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H. MAYBAUM

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SAFETY DEVICE FOR ELECTRIC COOKING AND HEATING DEVICES

Filed March 29, 1922

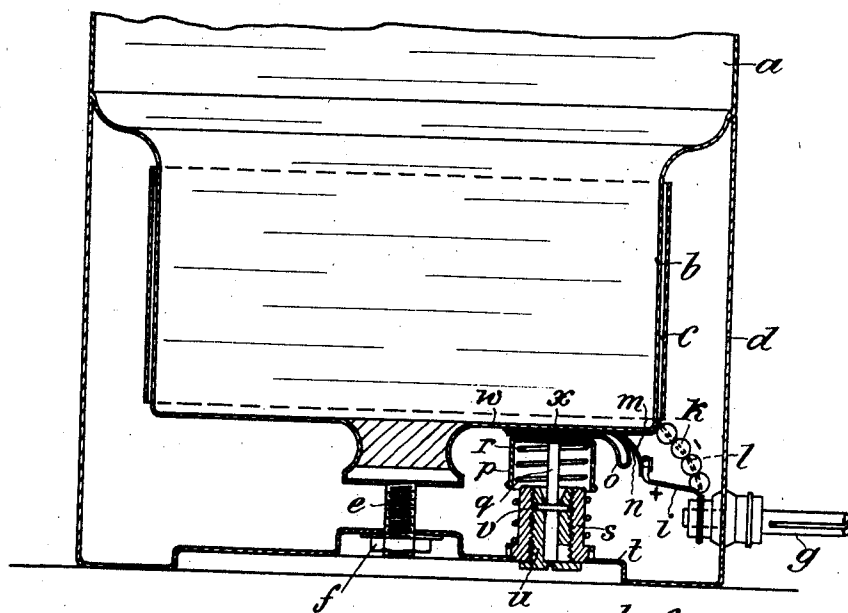


Fig. 2.

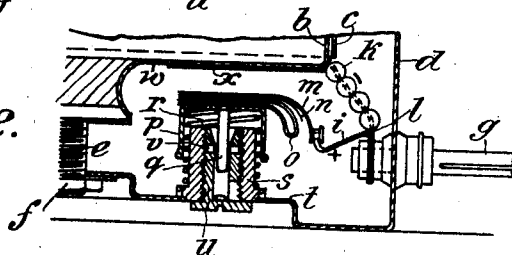
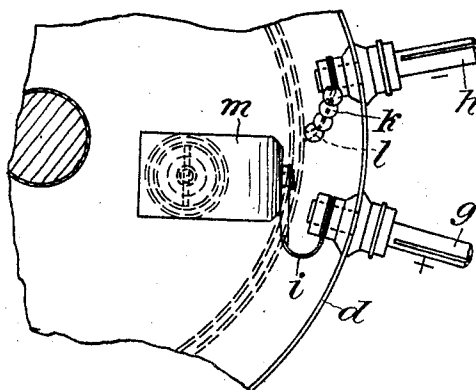


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR ELECTRIC COOKING AND HEATING DEVICES.

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To all whom it may concern:

Be it known that I, HEINRICH MAYBAUM, residing at Sundern, District of Arnsberg, Germany, have invented certain new and useful Improvements in Safety Devices for Electric Cooking and Heating Devices, of which the following is a specification.

It is known, that electrical boilers, cooking devices and the like are liable to be seriously damaged and put out of service when being overheated, for example when being, by neglect, left in the electric circuit in a liquid-empty state. Special safety devices have therefore been proposed which automatically interrupt or break the circuit, as soon as the temperature passes beyond its admissible upper limit. These safety devices normally comprise a so-called fuse member consisting of a metal of low melting point, for example an alloy of lead, tin and bismuth which, whenever the temperature increases to a dangerous degree, becomes softened and fuses away, so that the circuit is either directly interrupted or a circuit closing device controlled by the fuse member released and permitted to break the circuit.

It is the purpose of this invention to improve these safety devices by so arranging the fuse member, that the same is severed by combined fusing and mechanical action. As a matter of fact it may happen, that the user cuts out the electrical current, when the fuse member has just begun to soften and is just in a condition of plastic or elastic deformation in which it remains, when the apparatus is permitted to cool down to normal temperature. In this state the circuit closing contacts controlled by the fuse member may however be in a partly opened condition, so that upon further use sparking occurs between them, whereby the apparatus may again be seriously damaged or disabled. My invention therefore provides means whereby the fuse member is positively severed by combined heat and mechanical action, whenever it begins to soften by an undue increase of temperature. It starts from the fact, that most of the alloys of low melting point are, while being in a cold state, of a comparatively great me-

chanical strength, which however rapidly decreases, as soon as the metal begins to soften under the influence of heat.

According to the main feature of my invention I therefore provide a safety device of the kind described in which the fuse member forms the support of the central guiding pin of a movable contact carrying member whereby the same can be held in its current closing position. This central guiding pin is guided in the central bore of a stationary sleeve having also a lateral bore in which a fuse pin is located so as to be acted upon intermediate its ends by the end of the guiding pin. As soon as the fuse pin begins to soften its mechanical strength rapidly decreases, so that the central guiding pin may under the influence of its circuit opening spring which tends to move the contact carrying member into its circuit breaking position, act as a kind of shearing punch and break or shear out instantaneously and without fail the central portion of the fuse pin which formerly held the movable contact member against the action of its spring. This means then, that, whenever the fuse pin begins to soften, it is positively severed by the combined action of heating and mechanical means and with a snap action, so that the circuit closing contact is fully opened and sparking prevented.

Another feature of my invention resides in the arrangement of an additional spring between the movable contact carrying member and the proper contact secured to it whereby the contact closure may be preserved and sparking avoided during the fraction of time during which breaking of the fuse pin occurs, as will be more fully described in detail hereafter.

My invention is besides in its preferred embodiment illustrated in the accompanying drawings in which:

Fig. 1 is a vertical section of an electrical cooking pot provided with the new safety device, the same being shown in its circuit closing position,

Fig. 2 a part of the same section, the safety device being shown in its circuit breaking position,

Fig. 3 a plan-view of Fig. 2.

In the drawing *a* designates an electrical cooking or boiling vessel or heating device of any known or suitable construction, the lower contracted portion *b* of which is surrounded by the resistance or heating unit *c*. The lower portion of the vessel *a* is enclosed within a cylindrical base *d* the mantle of which practically forms the continuation of the uncontracted part of the mantle *a*. The members *a* and *d* are detachably secured to each other in any known or suitable way, for example by a screw and nut connection *e, f*.

g, h designate the usual contact pins; and while I have shown in the drawings only two of those contact pins, it is obvious, that other pins may be added if the apparatus is to be operated with different current tensions. This is well known in the art and needs no further description. Of the two contact pins pin *g* is by a piece of copper *i* connected with a movable contact *m* controlled by the fuse pin, as will be hereafter described more in detail, whereas contact pin *h* is connected to the one end of the resistance wire of the heating unit *c* by means of a piece of wire *l* which is insulated by glass beads *k*.

The contact member *m* is secured to a cup shaped contact carrying member *p* by means of a compression spring *o* and insulated therefrom by a mica plate *n*. The member *p* is under the influence of a helical spring *r*, which tends to move it into its circuit breaking position as illustrated in Fig. 2 of the drawing. The cup *p* is guided by a stationary sleeve *s* which is permanently attached to the bottom portion *t* of the base member *d* and into which a sleeve *u* is detachably screwed. This detachable sleeve *u* is provided with a central vertical bore or recess forming a guide for the central guiding pin *q* of the cup *p* and is at its upper end provided with a transverse passage adapted to receive a fuse pin *v*.

When the apparatus is to be used and is in its cold state, a fuse pin *v* is inserted into the transverse bore of the screw plug *u* and the same screwed into the sleeve *s*. Immediately the section of the fuse pin crossing the central bore of the plug *u* engages the lower end of the guide pin *q*, so that upon further entrance of the plug *u* the cup *p* is lifted into its circuit closing position according to Fig. 1 and against the tension of spring *r*.

In this circuit closing position the contact plate *m* is in contact with the contact plate *w* secured to the bottom plate *w* of the bowl *a* and duly insulated therefrom, whereby the circuit is closed, and the intermediate spring *o* is in its compressed condition. In this circuit closing position

the contacts *m, w* are held by the support of the pin *q* upon the fuse pin *v* which in its cold state is adapted to readily withstand the stress exerted upon it by the spring *r*. As soon however as the heat within the space enclosed by the members *a* and *b* increases to a critical point, the fuse pin *v* begins to soften and finally to fuse away, as is well known with this kind of safety devices. In becoming soft its mechanical strength rapidly decreases so that the central guiding pin *q* may now act as some kind of a punch and instantaneously and without fail sever the fuse pin intermediate its ends which are carried by the transverse bore of the screw plug *u*. The spring *r* is by this severing of the fuse pin released and adapted to break the contact with a snap like action and without any sparking. During the little interval of time which passes between the beginning of the softening of the fuse pin and its being severed by the combined heat and punching action the spring *o* becomes gradually released and holds the contact members *m, w* in their circuit closing position until the spring *r* is completely released and the rapid down stroke of the cup *p* may occur, which snaps the contact member *m* away from the contact member *w*.

The current is thus broken, so that any damage of the apparatus by overheating is safely prevented. In order to readjust the apparatus for further use after a cutting out of the current one screws out the plug *u* and inserts a fuse pin into the transverse bore, whereupon the plug *u* may be reinserted and the apparatus is ready for further use.

While I have in the foregoing specification and in the drawing described and illustrated my invention in its application to particular electrical heating device and in an embodiment in which the fuse pin does not form itself part of the circuit, it is obvious to those skilled in the art that my invention may just as well be used with any other kind of cooking and heating apparatus, caloric and thermic devices and the like in which the so-called dry burning is to be avoided and over heating of the device beyond a certain temperature positively prevented or in which the fuse pin forms itself part of the circuit.

What I claim as my invention is:—

A safety circuit breaker comprising a stationary guide sleeve carrying a fuse pin, a contact carrying member guided by said guide sleeve and movable into circuit making and circuit breaking positions; a spring biasing said contact carrying member to its contact breaking position, a circuit contact carried by said contact carrying member, a compressible spring interposed between said

circuit contact and said contact carrying member and compressed therebetween when the contact carrying member is in its circuit making position, and a guiding pin on
5 said contact carrying member for engaging the fuse pin whereby to hold the contact carrying member in its circuit making position when the fuse pin is relatively cold, the first said spring operating to break the fuse pin and thereby break the circuit when the 10 fuse pin becomes relatively hot.

In testimony whereof I affix my signature in presence of two witnesses.

HEINRICH MAYBAUM.

Witnesses:

WILHELMINE HEIMANN,
ELISABETH FIESELER.