

Dec. 11, 1962

M. L. JEFFREY

3,068,332

SNAP SWITCH

Filed Oct. 17, 1957

3 Sheets-Sheet 1

FIG. 1

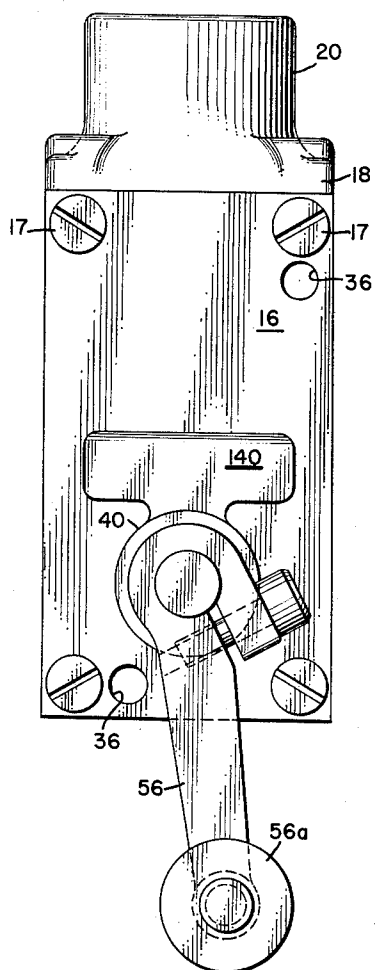


FIG. 4

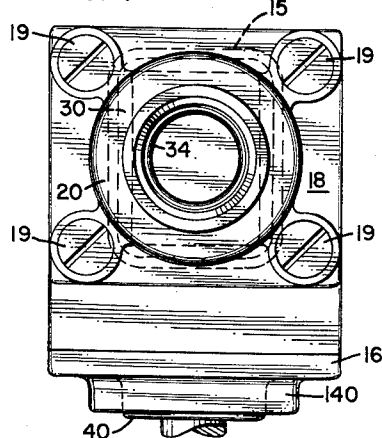


FIG. 2

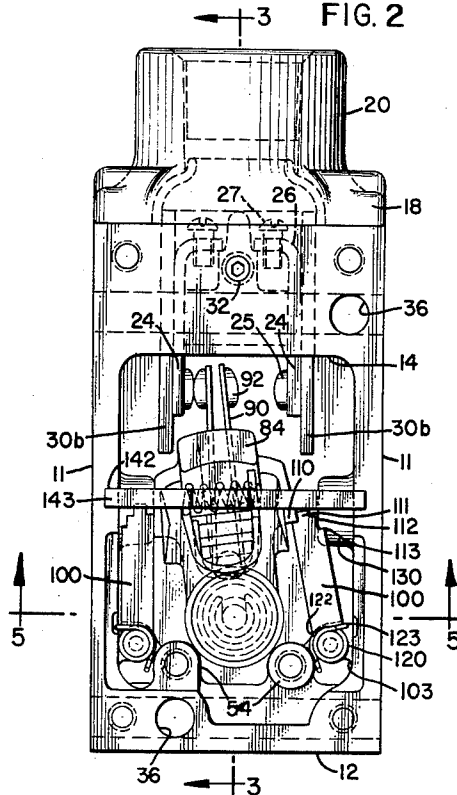
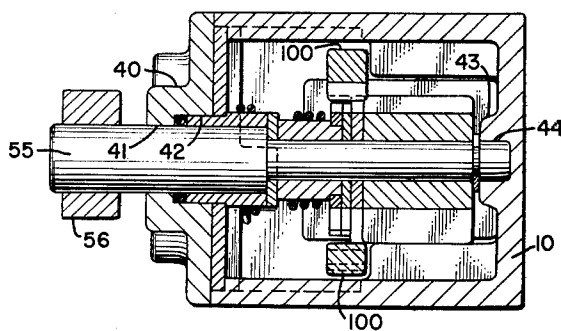


FIG. 5



INVENTOR
MAX L. JEFFREY

BY

J. D. Douglass

ATTORNEY

3,068,332

Filed Oct. 17, 1957

3 Sheets-Sheet 2

FIG. 6

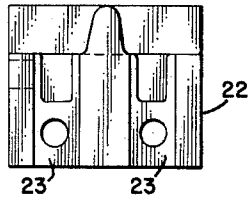


FIG. 7

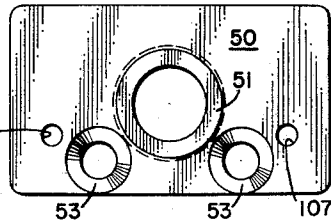


FIG. 3a

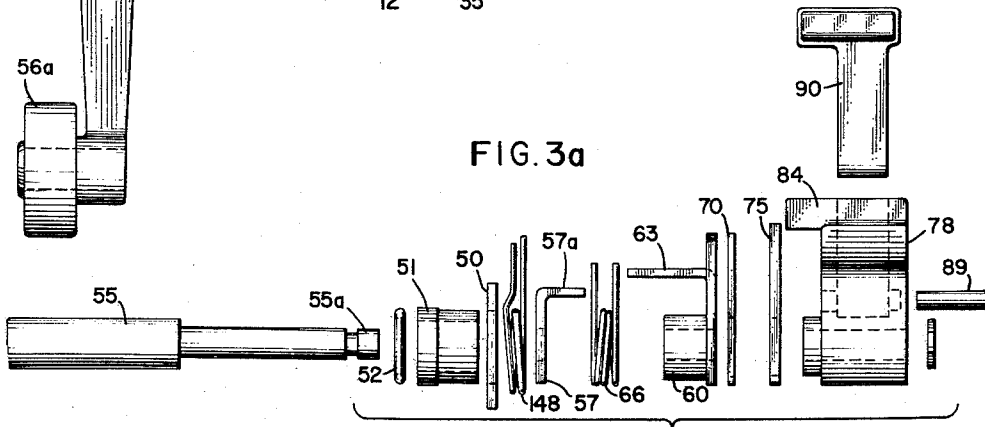


FIG. 9

INVENTOR
MAX L. JEFFREY

BY

J. O. Douglas
ATTORNEY

Dec. 11, 1962

M. L. JEFFREY

3,068,332

SNAP SWITCH

Filed Oct. 17, 1957

3 Sheets-Sheet 3

FIG. 10

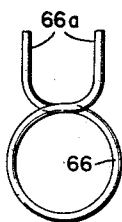


FIG. 11

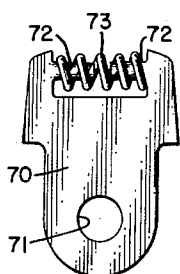


FIG. 12

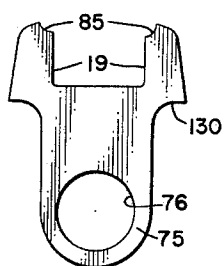


FIG. 13

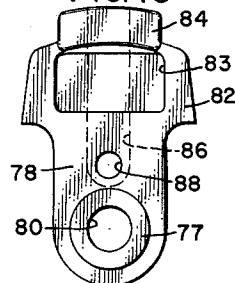


FIG. 14

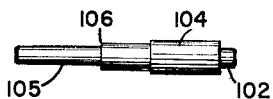


FIG. 15

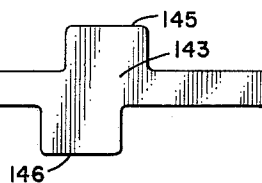


FIG. 16

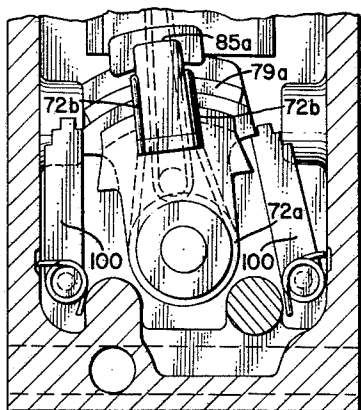


FIG. 17

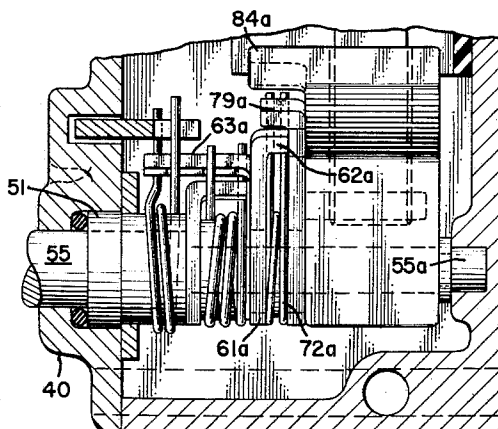


FIG. 18

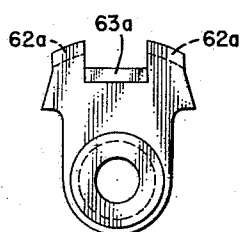
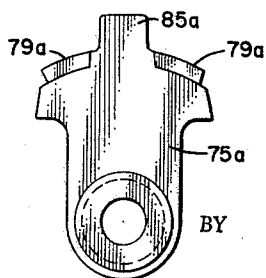


FIG. 19



INVENTOR
MAX L. JEFFREY

BY *J. O. Douglas*
ATTORNEY

1

3,068,332
SNAP SWITCH

Max L. Jeffrey, Daisy Hill Farm, Chagrin Falls, Ohio
Filed Oct. 17, 1957, Ser. No. 690,682
8 Claims. (Cl. 200—70)

This invention relates to improvements in switches for controlling electrical circuits and more particularly to a snap action switch wherein the mechanism adapts itself to the manufacture of either small or large switches.

At the present time there is a demand for a small switch that is capable of carrying larger currents than such switches are ordinarily capable of carrying. Such switches are frequently used as limit switches in conjunction with electrically controlled machine tools or the like and wherein it is desirable that the size of the switch be small in order that it does not take up too much space.

In such a switch it is desirable that it be able to carry large currents; that it be capable of operating for long periods of time without repair or replacement; that it may quickly break the circuits with a relative large air gap to prevent arcing, and, that the operating mechanism be capable of a large amount of overtravel without damage to its components.

It is also desirable that the switch may be adjusted to provide a right or left hand make or break or that it may be what is known as a neutral position which wherein contact may be made to one side or the other and wherein the normal position is a neutral one wherein no contact is made.

It is further desirable that the switch may be readily accessible for the connecting of wires and that it may be readily accessible for the replacement of parts.

It is also desirable to provide a switch wherein the contacts are isolated from the ambient atmosphere thus making it explosion proof.

By the switch of my present invention I am able to accomplish all of the foregoing.

Still other advantages of the invention, and the invention itself will become more apparent from the following description of an embodiment thereof, which is illustrated by the accompanying drawings and forms a part of this specification.

In the drawings:

FIG. 1 is a front elevational view of the switch of my invention;

FIG. 2 is a front elevational view with the cover plate and operating lever removed;

FIG. 3 is a vertical medial section taken on the line 3—3 of FIG. 2;

FIG. 3a is an exploded view of the shaft assembly;

FIG. 4 is a top plan view with the lever and shaft broken off;

FIG. 5 is a section taken from the line 5—5 of FIG. 2;

FIG. 6 is a side elevational view of a fixed contact carrier block;

FIG. 7 is a front elevational view of a front bearing plate and seal member;

FIG. 8 and 9 are front and side elevational views of the actuated and pawl release lever;

FIG. 10 is a front elevational view of a pressure transfer spring;

FIG. 11 is a front elevational view of a snap spring carrier;

FIG. 12 is a front elevational view of a contact carrier leaf;

FIG. 13 is a front elevational view of the movable contact carrier;

FIG. 14 is a view of a pawl support pin;

FIG. 15 is a plan view of a position bar;

2

FIG. 16 is a fragmentary elevational view of a modification of the invention;

FIG. 17 is a side view thereof;

FIG. 18 is a view of a modified form of pawl release lever; and

FIG. 19 is a view of a modified form of a contact carrier leaf.

Briefly my invention contemplates a movable contact carrier which is movable with its contacts between fixed contacts to make or break the contacts. The contact carrier is moved by an actuated member which is spring connected to an actuator member. The actuated member is also a pawl release member and is spring connected to a contact carrier engaging member to transfer its movement to the contact carrier, and is held against movement by pawls until a predetermined pressure is built up by the spring between the actuated member and the contact carrier engaging member at which time the pawl release member disengages the holding pawl and the spring then snaps the contact carrier engaging member along with the contact carrier to move the contacts into or out of contact, or both, with the fixed contacts.

More particularly there is provided a generally rectangular housing including a back wall 10, side walls 11 extending forwardly from the back wall and a bottom wall 12. A top wall 14, that is relatively thick is provided, and is formed with a rectangular opening 15, FIG. 4, which receives the fixed contact block later described.

The front of the housing is closed by a cover plate 16, held in place by screws 17, FIG. 1, extending through the plate and threaded into the main housing.

The top is closed by a conduit connector and cover plate 18 held in place by screws 19. This plate is formed with a threaded coupling portion 20 for connection to a wiring conduit not shown.

A fixed contact carrier and terminal block is provided, being seated in the rectangular opening 15 and having fixed contacts disposed in spaced relation on each side of the housing and between which the movable contact carrier may move to bring the movable contacts into engagement with the fixed contacts.

The fixed contact block 22, FIG. 6, is a generally oblong block of non-conducting material, being provided with pairs of side grooves 23 on opposite sides adapted to receive the contact carrying bars 24 which carry contacts 25 at their lower ends and are provided with bent over parts 26 at the upper ends for supporting connecting screws 27. The block 22 is encased by an insulating sheath 30, FIG. 3, the upper end of which surrounds the block and the lower end of which is open on the front side and is provided with skirts which extend downward at 30a and 30b on the back and sides. A set screw 32 is threaded in the wall 14, extends through the sheath and has an end 32a which projects into a seat formed in the block. Preferably the block and its sheath provide a close fit with the walls of the opening 15 so that the bars 24 are pressed into the seats and the entire assembly is tightly held against movement. When assembled the contacts 25 are disposed in pairs on opposite sides of the housing spaced from the side walls and shielded therefrom by the skirt walls 30b.

An insulating cup 34 is provided for the coupling 18, having an opening 34a through which the wires may extend.

Through holes 35 are provided, for the reception of through bolts or screws, not shown, for side mounting of the switch. Likewise through holes 36 are provided extending through the front cover and to the back of the switch for back mounting thereof.

It will be readily apparent that access to the connecting screws may be had by removing the connection or cap 18,

and that due to the manner in which the cap cooperates with the sheath 30, which may be slightly compressible, the conduit exit is sealed from the contacts making the switch explosion proof, and, as will later appear, the rest of the parts where sparking may occur, are also sealed against the ingress of gasses or moisture.

The lower part of the housing and the cover plate support the movable snap action and movable contact operating mechanism.

The cover plate 16 is provided with a circular bearing boss 40, FIG. 3, having a circular opening 41 which opens into a counterbore 42. The counterbore 42 in turn opens to the interior of the housing. The rear wall 10 is provided with a bearing boss 43 having a shaft bearing recess or socket 44.

An operating shaft is supported in the front boss by a bearing plate and seal and at the rear directly in the recess 44.

As can best be seen in FIGS. 3, 5 and 7 a front bearing plate and seal is provided which cooperates with the cover plate to provide a moisture and explosion proof seal. It includes a rectangular plate 50, FIG. 7, having a central opening into which a bearing of the "Olyte" variety may be pressed and which has a sleeve part 51 that extends into the counterbore 42 and engages an O ring 52. The bearing plate 50 is held in position by screws, not shown, which extend through countersunk openings 53 into threaded bosses 54 (FIG. 2) in the housing.

As shown in FIGS. 3 and 17 the sleeve part 51 may be slightly larger than the remainder of the bearing, or as shown in FIGS. 5 and 7 slightly smaller. In either event the bearing becomes a substantially integral part of the plate 50.

As can be seen in FIGS. 3 and 5, when the cover is in place the O ring 52 is compressed slightly which causes it to engage the wall of the counterbore and shaft thus providing a rotatable seal therebetween.

The operating shaft includes a front portion 55 of large diameter and a rear portion 55a of reduced diameter, FIG. 5. The front part 55 finds a bearing in the plate 50 and the small rear portion in the recess 44.

Outwardly of the housing the shaft may bear an operating lever 56 having a roller 56a on its end. The lever is adjustably secured to the shaft in any well known manner so that it may be extended to any desired position for contact with some operating part of the machine to which the switch may be attached.

Inwardly of and adjacent to the bearing, the shaft 55a has secured thereto, so that it is integral therewith, an actuator member which includes a circular flange or body secured on the small part of the shaft adjacent the shoulder formed by the part of large diameter and having an outwardly extending arm 57a which is bent over in spaced parallel relation to the shaft and extends rearwardly as best shown in FIG. 3. This member may be soldered or staked to the shaft and is movable therewith. The flange like body engages with the rear of the front bearing, which holds the shaft in position in the housing.

The actuator member 57 is connected by a spring to an actuated drive and pawl release member FIGS. 8 and 9 which includes a sleeve 60 rotatably journaled on the small part 55a of the operating shaft with one end abutting the body 57 of the actuator. The sleeve 60 has secured thereto a plate 61 which extends upwardly as viewed in the drawings. The upper end of the plate is formed to provide a yoke the legs of which are provided with inwardly facing spring seats 62. At the bottom of the legs there is provided a forwardly extending arm 63 which extends in spaced parallel relation to the operating shaft and in closely spaced parallel relation to the arm 57 of the actuator above that arm and with a slight clearance between the two arms. The outer sides of the arms which form the spring seats 62 are cutaway with oblique notches 64 for clearance purposes and to form pawl release faces. The arm 63 extends forward, well beyond

the body 57 of the actuator, for a purpose later to be described.

A torsion spring drive connection is provided between the actuator to the actuated drive member and includes a helical body 66, FIG. 10, the ends of which extend beyond a vertical center line through the spring and are provided with a pair of outwardly extending arms 66a. The body of the spring is disposed on the sleeve 60 and the arms extend in tangential engagement with the arms 57 and 63 of the actuator and actuated member, the spring arms being under tension and pressing toward each other.

This spring is so designed that a considerable amount of pressure is exerted by the spring arms 66a upon opposite sides of the actuator and actuated member arms 57 and 63 which are of the same width. This pressure tends to hold the arms in alignment with each other. Thus when the shaft is rotated the actuator arm 57 through the spring 66 rocks the actuated member 61. Normally the spring is of sufficient stiffness that the arms 57 and 63 move in unison until such time as one of the members meets with sufficient resistance to overcome the torsional force of the spring.

Adjacent to the actuated member 61 is a snap spring carrier FIG. 11 which comprises a plate 70 having an opening 71 which enables it to be journaled on the part 55a of the drive shaft. The upper part of the carrier is provided with a yoke which has a pair of inwardly extending lugs 72 which carry a helical compression spring 73. As can best be seen from FIG. 3, the body 70 of the spring carrier is relatively thin so that the spring 73, which has a diameter considerably larger than the thickness of the body, is disposed between and engageable by the spring seats 62 on the actuated member, which is arranged to operate alongside the body 70 of the carrier. The purpose of the carrier is merely to hold the spring in position so that one side is engaged by one of the seats 62 on the actuated member and the other side on the opposite side of the carrier is engaged by one of a pair of similar seats on a contact carrier leaf which operates the contact carrier.

The contact carrier leaf, FIG. 12, which is held against movement by pawls 100, is in interlocking engagement with the contact carrier and operates in unison therewith. These two parts could be unitary, but certain advantages accrue from making them in separate parts since the leaf can be made of hardened metal and the carrier of insulating material.

The leaf includes a stem like body 75, FIG. 12, having an enlarged opening 76 which enables it to be journaled on a circular boss 77 of the contact carrier stem 78, FIG. 13. The upper end of the leaf is shaped in the form of a yoke having arms the inner faces of which provide seats 79, which since the carrier is adjacent the spring carrier engage with the ends of the snap spring 73 in the same manner as the pawl release and actuated member 61. Movement of the actuated member causes one of the seats 62 to engage the end of the spring 73 and the other end of the spring presses against one of the seats 79 to transmit pressure to the carrier leaf. The carrier leaf is held against movement by pawls 100 for alternate engagement therewith on opposite sides, however, until the holding pawl is released by the actuated and pawl release lever.

The contact carrier includes the stem 78 having a bore 80 which extends through the stem and boss 77. Since the carrier is made of insulating material the boss 77 and the part defining the bore 80 may be made from a metallic insert which may be molded in position when the carrier is formed. The carrier is swingably journaled on the small part 55a of the shaft. Upwardly of the stem 78 the carrier is provided with a head 82 having the same general contour as the contact carrier leaf 75. At the position opposite the seats 79 of the carrier leaf however, the carrier is provided with a shallow recess 83 which provides ample clearance space for the spring 73 which may project beyond the carrier leaf. At the end the carrier is provided

with a forwardly extending projection 84, the bottom edges of which engage with seats 85 on the carrier leaf which seats are at the upper ends of the spring seats 79. Thus the carrier and carrier leaf are in interlocking engagement with each other when assembled, and movement of the leaf and carrier are in unison.

The central portion of the carrier is provided with a contact holding recess 86 which opens through the top of the carrier, and extends downwardly in the carrier to a point closely spaced from the insert which forms the bore 80. At this point a blind hole 88 extends from the front of the carrier rearwardly intersecting the recess 86. This hole is for receiving a contact holding and locking pin 89, FIG. 3. The contacts 92 FIGS. 2 and 3, are supported on a U-shaped strip 90 of resilient metal, the upper ends 91 of which are of inverted L-shape and have the contacts 92 riveted or otherwise secured thereto facing outwardly. The stem 90 of the contact holder is disposed in the recess 86 and locked in place by the pin 89 which passes over the strip at the bight. Thus the ends of the strip, carrying the contact, are free to move in the upper exit end of the recess 86. Since the carrier leaf 75 presses against the front side of the carrier the pin cannot escape.

As can best be seen from FIG. 2, the rocking movement of the carrier leaf and the carrier is prevented by pawls 100 disposed on opposite sides of the carrier. These pawls are of a character such that they may be placed in position to hold the carrier at one side or the other, as shown in FIG. 2, or, they may be turned around in which position they hold the carrier in either neutral position or on one side or the other.

The pawls or latches, FIG. 2, each comprise a body 100 the lower end of which is provided with a bore enabling it to be swingably journaled on a support pin. The support pin, FIG. 14, has a reduced rear end 102 which is journaled in a boss 103 on the rear of the housing, FIG. 2. An intermediate enlarged body 104 is provided which together with an elongated forward portion 105 of reduced diameter, forms a shoulder 106 against which the pawl abuts, the pawl being disposed on the part 105 of the pin. The forward end of the part 105 of the pawl pin is received in an aperture 107 in the bearing plate 50. A suitable sleeve may be provided between the pawl and the bearing plate to prevent it from moving forward on the pawl pin.

The upper end of the pawl is provided with seats for engagement with the contact carrier leaf. One side of the pawl has a single seat 110 adjacent which is a projection 111 that forms a stop. On the other side the carrier has another seat 112 at the same height as the seat 110 and below that a second seat 113. When the pawl is installed in the position shown in FIG. 2, the seat 110 is at the right height and the stop 111, which is disposed at one side of the center line through the pawl, is the correct position to hold the carrier leaf and the contact carrier to the left with the movable contacts 92 in engagement with the fixed contacts 25. At this time the resilient support 90 for the movable contacts is moved away from the wall defining the recess 86, thus the contacts are resiliently held in engagement with each other.

Each of the pawls is spring biased toward the carrier leaf. As shown in FIG. 2 the spring comprises a helical body 120 disposed around the pawl support pin 105. The ends of the spring are offset, one end 121 being hooked over a web 122 between the boss 103 which journals the pawl support pin and the boss 54 which contains the bearing plate screw 54. The other end of the spring is offset at 123 and engages the side of the pawl. It will be apparent that other types of springs such as compression springs could be used if desired.

The operation of the device so far as described is as follows:

If a neutral position switch is desired the pawls are rotated 180° from the position shown so that the seats

112—113 are toward the contact carrier leaf. When the seat 112 is under the abutment 130 of the leaf, the stop 111 is sufficiently far removed from the center line that the movable contacts are held in a mid-position between the fixed contacts. Further actuation of the pawl release lever allows the lever abutment 130 to move down to the seat 113 at which time the contacts are closed.

If the operating lever be moved clockwise and the parts are in the position shown in FIG. 2, the actuator 56 moves with the shaft and the arm 57 is also carried clockwise. This arm exerts pressure against one of the arms 66a of the spring 66. This spring is stiffer than the snap spring 72 and therefore pressure is exerted by the other arm of 66a of the spring against the arm 63 of the actuated and pawl release lever 61 which is also moved clockwise. The seat 62 of the pawl release lever engages with one end of the spring 72 causing a compression of the spring because the other end of the spring is held by one of the seats 79 of the contact carrier leaf which in turn is being held by the pawl 100. As movement is continued the spring 72 is compressed still further until such a time as the face 64 of the pawl release lever engages with the inner face of the pawl body at which time the pawl body is rocked to the right moving the seat 110 out from under the projection 130 on the contact carrier leaf 75. This releases the contact carrier leaf and the spring 72 snaps the contact carrier leaf to the right until the side of the head of the body engages with a boss 131 on the side wall of the housing. At the same time the other pawl on the opposite side of the housing engages with and holds the contact carrier leaf on the opposite side by engagement of the step 110 with the seat 130.

Since the contact carrier can move no farther to the right, the head being near to or against the boss 131, further movement of the shaft carries with it the actuator and actuated member causing a compression of the snap spring 73 until the pressure of this spring is sufficiently great that the torsion transfer spring 66 can no longer move the arm 63 on the actuated lever, at which time the actuator arm 57 can still move out of alignment with the arm 63 spreading apart the arms 66a of the transfer spring 66 permitting 90° of overtravel of the operating lever 56 without damage to the mechanism.

So far as described the parts would and can remain in a position on one side or the other to hold the contacts closed on one side or the other until the operating lever is moved in the other direction.

Means is provided however, which is optical, for always causing the operating lever to return to an original position along with the contacts. This means is substantially the same as that shown in my Patent No. 2,783,323.

As previously stated the arm 63 of the actuated and pawl release lever extends forward well beyond the actuator arm 57. The front cover is provided with an elongated boss 140 and the inner face of the cover is provided with an elongated recess 141. The side walls 11 of the housing are provided with notches 142, FIG. 2. A position bar, FIG. 15, is provided which comprises a strip 143 of rectangular cross section, the ends of which are arranged to be seated in the notches 142 and held in place by the cover. The position bar is provided with two outwardly extending tongues. The tongue 145 is at the center and on one side and acts as a neutral position controller. The other tongue 146 is on the other side and being off center acts as a right or left position controller. The bar is positioned in FIGS. 2 and 3 as a left contact closed position controller. In this case the tongue 145 is disposed in the recess 141 and the tongue 146 is disposed on the left side. In either event one of the tongues which extends inwardly of the housing is over the arm 63. A coil spring 148 similar to that of FIG. 10 is disposed about the body 55 of the shaft and the arms 149, which are longer than the arms 66a of the spring 66, extend on opposite sides of the tongue 146 and the arm 57. The

tongues 145 and 146 are of the same width as the arm 63 and therefore the two are held in alignment.

If it is desired to condition the switch so that the contacts on the right are closed the position bar is merely rotated end for end to place the tongue 146 on the right hand side. If a neutral position switch is required, the pawls are rotated 180° and the position bar is turned over so that the tongue 145 projects over the arm 63. At this time the tongue 146 is received in the recess 145.

In FIGS. 16 and 17 I have illustrated a modification of the snap action mechanism wherein the compression type spring of the previous embodiment is replaced by a torsion type of spring.

The difference resided largely in the actuated and pawl release lever and in the contact carrier leaf. The spring carrier is eliminated by the arrangement.

In this instance the actuated and pawl release lever 61a is provided at its upper end with a pair of rearwardly extending spaced arms 62a these being spaced above and outwardly of the operated arm 63a. The contact carrier leaf 75a instead of having a yoke on its upper end, is provided with a tongue 85a which interlocks with a notch in the overhanging head 84a of the contact carrier. Below the tongue on each side there is provided a pair of forwardly extending arms 79a. These arms are spaced apart and extend above the arms 62a on the pawl release lever.

The snap spring in this instance includes a body 72a disposed around the shaft 55a and having a pair of arms 72b extending tangentially from the body of the spring and upwardly into engagement with the inner faces of the arms 62a and 79a tending to hold them in alignment. The pressure exerted by the spring arms is outwardly.

In operation as the pawl release lever is moved clockwise, the left arm 62a moves the spring arm 72b to the right increasing the tension on the spring and transferring greater pressure from the right arm of the spring to the right arm 72b of the contact carrier leaf which is held against movement by the pawl. The tension on the spring increases until the pawl releases lever engages the pawl and releases it from holding engagement with the contact carrier leaf. At this time the right arm 72b of the spring snaps the contact carrier leaf and contact carrier to the right in the same manner as described for the previous embodiment.

It will be apparent that the pawls 100 could be made with only one seat 110 in which event the seating surface could be larger. Likewise separate pawls could be provided with seats 112 and 113 which were larger and either set of pawls supplied depending upon the type of operation desired.

The feature of the removable wire receiving coupling is important because it enables connections to be made or removed without removing the switch from the place of installation. As previously pointed out the structure being sealed around the contact points is not only liquid proof but vapor proof allowing the device to be submerged or placed in combustible atmosphere without danger of explosion.

Also of importance is the fact that the arrangement of the springs is such that there is no stress or undue tension placed upon the rotating parts to cause them to wear more on one side than the other. This increases the life of the device materially.

It is also apparent, that due to the construction, any of the parts that wear may be easily and quickly replaced by persons having a minimum of mechanical skill. The structure also lends itself to the manufacture of the switch of a very small type and still provide large current handling capacities.

Having thus described my invention, I am aware that numerous and extensive departures may be made therefrom without departing from the invention as defined in the appended claims.

I claim:

1. A snap action switch mechanism wherein a member

carrying movable contacts is arranged to move the contacts into engagement with fixed contacts, said mechanism including an actuator and actuated member with spring means connected between the members for transmitting pressure from one to the other, a latch plate and rocker engaging member juxtaposed to the actuated member throughout their length and spring means connected between the actuated member and latch plate for transmitting pressure from one to the other, pawl means for holding engagement with the latch plate and means on said actuated member for engagement with the pawl to release the pawl from holding engagement with the latch plate upon a predetermined relative movement between the actuated member and the latch plate.

2. A snap action switch mechanism wherein a member carrying movable contacts is arranged to move the contacts into engagement with fixed contacts, said mechanism including a rotatable shaft, an actuator secured to the shaft and actuated member rotatably supported on the shaft, spring means connected between the members for transmitting pressure from one to the other, a latch plate and a rocker rotatably journaled on the shaft in interlocking engagement with each other, a spring carrier interposed between the actuated member and the latch plate and spring means carried thereby and interposed between the actuated member and latch plate for transmitting pressure from one to the other, pawl means for holding engagement with the latch plate and means on said actuated member for engagement with the pawl to release the pawl from holding engagement with the latch plate upon a predetermined relative movement between the actuated member and the latch plate.

3. A snap action switch mechanism wherein a rocker carrying movable contacts is pivotally mounted in a housing and arranged to move the movable contacts into engagement with fixed contacts, said snap mechanism including an operating shaft, an actuator member carried by the shaft and having an arm extending alongside the shaft in spaced parallel relation thereto, an actuated member rotatably journaled on the shaft and having an arm juxtaposed to the arm of the actuator and spring means for transferring pressure from one of said arms to the other, a latch plate and rocker engaging member disposed alongside the actuated member and spring means between the two members for transferring spring pressure from one member to the other, means for locking the latch plate and rocker together for movement in unison, pawl means disposed at the side of the latch plate for holding engagement therewith and means on said actuated member for releasing the pawl means upon a predetermined movement of the actuated member.

4. A snap action switch mechanism wherein a rocker carrying movable contacts is pivotally mounted in a housing and arranged to move the movable contacts into engagement with fixed contacts, said snap mechanism including an operating shaft, an actuator member carried by the shaft and having an arm extending alongside the shaft in spaced parallel relation thereto, an actuated member rotatably journaled on the shaft and having an arm juxtaposed to the arm of the actuator and spring means having a body portion surrounding the shaft and outwardly extending arm for engagement with the two arms for transferring spring pressure from one of said arms to the other, a latch and rocker engaging member disposed alongside the actuated member and a spring carrier having spring means engaged between the two members for transferring spring pressure from one member to the other, means for locking the latch member and rocker together for movement in unison, pawl means disposed at the side of the latch member for holding engagement therewith and means on said actuated member for engagement with the pawl means upon a predetermined movement of the actuated member to move the pawl from holding engagement with the latch member.

5. A switch comprising a housing, fixed contacts sup-

9

ported within the housing and disposed in spaced relation to each other on opposite sides of the housing, a movable contact member pivotally supported within said housing for alternate movement between the fixed contact, said pivot means including a shaft rotatably supported between opposite housing walls, an actuator member secured to said shaft and having an arm extending in parallelism with the shaft and in spaced relation thereto, an actuated member rotatably supported on the shaft and having an arm extending opposite said arm of the actuator member juxtaposed thereto and spring means connecting said arms together, a movable contact carrier member rotatably supported by said shaft, a latch and contact carrier engaging member juxtaposed between the actuated member and the movable contact carrier, means on the contact carrier for interlocking engagement with the latch and contact carrier engaging member, and spring means for connecting the actuated member to the latch and contact carrier engaging member.

6. An apparatus as described in claim 5, wherein said spring means is carried by a spring carrier and is engaged by juxtaposed seats on the actuated member and the latch and contact carrier engaging member.

10

7. An apparatus as described in claim 6, wherein said latch and contact carrier engaging member is provided with latch engaging shoulders on opposite sides and spring actuated latch means having shoulder engaging seats is provided for engagement therewith on opposite sides.

8. An apparatus as described in claim 7, wherein said actuated member is provided with latch engaging portion for moving said latch alternately from engagement with said latch engaging shoulders.

References Cited in the file of this patent

UNITED STATES PATENTS

843,901	Lewis	Feb. 12, 1907
1,515,224	Seltzer	Nov. 11, 1924
1,804,425	Lefkowitz	May 12, 1931
2,586,075	Miller	Feb. 15, 1952
2,671,152	Cataldo	Mar. 2, 1954
2,761,030	Jeffrey	Aug. 28, 1956
2,783,323	Jeffrey	Feb. 16, 1957

FOREIGN PATENTS

743,266	France	Jan. 6, 1933
---------	--------	--------------