



March 7, 1944.

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2,343,612

MULTIPOLAR CIRCUIT BREAKER

Filed March 25, 1943

3 Sheets-Sheet 2

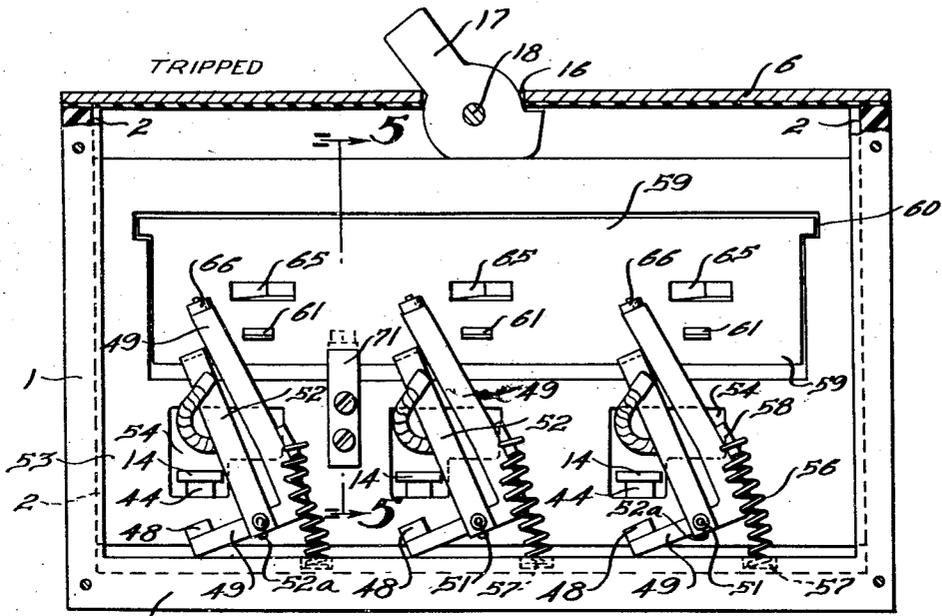


FIG. 3.

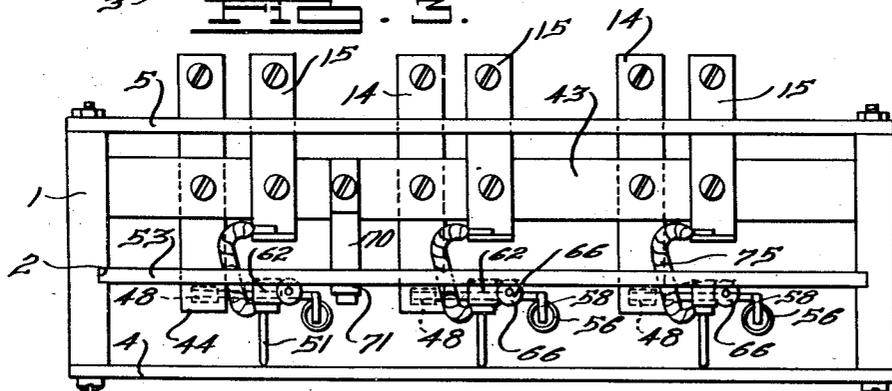
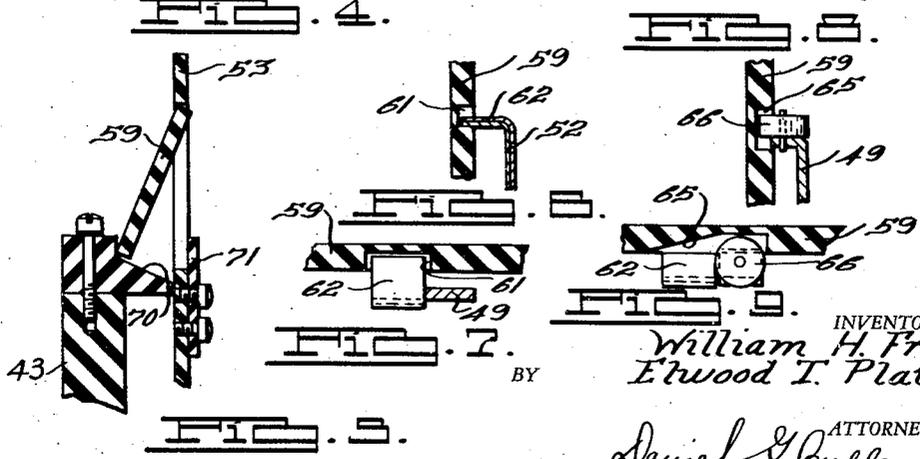


FIG. 4.



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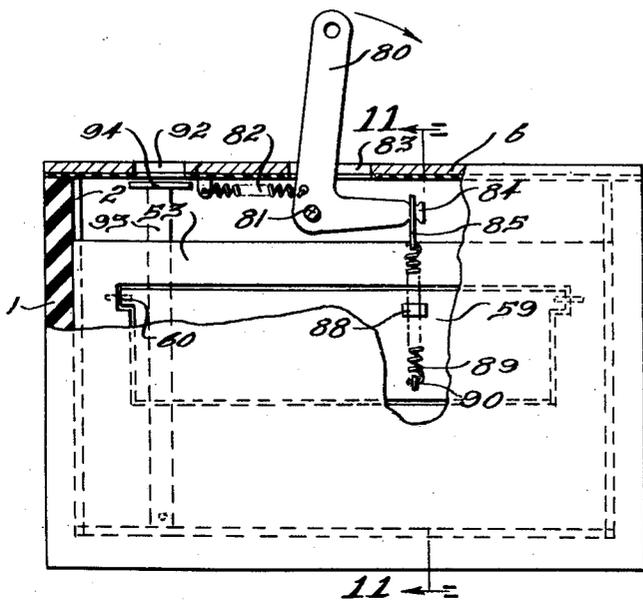


FIG. 10.

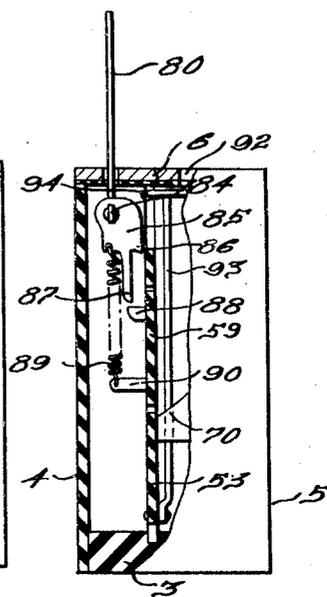


FIG. 11.

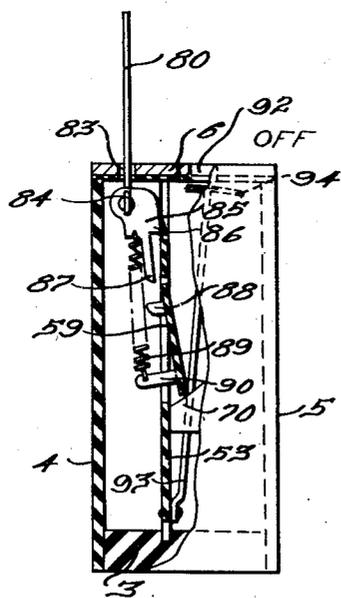


FIG. 12.

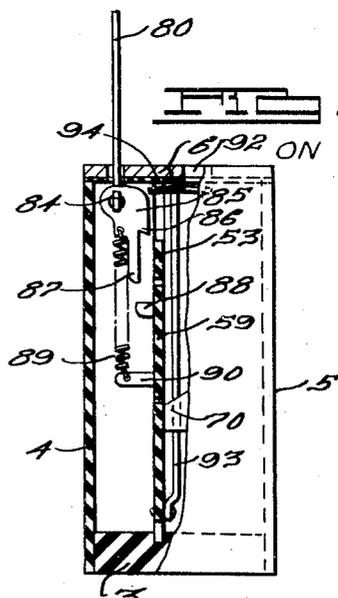


FIG. 13.

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# UNITED STATES PATENT OFFICE

2,343,612

## MULTIPOLAR CIRCUIT BREAKER

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Application March 25, 1943, Serial No. 480,432

20 Claims. (Cl. 200—116)

This application relates to manually and automatically operable multipolar circuit breakers. Two embodiments, differing in the arrangements for manual operation, are disclosed in the appended drawings.

In these drawings,

Figs. 1, 2, and 3 are front views of one embodiment, with a front cover removed showing the parts in closed circuit, open circuit, and overload released positions, respectively.

Fig. 4 is a top plan view with top cover removed.

Figs. 5, 6, 7, 8, and 9 are sections on lines 5—5, 6—6, 7—7, 8—8, 9—9, of Figs. 3, 1, 1, 1, 1, respectively.

Figs. 10, 11, 12, and 13 are views of another embodiment.

The breaker hereof comprises a U-shaped frame 1 having grooves 2 in its sides and having a bottom 3. A front cover 4, a back cover 5, and a top cover 6, enclose the frame. Through openings in the back cover 5, project line and load terminals 14 and 15. Through an opening 16 of the top cover projects an L-shaped cam handle 17 pivotally mounted in the cover by a pin at 18.

The line terminals 14 are mounted on blocks 43 and have stationary contacts 44 adapted to be engaged by contacts 48 of L-shaped contactors 49 riveted at 51 to bimetal strips 52, the rivets being formed as pivot pins for pivoting the contacts to a carrier plate 53 slidably mounted at its edges in grooves 2 of the sides of the frame. The pins 51 pass through slots 52a of plate 53 and have extensions abutting the front cover 4 to hold the contactors against plate 53. Openings 54 in plate 53 clear line terminals 14 to permit plate 53 to move up and down without interference from the line terminals, which project through the openings. Springs 56 seating on the bottom at 57 engage lugs 58 of the contactors for biasing them.

A large cut-out in plate 53 provides a space for a common holding bar 59 pivotally mounted in plate 53 by pivot pins 60. Bar 59 is formed with holding sockets 61 for receiving latch hooks or ends of strips 52, and with cam follower sockets 65 for receiving roller cams 66 pivotally mounted on the free ends of the contactors 49.

Mounted on block 43 is a stationary cam 70 adapted to be engaged by the lower edge of the holding bar 59 when the latter is out of line with plate 53 so as to bias the holding bar to move back into alinement with the plate 53 when plate 53 is moved down, with such motion of bar 59 being limited by a stop 71 on plate 53.

Flexible leads 75 connect the bimetal strips 52 with the load terminals 15 on block 43, these passing through the clearance openings 54 of the carrier plate 53.

The operation is as follows:

In the closed circuit position, Fig. 1, handle 17 is free of plate 53 which, with the contactor assemblies latched thereto, is biased by springs 56 so that the contacts 48 engage the contacts 44 which act as stops.

If the handle then be rocked clockwise (to Fig. 2), it will push the carrier 53 and the contactor assemblies latched thereto, downwardly against the bias of springs 56, to open the circuit, the parts being stopped by the stopping of movement of handle 17 whose cam end will hold the carrier 53 and its parts in open circuit position.

If any pole is overloaded its latch will be released at 61 by the warping of its bimetal strip 52 and its spring 56 will rock its contactor 49 counterclockwise (Fig. 3), whereupon its cam roller 66, riding on its cam follower 65, will swing the common holding bar 59 out of line with carrier 53 to release the remaining latches, whereupon the remaining contactors will be rocked counterclockwise by their springs 56. Carrier 53 and handle 17 will remain in the closed circuit position. Contactor movement is stopped by the engagement of the contactors with the bottom 3 of the breaker.

Rocking of the handle clockwise thereafter will move the carrier 53 downwardly. This will cause the lower edge of the common holding bar 59 to ride on the cam 70 so that bar 59 will return to alinement with carrier 53. Simultaneously, the contactors 49 will rock clockwise on the portions of the bottom 3 engaged by the contactors, as pivots, until the latching hooks reseal in sockets 61 for relatching. Contact rollers 66 will at that time reseal in sockets 65 of the holding bar 59. This will leave all the parts in the open circuit position, relatched.

It will be observed that the force for moving the common holding bar 59 when any one latch releases is obtained solely from the spring 56 of the released contactor, acting on the common holding bar through its cam 66 and follower 65, and that no bimetal strip 52 is required to exert any force other than what is required for moving itself away from holding socket 61 of the common holding bar.

It will also be observed that the common holding bar is a unitary, rigid, single piece of insulation and is not composed of several portions which move relatively.

If desired, as an alternative to the arrangement shown for opening the circuit manually (handle 17) a different manual circuit opening means might be provided, one that could operate on the holding bar 59 directly and swing it out of holding position, releasing the contactors to be moved quickly by their springs 56. This arrangement includes an L-shaped handle or bell crank 80 pivoted at 81 on the casing and biased to its normal position by a spring 82 projecting through a slot 83 in casing top 6. A free end 84 of the handle mounts a plate 85 having two cams 86—87 for engaging the upper edge of plate 53 or a lug 88 on the front of bar 59, and a spring 89 connects plate 85 to a second lug 90 on the front of bar 59.

If the parts are in the "on" position, Fig. 13, springs 82 and 89 help retain them there. If the handle then be moved to lower plate 85, cam 87 will engage lug 88 and rock bar 59 out of plate 53 to release the contactors to move to "off" position. The handle may be released and spring 89 will rock plate 85 slightly to align its cam 86 with plate 53 which it had previously cleared, so that on the next movement of the handle, it will lower plate 53 and return bar 59 to the "on" position, Fig. 13, and return plate 85 to the position of Fig. 13 where its cam 86 clears plate 59, so that handle release restores all parts for further operation, all movements being for step by step actuation.

For indicating the relation of the contacts 44—43, (Figs. 10—13) (engaged—"on"; disengaged—"off"), the position of the holding member 59 relative to the carrier 53 may be viewed, as through any suitable window, such as the window 92. To aid the user, the carrier may be provided with a spring 93 mounting a flag 94 which waves past window 92 and whose position responds to that of member 59 and contactor 49.

The two different manual circuit opening means here suggested, first, the handle 17 shown for moving the carrier 53, the bar 59, and the contactors 49, down to the position of Fig. 2; second, the means for engaging the bar 59 and swinging it away from the contactors, are merely suggested alternative forms, either one of which could be used. Each of such forms is within the purview of this application.

For phase separation, barriers (not shown) of suitable form can be provided between the separate poles, extending from carrier 53 to front plate 4, and by suitably forming these barriers, and other walls and portions of carrier 53, there can be formed arc confining chambers around the poles, with carrier 53 isolating the contact side of the device (in front of carrier 53) from the wiring terminal side (in back of carrier 53).

Sockets 65 and cams 66 are so shaped that cams 66 have considerable travel in sockets 65 in two relatively normal directions parallel to the plane of carrier 53, both for permitting relative motion of each contactor and the carrier to compensate for contact wear and inequalities of contact adjustment, and also to permit an overload released contactor to move considerably and thus gather momentum, on release, before it is required to engage cam 65, so as to strike holding plate 59 a hammer blow for release of other contactors.

Pins 51 and springs 56, the latter being generally out of parallel with respect to plate 53 by a slight amount, bias the cams 66 towards bar 59 and into sockets 65 and inhibit cams 66 from moving away from bar 59 when released.

The breakers herein shown are "trip free,"

since the contactors 49 and the bar 59 can not be inhibited, upon any latch release, by holding of the handles 17 or 80, since for all contactors to move, it is not necessary that the carrier move, but only that the contactors and the bar 59 move relative of the carrier.

In the breakers herein shown, the several contactors of the several poles or phases move in a common plane, rather than in parallel separate planes, and thus the breaker can be formed as a much thinner device, a pancake type, than multipolar breakers now known. This is particularly desirable when the breaker is used as part of a branch circuit connector for bus way, as shown in Patent No. 2,103,325 at 16, or when used with others in a panel, with handles exposed, as in Des. No. 122,844, or Patent No. 2,261,987.

Now having described the multipolar breaker herein disclosed, reference should be had to the claims which follow.

We claim:

1. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs.

2. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon those are then biased for circuit opening by their springs, the holding member providing separate abutments, each of the contactors having a bimetal element releasably engaging and holding to an abutment of the holding member and adapted to move on overload to release its contactor from the holding member and free it to be moved by its spring for circuit opening, with the contactor then moving the holding member to move its abutments from the bimetal elements of the remaining and still held contactors.

3. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection, between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the operative connection between each contactor and the holding member comprising a cam on the contactor for engaging a follower on the holding member and thus moving it out of its then holding position, wherein it had been holding the contactors which had not already been moved by their springs.

4. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the holding member providing separate abutments, each of the contactors having a bimetal element releasably engaging and holding to an abutment of the holding member and adapted to move on overload to release its contactor from the holding member and free it to be moved by its spring for circuit opening, with the contactor then moving the holding member to move its abutments from the bimetal elements of the remaining and still held contactors, the operative connection between each contactor and the holding member comprising a cam on the contactor for engaging a follower on the holding member and thus moving it out of its then holding position, wherein it had been holding the contactors which had not already been moved by their springs.

5. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's

latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the device having stationary contacts, the contactors and the holding member being movably mounted on a carrier which is movable so as to facilitate movement of the latched contactors and the holding member as a unit to and from a position wherein the contactors engage the stationary contacts.

6. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing spring independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the device having stationary contacts, the contactors and the holding member being movably mounted on a carrier which is movable so as to facilitate movement of the latched contactors and the holding member as a unit to and from a position wherein the contactors engage the stationary contacts, and a manually accessible actuator for moving the carrier.

7. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the device having stationary contacts, the contactors and the holding member being movably mounted on a carrier which is movable so as to facilitate

movement of the latched contactors and the holding member as a unit to and from a position wherein the contactors engage the stationary contacts, the carrier, and the holding member, being movable independently of and relative of the contactors, when these are not latch held, for reestablishing the inter-latch engagement of the contactors and the holding member.

8. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the device having stationary contacts, the contactors and the holding member being movably mounted on a carrier which is movable so as to facilitate movement of the latched contactors and the holding member as a unit to and from a position wherein the contactors engage the stationary contacts, the carrier, and the holding member, being movable independently of and relative of the contactors, when these are not latch held, for reestablishing the inter-latch engagement of the contactors and the holding member, and a manually accessible actuator for moving the carrier.

9. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, and manually operable means for causing relative movement of the holding member and a contactor for releasing them all for circuit opening manually.

10. A mutipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its

own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, and manually operable means for moving the holding member relative of the then stationary contactors for releasing them for circuit opening manually.

11. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, and manually operable means for moving one of the contactors relative of the holding member for circuit opening manually, whereupon the holding member is moved by the then moved contactor to release the remaining contactors.

12. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, and manually operable means for causing relative movement of the holding member and a contactor for releasing them all for circuit opening manually, the carrier, and the holding member, being movable independently of and relative of the contactors, when these are not latch held, for re-

establishing the interlatch engagement of the contactors and the holding member.

13. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, and manually operable means for causing relative movement of the holding member and a contactor for releasing them all for circuit opening manually, the carrier, and the holding member, being movable independently of and relative of the contactors, when these are not latch held, for reestablishing the interlatch engagement of the contactors and the holding member, and a manually accessible actuator for moving the carrier.

14. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the device having stationary contacts, the contactors and the holding member being movably mounted on a carrier which is movable so as to facilitate movement of the latched contactors and the holding member as a unit to and from a position wherein the contactors engage the stationary contacts, and a manually accessible actuator for moving the carrier, and the contactors then latched thereto, as a unit, for circuit opening.

15. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor

for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, the device having stationary contacts, the contactors and the holding member being movably mounted on a carrier which is movable so as to facilitate movement of the latched contactors and the holding member as a unit to and from a position wherein the contactors engage the stationary contacts, the carrier, and the holding member, being movable independently of and relative of the contactors, when these are not latch held, for reestablishing the interlatch engagement of the contactors and the holding member, and a manually accessible actuator for moving the carrier, and the contactors then latched thereto, as a unit, for circuit opening, and for moving the carrier and the holding member relative to the released contactors, then in open circuit position, for relatching them and the holding member.

16. A multipolar circuit breaker comprising a plurality of independent contactors, a common, unitary, movably mounted holding member to which the contactors are releasably and independently latched, and a plurality of independent biasing springs independently biasing the contactors, each spring being arranged to bias its own contactor for circuit closing when the latter's latch holds and to bias its own contactor for circuit opening when the latter's latch releases, each spring operating, when its contactor is no longer latch held, to bias its contactor relative to the common holding member for circuit opening, means providing an operative connection between each contactor and the common holding member whereby when a contactor is moved by its spring relative to the common holding member for circuit opening on release of the hold of its latch, that contactor moves the common holding member to release its hold on the remaining contactors whereupon these are then biased for circuit opening by their springs, and manually operable means for moving the holding member relative of the then stationary contactors for releasing them for circuit opening manually, and for moving the carrier and the holding member relative to the released contactors, then in open circuit position, for relatching them and the holding member.

17. A multipolar breaker comprising a carrier in the form of a thin plate, means mounting it for movement in its own plane, manual means for so moving it, a plurality of contactors spaced along said plate and mounted on axes normal to said plate to move along said plate relative thereto, and to move with said plate, springs biasing said contactors to move relative of said plate, and releasable latch means for releasably latching said contactors with respect to said plate.

18. A multipolar breaker comprising a carrier, means mounting it for movement, manual means for so moving it, a plurality of contactors mounted thereon for movement with and for movement relative of said carrier, springs biasing said contactors to move relative of said carrier, means

releasably latching said contactors with respect to said carrier so that normally, with the latches holding, the contactors move with said carrier, but when the latch means releases, the contactors move even though the carrier and the manual means are held against movement, and a casing enclosing all but the manual means of said elements.

19. A multipolar breaker comprising a movably mounted carrier, contactors pivotally mounted thereon on lost motion pivots, stationary contacts engaged by the contactors, springs independently biasing the contactors to move relative of the carrier while engaging the contacts and latched, and to move relative of the carrier and the contactors when unlatched, and releasable latch means for releasably latching the contactors to the carrier.

20. A multipolar breaker comprising stationary contacts, and movably mounted carrier, contactors movably mounted thereon, latch means releasably latching the contactors to the carrier, springs for moving the contactors, when released, relative of the carrier away from the stationary contacts and for moving the carrier and the contactors, when these are interlatched, so that the contactors engage the contacts, and a handle for moving the carrier and the contacts, when these are interlatched, so that the contactors leave the contacts, and for moving the carrier and contactors relatively, when these are not interlatched, for interlatching them.

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