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E. SCHROEDER

MULTIPLE SWITCH FOR USE IN CONNECTION WITH ELECTRIC WELDING MACHINES

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Fig. 2.

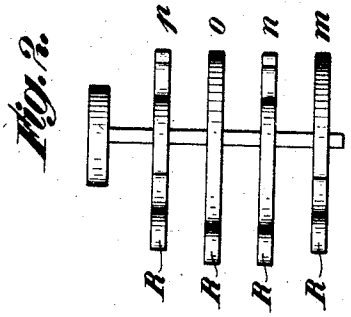
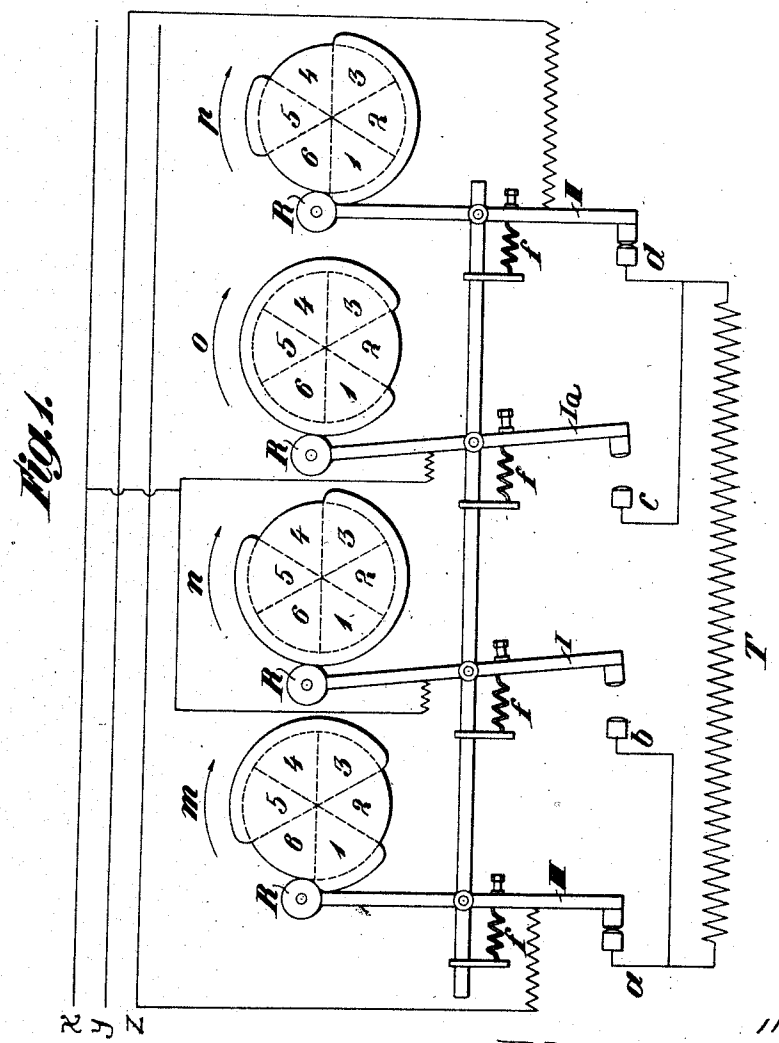


Fig. 1.



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UNITED STATES PATENT OFFICE.

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MULTIPLE SWITCH FOR USE IN CONNECTION WITH ELECTRIC WELDING MACHINES.

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To all whom it may concern:

Be it known that I, EDMUND SCHROEDER, a citizen of the Republic of Germany, residing at Berlin, in the Republic of Germany, have invented certain new and useful Improvements in Multiple Switches for Use in Connection with Electric Welding Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a multiple switch for use in connection with electric welding machines operating with a current interrupted in regular short intervals, for instance steam welding machine operating according to the so-called roll-step method (U. S. Patent 1,438,867).

Switch mechanism in accordance with the present invention is characterized by the feature that several contacts are adapted to connect a monophase transformer alternatively with each of the phases of a polyphase current system in such a way that during operation, a uniform load on all the phases is attained. In this way, a one-sided or unilateral load, which has a very bad effect on small systems, for which reason such machines are often prohibited from being connected to those systems, is avoided.

Other objects of the invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by persons skilled in the art, I have in the accompanying illustrative drawing, and in the detailed following description based thereupon, set out an embodiment of the same.

In these drawings:—

Figure 1 shows diagrammatically a multiple switch devised according to the present invention; and,

Figure 2 is a plan view of the cam discs and rollers therefor.

The ends of the primary monophase transformer coil T are connected with four contacts *a*, *b*, *c*, *d*, one end of said coil being connected with the contacts *a* and *b*, the other with the contacts *c* and *d*. The wires *x*, *y*, and *z* of the multiple phase net or polyphase current system are connected with four swinging contacts I, I*a*, II, and III, the first phase *x* being connected with the contacts I and I*a*, the second *y* with the contact II, the third *z* with the contact III. Coiled springs *f* tend to draw the contacts III, I, I*a*, and II against their stationary counter-contacts *a*, *b*, *c*, *d*, whereas cam disks *m*, *n*, *o*, *p*, are provided in order to interrupt the closed contacts at certain predetermined times. The cams of the disks are so arranged that after each pause another phase is connected up to the coil T.

Supposing, the cam disks rotate in the direction indicated by the arrows, and their position be just that shown in the drawing Each disk is assumed to be divided into six segments 1, 2, 3, 4, 5, 6, and the arrangement and length of the cams proper relatively to the segments is constantly that illustrated, whereas their position relatively to rolls R provided at the free ends of the swinging contact levers changes in a predetermined succession. In the position shown the contacts III/*a* and II/*d* are closed which means that the coil T is connected up, at the time being, to the phase II/III. At other times, in determined succession and constant repetition, the coil T is connected with the contacts III/*a* and I*a*/*c*, or is connected up to the phase I/III respectively; or with the contacts I/*b* and II/*d*, or up to the phase I/II respectively. All contacts are open when the segments bearing odd numbers cooperate with the rolls R, there being then a pause between the closing of two contacts. The coil T is connected with the phase I/III at the segments 2, with the phase I/II at the segments 4, and with the phase II/III at the segments 6. Thus, each phase is under load whilst the cam disks make one revolution, the loads are equal during this time, and there is a pause between each change of phases

The cam disks are, in fact, located not in one plane, as might be assumed from the diagrammatical representation in Figure 1 of the drawing, but they are located side by side as shown in Figure 2 on a common shaft rotated by suitable means.

If the switch is used in connection with a welding machine operating with step-wise roll movement, the number of revolutions of the cam disks must be one third of the number of steps caused by the driving shaft of that machine.

Another valuable advantage the improved multiple switch offers is this that it permits to attain, for a given period of time, threefold the number of interruptions possible

hitherto, or even sixfold if six-phase current is employed and as the switching is distributed on a plurality of contacts, the wear and tear of the individual contacts is but small.

I claim:

A multiple switch for use in connection with electric welding machines, comprising, in combination, a primary coil of a one-phase transformer, a plurality of contacts connected each with a phase of a multiple-phase net, and means to connect up alternately said coil with said contacts in a succession in which all phases are equally loaded during a period of time extending over several changes of the connections, as set forth.

In witness whereof I have hereunto set my hand.

EDMUND SCHROEDER.