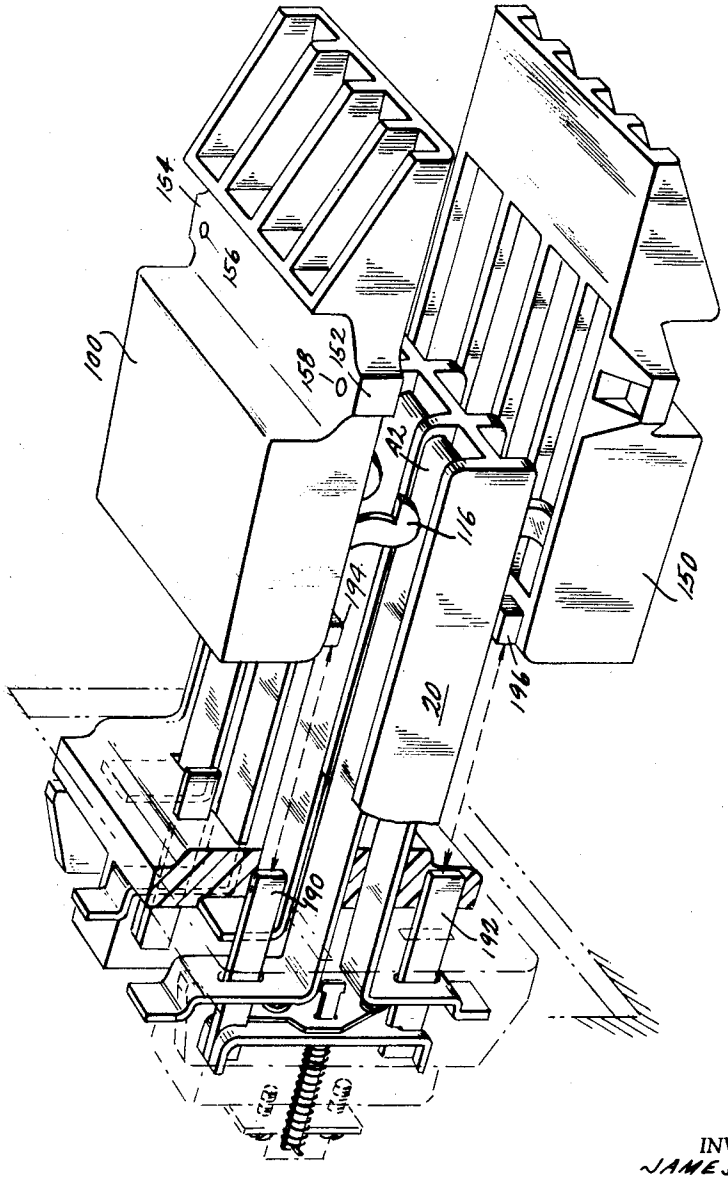
Dec. 15, 1959 J. C. CRAIG ET AL 2,917,592

CONTROL DISCONNECT CONTACT STRUCTURE FOR DRAW-OUT CIRCUIT BREAKERS

Filed May 14, 1958 4 Sheets-Sheet 1

FIG. 1.



INVENTORS
JAMES C. CRAIG.
EINAR H. FREDRICKSON

BY Strauch, Fater, Kurz & Soffen
ATTORNEYS

Dec. 15, 1959 J. C. CRAIG ET AL 2,917,592

CONTROL DISCONNECT CONTACT STRUCTURE FOR DRAW-OUT CIRCUIT BREAKERS

Filed May 14, 1958

4 Sheets-Sheet 2

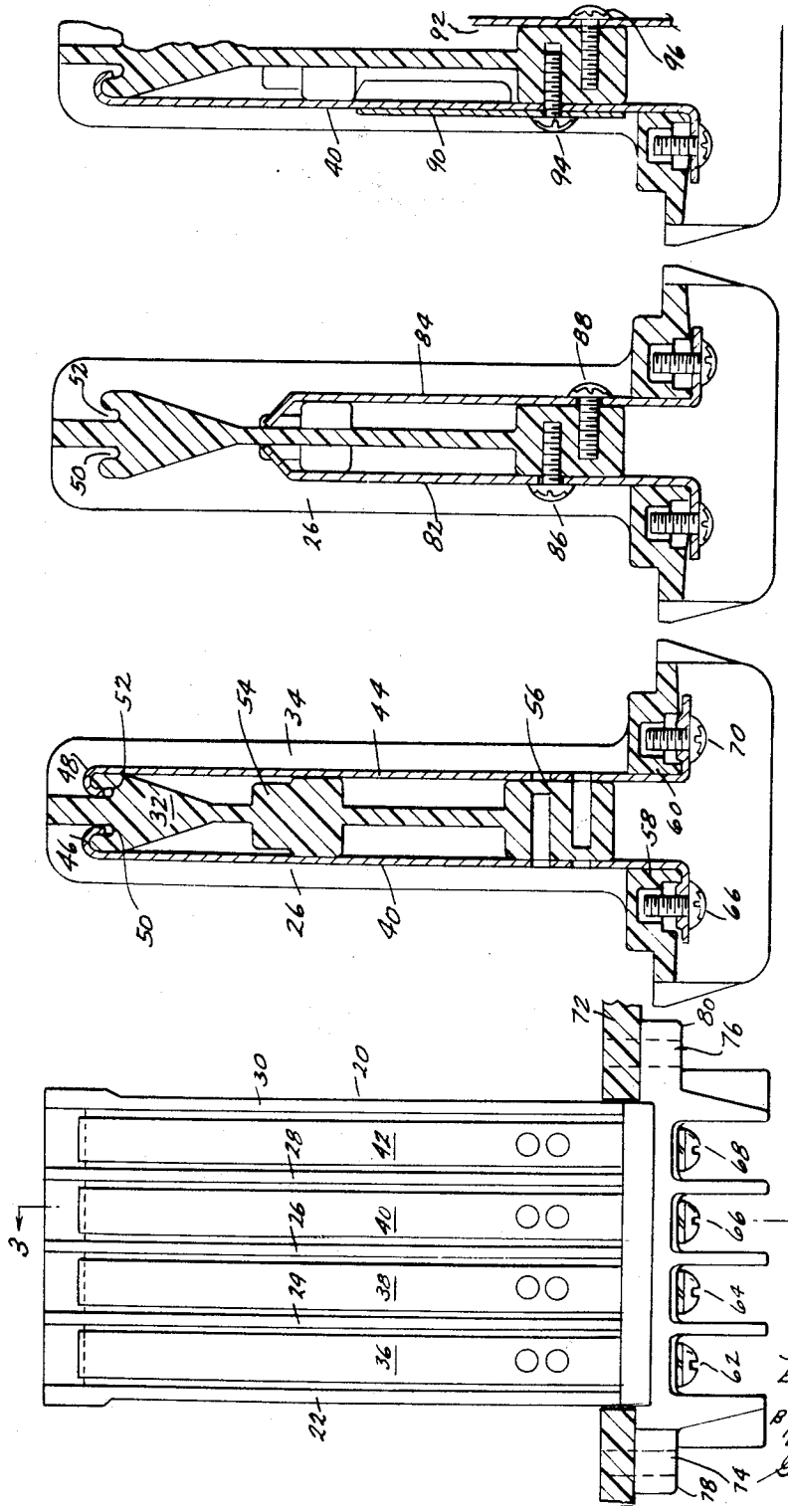


FIG. 5.

FIG. 4.

FIG. 3.

FIG. 2.

INVENTORS
JAMES C. CRAIG
EINAR H. FREDRICKSON

By Peterson, Faber, Gust & Doffen
ATTORNEYS

Dec. 15, 1959 J. C. CRAIG ET AL 2,917,592

CONTROL DISCONNECT CONTACT STRUCTURE FOR DRAW-OUT CIRCUIT BREAKERS

Filed May 14, 1958

4 Sheets-Sheet 3

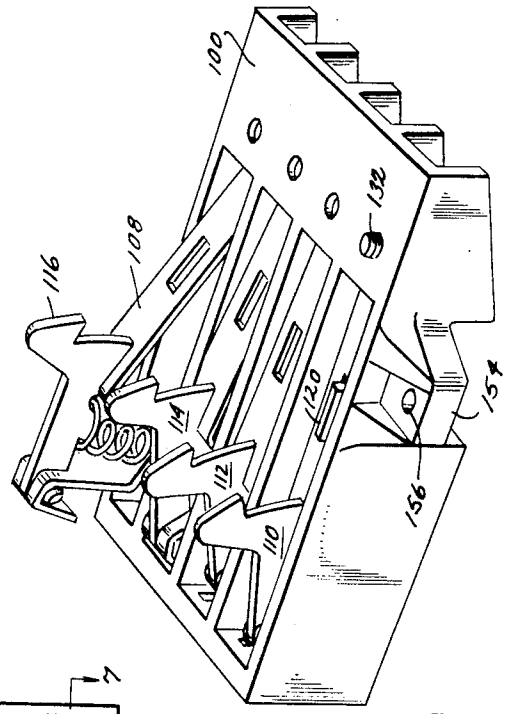


FIG. 8.

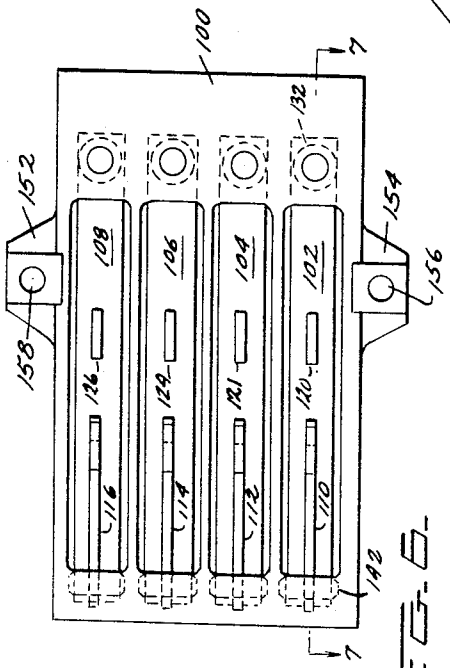


FIG. 6.

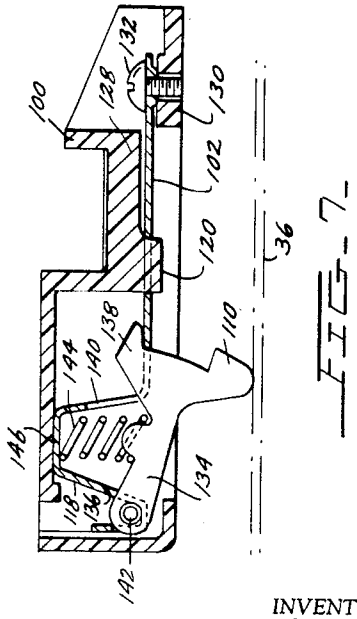


FIG. 7.

INVENTORS
JAMES C. CRAIG
EINAR H. FREDRICKSON

BY Ostrolenk, Faber, Gerb & Soffen
ATTORNEYS

Dec. 15, 1959 J. C. CRAIG ET AL 2,917,592

CONTROL DISCONNECT CONTACT STRUCTURE FOR DRAW-OUT CIRCUIT BREAKERS

Filed May 14, 1958 4 Sheets-Sheet 4

FIG. 10

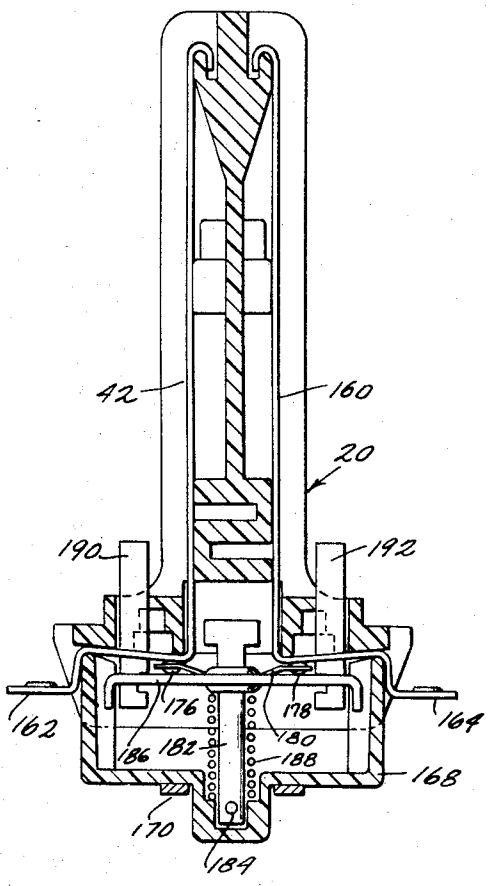
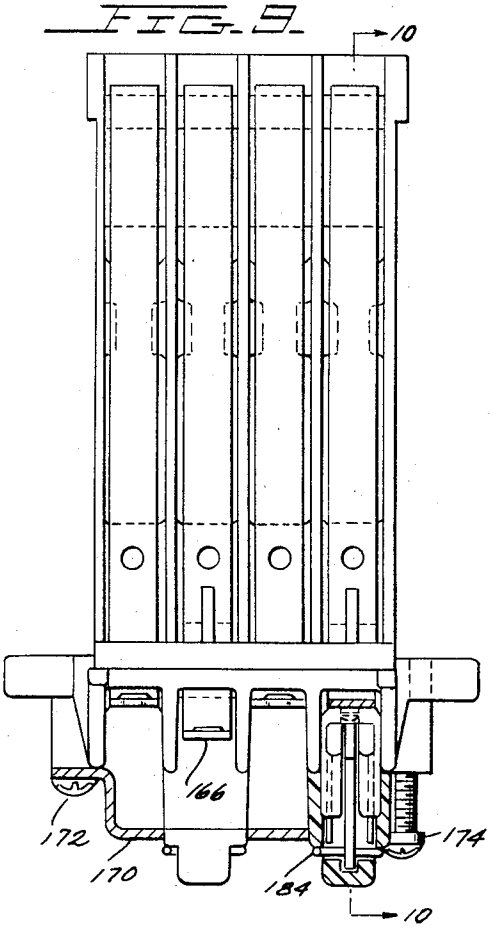


FIG. 9



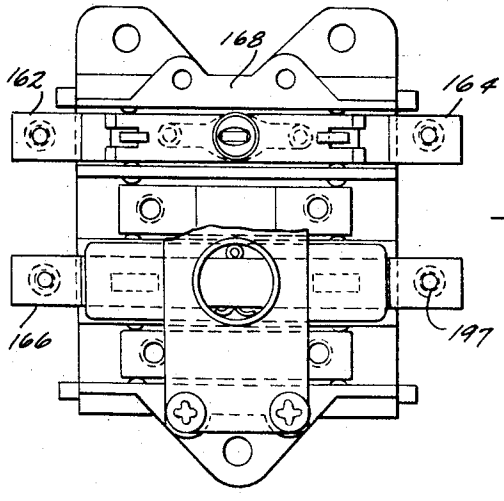


FIG. 11

INVENTORS
JAMES C. CRAIG
EINAR H. FREDRICKSON
BY Ostrolenk, Faber, Gerb & Soffen
ATTORNEYS

United States Patent Office 2,917,592
Patented Dec. 15, 1959

2,917,592

CONTROL DISCONNECT CONTACT STRUCTURE FOR DRAW-OUT CIRCUIT BREAKERS

James C. Craig, Mount Ephraim, N.J., and Einar H. Fredrickson, Philadelphia, Pa., assignors to I-T-E Circuit Breaker Company, Philadelphia, Pa., a corporation of Pennsylvania

Application May 14, 1958, Serial No. 735,333

14 Claims. (Cl. 200—50)

This invention relates to a control disconnect contact structure for draw-out circuit breakers wherein the stationary and movable components are assembled within molded housings in a novel manner, and the stationary control disconnect contact extends through the cubicle wall as an integral part of the wall to provide terminal connections externally of the cubicle.

Draw-out type circuit breakers as well known in the art, are mounted within a cubicle and are provided with main disconnect contacts and control disconnect contacts. Both the movable main contacts and movable control contacts are carried by the circuit breaker and their stationary cooperating contacts are supported within the cubicle. The main disconnect contacts are connected directly in series with the circuit breaker, while the control disconnect contacts are connected to various control circuits and operating circuits for controlling the circuit breaker operation. These control circuits are normally energized through the control disconnect contacts when the circuit breaker is in its operating position where the main disconnect contacts are engaged, as well as in a test position where the circuit breaker is moved to disconnect the main disconnect contacts while the control disconnect contacts remain engaged. When the circuit breaker is fully withdrawn to a disconnected position, the control disconnect contacts as well as the main disconnect contacts will then disengage.

In the past, the stationary control disconnect contact has been completely supported within the circuit breaker cubicle with the wiring from control circuits being taken through the circuit breaker cubicle wall to terminals fastened to the stationary control disconnect contact within the cubicle.

In this type of construction, it is necessary first, to take conductors through the circuit breaker cubicle wall and, secondly, to have to go into the cubicle in order to make terminal connections at the stationary control contact. Furthermore, the prior type of control disconnect contacts are normally riveted together so that replacement or maintenance of the contacts is difficult.

The principle of this invention is to provide a novel control disconnect structure where all of the conducting members of both the movable and stationary control disconnect contacts are assembled within a molded housing and supported therein by a minimum of fastening means. Furthermore, the contacts of any given housing are easily adaptable to situations where it is desired to maintain a control circuit only under operating conditions, but not under test conditions or, conversely, only under test conditions and not under operating conditions.

Further in accordance with this invention, the stationary disconnect contact forms an integral part of the cubicle wall and has a first portion containing the contacting elements extending into the cubicle for cooperation with the movable control disconnect contacts, while another portion is positioned externally of the cubicle and contains the terminal connectors for the various

contacting elements of the stationary control disconnect contact. Therefore, it is no longer necessary to gain access to the cubicle for making terminal connections in the control circuitry. Similarly, the necessity of passing conductors through the cubicle wall is eliminated, since the current path is contained within the stationary molded housing.

Where a plurality of control circuits are utilized and require a large number of contacting elements, the novel structure of this invention is inherently capable of stacking a plurality of contact members on top of one another so as to decrease the space requirement by having the stationary contacting members arranged back-to-back within a unitary molding, while the movable control contact sandwiches between the back-to-back positioned stationary members. Because of this sandwiching arrangement, the further desirable feature of having the movable components pointing toward one another will serve to protect the moving parts from damage when in the disconnected position. Further, when this stacking is utilized, the contact pressure will be distributed equally between both assemblies.

As another inherent feature of this novel structure, the stationary control disconnect contact may be easily adapted to support a by-pass switch which is normally closed when the circuit breaker is in its disengaged position, but is moved to the open position when the circuit breaker is in its operating position. As will be seen more fully hereinafter, switching of this type is needed to prevent the electrical interruption of normally closed auxiliary switch interlocks which would become disconnected when the circuit breaker is in the disengaged position.

Accordingly, the primary object of this invention is to provide a novel control disconnect contact structure for draw-out circuit breakers.

Another object of this invention is to provide a novel control disconnect contact structure wherein both the movable and stationary components are simply mounted within the molding housings.

Another object of this invention is to provide a novel control disconnect contact structure wherein the contacting portions of the stationary disconnect contact extend into the cubicle of the draw-out circuit breaker, while the terminal portions for the stationary contacting elements are positioned externally of the cubicle.

Another object of this invention is to provide a novel stationary control disconnect contact which is integral with the cubicle wall and its terminals are positioned externally of the cubicle wall.

Another object of this invention is to provide an economical control disconnect structure wherein the components are easily available for inspection and maintenance and are interchangeable.

A still further object of this invention is to provide a novel control disconnect contact structure which may be vertically stacked to save space.

A further object of this invention is to provide a novel control disconnect contact structure which may be adapted to receive an auxiliary switch means.

A further object of this invention is to provide a pair of cooperating control disconnect contacts which are supported within respective molded housings and utilize a minimum of retaining devices for holding their respective contacting elements in place.

These and other objects of this invention will become apparent from the following description when taken in connection with the drawings, in which:

Figure 1 is a perspective view of the stationary and movable control disconnect contacts in addition to an

auxiliary switch, as constructed in accordance with this invention.

Figure 2 is a top view of the stationary disconnect contact of Figure 1.

Figure 3 is a side cross-sectional view of Figure 2 when taken across the lines 3—3.

Figure 4 is a modification of the stationary control disconnect contact of Figure 3 where the control contacts are engaged only when the circuit breaker is moved to its connected position.

Figure 5 is similar to Figures 3 and 4, but is modified to permit engagement of the control contacts only when the circuit breaker is moved to its test position.

Figure 6 is a top view of the movable control disconnect contact of Figure 1.

Figure 7 is a side cross-sectional view of Figure 6 when taken across the lines 7—7.

Figure 8 is a perspective view of the movable contact of Figures 6 and 7 and specifically indicates the manner in which the contacting elements are assembled within their molded housings.

Figure 9 illustrates the manner in which the stationary disconnect contact of Figure 2 is associated with the auxiliary switch structure, as shown in Figure 1.

Figure 10 is a side cross-sectional view of Figure 9 when taken across the lines 10—10.

Figure 11 is a view of Figures 9 and 10 when looking toward the end of the stationary contact structure.

Referring first to Figures 1, 2 and 3, the stationary disconnect contact structure is comprised of a molded housing **20** having a plurality of extending ribs **22, 24, 26, 28** and **30** on either side of a central platform **32**. It will be noted in Figure 3 that a similar plurality of ribs, such as rib **34** which is adjacent rib **26** on the top side of the contact structure, are provided for each side of platform **32**. Stationary contacting elements **36, 38, 40** and **42** on the top of the molding, as seen in Figure 2, are supported between the various ribs and an identical set of contacting members, such as elongated contact member **44** seen in Figure 3, are provided on the under side of the stationary contact.

These contacting members are seen in Figure 3 to have a hook-shaped tip, such as tips **46** and **48**, which hook into ridges **50** and **52** respectively of platform **32**.

Contacting members such as strips **46** and **48** of Figure 3, are further supported by extending portions **54** and **56** of platform **32** and are terminated at their bottom by a hook shape or right angle formed around shoulders **58** and **60** respectively of the housing to terminate at their terminal position to form terminals such as terminals **62, 64, 66** and **68** of Figure 2 for the top conductors, and a similar set of terminals, such as terminal **70**, for conductor **48** of the bottom set of conductors.

The stationary control disconnect contact assembly is then positioned through an aperture in the cubicle wall **72**, as fragmentarily seen in Figures 1 and 2, and is fastened thereto in any desired manner, as by fastening means extending through apertures **74** and **76** in extending ears **78** and **80** respectively of molding **20**, as seen in Figure 2.

From the foregoing, it will be realized that the assembly of the stationary contacting elements within their molded housing will be extremely simple.

Thus, it is only necessary to first hook the lower terminal portion of the conducting strips around the shoulders **58** and **60** and thereafter snap the hook-shaped upper end, such as tips **46** or **48**, into their respective depressions in the platform **32**, such as depressions **50** and **52** respectively whereby the conductive strips will be held in place without the use of any retaining means.

However, the terminal fastening means, such as the screws associated with terminals **62** through **70** may further operate to secure the lower end of the conductive strips into position.

The above described contacting strips of Figure 3 will operate to provide engagement of the control disconnect contacts when the circuit breaker is positioned in either its connected or test positions.

The strips of Figure 3 may be modified to provide contact engagement only when the circuit breaker is in its operating position, or only when the circuit breaker is in its test position. To this end, the structure of Figure 4 will be utilized when the control contacts are to be engaged only with the circuit breaker in the connected position, while the structure of Figure 5 will operate to provide contact engagement of the control disconnects only when the circuit breaker is in the test position.

It will be first noted that the structures of Figures 4 and 5 are substantially identical to the structure of Figure 3. However, in the case of Figure 4, the contacting members, such as contacting members **82** and **84** are foreshortened so that when the movable control disconnect contact is withdrawn to a test position, the control disconnects will disengage. Since the support at the snap engaging depressions **50** and **52** of platform **32** is lost it is necessary to provide retaining screws **86** and **88** respectively to retain the conductors in position.

In the case of Figure 5, it is desired to prevent contact engagement when the circuit breaker is in its connected position, but to allow engagement when the breaker is in its test position. To this end, the identical structure of Figure 3 is utilized, but insulating strips, such as strips **90** and **92** respectively, cover the lower half of conductors **40** and **44** respectively of Figure 3 to expose only the upper portion of the conductive strips. In order to secure the insulator members **90** and **92**, retaining screws, such as screws **94** and **96** which are identical to screws **86** and **88** of Figure 4, are utilized.

From the foregoing, it is seen that the identical molding is utilized for the various embodiments. Accordingly, it is possible to achieve great interchangeability in the stationary control disconnect contact. Thus, it is possible to make certain of the conductive elements, such as elements **36, 38, 40** and **42** in a given layer, of the type shown in Figure 3, while another is of the type shown in Figure 4, while still a third is of the type shown in Figure 5.

Clearly, our novel structure easily lends itself to this type of interchangeability. Furthermore, it will be apparent that maintenance of the structure is extremely simple, since all of the conductive elements are easily accessible and easily replaceable.

Referring now to the movable contact structure, the movable contact of Figure 1 is best seen in Figures 6, 7 and 8 as comprising a molded housing **100** which supports the various conductive elements in a novel manner.

As best seen in Figure 6, the movable contact structure comprises four sets of conductive members **102, 104, 106** and **108** which correspond to stationary conductive elements **36** through **42** respectively in Figure 2. The contacting elements of conductors **102** through **108** are comprised of the protruding floating fingers **110, 112, 114** and **116** respectively wherein the outer portions of the protruding fingers can engage respective conductive strips of the stationary contact. This is seen in Figure 7 for the case of floating finger **110** of conductive member **102**, which is engageable with conductive member **36** of the stationary contact assembly.

Figure 7 shows the general shape of the conductive strips **102** through **108** as being elongated members having a generally S-shaped end portion, such as end portion **118** for conductive member **102**. Each of conductive strips **102** through **108** are further provided with apertures, such as apertures **120, 121, 124** and **126**, respectively, which aid in positioning and maintaining the conductive strips within their molded housing **100**.

More specifically, the molded housing is formed to cooperate with the shape of each of conductive strips **102** through **108**, as best seen in Figure 6 where the molded housing receives the bottom portion **120** of con-

ductive strip **102**. Housing **100** further provides a plurality of protrusions, such as protrusion **122** which extend through apertures of the strips such as aperture **120** of strip **102**. The ends of strips **102** through **108** which are opposite the generally S-shaped end **118** are then positioned between wall **128** and base portion **130** to be secured by a retaining means, such as screw **132** which also operates as a terminal fastening means.

Each of the floating fingers **110** through **116** are supported within their respective conductive strips **102** through **108** by having their rear elongated portion, such as portion **134**, extend through slot **136** of strip **102**, while their other elongated end **138** rests on the edge of slot **140** of their conductor, such as conductor **102**.

The right-hand end of the finger **110**, as seen in Figure 7, is supported on the edge of slot **140**, while the other end **134** has a conductive pin **142** extending therethrough and supported in the bottom portion **120** of conductive strip **102**. A biasing means, such as biasing spring **144**, is then provided between the top section **146** of each of the conductive members and a central portion of the finger **110** to thereby bias pin **142** into conductive engagement with strip **102** and bias the contacting portion of finger **110** outwardly and into a contact engaging position. Thus, when the movable contact is moved into engagement with the stationary control disconnect contact, the biasing means, such as biasing means **144**, will bias each of the floating contacts into engagement with their respective stationary conductive strips of the stationary control disconnect contact.

From the foregoing description of the movable contact and as best seen in Figure 8, the conductive elements are assembled by first sliding the right-hand end of the conductive strip, such as conductive strip **108** of Figure 8, into position between walls **128** and **130** of Figure 7 until the aperture **126** of strip **108** is positioned just past the protrusion which cooperates with aperture **126**, such as the protrusion **122** for conductive strip **102**.

The conductive strip is then depressed into the housing so as to bring the S-shaped portion of the left-hand end of the strip into its position with respect to the molded housing, and is then slipped backwardly until the molded protrusion **122** snaps into the aperture **126** to thereby rigidly secure the conductive strip in position.

It will be noted that the conductive strip **108** is assembled after the floating finger **116** and its respective biasing spring and conductive pin have been subassembled.

From the foregoing, it is understood that maintenance and replacement of the movable control disconnect contact is easily conducted, and that the elements are easily replaceable and interchangeable.

The movable contact cooperates with the stationary contact in the manner best seen in Figure 1 where the movable contact supported within housing **100** is positioned to cooperate with the upper layer of stationary contacts, while an identical movable contact structure contained within molded housing **150** cooperates with the lower layer of stationary contacts seen on the right-hand side of Figures 3, 4 and 5.

Each of the movable contacts contained within housings **100** and **150** are supported directly by the circuit breaker which is movable into and out of the cubicle when being moved between its various connected, test, and disconnected positions. For purposes of connecting the movable contacts to the circuit breaker, each of the molded housings are provided with extending ears, such as ears **152** and **154** of molded housing **100**, which contain apertures **158** and **156** respectively therein for passing a fastening means.

The contacts of Figure 1 are shown to be in the test position where the circuit breaker is partially withdrawn and the main disconnect contacts have been disconnected. However, it is seen that each of the control contacts are in engagement since the contact fingers, such as contact finger **116**, engages its respective stationary conductive member **42**.

If it were desired to defeat the connection of the control circuit including contacts **116** and **42** of Figure 1, then the structure of Figure 4 would be utilized whereby conductor **42** would be replaced by a conductor, such as conductor **82** of Figure 4, which would not reach sufficiently far to engage contact **116**.

Similarly, if it is desired to defeat engagement between contact **116** and **42** when the circuit breaker is moved inwardly to the connected position, then, as is shown in Figure 5, an insulating strip may be positioned toward the bottom of conductive strip **42** so as to defeat the engagement of contact **116** and **42** when the movable contact moves inwardly.

As well as providing a novel structure for each of the stationary and movable contacts, and as is best seen in Figures 1 and 2, the terminal connectors at the stationary contact are positioned externally of the cubicle wall **72** with the stationary contact forming an integral portion of this wall.

Accordingly, it is now possible to connect various control circuits at terminals, such as terminals **62** through **70** of Figures 2 and 3, without having to have access to the inside of the circuit breaker cubicle. Further, it is no longer necessary to bring conductive wires through the circuit breaker cubicle wall to make connection to the various conductive stationary contact elements **36** through **42**, since this connection is inherently made within the molded housing **20**.

The novel structure described above may be further adapted with a by-pass switch which is commonly used in circuit breaker installations of the draw-out type to provide a circuit which will close when the circuit breaker is withdrawn from the connection position. This by-pass switch provides a parallel closed circuit around certain auxiliary switch interlock circuits that may be closed when the circuit breaker is tripped open preparatory to withdrawing to the disengaged position. After the circuit breaker is withdrawn, the by-pass switch will maintain the interlock circuits closed so that external devices in the circuit will not operate. Without the by-pass switch, withdrawal of the circuit breaker would open the closed interlock circuit and indicate a false condition of circuit breaker closing.

The auxiliary by-pass switch is best seen in Figures 9, 10 and 11 in conjunction with a stationary contact of the type shown in Figure 2. More specifically, the contact structure of Figure 2 is identical to that of Figures 9 and 10 having only been modified in extending the conductors **38** and **42** and their adjacent conductors on the lower surface of molding **20** in the manner shown in Figure 10 for conductors **42** and its adjacent conductor **160**. That is to say, the terminals for conductors **42** and **160** are now brought out as terminals **162** and **164** respectively. In a like manner, the terminal **64** of Figure 2 is now brought out as terminal **166** in an identical manner to that of terminal **162**.

In utilizing the by-pass switch, a circuit is completed from terminal **162** to **164**, and likewise from terminal **166** to **197** when the circuit breaker is moved from the connected position to a disconnected position, thus preventing interruption of current when fingers **110** and **116** in Figures 7 and 8 leave their respective stationary contact members **42** and **160**. The auxiliary switch is contained within molded housing **168** which is positioned within the terminal area of the stationary contact structure, as shown in Figure 10 and is maintained in position by means of a strap member **170** of Figures 9 and 10, which is fastened to the molded housing **20** by fastening screws **172** and **174**.

A movable bridging contact is contained within housing **168** and includes contact buttons **176** and **178** which are joined by conductive member **180**. The movable

bridging contact is slidable on shaft-like member **182** which is fastened to molding **168** by pin **184** and is further connected to an operating member **186** which is also slidable on rod **182**.

The bridging contact structure **176**, **178**, **180** and **186** is normally biased toward bridging contact engagement with conductors **42** and **160** by means of biasing spring **188** so that terminal **164** is normally connected to terminal **162**.

A first and second operating rod **190** and **192** extend through molded housing **20** and conductors 42 and 160 to engage operating rod **186** in a lost motion engagement provided by virtue of the enlarged slot in members **190** and **192**.

As is best seen in Figure 1, when the movable contacts **100** and **150** are moved into the connected position, protrusions **194** and **196** will engage rods **190** and **192** respectively to drive them inwardly. Accordingly, the bridging contact structure **176** through **180** will be moved out of engagement by the operating rod **186** so that the circuit including conductors **42** and **160** will be disengaged so long as the circuit breaker is in its connected position.

When, however, the circuit breaker is withdrawn to a test or disconnected position, biasing spring **188** will drive the bridging contacts to their engaged position so as to prevent a change of signal taking place in any closed circuits before the circuit breaker is fully withdrawn from its connected position.

In the foregoing, we have described our invention only in connection with preferred embodiments thereof. Many variations and modifications of the principles of my invention within the scope of the description herein are obvious. Accordingly, we prefer to be bound not by the specific disclosure herein, but only by the appending claims.

We claim:

1. In a drawout type circuit breaker mounted within a circuit breaker cubicle and movable between a connected, test and disconnected position; a movable control disconnect contact and a stationary control disconnect contact; said movable control disconnect contact being mounted on said circuit breaker and being movable therewith; said stationary contact being positioned on a wall of said cubicle; said movable control disconnect contact engaging said stationary control disconnect contact when said circuit breaker is in said test and connected position and being moved to a disengaged position when said circuit breaker is moved to said disconnected position; said stationary disconnect contact including elongated contacting members for cooperating with said movable control disconnect, and a terminal means for said contacting members; said contacting members and said terminal means being mounted within a moulded insulating housing; said moulded housing and a portion of said contacting members extending through said wall of said cubicle with said contacting members exposed for electrical connection with said movable control disconnect contact inside of said cubicle, and said terminal means positioned externally of said cubicle.

2. In a drawout type circuit breaker mounted within a circuit breaker cubicle and movable between a connected, test and disconnected position; a movable control disconnect contact and a stationary control disconnect contact; said movable control disconnect contact being mounted on said circuit breaker and being movable therewith; said stationary contact being positioned on a wall of said cubicle; said movable control disconnect contact engaging said stationary control disconnect contact when said circuit breaker is in said test and connected position and being moved to a disengaged position when said circuit breaker is moved to said disconnected position; said stationary disconnect contact including elongated contacting members for cooperating with said movable control disconnect, and a terminal means for said contacting members; said contacting members and said terminal means being mounted within a moulded insulating housing; said moulded housing and a portion of said contacting members extending through said wall of said cubicle with said contacting members exposed for electrical connection with said movable control disconnect contact inside of said cubicle, and said terminal means positioned externally of said cubicle; said movable control disconnect contacts including a floating contacting finger and biasing means therefor; said biasing means biasing one end of said finger into engagement with a movable contact terminal and the other end of said finger towards an engaging position with respect to said stationary control disconnect contact.

3. In a drawout type circuit breaker mounted within a circuit breaker cubicle and movable between a connected, test and disconnected position; a movable control disconnect contact and a stationary control disconnect contact; said movable control disconnect contact being mounted on said circuit breaker and being movable therewith; said stationary contact being positioned on a wall of said cubicle; said movable control disconnect contact engaging said stationary control disconnect contact when said circuit breaker is in said test and connected position and being moved to a disengaged position when said circuit breaker is moved to said disconnected position; said stationary disconnect contact including elongated contacting members for cooperating with said movable control disconnect, and a terminal means for said contacting members; said movable control disconnect contacts including a floating contacting finger and biasing means therefor; said biasing means biasing one end of said finger into engagement with a movable contact terminal and the other end of said finger towards an engaging position with respect to said stationary control disconnect contact; each of said floating contact finger, biasing means, and said movable contact terminal being supported in a moulded housing and fastened thereto by a unitary fastening means for securing conductors to said movable contact terminal.

4. In a drawout type circuit breaker mounted within a circuit breaker cubicle and movable between a connected, test and disconnected position; a movable control disconnect contact and a stationary control disconnect contact; said movable control disconnect contact being mounted on said circuit breaker and being movable therewith; said stationary contact being positioned on a wall of said cubicle; said movable control disconnect contact engaging said stationary control disconnect contact when said circuit breaker is in said test and connected position and being moved to a disengaged position when said circuit breaker is moved to said disconnected position; said stationary disconnect contact including elongated contacting members for cooperating with said movable control disconnect, and a terminal means for said contacting members; said contacting members and said terminal means being mounted within a moulded insulating housing; said moulded housing and a portion of said contacting members extending through said wall of said cubicle with said contacting members exposed for electrical connection with said movable control disconnect contact inside of said cubicle, and said terminal means positioned externally of said cubicle; said movable control disconnect contacts including a floating contacting finger and biasing means therefor; said biasing means biasing one end of said finger into engagement with a movable contact terminal and the other end of said finger towards an engaging position with respect to said stationary control disconnect contact; each of said floating contact finger, biasing means, and said movable contact terminal being supported in a moulded housing and fastened thereto by a unitary fastening means for securing conductors to said movable contact terminal.

5. In a drawout type circuit breaker mounted within

a circuit breaker cubicle and movable between a connected, test and disconnected position; a movable control disconnect contact and a stationary control disconnect contact; said movable control disconnect contact being mounted on said circuit breaker and being movable therewith; said stationary contact being positioned on a wall of said cubicle; said movable control disconnect contact engaging said stationary control disconnect contact when said circuit breaker is in said test and connected position and being moved to a disengaged position when said circuit breaker is moved to said disconnected position; said stationary disconnect contact including elongated contacting members for cooperating with said movable control disconnect, and a terminal means for said contacting members; said contacting members and said terminal means being mounted within a moulded insulating housing; said moulded housing extending through said wall of said cubicle with said contacting members exposed for electrical connection with said movable control disconnect contact inside of said cubicle, and said terminal means positioned externally of said cubicle; said portion of said stationary control disconnect contact further including a pair of auxiliary bypass contacts; said pair of auxiliary bypass contacts being biased to an engaged position; a movable interconnecting means; said movable interconnecting means being operatively connectible between said pair of auxiliary contacts and said movable control disconnect contact to move said auxiliary contacts to a disengaged position responsive to a predetermined movement of said movable control disconnect contact.

6. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect contact comprising a conductive contact member positioned within a moulded housing; said conductive member having a first and second hook shaped portion at either end; said moulding having a cooperating configuration for receiving and retaining said hook shaped portion of said conductive member; one of said hook shaped portions forming a terminal connection for said conductive member; one surface of said conductive member at the end of said conductive member away from said end forming said terminal connection being exposed for sliding connection to a cooperating movable contact.

7. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect contact comprising a plurality of conductive contact members positioned within a moulded housing; each of said conductive members having a first and second hook shaped end; said moulding having a cooperating configuration for receiving and retaining each of said hook shaped ends of each of said conductive members in insulated relationship with respect to one another; one end of said hook shaped portions of each of said conductive members forming a terminal connection therefor; the surface of each of said conductive members beginning from the end of the said members away from said end forming said terminal connections being exposed for sliding connection to a respective cooperating movable contact.

8. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect comprising a first and second conductive contact member positioned within moulded housing; each of said first and second conductive members having a first and second hook shaped portion at either end; said moulding including a platform member having opposing surfaces; each of said platform surfaces being identical and having a configuration cooperating with said conductive members to receive and retain said first and second hook shaped portions of said first and second conductive strips on said respective opposing sides of said platform; said first hook shaped portion of said first and second conductive members forming a terminal connection for its respective conductive member, the surfaces of said first and second conductive members away from said platform being exposed for receiving a respective movable contact element in sliding contacting relationship.

9. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect contact comprising a conductive contact member positioned within a moulded housing; said conductive member having a first and second hook shaped portion at either end; said moulding having a cooperating configuration for receiving and retaining said hook shaped portion of said conductive member; one of said hook shaped portions forming a terminal connection for said conductive member; one surface of said conductive member at the end of said conductive member away from said end forming said terminal connection being exposed for sliding connection to a cooperating movable contact; the length of surface exposed to sliding connection determining the connection of said movable and stationary control contacts with respect to the position of said drawout circuit breaker positioning said movable contact.

10. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect comprising a first and second conductive contact member positioned within moulded housing; each of said first and second conductive members having a first and second hook shaped portion at either end; said moulding including a platform member having opposing surfaces; each of said platform surfaces being identical and having a configuration cooperating with said conductive members to receive and retain said first and second hook shaped portions of said first and second conductive strips on said respective opposing sides of said platform; said first hook shaped portion of said first and second conductive members forming a terminal connection for its respective conductive member, the surfaces of said first and second conductive members away from said platform being exposed for receiving a respective movable contact element in sliding contacting relationship; the length of surface exposed to sliding connection determining the connection of said movable and stationary control contacts with respect to the position of said drawout circuit breaker positioning said movable contact.

11. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect contact comprising a conductive contact member positioned within a moulded housing; said conductive member having a first and second hook shaped portion at either end; said moulding having a cooperating configuration for receiving and retaining said hook shaped portion of said conductive member; one of said hook shaped portions forming a terminal connection for said conductive member; one surface of said conductive member at the end of said conductive member away from said end forming said terminal connection being exposed for sliding connection to a cooperating movable contact; said moulded housing being fastenable within an opening in said cubicle wall with said exposed portions of said conductive member being positioned within said cubicle and said terminal connection being positioned external of said cubicle.

12. A stationary control disconnect contact for a drawout circuit breaker; said stationary disconnect contact comprising a plurality of conductive contact members positioned within a moulded housing; each of said conductive members having a first and second hook shaped end; said moulding having a cooperating configuration for receiving and retaining each of said hook shaped ends of each of said conductive members in insulated relationship with respect to one another; one end of said hook shaped portions of each of said conductive members forming a terminal connection therefor; the surface of each of said conductive members beginning from the end of the said members away from said end forming said terminal connections being exposed for sliding connection to a respective cooperating movable contact; said moulded housing being fastenable within an opening in said cubicle wall with said exposed portions of said conductive mem-

bers being positioned within said cubicle and said terminal connections being positioned external of said cubicle.

13. A stationary control disconnect contact for a draw-out circuit breaker; said stationary disconnect comprising a first and second conductive contact member positioned within moulded housing; each of said first and second conductive members having a first and second hook shaped portion at either end; said moulding including a platform member having opposing surfaces; each of said platform surfaces being identical and having a configuration cooperating with said conductive members to receive and retain said first and second hook shaped portions of said first and second conductive strips on said respective opposing sides of said platform; said first hook shaped portion of said first and second conductive members forming a terminal connection for its respective conductive member, the surfaces of said first and second conductive members away from said platform being exposed for receiving a respective movable contact element in sliding contacting relationship; said moulded housing being fastenable within an opening in said cubicle wall with said exposed portions of said conductive members being positioned within said cubicle and said terminal connections being positioned external of said cubicle.

14. A stationary control disconnect contact for a draw-out circuit breaker; said stationary disconnect contact comprising a plurality of conductive contact members positioned within a moulded housing; each of said conductive members having a first and second hook shaped end; said moulding having a cooperating configuration for receiving and retaining each of said hook shaped ends of each of said conductive members in insulated relationship with respect to one another; one end of said hook shaped portions of each of said conductive members forming a terminal connection therefor; the surface of each of said conductive members beginning from the end of the said members away from said end forming said terminal connections being exposed for sliding connection to a respective cooperating movable contact; each of said conductive members being interchangeable.

References Cited in the file of this patent

UNITED STATES PATENTS

2,727,965	Toth et al.	Dec. 20, 1955
2,727,966	Reichert et al.	Dec. 20, 1955
2,794,873	Bank	June 4, 1957