April 11, 1944. T. G. A. SILLERS 2,346,460

SWITCH GEAR

Filed Aug. 1, 1940 2 Sheets-Sheet 1

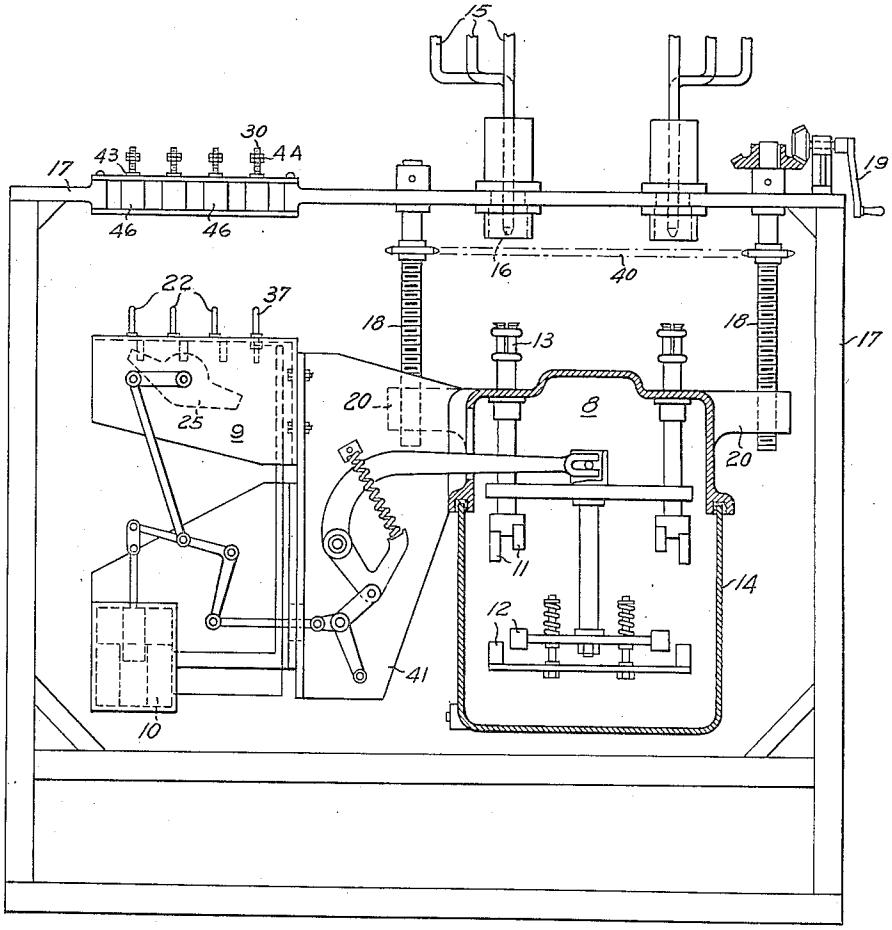


Fig. 1

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SWITCH GEAR

Filed Aug. 1, 1940 2 Sheets-Sheet 2

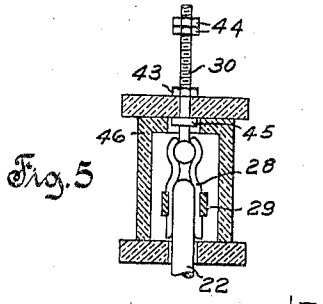


Fig. 5

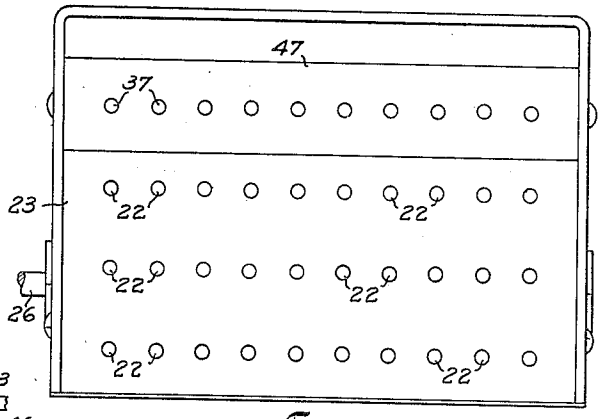


Fig. 3

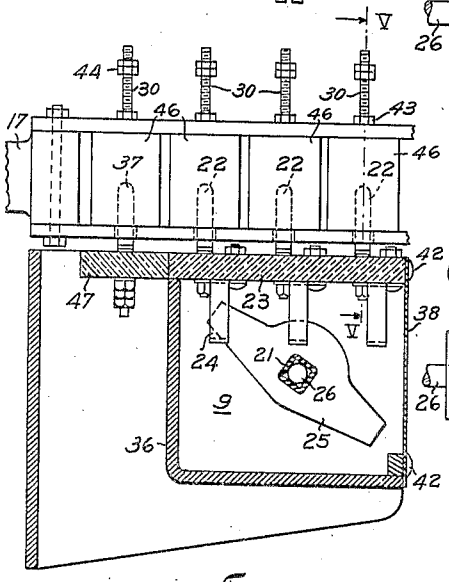


Fig. 4

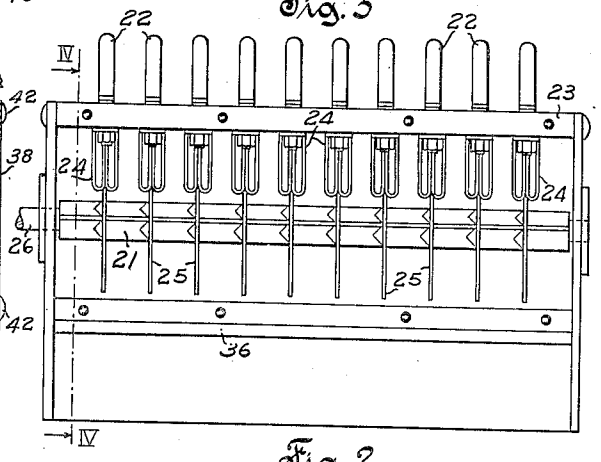


Fig. 2

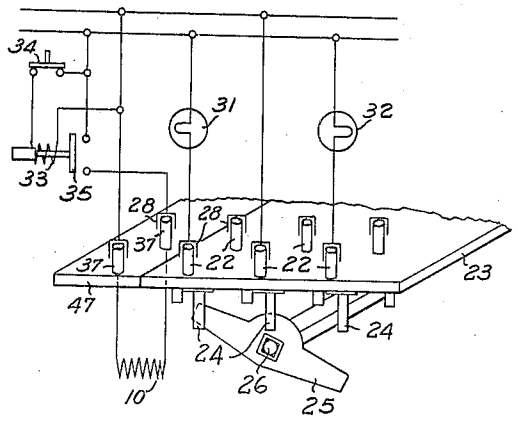


Fig. 6

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Patented Apr. 11, 1944

2,346,460

UNITED STATES PATENT OFFICE

2,346,460

SWITCHGEAR

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Application August 1, 1940, Serial No. 349,334

5 Claims. (Cl. 175—298)

This invention relates in general to switchgear mechanisms and relates particularly to a circuit breaker movable to and from a position in which the circuit breaker is connected with bus bars and in which an auxiliary switch is utilized to control auxiliary circuits controlling and indicating the functioning of the circuit breaker.

It is an object of the present invention to provide in a circuit breaking mechanism of the above type a new and improved means for connecting and disconnecting the auxiliary circuits when the circuit breaker is moved to connected or disconnected position.

It is also an object of the present invention to provide in a switch gear structure, a new and improved means for enclosing the auxiliary switch contacts, while providing for disconnection of the auxiliary circuits simultaneously with movement of the circuit breaker away from operating position.

It is a further object of the present invention to provide a new and improved circuit breaking mechanism which can be manufactured at a low cost and has its parts easily available for inspection and repair.

Objects and advantages other than those above set forth will be apparent from the following description when read in connection with the accompanying drawings, in which:

Fig. 1 is an elevational view of an embodiment of the present invention;

Fig. 2 is an enlarged end view of the auxiliary switch construction shown in Fig. 1;

Fig. 3 is a top view of the construction shown in Fig. 2;

Fig. 4 is a cross section view taken of the line IV—IV of Fig. 2;

Fig. 5 is a detailed view of one of the control disconnect contacts; and

Fig. 6 is a schematic diagram of connections which may be utilized for the parts shown in the other figures.

A single embodiment of the invention is shown in the drawings. In Fig. 1, a circuit breaker, shown generally at 8, is in a position in which it is disconnected from the bus bars 15. The circuit breaker 8 is raised or lowered to operating position by means of the screws 18 cooperating with bosses 20 on the circuit breaker. The lifting screws 18 may be connected as by a chain 40 and may be operated by a crank 19. Movement of the crank to lift the circuit breaker connects the disconnect contacts 13 on the circuit breaker studs to the disconnect contacts 16 on the bus bars 15. This connects the circuit breaker 8 into the bus bar line and thereafter cooperating movement between fixed contacts 11 and movable contacts 12 of the circuit breaker 8 will make and break the line circuit.

The tank 14 of the circuit breaker is removable for inspection and repair of the contacts. A plate 41 extends from the circuit breaker frame structure on which are mounted the operating coil 10 and the auxiliary switch which is shown generally at 9. The operating solenoid 10 operates both the auxiliary switch 9 and the circuit breaker 8 through the linkages as shown.

The auxiliary switch comprises generally a series of fixed contacts 24 which are bent over spring clips mounted at the center thereof on an insulating plate 23. A plurality of movable contacts 25 is mounted on a square tube 21 of insulating material which is supported by and rotates with shaft 26. The auxiliary switch contacts 25 all move together to connect the middle row of fixed contacts 24 (as viewed in Fig. 4) with either of the outer rows of contacts 24. As shown in Fig. 4, the left hand row of the auxiliary switch contacts is connected to the middle row of contacts 24 and the circuit to indicating device 31 is closed.

The auxiliary switch 9 is enclosed by a metal enclosure 36 provided with a cover 38 removably fastened by screws 42. As shown in Fig. 6 the auxiliary switch may control indicating lamps 31 or 32 to show whether the circuit breaker 8 is open or closed. The additional rows of auxiliary contacts are utilized to control any other relays or devices which are to be controlled in accordance with the position of the contacts of circuit breaker 8.

The supporting studs for the fixed contacts 24 of the auxiliary switch extend through the plate 23 and are rounded off at the top thereof to provide plug disconnecting contacts for the control circuits. The plate 23, being movable with the circuit breaker 8 when moved to connect or disconnect with the bus bars 15, at the same time moves to connect and disconnect the plug contacts 22 relative to contacts 28, through which the control circuits are energized. As shown in detail in Fig. 5 the stud 22 fits into a socket 28 which may be made in two or more parts held in position by a spring clip 29. The socket contacts 28 are held in position on a spherical end of studs 30, which are held to the frame 17 by means of collars 45 and nuts 43. Spacing tubes 46 of insulating material enclose the disconnect contacts 22 and 28. Connections to the indicating devices 31 and 32 and other apparatus shown

in Fig. 6 may be made through the studs 30 by means of nuts 44 thereon.

It will be noted that the enclosure 36 encloses only three rows of the contacts 24 attached to the ends of the studs 22. This enclosure limits the spread of the products of any arcing at the auxiliary switch 9 and prevents entrance of foreign matter therein. A fourth row of studs 37 similar to those studs 22 is included on an extension 47 of the insulating member 23 to provide disconnect service for apparatus or devices not included in the enclosure 36. As shown in Fig. 6 two of these contacts 37 may be utilized for connecting and disconnecting the circuit breaker operating coil 10. As shown in Fig. 6 the operating coil circuit is connected to the energizing source by means of relay contacts 35 on relay 33. The control source 34 can therefore energize the operating coil by means of relay 33 only when the circuit breaker, and therefore the plug member 23, is in operating position and the plug contacts 37 and 28 are in position shown in Fig. 6. By providing the enclosure 36 only around the auxiliary switch contacts and by making the plug members 22 unitary with the contacts 24, no opening is necessary in the enclosure 36 to provide necessary wiring connections to the plugs 22. By providing the extra row of plug contacts 37 externally of the enclosure 36, the necessity of wiring through the enclosure 36 to connect to the operating coil 10 is avoided.

The disclosed embodiment of this invention illustrates the manner in which a switchgear mechanism which provides disconnect service both for all pilot control circuits and for the main conductors can be manufactured with a minimum of wiring, at a saving of space, and which will operate in a new and improved manner. The auxiliary switch 9 can easily be placed where it can be operated in accordance with operation of the main circuit breaking contacts 11, 12. The plate 23 may be provided with extra rows of pilot circuit disconnect plugs and sockets which can be easily utilized later for additional control circuits desired.

Although but one embodiment of the present invention has been described and illustrated, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. In combination, a multiple contact circuit maker and breaker provided with fixed and movable contacts, means for enclosing said circuit maker and breaker to limit the effect of products of arcing at said contacts, means for supporting said fixed contacts on said enclosure comprising conducting studs extending through a wall thereof, an extension on said wall, an operating coil for said circuit breaker, additional conducting members carried by said extension and connected to said operating coil, and means for moving said enclosure to connect said circuit breaker contacts with circuits to be controlled and to connect said additional conducting members with a source of current supply for said operating coil.

2. In a switching mechanism, a frame adapted to be metal enclosed, a bus bar, a circuit breaker provided with cooperating fixed and movable load breaking contacts immersed in oil and also provided with disconnect contacts movable with said circuit breaker to connect the same to said bus bar, means to move said circuit breaker relative to said frame to bus bar connected position, additional contacts supported on said frame, an auxiliary switch supported by said circuit breaker and provided with fixed and movable contacts, means for operating said auxiliary switch movable contacts in accordance with operation of said circuit breaker movable load breaking contacts, said means comprising a winding, a supporting member on which said auxiliary switch fixed contacts are supported, an enclosure comprising said supporting member for enclosing said auxiliary contacts to limit the effect of products of arcing at said contacts, a plurality of conducting members carried by said supporting member, means for connecting certain of said conducting members to said auxiliary switch fixed contacts, means for connecting certain other of said conducting members to said winding, and means whereby said conducting members make with said additional contacts when said circuit breaker and said enclosure are moved to bus bar connected position.

3. In a switching mechanism, a frame adapted to be metal enclosed, a bus bar, a circuit breaker provided with cooperating fixed and movable load breaking contacts immersed in oil and also provided with disconnect contacts movable with said circuit breaker to connect the same to said bus bar, means to move said circuit breaker relative to said frame to bus bar connected position, additional contacts supported on said frame, an auxiliary switch supported by said circuit breaker and provided with fixed and movable contacts, means for operating said auxiliary switch movable contacts in accordance with operation of said circuit breaker movable load breaking contacts, said means comprising a winding, a supporting member on which said auxiliary switch fixed contacts are supported, a plurality of conducting members carried by said supporting member, means for connecting certain of said conducting members to said auxiliary switch fixed contacts, means for connecting certain other of said conducting members to said winding, an enclosure comprising said supporting member for enclosing said auxiliary contacts, and means for moving said enclosure with said circuit breaker whereby said conducting members make with said additional contacts when said circuit breaker is moved to bus bar connected position.

4. In combination, a circuit breaker provided with fixed and movable contacts, a multiple contact switch provided with fixed and movable contacts, means for operating said switch movable contacts in accordance with the operation of said circuit breaker movable contacts, means for enclosing said switch to limit the effect of products of arcing at the contacts thereof, cooperable fixed and movable disconnect contacts in series with said switch contacts and operable by movement of said enclosure to connect and disconnect said switch to and from the circuits to be controlled thereby, and a common means comprising a wall of said enclosure for supporting said movable disconnect contacts and said fixed switch contacts in electrically conductive connection.

5. In combination, a circuit breaker provided with fixed and movable contacts, a multiple contact switch provided with fixed and movable contacts, means for operating said switch movable contacts in accordance with the operation of said circuit breaker movable contacts, means for enclosing said switch to limit the effect of products

of arcing at the contacts thereof, means for enclosing said circuit breaker contacts to limit the effects of arcing at said contacts, means supporting said enclosures for coordinated movement thereof, cooperable fixed and movable disconnect contacts in series with said switch contacts, cooperable fixed and movable disconnect contacts in series with said circuit breaker contacts, and means operable by movement of said enclosures to operate both sets of said disconnect contacts to connect and disconnect said switch and said circuit breaker to and from the circuits to be controlled thereby.

THOMAS G. A. SILLERS.