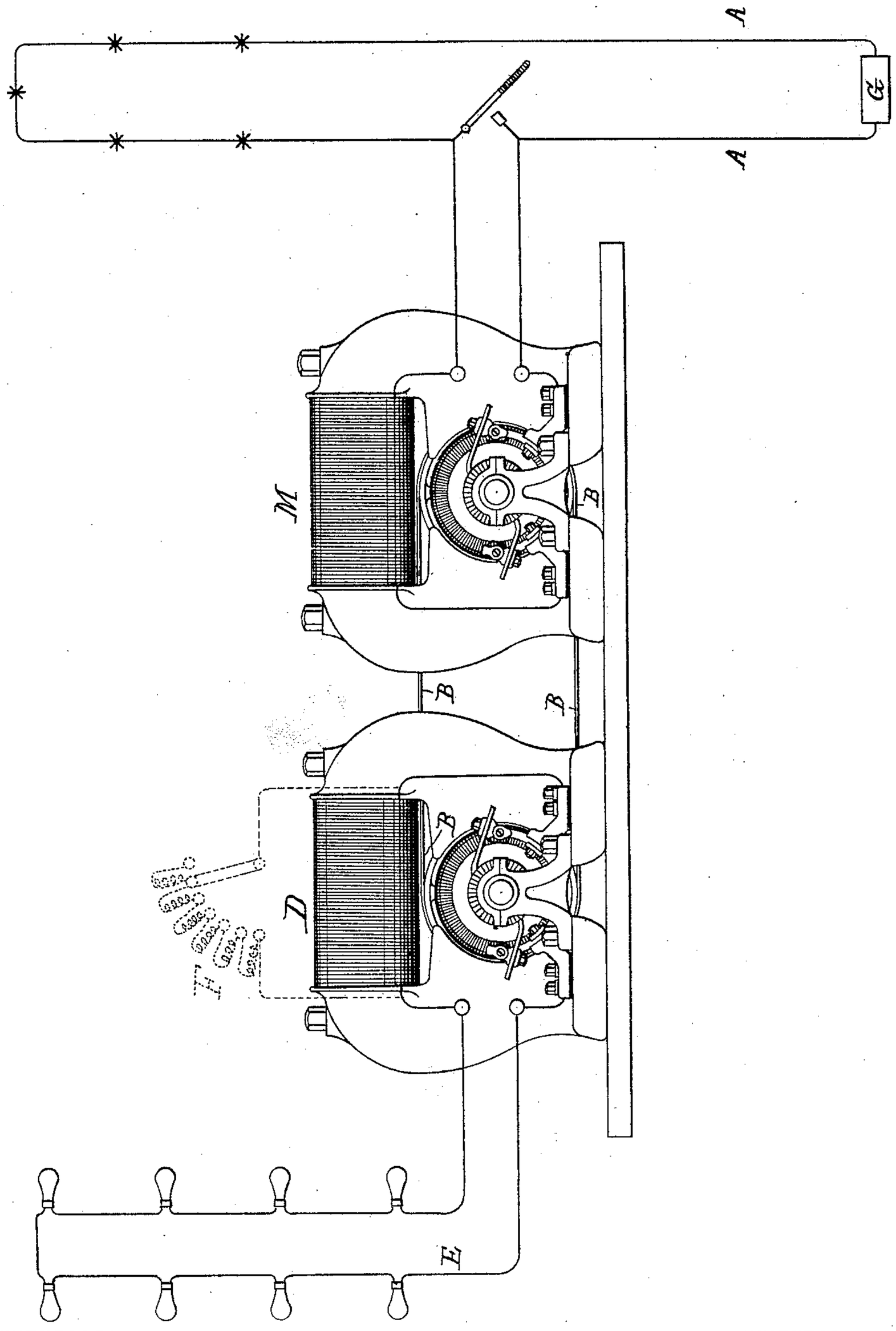
(No Model.)

D. HIGHAM.

SYSTEM OF ELECTRICAL DISTRIBUTION.

No. 407,204. Patented July 16, 1889.



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SYSTEM OF ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 407,204, dated July 16, 1889.

Application filed August 17, 1888. Serial No. 283,031. (No model.)

To all whom it may concern:

Be it known that I, DANIEL HIGHAM, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented an Improved System of Electrical Distribution, of which the following is a specification.

The object of my invention is to provide means whereby incandescent lamps or other translating devices can be supplied from constant-current circuits of high tension without danger to the users of the translating devices, and so that the means employed shall be self-regulating, as more fully set forth hereinafter.

The diagram in the accompanying drawing will serve to illustrate my invention.

A A are the high-tension mains, supplied with a constant current from generating-station G. These mains may be supplied with a current of any suitable intensity, but an ordinary arc-light circuit is preferable. At convenient points in this main circuit, where incandescent lamps or other translating devices are to be operated without danger to the users, I connect in series suitable series-wound electric motors M. In connection with each motor I provide a series-wound dynamo electric machine or generator D, to be driven from the motor M by a suitable electrically-insulated connection. In the present instance I show a belt B, of non-conducting material, passing over pulleys (which may also be of non-conducting material) on the armature-shafts of the respective machines.

In the circuit E of the dynamo D, I arrange the different translating devices in series, from which it will be apparent that the current set up in the local circuit E must be one of constant intensity.

In order that the motor M and dynamo D may perform their proper function in accordance with my invention, it will be necessary that the armature-cores of both machines be extremely well laminated. The object of this is to make the motor, when supplied with a current of constant intensity, give a practically constant pull on the belt B under any rate of speed, from the minimum to the maximum. The object of having the armature-core of the dynamo well laminated is similar, but reversed; that is, the object is to make the dynamo, when a constant torque is given to its armature-shaft, (by motors, for instance,) give a practically constant current in the local circuit, whether or not the dynamo be driven at a high rate of speed to overcome the resistance of a number of translating devices, or a slow rate of speed when working under a very low resistance.

It will of course be understood, without description, that if the armature-cores were not well laminated eddy currents would be set up, which would reduce the lift of the motor when the speed of the motor is increased, and would reduce the intensity of the current in the local circuit when the speed of the dynamo increases.

The operation of my invention is then as follows: When current is switched into the motor M, the armatures of both machines will instantly run up in speed, until a current of such intensity is set up in the local circuit and windings of the dynamo as to give a counter torque very near equal to the torque of the motor. At this point the speed will run at a fixed rate, and the current flowing through the translating devices in the local circuit will be held at a fixed intensity. This will be easily understood from the fact that if the current should tend to rise the rotating resistance of the dynamo would increase beyond the rotating effort of the motor and consequently reduce the speed, while if the current should tend to fall the rotating effort of the motor would become superior to the rotating resistance of the dynamo and the speed would consequently rise, as will be readily understood without further description. Suppose, now, half the number of lamps or other devices in the local circuit were to be cut out, the current for the moment would of course slightly increase, and the rise in current would increase the rotating resistance of the dynamo, which in turn would cause the speed to drop (very nearly one-half) until the current was normal again. The reverse action would of course take place if an increased number of translating devices should be thrown into the circuit, and in this

way the machines are made self-regulating. As the local circuit of each dynamo D is electrically separated from the high-tension mains, the users of a local circuit are in no danger from grounding of the high-tension mains.

My invention also possesses two incidental advantages; first, as the element of regulation is that of varying the speed of the armature, the commutator-brushes can be set at a fixed position through the whole working range, for it is well understood that the conditions of non-sparking are not affected by the change of armature speed; second, the speed of the armature is in proportion to the power consumed, and can be easily recorded by a suitable speed-recorder, thus making a meter of the utmost accuracy.

In connection with the dynamo D, I may use a shunt around the field-magnet coils with adjustable resistances F, as indicated by dotted lines, to adjust the strength of the field-magnet where needed.

I claim as my invention—

1. The combination, with the constant-current mains, of one or more local stations, each containing a motor in series in the said mains, a separate dynamo driven from the motor, and incandescent lamps or other translating devices in series in the local dynamo circuit.

2. The combination of the constant-current mains of high-tension with one or more local stations, each containing a motor in series with the said mains, a separate dynamo driven from the motor through an electrically-insulated connection, and incandescent lamps or other translating devices in series in the local dynamo-circuit.

3. The combination of constant-current mains of high tension with one or more local stations, each containing a motor in series with said mains, a separate dynamo, a belt for driving the latter from the motor, and incandescent lamps or other translating devices in series in the local dynamo-circuit.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL HIGHAM.

Witnesses:

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EDWARD M. RILEY.