balance of my apparatus, in answer to your inquiry, "What mechanical appliances would be required for this purpose?" to refer you to Figure 2 hereunto annexed, in which L represents the main lines from the generating plant, H storage battery, E an electro-motor, $\mathcal{J}$ incandescent lamps, M^2 an electro-magnet, S^2 a coil spring, C^7 an automatic switch worked by the magnet M^2 and the spring S^3, and R^2 resistance put into the line by the same hand switch by which the motor and lamps are turned on, and taken out by the same switch when the motor and lamps are turned off. The purpose of this resistance R^2 is to prevent the current from the dynamo, whenever the wind rises and the motor or lamps are turned on, from burning out the fuse-wire, as the electro-motive force of the dynamo current needs to be higher than the voltage of the stor age battery.

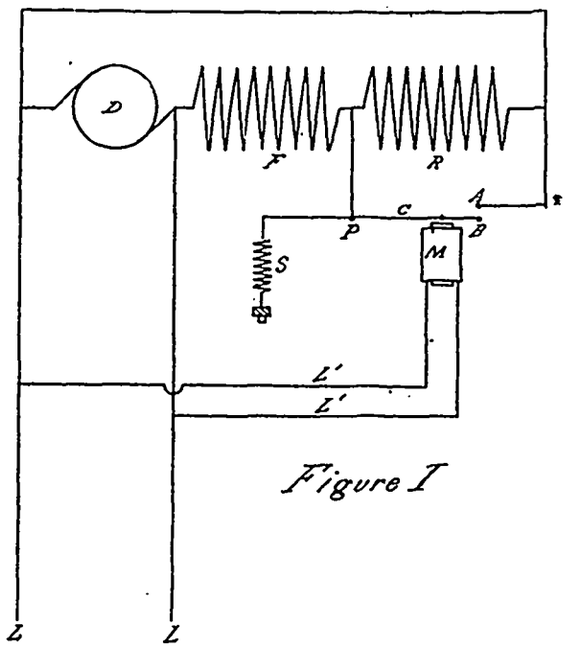

Figure I

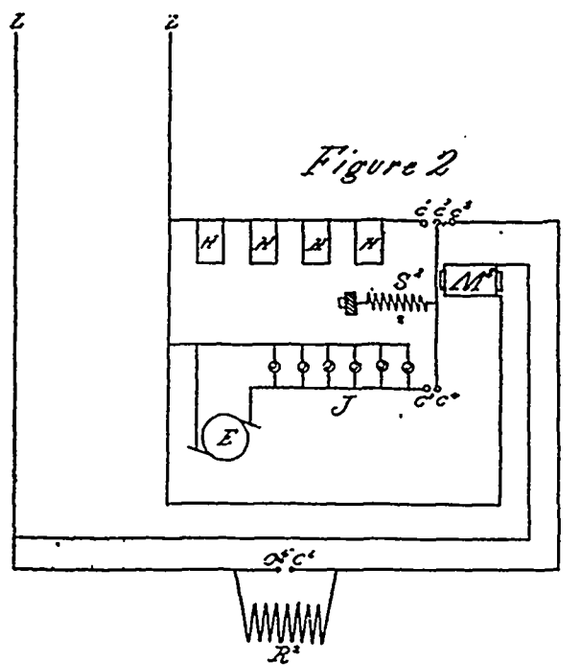

Figure 2

The manner in which this automatic switch and storage arrangement works is as follows: Arrange a two-throw hand switch for the purpose of turning on and off the power or lights in such a way that whenever the switch is turned one way it will connect C^3 with C^4. Assuming the storage battery H to be charged, the motor immediately starts, and the lights burn if turned on, because the coil spring S^2 holds C^7 against C^1. Now if the wind blows, as soon as the voltage rises to one hundred and twenty, that is, become sufficiently high to charge the battery, or in this case to overcome the resistance R^2 and light the lamps, the electro-magnet M^2 overpowers the spring S^2 and draws C^7 against C^2. The current now, instead of flowing from the battery, comes from the dynamo, and the battery is not used as long as the wind blows; but as soon as the wind ceases to blow the electro-magnet M^2 loses its power, the spring S^2 re-asserts itself again, and the current then comes from the battery. If, however, this occasional momentary flicker in the lights or variation in speed of the motor is objectionable, the windwheel may be stopped by a windlass attachment, whereby the wheel is turned edgewise to the wind, or parallel to the vane. But as this change does not occur very often, in the most cases it would not be objectionable. On the other hand, if the motor or lights are not needed, then turn the switch, to which I have just referred, the other way, having it so arranged that by so doing you disconnect C^4 from C^3, and at the same time connect C^4 with C^1 and C^5 with C^6. This being done, as soon as the wind blows sufficiently hard to bring the voltage up to one hundred and twenty, the electro-magnet M^2 overpowers the spring S^2 and connects C^7 with C^2; this allows the current from the dynamo to flow to and charge the battery H, as C^4 is now connected with C^1 by the hand switch to which I have referred. Moreover, the resistance R^2—which was put in for the purpose of preventing the lamps from being burned out in the event of the wind rising—is also short-circuited by the same switch. Thus whenever the wind blows, from the time the motor and lamps are turned off till they are again switched on, it is charging the battery. But as soon as the wind allows the electro-motive force to fall below the required pressure, the electro-magnet M^2 loses its power, and the spring S^2, re-asserting itself, opens the battery circuit and prevents it from discharging.

The working of this plant is highly satisfactory and is almost entirely automatic. The only attention it requires is the brushes of the dynamo need adjusting once or twice a week. All the bearings are self-oiling and consequently only require attention once in about three weeks.

While speaking of the storage of electrical energy, let me say that acting upon the advice of experienced storage battery men, I decided to use a large number of small cells rather than a small number of large cells; and by so doing I am satisfied that more ampere hours can be drawn off from the battery. I use fifty-one cells of the Faure type, having a nominal capacity of ninety ampere hours.

Now in regard to transmission I wish to say that in most countries there would be only occasionally an instance where it would be desirable to have the power or lights any great distance from the windwheel. In my case it was only necessary to place the wheel and dynamo three hundred and fifty feet distant from the battery, motor and lights, with which they are connected by copper wire one-tenth of an inch in diameter.

The only question to be considered regarding the transmission of the current a greater distance is the size of the line wire and the electro-motive force of the current, one or both of which should be increased.

With reference to the utilization of the current