April 9, 1940. A. BELZ 2,196,409

ELECTRIC ENERGY COLLECTING CONTACT

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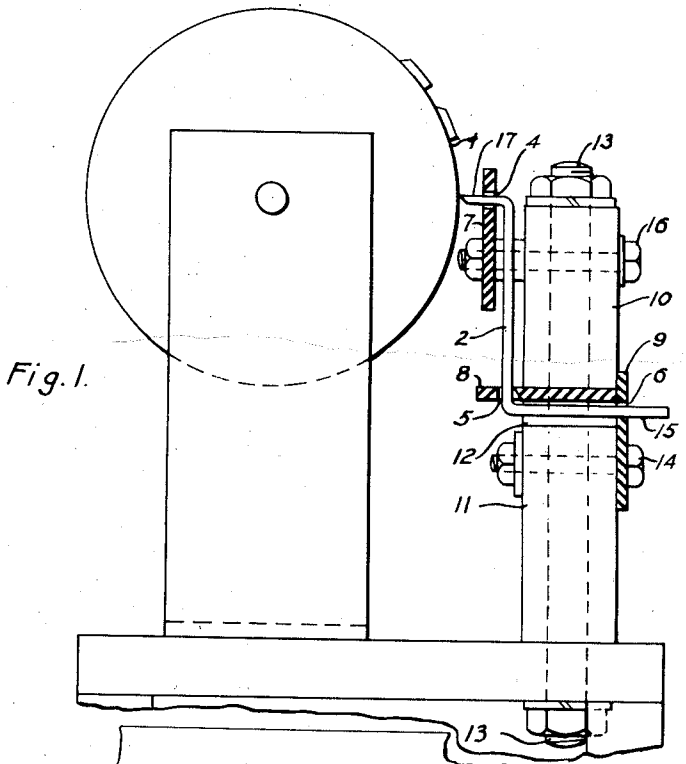


Fig. 1.

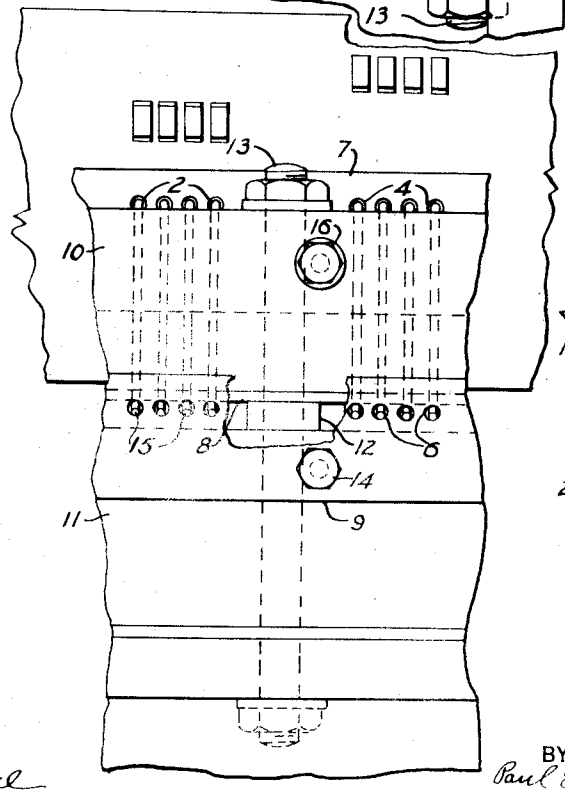


Fig. 2.

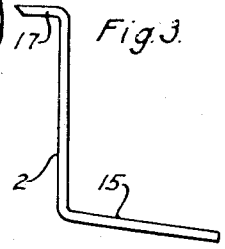


Fig. 3.

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ELECTRIC ENERGY COLLECTING CONTACT

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1 Claim. (Cl. 200—8)

My invention relates to switching devices, more particularly to the structure and arrangement of the stationary contact members, or current collecting elements, of drum controllers.

Drum controllers are well known and are utilized either to make circuits or break circuits or do both of these operations in a predetermined sequence. Very frequently the drum is motor operated and the operating sequence for the circuits controlled is repeated again and again, as in the operation of electric signs, by the coaction of the segments on the drum and the current collecting contacts.

The current collecting contacts heretofore known, in general, are constructed as so-called contact hammers, or movable fingers, which are built up of a plurality of rigid metal parts pivoted on bearings and utilizing special springs to produce the required contact pressure on the segments on the controller drum. Contacts and their springs and mountings, such as have just been briefly described, are relatively large and when the number of circuits, or required switching positions is very large, the switch drum is very long by reason of the large number of relatively wide contact fingers. Of course, it is possible, without changing the contact fingers, to couple two or more drums together. In such case, however, the drum diameter becomes large, the circuit connections complex, and the power to operate the drum becomes comparatively large.

One object of my invention is to provide a compact electric controller.

Another object of my invention is the provision of novel current collectors for drum controllers.

A further object of my invention is the provision of current collectors for drum controllers, so constructed as to automatically provide their necessary contact pressure without the use of special biasing means.

Other objects and advantages will become more apparent from a study of the following specification when considered in conjunction with the accompanying drawing, in which:

Figure 1 is an end view of a drum controller provided with my special stationary current collecting contacts;

Fig. 2 is a side view of the structure shown in Fig. 1, but the drum is not shown; and,

Fig. 3 is a view of a single current collecting contact not mounted.

As compared to the prior art devices, a considerable simplification is attained by my invention. According to my invention, the fixed contacts, or current collecting elements, consist of drawn material, more particularly elastic bronze wire. Any other wire as alloys of silver, other alloys of copper, and any other elastic current conducting metal is satisfactory. I have found wrought bronze, or bronze wire, to be very satisfactory. The bronze wire elements are so mounted as to be under a deformation and to thus automatically provide their own contact pressure. At the contact region with the segments on the controller drum, the wire may be cut at an angle and be generally disposed radially of the drum.

By the use of elastic wire strands a very large number of current collecting elements may be mounted adjacent each other to coact with a drum of a predetermined length. In addition, the mounting for the elements is made very much simpler than the mounting for the contact fingers of the prior art.

Referring to the figures of the drawing, the reference character 1 designates a rotatable drum of a drum controller upon which the segments, of the controller, for controlling a plurality of circuits (not shown), are mounted. Since the segments and the circuits constitute no part of my invention, these have not been shown. As fixed current collecting elements, I use resilient wires 2, which are bent at two positions to an extent so that the ends are nearly at right angles to the main body portion of the wires. Each wire, therefore, has a generally Z-shaped appearance. Note Figs. 1 and 3.

Adjacent the drum, I mount a rigid support consisting of two bars 10 and 11 held in spaced relation by a plurality of spacing plates 12, and rigidly held on a base plate by means of bolts 13. Three strips of insulation, namely, strips 7, 8 and 9, are rigidly mounted on the plates 10 and 11 by bolts 16, 13 and 14, respectively. These strips 7, 8 and 9 are provided with apertures 4, 5 and 6, respectively, the number of apertures in each strip being determined by the number of current collector elements 2 it is desired to mount adjacent the drum 1. The apertures are big enough to receive the collector elements 2 with considerable play, but when the elements are in place, as shown in Fig. 1, the assembly is not only extraordinarily simple, but each collector element resiliently engages the drum segments, yet is otherwise held in fixed position.

The resilient engagement of the elements with the drum and the constant contact pressure of the elements against the drum is accomplished by mounting the elements 2 in the apertures 4,

5 and 6 of the strips 7, 8 and 9, so as to be under a distorting force.

In the illustrated embodiment this distortion is accomplished by first inserting the ends 15 of elements 2, which normally have the shape shown in Fig. 3, into the apertures 5 and 6 in strips 8 and 9 and then inserting the ends 17 into the apertures 4 in strip 7 and then drawing the strip 7 into the position shown in Fig. 1. Ends 15 will thus be bent to take a position substantially at right angles to the main or body portions of their respective elements. Each element is thus firmly held in the strips and the ends 17 are urged toward the drum to give the contact pressures desired.

The spacing arrangement of the plates 10 and 11, as determined by spacers 12, is such that the individual wires, or current collecting elements, are not firmly clamped at any point, but by reason of the distorting action on the wires, the wires, or current collecting elements, are firmly held in position at the walls, or edges, of the apertures 5 and 6. The ends 17, on the other hand, when the drum 1 is in position, are free to move radially of the drum so that the slanting contact ends readily follow the contour of the drum or cam and the segments, not shown, with which they coact.

With the contact elements and the mounting therefor described, it is readily apparent that many contact elements, or current collectors, may be disposed side by side within a given length of the mounting for the segments with which the contact elements are to coact.

Fundamentally, my invention is complete if the current collector element is considered as an elastic lever of the first class resiliently engaging a controller drum and, by reason of the force with which the element engages the drum, is held between a pair of oppositely disposed edges, which edges may be considered a fulcrum and a resisting force, respectively.

In view of the compact, simple, and inexpensive construction and the consequent reliable operation of my invention, a wide field of use is assured. My invention, however, finds special application in the control of complex electric signs where a motor is used to operate a drum. My invention is, however, not limited to motor-operated controllers.

The foregoing disclosure is illustrative of my invention and is, therefore, not to be taken in a limiting sense. Others skilled in the art, particularly after having had the benefit of the teachings of my disclosure, may readily devise other and similar contact elements and mountings therefor for accomplishing the same and also similar results. I, therefore, wish to be limited only by the scope of the claim hereto appended and by such prior art as may in fact be pertinent.

I claim as my invention:

In an electric controller, in combination, a support comprising a plurality of members and having non-aligned openings in the members having a given relation to each other, a generally Z-shaped one-piece elastic current conducting element disposed in the openings so that the two substantially parallel portions of the Z-shaped element are engaged intermediate their ends and the main or body portion of the element is engaged adjacent the junction of one of the parallel portions and the main or body portions whereby the other parallel portion is free to move in its opening when deflected, and a controller drum adjacent the end of the element that is free to move so disposed as to be resiliently engaged by the free end.

ARNO BELZ.