Oct. 12, 1965 J. ELLENBERGER 3,211,862

PUSHBUTTON-CONTROLLED POLYPHASE OVERLOAD CIRCUIT BREAKER

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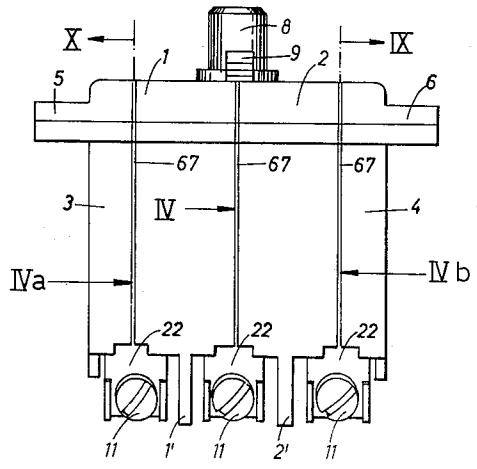


Fig. 1

Fig. 2

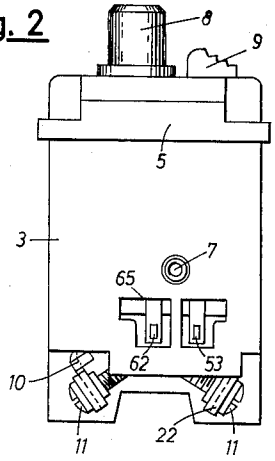
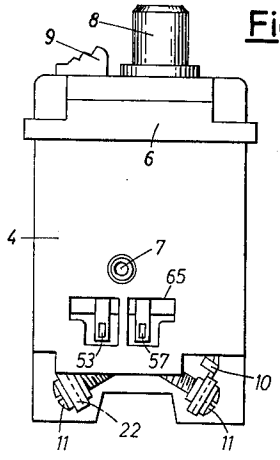


Fig. 2a



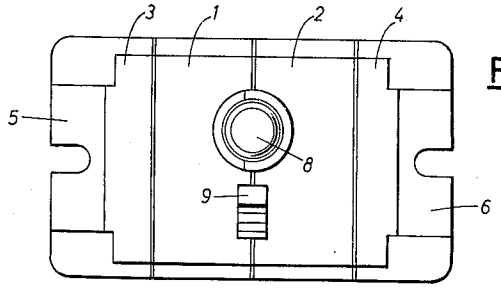


Fig. 3

By INVENTOR: JAKOB ELLENBERGER
Mulgler and Tozer, attorneys.

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Fig. 4

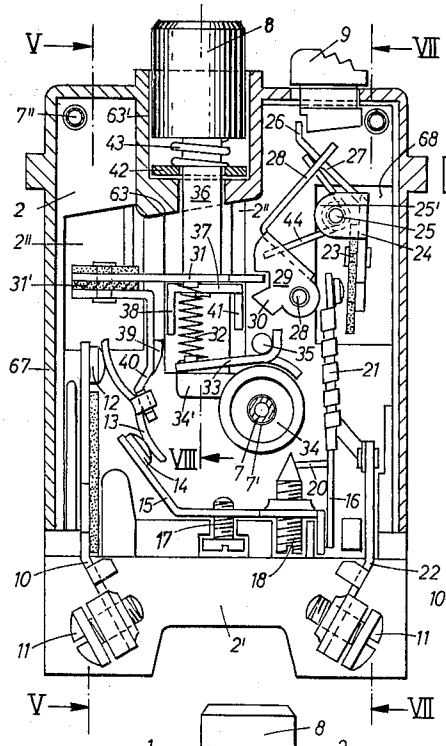
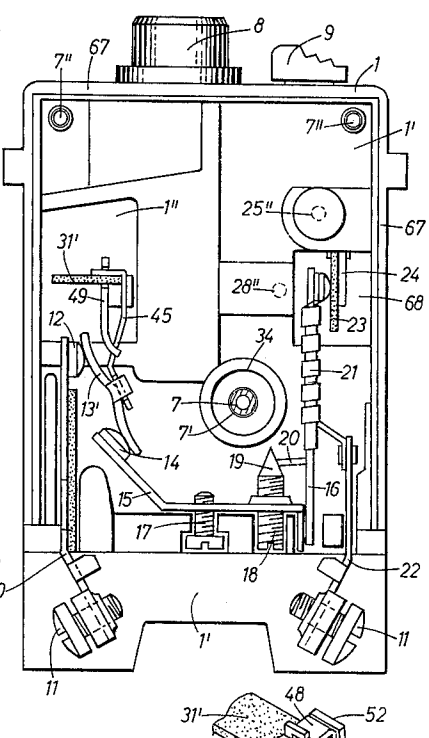


Fig. 4a



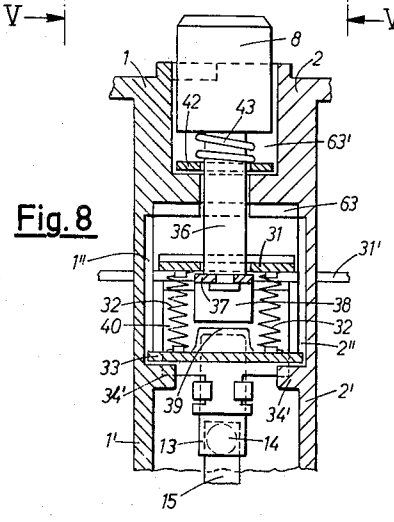


Fig. 8

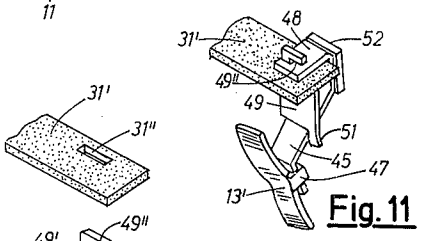


Fig. 11

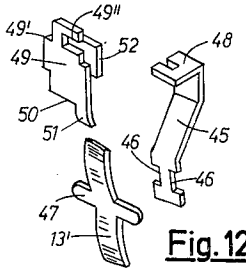


Fig. 12

INVENTOR: JAKOB ELLENBERGER

By Mueller and Toren, attorneys

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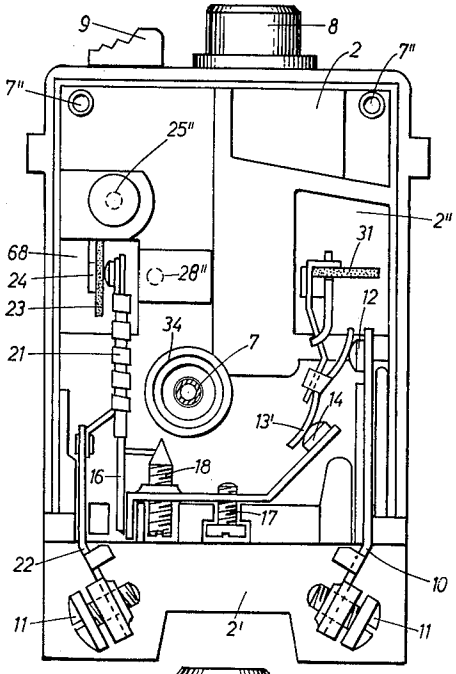

Fig. 4 b

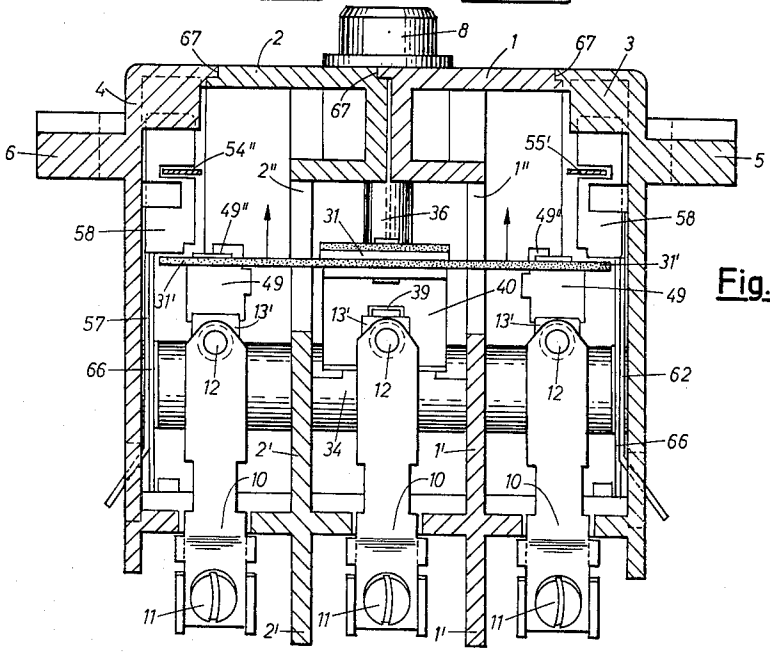

Fig. 5

INVENTOR: JAKOB ELLENBERGER

By Mueller and Traw Attorneys

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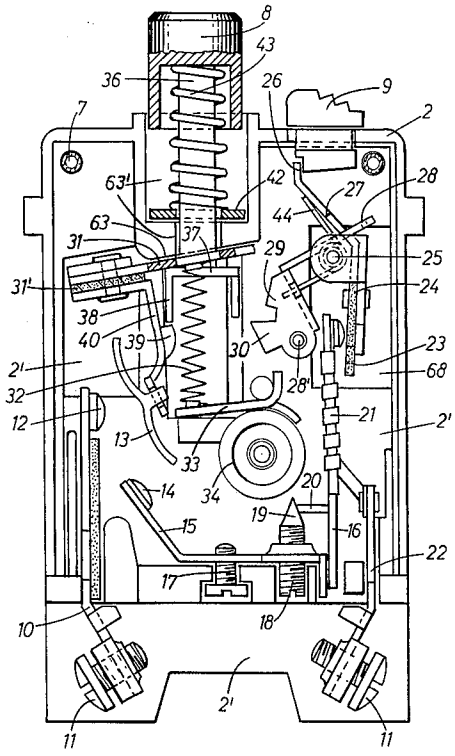
Fig. 6



INVENTOR: JAKOB ELLENBERGER
By Hughes and Tolson, attorneys

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Fig. 7

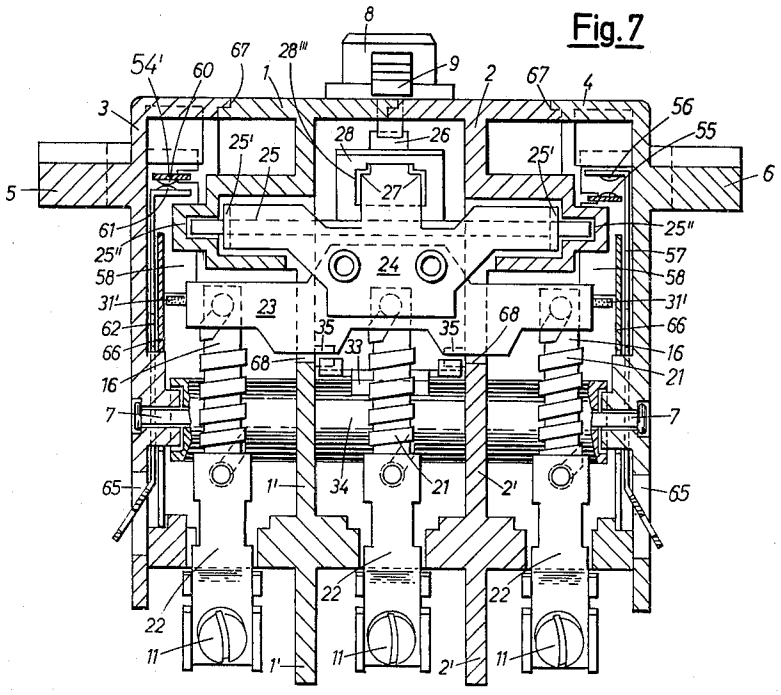


Fig. 10

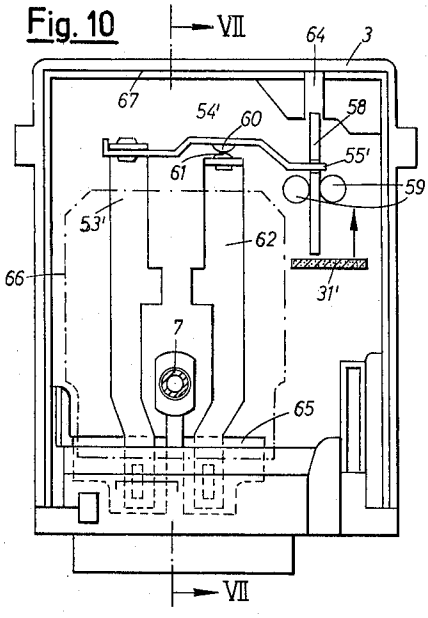
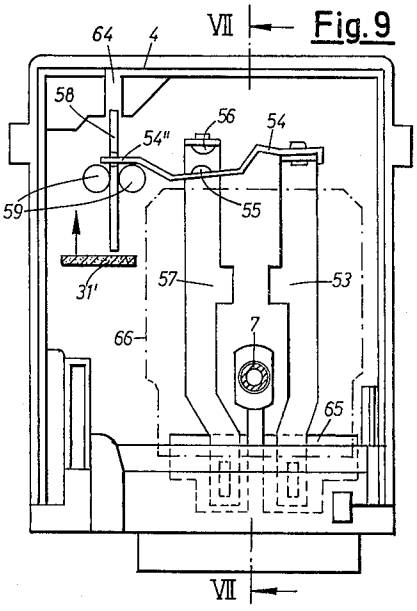


Fig. 9



INVENTOR: JAKOB ELLENBERGER

By Mulholland and Toren, attorneys

United States Patent Office

3,211,862
Patented Oct. 12, 1965

3,211,862

PUSHBUTTON-CONTROLLED POLYPHASE OVERLOAD CIRCUIT BREAKER

Jakob Ellenberger, Altdorf, near Nurnberg, Germany, assignor to Ellenberger & Poensgen G.m.b.H., a firm of Germany

Filed Apr. 25, 1963, Ser. No. 275,746
Claims priority, application Germany, Apr. 28, 1962, E 22,797
18 Claims. (Cl. 200—116)

The present invention relates to a push-button-controlled polyphase overload circuit breaker which is provided for each circuit to be controlled with a separate bimetallic strip which when bending under the effect of an overcurrent permits certain locking means to move to their inoperative position so that all of the circuits will then be interrupted by the circuit breaker. When these locking means are in their operative position, they maintain a control bridge of the circuit breaker in its connecting or on position. This control bridge is operatively connected to the pushbutton, is acted upon by a release spring, and carries the contact bridges for the different circuits insulated from each other.

There is a known circuit breaker of this type in which the control bridge is held in the connecting position by means of holding projections on the bimetallic strips. This known circuit breaker has the great disadvantage that it will be released only if all of the bimetallic strips are bent. Consequently, if an over-current occurs in only one circuit, the circuit breaker will not be released, but will remain in the connecting position.

It is an object of the present invention to provide an overload circuit breaker of the type as first described above which overcomes the mentioned disadvantage of the known circuit breaker and insures that all circuits which are connected thereto will be interrupted even though an overcurrent occurs in only one circuit.

According to the invention, this object is attained by providing the circuit breaker with a locking device in the form of a pivotable pawl which, when in the locking position, engaged upon a locking lever which is acted upon by all of the bimetallic strips of the different phases and which is pivotable to its inoperative position by a single bimetallic strip. Since this locking device forms a pivotable pawl, a relatively small force suffices to pivot this pawl to its inoperative position and thereby to release the circuit breaker. All of the bimetallic strips therefore act upon a single pivotable locking lever with which the locking pawl engages when it is in its locking position. The locking pawl may carry a strip, bar, or the like of insulating material which is directly acted upon by the bimetallic strips. With such a construction there is no need to insulate each bimetallic strip separately since the required insulation is already provided by the mentioned insulating strip.

In order to pivot the locking lever with as little friction as possible, its lateral ends are bent over and are spaced far apart and a shaft is passed through these bent-over parts and mounted in socket holes which are molded into the walls of the housing. Since the bearing points of the locking lever are thus spaced far apart, there is no danger of any lateral tilting or binding of this lever, and the lever will always pivot very easily. At its center, the locking lever may be provided with an arm with a pair of shoulders thereon which engages into an aperture in the locking pawl so that in the locking position the edges of the aperture will engage on these shoulders and the mentioned arm of the locking lever and the locking pawl will then be disposed substantially at right angles to each other. Due to this substantially rectangular position of the pawl to the locking lever, it requires only a very small force to disengage them from each other. In order to reengage the locking lever with the locking pawl after being previously disconnected, a torsion spring is mounted on the shaft of the locking lever so that one arm of this spring acts upon the locking lever and the other arm upon the locking pawl. According to another feature of the invention, the locking pawl is provided not only with a locking detent for locking the control bridge in the on position, but also with a stop projection upon which the control bridge acts when the pushbutton of the circuit breaker is depressed to move the control bridge to the on position, so that the locking pawl is thereby automatically pivoted to its operative position in engagement with the locking lever.

The locking lever may be provided with a projection which may be acted upon manually by a release button, lever, slide member, or the like. The circuit breaker according to the invention may therefore not only be released automatically by thermal action but also by hand.

For the double purpose of attaining a circuit breaker of the smallest possible dimensions and one which may be switched on and off with a sudden snap action, the invention further provides the control bridge to be mounted on a control rod, which is rigidly secured to the pushbutton, and to be pivotable relative to as well as slidable axially along the control rod. On its lower end, the control rod is further provided with a drive member which under the action of a release spring is adapted to press the control bridge against an inclined surface when it is in the off-position, so that when the control bridge is moved from this position to the on position, it will be taken along by a projection on the mentioned drive member until it interengages with the pawl. As soon as the control bridge then engages behind the holding projection on the pawl and the finger is taken off the pushbutton, the stop projection on the control bridge disengages from the drive member on the control rod so that under the action of the release spring, the control bridge can then pivot suddenly about the holding projection on the pawl into its connecting or on position in which the fixed contacts are electrically connected with each other by the contact bridges which are secured to the control bridge.

For guiding the drive member, it is provided with lateral projections which are slidable in guide slots in the walls of the housing. In addition, the control rod is guided in a bore in the walls of the housing. The entire unit consisting of the pushbutton, the control rod, and the drive member is thus securely guided and therefore the control bridge is also properly guided. The drive member may simply consist of a U-shaped piece of stamped sheet metal, one arm of which forms the two projections for guiding it in its guide slots in the housing walls.

The control bridge may be acted upon by one or more compression springs which are mounted in the housing and effect the trip-free release of the circuit breaker. If the pushbutton is held in the depressed position and the control bridge is released from the pawl, these compression springs move the control bridge to the off position. The compression springs rest on a plate which is loosely inserted into suitable recesses or between projections of the housing and is maintained in its proper position by the action of the compression springs. Due to this construction, the circuit breaker may be easily manufactured and assembled. The assembly may be further simplified if the control bridge and the mentioned plate are provided with pressed-out projections over which the ends of the compression springs are placed.

According to another feature of the invention, the control bridge is provided near each disconnecting point with an arm which extends at a substantially right angle thereto and has a contact bridge pivotably mounted on its free

end. Each of these contact bridges may be a simple stamped piece of sheet metal and have centrally thereof a pair of prongs which are bent over toward each other and are hooked loosely into corresponding recesses in the associated arm. Each contact bridge is therefore pivotably mounted on its associated arm and can thus adapt itself automatically to the position of the two fixed contacts which it should connect to each other so that a proper and reliable electric connection of the contact bridge with both fixed contacts will always be attained. This connection may be further improved by making the arms on which the contact bridges are pivotably mounted in the form of leaf springs. These springs are merely secured by a plug connection to the control bridge which consists of a strip or bar of insulating material. For this purpose, one end of each leaf spring is bent at a right angle and placed upon the upper side of the control bridge to which it is clamped by a U-shaped clamping piece. One arm of this U-shaped clamping piece passes through a slot in the insulating strip and has above the latter a notch into which the bent end of the spring engages by means of a corresponding notch. The other arm of the clamping piece presses the spring into a recess in the first arm. This construction permits the leaf springs and thus the contact bridges to be secured to the control bridge without the use of any tools.

The manufacture of the overload circuit breaker according to the invention may be further simplified by rigidly conecting each bimetallic strip to the associated contact bar carrying one of the fixed contacts so that these parts together form a structural unit which may be inserted as such into a recess in the housing and be secured thereto by a single screw. The contact bar may also be provided with a setscrew for adjusting the associated bimetallic strip.

The overload circuit breaker according to the invention is further provided with signal contacts which may be connected to suitable signal means for indicating when the circuit breaker is in the off position or in the on position. These signal contacts are actuated by the contact bridge through slide members which are slidable in slots in the housing and are directly engaged by the contact bridge. The signal contacts as well as the slide members are preferably mounted in lateral covers of the housing which may be provided with outer flanges for mounting the circuit breaker.

Aside from these lateral covers, the housing of the circuit breaker preferably consists of two parts in which control or quenching chambers for the individual circuits are provided which are separated from each other by partitions.

These and further features and advantages of the present invention will become more clearly apparent from the following detailed description thereof which is to be read with reference to the accompanying drawings, in which—

FIGURE 1 shows an enlarged side view of a circuit breaker according to the invention;

FIGURE 2 shows a view of the circuit breaker as seen from the left of FIGURE 1;

FIGURE 2*a* shows a view of the circuit breaker as seen from the right of FIGURE 1;

FIGURE 3 shows a top view of the circuit breaker according to FIGURE 1;

FIGURE 4 shows a view of the circuit breaker with its housing in the open position, as seen in the direction of the arrow IV in FIGURE 1, and with the circuit-breaking elements in the on position;

FIGURE 4*a* shows a view of the circuit breaker as seen in the direction of the arrow IV*a* in FIGURE 1, but without the left cover 3;

FIGURE 4*b* shows a view of the circuit breaker as seen in the direction of the arrow IV*b* in FIGURE 1, but without the right cover 4;

FIGURE 5 shows a cross section which is taken along line V—V of FIGURE 4;

FIGURE 6 shows a view similar to FIGURE 4 but with the circuit breaking elements in the off position;

FIGURE 7 shows a cross section which is taken along lines VII—VII of FIGURES 4, 9, and 10;

FIGURE 8 shows a cross section which is taken along line VIII—VIII of FIGURE 4;

FIGURE 9 shows a view upon the inside of the cover 4 according to FIGURE 1, as seen in the direction of the arrow IX, and with signal contacts within the cover;

FIGURE 10 shows a view upon the inside of the cover 3 according to FIGURE 1, as seen in the direction of the arrow X, and with signal contacts within the cover;

FIGURE 11 shows a perspective view of one of the two outer contact bridges; while

FIGURE 12 shows perspective views of the individual parts of the contact bridge according to FIGURE 11.

As illustrated in the drawings, the housing of the polyphase overload circuit breaker according to the invention consists of two central parts 1 and 2 and coverlike lateral parts 3 and 4 which have mounting flanges 5 and 6, respectively, integrally thereon. All of the parts 1 to 4 of the housing may be molded of a suitable insulating material and are provided with projections 67 and corresponding recesses so as to interconnect and be secured to each other by means of a single connecting screw or rivet, for example, a hollow rivet 7. In order to facilitate the assembly, the central parts 1 and 2 are preferably connected to each other by hollow rivets 7'' after the elements as hereafter described have been installed in these central parts.

A pushbutton 8 and a release knob 9 for releasing the circuit breaker by hand project from the housing. Each of the central parts 1 and 2 of the housing has a central partition 1' and 2', respectively, so that between these two partitions a control or quenching chamber is formed in which the actuating mechanism of the circuit breaker is located. Between the outer walls of the lateral covers 3 and 4 and the mentioned side walls 1' and 2' of the two central parts 1 and 2, two further control or quenching chambers are formed. The three mentioned chambers contain the control and connecting elements for three separate circuits. Each of these circuits comprises a terminal strip 10 with a connecting screw 11 and a fixed contact 12 which may be connected by a contact bridge 13, 13' to another fixed contact 14 on a contact bar 15 which, in turn, is rigidly connected to a bimetallic strip 16 and together with the latter forms a unit which is inserted into a corresponding recess in the associated housing part in which it is secured by a screw 17. The contact bar 15 carries a setscrew 18, the conical end 19 of which engages against a bent end 20 of the bimetallic strip 16. The bimetallic strip 16 carries a heating coil 21, the upper end of which is electrically connected to the bimetallic strip 16, while its lower end is secured to a terminal strip 22 which is likewise provided with a connecting screw 11.

All three bimetallic strips 16 may act upon an insulating strip 23 which is secured to a locking lever 24. This locking lever 24 is pivotably mounted on a pivot pin 25 which is inserted into socket holes 25'' in the two central parts 1 and 2 of the housing, as shown in FIGURE 7. Lever 24 is a stamped part and its outer ends are bent over at right angles to form tabs 25' through which the pivot pin 25 extends. These tabs 25' are spaced at such a distance from each other that the locking lever 24 will be prevented from tilting laterally. As also shown in FIGURE 7, locking lever 24 and the insulating strip 23 extend through openings 68 in the partitions 1' and 2'. At its center, the locking lever 24 has a projection 26 which has two shoulders 27 on which a locking pawl 28 engages. The locking pawl 28 has an aperture 28''' (FIGURE 7) through which the projection 26 on lever 24 extends. By means of the edge of this aperture 28'''

the locking pawl 28 rests on the shoulders 27 of lever 24. Pawl 28 is likewise a stamped part and is pivotably mounted at widely separated points on a pivot pin 28' which is mounted in socket holes 28'' (FIGURES 4*a* and 4*b*) in the two central parts 1 and 2 of the housing. Pawl 28 is thus very easily pivotable. It has a detent 29 and a stop projection 30. As shown in FIGURE 4, the detent 29 maintains a control bridge 31 in its connecting or on position. This control bridge 31 is acted upon by a pair of compression springs 32 (FIGURE 8) the lower ends of which rest on a plate 33 which is inserted between inner projections 34' on the partitions 1' and 2' of the housing and is held in position thereon by the compression springs 32. Plate 33 is held in position particularly by resting on the projection 34 in which the bore 7' for the rivet 7 is provided, and on projections 35 on the partitions 1' and 2' (FIGURE 7). Plate 33 and control bridge 31 are provided with pressed-out projections which engage into the opposite ends of springs 32 to hold the springs thereon.

The pushbutton 8 is mounted on a control rod 36 which extends freely through a bore in the control bridge 31 and the lower ends of which carries a U-shaped member 37 which is preferably riveted thereon. One arm 38 of this member 37 is operatively associated with a projection 39 on an arm 40 of the control bridge 31 which carries on its lower end of the contact bridge 13. The other arm 41 of member 37 is extended vertically to the plane of FIGURE 4 in both directions and is guided in vertical grooves 1'' and 2'' in the adjacent partitions 1' and 2' of the central housing parts 1 and 2. Control rod 36 is guided in an aperture 63' with recessed walls in which the pushbutton 8 is also movable in the axial direction. Control rod 36 carries a release spring 43, one end of which engages upon the pushbutton 8 and the other end upon an insulating disk 42 of hard paper which is inserted into the aperture 63'. When the circuit breaker is in the on position, as illustrated in FIGURE 4, the release spring 43 as well as the compression springs 32 act upon the control bridge 31. Since in this position the control bridge 31 acts upon the detent 29 of pawl 28, the central contact bridge 13 and the two outer contact bridges 13' which are mounted on an insulating strip 31' which is rigidly secured to the control bridge 31 are pressed by springs 43 and 32 with considerable force against the fixed contacts 12 and 14.

As shown in FIGURE 11, each of the contact bridges 13' which project into the two chambers which are closed by the lateral covers 3 and 4 may be secured to a spring arm 45 which may consist of bronze. This spring arm 45 is provided on both sides of its lower end with notches 46, as shown in FIGURE 12, into which the contact bridge 13' is loosely hooked by a pair of lateral clamping prongs 47 (FIGURE 11) so that the contact bridge 13 in the form of a stamped piece of metal can pivot on spring 45 in the clockwise or counterclockwise direction. The upper end of spring 45 is bent over at a right angle and forms a tab 48 which rests on the upper side of the insulating strip 31'. Adjacent to this tab 48, the insulating strip 31' has a slot 31'' through which an arm 49 of a connecting member passes so as to engage with the shoulders 49' (see FIGURES 11 and 12). Arm 49 has above the insulating strip 31' a slot 49'' into which the tab 48 with a corresponding slot may be inserted in the longitudinal direction of the insulating strip 31', so that the arm 49 and the tab 48 are locked together. In order to prevent the tab 48 and thus the entire spring 45 from being pushed back and from thus being disconnected from the arm 49, the lower end of arm 49 is provided with a recess 50 whereby a lateral projection 51 is formed which holds the spring 45 in the position according to FIGURE 11. The other arm 52 of the connecting member maintains the spring 45 in the recess 50.

As illustrated in FIGURES 8 to 10, covers 3 and 4 carry contact strips 53 and 53', respectively, which are secured to the inner walls thereof and each of which has a bronze spring 54 or 54', respectively, riveted thereon. A contact 55 on spring 54 in cover 4 is operatively associated with a contact 56 on a further contact strip 57. The extension 54'' of contact spring 54 is inserted into a slot in a slide member 58 which is guided between a pair of projections 59 of the housing.

The two outer contact bridges 13' have to be connected to the insulating strip 31' so as to be easily removable therefrom since it would otherwise be very difficult to install them. If they were firmly connected to this insulating strip they could not be passed through the openings 1'' and 2'' in the partitions 1' and 2'.

As illustrated in FIGURES 7, 9, and 10, the covers 3 and 4 carry on their inner sides signal means comprising contact strips 53 and 53', each of which has a bronze spring 54 or 54', respectively, riveted thereto. Contact 55 on the bronze spring 54 cooperates with a contact 56 on a further contact strip 57 on the cover 4. The extension 54'' of contact spring 54 is hooked into a slide member 58 which is slidable in a vertical direction between the projections 59 on cover 4 and within a slot 64 in this cover. Contact 60 on contact spring 54' engages upon a contact 61 on a contact strip 62 on the cover 3. The extension 55' of contact spring 54' is hooked into a slide member 58 which is slidable in a vertical direction between projections 59 on the cover 3 and within a slot 64 in this cover. In the position of the contact springs 54 and 54' shown in FIGS. 9 and 10, the control bridge 31 with the insulating strip 31' is then in the on position as illustrated in FIGURE 4. Contact strips 53, 53', 57, and 62 are held in place on the inner walls of covers 3 and 4 by small insulating strips 66 which are glued upon these walls, and the lower end of these contact strips extend through apertures 65 in the walls of cover 3 and 4 to the outside and there form connecting terminals.

If because of an excess current a bimetallic strip 16 is bent in the clockwise direction as seen in FIGURE 4, its upper end presses against the insulating strip 23 on the locking lever 24 so that the latter is then pivoted in the counterclockwise direction against the action of a torsion spring 44 which is mounted on pivot pin 25 and one arm of which acts upon the projetcion 26 on locking lever 24 and the other arm upon the pawl 28. By this movement, pawl 28 disengages from the shoulders 27 on locking lever 24 and is turned about its pivot pin 28' in the clockwise direction. The compression springs 32 then press the control bridge 31 together with the contact bridges 13 and 13' into the off position, as illustrated in FIGURE 6, in which the control bridge 31 engages upon an inclined surface 63. In this off position, arm 38 of the member 37 is located above the stop projection 39 on the arm 40 of control bridge 31. If the pushbutton 8 is then depressed, arm 38 acts upon the projection 39 and takes along the control bridge 31 in the downward direction until the right end of control bridge 31 according to FIGURE 6 engages upon the stop projection 30 on pawl 28 and turns the same about its pivot pin 28' in the counter-clockwise direction. Under the action of the torsion spring 44, pawl 28 then again engages with the shoulders 27 on the locking lever 24. If during this movement to the on position the finger is taken off the pushbutton 8, the arm 38 of member 37 disengages from the stop projection 39 and releases the control bridge 31, so that the contact bridges 13 and 13' are suddenly pressed by the compression springs against the fixed contacts 12 and 14.

In the operative position, as illustrated in FIG. 4, the insulating strip 31' of the control bridge 31 is located below slide 58, such as shown in FIGS. 9 and 10. In this position, contacts 55 and 56 are disconnected, and contacts 60 and 61 are closed. In the disconnecting operation, the control bridge 31, with the insulating strip 31', moves upwardly, such as indicated by the arrows in

FIGS. 9 and 10, and thereby moves the two slides 58 to such an extent that, in the inoperative position as shown in FIG. 6, contacts 55, 56 are closed, and contacts 60, 61 are opened.

If the pushbutton 8 is held in the depressed position either by hand or by being wedged in the housing, the compression springs 32 will effect a trip-free release of the circuit breaker when an overcurrent occurs in one of the bimetallic strips 16 and the latter is thereby bent.

The circuit breaker may also be released by hand by sliding the release knob 9 in the direction toward the pushbutton 8, as seen in FIGURE 4, so that its lower end then acts upon the upper end of the projection 26 on locking lever 24 and thereby pivots the latter in the counterclockwise direction, whereby pawl 28 is released and may then pivot in the clockwise direction to disconnect the circuit breaker.

Although my invention has been illustrated and described with reference to the preferred embodiment thereof, I wish to have it understood that it is in no way limited to the details of such embodiment, but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second contacts of respective first and second terminal means upon movement of said control bridge for completing and disconnecting the respective circuits, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements for each circuit and being displaceable, upon bending of any one of said bimetallic elements, due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, and a push button slidable in said housing toward and away from said control bridge and engageable with said control bridge to move said control bridge into an operative position against said biasing means into locking engagement with said locking means.

2. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second contacts of respective first and second terminal means for completing and disconnecting the respective circuits, a locking lever engageable with said control bridge for securing said bridge in an operative position, said locking lever having two ends bent at angles from each other one of said legs being disposed adjacent all of the said bimetallic elements for each circuit and being displaceable upon bending of any one of lever, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, and a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means.

3. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second contacts of respective first and second terminal means for completing and disconnecting the respective circuits, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements for each circuit and being displaceable upon bending of any one of said bimetallic elements due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, and a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means, said locking means comprising a locking lever, a pivot pin carried by said housing for pivotally mounting said locking lever, said locking lever having a central projecting locking arm, and a locking pawl pivotally mounted in said housing adjacent said locking lever and having an aperture which is engageable by the locking arm of said locking lever, said locking pawl being directly engageable with said control bridge for holding said control bridge in an operative position in which said control bridge biases said contact bridges against said respective first and second contacts.

4. A polyphase overload circuit breaker comprising a housing, a first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second contacts of respective first and second terminal means for completing and disconnecting the respective circuits, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements for each circuit and being displaceable upon bending of any one of said bimetallic elements due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, and a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means, said push button having a control rod portion, said control bridge being slidable in axial directions on said control rod, said control rod having a drive member which engages with said control

bridge when said push button is moved in an actuating direction to move said control bridge into engagement with said locking means.

5. A polyphase overload circuit breaker according to claim 4, wherein said drive member is provided with lateral projections which are slidable in guide slots in said hosuing to guide said drive member.

6. A polyphase overload circuit breaker according to claim 4, wherein said drive member consists of a U-shaped piece of sheet metal, including one arm which forms two lateral projections.

7. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second contacts of respective first and second terminal means for completing and disconnecting the respective circuits, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements for each circuit and being displaceable upon bending of any one of said bimetallic elements due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, and a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means, said biasing means comprising a compression spring on each side of said control member, one of said compression springs being of a force to cause positive biasing engagement of said contact bridges when said control member is in an operative position.

8. A polyphase overload circuit breaker according to claim 7, wherein said compression springs are mounted on a plate which is loosely inserted into recessess defined in said housing, said plate being held in position by the action of said compression springs.

9. A polyphase overload circuit breaker according to claim 8, wherein said control bridge is connected to said plate, said control bridge and said plate having pressed-out projections for accommodating respective ends of said compression springs.

10. A polyphase overload circuit breaker according to claim 8, wherein said control bridge has a projection extending at an angle in respect thereto for each of said contact bridges, said contact bridges being pivotally mounted on the free end of respective projections.

11. A polyphase overload circuit breaker according to claim 8, wherein said contact bridge is formed by a stamped piece of sheet metal having at its center a pair of arms bent-over towards each other in a clamp-like manner and hooked loosely into a pair of opposite recesses in the associated projection of said control bridge.

12. A polyphase overload circuit breaker according to claim 11, wherein said projections on said control bridge form leaf springs.

13. A polyphase overload circuit breaker according to claim 12, wherein each of said leaf springs is bent over at one end at substantially a right angle, a strip of insulating material secured at its upper side to said bent end, said insulating material being rigidly secured to said control bridge, and clamping means for securing said insulating material to said control bridge including a U-shaped clamping piece, one arm of which passes through a slot in the insulating material and is provided at a location above said insulating material with a notch into which the bent end of said spring is inserted.

14. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second terminal means for completing and disconnecting the respective circuit, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements of each circuit and being displaceable upon bending of any one of said bimetallic elements due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means, and signal contacts disposed along said control bridge and displaceable thereby, said signal contacts being slidable in said housing.

15. A polyphase overload circuit breaker according to claim 14, wherein said signal contacts and said slide members are mounted in lateral covers of said housing.

16. A polyphase overload circuit breaker according to claim 15, wherein said covers are provided with mounting flanges.

17. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges being disposed for engagement and disengagement with the respective first and second terminal means for completing and disconnecting the respective circuits, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements for each circuit and being displaceable upon bending of any one of said bimetallic elements due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, and a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means, said housing being divided into two parts separated by partitions defining control and quenching chambers for each of the different circuits, and lateral cover secured to each end of said housing parts.

18. A polyphase overload circuit breaker comprising a housing, first and second terminal means in said housing for each circuit with respective first and second contacts located in spaced relationship, said first terminal means including a bimetallic strip which is bendable upon changes in current load, a control bridge, spring means biasing said control bridge, a contact bridge for each circuit connected to said control bridge, means insulating said contact bridges from each other, said contact bridges

being disposed for engagement and disengagement with the respective first and second contacts of respective first and second terminal means for completing and disconnecting the respective circuits, locking means engageable with said control bridge for securing said bridge in an operative position, said locking means including a pivotal member disposed adjacent all of the said bimetallic elements for each circuit and being displaceable upon bending of any one of said bimetallic elements due to current overload to release said bridge, said spring means biasing said bridge causing displacement of said bridge upon release thereof by said locking means to move the contact bridges carried thereby out of engagement with the respective first and second terminals, a push button slidable in said housing toward and away from said control bridge in engagement with said control bridge to move said control bridge against said biasing means into locking engagement with said locking means, and a manually releasable button element slidable in said housing in a direction perpendicular to the sliding movement of said push button and engageable with said locking means for moving said locking means to release the control bridge.

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BERNARD A. GILHEANY, *Primary Examiner.*