to be seriously diminished in practice. 3. Does plaster of Paris make good porous cups? A. No. It may be used as an expedient only. 4. When porous cup is used is it still necessary to take zinc out when current is not passing? A. Yes; as the porous cell only retards diffusion, but does not stop it. 5. Will you explain what is meant by watt? A. A watt is the product of one volt by one ampere—the volt-ampere. It is the unit of power or of rate of expenditure of energy.

(7057) H. H. asks: 1. What is the reason for winding large wire on fields and small wire on armature of small motor, the armature of three pole type? A. The armature winding is in parallel. Therefore, it has twice the carrying capacity of the wire it is wound with, and but one-sixth the resistance. Hence fine wire can be used for it. The general rule for dynamos is that for series winding the field should have ⅔ the resistance of the armature; for shunt winding the product of the field and armature resistances should be equal to the square of the external resistance. The sizes and lengths of wires are based on these and similar considerations. The effect of too few turns of wire on a motor armature is to give high speed, with danger of burning out. 2. Can I use the number of amperes that my armature wire will carry to run my motor, irrespective of the number of volts? A. Yes. 3. I have a current of one ampere at six volts; what size of wire should field be wound with, also what resistance should I wind armature to secure the best results? The motor to be about the size of No. 1 Porter motor made by the Leavitt Company. A. Use No. 23 wire on field and No. 26 on armature. The resistance cannot be stated from data given. Wind the armature full. 4. Would I be able to use the same winding for 6 volts and 2 amperes? A. Use wire two or three numbers larger.

(7058) S. C. McK. asks: 1. Is there any glue, paste, or cement that is a good conductor of electricity, as good as carbon, when dry? A. No; unless carbon or finely divided metal be mixed with it. 2. Is there a nonvolatile liquid that is a good conductor of electricity? A. Mercury. 3. Can you approximate the pressure and amperage of a battery cell made as follows: Two Edison-Lalande zincs (type Q) suspended in a regular caustic potash solution (charge for type Q) covered with paraffine oil, the whole contained in a carbon cell (plumbago crucible)? I cannot get at the area of carbon in contact with the liquid, but you may be able to approximate it. I have two of these cells and they are very satisfactory. Have not worked them much on closed circuit, but have not been able to notice any falling off of current due to polarization. There are some pieces of copper oxide in the bottom of cells. A. 0·667 volt 9·5 amperes maximum current. 4. What property of carbon renders it so indispensable to the construction of telephone transmitters? A. Its granular nature, causing it to vary in resistance with pressure, either as regards surface contact or internal resistance.

(7059) J. ●. H. writes: In looking over some back numbers of your paper, in query column, you state that cast iron can be brazed or soldered. Will you please inform me where I can find directions in regard to doing same, especially to braze? A. The soldering and brazing of cast iron requires care to have the surface perfectly clean by scratching with a file and then rubbing the surface with a piece of zinc and sal ammoniac dissolved in water, when the surface can be tinned with a soldering copper, or brazed with borax and flux, using low brass. Another plan is to scratch the surface with a bundle of brass wire made up like a brush, thus coating the surface with brass, and so adapting it for soldering.

(7060) G. G. writes: 1. I have several brick tanks to build, circular, 10 feet diameter and 10 feet high. Will a coating of paraffine wax applied hot to the inside prevent leakage of water? Will it be permanent? If not successful, can the tank be afterward coated with cement? A. We cannot recommend the building of tanks as described. The brick is very porous, and unless the paraffine is heated on the face of the brick, it cannot be driven in sufficiently to make a permanent and watertight tank. The tanks should be built with the best Portland cement and plastered with the same and troweled smooth. Then, for a more perfect waterproofing, paraffine the surface of the plaster by heat. The plaster will not stick to a paraffined surface.

(7061) E. & E. ask whether platinum used as contact pieces in boilers is liable to corrosion from the water used in them, and in places where boilers scale, will the scales fasten themselves to the platinum? A. The metal will not be apt to corrode, but will very likely become covered with scale.

(7062) J. F. F. asks for a rule for figuring the number of candle power for lighting buildings, stores, etc., by electric lights. How many cubic feet of space will one candle power light? A. No general rule can be given, as the light required is affected by so many conditions. The color and nature of the wall or wall paper, hangings, furniture, and carpets, are all concerned, as well as the use to be made of the room, taste of the occupants, etc. Again, if frosted bulbs are used half or three-quarters of the light is lost, and cut glass or ornamental globes may cut down the light to one-fifth of its normal value. You can estimate on the basis of three 16 candle power incandescent lamps to each two gas burners which would normally required.

(7063) W. C. G. asks if a one horse power engine making only 200 revolutions a minute will run the dynamo in No. 600. A. It will if proper belt wheels are used to increase the speed. Two hundred revolutions per minute are not sufficient for the dynamo.

(7064) E H. asks: What is the coefficient of friction in a bicycle chain? A. It cannot be accurately stated. The perfection of the chain and its lubrication make a very great difference. If the chain is too tight, the friction will increase enormously. The chain should be very loose. The whole subject of friction is treated in a series of papers by Prof. Hele Shaw, in our SUPPLEMENT, Nos. 572, 573, 574, 575, and 576, to which we refer you. In our SUPPLEMENT, No. 1077, is an excellent article on mechanics of the cycle. Chain friction is not directly treated in any of these SUPPLEMENTS.

(7065) M. ●. asks: 1. What is the pressure in pounds per square inch of acetylene gas and air exploded, as in the cylinder of a gas engine? Also about what proportion of air and gas would make the strongest explosion? A. We have no records of this pressure. The fact that acetylene gas may itself be exploded under certain conditions goes to still further complicate the problem. Two volumes of gas should have twenty-five volumes of air for perfect combustion or explosion. 100 to 150 lb. per square inch would be a fair allowance. 2. About what would be the difference in regard to power between acetylene and gasoline? A. Gasoline would be much more powerful. 3. Is there any book or papers on the subject? A. We recommend, and can supply, "A Textbook on Gas, Oil and Air Engines, or Internal Combustion Motors Without Boilers," by Bryan Donkin, new edition, price $7.50 mailed; also "The Gas and Oil Engine," by Clerk, new edition, price $4 mailed.

(7066) M. C. asks: 1. I have a small induction coil wound with 8 ounces double silk No. 36 on the secondary and I have one with 4 pounds double cotton covered No. 35 on the secondary, and ½ pounds on primary of No. 14 double cotton covered, and the small coil with 2 cells battery gives more shock than the large one; is that natural on account of the size, as the large one gives more of shock, as more battery power is applied? A. If of generally similar construction and proportions, the large coil should be more powerful than the small one. It may be a question of insulation or of insufficient primary. A short circuit will make an immense difference. 2. How many volts will I need to get a 4 inch spark from the large coil dimensions as given? A. Divide turns in secondary by turns in primary; divide 400,000 by the quotient to get the voltage required in primary. This rule is only approximately correct. 3. Have you any work on how to make an ampere meter? A. See our SUPPLEMENT, Nos. 618, 628.

(7067) O. P. W. says: Will you please give me in Notes and Queries column a receipt for a durable lacquer for brass, colorless preferred, such as is used by instrument makers? A. 1. For colorless lacquer use thin white shellac varnish which has been filtered. 2. Seed lac, dragon's blood, annatto, and gamboge, each 4 ounces; saffron, 1 ounce; alcohol, 10 pints. 3. Turmeric, 1 pound; annatto, 2 ounces; shellac and gum juniper, each 12 ounces; alcohol, 12 ounces. 4. Seed lac, 6 ounces; dragon's blood, 40 grains; amber and copal, triturate in a mortar, 2 ounces; extract of red sanders, ½ drachm; Oriental saffron, 36 grains; coarsely powdered glass, 4 ounces; absolute alcohol, 40 ounces. Very fine.

(7068) C. L. M. asks if there is anything which will loosen up blue vitriol when it has caked in the bottom of a jar of gravity battery—frozen I think it is called. I have charge of the fire alarm here, and have quite a number of jars which are useless because the copper is frozen in. A. Try filling a tub with water, and immersing completely in it the jars, turn them upside down, keeping them absolutely full of water, allowing no air to enter. This may loosen it so that it will come away. Solution of the copper in nitric acid is rather expensive. You can, however, dissolve it in a mixture of sulphuric acid and sodium nitrate. This is cheaper than nitric acid.

(7069) L. H. G. asks: 1. What is the candle power of a nine ampere arc light? A. Nominally about 2,000 candle power, really about 800 candle power. 2. Does adding salt to coal in consuming injure the grate, and if used under a boiler, injure the boiler steel? A. It will not be apt to injure the grate. It might tend to corrode the boiler, especially if the latter were out of use and cold after its use.

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Printers' rollers, apparatus for casting, C. W. Crutsinger ... 572,744
Printing press strip feeding attachment, G. O. Goddard ... 572,793
Puller. See Stump puller.
Pulley block, ●. M. Mowat ... 572,766
Pulp grinder, wood, Schaeffer & Dale ... 572,572
Pump, H. D. B. Williams ... 572,782
Pump cleaner, beer, J. J. Geiger ... 572,631
Pump, double acting submerged force, H. D. B. Williams ... 572,783
Punch, ticket, F. P. Becker ... 572,625
Purse and receptacle, combined puzzle, W. Gross ... 572,796
Puzzle, E. Segar ... 572,727
Puzzle or game device, W. Gebert ... 572,701
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Racking stand for barrels, knockdown, C. W. Scott, Jr. ... 572,574
Rail bond, Walker & Nilson ... 572,668
Railway crossing, D. Grubilkey ... 572,702
Railway ditcher, W. B. Beddridge ... 572,875
Railway, electric, R. M. Hunter ... 572,706
Railway rail, W. C. Ferguson ... 572,534
Railway rail joint, C. J. Cochran ... 572,694
Raisin seeder, S. B. Bliss ... 572,858
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Range shield, H. J. Phillips ... 572,715
Razor strop, G. C. Blasdell ... 572,784
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Refrigerator, E. L. Phipps ... 572,822
Registering apparatus, nautical, P. Samohod ... 572,832
Regulator. See Gas pressure regulator.
Rock drill, Balsley & Priestly ... 572,855
Roller mill, R. W. Welch ... 572,589
Rotary engine, R. & E. Lanzone ... 572,707
Rubber separator, W. F. Askam ... 572,854
Sash fastener, A. N. Woodard ... 572,591
Saw, crosscut, A. Harman ... 572,804
Sawmill, gang, W. M. Wilkin ... 572,922
Saw set, W. H. Smith ... 572,835
Screen, G. W. Cross ... 572,697
Screw cutting die head, W. J. Smith ... 572,934
Screw driver, H. F. Henry ... 572,800
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Sewing machine, L. A. Miller ... 572,557
Sewing machine, broom, L. Pelton ... 572,615
Sewing machine feeding mechanism, J. M. Merrow ... 572,682
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Shaft brake, J. J. Stover ... 572, 49
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Shutter operating device, R. H. Ireland ... 572,804
Shutters, blinds, etc., interchangeable slat for, M. Shinsky ... 572,776
Sifter, ash, J. W. Fee ... 572,879
Signal apparatus, electric, G. Knowles ... 572,907
Slate picker, D. E. Phillips ... 572,661
Sled propeller, J. C. Robertson ... 572,568
Sleigh knee, H. & H. Wesle ... 572,847
Sling support and tripping device, A. Broussard ... 572,522
Slubbing or roving frames, jack or apparatus for insuring differential motion on, E. Tweedale et al ... 572,917
Smoke consuming furnace, J. W. Hogan ... 572,886
Snow plow, A. Even ... 572,747
Soap cup and holder for wash basins, combined, T. S. Heineken ... 572,635
Sole nail, H. Weeks ... 572,937
Sole trimming machine, J. B. Emery ... 572,878
Sounding and drawing profiles of beds of rivers, etc., machine for, R. McDowall ... 572,610
Spinning or twisting machine, J. R. Montgomery ... 572,658
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Stacker, pneumatic, F. A. Peavey ... 572,763
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