

Sept. 1, 1931.

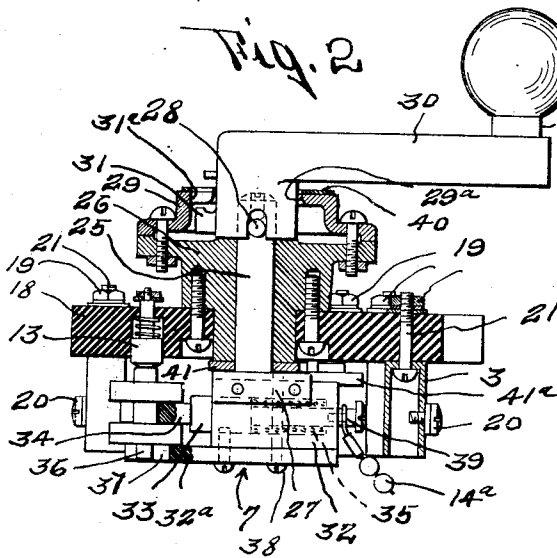
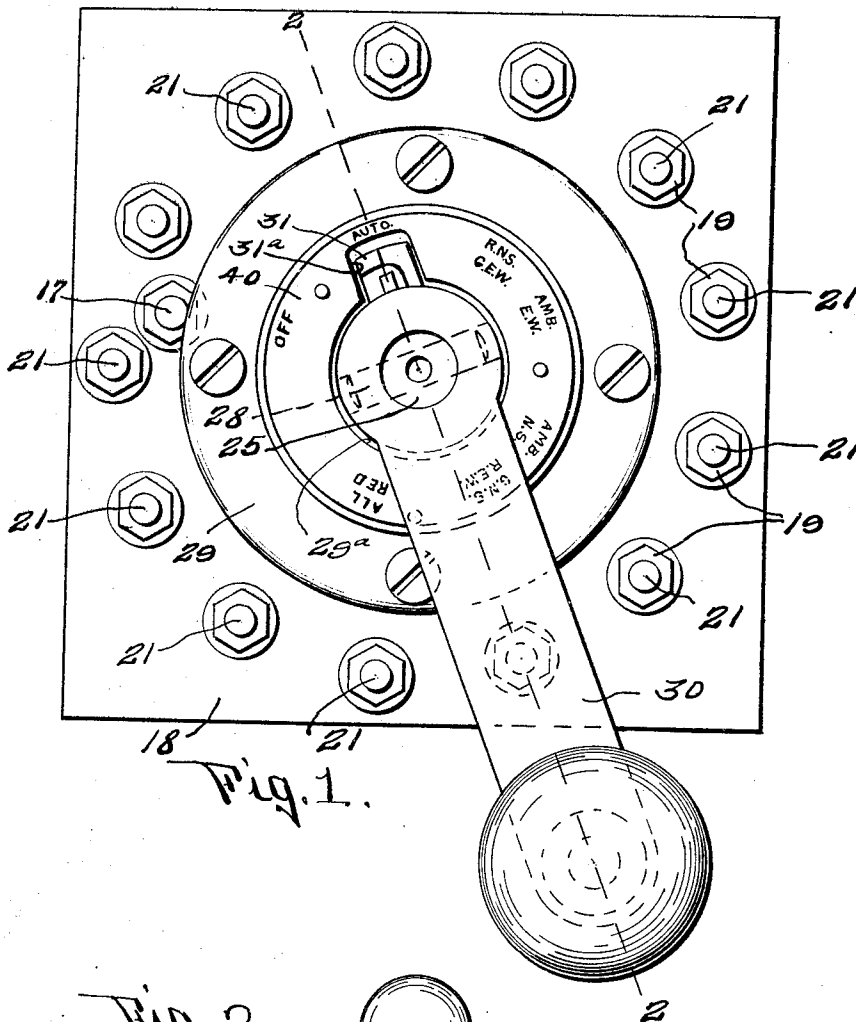
C. H. BISSELL

1,821,000

TRAFFIC SIGNAL SWITCH

Filed Sept. 19, 1928

4 Sheets-Sheet 1



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Fig. 3.

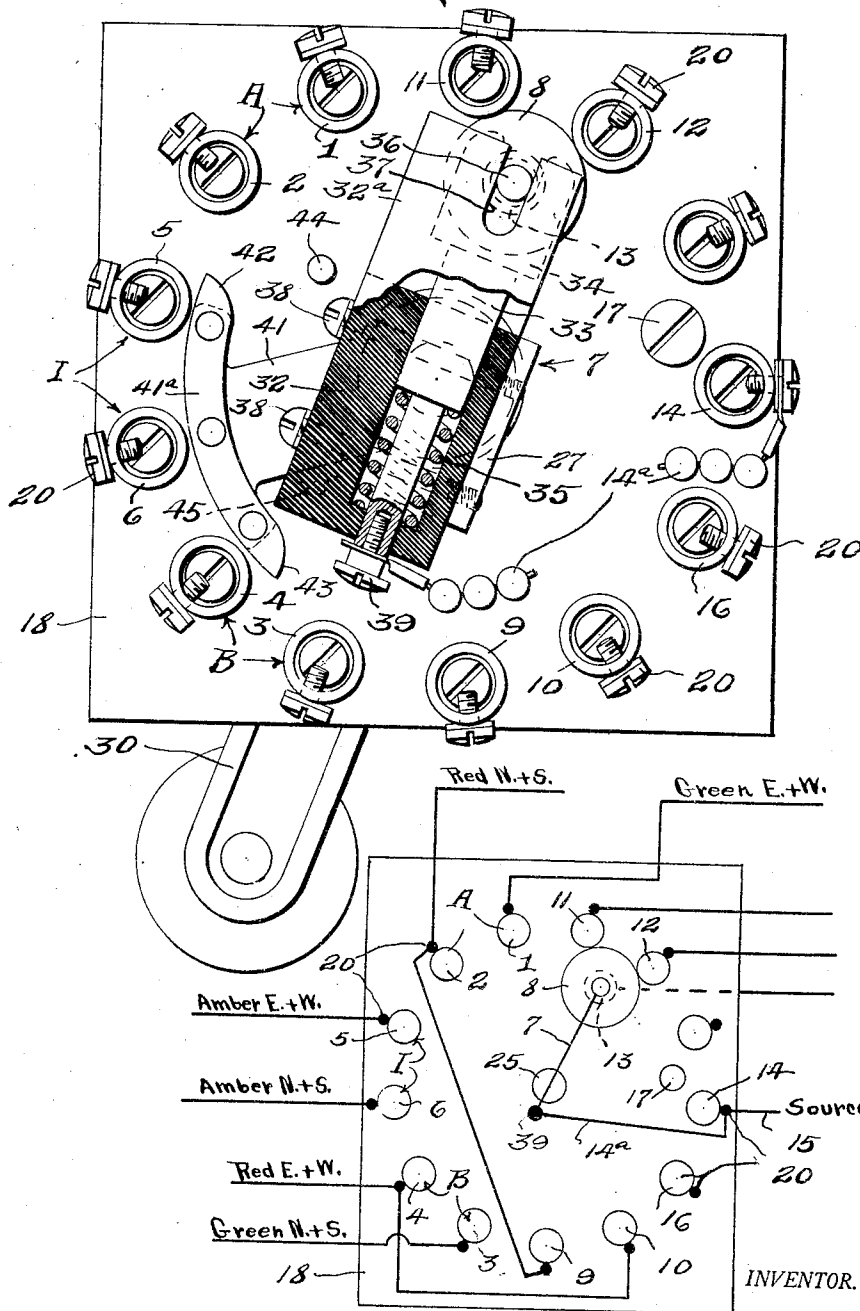


Fig. 4.

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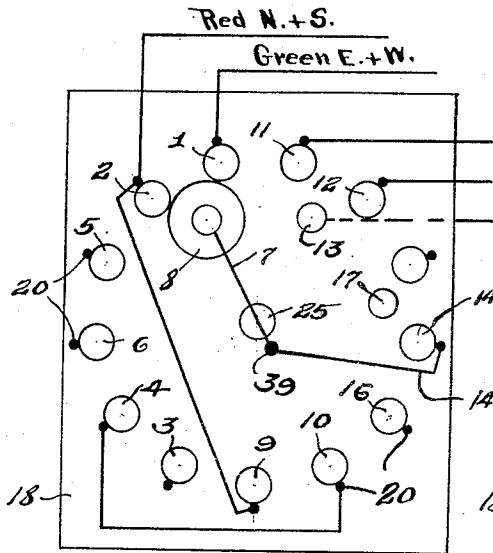


Fig. 5.

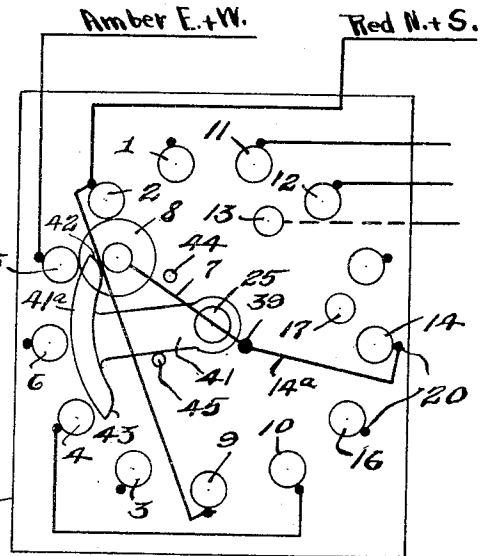


Fig. 6.

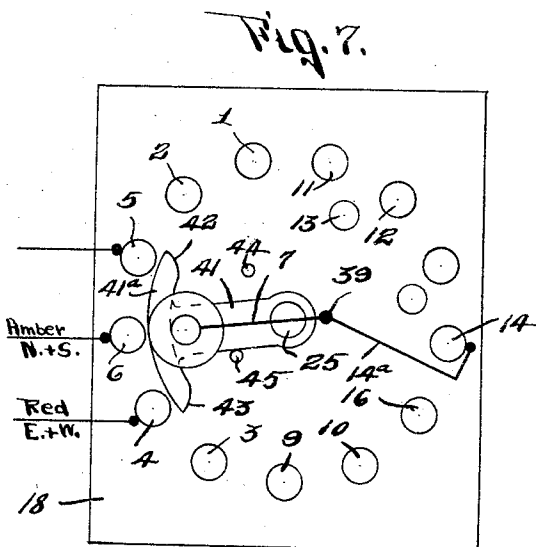


Fig. 7.

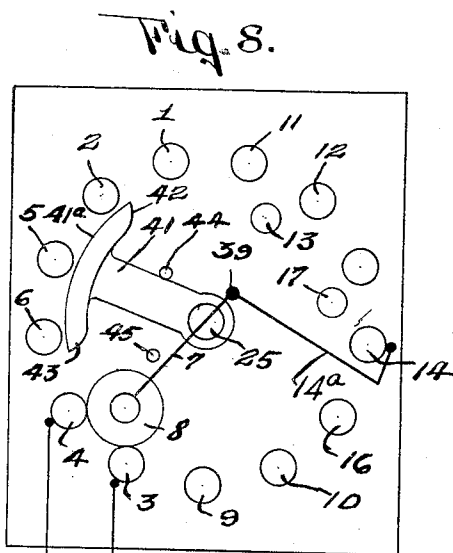


Fig. 8.

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4 Sheets-Sheet 4

Fig. 9.

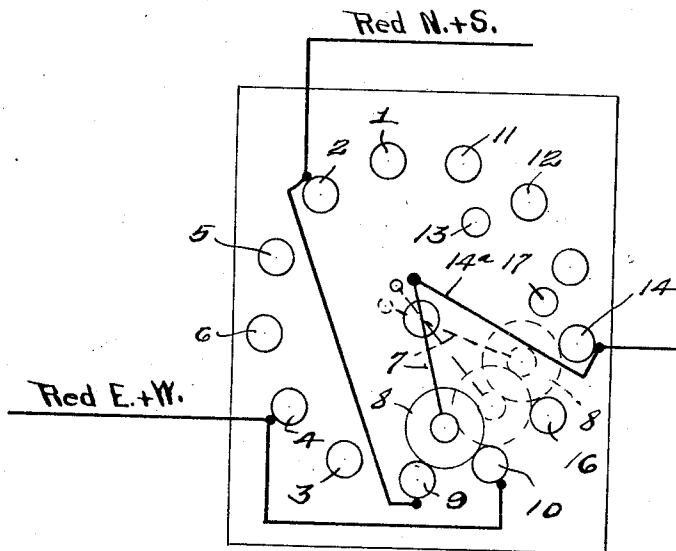
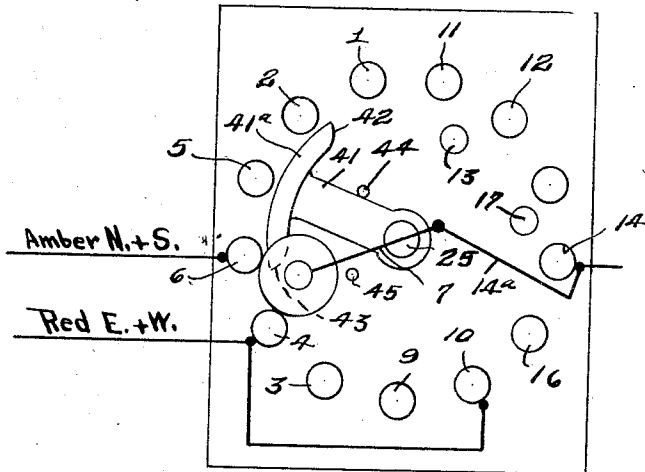


Fig. 10.

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UNITED STATES PATENT OFFICE

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TRAFFIC SIGNAL SWITCH

Application filed September 19, 1928. Serial No. 307,022.

This invention relates to electric switches particularly to traffic signal switches for controlling the stop and go signals on main and intersecting streets and also a warning signal, and it has for its object a particularly simple and efficient means for cutting out the intermediate warning signal before, for instance, the go signal on either street while displaying the intermediate warning signal prior to the stop signal on the streets. Other objects will appear throughout the specification.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a plan view of the switch.

Figure 2 is a sectional view, partly in elevation, taken on line 2—2, Figure 1.

Figure 3 is an inverted plan view, partly in section.

Figure 4 is a diagrammatic view illustrating the wiring of the switch.

Figures 5, 6, 7, 8, 9 and 10 are diagrammatic views illustrating the operation of the switch in different positions.

This switch comprises generally, a series of contacts, a movable switch arm having a conductor movable along the series to bridge any two adjacent contacts in the series and in a direction at an angle to the former movement and cut-out means operated by the movement of the switch arm for shifting the conductor in an angular direction out of contact with one or more of the intermediate contacts during the movement of the switch arm in one direction along the series and shifting said conductor in an angular direction out of engagement with another intermediate contact during the movement of the switch arm in the reverse direction.

As applied to a traffic signalling system, the series of contacts comprises first and second pairs of contacts A and B and two intermediate contacts I, the contacts of pair A being designated 1, 2 and those of pair B, 3, 4 and the contacts of the pair I as 5, 6.

The contact 5 is paired with the contact 2 of the pair A and the contact 6 with the contact 4 of the pair B. The switch arm 7 has a conductor as 8 arranged to bridge successively the contacts of the pairs, the switch arm being connected in a feed circuit and the contacts 1, 2 of the pair A being connected to the go signals on an intersecting street as an east and west street, while the contact 2 is connected to the stop signals on a main or north and south street. Likewise the contact 3 of the pair of contacts B is connected to the go signals on the main or north and south street; while the contact 5 of the intermediate pair of contacts I is connected to the warning or amber signal on an east and west street while the contact 6 is connected to the warning or amber signal on the north and south street. The cut-out means is operated during the movement of the switch arm to cut out the contact 6 or amber signal preceding the display of the go signal on the north and south street during movement of the switch arm in one direction and to cut out the intermediate contact 5 to prevent the display of the warning signal or amber preceding the go signal on the east and west street. The signals are usually lamped with colored lens, the go signals being green (G), the stop signals, red (R) and the warning signals amber (A).

In the illustrated embodiment of my invention, the contacts are shown as arranged in an arc-shaped series and the switch arm 7 is movable about an axis at the center of the series. There are also additional contacts which complete a circular series.

The additional contacts 9 and 10 are connected respectively to the contacts 2 and 4 of the pairs A and B by suitable jumpers so that when the roller 8 is in contact with these contacts 9, 10 the stop or red signals on both streets are connected in the circuit.

Additional contacts 11 and 12 are connected by suitable wires to an automatic timing device, and the roller or conductor 8 of the switch arm 7 when in engagement with the contacts 11 and 12 is also engaged with the contact 13 connected in the feed circuit. When the switch arm is swung into position

so that the roller or conductor bridges the contacts 11 and 12, the signals associated with the switch are operated automatically by an automatic timing device independently of the switch. The electric connection by which this is brought about forms no part of this invention. The contact 13 extends through the base of the switch and is spring pressed against the end of the roller.

14 is a contact or more strictly speaking a terminal or binding device to which the feed wire 15 is connected, and this terminal 14 is connected by a flexible conductor or wire 14^a to the switch arm. There is an additional idle contact 16 completing the circular series. The switch arm conductor or roller is moved into engagement with the idle contact 16 and the binding post contact 14 when the switch is "off", Figure 10.

When the parts are in the position shown in Figure 4, the conductor 8 of the switch arm is bridging the contacts 11 and 12 so that the current comes from the source through the wire 15, terminal 14, conductor 14^a through the switch arm and out through three branches connected to all signals through an automatic timing switch not shown.

A suitable stop 17 limits the movement of the switch arm in the position assumed when the signals are worked automatically.

The contacts are mounted in circular series on a suitable base 18 of insulation, each of them being a cylindrical post having a stem extending through the base 18 on which nuts 19 thread against the washers overlying the top face of the base, each contact also having a wire binding screw 20 on one side thereof. The nuts 19 and the stems on which they thread are binding devices for the branch circuits leading from the automatic timing switch not shown. Each terminal or contact is preferably tubular in form and provided with a head at one end, and the head is provided with a screw 21 extending through the hole in said head, the head of the screw bearing against the head of the terminal.

The switch arm 7 is mounted upon one end of a shaft 25 which is mounted in a bearing formed in a block or casting 26 mounted on the base 18 and as here shown the shaft is provided with a carriage 27 at one end on which the switch arm is mounted and with a transverse key 28 at its other end extending diametrically across the end of the bearing in the block 26.

A cap 29 is mounted on the top of the block and houses the key end of the shaft, the cap having an opening 29^a for a suitable wrench or crank handle 30. This handle 30 has a socket for receiving the end of the shaft and the key and also a radial lug 31 for extending through a notch 31^a in the flange of the cap around the opening, the lug passing under the flange for locking the handle in position

so that the handle can only be removed and replaced when the switch arm is in automatic position, that is, when the roller 8 of the switch arm is in contact with the contacts 11 and 12.

The carriage 27 and the key hold the shaft from endwise movement. The switch arm 7 includes a frame or box 32 of insulation and a side piece 32^a also of insulation on the frame or box and a metal spring pressed plunger 33 movable in the box and having a forked head 34, the spring 35 encircling the plunger tending to thrust the same outwardly. The roller is also formed with a circumferential groove, and the forked end 34 is arranged in the groove astride the portion of the roller forming the bottom of the groove. The roller also is formed with an axle 36 at one end working in a slot 37 in the side 32^a of the frame of the switch arm. The switch arm is secured to the carriage in any suitable manner as by screws 38. The plunger extends rearwardly to the outside of the box where it is provided with a binding screw 39 connected by the wire 14^a to the binding post 14 which is connected to the feed wire 15. The plunger therefore moves radially relatively to the switch arm for the purpose of permitting the roller to ratchet over the contacts.

The handle 31 is provided with a suitable pointer movable over a scale on a face plate 40 provided on the top of the cap 29 for indicating the position of the switch arm, these indications being "AUTO" for indicating automatic position of the switch; RNS and GEW grouped together at one point meaning red, north and south; green, east and west; AMB, EW grouped together indicating amber, east and west; AMBNS indicating amber, north and south, GNS and REW indicating green north and south and red, east and west, all red and off.

The means for cutting out the amber or yellow prior to the display of the go signal in either direction but permitting the display of amber prior to the change from go to stop in either direction comprises a cut-out member 41 consisting of an arm pivotally mounted on the shaft 25 between the carriage 27 and the base block, this arm having a shield 41^a at its outer end of such length as to cover or cut-out one or the other of the contacts 5 and 6 in accordance with the direction of movement of the switch arm 7, the shield being an arc-shaped piece of insulation mounted on the arm 41 and being provided with cam shaped ends 42, 43 arranged in the path of the roller. The arm 41 is mounted to rock through a small arc and its arc of movement is limited by stops 44, 45 on the base.

Assuming that the parts are in the position shown in Figure 5, with the roller bridging the contacts 1, 2 so that red is presented north and south and green, east and west, the operator shifts the handle in a clockwise direc-

tion and the switch arm 7 carries the roller to bridge the contacts 2 and 5 so that the red signals north and south continue to be momentarily displayed and the green signals, east and west are cut out and the amber presented east and west is cut in the circuit by reason of the contact 5 and the roller 8. At this point, Figure 6, the roller engages the cam end 42 of the cut-out member 41 and during continued movement of the switch handle, the roller 8 is pressed radially inwardly out of engagement with the contacts and during this movement the cut-out member moves out of engagement with the stop 44 into engagement with the stop 45 and the roller moves along the shield and is held out of contact with all contacts, thus skipping amber contact 6, Figure 7. The roller 8 then during continued movement, passes off the cam end 43 of the cut-out arm into engagement with contacts 4, 3, Figure 8, so that the green or go signals are presented north and south and the red or stop signals, east and west. During the reverse movement of the switch arm, the roller 8 moves out of engagement with the contact 3, thus cutting out the green, north and south and maintaining momentarily the red, east and west. Then the roller 8 of the switch arm encounters the cam 43 of the shield and the shield is pushed in a clockwise direction ahead of the roller and the roller now engages the contacts 4 and 6, Figure 9, so that the amber is presented north and south preliminary to a change of signals from green to red, north and south.

During continued movement, the roller is moved inwardly by reason of its engagement with the cam 43 and the fact that the arm 41 comes against the stop 44 and thus skips the amber contact 5 so that no amber is presented before the go signals east and west.

Continued movement brings the switch arm and the roller 8 back to its original position bridging the contacts 1 and 2. Thus the cut-out arm automatically cuts out the amber signal before the green signal in either direction and permits the amber or warning signal to be displayed before the stop signals or red, in both directions.

Movement of the switch arm anti-clockwise beyond the contacts 3, 4 into engagement with the contacts 9, 10 cuts in all the red or stop signals, Figure 10, this being desirable when it is necessary to stop all traffic in cases of emergency. Continued movement from this position brings the roller 8 into the dotted line positions, Figure 10, when the switch is off.

When the roller 8 is in engagement with the contacts 10 and 16, the red or stop signal is displayed east and west only, and when, in engagement with contacts 16 and 14, the switch is in its off position.

It is obvious that any particular contact or any number of contacts may be cut out by

changing the positions of the stops 44 and 45 or by carrying the length of the shield 41^a.

What I claim is:

1. In a switch, the combination of a series of contacts, a movable switch arm having a conductor movable along the series to bridge any two adjacent contacts in the series and also shiftable at an angle to the former movement, and means operated by the movement of the switch arm to shift the conductor in the angular direction out of contact with one of the intermediate contacts during movement of the switch arm in one direction along the series and to shift said conductor out of engagement with another intermediate contact during the movement of the switch arm in the reverse direction.

2. In a switch, the combination of a series of contacts, a movable switch arm having a conductor movable along the series to bridge any two adjacent contacts in the series and shiftable in a direction at an angle to the former movement out of contact with the terminals, and means operated by the movement of the switch arm to shift the conductor in the angular direction out of contact with one of the intermediate contacts during movement of the switch arm in one direction along the series and to shift said conductor out of engagement with another intermediate contact during the movement of the switch arm in the reverse direction, said means comprising a cam arranged in the path of the conductor and movable a limited distance therewith, and stops for limiting the movement of the cam with the conductor and the switch arm.

3. In a switch, the combination of a series of contacts, a movable switch arm having a conductor movable along the series to bridge any two adjacent contacts in the series and shiftable in a direction at an angle to the former movement out of contact with the terminals, and means operated by the movement of the switch arm to shift the conductor out of contact with one of the intermediate contacts during movement of the switch arm in one direction along the series and to shift said conductor out of engagement with another intermediate contact during the movement of the switch arm in the reverse direction, said means comprising a cam arranged to shield one of the intermediate contacts and expose the other to the switch conductor and having cam surfaces at the ends of the shield arranged in the path of the conductor, the cam being mounted to move in the direction of the switch arm and stops for limiting the movement in opposite directions.

4. In a switch, the combination of a series of contacts, a movable switch arm having a conductor movable to bridge any two adjacent contacts in the series, a member provided with a shield arranged to cover one of the intermediate contacts and uncover another

during the movement of the switch arm in one direction and to cover and uncover the intermediate contacts in the reverse order during the movement of the switch arm in the reverse direction along the series of contacts, said shield having inclined faces at its ends arranged in the path of the switch conductor, and stops for limiting the movement of the shield in opposite directions with the switch arm.

5. In a switch, the combination of a series of arc-shaped contacts connected in different branch circuits, a switch arm movable about the center of the axis of the series and having a conductor arranged to bridge any two adjacent contacts in the series, said conductor being connected in a feed circuit and mounted to move radially relatively to the axis of the switch arm and means operated by the movement of the switch arm to shift the conductor radially out of contact with one of the intermediate contacts during the movement of the switch arm in one direction along the series and to shift said conductor radially out of engagement with another intermediate contact during the movement of the switch arm in the reverse direction along the series.

6. In a switch, the combination of arc-shaped contacts, a movable switch arm having a conductor movable to bridge any two adjacent contacts in the series and also movable relatively to said arm in a radial direction and a cam movable about the axis of the switch arm and arranged in the path of the conductor to shift it radially during the movement of the switch arm along the intermediate contacts, and stops for limiting the movement of the cam with the switch arm.

7. In a switch, the combination of arc-shaped contacts, a movable switch arm having a conductor movable to bridge any two adjacent contacts in the series and also movable relatively to said arm in a radial direction and a cam movable about the axis of the switch arm and arranged in the path of the conductor to shift it radially during the movement of the switch arm along the intermediate contacts, the cam being in the form of a shield located to cover one of the intermediate contacts and formed with inclined faces at the ends thereof, said ends being arranged in the path of the switch conductor and the shield being arranged to cover one of the intermediate contacts while exposing another to the conductor during the movement of the switch conductor along the series of contacts, and shiftable by the switch arm in one direction during movement in one direction to cover one intermediate contact and in the other direction to cover the other intermediate contact during movement of the switch arm in the reverse direction.

8. In a switch, the combination of a series of contacts comprising first and second pairs of contacts, and two intermediate contacts

paired respectively with one of the contacts of the first and second pairs, a movable switch arm having a conductor movable to bridge successively the contacts of the pairs, the switch arm being connected in a feed circuit and the contacts connected in different branch circuits, and means for permitting the conductor to bridge one of the contacts of the first pair and one of the intermediate contacts during movement of the switch arm from the first pair toward the second pair of contacts and cutting out the other intermediate contact during such movement and for permitting the conductor to bridge one of the contacts of the second pair and the other intermediate contact and to cut out the first intermediate contact during movement of the switch arm from the second pair of contacts toward the first pair.

In testimony whereof, I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 17th day of September, 1928.

CARL H. BISSELL.