No. 615,418. Patented Dec. 6, 1898.

E. T. WILKINSON.

AUTOMATIC RHEOSTAT.

(Application filed May 8, 1897.)

(No Model.) 2 Sheets—Sheet 1.

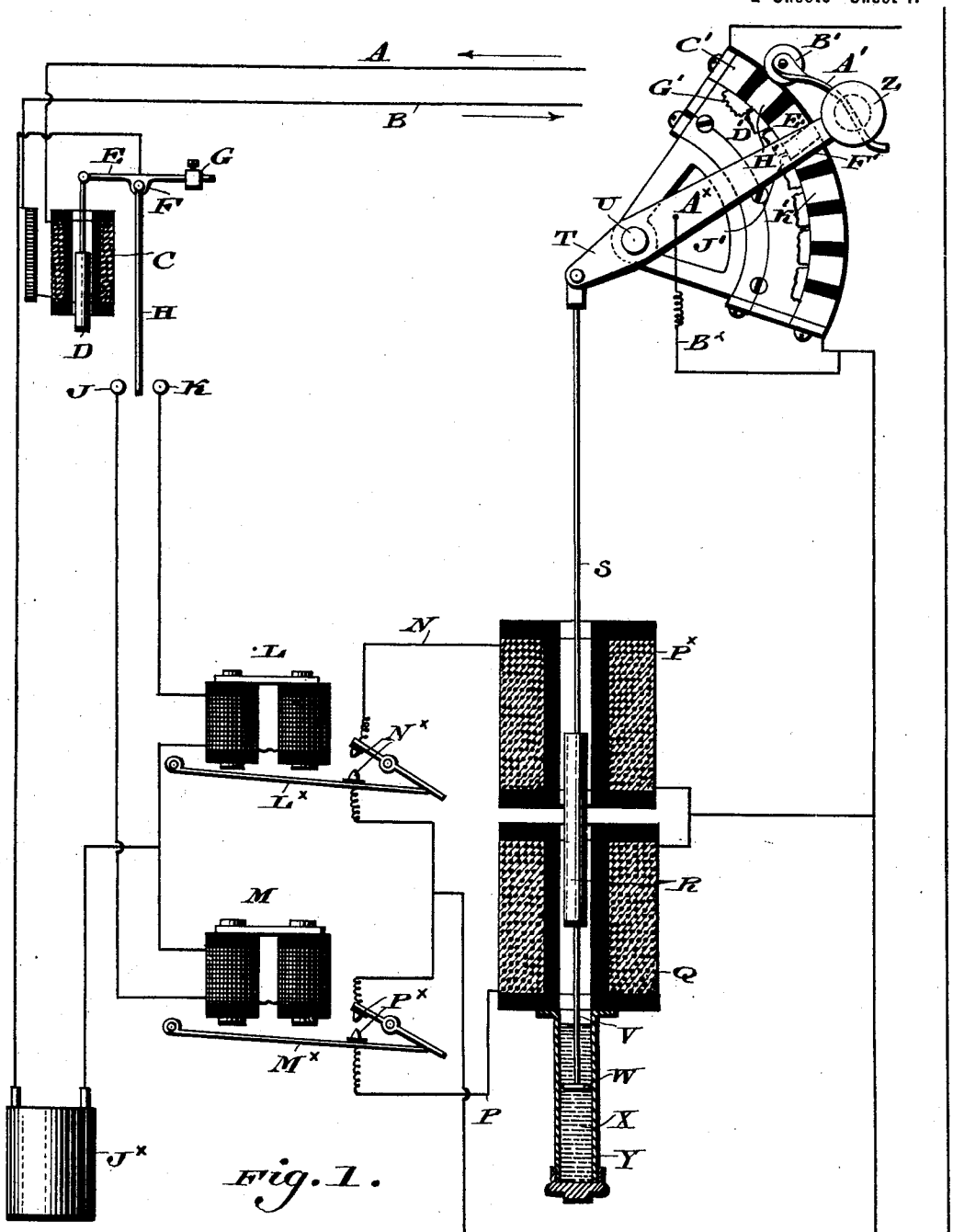


Fig. 1.

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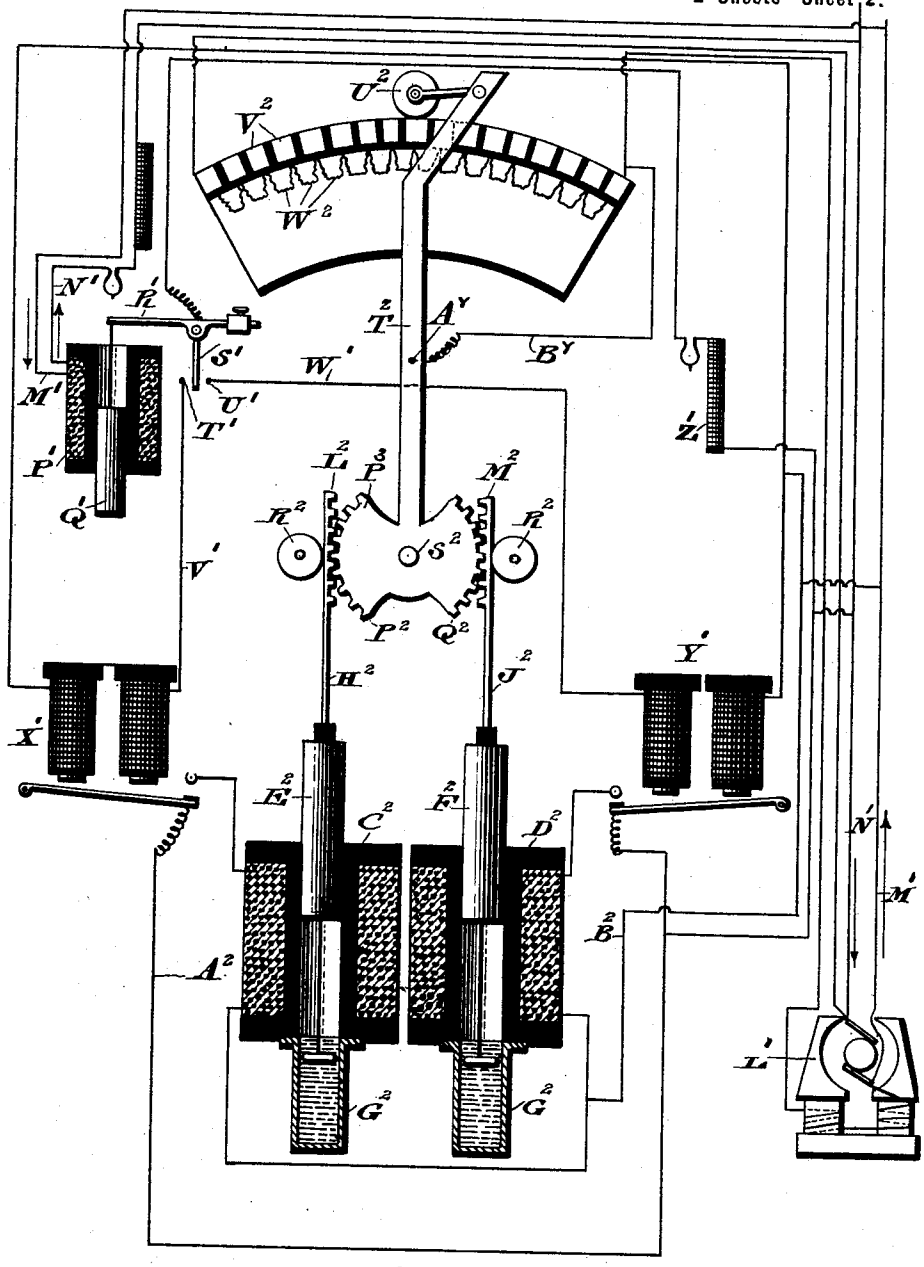


Fig. 2.

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UNITED STATES PATENT OFFICE.

ELEAZER T. WILKINSON, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 615,418, dated December 6, 1898.

Application filed May 8, 1897. Serial No. 635,622. (No model.)

To all whom it may concern:

Be it known that I, ELEAZER T. WILKINSON, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Automatic Rheostats, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of an improved construction of automatic rheostat which is sensitive and automatically operative under all conditions, the feature of which is the automatic movement, electrically controlled, of mechanisms which, acting as conductors, throw in or out of circuit of the fields of the dynamo the resistance-coils attached to segments B′ and C′, D′, E′, and F′.

It further consists of a novel means for reducing friction to a minimum in certain portions of the rheostat.

It further consists of novel details of construction, all as will be hereinafter set forth, and fully pointed out in the claims.

Figure 1 represents a diagrammatic view of an automatic rheostat embodying my invention. Fig. 2 represents a diagrammatic view showing another embodiment of the principle of my invention.

Referring first to Fig. 1, A and B designate conductors leading from and to an alternating-current converter, said conductors being connected to the solenoid C, which latter is provided with an armature D, the latter having suitable connection to the lever E, which is fulcrumed at the point F and provided with a counterbalance G.

H designates a needle which is suspended from the lever E and adapted to oscillate in unison therewith, wherefrom it will be seen that any variation of the current passing over the wires A B to the auxiliary solenoid C will cause a movement of the armature D, thereby actuating said lever.

The needle H will contact in one or the other of its extreme positions with the terminals J or K, said needle contacting with the terminal J in case of a rise above the normal and with the terminal K if below normal, thereby closing the circuits of the respective relays L and M, which are preferably connected and constructed substantially as shown and in electrical connection with a battery J^x, whereby the armature with respect to relay will be magnetized sufficiently to pick up the levers L^x or M^x, which close the circuit N and P on the points N^x or P^x, which may be of carbon, platinum, or other suitable material.

The function of the circuits N and P is to cause the working solenoids P^2 and Q to actuate in the proper direction the armature R, which latter has a connection S therefrom to the lever T, which is fulcrumed at U. V designates a rod depending from said armature and having a piston W on the end thereof, said piston reciprocating in the cylinder or dash-pot Y, filled with oil X or other suitable material, whereby motion of the armature R is steadied.

Z designates the head or extremity of the lever T, in which is mounted the strip A′, which carries the roller B′, which travels on the segments C′ D′ E′ F′, &c., which have suitable insulation therebetween, said segments having the resistance-coils G′ H′ J′, &c., extending therebetween and of sufficient size to introduce the desired resistance into the fields of the dynamo.

The windings of the working solenoids P^2 and Q are in series from the + to − poles of the exciting-dynamo, and the segments C′ D′ E′ F′, &c., are in series with wires running from the exciter to the field of the alternating-current machine.

The lever T and the roller B′, with their several connections and attachments, form an electrical conductor, which is used to affect the current in the fields of the alternating-current machine by bringing into circuit the resistance-coils connected with the segments C′ D′ E′, &c., through the wire B^x, connected at A^x with the lever T.

When it is desired to use my invention in connection with a direct-current machine, I employ the construction seen in Fig. 2, in which L′ designates a dynamo and M′ N′ the conductors leading therefrom to and from the auxiliary solenoid P′, which has an armature Q′, from which leads a connection to the lever R′, suitably fulcrumed and provided with the needle S′, by means of which electrical connection is made between the points T′ or U′, caused by any variation of electromotive force.

V′ and W′ designate wires leading from the points T′ U′ to the relays X′ and Y′, respectively, which instead of being worked by a battery-current, as shown in Fig. 1, are wound in series with sufficient resistance Z′ to reduce to a minimum the spark in the contact between S′ and U′ or S′ and T′ across the terminals from + to −.

A^2 B^2 designate the circuits to be closed by the relays X′ and Y′, respectively, and leading to the solenoids C^2 D^2, respectively, which latter are arranged side by side and each provided with an armature E^2 F^2, respectively, to which are attached dash-pots G^2 G^2, as already described.

H^2 J^2 designate rods (preferably insulated) attached to the armatures E^2 F^2 and carrying the racks L^2 M^2, which mesh with the teeth P^2 Q^2, respectively, of the gear or pinion P^3, which is journaled at S^2 and has the arm T^2 connected therewith, said racks being held in proper position relative to their pinion by means of the flanged revolving rollers R^2.

U^2 designates a roller pivotally supported from near the upper extremity of the arm T^2 and adapted to travel over the segments V^2, which are separated by suitable insulation and are each connected by the resistance-coils W^2, it being evident that the segments in the present instance are in series with the field-winding of the dynamo, as will be seen by following out the connections therebetween.

The lever T^2 and the roller U^2, with their several connections and attachments, form an electrical conductor and are used to affect the current in the fields of the dynamo by bringing into circuit the resistance-coils connected with the segments V^2 through the wire B^y, connected at A^y with the lever T^2.

The operation is as follows: The moving of the lever T or T^2 is effected by means of working solenoids P^x Q or C^2 D^2, respectively, and the action of the above solenoids is determined by means of the auxiliary solenoids C or P′, the function of the latter being to move the lever, with the attached needle, a short space, it being evident that a very slight change of voltage is sufficient to do this.

Especial attention is called to the feature of the employment of the roller B′ and U^2 as a means of connection between the arm T and T^2 and the segments C′ D′ E′, &c., and V^2, respectively, since by these means friction is reduced to a minimum, and the action of the working solenoids upon the lever T or T^2, which is effected by means of the rod S or by the racks L^2 M^2, and the contiguous pinion P^3, attached to or part of the lever T^2, will be very sensitive in every instance by reason of the absence of friction between the contact device and the segments on which it travels, by reason of which the greatest efficiency is attained.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a rheostat, a series of segments insulated from each other and provided with resistance-coils, a lever suitably fulcrumed and carrying a contact-roller for said segments, an armature connected with said lever, circuits with working solenoids therein actuating said armature, a solenoid with conductors leading thereto and provided with an armature, a pivoted lever connected with said armature and having a depending needle and relays in said solenoid-circuits having terminals adapted to be in contact with said needle, said relays having armatures for opening or closing said circuits.

2. In a rheostat, a plurality of working solenoids arranged side by side, armatures therefor, rods carrying racks and connected to said armatures, a pinion engaging said racks, means for keeping said racks and pinions in mesh, a lever attached to said pinion, a contact-roller carried by said lever together forming an electrical conductor, adapted to travel over segments, insulated from each other and provided with resistance-coils, together with means for actuating said armatures upon any variation of electromotive force.

3. In a rheostat, a series of insulated segments provided with resistance-coils, a pivoted lever carrying a roller contacting with said segments, an armature connected with said lever and provided with a stem having means connected therewith for steadying the movement of said armature, circuits with working solenoids therein for actuating said armature, a solenoid with conductors leading thereto and provided with an armature having a pivoted lever with a depending needle, said first-mentioned solenoid-circuits having relays with terminals adapted to be in contact with said needle.

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Witnesses:
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