Aug. 30, 1927. 1,640,701

C. E. HANNY

ELECTRIC SAFETY DEVICE

Filed Oct. 19, 1925

Fig. 1.

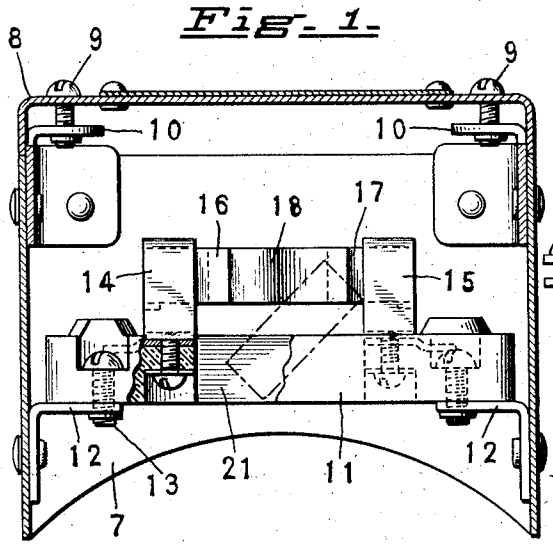


Fig. 3.

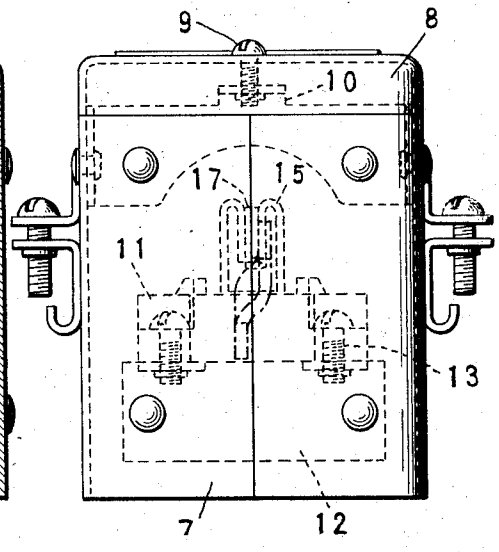


Fig. 2.

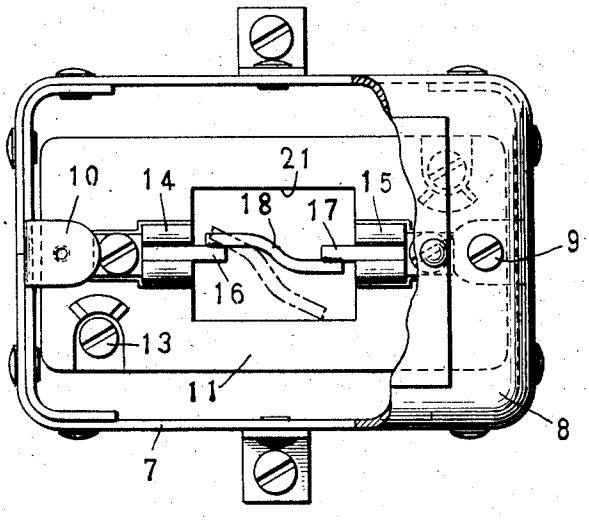


Fig. 4.

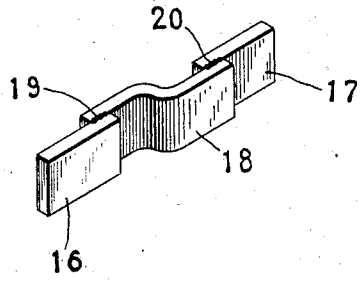
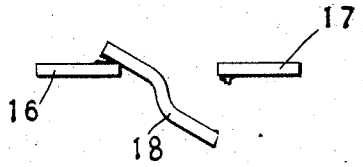


Fig. 5.



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Patented Aug. 30, 1927. 1,640,701

UNITED STATES PATENT OFFICE.

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ELECTRIC SAFETY DEVICE.

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My invention relates particularly to what are commonly termed thermostatic devices.

One object of the invention is to provide a device for automatically opening a circuit in case of overheating.

I have shown a special application of the main invention intended to be used in connection with a motor for feeding oil or similar fuel to a heating or steam operated device. It is frequently necessary to install such devices in more or less inaccessible positions. Sometimes the thermostat must be mounted on the top of the steam pipe and sometimes on the bottom. Sometimes the pipe may extend vertically and it may be necessary to mount the thermostat on one side of it. Such devices, therefore, must be able to be operated regardless of the position in which they are mounted.

Fig. 1 shows a cross-section of a casing with a thermostatic device embodying my invention.

Fig. 2 is a plan view showing a part of the cover of the casing broken away.

Fig. 3 is an end view.

Fig. 4 is a perspective view of the thermostatic element by itself.

Fig. 5 is a detailed view of the parts of the thermostatic element showing them in the act of separating.

In the form shown, the casing consists of a main part 7 which may be adapted to be secured to the side of a pipe, and a cover 8. This cover may be secured in place in any suitable manner, for instance, by means of screws 9 which engage in brackets 10 secured to the outer end of the body 7 of the casing.

Within the casing is mounted an insulating base of porcelain or other suitable material mounted upon brackets 12, and secured, for instance, by screws 13. To this base 11 are secured the spring clips or jaws such as 14 and 15 to which the terminals of the circuit are connected in any suitable manner.

The thermostatic element consists of two end members 16 and 17 and a connecting piece 18 which may be termed the drop-out. These three pieces may be of any suitable material such as brass or copper. The two members 16 and 17 are preferably in line with each other and the connecting piece 18 is preferably bent into a zig-zag or Z form so that one side of one end of the member 18 is soldered at 19 to one side of one end of the piece 16, and the opposite side of the piece 18 at its opposite end is soldered at 20 to the end of the piece 17 on the side opposite to the point 19. The solder is of a composition which will melt quickly at the temperature at which it is desired to have the circuit automatically opened. The solder may be for instance what is known as 160° solder. The end pieces 16 and 17 are adapted to be inserted in the spring clips 14 and 15 in the manner in which an ordinary fuse is inserted in fuse clips. The insulating base 11 is preferably provided with a recess or passage 21 between the clips 14 and 15.

By reason of the shape and construction of the parts, the thermostatic element 18 will automatically fall or drop out as soon as the temperature reaches the melting point of the solder. The shape and arrangement of the terminals 16 and 17 and the drop-out member 18 is such that this automatic opening occurs regardless of the position in which the parts happen to be mounted. In Fig. 1 in dot and dash lines I have shown the drop-out falling vertically through the opening 21. Naturally the solder at one end or the other will let go a little before the other end. In Fig. 3 I have also shown the drop-out member 18 falling through the opening 21. In Fig. 2 the elements might be considered as mounted horizontally so that the strip drops off sideways. One of the ends of the member 18 being below the member 17, that end of the member 18 is free to fall without obstruction and thus instantly open the circuit. It will be seen that this action will take place regardless of the position in which the device is located as soon as the temperature has reached the danger point. It does not matter whether the base carrying the terminals stands perfectly flat, upside down, endwise, sidewise, or at any angle; the connecting strip 18 will immediately fall away from the terminals and break the circuit. Such devices are commonly mounted on the steam pipe of an oil heater or in some other similar position, and the thermostatic element is included in the circuit which drives the motor (not shown) for feeding oil or fuel to the heater. Should the water get low in the boiler or

for any reason its temperature gets abnormal, the thermostat will be heated to the point where the solder will melt and allow the element 18 to drop away from its connections, thus breaking the circuit and stopping the motor automatically.

Nothing is destroyed, injured or lost in the operation of this device except that a minute portion of the solder may drop away from the parts, therefore the parts may be resoldered even by an unskilled workman and it will then be as good as new.

This thermostatic element has the distinct characteristic of operating at an approximately exact predetermined temperature and the operating point is governed entirely by the alloy of the solder used in securing the parts together. Obviously the melting point of the solder may be varied as desired and the assembled elements may be marked accordingly, thus an element of the desired capacity may be selected and may be depended upon to operate at that point. The element will operate at the rated temperature regardless of the amount of solder used in securing the parts together which fact is of great importance because it obviates the necessity of any particular care in soldering and it also obviates the necessity of calibrating or testing the elements after they are assembled.

Another advantage of this construction is that the drop out part 18 is made of comparatively heavy brass or copper and is substantially equal in conducting capacity to the contact ends 16 and 17, therefore, under normal conditions, it offers so little electrical resistance that it is not at all affected by the passage of the current.

This thermostat will operate equally well in the open air or when submersed in non-conducting liquid such as oil.

It should be understood, moreover, that the thermostatic element herein shown may be employed in still other relations.

I claim:

1. A thermostatic element comprising a flat zig-zag bent center strip and flat contact blades having substantially the same carrying capacity as the center strip, soldered to the ends of the said center strip and adapted to fit into ordinary fuse clips, the contact blade on one end being soldered on the side of said strip opposite to the blade on the other end, the amount of solder being only sufficient to hold the parts together.

2. A protective device comprising an insulating base, contact clips carried by said base and spaced apart from each other and an assembled thermostatic element detachably carried by said clips and consisting of flat terminal blades detachably fitting in said clips and a drop-out member of approximately the same cross section as the terminal blades and having its opposite ends soldered to the opposite sides of said terminal blades and adapted to fall away therefrom regardless of the position of the base.

3. A protective apparatus including an insulating base having a passage therethrough, contact clips mounted at opposite ends of said passage, a protective device carried by said clips and consisting of end pieces detachably mounted in said clips, and a drop-out having the opposite sides of its opposite ends sweated to said end pieces, the passage and said base being of a relative size to permit the said drop-out to fall through the passage.

4. A protective device including an insulating base having an opening therein, contact clips mounted at opposite ends of said opening, and a drop-out unit detachably secured in said clips, said unit consisting of two end members and a central drop-out member sweated to said end members at its opposite ends and sides, the said opening in the base being large enough to permit the drop-out to pass through the opening in said base at any relative angle.

5. A protective device including an insulating base having an opening therein, contact clips mounted at opposite ends of said opening, and a drop-out unit detachably secured in said clips, said unit consisting of two end members and a central drop-out member sweated to said end members at its opposite ends and sides, the said opening in the base being large enough to permit the drop-out to pass through the opening in said base at any relative angle, and the cross section of said drop-out member being substantially the same as that of its respective end members.

6. A pre-rated thermostatic drop-out unit comprising two flat contact blade members and a central drop-out member, the said dropout member being sweated to the said contact members at the opposite ends of its opposite sides and all of said members being of substantially the same cross-sectional area.

7. A protective device comprising stationary spring clips spaced apart from each other and a readily replaceable member consisting of two flat end blades adapted to be detachably mounted in said clips and held in definite positions thereby and a flat drop-out member having the opposite ends soldered to opposite sides of the end blades, the amount of solder being only sufficient to unite the adjacent surfaces of the drop-out member and the end blades, said end blades being so held that both ends of the drop-out member must be released before it can move out of position.

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