

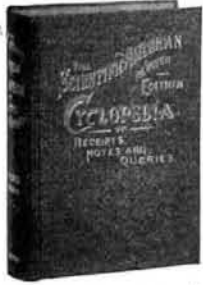
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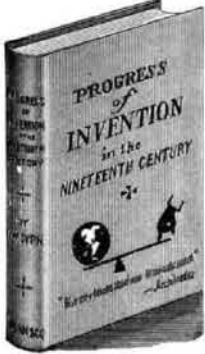


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(8480) F. S. N. asks: 1. Please inform me how many dry cells or batteries it requires to develop full brilliancy in a 16-candle power incandescent lamp? Is it best to run the batteries in series or in pairs with a central connection? A. It is not possible to light incandescent lamps from dry cells. They are not adapted for use continuously, but must rest after being in use for a very brief period. To light a lamp with a battery take as many cells as the voltage of one cell is contained in the voltage of the lamp. Dry cells have about 1.4 volts. If the lamp was rated for 54 volts, for example, 50 cells would be required to bring it to full brilliancy. They must be arranged in series. 2. Can you give me the directions for making a dynamo capable of lighting four incandescent lamps of 12 candle power each, power to run dynamo from dry batteries, and number of batteries required to run dynamo? A. SUPPLEMENT No. 600, price ten cents, gives the plans for building a dynamo which will light eight 16 candle lamps of 50 volts each. You cannot run a dynamo with a battery. You can run a motor with a battery, and use the motor to run a dynamo, but it would be at a great waste of power.

(8481) G. L. asks: 1. Have built a motor described in SCIENTIFIC AMERICAN of December 8 and 15 last. Can the same be run as a dynamo? If not, why? If so, how? A. The little motor can be run as a dynamo if you excite the field magnets by a battery. We doubt if it can excite its own fields, though you can try it after you have run it with a battery. 2. Also say whether enameled ware can be re-enameled after it chips off and commences to leak, and give receipt for same, with method of applying. A. We know of no way of repairing enameled goods.

(8482) J. D. asks: 1. Please tell me the composition of the heater on Nernst lamp; that is, what is this cement made of and what proportion? A. The Nernst lamp is described in the SCIENTIFIC AMERICAN for September 2, 1901, price ten cents, as it was exhibited at the Pan-American Exhibition. The proportions of the materials used in the filament are probably known only to the patentees. 2. What size platinum wire, length of wire 12 inches, must I use with a voltage of 110 to bring the wire up to a temperature of 1,000 deg. C.? A. Any size of wire can be heated to 1,000 deg. C. if you have current enough. The voltage of the current is not important except that it be sufficient to force the current through the wire. A low voltage would be better, since 12 inches of wire will have very little resistance, and you will require a rheostat, thus wasting current. 3. Give rule for finding current necessary to raise any size platinum wire to any temperature with any voltage. A. The heating power of a current is given by the formula $U = 0.24 C^2 R t$ calories. C is amperes, R is ohms, and t is time in seconds. This will give the amount of water heated 1 deg. C. Divide this by the specific heat of platinum to obtain the weight of platinum which would be heated 1 deg. C. in the same time. 4. Tell composition of some good asbestos cement. A. Asbestos cement varies in composition according to the purpose to which it is to be applied. For boiler and pipe covering it is mixed with plaster of Paris with a very thin glue. For fire-resisting purposes it may be mixed with a small portion of fire clay.

(8483) H. B. asks: 1. Will the motor described in SUPPLEMENT for August 2, 1890, run on a 100-volt alternating circuit? A. No. It is a direct-current motor. 2. If not, what changes could be made so as to make it? A. We should not change it. We should take a different design. See "Electrical Designs," price \$2 by mail, where there are several sizes of machines with plans and descriptions. 3. What horse power is the motor, and could this be doubled if everything else in the motor was also made twice as large? A. Perhaps a fifteenth to a tenth. The design is not adapted to a large machine.

(8484) C. L. G. asks: 1. Is it practical to use batteries for motors of small power, such as sewing machines, small lathes, etc.? A. Yes. 2. Could the Hopkins motor, described in SUPPLEMENT No. 641, be wound for power

(Continued on page 439)

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circuit and be used in series with incandescent lamps? A. Yes. 3. Please cite me to information of easily constructed electric motor of small power for power circuit. A. "Electrical Designs," price \$2 by mail. 4. Can you cite me to information of easily constructed battery motor better than Hopkins motor mentioned above? A. No.

(8485) S. C. asks if it is proper to say that "the volt and ampere have no connection whatever"? A. We should hardly put it in that way. The volt is the unit of electrical pressure, or electromotive force. The ampere is the unit of intensity of current. The ampere is the ratio of the volts to the ohms. They have that connection with each other.

(8486) F. J. D. asks if it is necessary to have a permit to run a small steam launch, say 20 feet in length; also, if government inspection of same is required. A. No license or inspection is required for running a steam launch on waters not navigable by other vessels in regular commercial travel.

(8487) J. R. K. asks: 1. Can you tell me what causes the so-called back fire in a two-cycle gas engine? Also can you suggest a remedy? A. Back firing in gas engines is caused mostly by a misfire charge exhausted into the muffler or exhaust pipe, which fires at the next exhaust. The next charge after a misfire is always a stronger charge, by a less admixture of burned gas, and also through this condition makes an unusually strong impulse or kick of the engine. Perfection in the action of the igniter is the only remedy. 2. Why is it that a two-cycle engine does not run at so high a speed as a four-cycle one, or is there a way to make them so they will? A. The two-cycle type has far less time to draw in and compress a charge than the four-cycle type per revolution, which causes defective charging and misfire at high speeds. The later designed automobile two-cycle engines seem to have sufficient speed for all practical purposes. 3. Which is the stronger—a two or a four-cycle engine of the same cylinder and stroke dimension? Some claim the two-cycle is, but I have never seen a two-cycle which would develop anywhere near the power that is claimed for some of the small four-cycle bicycle and automobile engines of equal size; and as I notice that the two-cycle is not used very much for automobiles, I wonder if they really do develop more power, for the weight would be less. A. The difference in power for equal-sized cylinders in favor of the four-cycle type is probably due to the greater compression and its greater explosive power. 4. I tested an engine for the power, and would like to know if this would be all right to get it approximately, or near enough for ordinary business. Of course, to get it correct it would have to be considerable of a job. Here is what I did: I used a pulley 18 inches in diameter on the engine shaft, and put a brake on it with an arm to the scale, which was 38.1-6 inches from center of shaft to point of bearing on the scale, which would be a circumference of about 20 feet, and the engine made 500 revolutions per minute, and the pull was 6 pounds on the scales. 500 revs. x 20 feet circumference of pull x 6 pounds pull on scales = 33,000 = 1.82 horse power about. Can you suggest a better way or a more simple one to get at it fairly correct? A. Your method of testing the actual power of the gas engine was correct. See SUPPLEMENT, No. 992, on the various methods of testing the actual power of engines, 10 cents mailed.

(8488) A. G. S. asks: 1. Have you a SUPPLEMENT telling how to make a simple construction yet effective 110-volt dynamo, with illustrations of the work and telling how to wind the magnets and the armature? Please tell the number of the SUPPLEMENT. How big would the dynamo have to be if it was series wound, according to the dimensions given in the SUPPLEMENT? A. SUPPLEMENTS 865 and 1210, price ten cents each, give plans of dynamos with descriptions. The dimensions of each are fully given in each paper. 2. Can you run incandescent lamps on the same circuit as an electric furnace? A. Yes. 3. How many volts does it take to run an electric stove? A. An electric stove may be run upon any voltage, though it becomes difficult to insulate for high voltages; 110 volts are very commonly used. 4. If a dynamo gives six volts running it steady, how many amperes and ohms will it have? A. No one can tell. The amperes must be measured with an ammeter, and the ohms can then be found by dividing the volts by the amperes. 5. Please name and explain the different ways in which dynamos are wound? A. Dynamos are series, shunt and compound wound, and if they are to furnish alternating current, they must be separately excited. These terms are explained in all textbooks of electricity. We can send you Thompson's "Elementary Lessons" for \$1.40 by mail. 6. How many volts does it take to run a 1 horse power motor? A. Motors may be built for any voltage. If run upon an incandescent lighting circuit they are either 110 or 220 volts. If upon an alternating current they are wound for 52 or 104 volts. The amperes are found for each motor by dividing 746 by the voltage. 7. Could you run an automobile at a good rate of speed with a 1 horse power motor? A. No. 8. How many volts does it take to make a watt? A. A watt is the power given by a current of one ampere flowing with a pressure of one volt. See Thompson's book above referred to.

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