C. C. STIRLING.

RHEOSTAT.

APPLICATION FILED JAN. 14, 1920.

1,374,332. **Patented Apr. 12, 1921.**

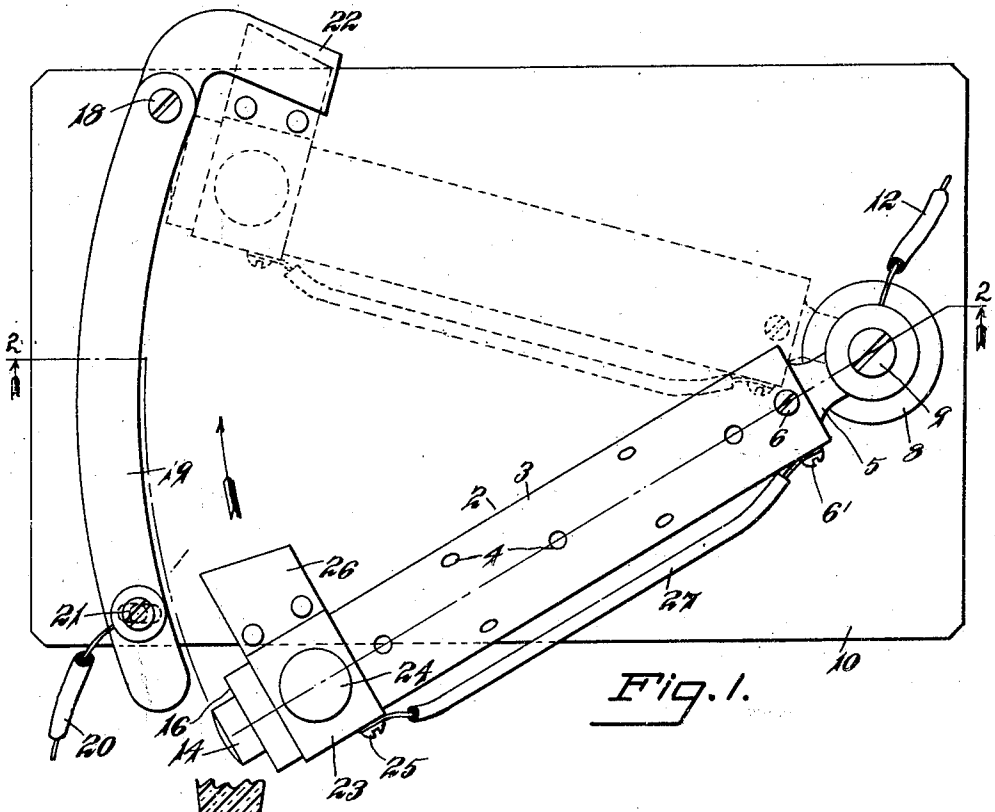


Fig. 1.

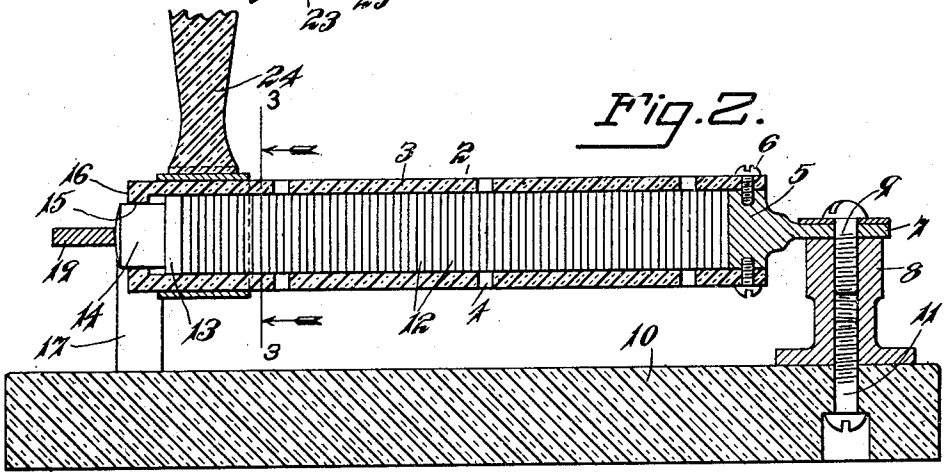


Fig. 2.

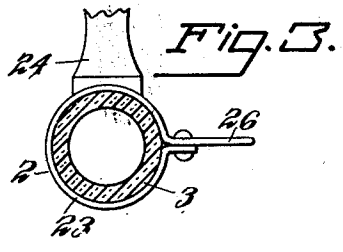


Fig. 3.

Inventor
C. C. Stirling
By Keith Spencer
Attorney

UNITED STATES PATENT OFFICE.

CLARENCE C. STIRLING, OF HARTFORD, CONNECTICUT.

RHEOSTAT.

1,374,332. Specification of Letters Patent. Patented Apr. 12, 1921.

Application filed January 14, 1920. Serial No. 351,372.

To all whom it may concern:

Be it known that I, CLARENCE C. STIRLING, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

This invention relates to rheostats. A rheostat involving the invention, can be employed with advantage in many of the connections where those of the present form are usable. It is however preëminently designed for starting purposes or for any intermittent use. I have several objects in view among them being the provision in an article of the character set forth, of simple and effective means which is susceptible of inexpensive construction and easy operation, and by which sparking or arcing is practically wholly eliminated.

In the drawings accompanying and forming part of the present specification I have shown in detail one of the several forms of embodiment of the invention which I will set forth fully in the following description to enable those skilled in the art to practice the invention. I am not restricted to this disclosure. I may depart therefrom in several respects within the scope of the invention.

Referring to said drawings:

Figure 1 is a plan view of a rheostat involving the invention and showing the movable member thereof in two practically extreme positions by full and dotted lines respectively.

Fig. 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a cross section on the line 3—3 of Fig. 2 also looking in the direction of the arrows.

Like characters refer to like parts throughout the several views.

A rheostat involving the invention as will be inferred, is generally speaking capable of many uses. As a matter of fact, some if not all of the features thereof, can be employed in association with equal advantage, in connection with other kinds of electric appurtenances of which a switch is typical. When the appliance is employed as a rheostat, it may with utility constitute a part of the equipment of the starting portion of a motor so that therefore, the instrument is especially adapted for use as a motor starting rheostat although I am not restricted in this regard. The rheostat desirably includes in its construction and as practically the principal member thereof, a movable part. This movement as will be understood, can be of any desirable nature although advantages are obtained, when it swings so that the movable member in some cases becomes a lever although I am not restricted in this regard.

A movable member such as meets my conditions is that denoted in a general way by 2 and it is practically or at least its body 3 is in the form of a container or tube as 3. This container or tube is made of some insulating material and it has in it a multiplicity of holes or perforations as 4. Set into the rear end of the container or tube 3 is a plug as 5 of some conducting material and held in assembled relation with the tube as shown by several screws as 6. This plug which closely fits the tube as shown has a tail piece or projection 7 fitted flatwise against the upper surface of the post or terminal 8 and pivoted thereto as at 9 for instance by means of a screw. This permits the necessary swing or oscillation of the tube 3. The terminal or post 8 is mounted upon a base or bed as 10 of some suitable insulating material as common in rheostats and switches and is held thereto as by the screw 11. One of the leads, as the wire 12, is connected electrically with the post or terminal 11.

The tube 3 acts as a container for a variable resistance which is varied I might note at this point, by the compression or expansion thereof. This variable resistance is desirably constituted by a large number of metal or other conducting plates such as disks 12 which are superimposed and the rear one of which fits against the conducting plug 5. The foremost or advanced disk fits against the body of a plug 13 slidable in the tube 3 and having a reduced extension 14 projecting through a perforation 15 in the front end 16 of said tube. This plug 13 with its extension 14 through coöperating means, is what acts in the present case to effect variation in resistance of the compressible and expansible contents of the tube 3.

Rising from the base 10 is an upright or post 17 to the upper end of which is pivotally connected as by a screw 18, the segment or sector 19 the inner curved face of which is coöperative with the plug 13 or

more properly of its extension 14, this surface being of a cam nature and having a progressive fall from the entering portion thereof which is at the adjustable front end of the segment. A wire as 20 complemental to the wire 12 is connected to the segment or sector 19 as by a screw 21. The screw 21 it might be noted, extends through the slot 21′ which is on an arc struck from the center of the screw 18. In view of this circumstance it is clear that the entering end portion of the segment or sector 19 may be adjusted laterally. Associated electrically with the segment or sector 19 and located at the tail or butt portion thereof, is an arm or bracket 22 practically of elbow form the short branch of which is rigidly and electrically connected with the segment 19 of which in fact, the arm or bracket might be an integral part. The other branch of this bracket 22 is practically at right angles or certainly transverse to the disposition of the segment or sector 19.

Around the tube 3 near the free end thereof is a metallic or other conducting band as 23 which is encircled closely by the hub of the handle 24, a screw as 25 extending through the hub of the handle 24 and the band 23. It will be understood that the band 23 due to the screw 25, is in electrical connection with the forward end of the series of plates or disks 12. This band 23 also coöperates with the arm 22 which acts as a contact as I will later explain, the band 23 for such purpose having a lateral extension 26. To one of the screws 6 to which I have already referred and which I will distinguish from the others by 6′, is connected one end of a conductor as 27 the other skinned end of said conductor being electrically connected with the screw 25.

In Fig. 1 by full lines the circuit-controlling member 2 of the rheostat is shown as in open position, the extension 14 of the plug 13 being out of engagement with the segment or sector 19 so that as a consequence the resilient or springy disks 12 can expand, the maximum amount as a matter of fact. It will be assumed that the tube 3 is moving in the direction of the arrow in Fig. 1 and when it has moved a short distance the extension 14 will strike the inner cam surface of the segment 19 and as the movement in such direction continues the cam or operative surface of the cam-like segment 19 acting against the extension 14 will force the same further into the tube 3 the movement continuing and the pressure on the disks further compressing them as the tube 3 moves in the direction of the arrows as the disks are compacted and resistance progressively decreases, the minimum resistance occurring obviously when the high or crown part of the cam-surface is reached. Just after this the extension 26 strikes the contact 22, as illustrated by dotted lines in said Fig. 1 so that the current will not travel through the plates or disks but will go from the plug by way of screw 6′ and wire 27 to screw 25 and band 23 and its extension to the contact 22 and finally by way of the segment 10 to the wire 20 thus cutting out the resistance entirely.

What I claim is:

1. A rheostat comprising a movable tubular member, a series of superimposed conducting elements in the tubular member, a plug of conducting material fitted in the tubular member and against which the elements bear, a contact, the tubular element being provided with a movable plug to engage the conducting elements and the contact being formed to cause the movement of the movable plug to effect the compression of the elements on one movement of the movable member and their contraction on another movement of said movable member, a part to arrest the movement of the movable member, and means for by-passing current around the conducting elements when the tubular member is thus arrested.

2. A rheostat comprising a movable tubular member, a series of superimposed conducting elements in the tubular member, a plug of conducting material fitted in the tubular member and against which the elements bear, and a contact, the tubular member being provided with a movable plug to engage the conducting elements and the contact being formed to cause the movement of the movable plug to effect the compression of the elements on one movement of the movable member, and their contraction on another movement of said movable member, a part of conducting material to arrest the movement of the movable member, and means for by-passing current around the conducting elements when the tubular member is thus arrested, and to said arrested part.

3. A rheostat comprising a movable container of insulating material, a series of superimposed conducting elements inclosed in the container, and a segmental contact to be traversed by the container, the contact having means for causing the expansion and contraction of the contained elements on predetermined movements of the container.

4. A rheostat comprising a movable container, a series of superimposed conducting elements inclosed in the container, a contact to be traversed by the container and having means for causing the expansion and contraction of the contained elements on predetermined movements of the container, a part to arrest the movement of the container, and means for by-passing current around the contained parts when the container is arrested.

5. A rheostat comprising a swinging con-

tainer, a series of superimposed conducting elements inclosed in the container, and a segmental contact to be engaged and traversed by the container, the engaged face of the contact causing the expansion and contraction of the contained elements on predetermined movements of the container.

6. A rheostat comprising a swinging container, a series of superimposed conducting elements inclosed in the container, and a segmental contact to be traversed by the container, the engaged face of the contact causing the expansion and contraction of the contained elements on predetermined movements of the container and a part to arrest the swinging container, and means for by-passing current around the conducting elements when the container is arrested.

7. A rheostat comprising a tubular member, a series of superimposed conducting elements in the tubular member, a plug of conducting material fitted in the tubular member and against which the elements bear, a terminal to which said plug is pivoted to effect thereby the swinging movement of the tubular member, and a segmental contact, the tubular element being provided with a movable plug to engage the conducting elements and the contact being formed to be engaged by and cause the movement of the movable plug to effect the compression of the elements on one movement of the movable member and their contraction on another movement of said movable member.

8. A rheostat comprising a tubular member, a series of superimposed conducting elements in the tubular member, a plug of conducting material fitted in the tubular member and against which the elements bear, a terminal to which said plug is pivoted to effect thereby the swinging movement of the tubular member, and a segmental contact, the tubular element being provided with a movable plug to engage the conducting elements and the contact being formed to be engaged by and cause the movement of the movable plug to effect the compression of the elements on one movement of the movable member and their contraction on another movement of said movable member, a part to arrest the movement of the movable member, and means for by-passing current around the conducting elements when the tubular member is thus arrested.

9. A rheostat comprising a movable container, a series of superimposed conducting elements inclosed in the container, and a contact to be traversed by the container, the contact having means for causing the expansion and the contraction of the contained elements on predetermined movements of the container.

10. A rheostat comprising a movable container, a series of superimposed conducting elements inclosed in the container, a contact traversed by the container, the contact having means for causing the expansion and the contraction of the contained elements on predetermined movements of the container, and means for by-passing current around the contained parts when the container is in a predetermined position.

In testimony whereof I affix my signature in the presence of two witnesses.

CLARENCE C. STIRLING.

Witnesses:

ELSIE M. RABENSTEIN,

HEATH SUTHERLAND.