April 24, 1928.

R. B. BENJAMIN ET AL

1,666,925

SWITCH CONSTRUCTION

Filed Nov. 5, 1923

2 Sheets-Sheet 1

Fig. 1

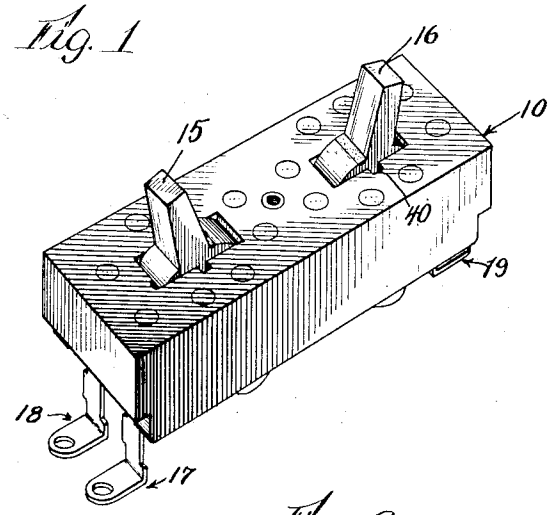



Fig. 2

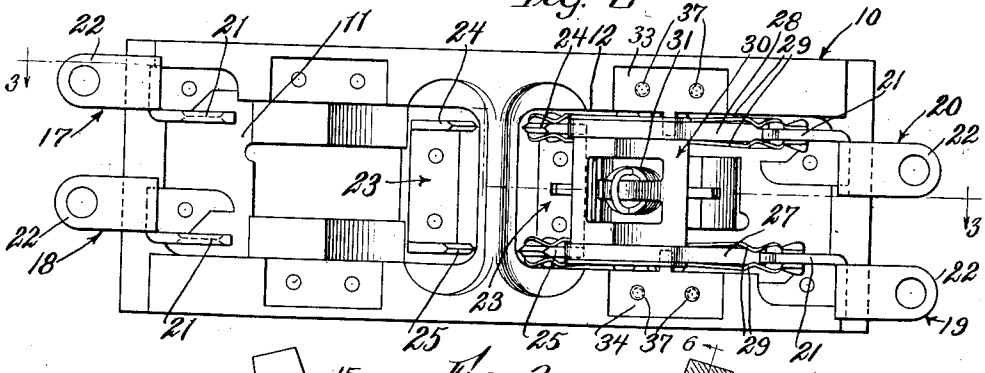
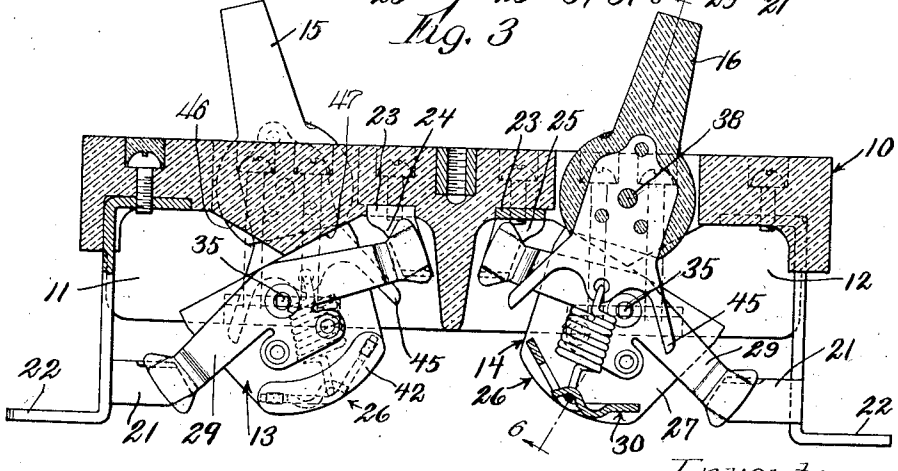



Fig. 3

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2 Sheets-Sheet 2

Fig. 4

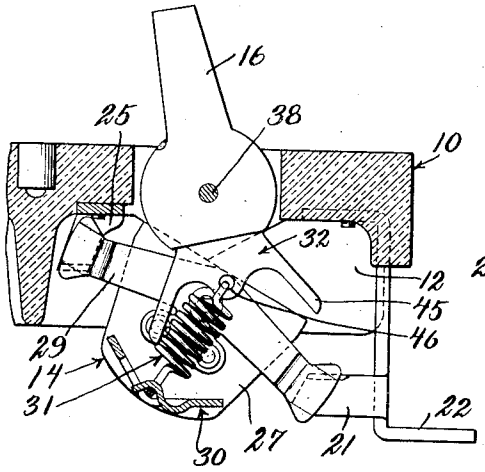



Fig. 5

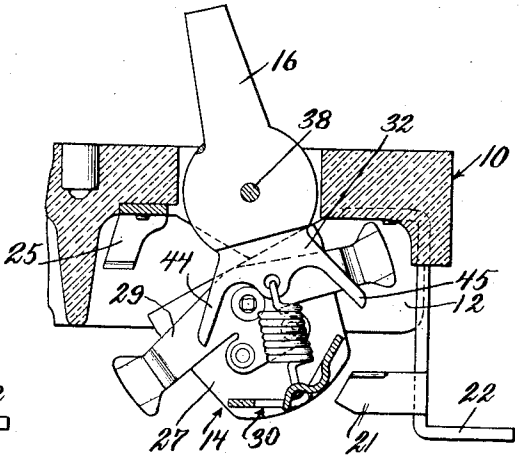



Fig. 6

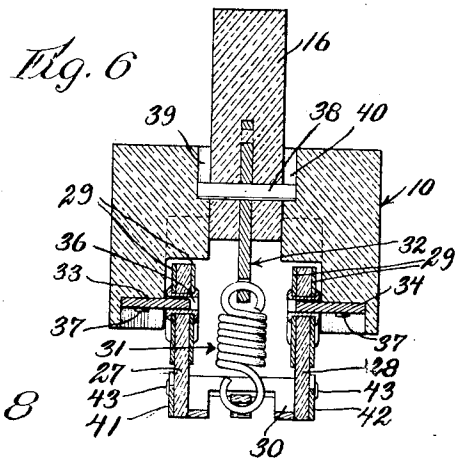



Fig. 7

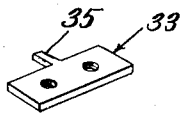



Fig. 8

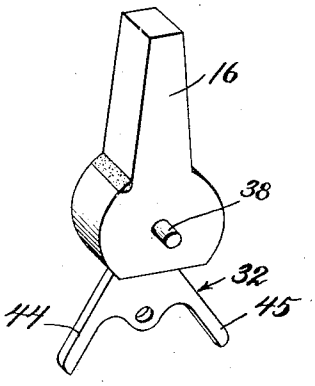
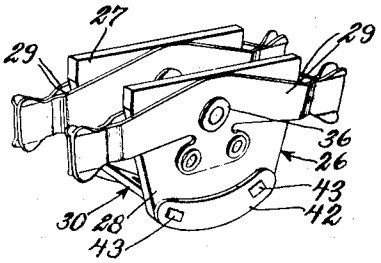



Fig. 9

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# UNITED STATES PATENT OFFICE.

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## SWITCH CONSTRUCTION.

Application filed November 5, 1923. Serial No. 672,755.

Our invention relates to switch construction.

One of the objects of our invention is to provide a construction in which improved means are provided for giving a "kick off" to the switch arm after the spring has been moved past its dead center position.

A further object of our invention is to provide a double switch construction which will contain few parts and will be compact and rugged in construction.

A further object of our invention is to provide a switch construction having improved means for effecting four simultaneous breaks in series between the switch terminals.

Further objects will appear from the description and claims.

In the drawings in which an embodiment of our invention is shown—

Figure 1 is a perspective view of a double switch construction;

Fig. 2 is a bottom view of the switch;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a sectional view showing one of the switch mechanisms in "on" position;

Fig. 5 is a view similar to Fig. 4 but showing the switch moved to "off" position;

Fig. 6 is a section on the line 6—6 of Fig. 3;

Fig. 7 is a perspective view of a gearing member;

Fig. 8 is a perspective view of the actuating and kick off member; and

Fig. 9 is a perspective view of the oscillatable bridging member.

The switch construction shown is designed for use in panel board work for controlling the branch circuits although it may obviously be used for other purposes.

Referring now to the drawings in detail, the double switch construction shown therein comprises a substantially rectangular insulating housing and supporting member 10, having a flat upper face and a pair of recesses 11 and 12, in its lower surface, and a pair of switch mechanisms 13 and 14 housed in said recesses respectively, and having operating switch levers 15 and 16 extending above said insulating member for operation.

The insulating member 10 is mounted on four metal stampings, 17, 18, 19 and 20, by which it is secured to any suitable support such as a panel board (not shown). Each of these stampings is provided with an integral switch contact portion 21 and an integral switch terminal portion 22.

The switch mechanism 13 comprises means for effecting four simultaneous breaks in series between the pair of switch terminals at the left hand end of the insulating member 10, and the switch mechanism 14 comprises means for effecting four simultaneous breaks in series between the pair of switch terminals at the right hand end of the insulating member.

The construction of the switch mechanisms 13 and 14 is similar so that a description of one will suffice for both. Each of these switch mechanisms comprises a metal stamping 23, having a pair of integral switch contact portions 24 and 25 and an oscillatable bridging member 26 for simultaneously breaking the circuit at the four associated contacts 21, 21, 24 and 25.

This oscillatable bridging member, as shown in Fig. 9, comprises a pair of insulating fibre plates or discs 27 and 28, two pairs of bridging conducting strips 29, one pair secured to each of said insulating plates, and a sheet metal connecting member 30 for securing the two insulating plates 27 and 28 together. This metal connecting member 30 not only serves to hold the insulating plates together, but also serves as an anchorage for one end of the coil tension spring 31, the other end of which spring is secured to a sheet metal member 32 carried by the operating handle 15.

For mounting the bridging member for oscillating movement a pair of bearing members 33 and 34 are provided, each having an integral pintle portion 35, which extends into the eyelet 36, which serves to hold the bridging strips 29 on the insulating plate. The bearing members 33 and 34 are secured on the insulating member 10 in any suitable manner as by screws 37.

The operating handle 16 is oscillatably mounted on the insulating member 10 by means of a bearing pin 38, the ends of which rest in the bottom of the bearing grooves 39 and 40. The coil tension spring 31 serves not only as a transmission between the operating handle 16 and the bridging member

26, but also serves to hold the bearing pin 38 in place at the bottom of the bearing grooves.

To properly secure the metal connecting member 30 to the insulating plates 27 and 28, a pair of elongated metal washer members 41 and 42 are provided, the metal connecting member having a plurality of integral rivet portions 43 which extend through the insulating plates and the ends of which are riveted over on the metal washers.

In order to provide a positive kick off for the bridging member after the tension spring has been moved past the dead center, the metal member 32 is provided with a pair of push fingers 44 and 45, one on each side of the transmission spring 31 and engageable with the spring. As shown in Fig. 4, one of these push off fingers will engage the transmission spring shortly after it has passed the dead center, to give a positive kick off to the bridging member to quickly free the bridging strips 29 from the contacts with which they are engaged.

The operation of the switch will be clear from a consideration of Figs. 4 and 5. The movement of the switch lever 16 shifts the end 46 of the transmission spring 31 past the center line of the bridging member 26, whereupon the transmission spring exerts a force tending to oscillate the bridging member. If the bridging member sticks or fails to move promptly, the push off finger 44 engages the transmission spring 31 soon after it has passed the dead center and gives a positive kick off to the bridging member whereupon the transmission spring quickly snaps the bridging member to "off" position.

As shown in Fig. 4, the shape of the contact portion of the bridging strip 29 is such that the extreme end or tip of the strip is the last to break contact with the stationary contact 25.

This construction minimizes arcing, as the tip is the part which has the quickest movement.

The insulating base 10 is provided with an angular portion having inclined stop shoulders 46 and 47 positioned to engage the insulating discs 27 and 28 to limit the throw of the switch blades 29 and thus protect them from damage.

While we have shown but one embodiment of our invention it is obvious that it may be covered in other forms covered and defined by the claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A switch construction comprising a pivoted oscillatable switch arm, a contact with which the switch arm is engageable and means for oscillating said switch arm, comprising a pivoted oscillatable actuating member, a coil tension spring connecting said switch arm and oscillatable member and a push member carried by said oscillatable member for engaging said spring to free said switch arm from said contact, after the spring has passed the dead center.

2. A switch construction comprising a pivoted oscillatable switch arm, a contact with which the switch arm is engageable and means for oscillating said switch arm, comprising a pivoted oscillatable actuating member, a coil tension spring connecting said switch arm and oscillatable member and a pair of push fingers carried by said oscillatable member and embracing said spring and engageable therewith to give said switch arm a push after the spring has passed a dead center.

3. A double switch construction comprising an insulating housing and supporting member, four stampings, each stamping comprising a standard for supporting said insulating member, a switch contact, and a terminal, two switch mechanisms mounted on said insulating member and housed thereby, each switch mechanism comprising a pair of contacts electrically connected with each other and means for simultaneously breaking the circuit at the contacts of said pair and at two of the contacts of said stamping, whereby each switch mechanism effects four breaks in series.

4. A double switch construction comprising an insulating housing and supporting member, four stampings, each stamping comprising a standard for supporting said insulating member, a switch contact, and a terminal, two switch mechanisms mounted on said insulating member and housed thereby, each switch mechanism comprising a pair of contacts electrically connected with each other and means for effecting four simultaneous breaks at the contacts of said pair and two of the contacts of said stamping comprising a pair of oscillatable conducting bridging members engageable and disengageable with respect to said contacts.

5. A double switch construction comprising a rectangular insulating supporting and housing member, having a substantially flat face and a pair of recesses in its under surface, a pair of switch mechanisms housed by said member in said recesses respectively, each mechanism having an operating member accessible for operation above said insulating member, a pair of switch contacts adjacent one end of said base, the circuit between which is controlled by one of said switch mechanisms, a pair of switch terminals electrically connected with said contacts respectively, a second pair of switch contacts adjacent the other end of said insulating member, the circuit between which is controlled by the other switch mechanism, and a second pair of switch terminals electri-

cally connected with said second pair of contacts respectively.

6. A double switch mechanism comprising an insulating housing and supporting member having a substantially flat face and a pair of recesses in its under surface, a pair of switch mechanisms housed by said member in said recesses respectively, each mechanism having an operating member accessible for operation above said insulating base, a pair of switch contacts adjacent one end of said insulating member, a pair of switch terminals electrically connected with said contacts respectively, a second pair of switch contacts electrically connected with each other, adjacent the middle portion of said member, one of said switch mechanisms serving to simultaneously break the circuit at all four of said contacts to effect four breaks in series between said pair of switch terminals, a third pair of switch contacts adjacent the other end of said insulating member, a second pair of switch terminals electrically connected with said third pair of contacts respectively, and a fourth pair of switch contacts adjacent the middle portion of said insulating member, the other switch mechanism serving to simultaneously break the circuit at said third and fourth pairs of contacts respectively, to effect four breaks in series between said second pair of switch terminals.

7. A switch construction comprising a pivoted oscillatable switch arm, a contact with which the switch arm is engageable and means for oscillating said switch arm, comprising an actuating member movable back and forth, a coil tension spring connecting said switch arm and actuating member and a push member carried by said actuating member for engaging said spring to free said switch arm from said contact, after the spring has passed the dead-center.

In witness whereof, we have hereunto subscribed our names.

REUBEN B. BENJAMIN.
CHESTER E. WARNER.