March 31, 1936. W. H. FRANK ET AL 2,035,743

CIRCUIT BREAKER

Filed March 29, 1934

Fig-1.

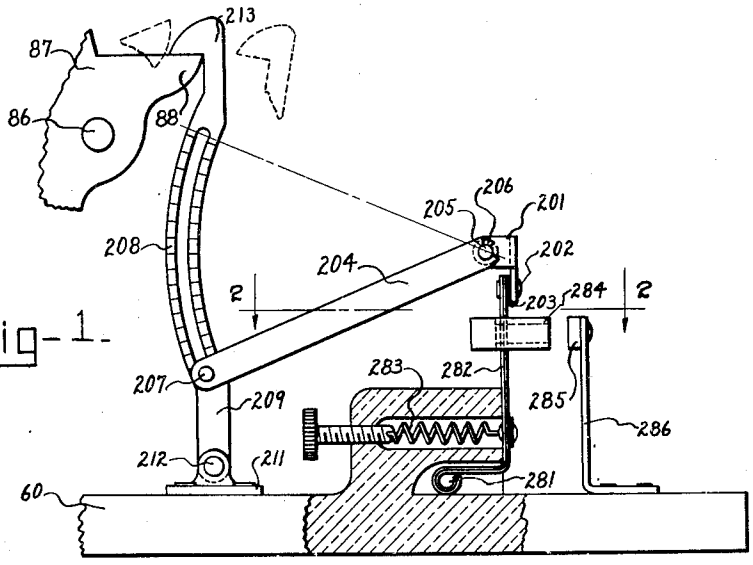
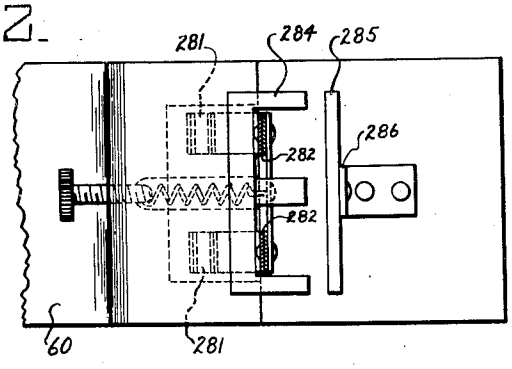


Fig-2.



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CIRCUIT BREAKER

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Application March 29, 1934, Serial No. 717,989

12 Claims. (Cl. 200—88)

This application relates to circuit breakers, and discloses a novel holding means for breaker trip pawls or levers, useful as a substitute for holding means of the character disclosed in Patent No. 1,982,289, November 27, 1934, Figs. 3–4.

Details of the constructions shown will be understood upon reference to the following detailed descriptive matter which relates to the appended drawing. In this drawing,

Figures 1 and 2 show holding means for a breaker pawl, in elevation and top plan view.

Figures 1 and 2 show novel holding means for breaker trip pawls or levers, useful as a substitute for a holding means like the one shown at 200—209, 211—213 of Patent No. 1,982,289, November 27, 1934, Figs. 3–4, to hold the end of a trip pawl or lever, like the end 88 of the pawl 87, pivotally mounted in the frame at 86.

On the base 60 is pivotally mounted at 281 a thermal warping element 282 urged toward the base by a coiled tension spring 283 connected in circuit through the pivot hinge at 281, or through a flexible jumper, and adapted to warp on overload to the right. Secured to and disposed transversely across and preferably insulated from the warping element is an E-shaped magnetic material piece 284 which, together with the magnetic material plate 285 mounted upon the pedestal 286, forms a magnetic circuit with the thermal element 282 forming a single turn coil to provide the magnetomotive force.

A bracket 201 is rigidly secured to warping element 282 by rivets 202, there preferably being insulation 203 between the element and the brackets. An arm 204 is pivotally connected to bracket 201 by a pin 205 and is provided with a lock washer 206 which maintains arm 204 in any desired preset position, relative to the element. A pin 207 on the outer or free end of arm 204 rides freely in a circular slot 208 of a lever-latch 209 pivotally secured to a foot 211 by a rivet 212 and thus mounted on the base 60. A hook 213 on the upper end of latch 209 holds the breaker pawl 87 firmly when the breaker is in the "on" position, or in its normal "off" position.

When an overload occurs, the warping element 282 moves to the right, due to thermal forces, or magnetic forces, or a combination of both forces. This motion is magnified by the leverage ratio provided by the lever latch 209 moving the hook end 213 thereof to release the pawl 87.

Now having described an embodiment of the invention, reference will be had to the following claims for a determination of the scope of the invention.

We claim:

1. In a circuit protective device, a breaker release part adapted to be held or released, a latch for holding said part, a circuit current controlled thermally responsive element adapted to warp on overload and return on cooling, a movement amplifying positive connection between said latch and said element whereby minute movement of the element on warping or cooling causes greater movement of the latch, and a magnet for causing instantaneous movement of the element on overload, the element being so mounted that it may move bodily in accordance with stresses exerted thereon by the magnet.

2. For use in a circuit protective breaker having means normally tending to move parts into release condition when they are in reset condition and a pawl which when held prevents such action of the means, a holding means for said pawl including a circuit current controlled thermally responsive element which deflects by warping on overload into pawl releasing position and is mounted to move bodily regardless of deflection, and a circuit current controlled magnet for moving the element bodily and instantaneously into pawl releasing position on an overload of sufficient magnitude to operate the magnet.

3. For use in a circuit protective breaker having means normally tending to move parts into release condition when they are in reset condition and a pawl which when held prevents such action of the means, a holding means for said pawl including a circuit current controlled thermally responsive element which deflects by warping on overload into pawl releasing position and is mounted to move bodily regardless of deflection, and a circuit current controlled magnet for moving the element bodily and instantaneously into pawl releasing position on an overload of sufficient magnitude to operate the magnet, the holding means also including a holding latch connected to the element by a movement amplifying connection and operating directly on the pawl.

4. In a circuit protective device, a circuit current controlled delayed action holding element, and a magnet carried by and forming part of the element for causing instantaneous movement of the element on overload, the element being so mounted that it may move bodily in accordance with stresses exerted thereon by the magnet, the element being an energizing source for the magnet.

5. A holding and releasing means for a circuit breaker part comprising a thermally re-

sponsive element, movement amplifying means positively connecting the element to the breaker part whereby overload warping or return cooling of the element will cause amplified movement of the breaker part, the current in said element providing a magnetic force auxiliary to the thermal force for releasing the breaker, the element being mounted to move bodily regardless of deflection in accordance with magnetic forces created by the current flowing through it.

6. A holding and releasing means for a circuit breaker part comprising a thermally responsive bimetal element, movement amplifying means positively connecting the element to the breaker part whereby overload warping or return cooling of the element will cause amplified movement of the breaker part, and means responsive to the current flowing in said element for creating a magnetic force which assists the thermal warping force for causing release movement of said element and thereby releasing the breaker, the element being mounted to move bodily regardless of deflection in accordance with magnetic forces created by the current flowing through it.

7. A holding and releasing means for a circuit breaker part comprising a circuit current controlled element constructed to deflect itself with a delayed action to release position on a circuit fault and to deflect itself automatically to holding position thereafter, and mounted on a pivot hinge so as to be movable bodily to and from release and holding position regardless of deflection, and means operating on a circuit fault and against an adjustable resistance for causing instantaneous movement of the element bodily to release position.

8. A holding and releasing means for a circuit breaker part comprising a circuit current controlled element constructed to deflect itself with a delayed action to release position on a circuit fault and to deflect itself automatically to holding position thereafter, and mounted on a pivot hinge so as to be movable bodily to and from release and holding position regardless of deflection, and means operating on a circuit fault for causing instantaneous movement of the element bodily to release position.

9. A holding and releasing means for a circuit breaker part comprising a circuit current controlled element constructed to deflect itself with a delayed action to release position on a circuit fault and to deflect itself automatically to holding position thereafter, and mounted on a pivot hinge so as to be movable bodily to and from release and holding position regardless of deflection, and magnetically actuating means operating on a circuit fault and against an adjustable resistance for causing instantaneous movement of the element bodily to release position.

10. A holding and releasing means for a circuit breaker part comprising a circuit current controlled element constructed to deflect itself with a delayed action to release position on a circuit fault and to deflect itself automatically to holding position thereafter, and mounted on a pivot hinge so as to be movable bodily to and from release and holding position regardless of deflection, and magnetically actuating means operating on a circuit fault for causing instantaneous movement of the element bodily to release position.

11. Means for moving a circuit breaker holding part comprising a circuit current controlled element constructed to deflect itself with a delayed action to move the part into release position on a circuit fault and to deflect itself automatically to move the part into holding position thereafter, and mounted so as to be movable bodily to and from release and holding position regardless of deflection, and means operating on a circuit fault for causing instantaneous movement of the element bodily to release position, the element being positively connected to the part through a movement amplifying connection so that minute movements of the element will positively cause amplied movements of the part.

12. Means for moving a circuit breaker holding part comprising a circuit current controlled element constructed to deflect itself with a delayed action to move the part into release position on a circuit fault and to deflect itself automatically to move the part into holding position thereafter, and mounted so as to be movable bodily to and from release and holding position, and circuit current controlled magnetically actuating means operating on a circuit fault for causing instantaneous movement of the element bodily to release position, the element being positively connected to the part through a movement amplifying connection so that minute movements of the element will positively cause amplified movements of the part.

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