Feb. 26, 1957 M. L. JEFFREY 2,783,323

QUICK ACTING SWITCH

Filed March 21, 1955 2 Sheets-Sheet 1

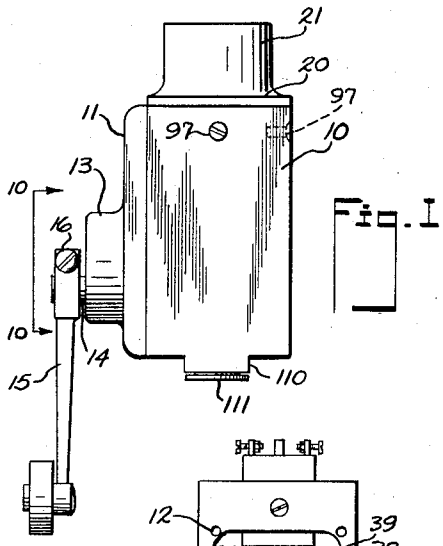



Fig. 1

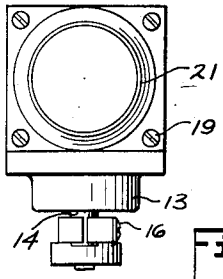



Fig. 2

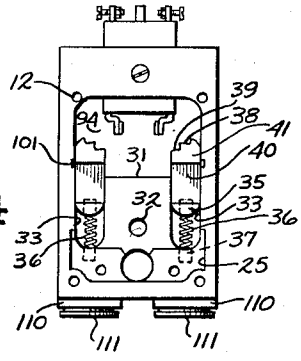



Fig. 4

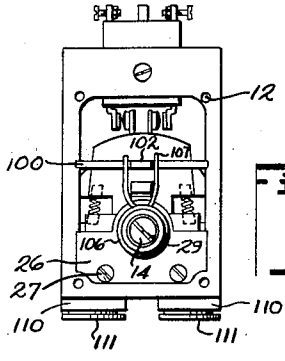



Fig. 3

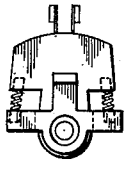


Fig. 5

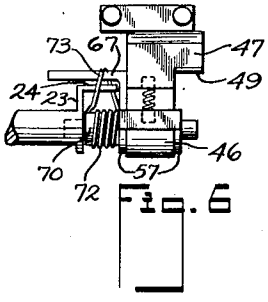



Fig. 6

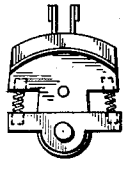


Fig. 7

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QUICK ACTING SWITCH

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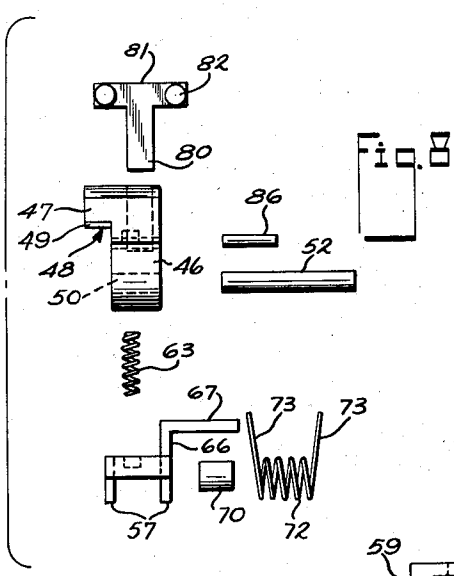



Fig. 8

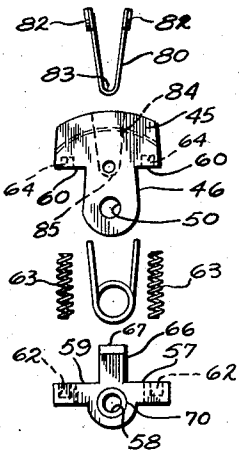



Fig. 9

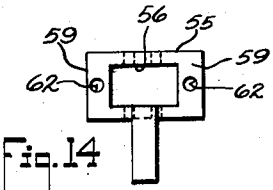



Fig. 14

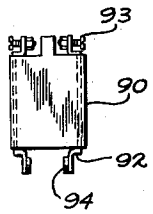



Fig. 15

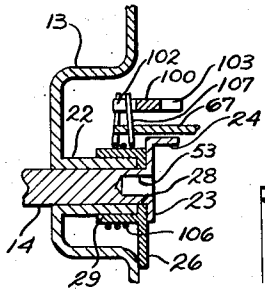



Fig. 10

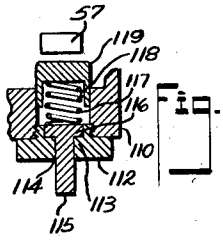



Fig. 16

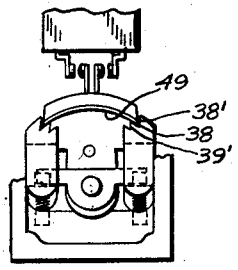



Fig. 11

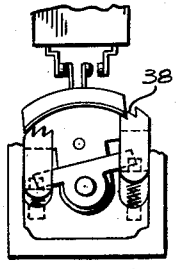



Fig. 12

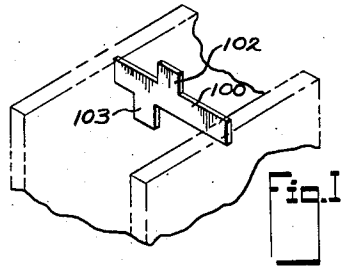



Fig. 13

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United States Patent Office 2,783,323 Patented Feb. 26, 1957



2,783,323

# QUICK ACTING SWITCH

Max L. Jeffrey, Chagrin Falls, Ohio

Application March 21, 1955, Serial No. 495,602
15 Claims. (Cl. 200—70)

This invention relates to switches and more particularly to a switch of the quick-acting type.

Among the switches of the prior art are the type known as limit switches, which obtain extensive use in machine tool applications. Although many such switches have been made in the past, a great majority of them are large and cumbersome, which limits the applications thereof.

By the present invention I have provided a switch which is substantially smaller than those of the prior art and which performs all of the functions of their larger counterparts. The switch of my present invention, because of its reduced size, can be mounted in many places where the prior switch could not be used. Because of its ruggedness, it will operate over long periods of time without the usual servicing requirements. Its improved operation is brought about largely by an improved release mechanism for the contacts where the circuit is quickly made and broken, with minimum wear upon the parts.

Furthermore, although the switch is small, the contacts may be made for exceptionally heavy duty operations.

Other advantages of the invention are related to the ability to release the contacts quickly and easily without destruction of the switch.

Another advantage of the switch is the ability to provide one where the switch, with a relatively small adjustment, may be made to operate in either direction to provide a circuit normally closed in one direction and open in the other or vice versa, or one where it operates from a neutral position in both directions.

Still other advantages of the invention and the invention itself, will become 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 side elevational view of the switch of my invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a view looking into the front of the switch with the cover and operating handle removed;

Fig. 4 is a similar view with certain parts removed to show the operating pawls;

Fig. 5 is a view of the movable contact carrying assembly as viewed from the same position as shown in Fig. 3;

Fig. 6 is a side elevational view thereof;

Fig. 7 is a rear elevational view thereof;

Fig. 8 is an exploded view of the movable contact assembly as viewed from the side;

Fig. 9 is a similar view from the front;

Fig. 10 is a fragmentary vertical section taken from a plane indicated by the line 10—10 of Fig. 1;

Figs. 11 and 12 are fragmentary views showing the portions of the housing and the manner of operation of the rotor assembly;

Fig. 13 is a fragmentary perspective view of the casing showing the rotor spring return bar;

Fig. 14 is a plan view of the rocker operating member;



Fig. 15 is a view of a fixed contact mounting block removed from the housing; and

Fig. 16 is a sectional view of a modification thereof.

Throughout the drawings like parts have been designated by like reference characters.

Generally, the switch of my invention includes a housing which houses at one end a set of fixed contacts, that may be connected into an electrical circuit. Below the fixed contacts are provided movable contacts which may be swung into and out of engagement with the fixed contacts. An operating shaft is provided and has a spring connection with a swingable contact operating member and this member in turn has a spring connection with the swingable contact carrying member. The swingable contact carrying member is held against movement by a pair of pawls engaged therewith which are released by the operating member on a predetermined build up of spring pressure to cause the release. Means is also provided so that the mechanism may be adjusted to provide normally open or closed circuits.

More particularly, the housing 10 may be of generally rectangular formation, as shown in Figs. 1 and 2, having a front cover 11 secured to the housing by screws extending through the cover and into threaded openings 12. The cover is provided with a boss 13 in which an operating shaft 14 is journalled and to which an operating handle 15 may be secured by a clamping screw 16.

The top of the housing is provided with a removable member 20 having a circular boss 21 which is internally threaded for connection to a suitable conduit, not shown.

The boss on the cover is provided with an inwardly projecting flange 22 in which the operating shaft 14 is journalled. The shaft 14 is provided with a head 23 on its inner end which carries at one side a lug 24 extending inwardly towards the switch mechanism.

As can best be seen in Fig. 4, the lower end of the housing is provided with a seat 25 in which a bearing plate 26 is secured by screws 27, the plate having an opening 28, Fig. 10, for reception of the shaft 14. Spaced from the opening 28 in the plate 26, is an outwardly extending cylindrical flange 29 which is in telescoping engagement with the cylindrical projection 22. The combination with the cover of this plate and the telescoping engagement of the flanges 29 and 22 provides a firm, strong journal for the shaft 14 and at the same time provides an explosion-proof seal for the entry of the shaft into the housing.

The rear housing wall, as can best be seen in Fig. 4, is provided with a central boss 31 having an opening 32 which provides a journal for a shaft, later to be described. The sides of the boss 31 and the sides of the housing define vertically extending channels 33 in which rocker pawls are slidably disposed. The rocker pawls each include a body of generally rectangular formation to provide a relatively close sliding fit in the channels 33. The lower ends 35 of the pawls are engaged by coil springs 36 which are seated in recesses in the pawls and the other ends seated in recesses 37 in the housing at the ends of the channels 33. The upper ends of the pawls are provided with heads 41 that carry rocker engaging seats 38 and 39. The seat 39 is on the lower inner edge of the head while the seat 38 is spaced above and outward of the seat 39. The central portion of the pawl is provided with a recess which is formed by virtue of the base 35 and the head 41. As will later appear, the pawls engage with the rocker head to hold it against movement until a certain amount of spring pressure is built up after which they release the rocker allowing it to snap over into an alternate position.

The rocker assembly which is of generally T formation comprises a head 45 and a depending stem 46. The upper end of the head is provided with an outwardly curved projection 47, as can best be seen in Fig. 8. The

underside 48 of the curved projection is provided with a metal face 49, shown in Fig. 11. The curvature of this face is defined by a radius from the center of a mounting hole 50 in the stem 46. The hole 50 provides a pivot point for the rocker which may pivot about a pin 52, one end of which is journalled in the opening 32 and the other end of which extends into an opening 53 in the stem 14 of the operating shaft.

The rocker is pivoted about its pivot 52 by a cradle member which comprises a generally rectangular body 55 having a rectangular center opening 56, through which the stem 46 of the rocker may extend and rock. Depending from the front and back sides of the body are spaced parallel lugs 57 provided with aligned openings 58 which allows the same to be rockably journalled on the same shaft 52 that the rocker is journalled on. In its assembled condition the stem 46 of the rocker extends through the opening 56 and the pin 52 extends through the aligned openings 50 and 58 on the rocker and cradle. The two parts, due to the fact that the opening 56 is larger than the stem 46, are capable of independent rocking movement relative to each other.

On both sides of the opening 56 the cradle body is provided with faces 59 which extend opposite to and under the faces 60 of the rocker. The faces 59 are provided with seats 62 which receive coil springs 63, the upper ends of which are engaged in recesses 64 extending through the faces 60 in the rocker. In its assembled position, the springs, which are of substantially equal tension, hold the cradle and rocker with their faces 57 and 60 in substantial parallelism with each other. The cradle may be rocked relative to the rocker when the rocker is held, one of the springs compressing on one side and the other spring on the other side expanding.

The cradle is also provided with an upstanding stem 66 which extends alongside the stem of the rocker and then projects outwardly normal thereto to provide an operating lug 67, which is in parallelism with the lug 24.

The assembled rocker and its cradle are most clearly shown in Figs. 5 to 7 inclusive. It will be noted, as can best be seen in Figs. 6 and 10, that when the cover and the operating shaft are in place, with the shaft supporting the pin 52, that the lug 24 on the stem 14 extends under, parallel to, and in closely spaced relation to the operating lug 67 on the cradle. As can best be seen in Fig. 6, the stem has telescoped thereon a sleeve 70 which bears against the outer face of the lugs 57 on the cradle and against the head 23 on the operating stem. This forms a bearing for a coil spring 72 having a pair of arms 73 which engage with the lugs 67 and 24 on opposite sides thereof, each arm engaging the same side of each lug, holding them resiliently in alignment with each other but permitting relative movement therebetween against the pressure of the spring arms.

When the rocker cradle assembly is in position in the housing the curved projection 47 on the rocker overhangs the boss 31 on the rear housing and is disposed above the pawls, Figs. 11 and 12, the seats of which are forced into engagement with the metal face 49 on the rocker. The springs 36 hold the pawls against this face, which is provided with sharp extremities on the ends, that engage with either the seats 38 or 39.

As can best be seen from Fig. 11, in its neutral position the portions of the face 49 adjacent the edges are seated on the seats 38. The upper faces of the seats 38 and 39 are curved to conform to the curvature of the face 49 which is pressed against the face 49, and, the outer edge of the seat as viewed from the center line, is provided with surfaces 38' and 39' which abut the edge of the rocker. The pawls thus hold the rocker against rocking movement. The laterally extending portions of the cradle, which carry the faces 59, extend between the projections 35 and 41 on the pawls, and, when the cradle is rocked, the pawl on one side is depressed. The spring on the other side is able to raise the other pawl when



the rocker is released as the downwardly depressed pawl is depressed far enough so that the face 49 disengages from the seat 38. Rocking the cradle in alternate directions lowers the pawls on alternate sides.

When the handle 15 is rotated the stem 14 is necessarily rotated with it and the lug 24 is carried to one side of the lug 67 on the cradle against the pressure exerted by the arms 73 of the spring 72; as the arms are forced farther apart, upsetting the alignment between the lugs 24 and 67 the spring pressure increases. It will be appreciated that the arms of the spring 72 are always attempting to keep these lugs in alignment with each other.

At the same time the cradle is moved or rocked about the pivot pin 52 which increases the tension on one of the springs 68 which is forcing the rocker in the same direction as the shaft 14 and decreases the tension on the other spring. If it be assumed that the parts are in the position as shown in Fig. 11, it will be appreciated that although the cradle may move to nearly the position shown in Fig. 12, the rocker cannot move because it is held by the pawl. However, assuming again, as viewed in Fig. 11, that the cradle is being moved counterclockwise by the rotation of the shaft in a counterclockwise direction, it will be noted that spring pressure is being built up between the arm 73 to the cradle and by the spring 63 from the cradle to the rocker, and that as the rotation of the shaft 14 is increased the pawl on the left is gradually being pressed downward against the pressure of the spring 36. At the same time the edge of the metal face 49 travels upward on the face 38' of the pawl seat 38 until such a time as the pawl is withdrawn in a downward direction far enough for the face 38' of the pawl to disengage from the rocker. At this time the pressure of the spring snaps the rocker violently to the left, as viewed in Fig. 11, to the position shown in Fig. 12.

As better shown in Figs. 8 and 9, the movable contacts include a substantially V-shaped stem 80, the upper ends of the legs of which are provided with T-shaped portions 81 carrying contacts 82. The stem 80 is disposed in a recess 84 extending through the top of the rocker into the rocker over the rocker stem 46. This recess extends downward through the rocker and into the stem 46, and the walls slant outwardly in conformity with the slant of the contact stems. The stem of the rocker is provided with a hole 85 extending therethrough and into which a pin 86 may be passed, which pin extends through the bight 83 of the contact stem 80 and holds the stem securely in the rocker. Preferably the recess 84 is of rectangular cross-section. It will be seen that since the stem is made of a spring type metal that the contacts are capable of movement in the recess toward each other which provides a resilient mounting for the stems.

As previously stated, the movable contacts are movable between fixed contacts, the fixed contacts are mounted in a block in the top of the housing which is held in place by the removable screw or screws 97 extending through the walls of the housing into the block. The block is comprised of insulating material 90 having contact strips 92 secured into the block during molding, the strips each carrying a screw 93 at the upper end and a contact 94 at the lower end.

The block may thus be easily assembled in the housing, and, when assembled, the conduit coupling 21 is secured in place by screws 19 which extend through the flange on the edge of the coupling into the walls of the housing. It will be appreciated that other types of fixed contacts may be provided and that they are supported in spaced parallel relation to each other and on opposite sides of the movable contacts 82. The pairs of contacts 94 are adapted to be shorted by the T head 81 of the movable contacts. It will be apparent that with this con-

struction each time the contacts make and break a wiping action occurs which keeps the contacts clean. Obviously a suitable wrapping of insulating material is desirable around the block and between the block and the housing to protect it against short circuits.

The switch is adapted, by a simple adjustment, to be conditioning so that it may be moved from a neutral position, as shown in Fig. 11, to make contact in either direction, or it can be conditioned to close in one direction and opened in the other. Thus it may be adjusted to three positions, normally closed on one side, normally closed on the other side, or neutral. In order to effect this conditioning, control means is provided which comprises a bar or plate **100**, Fig. 13, of generally rectangular conformation, the ends of which are seated in recesses **101**, in opposite sides of the housing walls, see Figs. 3, 4 and 13, the recesses extend toward the back wall for a distance equal to the width of the plate and the plate being quickly and easily removable from those recesses and being held in position by the cover **11**.

The plate is provided with two lugs on opposite sides, the one lug **102** being the neutral position lug and the other lug **103** being the closed position lug. It will be appreciated that the bar may be disposed in the position shown in Fig. 13 where the lug **102** is mid-way between the side walls of the housing or that the bar may be rotated on its longitudinal axis 180° to bring the lug **103** upward, in which position it is closer to one housing wall than the other, and from which position it may also be rotated 180°, end for end, to bring the lug **103** closer to the other wall.

In its assembled position the control plate is disposed slightly above but spaced from the lugs **67** on the cradle. The flange **29** on the bearing plate **26** also provides a bearing surface for a spring **106** comprising a coiled body and having a pair of arms **107** which extend beyond the lug **67** and the lug **102** of the control plate on opposite sides, holding the lug **67** in alignment with the lug on the control plate. It will thus be seen that this spring determines the position of the cradle when no pressure is being exerted on the shaft **14** but when the shaft **14** is rotated, and, through its spring rotates the cradle out of alignment with the lug **102** on the control plate, one of the arms **107** is moved away from the other arm. The other arm cannot move because it is held by the lug **102**. When pressure on the shaft **14** is released the spring presses the arms **67** back into alignment with the lug **102** returning the cradle to the normal neutral position, as shown in Fig. 11. Thus, when the plate is in the housing with the lug **102**, which is a centering lug, facing outward, the switch is conditioned as a neutral position switch. Should the plate be reversed to bring the lug **103** so that it projects outward, then the switch will be conditioned as a normally closed switch, and the position in which it is normally closed depends upon which side of the housing the lug **103** is closest to.

The switch can also be made as a push button type switch without any substantial changes in its structure. As shown in Figs. 1 to 3 inclusive, the bottom of the housing is provided with a pair of bosses **110** in which plugs **111** are screw threaded. As best shown in Fig. 16, upon removal of the plugs **111** a push button plunger is adapted to engage the underside of the cradle **57** to enable the cradle to be rocked. To this end, the housing is provided with a bore, one end of which is threaded to receive a threaded bushing **112**. The bushing has an inwardly extending flange **113** surrounding an opening **114**. A push button comprising a stem **115** is disposed in the opening and has a head **116** disposed in the bore. The head engages a spring **117** which is relatively stiff as compared to the springs **63**. The other end of the spring is seated in a bore **118** in a plunger which has a head **119** disposed opposite to the cradle **57**. Two such assemblies are supplied, each of which is



disposed opposite the ends of the cradle **57**, that pressure upon the stem **115** causes the plunger **119** to engage the cradle allowing it to be rocked independently of the stem **14**.

It may be desirable when the device is used solely as a push button switch that the operating handle **15** be removed and a simple collar secured to the end of the stem **14**.

It will thus be seen that I have provided a switch where the contacts, which are the principal wearing parts, may be easily replaced. It is also apparent that I have provided a switch that can easily be adjusted to determine the type of operating switch desired, i. e., neutral position or normally closed and that it has a quick action in any of these positions. It is also apparent that I have provided a switch which is extremely rugged, economical to construct and easily assembled. Should the parts wear they may be easily replaced. It will be noted that the manner of the movable contacts is such that a good wiping action is obtained against the fixed contacts which thus maintains clean contacts throughout their life.

Having thus described my invention, in an embodiment thereof, it is to be understood that the construction shown has been for the purpose of illustrating the invention. I am aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A quick action switch mechanism including a movable contact carrying member having a stem and a head extending from opposite sides thereof, an operating member for said contact carrying member comprising a central bearing portion and a pair of extensions from each side thereof, said operating member being formed with an opening bisecting said bearing portion, said stem on the contact carrying member extending into said opening and being movable relative to the operating member, the contact carrying member and the operating member both being mounted on a common rockable axis, and resilient means connected between said head on the contact carrying member and said extensions on the operating member.

2. A quick action switch mechanism including a contact carrying member having a stem and laterally extending head portions, an operating member including a bearing portion and a pair of oppositely extending parts disposed in spaced parallel relation opposite to said laterally extending head portions, said stem of the contact carrying member and said bearing portion of the operating member being journalled on common pivot means, spring means seated between said head portions of the contact carrying member and said oppositely extending parts of the operating member for resiliently transferring movement from the operating member, when it is rocked, to the contact carrying member, the contact carrying member being formed with an opening through said head portions into the contact carrying member, and a contact member disposed in said opening and carrying a contact disposed beyond said head portions of the contact carrying member.

3. The switch mechanism of claim 2, wherein said contact member is comprised of a U-shaped stem carrying contacts on its free ends, and said stem is removably held in the contact carrying member by a pin extending through the contact carrying member and above the bottom of said stem.

4. A quick action switch mechanism including a contact carrying member having a stem portion and laterally extending head portions terminating in pawl engaging parts, an operating member for said contact carrying member including a body having a central opening for the reception of the stem portion of the contact carrying member, common pivot means for said members extending through the body and the stem portion, said stem

portion being rockable in said opening on the pivot independent of the operating member, said operating member being provided with laterally extending portions disposed in oppositely spaced relation to the head portions, spring means between each described laterally extending portion and the head portion for resiliently transmitting movement from the operating member to the contact carrying member, pawl means on opposite sides of said head portions of the contact carrying member for holding engagement therewith, and means on said pawls for engagement by said operating member for alternately withdrawing the pawls from engagement with the head portions of the operating member.

5. A snap action switch mechanism comprising a swingable contact carrying member, pivot means for supporting said swingable member, said swingable member carrying movable contacts for movement into engagement with fixed contacts and having pawl engaging surfaces on opposite sides of the pivot means, pawls for engagement with said surfaces, said pawls being movable in planes on opposite sides of the pivot means in straight lines, spring means for engaging said pawls and holding them against said surfaces, each of said pawls being provided with at least two seats, a rockable lever pivotally mounted on said pivot means and having portions for engagement with said pawls to cause alternate operation thereof in opposite directions, and spring connected means between said rockable lever and said contact carrying member to operate said contact carrying member.

6. A quick action switch mechanism including a contact carrying member having contacts thereon movable between fixed contacts, said member including a head and an apertured stem, with the head having parts extending laterally on opposite sides of the stem, a first operating member comprising a body having an opening therein into which the stem of the contact carrying member extends and common pivot means for the body and stem extending through the body and stem and providing a support therefor, said stem being movable in said body and said body having portions extending opposite to and in spaced relation to said laterally extending parts of the head, spring means seated between the opposed parts of the head and body for transmitting movement to the contact carrying member, pawl means engaging the contact carrying member and engaged by said first operating means to hold the pawl member until released by said first operating member, said first operating member being provided with a portion extending in spaced parallel relation to the pivot means a second operating member journalled axially of said pivot means and having a portion extending alongside the last mentioned portion of said first operating member, and spring means engageable with said last mentioned portions for holding them resiliently in alignment and for transmitting rocking movement to said first operating member.

7. A device as described in claim 6 where the spring means has a body which surrounds the pivot pin and arms extending from said body and engaging said aligned members on opposite sides.

8. A quick action switch mechanism comprising a housing, a set of fixed contacts in the housing, rockable means carrying movable contacts for movement into and out of engagement with the fixed contacts, pivot means supporting said rockable means for rocking movement about said pivot means, means extending in spaced parallel relation to said pivot means carried by said rockable means, means for biasing said rockable means to a predetermined position comprising an abutment member carried by the housing and extending alongside the means carried by the rockable means, and spring means for engagement with the abutment member and the means carried by the rockable means for holding them in spring pressed alignment.

9. A device as described in claim 8 where said abutment member comprises a body removably mounted in the housing, and said member is provided with a stem extending alongside the means that extends in spaced relation to said pivot means.

10. A device as described in claim 8, where the abutment member comprises a body having a centrally disposed lug on one side and a lug offset from the center on the other side, and said member is removably supported in the housing and may be moved to bring the centrally disposed lug on the offset lug in juxtaposition to the means on the rockable means that extends in parallel relation to the pivot means.

11. A device as described in claim 10 where the spring comprises a body of at least one convolution having arms extending therefrom and engages said juxtaposed parts for holding them in resilient alignment.

12. A switch mechanism comprising a housing, a movable contact carrying member, pivot means for pivotally supporting said member in said housing, said member having a stem portion one end of which is journalled on said pivot means and the other end of which carries a head having portions extending laterally of said stem and pivot means and being formed with pawl engaging surfaces of hardened metal on opposite sides, said housing being formed with guideways in spaced parallel relation to each other on opposite sides of said pivot means, a pawl disposed in each of said guideways and each pawl having at least two seat engaging surfaces on its end disposed for alternate engagement with said pawl engaging surfaces on the contact carrying member, spring means biasing the pawls to engage said pawl engaging surfaces on the contact carrying member, said pawls each having a transversely extending abutment, a rocker member journalled on said pivot means and having portions extending laterally from opposite sides and disposed for engagement respectively with said abutments on said pawls for moving the pawls against said spring bias, and spring means connecting said rocker member to said contact carrying member arranged to build up swinging pressure on the contact carrying member upon movement of the rocker member.

13. A switch mechanism comprising a housing, a movable contact carrying member, pivot means for pivotally supporting said member in said housing, said member having a stem portion one end of which is journalled on said pivot means and the other end of which carries a head having portions extending laterally of said stem and pivot means and being formed with pawl engaging surfaces of hardened metal on opposite sides, said housing being formed with guideways in spaced parallel relation to each other on opposite sides of said pivot means, a pawl disposed in each of said guideways, each pawl having at least two seat engaging surfaces on its end disposed for alternate engagement with said pawl engaging surfaces, spring means for each pawl to hold it seated against one of said pawl engaging surfaces on the contact carrying member, said pawls each having a transversely extending abutment, a rocker member journalled on said pivot means and having portions extending laterally from opposite sides and disposed for engagement respectively with said abutments on said pawls for moving the pawls against said spring means, and spring means connecting said rocker member to said contact carrying member arranged to build up swinging pressure on the contact carrying member upon movement of the rocker member.

14. A quick acting switch mechanism comprising a housing, an opening formed in one end of the housing, a block of insulating material carrying fixed contacts disposed in said opening with the fixed contacts projecting into the housing in spaced relation to each other on opposite sides of the housing, a cap having a conduit receiving boss secured to the end of the housing and covering the end of the housing, said block completely filling the opening in the housing, a movable contact carrying member comprising an apertured stem and having a head on the end of the stem providing portions

extending laterally of the stem, pivot means supported by the housing and extending through said stem, an operating member for said movable contact carrying member comprising a body having a central opening for admission of said stem and bosses on opposite sides journalled on said pivot means, said operating member being provided with lateral extensions on opposite sides of said bearings disposed in oppositely spaced parallel relation to the laterally extending portions of the head, springs disposed between said laterally extending head portions and said lateral extensions for resiliently transferring movement from the operating member to the contact carrying member, means for holding said contact carrying member against movement and releasable by said operating member upon relative movement of the contact carrying member and operating member comprising separate pawls disposed on opposite sides of said operating member and having seats engageable with the edges of the head of the contact carrying member, said operating member having portions for engagement with each of said pawls to move each pawl separately out of engagement with said head portions and spring means for holding said pawls into engagement with said head, each of said pawls being provided with at least two seats for alternate engagement with said head portion, and resilient operating means for said operating member comprising a stem journalled in the housing axially of said pivot means, said operating member having a lug extending from it along said pivot means in spaced parallel alignment therewith and said stem having a lug disposed alongside the lug in the operating member, and a spring having at least two convolutions disposed around said pivot means and having arms resiliently biased toward each other disposed on opposite sides of said lugs.

15. A quick acting switch mechanism comprising a housing, an opening formed in one end of the housing, a block of insulating material carrying fixed contacts disposed in said opening with the fixed contacts projecting into the housing in spaced relation to each other on opposite sides of the housing, a cap having a conduit receiving boss secured to the end of the housing and covering the end of the housing, said block completely filling the opening in the housing, a movable contact carrying member comprising an apertured stem and having a head on the end of the stem providing portions extending laterally of the stem, pivot means supported by the housing and extending through said stem, an operating member for said movable contact carrying member comprising a body having a central opening for admission of said stem and bosses on opposite sides journalled on said pivot means, said operating member being provided with lateral extensions on opposite sides of said bearings disposed in oppositely spaced parallel relation to the laterally extending portions of the head, springs disposed between said laterally extending head portions and said lateral extensions for resiliently transferring movement from the operating member to the contact carrying member, means for holding said contact carrying member against movement and releasable by said operating member upon relative movement of the contact carrying member and operating member comprising separate pawls disposed on opposite sides of said operating member and having seats engageable with the edges of the head of the contact carrying member, said operating member having portions for engagement with each of said pawls to move each pawl separately out of engagement with said head portions and spring means for holding said pawls into engagement with said head, each of said pawls being provided with at least two seats for alternate engagement with said head portion, and resilient operating means for said operating member comprising a stem journalled in the housing axially of said pivot means, said operating member having a lug extending from it along said pivot means in spaced parallel alignment therewith and said stem having a lug disposed alongside the lug in the operating member, and a spring having at least two convolutions disposed around said pivot means and having arms resiliently biased toward each other disposed on opposite sides of said lugs, the lug on said operating member extending beyond the lug on the operating stem, and a positioning member comprising a body removably disposed in said housing and having a centrally disposed lug on one side and a lug disposed to one side of the center on the other side, said positioning member being adjustably disposed in the housing to bring either of said lugs in juxtaposition to the extensions of the lug on the operating member and a spring comprising a body of at least one convolution surrounding the operating stem and having arms resiliently pressed toward each other disposed on opposite sides of said last mentioned lugs to hold them in alignment.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,542,088 | Krieger | Feb. 20, 1951 |
| 2,604,792 | Jeffrey | July 29, 1952 |
| 2,627,000 | Jeffrey | Jan. 27, 1953 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 274,547 | Germany | May 28, 1914 |
| 356,477 | Italy | Feb. 2, 1938 |