosed in a tight box the odor will not be perceived very much in the room. 2. I have seen several accounts of Roentgen rays producing acute dermatitis and causing the hair to fall out. Will you please explain to what extent this danger exists, and what means, if any, may be taken to prevent its occurrence? A. The danger of producing X-ray burns is very imminent if the operator is inexperienced or the tube is not properly shielded. The best mode of avoiding these burns is to have an apparatus which will do its work so quickly as to not produce them. It is, however, prudent to cover the patient in the parts exposed to the rays with a piece of aluminium foil which is grounded to a gas or water pipe or has a wire carried to earth. 3. In an interrupter where the circuit is quickly broken under water, is it necessary that the contacts be made of platinum? A. The same heat is produced in breaking a certain current under any circumstances. If water is interposed, the heat is carried away more readily, but the spark and heat of the break is able to burn the wire, and platinum should be used for the terminals.

(8438) J. E. P. asks: 1. In substituting a button to throw the drop at the central telephone station, how many Mesco dry cells will be required instead of the magneto-electric machine usually used in small towns? A. This depends upon the distance from the central, and the number of telephones in series if the line is a party line. It may be that a small number will do the work. Experiment is the solution probably in this case. 2. What cells would you consider preferable for this charge? A. There are a number of dry cells differing but little from each other. We have no recommendation to give to one of these over another.

(8439) W. H. P. asks: Can you give me the address of a manufacturer of a light to illuminate porch and grounds, not using gas from the street main? A. No. We cannot give any advertisement to any one in this column. Our advertising columns are the place to refer for addresses of dealers. Within a few weeks there has been an advertisement which exactly fills the bill for you. The light is that of acetylene.

(8440) G. S. T. writes: Will you kindly give me your opinion of the following statement made here to-day: That a cube of iron one inch square, being dropped overboard at the greatest known depth of the ocean, would not sink to the bottom, but that there is a depth where it would be held in suspense. A. The cube will drop to the bottom of the ocean at the greatest depths. Anything that is heavier or has a greater specific gravity than salt water sinks to the bottom at all depths. The compressibility of sea water is only about 0.000044 of its bulk per atmosphere of pressure and not materially denser at great depths; thus at a depth of a mile its density would be only

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about 1-130 greater than at the surface. Sand and mud sink to the bottom of the ocean at great depths, and shells are dredged from the deepest seas.

(8441) C. R. M. asks: I want to get the table for carrying capacity of copper wire and German silver wire. I have seen tables run as fine as 26 B. & S. gage, but not any finer. I would like to get a table or a way to figure for finer wire if possible. I also would like something on the size of wire to use on motors and dynamos. A. A finer wire than No. 18 has no carrying capacity, since its use is not allowed by the fire underwriters for wiring buildings. The wires in dynamos and motors are selected on the basis of 2,000 to 3,000 amperes per square inch of cross section in ring armatures, and even 4,000 amperes in drum armatures. In magnet coils only about 2,000 amperes per square inch is allowed.

(8442) A. L. S. asks: 1. In the engineering notes of your paper for September 28, 1901, there is a paragraph on obtaining oxygen from the air, stating that it can be mixed with water gas for lighting. Is not this an explosive mixture? A. A mixture of oxygen from the air and street gas is explosive in certain proportions: but in the burning of these in a jet the fire cannot get at the mixed gases till they are ready to be burned, as in the calcium light jet. 2. Also, will you kindly give the principle of the Nernst lamp? A. The Nernst lamp employs a thread of a substance like that used in the Welsbach mantle. This, heated to a white heat, gives out light.

(8443) J. N. P. asks: Kindly furnish me with explicit definition of the term "equivalent focus," as applied to a compound photographic lens. Give one or more rules, as free from mathematics as may be, for accurately determining the equivalent focus of such a lens. Is the relation of diaphragm aperture to focal length of a lens based upon the actual or equivalent focus? How can we determine the diameter of the circle of illumination of a lens upon which its covering power is dependent, since this dimension varies with the distance between lens and ground glass? A. The equivalent focus of a photographic combination is "the focal length of the single lens which will produce the same sized image." This focus is measured from the optical center of the lens. It is not the "back" focus. Several methods are given for measuring the equivalent focus in Taylor's "Optics of Photography," price $1 by mail.