under different pressures? I find it stated that 1 cubic inch of water at 70° Fah. under the ordinary atmospheric pressure weighs 0·578 ounce. What is the weight of same when under a pressure of 75 pounds as indicated by a Crosby water gauge? A. Water is very slightly compressible. For one atmosphere of pressure (14·7 pounds), it is compressed 0·00005 of it original volume. For 75 pounds above the atmosphere therefore it would increase in weight about 0·00025, giving 0·57814 ounce instead of 0·578 ounce. The above rule is approximately correct.

(5612) E. G. R. asks: 1. Will the No. 2 water motor described in SCIENTIFIC AMERICAN of October 14, page 244, run the hand power dynamo described in "Experimental Science"? A. Yes, if there is sufficient head of water. 2. How large a lamp would the above dynamo run when the field magnets are separately excited with six or eight Bunsen cells? A. Three to five six-candle power lamps, without any cells; with the cells twice as many, especially if you use a drum armature. 3. When field magnets are separately excited as above, would the dynamo charge two storage cells? A. Yes. 4. What horse power has the No. 2 water motor? A. Address the manufacturers for particulars.

(5613) F. E. K. asks: 1. Can a plastered wall in a house be blackened so as to be used as a crayon board? If so, how can I prepare a paint to be used to paint it? A. For a wall blackboard: to 1 pint shellac varnish add 6 drachms lampblack, 1 drachm of ultramarine blue, 3 ounces ground pumice stone, 2 ounces rottenstone ground. If not thin enough to spread easily with a brush, add enough alcohol; two or three coats will be needed for a plastered wall. 2. How far is New York City from the deep ocean, and the length of Broadway in the same city? A. About 12 miles in a direct line. Broadway is about 5 miles long. 3. What is the size and weight of the Capstone on Washington monument? A. The capstone of the Washington monument weighs 3,300 pounds. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 476, for an interesting account of its setting. 4. What is the size of the smallest boat that has crossed the Atlantic Ocean? A. About 18 feet in length.

(5614) H. L. B. asks: 1. What is the safe carrying capacity in amperes of a copper wire, No. 14 gauge, B. and S. and how is the carrying capacity of any wire to be found? A. 6·4 amperes. See Sloane's "Arithmetic of Electricity." Allow 2,000 amperes per square inch of section. 2. Is there any book published giving directions for concealed incandescent wiring? A. We can supply Badt or Davis on "Electric Wiring," $1 each by mail. 3. Is there any instrument on the market for recording the height of water in a tank located some distance from the station supplying it? Could not a common low pressure water gauge be used? A. A pressure gauge could be connected to do this.

(5615) A. E. N. writes: In the SCIENTIFIC AMERICAN SUPPLEMENTS already received from you I find a Wimshurst electric machine (glass friction) advised for the generation of ozone by electricity. But having better opportunities to use other sources of electricity, I should like to know: 1. Whether a galvanic battery or a magneto-electric machine could be substituted for the Wimshurst? A. No. 2. What is the strength of a Wimshurst electric machine (taking as a standard the Daniell cell=about 1 volt) compared to other electric machines, viz., 1, Daniell battery; 2, Davis & Kidder magneto-electric machine; 3, Gaiffe's pocket electro-medical machine? A. It may run up into millions of volts. The electro-medical machines probably do not run higher than two or three hundred volts.

(5616) W. F. R. writes: 1. Have you any literature relating to the manufacture of copper oxide plates as used in Edison Lalande battery? A. We have no literature on this. We could supply you with the patents at 25 cents each. 2. Can you inform me as to the best and cheapest method of preparing copper oxide (black)? A. Ignite copper borings to redness in the air. 3. Do you think it would be possible for me to make a box of blacklead for heating above plates? If so, how should I proceed to prepare such a crucible? A. Use a mixture of clay and plumbago made into a paste with water.

(5617) T. G. S.—The photograph sent by you shows a fresh water lizard, probably *Triton tigrinus*, Green. It is an aquatic species not rare, and well known. The horns you mention are branchial appendages which grow out and are shed. See N. Y. Natural History Survey, Zoology, Fishes and Reptiles, page 83; in illustrations, plate 15, Fig. 32.

(5618) C. C. N. writes: How many storage batteries of a given size would it take to run a 40 horse power motor? How long would it take to charge them with a 10 horse power dynamo, and also a 2 horse power dynamo? How long would it take to discharge them? Also, is the power being used up when not running? A. You may allow 425 cells to run the motor 10 hours. It will take four and a quarter times and twenty-five times the period of running to charge with the 10 horse power and 2 horse power dynamos respectively. It will very slowly lose its charge when not working.

(5619) A. R. K. asks: 1. What do electricians call a multiplier, and in what capacity is it used? A. A galvanometer is sometimes called a multiplier. 2. Is there a multiplier, so called, that can increase the efficiency of a dynamo from 75 to 100 per cent? A. No. This would be in the line of perpetual motion. There is room, however, for inventions in increasing the efficiency of dynamos.

(5620) H. S. S. asks for (1) a recipe for a tin electroplating solution for plating on copper. A. We quote the following from the "Scientific American Cyclopedia of Receipts, Notes, and Queries:" "Deposition of Tin by Simple Immersion or Dipping.—For this purpose a saturated solution of cream of tartar is made with boiling water; in this solution small brass or copper articles, such as brass pins for example, are placed between sheets of grain tin and the liquid is boiled until the desired result is obtained—a beautifully white coating of tin upon the brass or copper surfaces. Ordinary brass pins are coated in this way. A little chloride of tin may be added to the bath to facilitate the whitening. The articles are afterward washed in clean water and brightened by being shaken in a leathern bag with bran." 2. Please describe the machine Nikola Tesla uses to produce high alternating currents. What is its armature made like? A. We refer you to SCIENTIFIC AMERICAN, Nos. 9, 11, and 13, vol. 66; also SUPPLEMENT, Nos. 792, 902, 831, 692, 847, 855. 3. What is the highest number alternations in a magneto-dynamo, such as is used for shocking purposes? A. From a few hundred up to two thousand or more a minute. There is no "highest number." 4. Suppose an electric battery be made by making a lead tray 6 × 6 and 4 inches deep. In the bottom is put sulphate of copper 1 inch deep, and over that 1 inch sawdust. A zinc plate on the sawdust as positive pole; binding screw on tray and one on zinc. Solution used, water. What voltage and amperage would it give? Would it give continuous current? How long would such a battery last (if used every day of twenty-four hours) before becoming exhausted? A. About one volt. The continuous current will be, perhaps, half an ampere. Its period of running would depend on the resistance of the outer circuit. 5. Will a bichromate battery, with porous cup filled with bichromate potash and outside vessel filled with a solution of common salt, continue in action for a greater number of hours than the ordinary one-solution bichromate battery? A. It might run longer, but would give a far less total of electric energy.

(5621) A. H. writes: 1. One of my zincs of a Daniell gravity cell has been almost destroyed, while the other two are not affected in the least. There has been no solution in the jars for about one month, and during this time the zincs were covered with a copper-like substance, which had formed while the battery was in action. How was it that one zinc was destroyed and the other two were not affected? A. It seems probable that the destroyed zinc was more attacked than the others before you laid up the battery. Corrosion would be slow, if the zinc was not in the solution. 2. How much wire on the field magnets of the hand power dynamo, No. 161, and also how many feet on the armature, as near as you can judge? A. Five pounds wire for magnets, 100 feet for armature; if drum wound, about 200 feet. 3. Do not the brushes have to touch one commutator segment before it leaves the other? A. No. 4. Can a Porter's motor, No. 1, be used as a dynamo? A. You will not get much result, we think. We have no figures as to its voltage and amperage.

(5622) N. T. asks: Of the various kinds of batteries, such as storage cell and plunge, which is the strongest? A. Storage batteries are far the strongest. How to make them is told in SUPPLEMENT, No. 845. Other batteries, 157, 158, 159, and 792. Also see storage batteries in SUPPLEMENT, No. 838. These we can supply for 10 cents each.

(5623) E. A. E. writes: I would like to build an induction coil that will produce a 4 or 5 inch spark. Can I follow directions as given in SUPPLEMENT, No. 160, and are there any changes I can make that will be a benefit to it? What is the object of the insulation of resin and wax between the two sections of the secondary coil? Also, have you any books or papers from which I can get information on this subject? A. You will find it quite difficult to make a successful 5 inch spark induction coil. The object of the disk is to separate portions of the secondary which differ greatly in relative potential. For a large coil, 6 or 8 such disks should be used. For other coils, see our SUPPLEMENT, Nos. 229 and 569, and SCIENTIFIC AMERICAN, No. 14, vol. 66, all of which we can supply for 30 cents. Also, "Induction Coils—How Made and How Used," price 50 cents; also Bonney's "Induction Coils," price $1 mailed.

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Rail brace and fastener, combined, W. R. Gerhart ... 510,419
Rail joint, C. E. Swingle ... 510,724
Railway and tramway crossing, J. E. Billups ... 510,399
Railway conduit, electric, W. R. De Voe ... 510,634
Railway, conduit electric, J. P. Michieli ... 510,647
Railway lock switch, Wilson & Ham ... 510,750
Railways, closed conduit system for electric, R. H. Elliott ... 510,850
Range indicator, B. A. Fiske ... 510,417
Ratchet drill, B. M. Kepler ... 510,542
Recorder. See Fare and time recorder. Time recorder.
Register. See Cash register.
Regulator. See Air brake regulator. Air brake pressure regulator. Electric regulator. Piano touch regulator. Windmill regulator.
Roads and other surfaces, apparatus for breaking up, Voysey & Hosack ... 510,739
Roads, etc., apparatus for breaking up, Voysey & Hosack ... 510,738
Rock breaking machine, C. Kimplen ... 510,800
Rock drilling machine, Pearsall & Walker ... 510,517
Roller. See Land roller. Picking roller.
Rocker shield, F. A. Keyes ... 510,799
Rocking chair, J. Bodart ... 510,460
Rolling mills, pass receiver and shifter for, W. A. Sweet ... 510,451
Rotary engine, J. F. McElroy ... 510,482, 510,483
Rule, key seat, D. Wilson ... 510,494
Saddle, C. T. Hester ... 510,684
Salts by electrolysis, process of and apparatus for dissociating soluble, H. S. Blackmore ... 510,834
Sash fastener, J. S. Coey ... 510,776
Sash fastener, H. W. Hood ... 510,686
Sash fastener, F. J. Loudin ... 510,432
Sash holder, J. Robertson ... 510,614
Saw frame, E. Chaquette ... 510,774
Sawmill feed mechanism, T. J. Reamy ... 510,818
Saw sharpening device, T. S. Disston ... 510,846
Sawing machine, back, Stover & Hoefer ... 510,619
Scourer. See Grain scourer.
Scouring, polishing, and buffing machine, combined, N. Nelson ... 510,438
Screen. See Carriage screen. Window screen.
Sealed bucket, hermetically, S. N. Long ... 510,867
Seat spring, G. Coxon ... 510,828
Sewing machine attachment, H. B. Burns ... 510,771
Sewing machine box loop attachment, J. W. Hynes ... 510,792
Sewing machine feeding mechanism, W. A. Mack ... 510,868
Sewing machine feeding mechanism, C. Maldaner ... 510,433
Sewing machine welt guide, L. D. Stinchfield ... 510,655

Shades, adjustable bracket for window, Page & Bird 510,815
Sharpening machine, scythe, A. Galette 510,637
Shelf support, adjustable, E. T. Leuthold 510,804
Shelving, metallic, M. J. Breslin 510,562
Shirt, P. Ganson 510,639
Shovel. See Cinder shovel.
Shutter worker, A. Rosenberg 510,446
Signal. See cable road signal.
Siphon motor, F. W. Reinhardt 510,709
Sluice box, J. P. Foley 510,474
Smoke consuming furnace, W. L. Denio 510,631
Sole, pneumatic shoe, A. W. Foster 510,504
Spindle, G. O. Draper 510,848
Spindle adjusting device, W. A. Chandler 510,404
Spinning frame, cap, N. Hicks 510,861
Spoon holder, J. R. Blair 510,835
Spring. See Draught spring. Seat spring.
Spring attachment for the wheels or other parts of cycles and other vehicles, W. E. Hart, Sr. & Jr 510,538
Sprinkler. See Lawn sprinkler.
Square hinge, folding, E. De Camp 510,529
Stage apparatus, J. F. Byrne 510,772
Stalk cutter, J. H. Herring 510,789
Steak crusher, P. L. Mars 510,513
Steam boiler, M. N. Forney 510,636
Steam by the aid of molten slag, apparatus for generating, E. A. Ashcroft 510,395
Steam engine, J. Abell 510,561
Steam plant, E. B. Coxe 510,582, 510,583, 510,555
Steam superheater with independent furnace, L. Uhler 510,658
Steam trap, C. A. Schroyer 510,651
Steering apparatus, tow, J. R. & J. B. Wilson 510,749
Sterilizing apparatus, Adam & Rehfuss 510,757
Stock yard gate, J. M. Keith 510,511
Stool and table, combined, Cunningham & Dankmeyer 510,411
Stop motion, H. H. Cummings 510,677
Stopper. See Bottle stopper.
Store service, device for removing dust from, J. L. McKay 510,872
Stove, cooking, J. M. Kelly 510,797
Stove or range, F. A. Magee 510,692
Stove, slow combustion, H. Serebriakoff 510,714
Strainer for oil or similar presses, M. P. A. Tollin 510,732
Switch. See Electric switch. Electric motor reversing switch. Electric snap switch. Railway lock switch.
Table. See Folding table. Work table.
Table foot, adjustable, Luethi & Riedel 510,691
Tablet, memorandum, A. Marks 510,810
Tacking machine, hand, A. F. Preston 510,443
Tags, machine for making shipping, G. A. Huewe 510,641
Telegraph or telephone system, W. R. Kirk 510,430
Telegraphy or telephony, simultaneous, S. W. Holman 510,508
Telegraphy, system of, C. J. Reed 510,612
Telephone exchange system, W. W. Jacques 510,863
Telephone toll apparatus, W. Gray 510,535
Ticket controlling machine, L. J. & H. C. Hunter. 510,428
Tile, illuminating, D. G. Beeching 510,831
Tiles and brick, apparatus for burning, W. Whitesell 510,458
Time detector, watchman's, C. Weinedel 510,745
Time recorder, workman's, G. W. McAninch 510,811
Tire tightener, E. Fischer 510,473
Tires, repairing tool for pneumatic, C. E. W. Woodward 510,664
Tongue depressor and throat illuminator, G. Nitback 510,516
Tongue support, D. H. Young 510,560
Tongue support, wagon, J. F. Tiner 510,728
Tool and handle therefor, multiple, R. J. Christy. 510,775
Torch, fireworks, T. M. Pierce 510,440
Toy, mechanical, E. I. Pyle 510,444
Track for vehicles, endless self-laying, A. P. Anderson 510,668
Traction engine, M. Powers 510,707
Transporting horses and other animals, vehicle for, G. H. Fenton 510,416
Trap. See Animal trap. Steam trap.
Trap for basins, sinks, etc., P. Falkinburg 510,503
Trellis, flower, W. D. Smith 510,523, 510,524
Trolley wire support, L. S. Pfouts 510,485
Truck, electric car, C. F. Winkler 510,661
Trunk, J. L. Warren 510,743
Trunk, A. S. Wilkinson 510,459
Tube. See Drainage tube. Pneumatic dispatch tube.
Tubing, coupling for metallic flexible, Linzeler & Dubault 510,481
Tug holder, J. M. Eblesisor 510,849
Turn table, E. W. Edwards 510,592
Type bars, machine for producing, J. C. Fowler ... 510,858
Typewriting machine, W. S. Cress 510,409
Typewriting machine, J. C. Sinclair 510,653
Valve, T. W. Heermans 510,860
Valve, compound engine reversing, G. E. Wright. 510,665
Valve gear, steam engine, E. Hill 510,685
Valve, hot water, F. C. Goff 510,420
Valve, steam or other, F. Hedley 510,425
Vehicle, T. H. Wilcox 510,624
Vehicle brake, S. L. Allen 510,667
Vehicle brake, J. A. Bickford 510,766
Vehicle brake, M. B. Monroe 510,699
Vehicle equalizing device, H. B. Cross 510,676
Vehicle sand band, R. J. Darby 510,629
Vehicle wheel, P. Gendron 510,783
Velocipede, Lipe & Brown 510,606
Velocipede, ice, L. Noelcke 510,813
Voting booth, J. W. Hine 510,427
Wagon, coal dumping, L. R. Behlert 510,670
Wagon, dumping, F. S. Higbee 510,426
Wagon jack, J. F. McDaniel 510,701
Wagon stake, Decker & Long 510,679
Wall, tile building, J. Stewart, Jr 510,720
Washer. See Bottle washer. Wheel washer.
Washing machine, P. M. Thompson 510,726
Watch, stem-winding and setting, W. F. Waggoner 510,740
Water closet, E. Hammann 510,598
Water motor, R. C. Watkins 510,826
Wave motor, J. C. Walker 510,741
Wheel. See Vehicle wheel.
Wheel washer, F. A. Dieffenbach 510,680
Windmill, L. W. Beard 510,497
Windmill regulator, automatic, T. J. Adams 510,627
Windmill vane, J. H. Miller 510,435
Window screen, J. Dover 510,530
Wire and wire rods, manufacture of, J. Needham 510,703
Wire cloth apron, F. G. & A. C. Sargent 510,558
Wire stretching device, S. Graham 510,477
Wood barking machine, W. W. D. Jeffers 510,795
Work box, W. N. Casson 510,563
Work table, lady's, A. M. Idol 510,509
Wrench, N. Eccles 510,414
Wrench, W. L. Pike 510,441

TRADE MARKS.

Curry powder, W. H. Crossman & Brother 23,917
Flour, meal, and crushed cereals, E. Elsworth & Company 23,910
Food for infants and invalids, prepared, Imperial Granum Company 23,909
Hooks and eyes, Firm of W. Prym 23,925
Irish frieze and cheviot cloths, E. Connor & Company 23,922
Lard, J. M. Ceballos & Company 23,912
Lard, F. Garcia & Company 23,911
Lead, white, Whittier, Fuller & Company 23,919
Medicinal mixture for certain named diseases, J. R. Blumenberg 23,924
Ointment for skin diseases, Walker Pharmacal Company 23,923
Polish for gold, silver, nickel, brass, copper, zinc, and tin, metal, R. B. Clark 23,920
Sewing machines and attachments, Firm of J. Wanamaker 23,926
Tobacco, chewing and smoking, W. T. Brown 23,916
Underwear for ladies and children, Stapley & Smith 23,921
Washing powder, E. Bengtson 23,918
Whisky, Bernheim Brothers 23,913
Whisky, R. W. Crawford 23,915
Whisky, R. M. Rose Company 23,914

DESIGNS.

Axle box frame, J. A. Brill 22,966
Badge, souvenir, J. L. Sale 22,964
Bed pan, A. R. Gulick 22,967
Counter, showcase, J. D. Warren 22,963
Printer's side-stick, S. Starrett 22,965
Store wall fixture, J. D. Warren 22,962
Wall paper, F. Aumonier 22,960, 22,961

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