Would it not be just as safe to put up ½ inch or ¾ inch gas pipe, with a good point and a large plate at the bottom to scatter the current? A. Gas pipe is often used for lightning rods, but iron is not as good; copper is preferable. Probably the best form of lightning rod is a copper strip nailed directly to a building and connected with a good earth plate.

(4850) F. K. & Son ask: 1. What size belt should we use to deliver 1½ horse power; speed of main shaft 260 revolutions, with 12 inch pulley to drive line shaft, having an 18 inch pulley? A. A 1½ inch belt. 2. What size belt should we use to deliver 1½ horse power; speed of main shaft 173 revolutions, with 10 inch pulley, to drive line shaft with 16 inch pulley? A. A 2 inch belt. 3. What size belt should we use to deliver 1½ horse power; speed of main shaft 173 revolutions, with 16 inch pulley to drive line shaft with a 12 inch pulley? A. A 1½ inch belt.

(4851) G. R. C. writes: A friend of mine would like to know why a Stevenson horizontal check valve will clatter, and does not seat when he stops the feed pump; and as long as it clatters it leaks, and when it does not is perfectly tight, and to stop its clattering he has to close the globe valve between the check and the boiler, or open the petcock on the air chamber. The clattering resembles a telegraph instrument with the circuit open and closed two or three hundred times a minute. A. The air in the pump chamber is highly compressed, according to the pressure in the boiler. It is elastic and acts like a spring on the water in the pipe between the pump and the boiler. The action of the water in the boiler when making steam is like a tremor or vibration, and communicates a vibratory motion to the water in the feed pipe, which is balanced by the air pressure in the air chamber. The opening of the petcock breaks the exact balance and the overpressure from the boiler closes the check valve. The closing of the valve between the boiler and the check valve also stops the vibration by closing communication with the boiler.

(4852) H. H. S. asks: 1. What chemical is put in the porous cup of a Leclanche battery? A. Equal parts of granulated carbon and granulated black oxide of manganese. 2. What chemicals are used in electroplating with copper, and in what proportion are they mixed? A. For an answer to this query we refer you to SUPPLEMENT 310. 3. Is there any chemical that will take the copper coating off the sticks of carbon from an arc light without destroying the carbon? A. Use nitric acid. 4. Is there any article on the construction of an electric machine in the SUPPLEMENT? A. You will find a description of the Holtz machine in SUPPLEMENTS 278 and 279, and of the Wimshurst machine, in Nos. 546, 648, 584, and 647.

(4853) E. F. S.—1. Where I work we have a large quantity of glue which has been used for moulds in plaster casting (plaster of Paris). It has become very dirty and hard from grease and bits of plaster, etc., and unfit for use. Is there any way to renew it at reasonable cost? A. Glue and glycerine jelly, adding a little water to thin it, and strain it through a cloth, hot. Skim off any oil that may rise in heating. Boil the strained jelly to evaporate the water. 2. Would ether or chloroform work better in an ice machine, not taking cost into consideration? A. Ether is preferable as a refrigerant in ice machines. 3. Some time ago I saw a description of magazine photograph camera in your paper. Where can I find it? A. The magazine camera is described in SCIENTIFIC AMERICAN, July 16, 1892.

(4854) O. G. F. M. says: 1. Have a shunt-wound dynamo, with 4 wire No. 20 on field and 1½ same on armature. I carry from 5 t 7 16-candle power lamps of 50 volts each; but the field magnets get very hot. It does not matter what load I have or whether I insert some resistance in field magnets. What is the reason? Is the wire wound in the right proportion? A. Too much of your current goes around your field magnet. You should rewind with finer wire, say No. 24, or use the machine as a series machine. 2. Can you give mea formula of some good composition for use in blocking tablets, something which will not adhere to the sheet of paper when torn off? A. The composition is said to be prepared as follows: Glue, 4 pounds; glycerine, 2 pounds; linseed oil, ½ pound; sugar, ¼ pound; aniline dyes, q. s. to color. The glue is softened by soaking it in a little cold water, then dissolved together with the sugar in the glycerine, by aid of heat over a water bath. To this the dyes are added, after which the oil is well stirred in. It is used hot. Another composition of a somewhat similar nature is prepared as follows: Glue, 1 pound; glycerine, 4 ounces; glucose sirup, about 2 tablespoonfuls; tannin, one-tenth ounce. Give the compositions an hour or more in which to dry or set before cutting or handling the pads.

(4855) P. J. L. asks: 1. What objection can be urged against the sprocket wheel and chain for high speed belting? Does it make too much noise or is the friction greater than leather or rubber? A. The sprocket wheel and link belt is noisy under high speed and has considerable more friction than belts of leather or rubber. It is not a noiseless transmitter of power under any speed, and seems to have been invented for a peculiar work not suited for the nature of belts or for a slow and unyielding pull. 2. What, if anything, has been done or accomplished in the way of compounding the explosive force of gas compounds in gas engines, and would not there be a reaction of the expansion of this combustion, the same as the condensation of steam in a steam cylinder? A. There has been no practical application of a compounding system to the gas engine. Heretofore, the irregular and intermittent action of the explosive force seems to have been a bar to efforts at compounding, yet with the later improvements we do not see why there is not a good field open for compounding gas engines. Of course there can be no condensation and no latent heat to keep up the temperature, and therefore the principle of expansion in a second cylinder would have to conform to the limit of a compound air engine.

(4856) A. E. H. asks: Would a lamp of the following description be safe and practical? Gasoline to be used instead of coal oil, the bowl to be near the bottom, the burner to be not closer than 4 inches above, the intervening space to be used for the generating of the gas, the lamp to be made of strong material such as cast iron or something that will not break and that will stand considerable pressure. A. We cannot recommend any form of gasoline lamp for house use. There are many difficulties and dangers attending the use of gasoline unless entirely isolated f om the lamp. There is a class of gasoline lamps or torches used for outdoor illumination with large, smoky flames, in which the fountain is several feet from the burner, with the feed regulated by a cock. The gasoline is vaporized in the burner. They can be procured through the lamp trade.

(4857) F. K. says: Please inform me which of the common metals expands and contracts most and how much per foot with a change of 20° tem. Also how much will an iron wire, No. 16 B. S., 10 feet long, expand with 20° rise in temperature and what force will it give? A. Zinc expands and contracts most of all the metals by changes of temperature. It expands a fraction over 0·004 of an inch per foot for 20° rise in temperature. Iron wire about 0·002 of an inch per foot for 20° rise in temperature, or 0·020 of an inch for a 10 foot rod, its push will be equal to the elastic strength or size of the wire or rod.

(4858) A. B. asks: 1. Can double thick window glass be used for the glass plates of an "influence" electric machine? A. Yes; but it is not as desirable as the thinner glass. 2. How can I dri l a hole in the center of the glass plates? A. Make a drill from Stubs' wire, without heating or forging. Heat it to a low red and plunge it into a solution of chloride of zinc (ordinary soldering fluid). With this drill you can readily make holes through a glass plate. You should lubricate it with turpentine. 3. What numbers of the SCIENTIFIC AMERICAN SUPPLEMENT give the best directions and drawings for making an influence machine? A. You will find articles on the Wimshurst machine in SUPPLEMENT, Nos. 546, 648, 584 and 647.

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