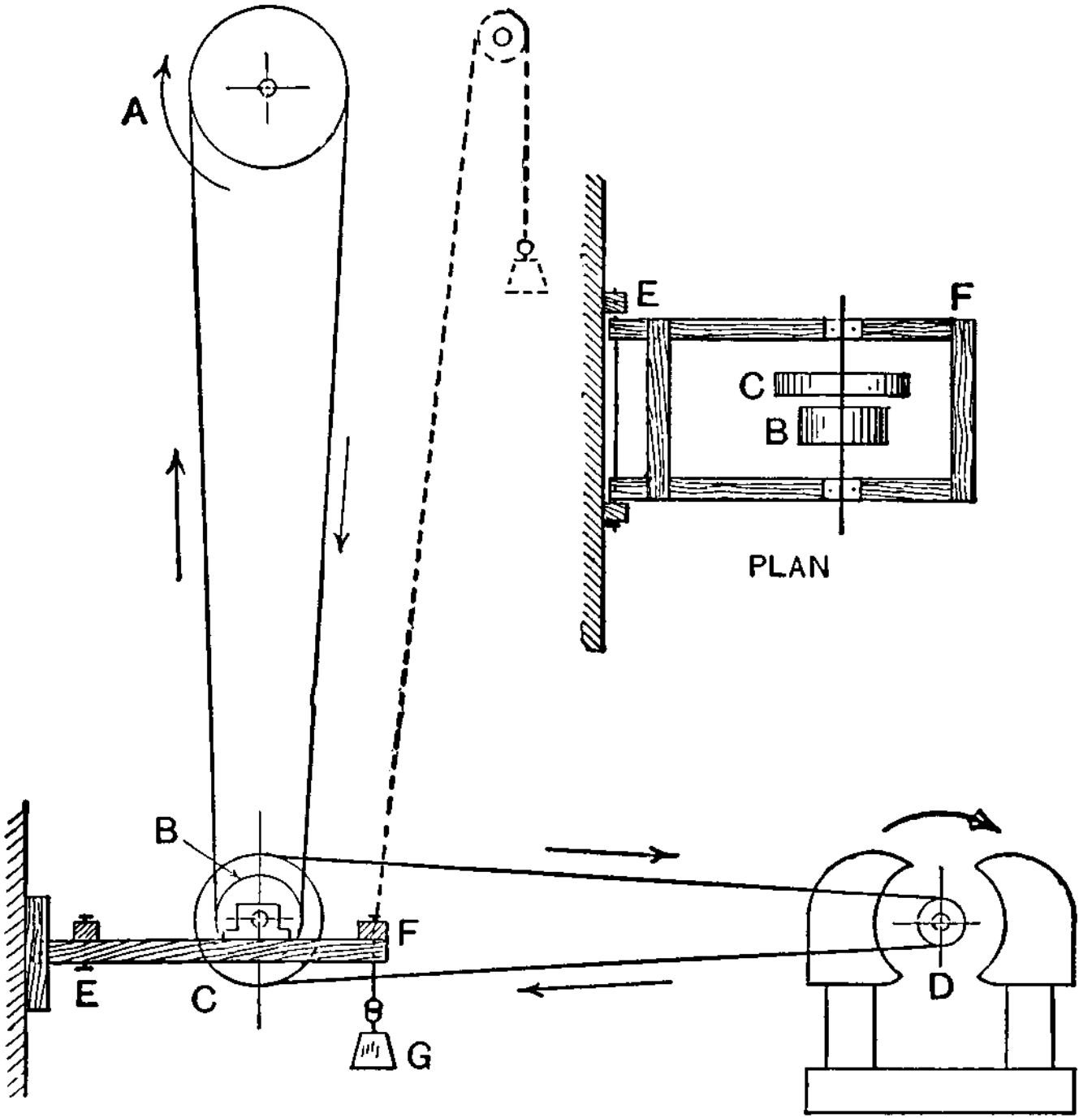

FIG. 75.—Driving Belt Arrangement for Wind Electrical Plant.

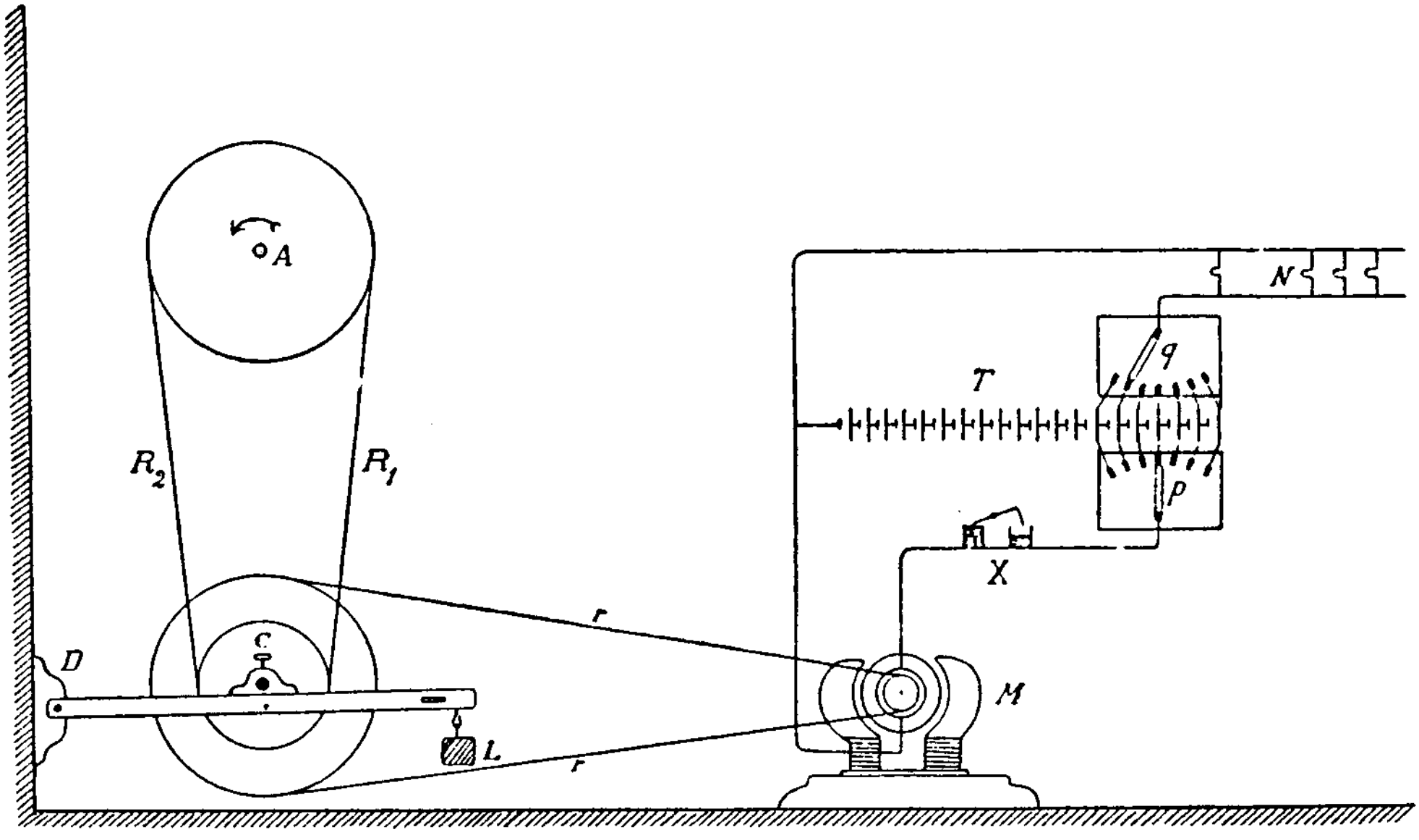

Fig. 5. Konstant elektrisk Strom.

The apparatus required to maintain the dynamo at the right speed when that of the mill itself ranges too high is a system of belts and pulleys, shown in fig. 75. Here A is an ordinary pulley with the usual curved face; B, a rather wide, flat-surfaced pulley; C and D, again, ordinary pulleys; C and B being fast on one shaft. This shaft is carried on the light timber frame EF, hinged at E, and carrying a weight G at the other end.

It will be seen that this arrangement provides for a constant pull on the belt between A and B. It may be found that this pull is too great even without the weight G, in which case a cord (shown dotted) takes its place, and, by means of a pulley overhead and another weight, takes off some of the load.

The belt CD has no special feature beyond being thin, supple, and even. That between A and B, however, must be specially smooth on its running surface, and must in addition be thoroughly well oiled. On this depends the peculiar result to be obtained. It is found that when the weight G has been properly adjusted, and other details of current supply, etc., decided upon by experiment, no matter how much faster than normal A is compelled to run by the wind, the speed of B remains constant or with just sufficient variation to meet the slightly varying conditions required by the dynamo, the belt slipping on B at the higher speeds. The principle, of course, is not new; but its application in the present instance, together with the automatic switch, is an excellent example of mechanical adaptation.

The details of the whole of the apparatus must necessarily be worked out by individual requirements: the following suggestions, however, are added as an example, the instance chosen being the 10-foot windmill described in the last chapter. This windmill, working in a 15- or 16-mile breeze, should have an output of about ¼ H.P. Allowing for losses in dynamo, gearing, and belts, it may be assumed that a dynamo of 100-watts output would be the right machine for the available power. The voltage chosen might well be 25, this being its lowest rate at normal speed, which may be assumed at 1500 revs. per minute.

Under these circumstances, and assuming pulley A (fig. 75) to run at 200 revs. per minute (by whatever gearing used), A might be 12 inches diameter × 2 inches width; B, 6 inches × 3; C, 8 inches × 2; and D, the dynamo pulley, 2 inches × 2 inches. This gives a rather higher ratio than is required—an error on the right side. The belt between A and B should be 1½ inches × 3/16 inch, the pulleys being about 6 feet centres, and belt CD 1 inch wide × ⅛ inch thick, also with about 6 feet drive.

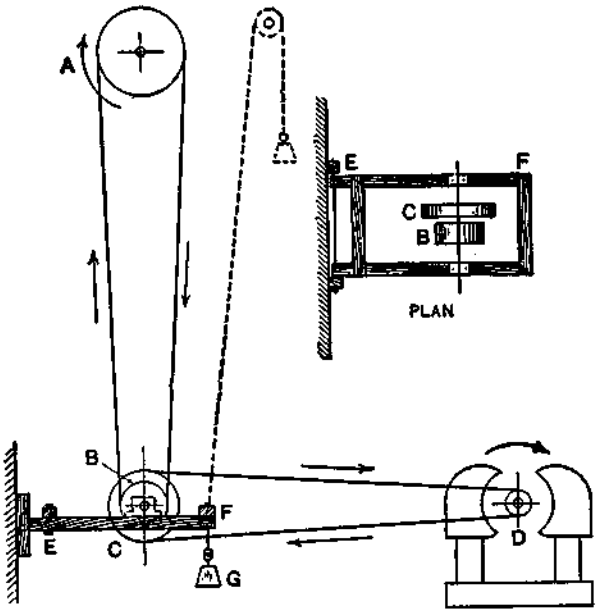

FIG. 75.—Driving Belt Arrangement for Wind Electrical Plant.