

(No Model.)

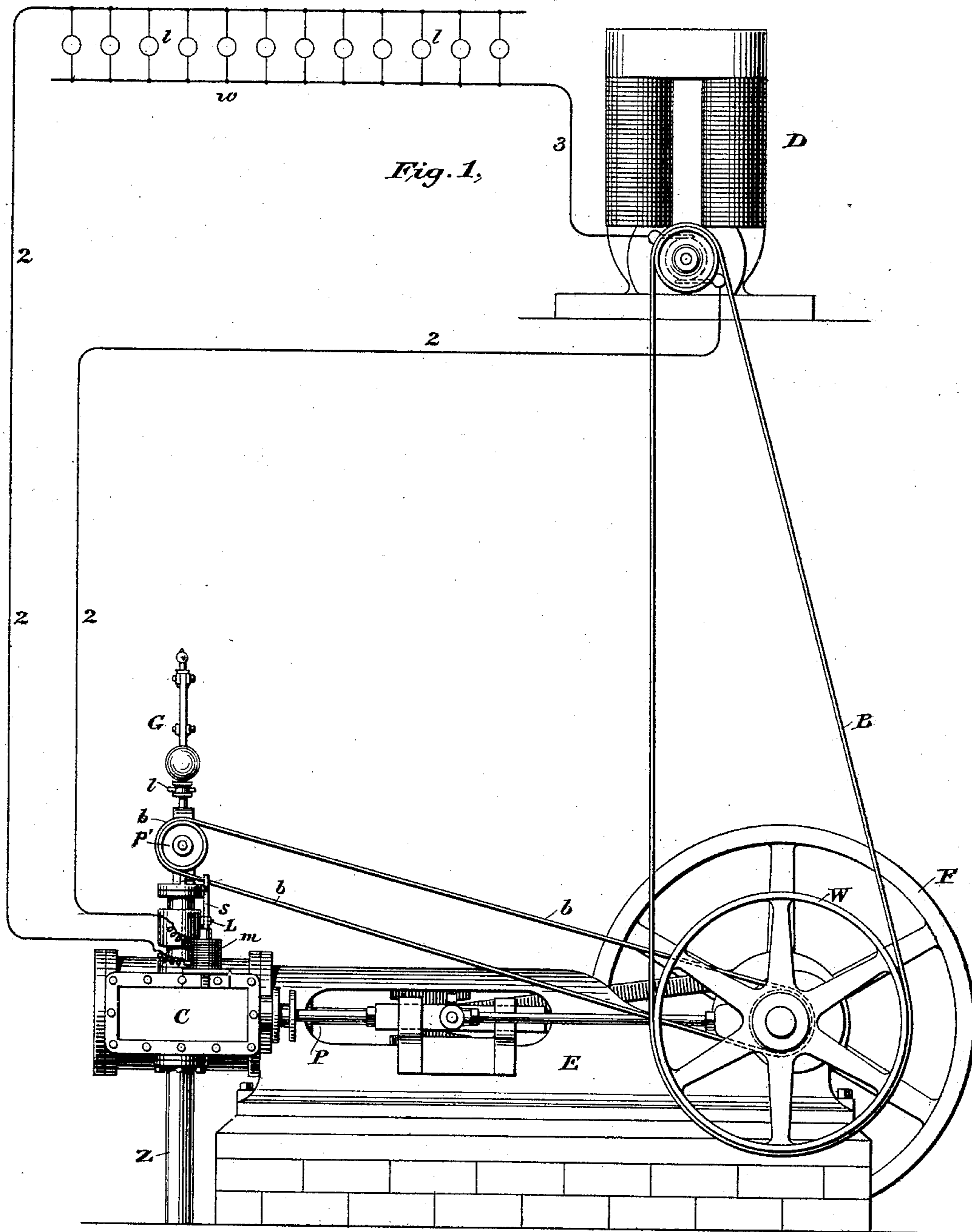
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W. W. GRISCOM.

AUTOMATIC REGULATION OF ELECTRICAL CIRCUITS.

No. 407,006.

Patented July 16, 1889.



Witnesses
Geo. W. Breech.
Carrie E. Ashley

William W. Griscom, Inventor
By his Attorney *Wm. H. Henshaw*

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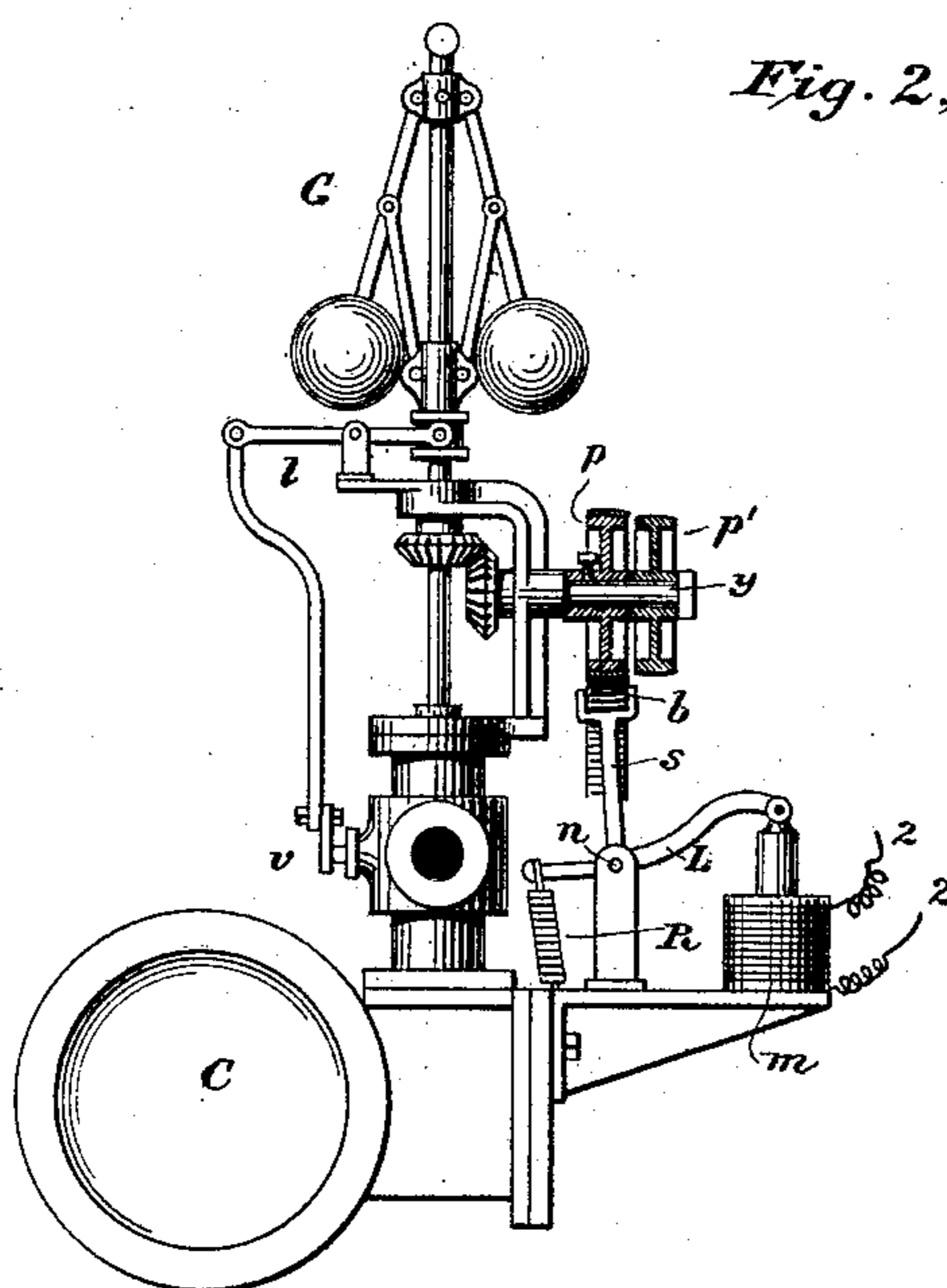
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UNITED STATES PATENT OFFICE.

WILLIAM W. GRISCOM, OF HAVERFORD COLLEGE, ASSIGNOR TO THE ELECTRO DYNAMIC COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC REGULATION OF ELECTRICAL CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 407,006, dated July 16, 1889.

Application filed February 11, 1889. Serial No. 299,552. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. GRISCOM, a citizen of the United States, and a resident of Haverford College, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in the Automatic Regulation of Electrical Circuits, of which the following is a specification.

My invention is an improvement in the automatic regulation of electric current generated by a dynamo-electric machine.

I provide a prime motor, which is preferably a steam-engine having adequate boiler capacity and means for admitting steam in equal quantities at each stroke of the piston, the steam being maintained as near to uniform pressure as possible, whatever the speed of operation. I belt such an engine to the dynamo in the usual manner, but normally the governor for varying or controlling the admission of steam is inactive and out of action.

Let us assume a pressure of one hundred pounds at the cylinder and a rotation of three hundred per unit of time. The electric current generated by the dynamo used is, say, fifty ampères and five hundred volts. This assumes a resistance in circuit of ten ohms. It will be noticed that one hundred pounds of steam-pressure is translated into fifty ampères of current under the existence of the assumed conditions. If, now, the resistance in the circuit with the dynamo be increased to twenty ohms, the current will tend to drop to twenty-five ampères, but while falling the rotations of the fly-wheel and the speed of the piston under the pressure of steam assumed will increase, the rotations of the dynamo-armature will be increased, and the electro-motive force will rise until the fall in current is stopped, when it will rapidly rise again until the electro-motive force reaches one thousand volts, when the normal current intensity of fifty ampères is restored. This is automatic regulation of current intensity by uniformity of steam-pressure. It is equally true that if the resistance in circuit be reduced results opposite to those described in case of increased resistance will follow at the engine.

My invention consists in applying to this arrangement of apparatus an automatic means for providing against a failure of current in

the dynamo-circuit when said circuit is broken, either by accident or design, and is calculated to prevent injury to the prime motor by reason of the increased speed to which the uniform steam-pressure would subject it were the load thus entirely removed, practically entirely removed, or greatly varied. This consists of an arrangement of apparatus for bringing into operation a device for controlling the admission of steam to the cylinder. I prefer the arrangement shown, which consists of an automatic governor normally held out of action by an electro-magnet in the circuit of the dynamo, but which is thrown into action by a change in the electric current of a predetermined character as its complete failure or its abrupt fall to an ineffective or inappreciable point.

The accompanying drawings illustrate my invention.

Figure 1 shows the prime motor driving the dynamo, which in turn supplies the working-circuit with electricity. Fig. 2 is a detail showing the means for controlling the steam-inlet to the engine through the medium of a governor normally out of action.

E is a steam-engine having a piston P, cylinder C, fly-wheel F, and pulley-wheel W. Adequate boiler capacity is available through the pipe Z.

D is a dynamo-electric machine driven from the engine by belt B and supplying working-circuit *w*, containing lamps L. The working-circuit and dynamo are connected by main leads 2 and 3.

The engine-governor G is the ordinary form of ball-governor connected with steam-inlet valve *v* by a compound lever *l*. There is a bevel-gear on the governor-shaft meshing with a similar gear located on a bearing journaled at right angles thereto. On bearing *y* there is a loose pulley *p'* and a fast pulley *p*. The belt *b* connects the fly-wheel shaft with the bearing *y*, and may be placed upon either loose pulley *p'* or fast pulley *p*.

m is a solenoid electro-magnet located in the main lead 2. Its core is jointed to a three-armed lever L, held in a retracted position by the spring or retractor R. The third arm of this lever is in the form of a belt-shifter composed of an arm and a bifurcated terminal having one bifurcation upon each side of belt *b*.

As the apparatus is shown, the entire apparatus is idle, and as no current is flowing in the magnet *m* the retractor *R* has caused belt *b* to take up its position upon fast pulley *p*.
 5 As soon as the engine starts and current is generated in circuit 2 3 magnet *m* will draw its solenoid inward, and the belt-shifter will cause belt *b* to take up its position on loose pulley *p'*, when it will be out of action. As
 10 above explained, the steam-pressure being substantially constant, the strength of current will be maintained constant by automatic variations in speed of the engine; but should the current fail or abruptly decrease, so as to
 15 practically remove the load from the engine, the magnet *m* will release its armature-core and the governor will be thrown into operation to control the inlet-valve of the engine.

What I claim, and desire to secure by Letters
 20 Patent, is—

1. The combination of a prime motor, a suitable source of power—such as steam, water, or gas—a pipe or passage for conducting or applying such power to said motor, a normally-open
 25 valve or gate controlling said passage, a dynamo-electric machine operated by said prime motor, an electrical circuit containing said

dynamo, and an electro-magnet having a normally-attracted armature mechanically connected with said valve, whereby the failure of
 30 current in said circuit releases said valve and closes the gate or passage, substantially as described.

2. The combination of a prime motor, a suitable source of power—such as steam, water, or
 35 gas—a pipe or passage for conducting or applying said power to the motor, a normally-open valve or gate controlling said passage, a governor normally out of action for operating
 40 said gate or valve, a dynamo-electric machine operated by said prime motor, an electrical circuit containing said dynamo, an electro-magnet located in said circuit having a normally-attracted armature, and means for establishing an operative connection between
 45 said governor and a moving part of the motor controlled by said armature, whereby the failure of current in said circuit releases said valve and closes the gate or passage, substantially as described.

WILLIAM W. GRISCOM.

Witnesses:

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