

Nov. 14, 1944.

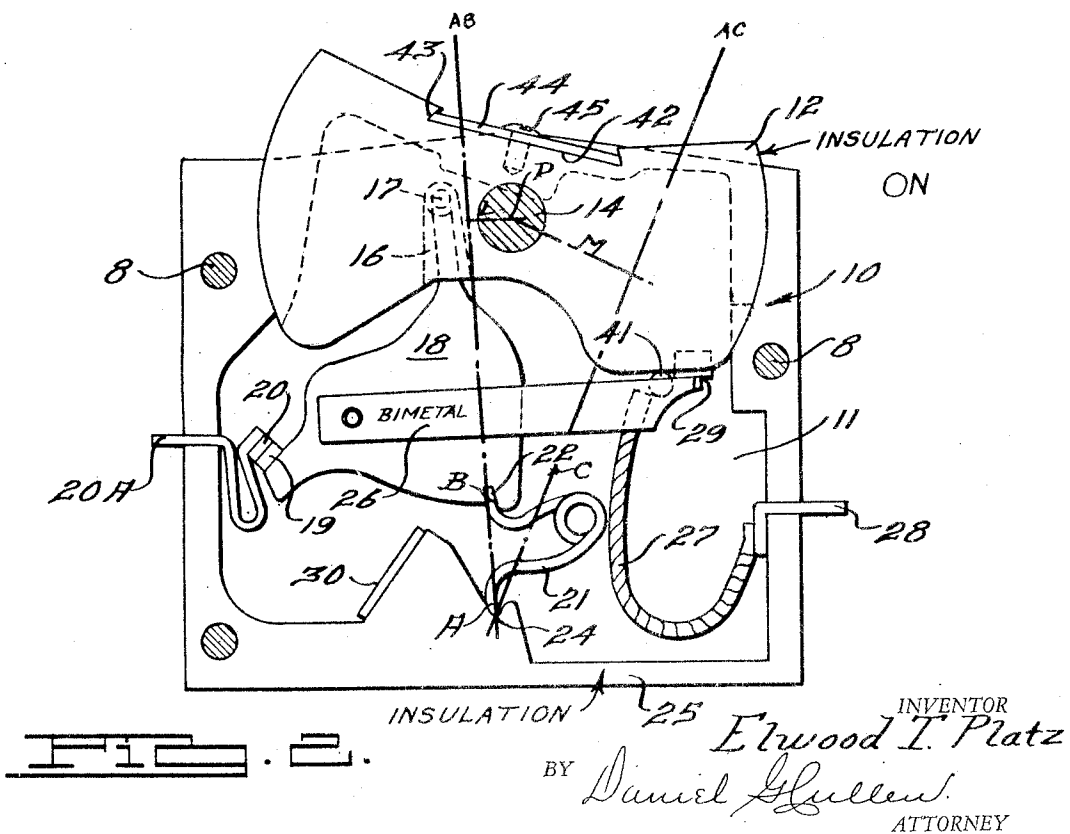
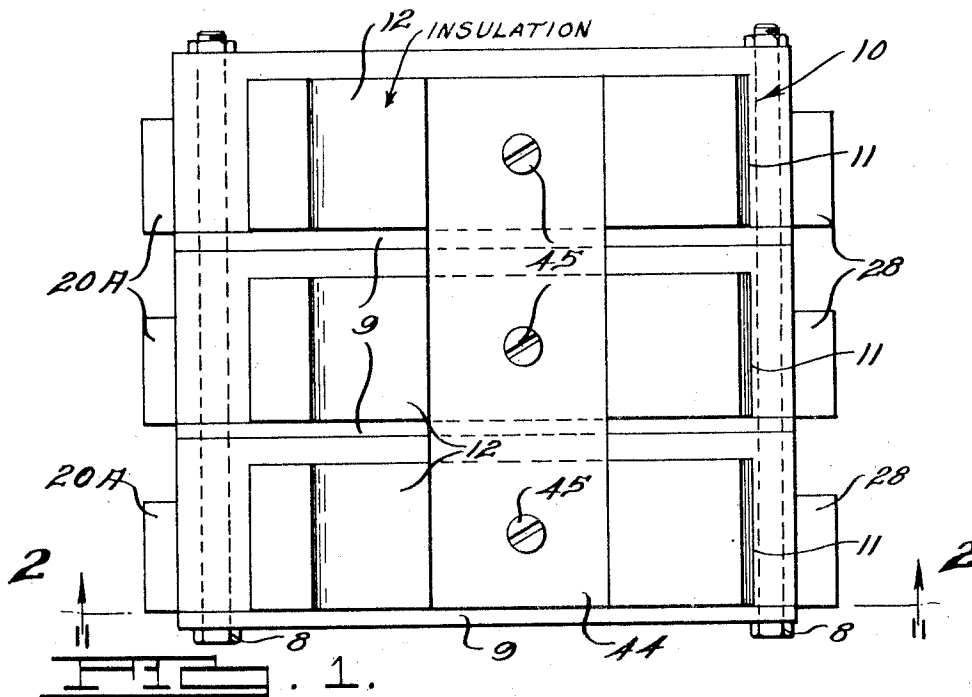
E. T. PLATZ

2,362,850

MULTIPOLAR CIRCUIT BREAKER

Filed March 8, 1943

2 Sheets-Sheet 1



Nov. 14, 1944.

E. T. PLATZ

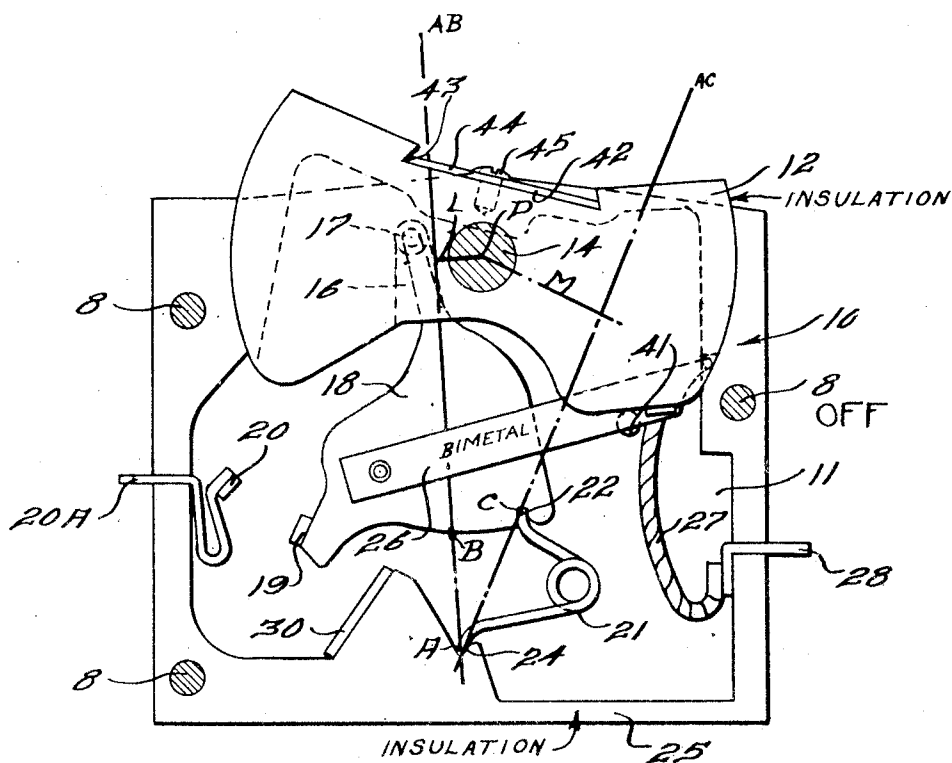
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FIG. 3.



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MULTIPOLAR CIRCUIT BREAKER

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Application March 8, 1943, Serial No. 478,351

22 Claims. (Cl. 200—116)

This application discloses a multipolar circuit breaker having overload release latches, so constructed that all poles open on overload in any, without unlatching of any but the overloaded pole or poles, the remainder opening though remaining latched.

For an understanding of the breaker hereof, it is desirable to compare it with the breaker shown in my prior application, Serial No. 376,036, filed January 27, 1941, now Patent No. 2,330,237 of September 28, 1943. That application discloses, in Figs. 11-20 inclusive, a single pole circuit breaker having a carrier or actuator or handle 12b pivotally mounted in a casing at 14b and pivotally mounting at 17b a contactor biased by a spring 21b engaging the contactor at point 22b, the contactor having a bimetal strip 26b interlatching the contactor and the carrier or handle at latch point 29b. In that device, the handle, with the contactor latched thereto so that handle and contactor moved as a unit, can be rocked manually to and from circuit closing and circuit opening positions on the handle pivot; and, when the parts are in circuit closing position, on warping of the bimetal strip, the latch at 29b is released and the spring biases the contactor to rock relative of the handle, the handle, however, remaining stationary in its closed circuit position, or if it moves, moving only slightly but not to an open circuit position.

When a number of such circuit breakers are combined, with adjacent handles tied together so that they may be manipulated in unison, as shown in Patent No. 2,274,159 of February 24, 1942, there is formed a multipolar breaker. The device so formed does not operate to open all the poles on overload in any one; instead, only the overloaded pole or poles will open, the others remaining closed. In each overloaded pole, the contactor will move to open the circuit, but the handle or actuator will remain stationary; and in the other poles, the contactors, as well as the actuators or handles will also remain stationary.

In this application, I disclose a multipolar circuit breaker so constructed that on overload in any pole, all the poles will open automatically. This breaker comprises several single pole circuit breakers, each of which is generally, but not specifically, of the type shown in application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, with the actuators linked together in accordance with Patent No. 2,274,159. Unlike those of application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, the individual circuit breakers hereof, however,

are so designed that when the latch of any one of them releases, due to an overload in the pole controlled by that breaker, not only will the contactor of that breaker move relative to its actuator to open the line of that pole, but in addition the actuator of that breaker will move to an open circuit position; since, in this multipolar breaker all actuators are tied together, the other or remaining breaker actuators will also move automatically to open their circuits as well.

Opening of all poles on overload in any pole is a characteristic not provided by a gang of breakers of application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, with their handles tied together in accordance with Patent No. 2,274,159, but is provided by the construction of this application.

The changes which have been made and which enable breakers of the type shown in application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, to operate satisfactorily for multipolar operation, as above, primarily are changes in location of the contactor pivot points and of the contactor-spring connection points, such as will enable the actuators of all breakers to rock from circuit closing position to a circuit opening position in response to a release of any latch; in any breaker, a release of its latch will cause its actuator to rock to circuit open position, a characteristic not true of the breakers of application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943. Thus in this multipolar breaker, overload in any pole will cause latch release of the breaker of that pole and also shifting of the actuator of that pole, and since all of the actuators of the multipolar breaker are tied together, all of them will rock simultaneously and thus all of the breakers will move to open circuit position simultaneously and thus a unit of several, tied together, will satisfactorily function as a multipolar breaker, opening of all poles on overload in any being thus attained.

For an understanding of the multipolar breaker herein disclosed, reference should be had to the appended drawings.

In these drawings,

Fig. 1 is a top plan view of a multipolar breaker.

Fig. 2 is a front view of one of the poles, with front cover removed for purposes of clarity, showing the parts of that pole in closed circuit position.

Fig. 3 is a similar view, but showing the parts in an open circuit position.

Figs. 1 and 2 of the drawings show a multipolar breaker made up of several breakers tied together as by screws 8. Each breaker has a front cover 9 which closes a casing 10 having a compartment 11 containing and closed by a rocker type cup shaped handle or actuator or carrier 12 mounted on a pivot 14 and having, in its inside walls, notches 16 which receive the ends of a pin 17 fixed to and forming part of a contactor 18, the latter thus being carried by the handle 12. The contactor has a contact 19 mating with a stationary contact 20 mounted on the end of a flexible terminal 20a. Each contactor is biased by a spring 21 whose upper end engages the contactor at point 22 and whose lower end is seated in a V block 24 of the compartment floor 25. Integrally secured to the contactor 18 at its contact end is a bimetal strip 26 connected by a flexible lead 27 to a terminal 28. The free end of each strip 26 interlatches its contactor and its actuator at point 29. Each floor 25 has a contactor stop portion 30.

The back wall of the casing is formed with a stop 41 to engage the lower edge of the handle and limit its clockwise rotation when the latch releases.

The upper or closed surface of each actuator is formed with a transverse slot 42 having undercut ends 43 receiving a tie strap 44 which is fastened to the actuators by screws 45 so as to tie together all of them and thus make of them a single handle or carrier.

Operation

In "on", Fig. 2, the several springs 21 urge the unit consisting of the actuator or carrier and the contactors interlatched thereto at 29 to rotate clockwise around pivots 14, stopping being assured by the contact engagements at 18-20.

In "off", when the left end of the actuator or carrier 12 is pressed down from the "on" position, Fig. 2, the carrier and the contactors rock counterclockwise as a unit around pivots 14, the parts stopping with the contactors engaging stops 30. The rocking of the springs 21 overcenter (across pivots 14) assures snap action.

Overload release.—When the latch of any one breaker releases its contactor from the carrier, its spring 21 rocks its contactor on its pivot 17 to move counterclockwise relative of the carrier to open its pole. Its contactor rocks in the carrier until the end of strip 26 strikes the closed wall of the carrier, whereupon the bias of its spring 21 on its contactor, still potent, rocks the carrier and its contactor as a unit on pivot 14, counterclockwise, until its contactor is stopped by its stop 30. The carrier is blocked from clockwise rotation by stop 41.

This movement of the carrier may or may not be enough to move the carrier all the way into "off" position. However, it is certainly enough to move the carrier sufficiently to cause the other springs 21 to cross their centers or pivots 14, and no longer to bias the carrier to "on" position, but rather to bias the carrier to "off" position, and they so act, and in so acting, they move the carrier to "off" position, as a unit, the momentum of the moving parts, of course, aiding in such operation.

When the carrier rocks to the circuit open position, the lines on all poles will be opened automatically. However, though all of the poles will open, only the overloaded ones will unlatch, the remainder opening by handle movement, simulating manual operation, and not by their un-

latching. In this way, opening of all poles on overload in any, is attained.

It will be observed that, by way of contrast to multipolar breakers now known, where opening of all poles on overload in any is attained by having all poles unlatch when any one unlatches, using a common latching means for all poles, in this device the result is attained, not by multipolar unlatching, but rather by multipolar handle movement, on unlatching of any pole, the remainder remaining latched.

The operation is such that any overloaded pole will open, free of the carrier. While it is intended that this will cause opening of the non-overloaded poles, this will so operate only if the carrier is not restrained against moving to an open circuit position. It will be seen that even if the handle be held against movement, so that the non-overloaded poles remain closed, at least the overloaded pole or poles will open, for an overload in any pole causes unlatching of the contactor thereof so that it at least moves, being free of the handle by virtue of its becoming unlatched.

During the movement of the carrier from circuit closing position to circuit opening position in response to an unlatching in any one breaker, the carrier will first be moved by a spring of an unlatched breaker acting through its contactor, to a position where the biasing springs of latched breakers will not impart circuit closing bias to the carrier but will have moved across pivots 14 so that these springs will impart circuit opening bias to the carrier. Thereupon, the carrier will move, though in the last part of its movement it obtains no bias from the unlatched breaker spring, since the connecting element between the carrier and that spring, namely the contactor, is no longer free to move, but on the contrary is blocked by its stop 30. Thus, the force for moving the carrier and for opening all three lines following an overload, in any one line, is obtained in the first part of the carrier movement from the spring of the released breaker and in the latter part of its movement from the springs of the unreleased breakers. The first part of the carrier movement involves shifting the carrier sufficiently so that the springs of the unreleased breakers shift across their pivots so that their forces change from circuit closing forces to circuit opening forces.

It will also be observed that the carrier is moved toward or to "off" position, following unlatching of any pole; if the carrier movement is complete to "off" position, the abutment point 29 of each unlatched pole will move past the latching end at 29 of the bimetal strip, which meanwhile has cooled, and the carrier will relatch itself automatically to the latching strip 26 of the unlatched pole. The operation of overload opening then will terminate not only with the handle and the contactors in "off" position but also with no pole unlatched.

If it happens that the above described relatching operation does not take place, because the carrier did not move all the way to "off" position, possibly due to misalignment of parts, then relatching can be effected manually by moving the carrier counterclockwise all the way to or beyond the "off" position from whatever position it happens to occupy when it comes to rest.

Important structural differences between the breakers hereof and that of application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, are in locations of points 17 and 22. In

the breakers hereof, points 17 are far closer to pivots 14 and points 22 are considerably further from contacts 19, than in the breaker of application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943. When points 17 and 22 are in the locations shown in application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, the breaker handle does not shift from circuit closing position to circuit opening position on latch release; but when the locations of points 17 and 22 are shown here, the carrier shifts, as described, on latch release and it is this factor which makes it possible to get circuit opening on all poles of a multipolar breaker due to overload in any pole, with the actuators rigidly fastened or tied together, something that cannot be obtained with breakers according to Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, even with their handles tied together according to Patent No. 2,274,159.

Instead of the multipolar breaker being made up of three separate breakers with their casings and handles fastened together, it would be feasible to make a simple three compartment casing with a unitary multiple section carrier or handle, each compartment containing the necessary contact parts. However, for purposes of simplicity, it is preferred to make the multipolar breaker hereof out of three separate complete breakers, each generally, but not specifically, like the breaker of application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943, but with the herein disclosed locations of points 17 and 22, and with the several individual handles tied together rigidly to operate in unison, as a single carrier or handle.

Figs. 2, 3 show the relation of forces in the breakers of this application. Point A defines one end of spring 21, point B defines the other end when the latch holds, point C defines that other end when the latch releases, line AB the line of spring force when the latch holds, AC the line of spring force when the latch releases, L the moment arm of spring force when the latch holds, M the moment arm of spring force when the latch releases, P the center of pivot 14. From Fig. 2, it can be seen, that in a three pole construction hereof, the forces for moving the carrier to an open circuit position, when even one of the breakers unlatches, is greater than the forces for retaining the carrier in its closed circuit position, and thus the carrier moves to an open circuit position when even one of the breakers unlatches. This is not true of a three pole breaker made according to application Serial No. 376,036, now Patent No. 2,330,237 of September 28, 1943.

Now having described the multipolar breaker herein disclosed, reference should be had to the claims which follow for a determination of the inventions hereof.

I claim:

1. A multipolar breaker comprising a plurality of contactors, each having an overload release latch and a biasing spring, pivotal mountings and interconnection means for the contactors and springs arranged so that when the contactors are in circuit closing position, and all the latches hold, the springs bias the contactors towards circuit closing position to maintain them there, but when any latch releases, the corresponding spring will bias the corresponding contactor to an open circuit position and shift the remaining springs so that these will bias the remaining, still latched, contactors also to open circuit positions.

2. A multipolar breaker comprising a plurality of contactors, each having an overload release latch and a biasing spring, pivotal mountings and interconnection means for the contactors and springs arranged so that when the contactors are in circuit closing position, and all the latches hold, the springs bias the contactors towards circuit closing position to maintain them there, but when any latch releases, the corresponding spring will bias the corresponding contactor to an open circuit position and shift the remaining springs so that these will bias the remaining, still latched, contactors also to open circuit positions, and manually accessible means for shifting all the contactors, when they are latched, to and from open circuit and circuit closing positions, in unison.

3. A multipolar breaker comprising a plurality of pivotally mounted interconnected contactors, each having an overload release latch and an overcenter biasing spring, the parts being so arranged that when the contactors are in circuit closing position and all the latches hold, the springs bias the contactors towards circuit closing to maintain them there, but when any latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs overcenter so that these will bias the remaining, still latched, contactors also to open circuit positions.

4. A multipolar breaker comprising a plurality of pivotally mounted interconnected contactors, each having an overload release latch and an overcenter biasing spring, the parts being so arranged that when the contactors are in circuit closing position and all the latches hold, the springs bias the contactors towards circuit closing to maintain them there, but when any latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs overcenter so that these will bias the remaining, still latched, contactors also to open circuit position, and manually accessible means for shifting the contactors, when they are all latched, to and from open circuit and circuit closing positions, in unison.

5. A multipolar breaker comprising a plurality of pivotally mounted interconnected contactors, each having an overload release latch and an overcenter biasing spring, the parts being so arranged that when the contactors are in circuit closing position and all the latches hold, the springs bias the contactors towards circuit closing to maintain them there, but when any latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs overcenter so that these will bias the remaining, still latched, contactors also to open circuit positions, and manually accessible means for shifting the springs of all the contactors, overcenter when these are all latched, so that the contactors shift to and from open circuit and circuit closing positions, in unison.

6. A multipolar breaker comprising a plurality of pivotally mounted contacts, each having an overload release latch and a biasing spring, the relation of the parts being such that when the latch holds, and the spring is on one side of the contactor pivot, it biases that contactor to circuit closing position, and when it is on the other side of the contactor pivot, with the latch hold-

ing, it biases that contactor to an open circuit position, and means for interconnecting the contactors arranged so that when any one latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs across their contactor pivots so that these will no longer bias the remaining, still latched, contactors to circuit closing position but will now bias them to open circuit position

7. A multipolar breaker comprising a plurality of pivotally mounted contacts, each having an overload release latch and a biasing spring, the relation of the parts being such that when the latch holds, and the spring is on one side of the contactor pivot, it biases that contactor to circuit closing position, and when it is on the other side of the contactor pivot, with the latch holding, it biases that contactor to an open circuit position, and means for interconnecting the contactors arranged so that when any one latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs across their contactor pivots so that these will no longer bias the remaining, still latched, contactors to circuit closing position but will now bias them to open circuit position, and manually accessible means for shifting all the springs simultaneously across the pivots, when the latches hold, for shifting the contactors in unison to and from open circuit and circuit closing positions.

8. A multipolar breaker comprising a plurality of pivotally mounted contacts, each having an overload release latch and a biasing spring, the relation of the parts being such that when the latch holds, and the spring is on one side of the contactor pivot, it biases that contactor to circuit closing position, and when it is on the other side of the contactor pivot, with the latch holding, it biases that contactor to an open circuit position, and means for interconnecting the contactors arranged so that when any one latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs across their contactor pivots so that these will no longer bias the remaining, still latched, contactors to circuit closing position but will now bias them to open circuit position, the interconnection means being manually accessible to enable the contactors to be shifted simultaneously to and from open circuit and circuit closing positions.

9. A multipolar breaker comprising a plurality of pivotally mounted contacts, each having an overload release latch and a biasing spring, the relation of the parts being such that when the latch holds, and the spring is on one side of the contactor pivot, it biases that contactor to circuit closing position, and when it is on the other side of the contactor pivot, with the latch holding, it biases that contactor to an open circuit position, and means for interconnecting the contactors arranged so that when any one latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs across their contactor pivots so that these will no longer bias the remaining, still latched, contactors to circuit closing position but will now bias them to open circuit position, and manually accessible means for shifting the contactors simultaneously, when the

latches hold, to and from open circuit and circuit closing positions.

10. A multipolar breaker comprising a plurality of pivotally mounted contacts, each having an overload release latch and a biasing spring, the relation of the parts being such that when the latch holds, and the spring is on one side of the contactor pivot, it biases that contactor to circuit closing position, and when it is on the other side of the contactor pivot, with the latch holding, it biases that contactor to an open circuit position, and means for interconnecting the contactors arranged so that when any one latch releases, the corresponding biasing spring will bias the corresponding contactor to an open circuit position and at the same time shift the remaining springs across their contactor pivots so that these no longer will bias the remaining, still latched, contactors to circuit closing position but will now bias them to open circuit position, the interconnection means being manually accessible to enable it to be shifted for shifting the springs across their contactor pivots and thus shift the contactors in unison to and from open circuit and circuit closing positions.

11. A multipolar breaker having a plurality of interconnected pivoted contactors, each having an overload release latch and a biasing spring, arranged for overcenter operation, that is to say, when a spring is on one side of its contactor pivot, it biases its contactor to circuit closing position, and when it is on the other side of its contactor pivot, it biases its contactor to open circuit position, the pivots and springs being so located that the open circuit moment arm of each spring is considerably greater than its closed circuit moment arm, whereby when any one spring moves across its contactor pivot, from circuit closing biasing position to open circuit biasing position, on unlatching or release of its contactor, it not only shifts its contactor to open circuit position but also overcomes the circuit closing bias of the remaining springs, of the contactors still latched, and shifts these springs across their contactor pivots to cause their contactors also to move to open circuit position.

12. A multipolar breaker having a plurality of interconnected pivoted contactors, each having an overload release latch and a biasing spring, arranged for overcenter operation, that is to say, when a spring is on one side of its contactor pivot, it biases its contactor to circuit closing position, and when it is on the other side of its contactor pivot, it biases its contactor to open circuit position, the pivots and springs being so located that the open circuit moment arm of each spring is considerably greater than its closed circuit moment arm, whereby when any one spring moves across its contactor pivot, from circuit closing biasing position to open circuit biasing position, on unlatching or release of its contactor, not only shifts its contactor to open circuit position but also overcomes the circuit closing bias of the remaining springs, of the contactors still latched, and shifts these springs across their contactor pivots to cause their contactors also to move to open circuit position, and manually accessible means for shifting the contactors simultaneously to and from open circuit and circuit closing positions.

13. A multipolar breaker having a plurality of interconnected pivoted contactors, each having an overload release latch and a biasing spring, arranged for overcenter operation, that is to say, when a spring is on one side of its contactor pivot,

it biases its contactor to circuit closing position, and when it is on the other side of its contactor pivot, it biases its contactor to open circuit position, the pivots and springs being so located that the open circuit moment arm of each spring is considerably greater than its closed circuit moment arm, whereby when any one spring moves across its contactor pivot, from circuit closing biasing position to open circuit biasing position, on unlatching or release of its contactor, not only shifts its contactor to open circuit position but also overcomes the circuit closing bias of the remaining springs, of the contactors still latched, and shifts these springs across their contactor pivots to cause their contactors also to move to open circuit position, and manually accessible means for shifting the springs overcenter, when the contactors are latched, to cause the contactors to move simultaneously to and from open circuit and circuit closing positions.

14. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to bias the other contactors, as well as its own, to move for circuit opening upon release of its own latch.

15. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to shift the springs of the remaining contactors out of the position wherein they exert circuit closing bias and into a position wherein they exert circuit opening bias, these then biasing the other contactors, as well as the carrier, to move in the circuit opening direction.

16. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and

the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to bias the other contactors, as well as its own, to move for circuit opening upon release of its own latch, the carrier being manually accessible so to be shifted, with its springs and its contactors latched thereto, to and from circuit opening and closing positions.

17. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to shift the springs of the remaining contactors out of the position wherein they exert circuit closing bias and into a position wherein they exert circuit opening bias, these then biasing the other contactors, as well as the carrier, to move in the circuit opening direction, the carrier being manually accessible so as to be shifted, with its springs and its contactors latched thereto, to shift the springs across the contactor pivots whereby the contactors move to and from circuit opening and closing positions.

18. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to bias the other contactors, as well as its own, to move for circuit opening upon release of its own latch, the carrier being manually accessible so to be shifted, with its springs and its contactors latched thereto, to and from circuit opening and closing positions.

19. A multipolar breaker comprising a plurality of contactors, each having an overload release latch and a biasing spring, pivotal mountings and

interconnection means for the contactors and springs arranged so that when the contactors are in circuit closing position, and all the latches hold, the springs bias the contactors towards circuit closing position to maintain them there, but when any latch releases, the corresponding spring will bias the corresponding contactor to an open circuit position and shift the remaining springs so that these will bias the remaining, still latched, contactors also to open circuit positions, and relatch every released latch automatically.

20. A multipolar breaker comprising a plurality of contactors, each having an overload release latch and a biasing spring, pivotal mountings and interconnection means for the contactors and springs arranged so that when the contactors are in circuit closing position, and all the latches hold, the springs bias the contactors towards circuit closing position to maintain them there, but when any latch releases, the corresponding spring will bias the corresponding contactor to an open circuit position and shift the remaining springs so that these will bias the remaining, still latched, contactors also to open circuit positions, and relatch every released latch automatically, and manually accessible means for shifting all the contactors, when they are latched, to and from open circuit and circuit closing positions, in unison.

21. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first

5 biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to shift the springs of the remaining contactors out of the position wherein they exert circuit closing bias and into a position wherein they exert circuit opening bias, these then biasing the other contactors, as well as the carrier, to move in the circuit opening direction, and also relatching the unlatched contactor to the carrier.

22. A multipolar circuit breaker comprising a pivotally mounted carrier, a plurality of independent contactors independently pivoted thereon and also independently interlatched therewith, and a plurality of independent biasing springs independently engaging and biasing the contactors, each spring being arranged to bias its own contactor and the carrier interlatched therewith and the remaining contactors interlatched with the carrier, when the latches hold, in a circuit closing direction, and, when its latch releases, to bias its own contactor, and the carrier, and the remaining contactors still latched to the carrier, in an opposite or circuit opening direction, each spring, on release of its latch, first biasing its contactor to move relative to the carrier in the circuit opening direction, and then crossing the pivotal mounting of the carrier, and then biasing the carrier in the circuit opening direction, thereby to bias the other contactors, as well as its own, to move for circuit opening upon release of its own latch, the carrier being manually accessible so to be shifted, with its springs and its contactors latched thereto, to and from circuit opening and closing positions, the unlatched contactor moving free of the carrier when its latch releases, so that it can open its circuit, even though the carrier be held against movement, and even though the remaining, still latched, contactors are thereby held against open circuit movement.

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