G. B. DUSINBERRE.

CURRENT CONTROLLER.

APPLICATION FILED MAY 8, 1911. RENEWED MAR. 4, 1912.

1,041,982. Patented Oct. 22, 1912.

3 SHEETS—SHEET 1.

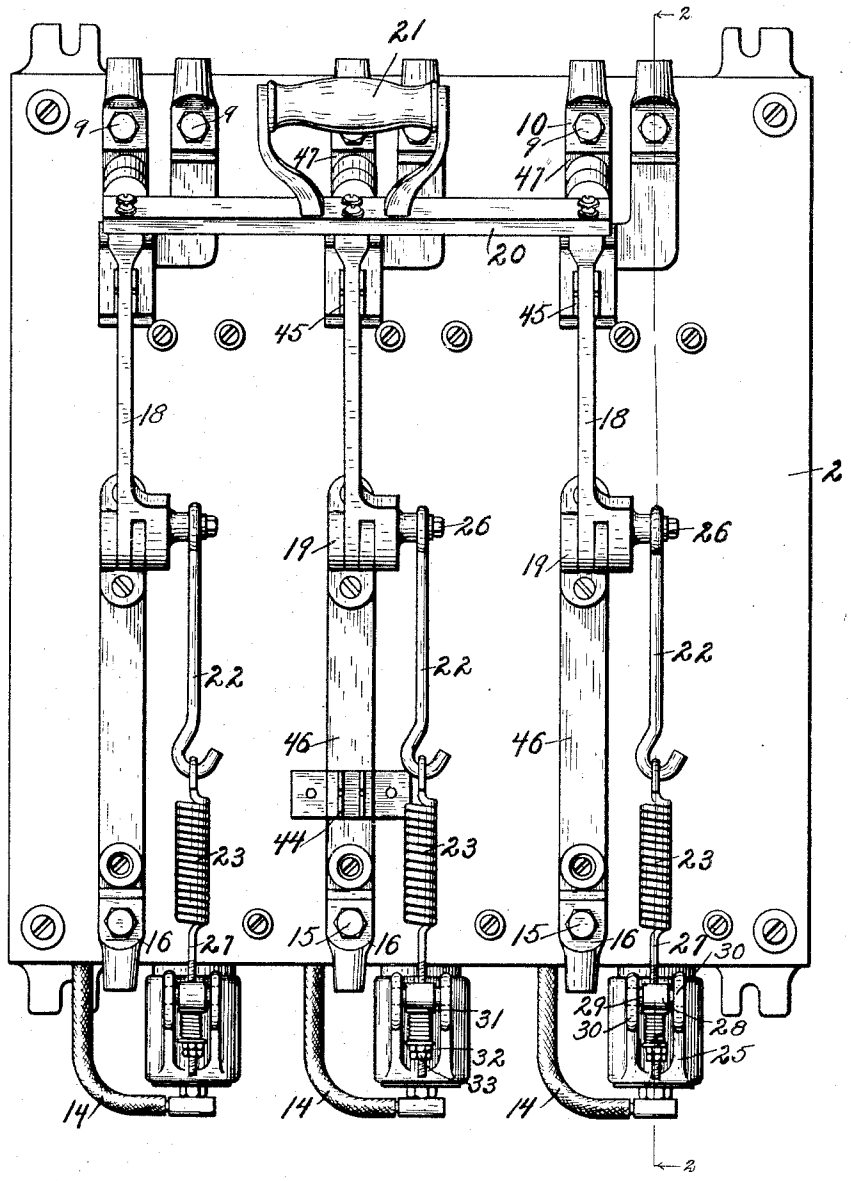

Fig. I.

Witnesses

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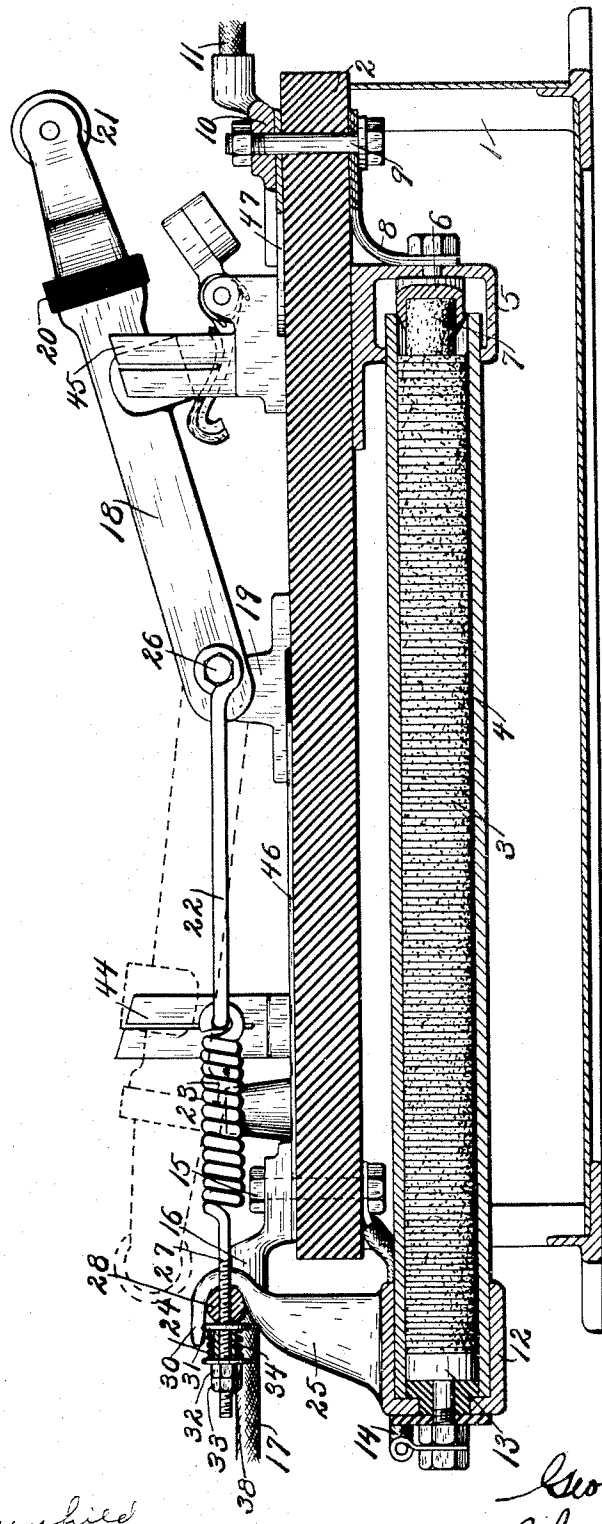

Fig. II.

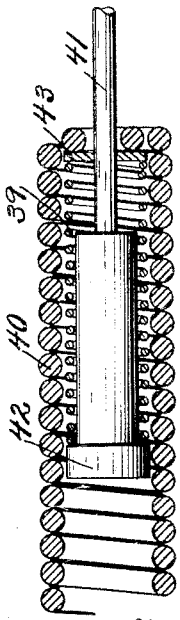

Fig. VI.

Witnesses

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3 SHEETS—SHEET 3.

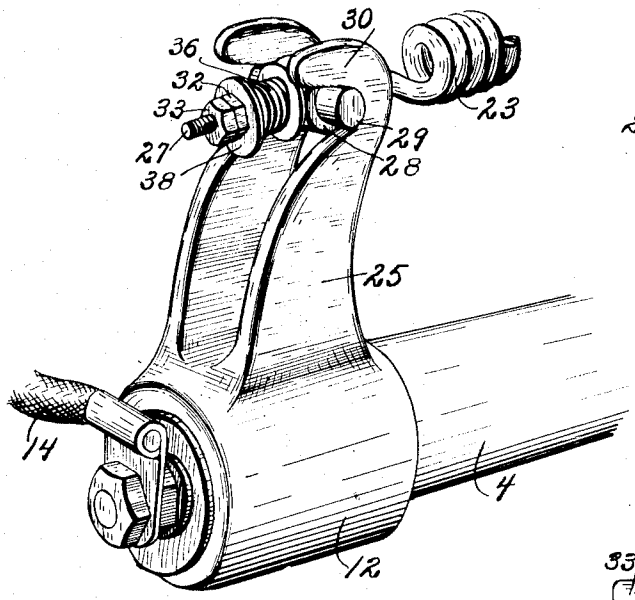

Fig. III.

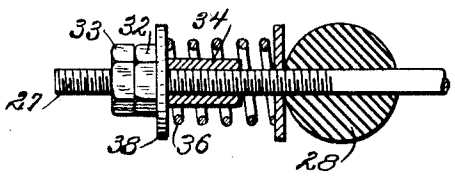

Fig. IV.

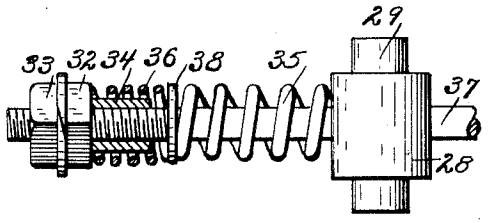

Fig. V.

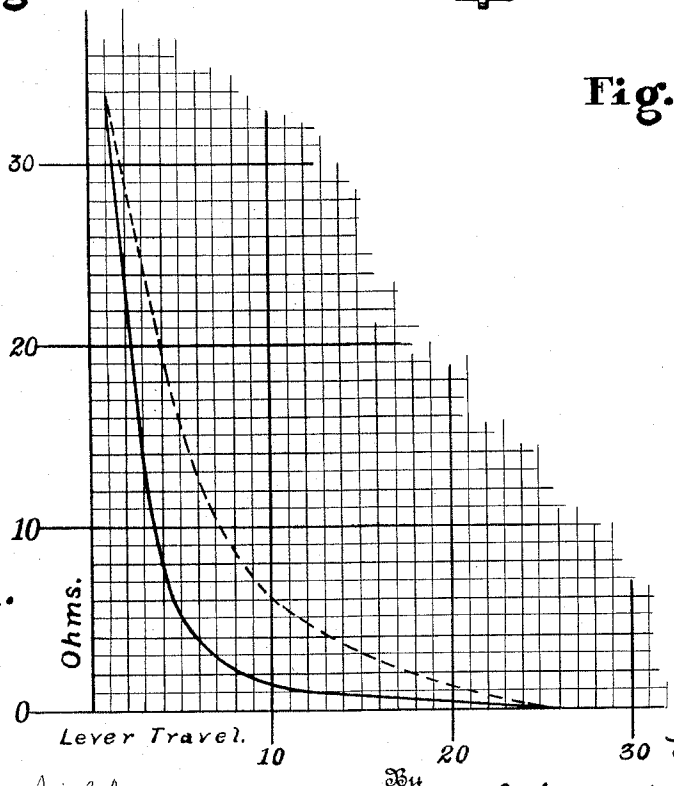

Fig. VII.

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE B. DUSINBERRE, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ALLEN-BRADLEY COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

CURRENT-CONTROLLER.

1,041,982. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed May 8, 1911, Serial No. 625,796. Renewed March 4, 1912. Serial No. 681,609.

To all whom it may concern:

Be it known that I, GEORGE B. DUSINBERRE, a citizen of the United States, residing at Cleveland, Ohio, have invented certain new and useful Improvements in Current-Controllers, of which the following is a specification.

This invention relates to improvements in current controllers.

The main objects of this invention are: First, to provide an improved electric controller or rheostat having compressible resistance medium in which the resistance is reduced at a comparatively uniform rate. Second, to provide a structure embodying these advantages which is very simple and economical in structure and durable in use.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure, which is a preferred embodiment of my invention, is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a plan view of a controller embodying the features of my invention. Fig. II is a section thereof taken on a line corresponding to line 2—2 of Fig. I. Fig. III is an enlarged detail perspective view of one of the resistance units removed from the frame. Fig. IV is an enlarged detail showing the arrangement of the auxiliary compression spring 24. Fig. V is a detail view, partially in section, showing a modified construction. Fig. VI is a detail view, partially in section, showing a further modification of the compression springs. Fig. VII is a diagrammatic view showing the resistance obtained at various points of the lever travel.

In the drawing, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, I provide a frame 1, having corner posts on which the top plate 2 is mounted. This top plate is of suitable insulating material to avoid the necessity of otherwise insulating the parts mounted thereon. The structure illustrated is adapted as a controller for polyphase alternating currents. The resistance medium is in the form of piles or columns of disks 3, preferably a carbon composition, which are arranged in tubular containers 4. A single unit only will be described, as the description is applicable to all of them.

The container 4 is supported within the casing by means of the bracket 5 adapted to receive the upper end of the container. Supported on the bracket in a suitable socket 6 is a contact block 7, also formed of carbon, against which the inner resistance medium disk rests. This block 7 is connected by the electric connection 8 with the binding post 9, on which is mounted a suitable coupling 10 for the delivery circuit wire 11. On the lower end of the container is a pressure member 12, by which the contact block 13 is carried, the pressure member being sleeved upon the container, while the contact block projects into the same to engage the lower resistance medium disk. The contact block 13 is connected by a wire 14 to the binding post 15, on which the coupling member 16 for the line wire 17 is mounted.

The disks 3 are compressed to reduce the resistance. It is desirable that the resistance be reduced at a comparatively uniform rate. It is found in practice that the resistance is reduced very rapidly during the first part of the compression movement.

In Figs. I and II, the structure is shown in its closed position, the open position of the actuating lever 18 being indicated by dotted lines. The lever 18 is mounted on a suitable bracket 19 on the body or top plate 3, the three levers of the structure illustrated being connected by the bar 20 having a handle 21 thereon so that they are actuated together. The lever 18 is connected to the pressure member 12 by means of the link 22, the main spring 23 and the auxiliary spring 24 and the arm 25 on the pressure member. The pin 26 on the lever on which the link 22 is engaged is arranged eccentrically relative to the lever pivot. The main spring 23, in the structure illustrated in Figs. I, II, III and V, is provided with a rod-like extension 27 on which the auxiliary spring 24 is arranged. On this rod 27 is an arm engaging member 28, having journal-like ends 29 to engage the out-

wardly-facing hooks 30 on the arm. At each end of the auxiliary spring I arrange a collar 31, the inner collar bearing against the arm engaging member 28, while the outer collar is supported by a nut 32. A lock nut 33 is preferably provided for this nut. To limit the compression of the auxiliary spring 24, I arrange on the rod 27 a sleeve 34. This sleeve, when the spring is collapsed, as is shown in Fig. II, receives the thrust of the collars and thus relieves the auxiliary or light spring 24. When the lever 18 is in its open position, as shown by dotted lines in Fig. II, there is no pressure upon the resistance medium and it has its full resistance. The circuit is opened at this point. When the lever 18 is actuated, the power is transmitted through the main and auxiliary springs to the pressure member 12. The power of the auxiliary spring 24 is first exerted and when this is completely collapsed, or collapsed as much as the sleeve 34 will permit, the power of the spring 23 is exerted. As previously stated, the resistance is rapidly reduced during the early compression of the resistance medium. By interposing the auxiliary springs or spring members of different strength, the power of the weakest spring is first exerted to compress the resistance medium, and then the strength of the stronger spring is exerted, so that resistance is cut out at a comparatively even rate in the lever travel.

In Fig. VII, I illustrate diagrammatically by the dotted line the approximate resistance obtained in the structure illustrated at various points of the lever travel. The vertical line indicates ohms and the horizontal line the lever travel. The full line illustrates the approximate resistance furnished by certain other forms of controllers at different points of the lever travel.

When a single spring, as the main spring 23, is employed in applying the pressure to the resistance medium, the resistance curve is found to be somewhat irregular and the resistance is cut out very rapidly during the early part of the lever movement. Further it is not possible to regulate the resistance at different points of the lever movement, but by providing a plurality of springs or spring members, through which the pressure is applied, springs of required strength can be provided so that the resistance at any point of the lever travel is quite accurately controlled or regulated. For instance, in some cases it is desired to cut out the resistance rapidly or in a short space of lever travel, and in others more gradually or in a longer space of lever travel. By my improvements I am able to secure the desired result.

In the modified construction shown in Fig. V, both the main spring 35 and the auxiliary spring 36 are arranged upon the rod or link 37 passing through the member 28. An inner collar 38 is arranged between the main and the auxiliary springs.

In the modified structure shown in Fig. VI, the auxiliary spring 39 is arranged within the main spring 40, the link 41 being provided with a head 42 engaging the inner end of the auxiliary spring, while its outer end rests against the washer 43, as shown. The lever 18, when in its open position engages the blades 44, and, when closed, the blades 43. When the lever is completely closed, the resistance medium is cut out, and the circuit is through the lever, the bar 46 and the plate 47 to the post 9.

There are also various forms of compound springs, that is springs having one part stronger than the other, which might be utilized. These modifications are so numerous that I do not attempt to illustrate them herein, the modification illustrated will suggest others to those skilled in the art.

I do not describe the automatic cut-out device shown in Fig. IV herein in detail, as it forms no part of this invention.

I have illustrated and described my improvements in detail in the form in which I have embodied them. I am aware however, that considerable variations in structural details, other than those illustrated, are possible. Such variations, in view of the illustrations given, will no doubt be readily understood by those skilled in the art to which this invention relates.

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

1. In an electric current controller, the combination of the resistance medium, means for subjecting said resistance medium to compression comprising a lever, a pressure member having an arm thereon, a spring having a rod-like extension thereon connected to said lever, an arm engaging member through which said spring extension is arranged, an auxiliary spring arranged on said extension, collars arranged on said extension at each end of said spring, the inner collar being arranged to bear against said arm engaging member, a sleeve arranged on said extension between said collars, and a nut threaded on said extension to engage the outer collar.

2. In an electric current controller, the combination of the resistance medium, means for subjecting said resistance medium to compression comprising a lever, a pressure member having an arm thereon, a spring having a rod-like extension thereon connected to said lever, an arm engaging member through which said spring extension is arranged, an auxiliary spring arranged on said extension, collars arranged on said extension at each end of said spring, the inner collar being arranged against said

arm engaging member, and a nut threaded on said extension to engage the outer collar.

3. In an electric current controller, the combination of the resistance medium, means for subjecting said resistance medium to compression comprising a lever, a pressure member, a spring having a rod-like extension thereon connected to said lever, and an auxiliary spring arranged on said extension and through which said main spring acts upon said pressure member.

4. In an electric current controller, the combination of a resistance medium, means for subjecting said resistance medium to compression comprising a resistance medium pressure member, an actuating member, a main spring connected to said actuating member, and an auxiliary spring interposed in the connection for said main spring to said resistance medium pressure member, said auxiliary spring being of less strength than said main spring.

5. In an electric current controller, the combination of a resistance medium pressure member, an actuating member, a main spring connected to said actuating member, an auxiliary spring interposed in the connection for said main spring to said resistance medium pressure member, said auxiliary spring being of less strength than said main spring, and means for limiting the stress upon the said auxiliary spring.

6. In an electric current controller, the combination of the compressible resistance medium, and means for subjecting said resistance medium to compression comprising a main spring member and an auxiliary spring member, the auxiliary spring member being of lesser strength than the main spring member.

7. In an electric current controller, the combination with the resistance medium, of means for subjecting said resistance medium to compression comprising spring members of different strength arranged so that the resistance medium is successively subjected to the power thereof.

8. In an electric controller, the combination of a resistance medium, and means for subjecting said resistance medium to compression comprising spring members of different strength to the power of which the said medium is successively subjected.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

GEORGE B. DUSINBERRE. [L. S.]

Witnesses:
JAMES C. O'NEIL,
FRANK PAUL.