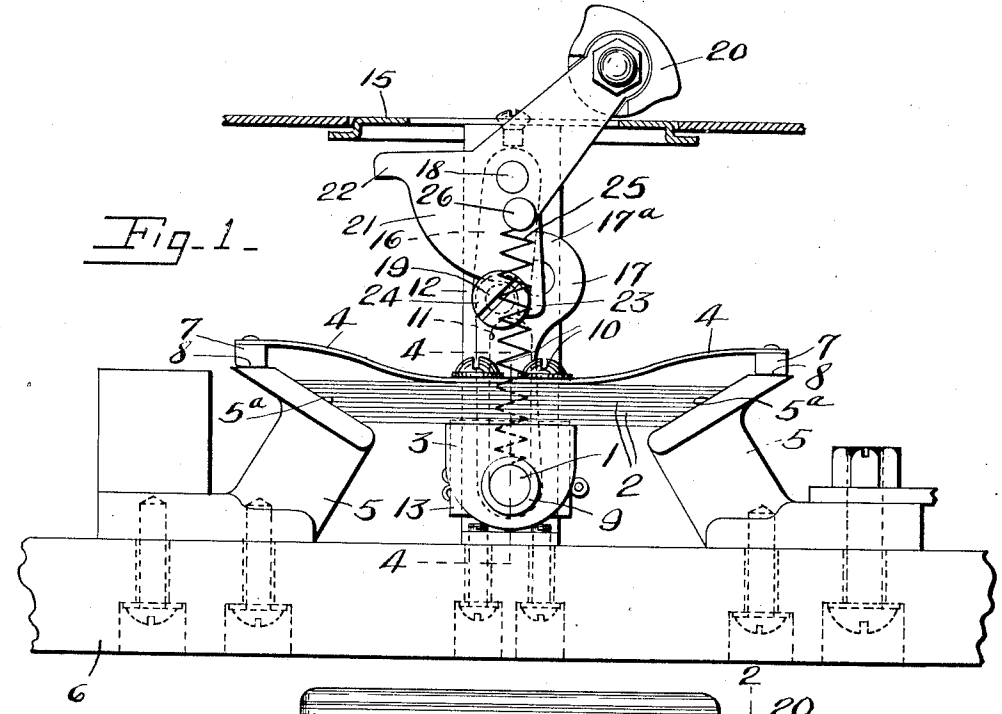
Aug. 21, 1923. 1,465,412

C. H. BISSELL ET AL

QUICK BREAK SWITCH

Filed Aug. 17, 1917 2 Sheets-Sheet 1

Fig. 1.



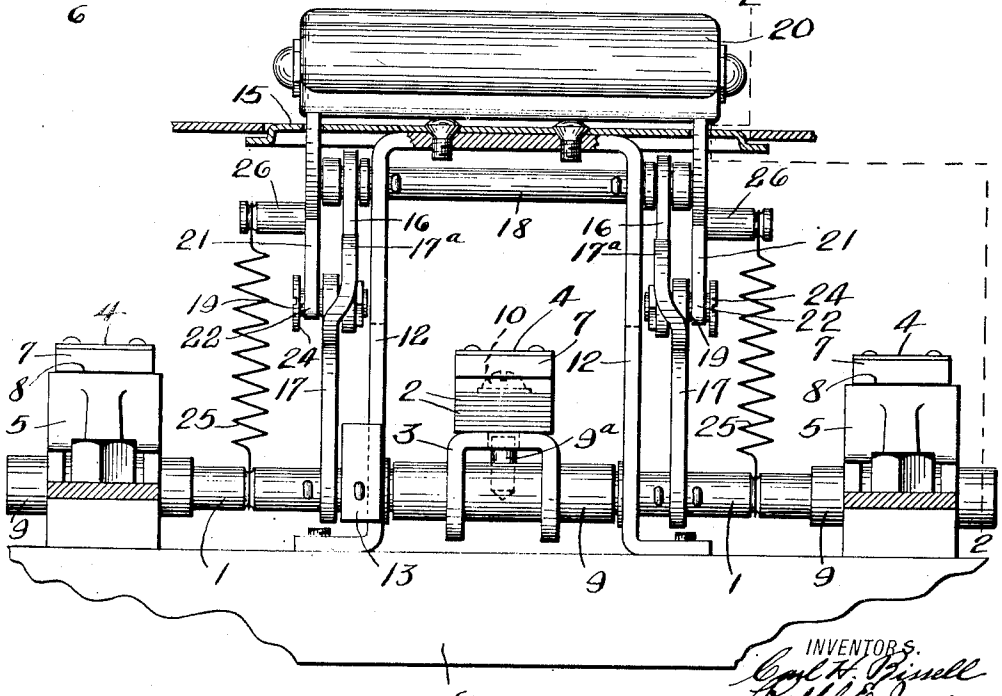


Fig. 2.

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Fig. 3.

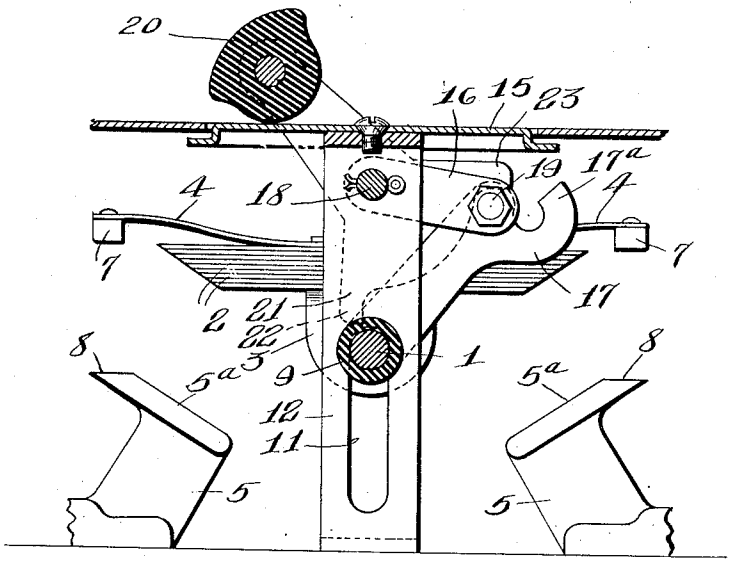
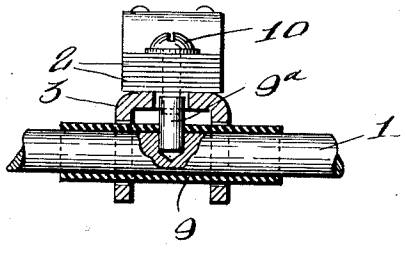


Fig. 4.



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UNITED STATES PATENT OFFICE.

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QUICK-BREAK SWITCH.

Application filed August 17, 1917. Serial No. 186,716.

To all whom it may concern:

Be it known that we, CARL H. BISSELL and RALPH E. JONES, citizens of the United States, and residents of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Quick-Break Switch, of which the following is a specification.

This invention has for its object a quick break switch which is particularly simple in construction and highly efficient and durable in use, and it consists in the novel features 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 an elevation of a switch embodying our invention, the contiguous portion of a panel board base on which the switch is mounted, and the top plate of the switch being also shown, the top plate being shown in section.

Figure 2 is a sectional view taken on line 2—2, Fig. 1.

Figure 3 is a sectional view of the switch, parts being omitted, the switch member being shown in its "open" position.

Figure 4 is a sectional view on line 4—4, Fig. 1.

This switch comprises generally, a movable switch member, means tending to move the switch member to its open position, and operating mechanism including parts movable into locking position as the switch member approaches its closed position, and an operating member acting to normally move said parts out of their unlocked position whereby the first mentioned means affects a quick opening of the switch.

The switch member here shown is of the laminated type comprising a support as a rod 1, laminated bars 2 extending crosswise of the rod 1 and mounted upon a carrier 3, which is pivotally mounted on the rod and also a contact member 4 in the form of a leaf spring overlying the bars 2 and having its ends arranged to engage the switch contacts 5 on the panel board 6 and to be tensioned as the switch member approaches its closed position, and before the laminated bars firmly engage the contacts. The contacts 5 are formed with converging faces 5^a and the laminated bars 2 are bevelled at their ends to conform to the inclined faces 5^a. The spring leaf 4 is thickened or has blocks 7 at its ends which rest upon the horizontal top faces 8 of the contacts 5, the blocks engaging said faces 8 before the laminated parts 2 are compressed against the inclined faces 5^a and hence the leaf is under tension and tends to move the switch member to its open position. The leaf 4 acts as an auxiliary contact to make contact before the laminated bars of the switch member and also to break contact after the laminated bars, thus protecting said bars from burning through arcing. The laminated bars are shown in Fig. 1 as straight although in reality they are slightly curved when the switch member is closed. The switch is of the multiple type for a three-wire system and there are three sets of laminated bars 2 mounted on the rod 1.

Each carrier 3 is in the form of an inverted U-shaped clip or yoke through which the rod 1 extends, the yoke being mounted upon a sleeve 9 of insulation encircling the rod. The yokes are capable of a slight rocking movement and are limited in their rocking movement by radially extending shoulders or pins 9^a extending through the sleeves of insulation and into sockets in the rod and also extending into sockets or openings in the intermediate portion of the yoke. The pins 9^a loosely fit the last mentioned openings so that the yoke is capable of a slight rocking movement. The laminated bars and the spring leaves 4 are secured between their ends to the yokes 3 by screws 10.

The rod 1 extends through slots 11 formed in uprights or standards 12 rising from the base 6 and has a guiding block 13 fixed thereon which moves along one of said standards in order to hold the rod from turning. The uprights or standards 12 are the legs of an inverted U-shaped frame member, the ends of which have outturned feet for securement to the base 6 and the intermediate part of which extends in a horizontal position and carries the face plate 15 of the switch.

The mechanism for operating the switch member is movable into a locking position when the switch member is closed, and includes a pair of toggle links 16, 17, one of which, as 16, is pivoted at its outer end to a fixed point as a shaft 18 supported by the parts 12 near the upper ends thereof beneath

the face plate 15, and the other of which, as 17, is pivoted at its outer or lower end on the rod 1.

The joint or pivot 19 connecting the links is movable into the dead center line of the toggle, that is, a straight line passing through the axes of the shaft 18 and the rod 1, and suitable locking means is provided for stopping the movement of the links when the joint 19 has passed into or slightly beyond the dead center line when the switch is in its closed position.

As here shown, this stop is an extension 17ª provided on one of the links as the lower link 17 and projecting beyond the joint 19 into position to engage the edge of the link 16 when the joint of the toggle has passed into or slightly beyond a dead center line. There are two pairs of toggle links 16, 17 located on the outer sides of the uprights 12. The operating member comprises a handle or lever 20 movable back and forth and connected to the toggle by a lost motion connection. As here shown, said connection consists of a single shoulder on one of the coacting parts that is, the handle lever or the toggle, and a pair of spaced apart shoulders on the other of said parts, said pair of shoulders being spaced apart a distance nearly equal to the throw of the single shoulder.

In the illustrated form of our invention, the handle lever 20 is pivoted between its ends on an axis concentric with that of the links 16 and is formed with a quadrant 21 below its axis having spaced apart shoulders 22, 23 which coact with a shoulder 24 as an extension 24 of the joint 19 of the toggle. The lever is double or in the form of a yoke having lever arms mounted on opposite ends of the shaft 18.

A spring or springs 25 are utilized for holding the switch member in its open position and the handle in either of its positions assumed when the switch is open or closed, and for supplementing action of the spring leaves 4. Said springs 25 as here shown extend lengthwise of the toggles and are so connected that they move in a direction crosswise of the center line of the toggle from either side to the other, by the handle lever in position to tend either to hold the toggle in its locked position, or to hold the toggle in its folded position when the switch is open. As here shown, the springs 25 are connected at their lower ends to the rod 1 and at their upper ends to shoulders 26 on the handle lever below the axis thereof and at one side of the lengthwise plane of the handle lever midway between the shoulders 22, 23.

In operation, when the switch member is closed as illustrated in Fig. 1, the shoulders 22 are spaced apart from the toggle joints 19 and the springs 25 are at one side of the dead center line of the toggle and tend to hold the toggle in its locked position. During the movement of the handle to the left, Fig. 1, the shoulders 23 are moved away from the shoulder 24 at the joints of the toggles additionally tensioning the springs 25 until the shoulders 22 engage the shoulders 24 at the toggle joints so that a slight additional movement of the handle lever moves the toggle joints 19 out of the dead center lines and the spring leaves 4 and the springs 25 retract and move the switch member to its open position. Either the spring leaves 4 or the springs 25 are sufficient to move the switch member to its open position, but the springs 25 hold the switch member in said open position but in case a different type of switch member is employed as one having no resiliency, the springs 25 will alone perform the function of opening the switch member.

When the switch member is in its open position, the toggles are retracted and the joints 19 thereof are engaged with the shoulders 23 so that during movement of the switch handle to the right into the position shown in Fig. 1, the shoulders 23 move against the toggle joints moving the switch member to its closed position and the last part of the movement of the handle lever to the right moves the toggle joints into or beyond the dead center lines of the toggles so that the switch is locked in its closed position.

What we claim is:

1. A switch comprising a support, a rectilinearly movable switch member, an operating member pivoted to the support, a toggle including links pivoted together and connected at their opposite ends to the switch member and to the support concentric with the operating member, and a spring tending to open the switch and fold the toggle, the operating member coacting with the toggle to move the same out of its extended position and permit the spring to complete the folding of the toggle, the spring being connected to the switch member and to the operating member at a point at one side of the axis of the operating member whereby the end of the spring connected to the operating member shifts during the movement of the operating member, substantially as and for the purpose set forth.

2. A switch comprising a switch member including a shaft and contacts mounted between their ends on the shaft and extending to opposite sides of the shaft, and means for moving the shaft in a direction at a right angle to its axis and thereby moving the contacts rectilinearly into and out of operative position, said means comprising a pivoted operating member, a toggle consisting of links pivoted together at like ends and having their other ends connected respectively

to the shaft and to a point concentric with the axis of the operating member, the operating member coacting with the toggle to move the same into and out of the center line of the toggle, and a spring connected at one end to the shaft and at its other end to the operating member at one side of the axis of said member, substantially as and for the purpose described.

3. A switch comprising a switch member including a shaft and contacts mounted between their ends on the shaft and extending to opposite sides of the shaft, and means for moving the shaft in a direction at a right angle to its axis and thereby moving the contacts rectilinearly into and out of operative position, said means comprising a pivoted operating member, a toggle consisting of links pivoted together at like ends and having their other ends connected respectively to the shaft and to a point concentric with the axis of the operating member, the operating member coacting with the toggle to move the same and having spaced apart shoulders on opposite sides of the joint of the toggle and movable into and out of engagement with said joint, and a spring extending lengthwise of the toggle and connected at one end to the shaft and at its other end to the operating member at a point at one side of the axis of said member, substantially as and for the purpose set forth.

In testimony whereof, we have hereunto signed our names at Syracuse, in the county of Onondaga and State of New York, this 15th day of June, 1917.

CARL H. BISSELL.
RALPH E. JONES.