A. J. HALL.

CONTROL APPARATUS.

APPLICATION FILED OCT. 9, 1914. RENEWED AUG. 26, 1919.

1,336,560. **Patented Apr. 13, 1920.**

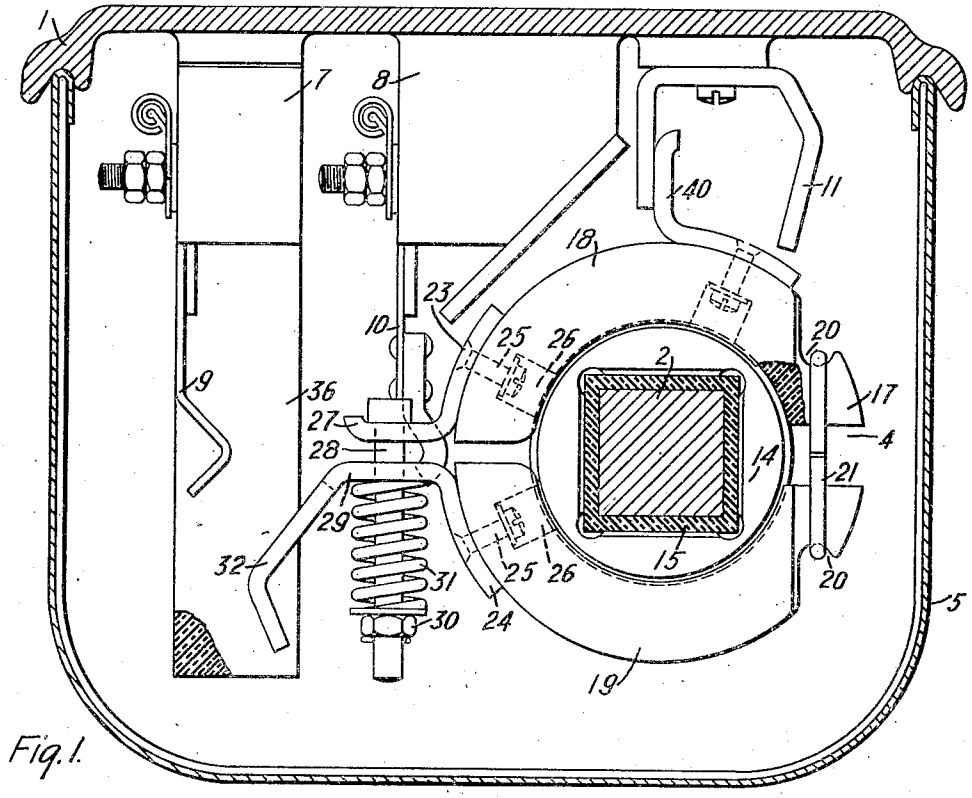


Fig. 1.

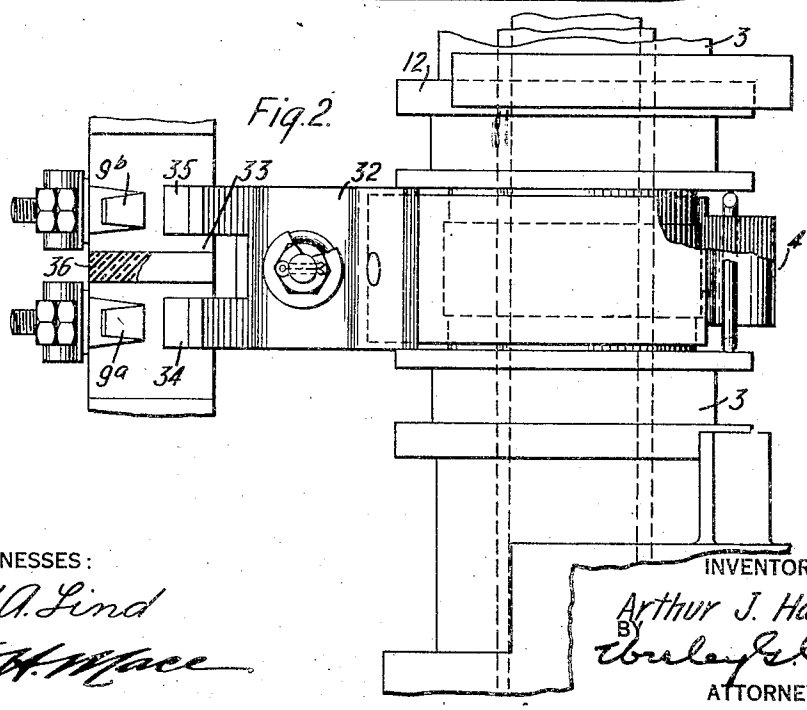


Fig. 2.

WITNESSES:

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ARTHUR J. HALL, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CONTROL APPARATUS.

1,336,560. Specification of Letters Patent. Patented Apr. 13, 1920.

Application filed October 9, 1914, Serial No. 865,247. Renewed August 26, 1919. Serial No. 320,051.

To all whom it may concern:

Be it known that I, ARTHUR J. HALL, a subject of the King of Great Britain, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Control Apparatus, of which the following is a specification.

My invention relates to control apparatus of the drum type, and it has special reference to so-called "slip-segment" devices that are employed as accessories to main controller drums for the purpose of interrupting the energizing control circuits when the control drum is moved backward a predetermined amount.

One of the objects of my invention is to improve and simplify the construction and operation of devices of this character as shown and described in a co-pending application, Serial No. 869,570, filed October 31, 1914, by P. L. Mardis and assigned to the Westinghouse Electric & Manufacturing Company, and particularly to provide a device which may be inexpensively constructed and assembled, and which may be taken apart with facility in order to replace or renew certain of its parts that are particularly susceptible to wear and breakage.

My invention may best be understood by reference to the accompanying drawing in which Figure 1 is a view, partially in section and partially in plan, of a device constructed in accordance with my invention; and Fig. 2 is a view, in side elevation, of a portion of the device shown in Fig. 1.

Referring to the drawing, the apparatus shown comprises a main supporting frame 1, a rotatable shaft 2, a main controller drum 3, a slip-segment device 4, and an inclosing case 5.

The main supporting frame 1, which may be of any well known construction, has mounted thereon a plurality of insulating blocks or bars 7 and 8 to which stationary contact fingers 9 and 10 are respectively secured. A U-shaped member 11 is also fastened to the frame 1 and serves as a stop for limiting the movements of the slip-segment device, as hereinafter set forth.

The main controller drum 3, as shown, comprises two portions that are suitably fastened to the rotatable shaft 2 and which embody movable contact segments 12 that are adapted for coöperative engagement with the stationary contact fingers 10. The construction of the main controller drum 3 and the divided arrangement thereof is merely incidental to the present invention, which resides particularly in the construction of the slip-segment device 4 that is located intermediate the two portions of the controller drum 3.

The slip-segment device 4 comprises a metallic bushing 14 having a square central recess to receive the square rotatable shaft 2, and, intermediate the shaft 2 and bushing 14, is an insulating collar 15 of rectangular form. The bushing 14 is, therefore, rigidly associated with the shaft and insulated therefrom. Surrounding the bushing 14 is a split sleeve 17 which is held in frictional engagement therewith, as will be hereinafter pointed out.

The split sleeve 17 comprises two complementary parts 18 and 19, preferably made of insulating material such as "bakelite," or the like, and one end of each of the sleeve parts 18 and 19 is provided with an exterior recess or groove 20 for the purpose of receiving a ring 21 which may conveniently be of rectangular configuration. Associated with the opposite ends of the sleeve parts 18 and 19 are angle members 23 and 24, preferably of cold-rolled steel. Portions of said members 23 and 24 conform to the periphery of the parts 18 and 19 and are detachably secured to said parts by means of bolts 25 having nuts which are located in recesses 26 provided for that purpose. The angle member 23 embodies an arm 27 that projects outwardly in a radial direction to receive a bolt 28 that also coöperates with a radially disposed arm 29 of the angle member 24. The free end of the bolt 28 is provided with an adjusting nut 30 between which and the arm 29 of the angle member 24 is disposed a coil spring 31 that surrounds the bolt 28. The spring 31, therefore, serves, in conjunction with the angle members 23 and 24, to maintain the parts 18 and 19 of the split sleeve 17 in frictional engagement with the bushing 14, whereby movements of the sleeve are effected in accordance with the movements of the controller drum shaft 2.

The angle member 24 also constitutes a movable contact member, the outer end 32 thereof being shaped to coöperate with the stationary contact fingers 9. The end 32 of the member 24, is, moreover, provided with

a slot 33 intermediate its sides whereby said member is divided into two parts 34 and 35. Adjacent stationary contact fingers 9^a and 9^b are arranged for coöperative engagement with the parts 34 and 35 of the contact device 32, and, in order to prevent "arcing over" between said adjacent stationary contact fingers, an insulating barrier 36 is employed which is located intermediate said fingers 9^a and 9^b and is disposed within the slot 33 of the contact device 32.

Another angle member 40 is detachably secured to the part 18 of the split sleeve 17, and its outwardly projecting portion is positioned between the respective side arms of the U-shaped stop 11, whereby engagement therewith serves to limit the degree of movement of the slip-segment device 4.

If the controller shaft 2 is assumed to be rotated in a clock-wise direction, the slip-segment device 4 will turn with the shaft 2, by reason of the frictional engagement between member 14 and the device 4, as hereinbefore set forth, until the stop 40 engages an arm of the member 11, when further movement of the segment 4 stops. The contact members 34 and 35 will engage the contact fingers 9^a and 9^b in this position, and for further forward movements of the controller, and thereby establish a connection between the two contact fingers 9^a and 9^b. In a similar manner, any counter clock-wise movement of the shaft 2 causes the fingers 34 and 35 to become disengaged from the contact members 9^a and 9^b and to return to the position shown in the drawing. Arcing between the contact members 9^a and 9^b is avoided by interposing the insulating barrier 36 therebetween, as hereinbefore explained.

By reason of the structure set forth, a particularly cheap and simple device is provided in which the parts that are subjected to wear may be readily removed and replaced. Moreover, the structure is light and compact and may be assembled with a minimum of labor and expense.

The appended claims are intended to cover such modifications in the structure and arrangement and location of parts as do not depart from the spirit and scope of my invention.

I claim as my invention:

1. The combination with a rotatable bushing, of a two-part sleeve surrounding said bushing, a ring coöperating with a pair of adjacent ends thereof, a pair of detachable members secured to the other adjacent ends thereof, one of said members serving as a contact device, resilient means coöperating with said detachable members for yieldingly holding together the parts of said sleeve, and means for restraining the movement of said sleeve to a predetermined degree.

2. The combination with a rotatable shaft, a bushing associated therewith, a split annular sleeve rotatably mounted on said bushing, one end of each half of said sleeve having a recess therein, and a ring disposed in said recess of each member for holding said ends together, of a contact device associated with said sleeve, means for yieldingly holding said sleeve in frictional engagement with said bushing, and a stop for limiting the movement of said sleeve.

3. The combination with a rotatable drum, a split sleeve surrounding said drum, and removable means for holding said split sleeve parts together at one end, of metal members detachably secured to the respective opposite ends of said split sleeve parts, resilient means coöperating with said metal members for holding said split sleeve in frictional engagement with said drum and means independent of said resilient means for limiting the rotative movement of said sleeve to a predetermined degree.

4. The combination with a rotatable drum, and a sleeve having frictional peripheral engagement with said drum, of an outwardly projecting contact member associated with said sleeve and having an intermediate slot therein, a pair of stationary contact fingers to engage the parts of said slotted contact member, an insulating barrier disposed within said slot, and a stop for limiting the rotative movement of said sleeve.

5. The combination with a rotatable cylindrical member, a two-part sleeve of molded insulating material surrounding said member, each part having an exterior groove near one end, and a removable ring disposed in said grooves for holding said adjacent ends rigidly together, of a plurality of angle members secured to the other ends of said sleeve parts, a single spring coöperating with said angle members for holding said sleeve parts together, one of said angle members projecting outwardly to form a contact device, another angle member secured to said sleeve, a stationary contact finger for engaging said contact device, and a stop for engaging said last angle member and limiting the movement of said sleeve.

6. The combination with a rotatable drum, a split sleeve surrounding said drum and comprising complementary parts, means for holding said parts together at one end, and angle members detachably secured to the other ends of said parts, one of said angle members projecting outwardly and constituting a contact device, of adjustable resilient means embodying a bolt and coil spring coöperating with both of said angle members for maintaining the parts of said split sleeve in frictional engagement with said drum, and a stop for limiting the rotative movement of said sleeve.

7. The combination with a rotatable shaft,

and a bushing mounted thereon, of a split sleeve member of insulating material having frictional peripheral engagement with said bushing outwardly extending metal members secured to the respective parts of said sleeve, one of said metal members constituting a contact member, resilient means cooperating with said metal members for maintaining said split sleeve in frictional engagement with said bushing, and means for limiting the rotative movement of said sleeve.

8. The combination with a rotatable drum, a split sleeve of insulating material surrounding said drum, and a removable means for holding said split sleeve parts together at one end, of a member secured to each of the opposite ends of the said split sleeve parts, one of said members constituting a contact member, resilient means cooperating with said members for holding said split sleeve in frictional engagement with said drum, a third member secured to said split sleeve, and means coöperating with said third member for limiting the rotative movement of said sleeve to a predetermined degree.

In testimony whereof, I have hereunto subscribed my name this 7th day of Oct., 1914.

ARTHUR J. HALL.

Witnesses:
G. R. IRWIN,
B. B. HINES.