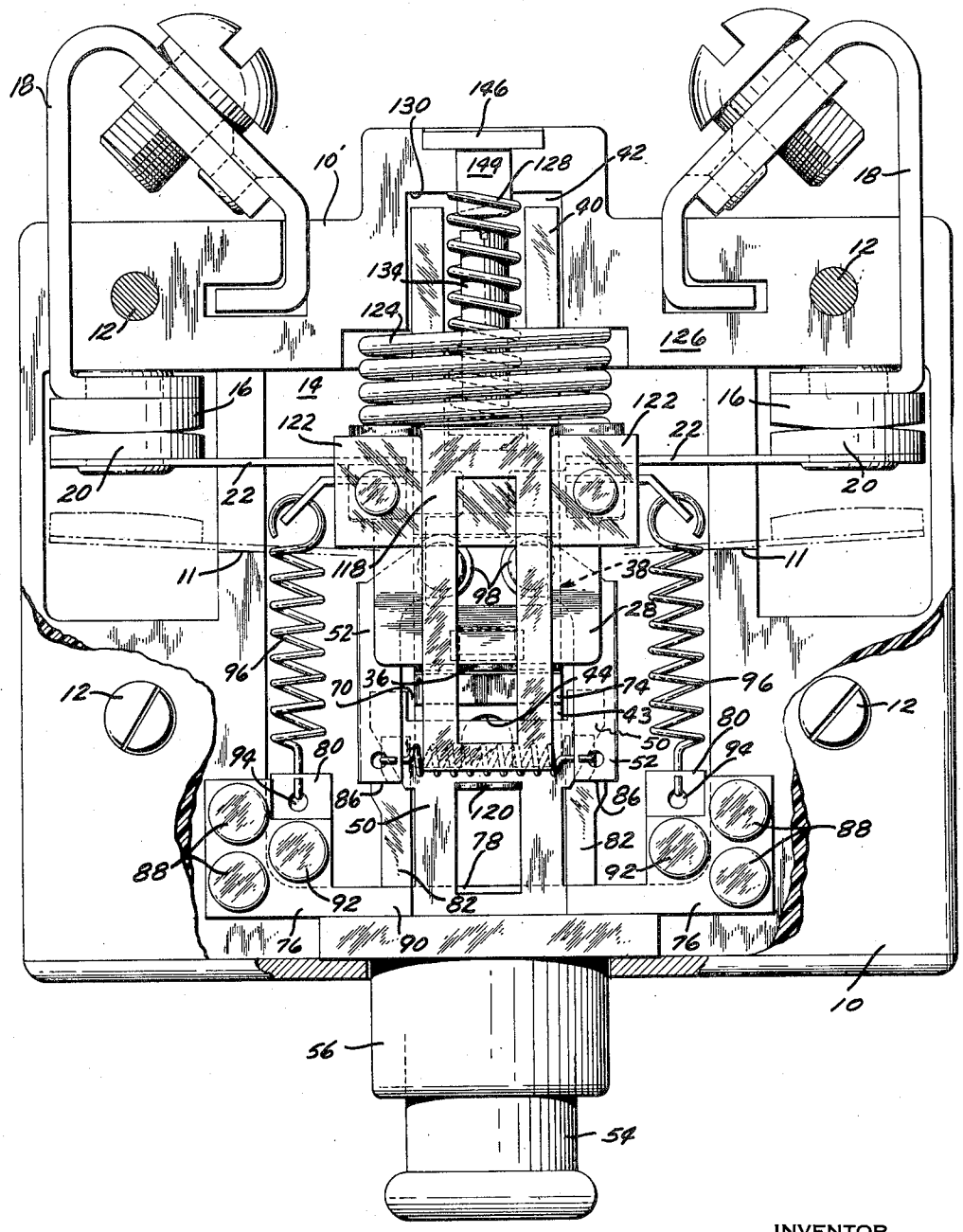
July 9, 1957 R. C. INGWERSEN 2,798,920

ELECTRIC CIRCUIT BREAKER WITH MECHANICAL LATCH SETTING THERMAL LATCH

Filed July 20, 1955 5 Sheets-Sheet 1

FIG. 1.



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ELECTRIC CIRCUIT BREAKER WITH MECHANICAL LATCH SETTING THERMAL LATCH

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FIG. 2.

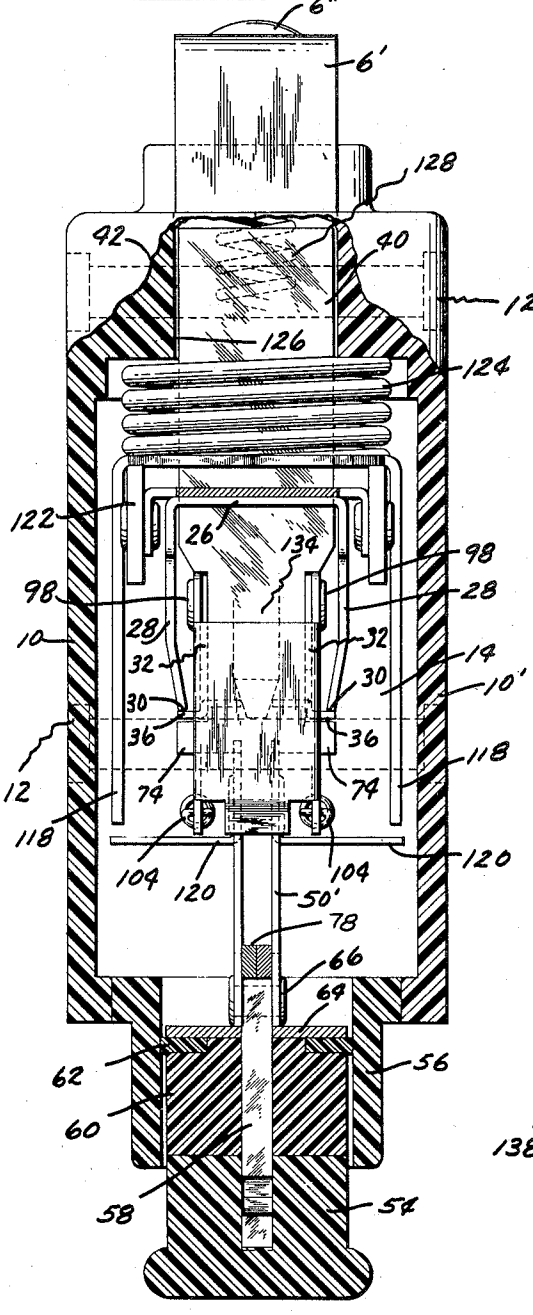


FIG. 3.

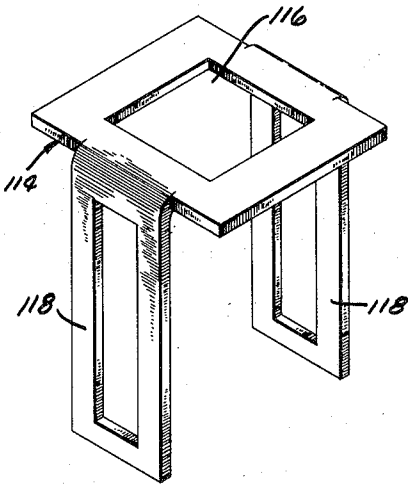
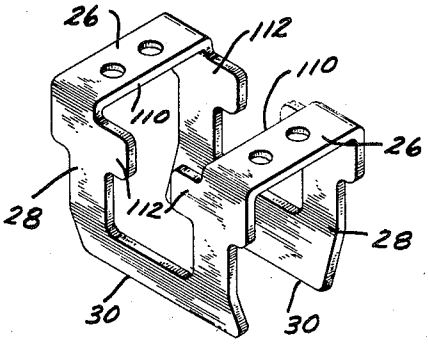


FIG. 4.



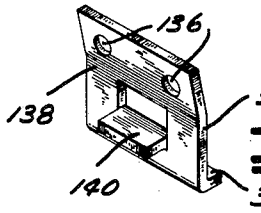


FIG. 5.

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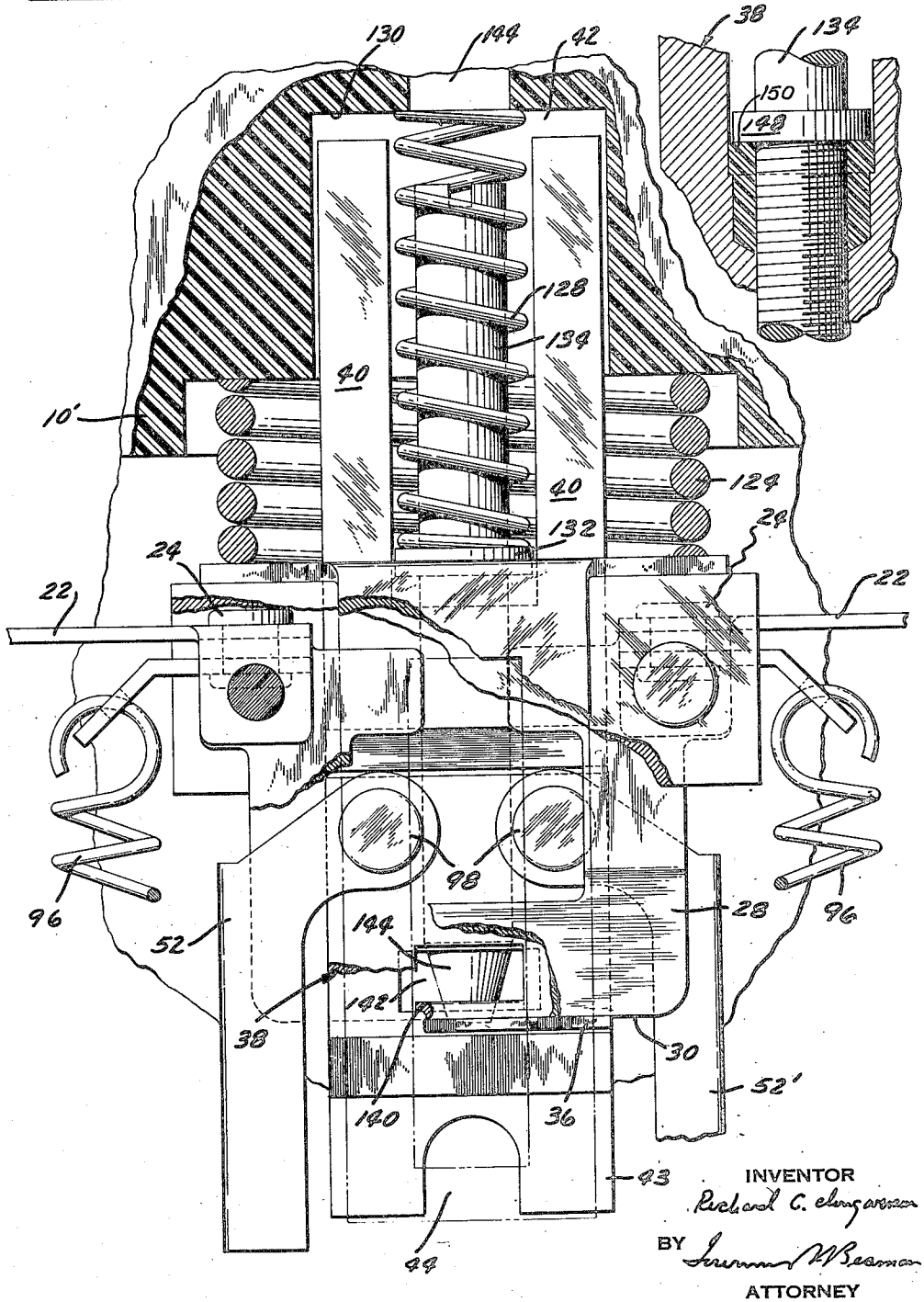
July 9, 1957 R. C. INGWERSEN 2,798,920

ELECTRIC CIRCUIT BREAKER WITH MECHANICAL LATCH SETTING THERMAL LATCH

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FIG. 6.

FIG. 7.



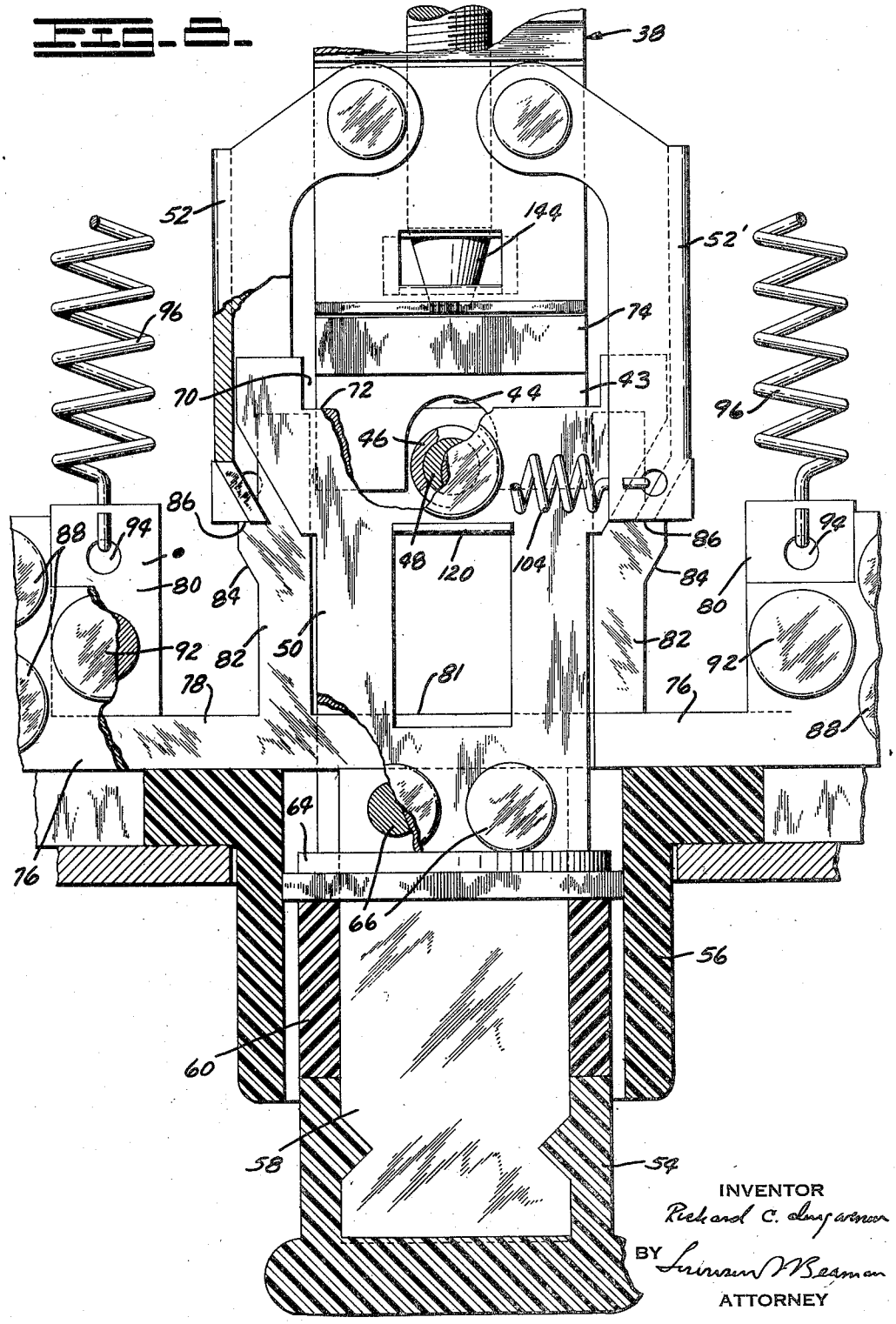
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July 9, 1957 R. C. INGWERSEN 2,798,920

ELECTRIC CIRCUIT BREAKER WITH MECHANICAL LATCH SETTING THERMAL LATCH

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FIG. 8



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ELECTRIC CIRCUIT BREAKER WITH MECHANICAL LATCH SETTING THERMAL LATCH

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FIG. 9.

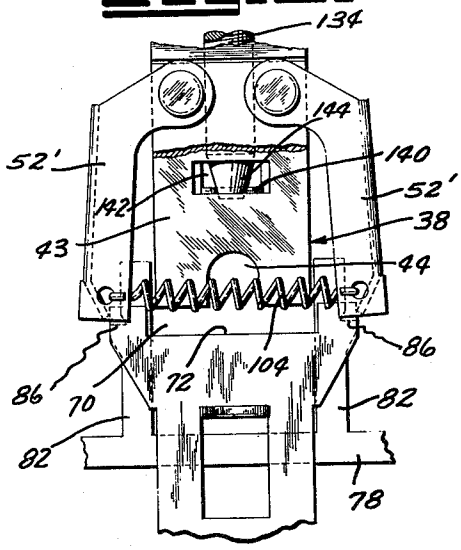


FIG. 10.

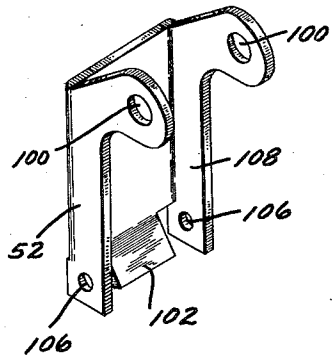


FIG. 11.

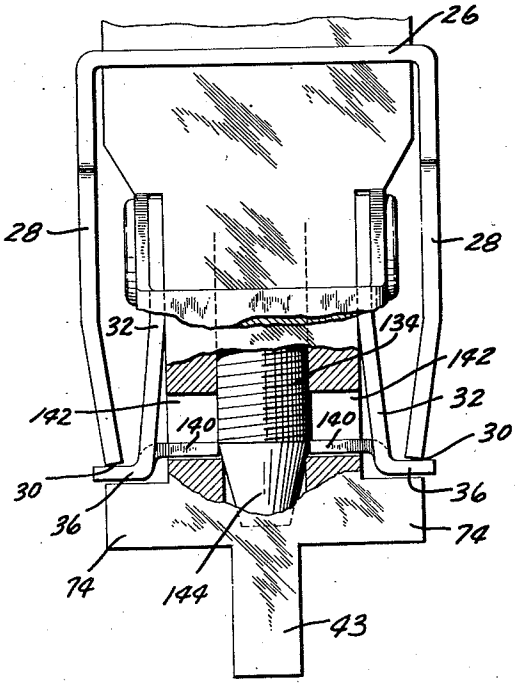
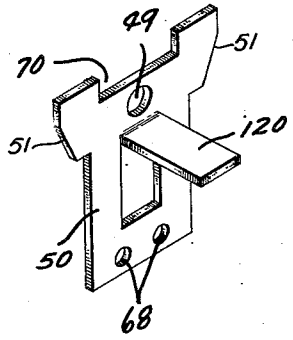


FIG. 12.



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United States Patent Office

2,798,920

Patented July 9, 1957

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ELECTRIC CIRCUIT BREAKER WITH MECHANICAL LATCH SETTING THERMAL LATCH

Richard C. Ingwersen, Jackson, Mich., assignor to Mechanical Products, Inc., Jackson, Mich., a corporation of Michigan

Application July 20, 1955, Serial No. 524,767

10 Claims. (Cl. 200—116)

This invention relates to a combination manual on-off electric switch and automatic circuit breaker in which the circuit is automatically protected against overload current in excess of a predetermined rating but is capable of being manually actuated. In particular, the invention relates to a switch of the character described in which the automatic current overload protection is provided by a thermostat latch and movable contact assembly which is capable of being set, and re-set, manually, into operative position, in which the latch engages relatively fixed abutment structure and the movable contacts close a circuit with respect to companion relatively fixed contacts, and which assembly is automatically moved to position in which the circuit is immediately opened at said contacts upon the latch being subjected to heat in excess of current of the predetermined current rating, it being appreciated that the thermostat latch is in electrical conducting relation to said contacts so that the latch will be heated by the conducted current.

A requirement of switch-circuit breakers of the above kind is that they should have long life but this, in prior art constructions, has been limited by the ability of the thermostat latch to withstand continuous distortion and motion in its operation to break the controlled circuit. Present day demands for aircraft switch-circuit breakers, in particular, it that they should be capable of being actuated several thousand times for deliberately opening and closing the controlled circuit. If this, as with prior art constructions, also involved actuation of the thermostat latch it would be practically impossible to meet such demands since the thermostat latch has to be finely calibrated to be responsive to the particular current overload and continuous distortion and flexing thereof would produce undue wear and deterioration and negative setting of the latch.

Although it is required that these switch-circuit breakers should be actuated many thousand times, actuation of the thermostat latch under overload occurs relatively few times. Appreciating this, an important object of this invention is to provide a manual on-off electric switch and automatic circuit breaker with which the manual on-off actuation can occur without disturbing the setting of the thermostat latch.

A further object of the invention is to provide a combination manual on-off electric switch and automatic circuit breaker with which manual actuation can take place without disturbing the setting of the thermostat latch, while leaving the latch always free to operate whenever overload occurs.

A further object of the invention is to provide a combination manual on-off electric switch and automatic circuit breaker incorporating a mechanical latch by actuation of which the controlled circuit can be opened or closed without disturbing the setting of a thermostat latch, combined with means by which the mechanical latch will be actuated to free the parts to move to contact open position upon release of the thermostat latch under overload.

The above and other objects and advantages of the invention, residing in the construction, arrangement and combination of parts will appear clear from consideration of the following description with reference to the accompanying drawings and from the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevational view of a combined automatic circuit breaker and manual switch in accordance with the invention, with the major portion of the casing shown broken away to reveal the internal mechanism in the contact closed position,

Fig. 2 is an end view of Fig. 1 revealing the internal mechanism in end elevation, the major portion of the casing being broken away to reveal the mechanism and sectioned,

Fig. 3 is a perspective view of the pusher saddle,

Fig. 4 is a perspective view of the thermostatic metal latch,

Fig. 5 is a perspective view of one of the abutment ledges for the thermostatic metal latch,

Fig. 6 is an enlarged fragmentary view of a portion of said mechanism, including the mechanical latches, actuator plunger and associated springs and the adjustment screw for adjusting the setting of the abutment ledges for the thermostatic metal latch,

Fig. 7 is a detail section of the actuator plunger and its associated locking sleeve,

Fig. 8 is another enlarged fragmentary view of a portion of said mechanism, showing the mechanical latches in set position with respect to their fixed abutment plates and showing a portion of the casing in section,

Fig. 9 is a fragmentary elevational view of the mechanical latches, on a reduced scale compared with their showing in Figs. 6 and 8, and showing these latches in an outwardly spread position for disengaging their abutments,

Fig. 10 is a perspective view of one of the mechanical latches seen in Fig. 9,

Fig. 11 is a fragmentary end elevation of the thermostatic metal latch and their associated abutment ledges and adjustment screw, these being shown on a smaller scale compared with their showing in Fig. 6, and

Fig. 12 is a perspective view of one of the cam plates with which a said mechanical latch, as seen in Fig. 9, engages to partake of its spreading motion.

Referring to the drawings, and firstly to the embodiment of the invention according to Figs. 1–12, the operating parts are mounted upon and within a two-part casing **10**, **10'** of electrical insulation material held together, as by screw studs **12**, to form an enclosed chamber **14** in which a pair of spaced apart fixed electrical contacts **16** carried upon terminals **18** is mounted for cooperation with correspondingly spaced movable electrical contacts **20** to complete an electrical circuit.

The movable contacts **20** are carried at the outer ends of a pair of flexible electrically conductive arms **22**, which arms are fixed at their inner ends, as by rivets **24** (Fig. 6), upon the bridge portions **26** (Figs. 2, 4 and 11) of a thermostatic metal latch element formed to provide a pair of spaced apart and opposed latch parts **28** arranged to have releasable latching engagement, by their edges **30**, with abutment elements **32** (one of which is seen in detail in Fig. 5) formed with abutment ledges **36** with which said latch edges **30** engage.

The movable contacts **20**, flexible conductor arms **22** and thermostat metal latch element **26**, **28**, **30** are secured together for rectilinear sliding motion as a unit with respect to an actuator plunger, a part of which is indicated generally by reference **38** (Figs. 1, 2, 6, 8 and 9).

Actuator plunger part **38** is made from electrical insulation material and at one end is shown formed with fork prongs **40** guided within an interior end slot **42** in the casing **10**, **10'**. At its opposite end, the said actuator

plunger part is shown formed with a projection 43 (Figs. 1, 6, 8 and 9) containing a central recess 44 in which a transverse spacer sleeve 46 (Fig. 8) is located, said sleeve being centrally connected, as by rivet 48, between a pair of similar cam plates 50, 50' (Figs. 1, 2, 8 and 12) provided for the purpose of actuating a pair of similar mechanical latches 52, 52' upon manual actuation of actuator button 54. In Fig. 12, 49 indicates a hole for receiving said rivet 48.

Button 54 is mounted for rectilinear sliding motion, by a push-pull action, within a boss 56 formed at the end of the casing 10, 10' opposite the end containing said plunger fork guide slot 42. This button is affixed to a central plate 58 (Figs. 2 and 8) embedded in the insulator material of the button 54 and an adjacent button extension 60, which button extension may be of a distinctive color, White, for example, compared with the color of button 54, which may be Black. This gives a visible indication of the condition of the circuit breaker-switch by the White part 60 being rendered visible only when the contacts 16, 20 are separated. 62 indicates a sealing washer on button part 60, secured in place by plate 64 and having sealing engagement with the inner surface of boss 56.

Plate 58 has an inner end extension to which said cam plates 50, 50' are rigidly secured, as by rivets 66, the holes for the rivets being seen at 68 in Fig. 12.

The cam plates have end recesses 70 which form guides for flanges 74 on the actuator plunger 38, there being a lost-motion connection between said flanges and the recess edges 72 as will be later described and which lost-motion provides for limited freedom of relative motion of spacer sleeve 46 with respect to end recess 44 of plunger part 38 and hence of the cam plates and button parts. The cam plates also have inclined edge portions 51 positioned to have camming engagement with lips 102 on the latches 52, 52'.

Cam plates 50, 50' are guided for rectilinear sliding motion with respect to a fixed combination spring anchorage and abutment plate assembly consisting of the parts 76, 78 and 80. Part 78 (Figs. 1, 2 and 8) is shown (see Fig. 2) as formed by two similar parts but this is merely for ease of manufacture to enable the parts to be stamped out. Part 78 is fixedly mounted in a recess formed within the casing and has spaced apart arm portions 82 (Figs. 1, 8 and 9) formed with inclined outer edge portions 84 and upper (as seen in the drawings) horizontal edge portions 86. A pair of parts 76 is secured upon opposite sides and at each end of part 78 by means of rivets 88 (Figs. 1 and 8). Parts 76 are located in substantially the same planes as their corresponding cam plates 50, 50' and have arm portions 90 (Fig. 1), the spaced apart extremities of which form guides for the cam plates. Parts 80 are of insulation material and are secured to their respective pairs of parts 76 by rivets 92. A hole 94 in each insulator part 80 serves for the anchorage of one end of a pair of coil springs 96.

The latches 52, 52' are in the form of channel shape crank arms as seen clearly in Fig. 10 and are pivotably mounted upon the actuator plunger 38 by pivot pins 98 engaged in the holes 100 seen in Fig. 10. Each latch, at the end remote from its pivoted end, is formed with an inwardly inclined tongue 102 postioned to engage with the horizontal edge portions 86 of the arms 92 when these latch parts 52, 52' are in an inwardly urged position, as seen in Figs. 1 and 8, due to the action of coil springs 104 which constantly operate to urge these latch parts inwardly. The coil springs 104 are anchored at their ends in holes 106 in the side flanges 108 (Fig. 10) of these latch parts.

At this point it should be explained that actuator plunger 38 is of rectangular cross section and that the inner edges 110 (Fig. 4) of the thermostatic metal latch define a central rectangular shape opening through which the actuator plunger slidably passes, with the side portions 112 of the thermostatic latch located in slidable embracing relation to opposite surface portions of the plunger. It should be further pointed out that the actuator plunger is formed by the part 38 and the united cam plates 50, 50' and button parts 54, 60, there being a lost-motion connection at 46, 44 as above mentioned and the purpose of which will be described later.

Also mounted for relative rectilinear sliding motion upon the actuator plunger part 38 is a pusher saddle, indicated by the general reference 114 in Fig. 3. This pusher saddle has an end section formed with a rectangular opening 116, through which the actuator plunger part 38 slidably passes, and the saddle also has opposed spaced apart side arm portions 118 (shown slotted for lightness), the free extremities of which arms are located opposite outwardly directed flanges 120 rigid with the cam plates 50, 50'. Blocks 122 (Figs. 1 and 2) of electrical insulation material secured to the inner ends of the movable contact carrying arms 22 serve to hold the pusher saddle spaced upwardly (as seen in the drawings) from the electrically conductive movable contact and thermostat metal latch assembly. A relatively stiff coil spring 124 operates between the pusher saddle and the interior of the casend 126 to exert constant pressure against the pusher saddle.

A further coil spring 128 operates between the interior surface 130 of the casing 10, 10' and a flange 132 (Fig. 6) on an adjustment screw 134 to exert constant pressure upon the actutor plunger.

In the set position of the thermostat metal latch element 26, 28, 30 the edges 30 of the latch parts 28 engage their respective abutment ledges 36, as above mentioned. A pair of abutment elements 32, as seen in Fig. 5 is mounted upon the plunger portion 38 upon opposite sides of the plunger portion, being secured to the plunger portion by the ends of the pivot pins which serve for the pivotal mounting of the latches 52, 52', the holes 136 seen in Fig. 5 serving for the passage of these pivot pins through the abutment elements 32.

Each abutment element, initially, is formed with a slight bend indicated at 138 in Fig. 5 and is also formed with a tongue 140. Tongues 140 extend into openings 142 in the plunger portion 38 so that their inner edges engage the tapered end 144 of the adjustment screw 134, with the abutment elements being in a tension secured position upon opposite sides of abutment portion 38 due to tightening of the ends of the pivot pins 98 against the abutment elements and attendant flattening of the bends 138.

The adjustment screw 134 has screw-threaded engagement with the plunger part 38 and is accessible for actuation through an opening 144 in one end of the casing, which opening is then sealed, as by the plug 146. A flange 148 on the adjustment screw engages a deformable sleeve 150 (Fig. 7), which sleeve may be of silicon-rubber and is capable of being deformed into locking engagement with respect to the adjustment screw 134 by pressure applied by the flange 148.

Adjustment of the screw 134 enables the tapered screw end 144, by contact with the tongues 140 on the abutment elements 32, either to spread the elements 32, and hence their abutment ledges 36, outwards or to allow these ledges to move inwards under the influence of their inherent tension, depending upon requirements and the direction of rotation of the adjustment screw. Such adjustment would be made prior to sealing the opening 144 and enables the operation of the thermostat metal latch 26, 28, 30 to be finely controlled to the extent that the distance which the latch edges 30 have to move relatively to the latch ledges 36 can be finely adjusted to suit a particular calibration requirement.

Operation of device as a mechanical switch

With the mechanism in the position shown in Figs. 1, 2, 6, 8 and 11 the actuator plunger 38, 50, 50', 60, 58

is in an inwardly pushed condition, in which the thermostatic metal latch **26, 28, 30** is set with its edges **30** in proper engagement (such engagement being possible by adjustment of the screw **134**, if this is necessary) with their abutment ledges **36** and the plunger is held in such condition due to the engagement of the lips **102** of the mechanical latches **52, 52'** with the edge portions **86** on the fixed arms **82**. In this position contacts **20, 16** are closed, coil springs **96** are tensioned, springs **124, 128** are compressed, spacer **46** is in engagement with the bottom of recess **44** in the extension **43** of the plunger portion **38** and the springs **104** hold the latches **52, 52'** engaged with the said edges **86**.

With the parts thus positioned, if a pull is exerted upon the actuator plunger, spacer **46** will move away from the bottom of the recess **44** due to the lost-motion provided at this point, and the resulting relative movement of plunger portion **50, 50', 60, 54** to plunger portion **38**, will cause the cam surfaces **51** on the cam plates **50, 50'** to exert pressure against the latch tongues **102** and spread the latches apart, as seen in Fig. 9, against the action of the springs **104**. At the instant the latch tongues **102** disengage the surfaces **84** the tensioned coil springs **96** will be effective to move the arms **82** immediately to the contact open position, in which position the movable contacts **20, 20** are disengaged from their companion contacts **16, 16** and the arms **22** rest against the surfaces **11** (Fig. 1) inside the casing. At the same time as contact arms **22** move to the contact open position, shown in dotted lines in Fig. 1, the stout coil spring **124**, and the lighter spring **128**, will expand, but in this instance the expansion of coil spring **124** is merely incidental to the arrangement involved since the purpose of this spring is to cause the pusher saddle to strike forcibly against the cam plate flanges **120** (for spreading the latches **52, 52'** apart) but in this instance said flanges will have been moved away from the pusher saddle by the manual pulling of the actuator plunger.

With the latches disengaged from the edges **84**, continued outward movement of the actuator plunger will be attendant with guided movement of the spread apart latches along the outer edges of the fixed arms **82**, during which time the spread apart arms are pulled inwards by their springs **104** due to the overall reduction in width of the spaced apart arms **82** beneath the inclined cam surfaces **84** as appears clear in Figs. 1 and 8. Outward movement of the actuator plunger will be arrested when the spacer **46** comes to rest against portion **81** (Figs. 1, 2, and 8) of the fixed part **78**.

All these movements take place without in any way disturbing the setting of the thermostatic metal latch with respect to its abutment ledges. With regard to the position of the parts seen in Fig. 8, the spacer **46** is shown removed from the bottom of recess **44**. This represents a portion of the lost-motion movement, the entire extent thereof being that corresponding to the time when cam surfaces **51** engage the latch lips **102**.

To return the assembly to contact closed position, the actuator plunger is pushed in, this being initially accompanied by movement of spacer **46** from surface **81** to the bottom of recess **44**, whereby the lost-motion is taken-up and spacer **46** is effective to push upon the plunger portion **38**. This causes edges **51** on the cam plates to engage the latch tongues **102** and spread the latches **52, 52'** apart against the action of their springs **104** until, upon continued inward movement of the actuator plunger, the lips **102** arrive at the surfaces **86**, whereupon the springs **104** are immediately effective to pull the latches inwards and hold them engaged with the fixed surfaces **86**. At this time the contact arms **22** will have been moved to close the movable contacts **20** against the fixed contacts **16** and the springs **124** and **128** will have been re-compressed.

Operation of device as automatic circuit breaker

Considering the parts in the position shown in Figs. 1, 2, 6, 8 and 11, in the event the thermostatic metal latch **26, 28, 30** becomes sufficiently heated, by conduction of current of a predetermined overload value, the latch edges **30**, due to the resulting distortion of the latch parts **28**, will move relatively to the abutment ledges **36** and disengage these edges. Immediately this happens springs **96** will move the latch **26, 28, 30** to the contact open position in which the arms **22** rest in the dotted line position seen in Fig. 1. If, at the time when this latch disengages its abutment ledges no holding pressure is exerted against button **54**, spring **124** will immediately expand in following relation to the outward movement of the thermostatic metal latch and cause the ends of the pusher saddle arms **118** to strike forcibly against the flanges **120**, which in this instance will be positioned as seen in Figs. 1 and 2 and will therefore be positioned to be struck by the ends of the pusher saddle. The resulting pressure exerted against flanges **120** causes the plunger part **54, 60, 50, 50'** to move outwardly relatively to the plunger part **38** and thereby cause the cam plates, by their cam surfaces **51**, to engage the latch tongues **102** and spread the latch parts **52, 52'** apart against the action of their springs **104** and thereby release these latch parts **52, 52'** from engagement with the edge surfaces **86**, whereupon spring **128** will be free to move the plunger part **38** outwardly and thereby carry the latch parts **52, 52'** outwardly and thus reposition the latch tongues **102** for re-engagement with inclined surfaces **84** of the fixed arms **82** to thereby enable the latch parts to be actuated for engagement with the fixed edge surfaces **86** upon the next inward movement of the actuator plunger. At the same time, outward movement of plunger part **38** will cause the abutment edges **36** of the thermostatic metal latch **26, 28, 30** to be brought into position opposite the edges **30** of the already outwardly projected thermostatic latch and thereby permit these edges to move into re-engagement with their abutment ledges, due to the inherent inward springiness of the latch parts **28** and the inwardly cranked form thereof as seen clearly in Figs. 4 and 11. With the plunger brought to rest in its fully outwardly projected position, in which spacer **46** engages surface **81** and the button part **60** is visible, the thermostatic metal latch will be re-engaged with the abutment ledges **36** and the plunger will be in position to be again pushed-in to close the contacts **20** against the contacts **16** and hold the contacts closed due to re-engagement of the mechanical latch tongues **102** with the fixed edge surfaces **86**.

In the event that pressure is applied to plunger button **54** at the time when the thermostatic metal latch disengages its abutment ledges **36** the pusher saddle ends will be held against the then held flanges **120** but the button must be released before the device can be re-set and immediately the button is released the pusher saddle completes its function to push upon the flanges **120** and hence cause the cam plates **50, 50'** to spread apart the mechanical latches **52, 52'** as previously described.

What is claimed is:

1. An electric overload protected switch comprising in combination, casing structure including fixed abutment structure and containing fixed contact means, actuator means slidably mounted upon said casing structure, said actuator comprising a two part plunger, with the plunger parts interconnected by a lost motion connection, which permits one part to move relatively to the other part for a limited extent, whereupon the plunger parts move together, an abutment on one plunger part, a thermostat latch normally engaged with said abutment and slidable with respect to said actuator, movable contact means engageable with said fixed contact means and in electrical connection with said thermostat latch, a mechanical latch including a movable part carried by the other

plunger part and a fixed abutment on said casing structure, spring means constantly urging said movable latch part into engagement with its fixed abutment, spring means constantly urging said movable contact means to open position with the thermostat latch either engaged with its said abutment or disengaged therefrom, spring means constantly urging said actuator plunger to contact open position, said mechanical latch being manually actuated upon movement of the actuator plunger to permit the movable contact means to move to open or closed position with the thermostat latch engaged with its said abutment, means on said actuator plunger operable to automatically actuate said mechanical latch to permit the moveable contact means to move to open position upon release of said thermostat latch from its abutment, and spring means constantly urging said automatic actuator means for said mechanical latch into latch actuating direction.

2. An electric overload protected switch comprising in combination, relating fixed and movable contact means, said movable contact means including a thermostat metal latch in electrical connection therewith, support structure including a manual actuator plunger, said plunger carrying an abutment and said structure including a fixed abutment, said plunger also carrying mechanical latch means, engageable with said fixed abutment to hold the movable contact means closed against the fixed contact means, said mechanical latch means being actuated by movement of the actuator plunger and said thermostat metal latch being engageable with the abutment carried by said plunger, said plunger including a lost motion connection for permitting actuation of said mechanical latch means by movement of the actuator plunger with the thermostat metal latch engaged with said plunger abutment, and pusher means operatively associated with said thermostat metal latch for effecting actuation of said mechanical latch upon disengagement of said thermostat metal latch from its abutment.

3. An electric switch as claimed in claim 2, said movable contact means and thermostat latch being connected together for movement as a unit with respect to said actuator plunger, said latch being normally held engaged with the abutment carried by said actuator plunger.

4. An electric switch as claimed in claim 2, said mechanical latch comprising a part pivotally mounted on said actuator plunger and a cam plate carried by said support structure, and spring means constantly urging said pivoted latch part against said cam plate.

5. An electric switch as claimed in claim 2, said actuator plunger comprising two separate parts, flange means on one plunger part, said mechanical latch comprising a part pivoted on the other plunger part and a cam plate carried by said support structure, spring means constantly urging said pivoted latch part against said cam plate, said plate including a ledge for engagement by said pivoted part, means operatively associated with said thermostat latch for actuating said mechanical latch upon release of the thermostat latch from its abutment on the actuator plunger and means constantly operating against said mechanical latch actuating means for causing the said actuating means to hit against said flange means and cause actuation of the mechanical latch upon release of the thermostat latch.

6. An electric switch as claimed in claim 5, said mechanical latch actuating means being in the form of a pusher saddle and said means constantly operating against said actuating means consisting of a strong spring which is freed to push said pusher saddle against said flange means upon release of the thermostat metal latch.

7. An electric switch as claimed in claim 2, spring means constantly urging said movable contact means to open position, spring means constantly urging said actuator plunger to contact open position, spring means constantly urging said mechanical latch against said fixed abutment and spring means constantly urging said pusher means to engage flange means on said actuator plunger upon release of said thermostat metal latch.

8. An electric overload protected switch comprising a casing, fixed contact means supported in said casing, a thermostat latch supported in said casing for lineal movement toward and away from said fixed contact means, contact means supported on and carried by said thermostat latch for movement into and out of engagement with said fixed contact means upon movement of said thermostat latch, said thermostat latch being connected with said movable contact means in current-carrying relation and being operative to automatically release said movable contact means to move to open position upon the occurrence of a predetermined current overload, a mechanical latch, manual actuator means operatively connected with said movable contact means and with said mechanical latch for moving said movable contact means into and out of engagement with said fixed contact means irrespective of the current value, said actuator being effective to actuate said mechanical latch for holding the movable contact means in closed position upon movement of said actuator means in one direction, and means automatically operative to actuate said mechanical latch upon the occurrence of current overload and release of said thermostat latch.

9. An electric overload protected switch comprising in combination with relatively fixed and movable contact means, a thermostat latch and a mechanical latch, a movable plunger having separate portions, an abutment on one plunger portion, said thermostat latch being normally engaged with said abutment, said thermostat latch being connected with the movable contact means in current-carrying relation thereto and being operative upon the occurrence of a predetermined current overload so as to move out of engagement with said abutment to automatically release the movable contact means to move to open position, said plunger means being operatively connected with said movable contact means for moving the movable contact means to open and closed positions irrespective of the current value, said mechanical latch including movable structure carried by the other plunger portion, means for providing a lost-motion connection between said plunger portions, whereby said mechanical latch can be opened during movement of the plunger to contact open position either with the thermostat latch held engaged with said abutment or with the thermostat latch disengaged from said abutment, said mechanical latch being closed when said plunger is moved to its contact closed position so as to hold the movable contact means in closed position, and means automatically operative to open said mechanical latch upon the occurrence of current overload and release of said thermostat latch.

10. An electric overload protected switch comprising in combination with relatively fixed and movable contact means, a thermostat latch and a mechanical latch, a two-part plunger including a part carrying an abutment and a part carrying said thermostat latch and also carrying a movable part of said mechanical latch, said mechanical latch including a relatively fixed part and said thermostat latch being normally held engaged with said abutment for movement as a unit with said plunger, spring means constantly urging said movable contact means to open position, spring means constantly urging said plunger to contact open position, spring means constantly urging said movable mechanical latch part into engagement with said fixed part, said thermostat latch being connected with the movable contact means in current carrying relation thereto so that upon the occurrence of a predetermined current overload said thermostat latch will move out of engagement with said abutment, whereby the movable contact means will move to open position, said plunger being operatively connected with said movable contact means and with said mechanical latch for moving the movable contact means to open and closed

positions irrespective of the current value, said mechanical latch being normally closed when said plunger is in its contact closed position so as to hold the movable contact means in closed position, and means automatically operative to actuate said mechanical latch upon the occurrence of a current overload and release of said thermostat latch.

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