

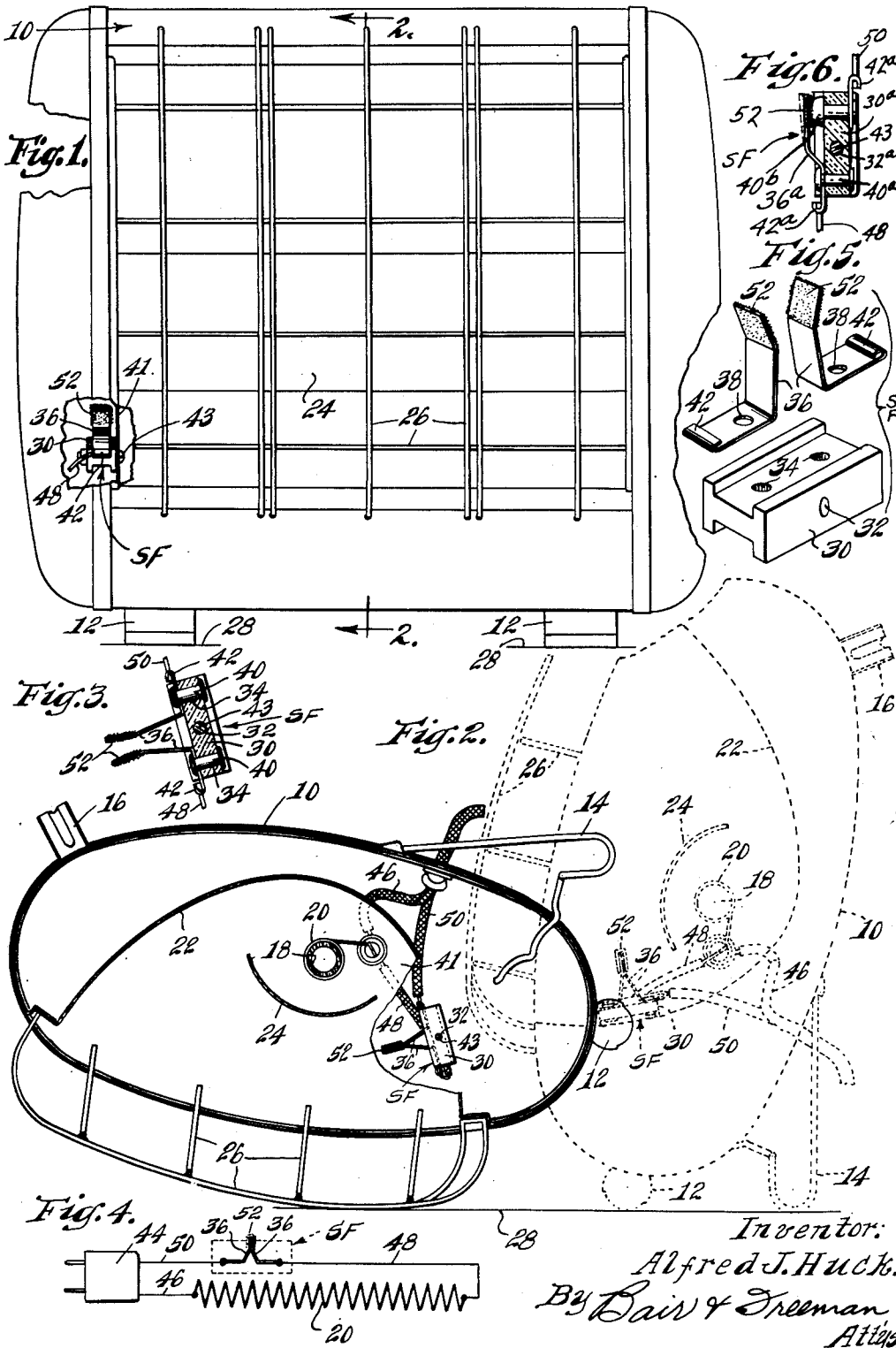
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SAFETY FUSE FOR ROOM HEATERS AND THE LIKE

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SAFETY FUSE FOR ROOM HEATERS AND THE LIKE

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This invention relates to a safety device operable to break the circuit of the heating element in a room heater or the like when the heater is accidentally tipped forwardly on its face to a position where damage could result to the floor or carpet if the heater were left energized in such position.

One object of the invention is to provide a safety device which instead of responding to an overload current therethrough, as in the usual type of fuse, responds to increased ambient temperature caused by an abnormal condition such as the normally open face of the heater being directed toward a floor surface thereby resulting in the heat reflected from the heating element causing a rise in temperature ambient to the safety device and eventually causing the elements thereof to be separated for breaking the circuit.

Another object is to provide a safety fuse in the form of a mounting block and one or more tensioned spring arms which are normally connected in the circuit by means of solder that melts at a temperature between normal temperature and a dangerously high temperature attained after a period of time with the heater in an abnormal position.

A further object is to provide a safety fuse of comparatively simple and inexpensive construction capable of convenient connection into the circuit of a heating element and readily located in a room heater or the like for operation as a safety factor when such operation is required.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my safety fuse whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, wherein:

Figure 1 is a front elevation of a room heater with a portion broken away and my safety fuse illustrated therein;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1 showing by dotted lines the heater in normal position and by solid lines the heater in a position tipped forwardly on the floor;

Figure 3 is an enlarged sectional view of the safety fuse in the position of Figure 2 showing it in the operated position.

Figure 4 is a diagrammatic view showing the connection of the safety fuse in the circuit of the heating element.

Figure 5 is an exploded perspective view of the parts of the safety fuse, and

Figure 6 is a sectional view similar to Figure 3 showing a modified form of safety fuse.

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On the accompanying drawing I have used the reference numeral 10 to indicate in general a room heater. The heater 10 is supported by feet 12 and 14, the normal position being that shown in Figure 2 by dotted lines. A handle 16 is provided at the back for carrying purposes.

Within the casing of the heater a core 18 of insulating material is provided around which a heating element 20 is wound. A heat reflector 22 is positioned back of the heating element, and a shield and reflector 24 is positioned in front of it. The open front of the reflector 22 is covered by a safety grill 26.

The invention here involved is a safety fuse indicated generally at SF. It comprises an installing base 30 of porcelain or the like having an opening 32 for mounting as on an end wall 41 of the reflector 22 by means of a bolt 43.

The base 30 has a pair of openings 34 through which rivets 40 extend. The surface of the base 30 is grooved to receive and position a pair of fuse links 36 formed of suitable sheet metal and made of the approximate shape shown in Figures 3 and 5. These links are provided with perforations 38 through which the rivets 40 extend for mounting the fuse links on the base. The sides of the groove in the base 30 prevent the links from turning on the rivets.

The fuse links are provided with eyes 42 with which wires 48 and 50 are connected, the wires extending to the heating element 20 and to a service plug 44, respectively. The heating element 20 is also connected by a wire 46 to the plug 44 as is most clearly shown in Figure 4.

The fuse links 36 are normally soldered together as indicated at 52 and as shown in both the solid line and the dotted line positions in Figure 2. Referring to Figures 3 and 5 it will be obvious that the links have to be sprung toward each other for soldering together at 52. It will be obvious that when the solder melts the links will spring apart as in Figure 3 since they are under tension as just described.

A room heater or similar appliance is used normally in the upright position as shown by dotted lines in Figure 2 in which position the temperature attained at the supporting surface such as the floor surface 28 is low. Accordingly there is no charring of the wood of the floor nor of a carpet when one is used to cover the floor. However, if the heater is accidentally overturned so that it falls on its face as shown by solid lines in Figure 2 the radiant heat is concentrated on the supporting surface 28 and charring of that surface may result due to the rise in temperature.

In order to prevent this latter condition it is

common practice to use a large internal volume heater which results in poor radiant heat focusing, or a radically outwardly bulging guard at 26. The result is a large and bulky appearing appliance and it is not very practical or desirable.

Another method is to use a weight actuated switch, or a mercury switch rigidly mounted in such manner that the mercury falls away from the electrodes when the heater is tipped face forward. These types of switches are relatively expensive and under certain conditions may fail to operate. Accordingly, I have provided a safety device as disclosed and the result is a safety means that is reliable in operation and inexpensive to fabricate and assemble in the heater.

When the heater tips forwardly as in Figure 2 the concentrated heat raises the temperature so that in about five minutes it may be advanced from only 250° F. to 550° F. By using a solder at 52 that melts at approximately 450° F. the fuse will open in approximately 3 1/2 minutes after the heater is tipped forward. This opens the heating element circuit and thereby prevents excessive temperature on the supporting surface 28 under such abnormal condition.

I have found that an ordinary eutectic solder such as tin or tin and lead solder is suitable for my purpose. The fuse links 36 should be of spring brass, Monel or nickel capable of retaining their spring characteristics regardless of the rise in temperature.

The safety fuse SF may be located as shown in a closed compartment beyond the reflector end wall 41 and is thus out of sight, so as not to mar the appearance of the heater. I find that it operates very satisfactorily in this position although it may be mounted in an exposed position within the reflector 22 if found desirable.

While I have described the safety fuse in connection with a room heater, obviously it can be used in other appliances wherever applicable. It can also be made with a single fuse link instead of having two links. Figure 6 shows such an arrangement. A single fuse link 36a is mounted by the lower rivets 40a and is soldered at 52a to the upper rivet 40a. The initial shape of the link 36a is shown dotted and it springs to this position for breaking the circuit when the solder melts.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by

my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. In a safety device for room heaters and the like, a pair of fuse links soldered together under tension whereby they will separate upon the solder melting, said safety device remaining soldered at normal temperatures when the room heater operates in the normal manner and being located in the open face of the heater so that the temperature attained within a few minutes after the heater tips forwardly on its open face due to heat reflected back from the surface on which the heater is tipped melts the solder and thereby permits separation of said fuse links, said fuse links being connected in series with the heating element of said room heater.

2. In an electrical appliance having a heating element and a reflector for reflecting heat therefrom, safety means comprising a tensioned fuse link and a current carrying element having adjacent surfaces thereof soldered together whereby melting of the solder permits their separation, said link and element being located in said reflector, being connected in series circuit with said heating element, being capable of remaining soldered together at normal operating temperatures within said reflector, and being located so that concentrated heat on a supporting surface when the heater is tipped to a non-normal position with said reflector directing the heat of said heating element to said surface will cause sufficient rise in temperature of the heat reflected by said surface back to said safety fuse for melting said solder.

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