Jan. 13, 1925.

H. L. COYNE

1,522,713

CIRCUIT CONTROLLING SWITCH

Filed April 13, 1922

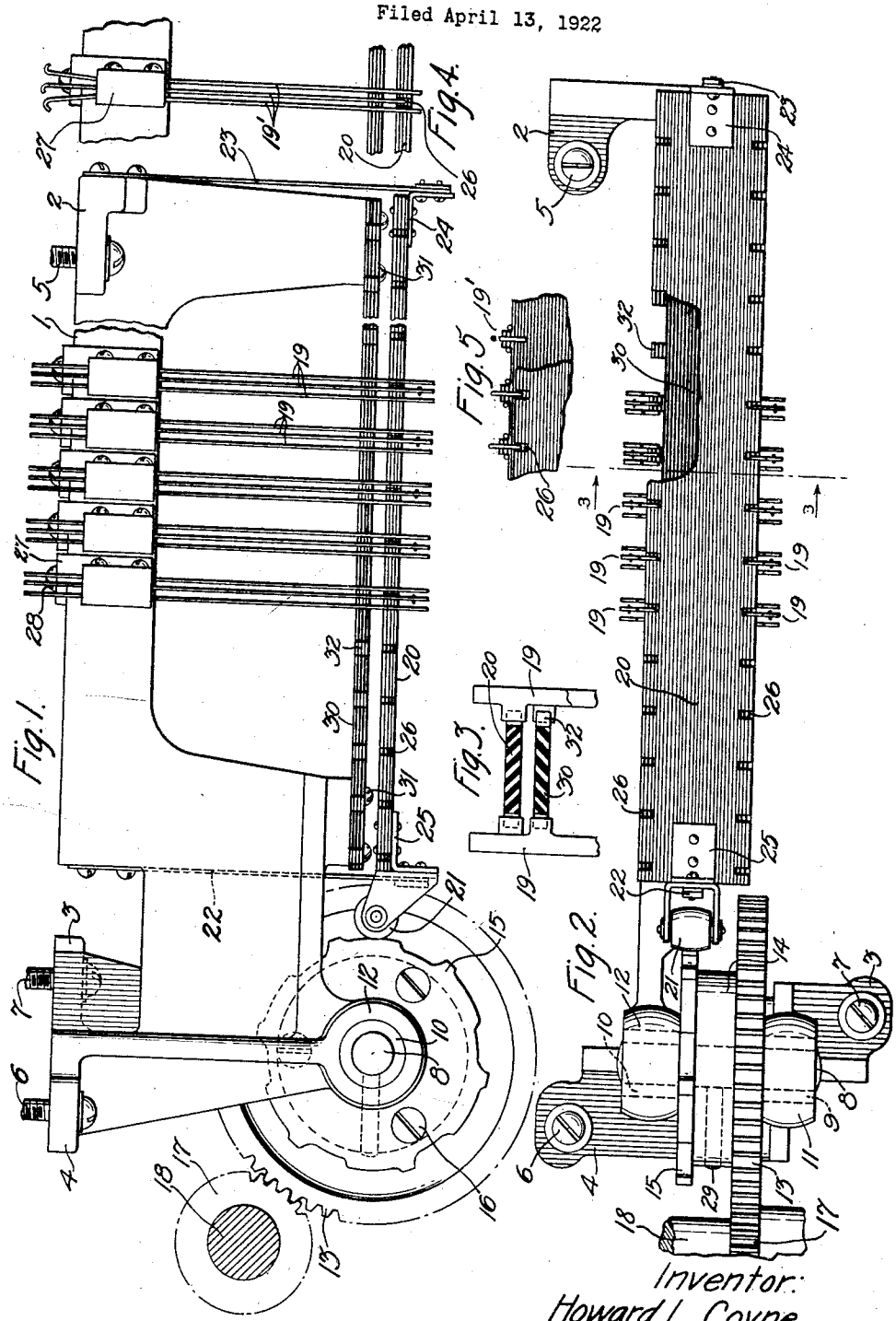


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

HOWARD L. COYNE, OF BROOKLYN, NEW YORK, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CIRCUIT-CONTROLLING SWITCH.

Application filed April 13, 1922. Serial No. 552,280.

To all whom it may concern:

Be it known that I, HOWARD L. COYNE, a citizen of the United States, residing at Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Circuit-Controlling Switches, of which the following is a full, clear, concise, and exact description.

This invention relates to a circuit controlling switch and is an improvement over a similar device patented February 25, 1919, No. 1,295,709 in the names of R. M. De Vigner and B. Freile. Its object is to provide a simple, compact, inexpensive and efficient device which will be adapted to control a large number of independent electrical circuits.

The device, which might be termed an interrupter, consists in general of a rotatable spindle to which a cam and a gear are rigidly secured, a motor mechanism for operating the rotary element, a movable bar arranged to be operated by the rotation of the cam and a series of movable switch-members arranged to be operated by the movement of the bar. The movable switch-members to be operated are contact springs mounted upon, but insulated from the supporting frame in which the spindle is mounted.

The motor mechanism for operating the movable elements of the interrupter preferably consists of a continuously rotating power shaft common to a plurality of interrupters and a pinion carried by this shaft arranged to mesh with the gear on the spindle.

A feature of this invention is the provision of a reciprocable interrupter-spring operating bar, preferably made of insulation material such as phenol fibre, supported by resilient supports. The said bar has lateral indentations at suitable intervals adapted to engage projections from the movable contact springs of each set of interrupters spring sets and when operated by the rotation of the cam causes contact with the alternate contact springs to be made or broken depending on the direction of the movement of the bar.

Another feature of this invention is the arrangement of the contact springs with relation to the common operating bar whereby the contact springs may be easily removed without obstruction from the bar or vice versa.

Other features of the invention and advantages will appear from the following detailed description and from the claims appended hereto, reference being had to the accompanying drawing, in which Fig. 1 is a front assembly view of said switch; Fig. 2 is a bottom view thereof with the notched reciprocating bar partially cut away so as to show more clearly the outside contact springs of two sets of springs in their respective positions; Fig 3 is a sectional view taken on line 3—3 of Fig. 2 and viewed in the direction indicated by the arrows; Fig. 4 is a partial assembly view of the frame showing a modified form of contact springs mounted thereon; and Fig. 5 is a partial bottom view of the modified form of interrupter spring mounting.

The supporting frame 1 is provided with three flanges 2, 3 and 4 by means of which the frame 1 may be fastened to a flat surface by the screws 5, 6 and 7 respectively. One end of the frame 1 has a forwardly projecting yoke. A spindle 8 is rotatably mounted in bearing 9 and 10 in the arms 11 and 12 respectively of the yoke. Between the arms 11 and 12 a collar 14 is fastened to the spindle 8 by a set screw 29. A gear 13 is rigidly secured to the collar 14 in any well known manner, and meshes with a pinion 17 which is secured to a constantly rotating shaft 18. A cam 15 is rigidly secured to the collar 14 and the gear 13 by screws 16 which extend through the cam and collar.

The spindle 8, cam 15, collar 14 and gear 13 rotate as a complete unit. To assemble this unit, the cam 15 is first fastened to the collar 14 and the gear 13, then this assembled portion of the unit is placed between the arms 11 and 12 of the yoke. The spindle is next inserted and then the collar is fastened thereto by the set screw 29. The width of the collar together with the width of the cam and the gear is approximately the same as the distance between adjacent faces of the arms 11 and 12, therefore after the rotary unit is completely assembled no axial movement of the spindle can take place.

The insulation bar 20 carrying a roller 21 is supported by two flat springs 22 and 23, one end of each spring being attached to the frame 1 and the other end of each spring being attached to the brackets 24 and 25 rigidly fastened on said bar by means of riv-

ets or screws. The bar 20 is arranged so that these springs 22 and 23 keep the roller 21 of the bar in engagement with the surface of the cam 15. The bar 20 is provided with two rows of notches 26, one row extending longitudinally along the top of the bar 20 and the other row extending longitudinally along the bottom of the bar 20 as viewed in Fig. 2.

A plurality of sets of flat contact springs 19 are arranged in a row along the top of the frame 1 and are secured thereto by means of the brackets 27 and screws 28. A similar row is secured to the bottom side of the frame 1.

Each notch 26 in the row on the top side of the bar 20 is in operative relation with the center spring of a different set of contact springs 19 of the row attached to the top side of the frame 1. Similarly each notch 26 in the row on the bottom side of the bar 20 is in operative relation with the center spring of a different set of contact springs of the row attached to the bottom side of the frame 1. The alternate or outside springs of each set are held in proper spaced relation by means of lugs 32 on the edges of bar 30. Bar 30 is secured to the frame 1 by screws 31.

This arrangement is such that as the cam 15 is rotated the bar 20 is moved back and forth, so that each movable contact spring in engagement therewith will be moved in or out of contact with its alternate contact springs. It will therefore be obvious that if the shaft 18 rotates at a constant speed the circuit through the contact springs 19 will all be interrupted at a constant rate.

Should it be desired to remove any set of contact springs for repairs or replacement it is only necessary to remove the screw 28 which holds such set in place and to draw the set up over the frame 1, the arrangement of the bars 20 and 30 being such that they do not obstruct the withdrawal of the contact sets. Similarly the bar 20 may be readily removed without obstruction from the contact sets.

In the modification disclosed in Figs. 4 and 5 the contact springs of each set 19′ are shown as made of wire. The springs of each set are suitably moulded into a block of insulating material which may be clamped in the bracket 27 in any suitable manner. The center spring is bent at right angles at its free end to afford a contacting surface for engagement with the outside or alternate springs. This bent portion also extends into a notch 26 in the reciprocating bar 20 whereby movement of the bar is imparted to the center spring.

What is claimed is:

1. In a circuit controlling switch the combination of a frame and a continuously rotatable member mounted therein, of rows of unitary sets of contact devices insulatedly arranged on said frame, an operable device in each of said sets adapted to be moved into contact with the adjacent stationary devices in the set, a reciprocable notched bar of insulating material, and movable supports therefor, said bar being arranged to be reciprocated by said rotatable member and removable from said supports without obstruction by said sets of devices, each of said notches in said bar being in operative relation with one of said operable devices.

2. In a circuit controlling switch, a frame, rows of unitary sets of contact springs insulatedly arranged on said frame, each of said sets comprising a movable and stationary springs, a stationary insulating bar mounted on said frame, a plurality of laterally extending lugs on said stationary bar, said lugs being provided to maintain the stationary springs of each set in spaced relation with reference to said movable springs, a reciprocable notched insulating bar, movable supports therefor, said reciprocable bar being removable therefrom without obstruction by said springs, each notch of said last-mentioned bar being in operative relation with one of said movable springs, and a continuously rotatable cam for reciprocating said reciprocable bar.

3. In a circuit controlling switch, the combination of a frame, rows of sets of contacts arranged on said frame, each of said sets comprising a movable contact and a pair of stationary contacts, an insulated bar on said frame, a plurality of laterally extending lugs integrally formed with said bar for holding the stationary contacts of each set in spaced relation, a longitudinally movable notched bar, a continuously rotatable cam for said bar, and means integrally formed with said bar for moving said movable contacts in two effective directions with respect to each of said stationary contacts, said directions being independent of the direction of movement of said cam.

In witness whereof, I hereunto subscribe my name this 11th day of April A. D., 1922.

HOWARD L. COYNE.