

Jan. 9, 1962

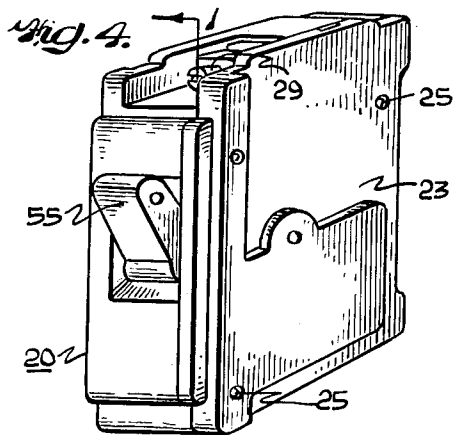
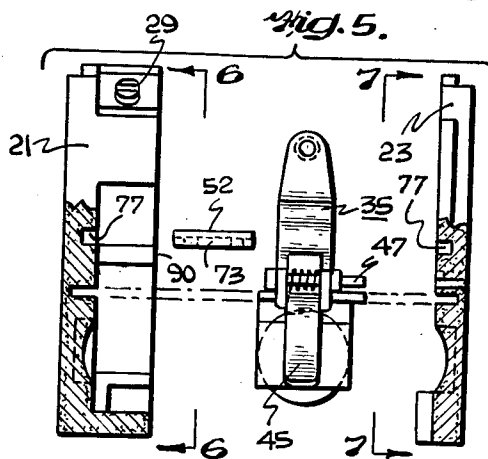
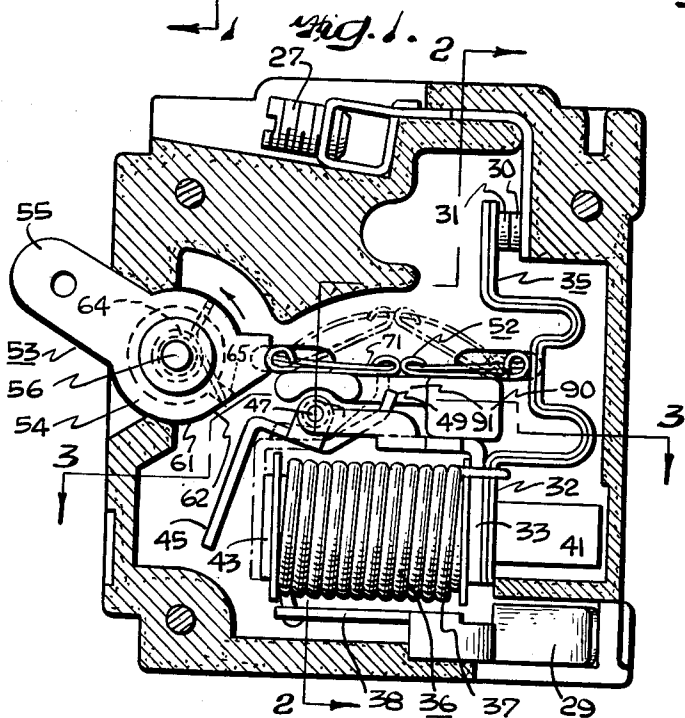
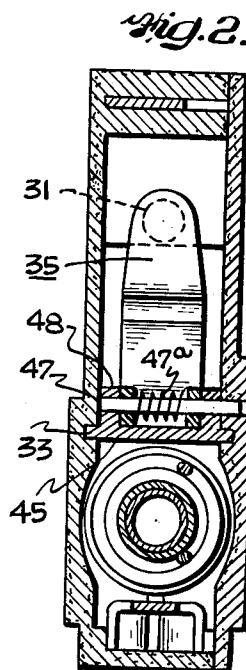
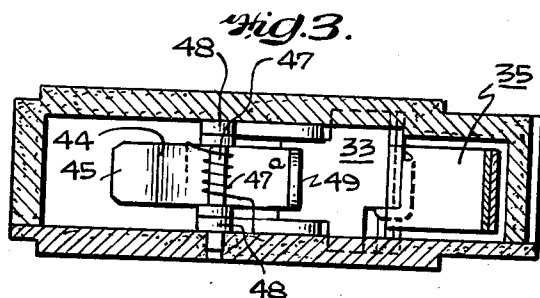
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3,016,435

CIRCUIT BREAKER AND LATCH STRUCTURE

Filed March 18, 1959

2 Sheets-Sheet 1



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CIRCUIT BREAKER AND LATCH STRUCTURE

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2 Sheets-Sheet 2

Fig. 6.

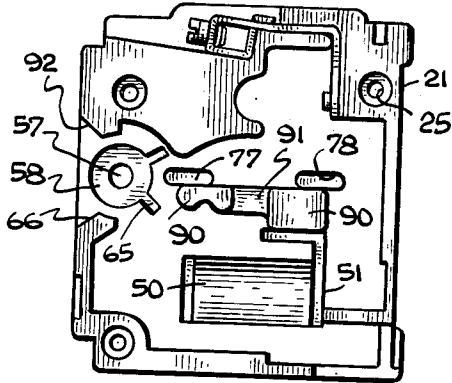


Fig. 7.

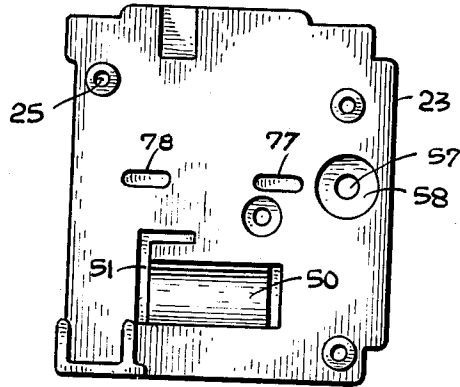
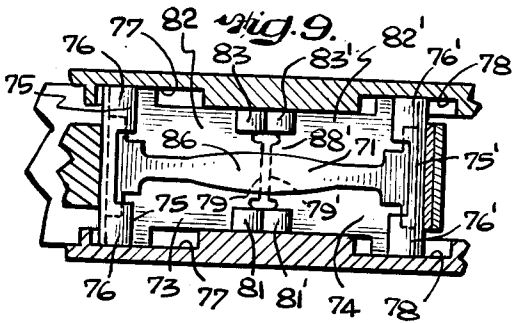
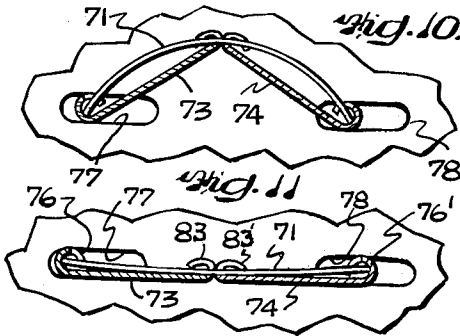
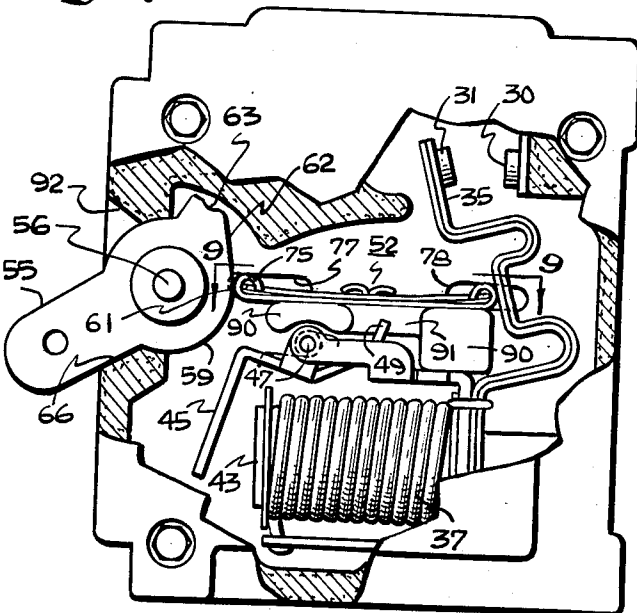
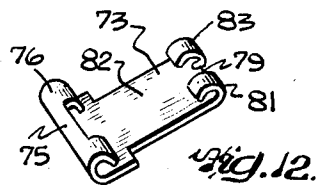
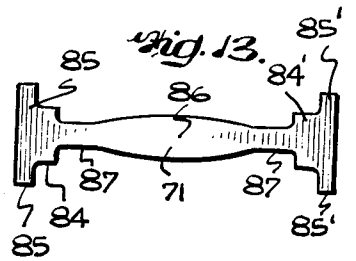


Fig. 8.



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3,016,435

CIRCUIT BREAKER AND LATCH STRUCTURE
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16 Claims. (Cl. 200-94)

My invention relates to an improved circuit breaker and more particularly to latch structures therefor.

It is desirable to provide a latch structure having a minimum number of parts. Furthermore, the latch structure, for certain applications, should be as small as possible in order to make feasible the reduction in size of the entire circuit breaker. An object of my invention is to provide a latch structure having a minimum number of parts.

Some of the circuit breakers that have been utilized heretofore have required many hand operations in assembling the latch structure. It is another object of my invention to provide a latch structure which will readily lend itself to automation.

The speed with which a circuit breaker opens, after the overcurrent sensing mechanism has been operated, is an essential characteristic. Another object of my invention is to provide a latch structure that lends itself to fast operation.

It is a further object of my invention to provide an improved latch structure that will not allow the contacts of the circuit breaker to be held closed against tripping when an over-current occurs.

A still further object of my invention is to provide an improved housing for supporting my latch structure and the associated members of the circuit breaker.

My invention is incorporated in an electric circuit breaker having a stationary contact and a movable contact, the latter being carried by a spring arm which, in closed position, is biased by a latch structure and a cam forming part of an operating handle. The latch structure comprises a flat, elongated, central spring and two reinforcing members which are normally biased by the spring against a support structure. The latch structure in moving from the closed position to the open position of the contacts, and vice versa, is slidable in a pair of slots provided on either side of the inner casing of the housing structure. The cam, which is part of the handle structure, is in contact with one end of the latch structure at all times and has an indentation adjacent the extremity of the cam surface for receiving and holding the end of the latch structure when the contacts are closed.

In operation, the latch structure moves through three positions, a no-load position corresponding to the open position of the contacts, a load carrying position corresponding to the closed position of the contacts, and a momentary collapsed position corresponding to the tripped position of the contacts. The reinforcing members of the latch structure are normally in end-to-end abutting relationship and, in the closed position of the contacts, transmit the force between the spring arm carrying the movable contact and the pintle of the handle structure. The central, flat, elongated spring of the latch structure biases the reinforcing members against support members projecting from one wall of the housing structure.

The cam is rotatable about the pintle of the handle structure. Initial rotation of the cam from the "Off" to the "On" position places the reinforcing members of the latch structure under load, against the bias of the spring arm, and continued rotation of the cam moves the latch structure and spring arm away from the pintle of the handle until the movable contact makes firm engagement with the stationary contact. When this latter position is

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achieved the curved end of the latch member adjacent the cam slips into an indentation in the extremity of the cam thereby effectively locking the circuit breaker in closed position until such time as the latch structure is moved upward by a force from beneath the reinforcing members or until the handle is turned to the "Off" position. The force from beneath the latch structure tends to separate the two reinforcing members of the latch structure by moving the inner end of at least one of the reinforcing members upwardly thereby breaking the force transmitting ability of the latch structure. As soon as the latch members or one of them are moved upwardly the spring arm moves toward the handle thereby carrying the movable contact away from the stationary contact and opening the electric circuit of which the circuit breaker forms a component part.

The foregoing and other objects, the principles and characteristic features of my invention, and the best mode in which I have contemplated applying such principles will further appear from the following description and the accompanying drawings in illustration thereof.

In the drawings:

FIG. 1 is a side elevational, cross-sectional view of my improved circuit breaker showing the latch structure and the contacts in closed position;

FIG. 2 is a front elevational, cross-sectional view taken along the line 2-2 of FIG. 1;

FIG. 3 is a plan partly in cross-section view of my improved circuit breaker taken along the line 3-3 of FIG. 1;

FIG. 4 is an external view of my improved circuit breaker in perspective showing the handle in the "On" position;

FIG. 5 is an exploded, front elevational view, partly in cross-section, of my improved circuit breaker;

FIG. 6 is a side elevational view of the inside of the lefthand portion of the casing, as viewed from the line 6-6 in FIG. 5;

FIG. 7 is a side elevational view of the inside of the righthand portion of the casing, as viewed from the line 7-7 of FIG. 5;

FIG. 8 is a side elevational view, partly in cross-section of my improved circuit breaker with the contacts in open or "Off" position;

FIG. 9 is an enlarged, fragmentary, plan view, partly in cross-section of the latch structure in the "Off" position;

FIG. 10 is a side elevational, fragmentary view of the latch structure in its momentarily collapsed position, similar to that indicated in outline in FIG. 1;

FIG. 11 is a side elevational view of the latch structure in the "Off" position;

FIG. 12 is a perspective view of one of the latch reinforcing members; and

FIG. 13 is a plan view of the latch spring.

Referring to the drawings, my circuit breaker includes an insulated housing 20, divided into a lefthand casing 21 and righthand casing 23 and secured together by bolts and nuts or rivets extending through holes 25, having external electrical terminals 27 and 29 connected to internal contacts 30 and 31, respectively. The movable contact 31 forms part of the upper end of a resilient movable arm 35 the base 32 of which is attached to the frame 33 and tube 41 of a solenoid 36. The arm 35 is so constructed and secured, as aforesaid, as to bias the contact 31 to the open position. The solenoid 36 comprises a coil 37 connected at one end to the inner part of the external terminal 29 by a conductor 38 and at the other end to the base 32 of the resilient arm 35. The coil 37 is wrapped about a tube 41 to which is secured a magnetically permeable face 43.

Associated with the face 43 of the solenoid 36 is a pivotable armature 44 having a magnetically permeable head 45, engageable with said face 43, and a tripping arm 49 engageable with the latch structure 52. The armature is supported on and pivotable about a pintle 47 the ends of which are seated in ears 48 forming a part of the frame 33. A spring 47a encircling the pintle 47 biases the head 45 away from the face 43 and the tripping arm 49 away from the latch structure 52. The solenoid 36 and associated structure is seated in inner recesses 50 and 51 in the casings 21 and 23.

The movable resilient arm 35 is preferably formed of a plurality of layers or leafs of electrically conducting material, such as copper or copper alloys, having spring qualities. Utilizing a plurality of layers for the arm 35 increases the flexibility thereof, while decreasing its electrical resistance, over that of a similar arm formed from one integral mass of metal.

Mounted to one side of the casings 21 and 23 is a unit member 53 having a cam 54, a handle 55 and a stud 56 which projects into and is supported by and rotatable in small circular recesses 57 in the casings, the extended ends of the cam 54 being rotatable in the large circular recesses 58 in the casings. The cam 54 has a low surface 61 joined to the high surface 63 by a slope 62. One end of the latch structure 52 is in contact with one of the surfaces 61, 62 or 63 at all times. A spring 64 encircles one end of the stud 56 and has its ends anchored in the casing cleft 65 and a cleft (not illustrated) formed in the member 53 for biasing the unit member 53 so that the surface 61 contacts the end of the latch structure 52 in the "Off" position of the circuit breaker, FIG. 8.

The latch structure comprises a flexible latch spring 71 and latch reinforcing member links 73 and 74. The spring 71, of beryllium-copper or the like, is thin and narrow relative to its length, flexible, and has a longitudinal arc or bow form whereas the reinforcing members are rigid, relatively thick and wide, flat and each slightly longer than one-half the length of the latch spring 71. The reinforcing members 73 and 74 are utilized to transmit the force generated at the cam surfaces 62 and 63 by the manual turning of the handle 55, to the contact arm 35. The latch spring 71 normally biases the opposed ends of the reinforcing members 73 and 74 downward toward abutting and force-transmitting relationship.

As best illustrated in FIGS. 9 and 12, the reinforcing members 73 and 74 are provided at one end with apertured curled portions 75 and 75', respectively, each having two laterally projecting ears 76 and 76' for the reception of one end of the latch spring 71 and each are slidable in two pairs of opposed grooves 77 and 78 formed in the casings 21 and 23. At the opposite ends 79 and 79', respectively, each of the reinforcing members 73 and 74 are divided to form spaced ears 81 and 83 and 81' and 83', respectively, so that the central portion 86 of the latch spring 71 can lie therebetween. In engaged position, FIGS. 1, 8 and 9, the ears 81 and 81' and 83 and 83' are in engagement one with the other along a line of contact on their curved surfaces. The flat bases 82 and 82', respectively, of the reinforcing members are foreshortened at the ends 79 and 79' so as not to project into the line of contact between the engaged reinforcing members. Thus, the force necessary to break the frictional engagement between the reinforcing members on overcurrent is minimized.

As best illustrated in FIGS. 9 and 13, the spring 71 has enlarged end portions 84 and 84' that are provided with extensions 85 and 85' receivable within the curled end portions 75 and 75' of the reinforcing members 73 and 74 for pivotable movement of the spring 71 relative to the curled end portions 75 and 75' and to prevent longitudinal movement of the reinforcing members relative to the spring 71. The central portion 86 of the latch spring 71 is disposed in spaces 88 and 88' between the spaced ears 81 and 83 and 81' and 83'. A central por-

tion 86 of the spring 71 has curved opposed sides and is connected to the enlarged end portions 84 and 84' by narrow neck portions 87 and 87'.

The spring 71 is prestressed to form a downward bow or arc. The extreme ends 75 and 75' of the reinforcing members are vertically immobile being held by the ears 76 and 76' in the slots 77 and 78 in the casings. The spring 71 has a tendency to impart a downward bow or buckle to the reinforcing members when the ends of the spring are held in the ears 76 but it is prevented from doing so because the ears 76 are restrained by the grooves 77 and 78 and the remainder of the reinforcing members are restrained from downward movement by reason of a restraining wall 90 extending from the casing 21. The wall 90 has a central opening 91 in which is disposed the extension arm 49 of the armature 44.

The restraining wall 90 has its uppermost surface in contact with the lowermost surface of the latch structure, FIGS. 1 and 8, and is positioned with respect to the grooves 77 and 78 so that the reinforcing members 73 and 74 lie in a substantially straight force-transmittable line. That is to say, the uppermost surface of the restraining wall 90 is located above the level that would be occupied by the central portion of the latch structure, under the influence of the spring 71, if it were merely suspended from the grooves 77 and 78 without any restraining wall 90 to position the latch structure.

The "Off" position of the latch structure in which the contacts 30 and 31 are spaced from each other is illustrated in FIGS. 8 and 9. In such position the movable contact arm 35 abuts and may press against the end portion 75' of the reinforcing member 74. The end portion 75 of the reinforcing member 73 abuts the low surface 61 of the cam 54. In the "Off" position the latch structure 52 is at the extreme left, the ears 76 and 76' being in the lefthand portions of the grooves 77 and 78, as viewed in FIG. 8.

To move the breaker from the "Off" position, FIG. 8, to the "On" position, FIG. 1, the handle 55 is rotated clockwise, as viewed in such illustrations, until it is in the uppermost position (FIG. 4) and resting against the stop 92 of the housing. Such movement will place the surface 63 of the cam 54 in restrainable engagement with the end portion 75 of the latch structure. A notch or indent 66 may be provided in the surface 63 for better locking engagement. Such rotation of the cam 54 causes the latch structure 52 to slide on the restraining wall 90 to the right (because the cam 54 imposes a rectilinear force along the longitudinal axes of the reinforcing members) forcing the movable arm 35 to the right and forcing the contact 31 into engagement with the contact 30 (FIG. 1). During such movement any tendency of the central portion of the latch structure 52 to move upwardly is resisted by the spring 71 and any tendency to move downwardly by the wall 90. Thus, the force generated by the turning of the cam 54 is imparted to the lefthand curled end portion 75 of the reinforcing member 73 and transmitted through the ears 81 and 81' and 83 and 83' to the reinforcing member 74 and from its end portion 75' to the movable arm 35. When the handle 55 abuts its upper stop the high surface 63 of the cam contacts the lefthand curled end portion 75, the contacts 30 and 31 close and the latch structure 52 becomes stabilized in the engaged position.

In the position shown in FIG. 1, the electrical circuit through the circuit breaker is complete and current passes from the terminal 29 through the coil 37 to the springed arm 35, thence through the contacts 31 and 30 and out through the terminal 27. Upon an overload in electrical current passing through the coil 37 the magnetic flux at the face 43 is so increased as to attract the armature 45 and to cause it to pivot about the pintle 47. This causes the counter rotation of the tripping arm 49 so that its end strikes the underside of the reinforcing member 73 in the vicinity of the juxtaposed end portions 79 and 79'.

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The position of the armature head 45 when in attracted position and the arm 49 when in tripping position is shown in outline in FIG. 1. This blow upon the underside of the latch member 73 causes the abutting ends 81 and 83 thereof to rise above the level of the surface of the restraining wall 90 and out of engagement with the abutting ends 81' and 83' of the reinforcing member 74 against the bias of the spring 71. The spring 71 which, prior to the latch structure being struck by the arm 47, is concaved downwardly, flexes and becomes deflected upwardly and the reinforcing members become oblique to each other. Thus, momentarily, the ends of the spring 71 are moved apart until the central portion of the spring is moved up beyond the plane of its end members 85 and 85'. As soon as this plane is passed, the end 85' of the latch spring is moved toward the end 85 under pressure from the spring force of the arm 35.

As soon as the ends 81 and 83 are no longer in full force-transmitting contact with the abutting members 81' and 83', the springed contact arm 35 is free to and does move toward the cam 54 against the bias of the latch spring 71 so that the contact 31 is immediately freed of contact with the contact member 30 and the electrical path is broken. At the same time, once the latch structure collapses the frictional engagement between the cam surface 63 and the end 75 of the latch structure is eliminated or very substantially reduced so that the cam 54, and its associated handle 55, is free to turn, counterclockwise, under pressure from the spring 64 encircling the stud 57, toward the "Off" position until the handle abuts against the stop 66 of the casing 21. As the cam turns, presenting its low surface to the end 75 of the latch structure, the biasing of the arm 35 will cause the entire latch structure to move to the left to the position illustrated in FIG. 8. Simultaneously with this movement the bias of the spring 71 returns itself and the reinforcing members to the position illustrated in FIG. 11, wherein the ends of the reinforcing members 73 and 74 are juxtaposed and the spring 71 is bowed downwardly.

It is to be noted that it is impossible to hold the handle in "On" position, and thereby prevent the circuit breaker from tripping, because even though the handle is held in the position illustrated in FIG. 1 the latch structure will collapse upon the occurrence of an overload current and the springed contact arm 35 will move the contact member 31 away from the contact member 30 so as to break the electrical circuit. If the handle is held in the "On" position upon the occurrence of an overload current, the breaker will trip but the latch spring 71 will be held in an upwardly bowed position such as that illustrated in outline in FIG. 1. When the handle 55 is finally released, the handle 55 and cam 54 will be rotated by the spring 64 and the latch spring 71 will then force the reinforcing members 73 and 74 to assume the position of the latch structure illustrated in FIG. 8.

As soon as the electric current has been interrupted, the magnetic attraction of the face 43 for the armature head 45 will cease and the armature will be rotated clockwise by the spring 52, to the position shown in solid outline in FIGS. 1 and 8.

The electric circuit may, of course, be broken by manually turning the handle 55 from the "On" position, FIG. 1, to the "Off" position, FIG. 8. In such event, the springed arm 35 biases the latch structure 52 to the left as the cam moves its presenting surface from the high surface 63 to the low surface 61; the contact 31 moving at the same time, out of contact with the stationary member 30. The latch structure under such circumstances is not split nor is the latch spring 71 bowed upwardly.

As has been noted, the casing halves have been specially designed to contain and support the latch structure and its associated members within the housing so that the latch structure will not collapse under pressure from either the cam 54 or the springed contact arm 35 and 75

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will not move from its intended position regardless of the attitude of the circuit breaker housing. That is to say, the circuit breaker can be installed in any desired position without loss of effectiveness.

Having described my invention, I claim:

1. In a circuit breaker, a stationary contact member, a movable contact member biased away from said stationary contact member, a resilient member, said resilient member being movable from a first stable position to a second unstable position, cam means for urging said resilient member against said movable contact member when said resilient member is in its first position and moving the said movable contact into abutment with said stationary contact member, tripping means for initiating the movement of said resilient member from said first position to said second position, the bias of said movable contact member completing the movement of said resilient member into said second position while said movable contact member moves away from said stationary contact member.

2. In a circuit breaker, a stationary contact member, a movable contact member biased away from said stationary contact member, a resilient member, said resilient member being movable from a first stable position to a second unstable position, cam means for urging said resilient member in its first position against said movable contact member for placing and holding the movable contact member in abutment with the stationary contact member, wall structure defining grooves, said resilient member having end portions slideably movable in said grooves, tripping means for initiating the movement of said resilient member into said second unstable position, the bias of said movable contact member completing the movement of said resilient member into said unstable position while the movable contact member moves away from said stationary contact member, said tripping means including a pivotable armature and a solenoid coil capable of attracting said armature upon the occurrence of an overcurrent, said pivotable armature comprising an attraction head and a tripping arm the end of which is engageable with said resilient member when said attraction head moves into engagement with said solenoid.

3. In a circuit breaker having stationary and movable contact members, the latter being movable between an open circuit position and a closed circuit position, a cam having high and low surface positions, a resilient member interposed between said cam and said movable contact member and normally in contact with the surface of said cam and an intermediate portion of said movable contact member, wall structure defining grooves, said resilient member having end portions slideable in said grooves, said movable contact member being biased to the open circuit position, said cam being rotatable for generating a force by engagement of said high surface position with one end of said resilient member while urging the other end of said resilient member against said movable contact member to overcome the bias of the latter and to move it into closer circuit position with said stationary contact member, and means responsive to overload current for deflecting said resilient member and allowing the biasing force of said movable contact member to move said movable contact to the open circuit position.

4. In a circuit breaker having a stationary contact and a movable contact, the latter mounted on a spring arm, an elongated resilient member, cam means for urging said resilient member against said arm to move the movable contact into abutment with the stationary contact, wall structure defining grooves, said resilient member having end portions slideable in said grooves, tripping means comprising a pivotable armature and a solenoid, said pivotable armature being so constructed that upon the occurrence of a predetermined overload current one end of said armature will move toward said solenoid core and the other end of said armature will press against

a portion of said resilient member whereby said resilient member will flex and permit one end portion of said resilient member to move toward the other end portion, under the bias of the movable arm, while the movable contact separates from the stationary contact.

5 5. A circuit breaker comprising a contact, a resilient member, an arm having a contact section complementary to said contact and an intermediate section biased toward one end of said resilient member, a handle and cam member in normal contact with the other end of said
10 resilient member, means including said resilient member for transmitting motion of said cam member to said arm, and other means for collapsing said first named means, said first mentioned means freeing said cam member when said first mentioned means is collapsed and allowing said cam member to move directly to the open
15 position of the contacts.

6. A circuit breaker as set forth in claim 5 in which said other means includes a magnetically attractible armature having an extension arm contactable with said first named means upon the occurrence of an overcurrent, for collapsing said first named means.

7. A circuit breaker comprising a stationary contact member, a movable member biased away from said stationary contact member, means for securing said movable contact member in electrical contact with said stationary contact member, said means including said cam member and a resilient spring and reinforcing members slideably connected to said spring, said reinforcing members being disposed in end to end relationship, wall structure having grooves on opposite sides of said spring, said reinforcing members having first end portions pivotably engaging the end portions of said spring and movable in said grooves, said reinforcing members having second end portions in end to end abutting relationship, a restraining member extending from said wall structure for limiting movement of said reinforcing members and said spring in one direction, said spring formed so as to exert a force on said reinforcing members in said one direction, and a current responsive mechanism for separating said reinforcing members and deflecting said spring permitting said biased movable contact member to break electrical contact with said stationary member.

8. A circuit breaker as set forth in claim 7 in which said current responsive mechanism includes a member for contacting at least one of said reinforcing members and breaking said abutting relationship so that the biasing force of said movable contact bows said spring away from said restraining member permitting said contacts to open.

9. In combination, a stationary contact member, a resilient movable member having a section complementary to said contact member, a latch for securing said complementary section in contact with said stationary contact member, said latch comprising a bowed elongated spring member and flat reinforcing members slideably connected to said spring member, said reinforcing members being disposed in end to end relationship, a cam member having high and low surfaces for generating and imposing a force on said reinforcing members, said cam member being biased toward its low surface, said generated and imposed force being transmitted to said movable member for causing contact between said complementary section and said stationary member, wall structure having grooves on opposite sides of said spring, said reinforcing members having opposed first end portions engaging the end portions of said spring and slideable in said grooves, said reinforcing members having second end portions in end to end abutting relationship, a restraining member for limiting downward movement of said reinforcing members and said flat spring, said flat spring being slightly longer than the distance between said first end portions and positioned to exert a downward force on said reinforcing members, a current responsive trip mechanism for vertically moving said latch to a position in which said resilient

member moves said complementary section away from said stationary member and moves one end of said latch toward the other end of said latch and permits said cam to move so as to present its low surface to said latch.

10. In combination, a stationary contact, a movable contact, a resilient arm secured to said movable contact for biasing the movable contact away from said stationary contact, a latch structure for securing said movable contact in abutment with said stationary contact, said latch structure comprising a resilient elongated spring, a pair of rigid elongated reinforcing members, wall structure defining opposed grooves on each side of said reinforcing members, said reinforcing members each having oppositely disposed end portions that are slideable in said grooves, additional wall structure for limiting downward movement of said latch, cam means for imposing a force along the longitudinal axis of said reinforcing members, trip means responsive to overcurrent including a pivotable armature and a solenoid coil having a permeable core, said coil being adapted to rotate said armature into contact with at least one of said reinforcing members, whereby the biasing force of said resilient arm moves the end portions of said spring toward each other and allows the contacts to separate.

11. In a circuit breaker, a stationary contact member, a movable contact member, a pair of abutting links slidable relative to each other, means biasing said links to a force transmitting position, operating means for urging said links toward said movable contact member when in force transmitting position, said operating means being slidably connected to one of said links, said movable contact member being slidably connected to the other of said links, said movable contact member being biased to the contacts open position, trip means for moving said links relative to each other and out of force transmitting position.

12. In a circuit breaker, a stationary contact member, a movable contact member biased away from said stationary contact member, a resilient means, cam means for urging said resilient means toward said movable contact member, said cam means being slidably connected to said resilient means, said resilient means being slidably connected to said movable contact member, and wall structure for limiting movement of said resilient means between said cam means and said contact member, said resilient means being slidably connected to said wall structure, said cam being movable to positions corresponding to the open and closed positions of the contacts, and biasing means for biasing said cam to the open position of the contacts, said resilient means being collapsible from a first stable position to a second unstable position and back to the first stable position, said cam and said contacts each moving simultaneously to the open positions of the contacts during the collapsing of the resilient means.

13. The structure recited in claim 12 wherein said resilient means is biased against said wall member during portions of the slidable movements between said cam means and said movable contact member.

14. In apparatus of the character described a linkage for transmitting motion comprising first and second abutting members in force transmitting relationship, a wall with respect to which said first and second members are both slidable, and spring means for simultaneously biasing said members against said wall, actuating means for imposing a force on one of said abutting members for transmission to the other, and means for overcoming the bias on the members and collapsing them so that they are no longer in abutting force transmitting relationship.

15. In a circuit breaker, a stationary contact member, a movable contact member, a pair of links pivotable relative to each other, means biasing said links to a force transmitting position, operating means for urging said links toward said movable contact member when in force transmitting position, said operating means being slidably connected to one of said links, said movable contact mem-

ber being slidably connected to the other of said links, said movable contact member being biased to the contacts open position, trip means for pivoting one of said links relative to the other and out of said force transmitting position, the link biasing means being actuated simultaneously with the pivoting of the links for overcoming the bias tending to retain said links in force transmitting position and thereafter biasing the links to the force transmitting position subsequent to opening of the contacts.

16. In combination, a stationary contact, a movable contact, biasing means for urging said movable contact away from said stationary contact, a force transmitting latch structure for overcoming said biasing means and securing said movable contact in abutment with said stationary contact, said latch structure including an elongated spring, wall structure for limiting movement of said spring in the direction transverse to its longitudinal axis and the direction transverse to that of the force transmitting direction, said latch structure being slidable upon said wall structure, operating means for applying force to one end of said latch structure when said spring is bowed in the direction toward said wall, the force applied to said

latch structure being transmitted by said latch structure when said spring is bowed toward said wall to overcome the biasing means urging said movable contact away from said stationary contact, trip means for flexing said spring in the direction away from said wall for allowing the end portions of said latch structure to come sufficiently close to each other for releasing the biasing means and allowing the contacts to open.

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