

May 29, 1956

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2,748,320

CIRCUIT INTERRUPTERS

Filed April 13, 1951

2 Sheets-Sheet 1

Fig. 1

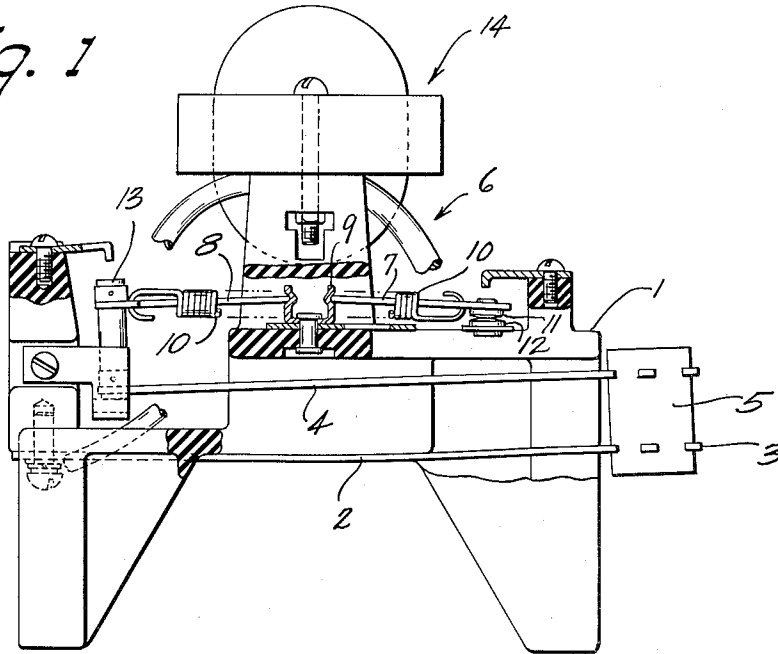
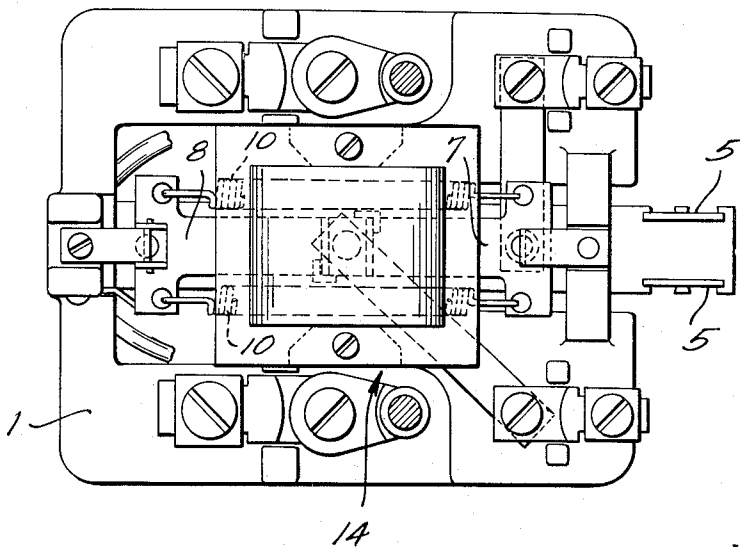


Fig. 2



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2 Sheets-Sheet 2

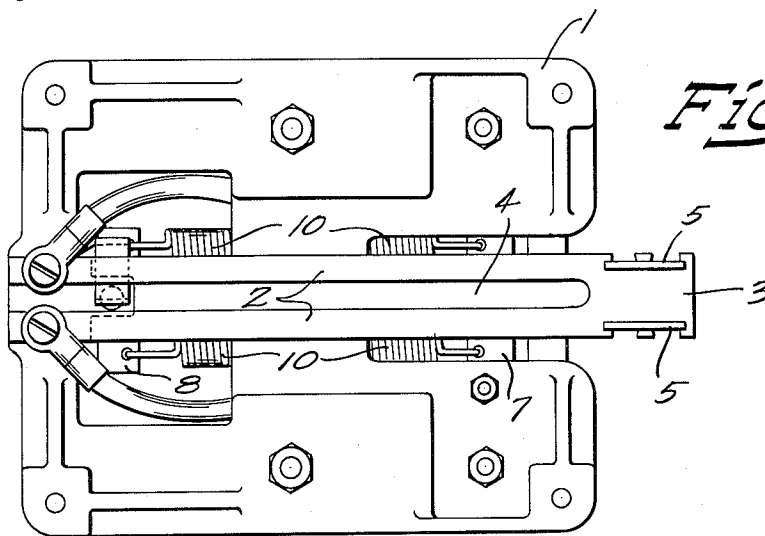


Fig. 3

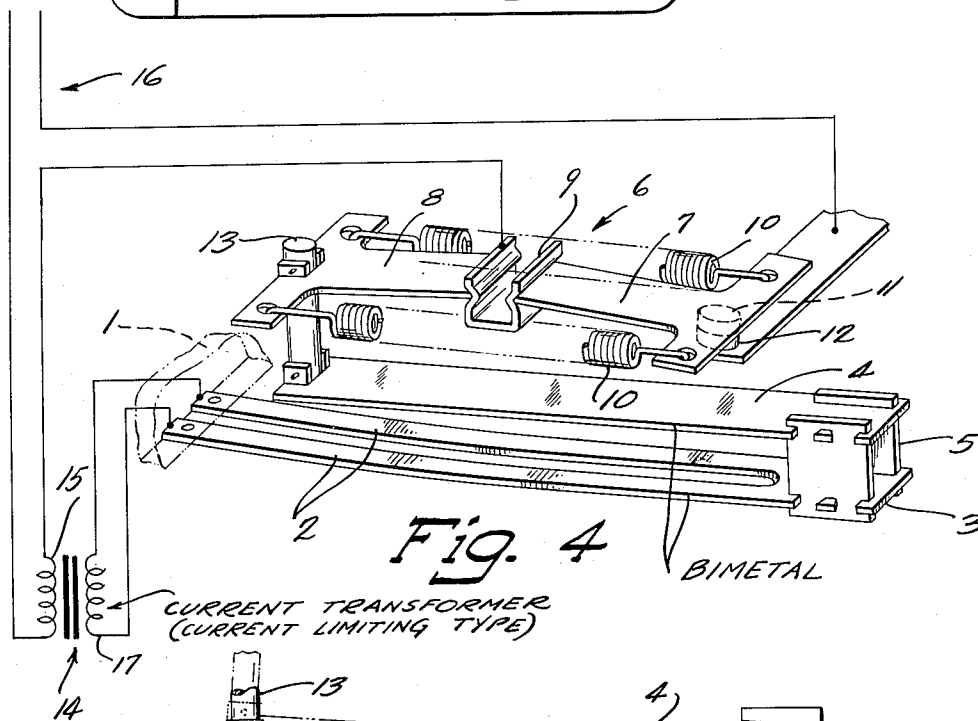


Fig. 4

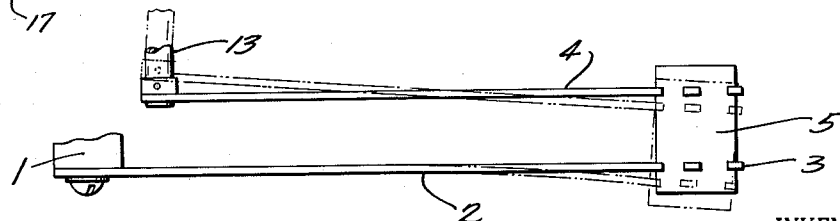


Fig. 5

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1

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CIRCUIT INTERRUPTERS

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2 Claims. (Cl. 317-14)

This invention relates to circuit interrupters arranged to open a load circuit when the current in this circuit exceeds a predetermined value.

Objects of this invention are to provide a circuit interrupter which is thermally operated and is compensated for ambient temperature changes and which is so made that it will not operate for a brief or transient overload, but will operate for an overload which persists for an appreciable length of time sufficient to cause heating of the thermal motor means.

Further objects are to provide a circuit interrupter in which bimetal means are employed which actuate a snap switch, and in which a current transformer of the current limiting type is provided for heating the bimetal means, the construction being such that excessive overloads are prevented from unduly warping the bimetal means.

Further objects are to provide a circuit interrupter which is very simple in construction and which may be cheaply made and which will not operate inadvertently due to vibration or mechanical shock.

An embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a side view of the circuit interrupter with parts broken away and parts in section.

Figure 2 is a plan view of the circuit interrupter.

Figure 3 is a bottom view of the circuit interrupter.

Figure 4 is a view of the bimetal members and switch removed from the remaining portion of the apparatus, such view showing the electrical connections.

Figure 5 is a side view of the bimetal members showing the position of the parts in full lines under no load and the position of the parts in dot and dash lines under overload.

Referring to the drawings, it will be seen that the device comprises an insulating body portion 1 which supports a bimetal actuator strip 2 consisting of a pair of spaced legs joined by a bail portion 3. The inner ends of the fixed legs 2 are rigidly secured to the body portion 1 as shown in Figures 3 and 4. The bail portion 3 is rigidly attached to a compensator bimetal strip 4 by means of a pair of insulating end plates which both thermally and electrically separate the two bimetal strips. It is to be noted that the end plates 5 are rigidly attached to both the actuator strip and the compensator strip 4.

The body portion carries a snap switch indicated generally by the reference character 6. This snap switch comprises a pair of arms 7 and 8 which are pivotally mounted on a conducting supporting member 9. The arms 7 and 8 are joined by a pair of tension, over-center springs 10. The arm 7 carries the movable contact 11 which is arranged to engage and disengage the stationary contact 12. The arm 8 is operatively coupled to the free end of the compensating bimetal strip 4 by means of an insulating rod 13 which is pivoted to both the arm 8 and the compensator strip 4.

The body portion 1 also carries a current transformer indicated generally by the reference character 14 whose

2

primary 15 is connected in a load circuit 16 and whose secondary 17 is connected to the two legs of the bimetal, actuator strip 2.

The compensator strip 4 is so arranged that it deflects in the same direction as the strip 2, 2 for changes in ambient temperature. Thus it will compensate for ambient temperature variations as it is operatively interposed between the actuator strip and the switch.

It is apparent from an examination of Figures 4 and 5 that when the bimetal strip or actuator strip 2 bows downwardly as shown in Figure 5, it thus rocks the inner end of the compensator strip 4 upwardly thus moving the snap switch to switch open position.

Under these conditions, the load circuit 16 is opened since one side is connected to the conducting supporting member 9 of the snap switch and the other side is connected to the fixed or stationary contact 12, the metal arm 7 of the snap switch forming the conductor between the metal support 9 and the movable contact 11.

When the bimetal actuator strip cools, it will move upwardly to the position shown in Figure 4 and will close the switch.

The device is very simple and sturdy and can be very cheaply produced and easily installed.

Further, it will be noted that the snap switch is biased either closed or open and consequently, therefore, it will not be inadvertently closed due to vibration or mechanical shock.

It will be noted further that the device will not operate for very brief or transient overloads since there is an appreciable interval of time required for heating the actuator member.

It is to be noted particularly that by having the current transformer 14 of the current limiting type that an excessive overload will not produce undue warping of the compensator strip.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. An overload circuit interrupter comprising snap switch means connected in a power line and having a snap opening and a snap closing action, a bimetal actuator strip operatively connected to, and furnishing power for the actuation of, said switch means for opening said switch means on overload, and a current transformer having its primary connected in said power line and having its secondary connected to said bimetal actuator strip, said bimetal actuator strip being operatively connected to said switch means to close said switch means when said bimetal actuator strip cools, said transformer being of the current limiting type, whereby said bimetal actuator strip is protected against undue warping upon the occurrence of excessive overloads in said power line.

2. An overload circuit interrupter comprising snap switch means connected in a power line and having a snap opening and a snap closing action, a bimetal actuator strip operatively connected to, and furnishing power for the actuation of, said switch means for opening said switch means on overload, a bimetal compensator strip responsive to ambient temperature mechanically interposed between said bimetal actuator strip and said switch means, said bimetal actuator strip being operatively connected to said switch means to close said switch means when said bimetal actuator strip cools, and a current transformer having its primary connected in said power line and having its secondary connected to said bimetal actuator strip, said transformer being of the current limiting type, whereby said bimetal actuator strip is protected

against undue warping upon the occurrence of excessive overloads in said power line.

References Cited in the file of this patent

UNITED STATES PATENTS

1,696,289	Wood	Dec. 25, 1928
1,722,741	Getchell	July 30, 1929

5

1,797,886
1,844,403
1,871,875
2,252,444
2,300,900
2,343,132

Thomas	Mar. 24, 1931
Leblanc	Feb. 9, 1932
Bradford	Aug. 16, 1932
Stimson	Aug. 12, 1941
Armstrong	Nov. 3, 1942
Barr	Feb. 29, 1944