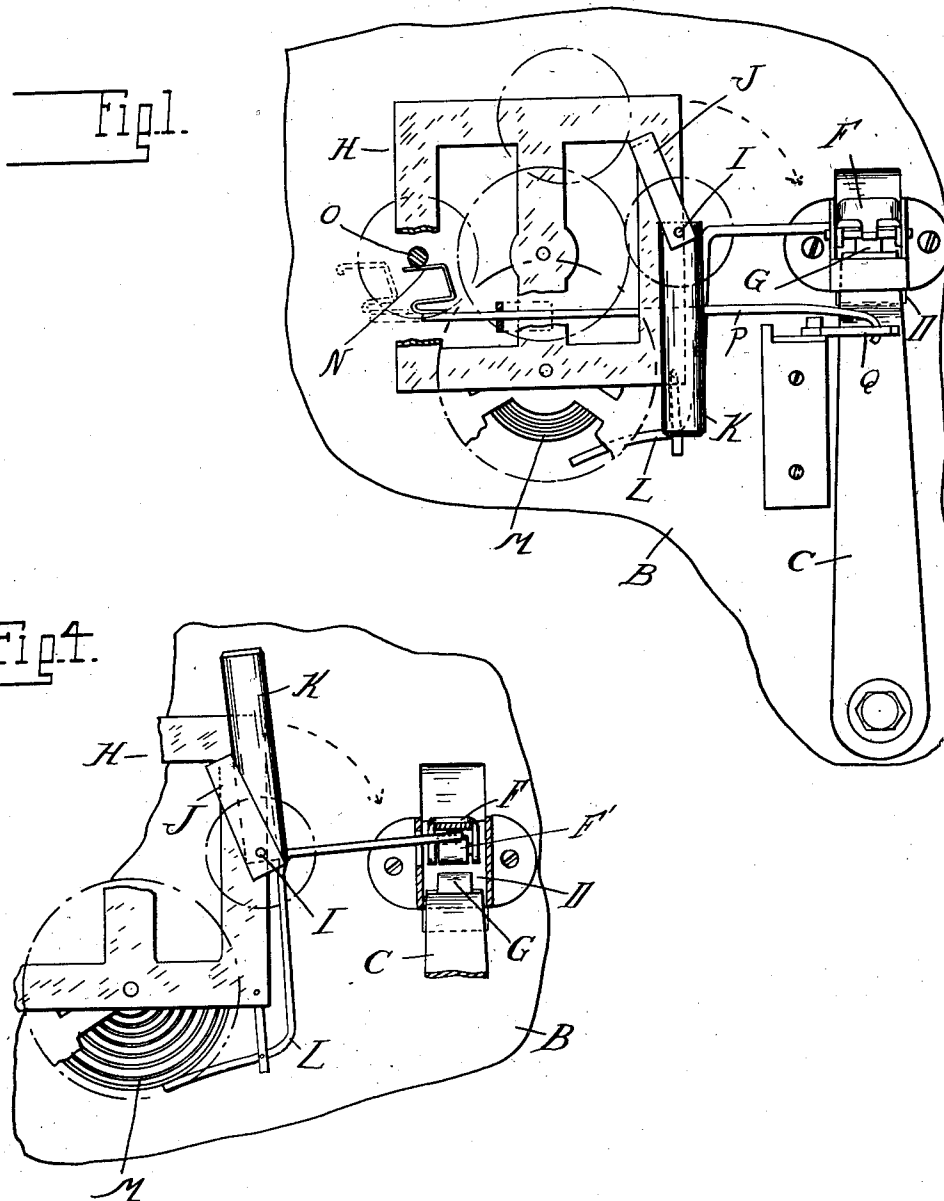


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 SAFETY SWITCH FOR ELECTRIC HEATERS AND OTHER ELECTRICAL APPARATUS.
 APPLICATION FILED DEC. 15, 1911.

Patented May 6, 1913.

2 SHEETS-SHEET 1.

1,060,986.



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2 SHEETS—SHEET 2.

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

FRANK KUHN, OF DETROIT, MICHIGAN, ASSIGNOR TO AMERICAN ELECTRICAL HEATER COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

SAFETY-SWITCH FOR ELECTRIC HEATERS AND OTHER ELECTRICAL APPARATUS.

1,060,986.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed December 15, 1911. Serial No. 665,887.

To all whom it may concern:

Be it known that I, FRANK KUHN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Safety-Switches for Electric Heaters and other Electrical Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

It is the object of the invention to avoid danger from electrical heating apparatus through the neglect of the operator to turn off the switch when the apparatus is no longer in use. Thus for instance with electrically heated sad irons, if the current is left on when the iron is not in use the heat normally absorbed in the work will accumulate until a danger point is reached. Various forms of thermostatic devices have been employed for automatically cutting out the circuit, but these are delicate in construction and uncertain in operation.

With the present invention, I avoid danger from overheating by the employment of a switch which is periodically mechanically opened, the intervals between operations being too short to permit any dangerous accumulation of heat. On the other hand, the intervals between operations are sufficiently long so as not to interfere with the work, and it is merely necessary for the operator to reclose the switch each time that it is thrown out, to maintain a continuous heating effect.

In the drawings,—Figure 1 is a rear elevation of the switch; Fig. 2 is a plan view partly in horizontal section; Fig. 3 is a vertical section; Fig. 4 is an elevation showing a portion of Fig. 1 with the parts in a different position of adjustment.

A is an electric switch of any suitable construction shown as a two-blade knife switch, and which is mounted upon a suitable base B.

C is a spring for automatically opening the switch, and which as shown is mounted on the rear of the base B and projects through an aperture D therein and bears against a plate or bearing E mounted on the insulator bridge of the switch.

F is a locking latch for engaging a lug G on the spring and holding the latter in released position, or where it will not interfere with the closing of the switch.

H is a suitable clock mechanism also preferably mounted on the base B and which is provided with a shaft I timed to complete its cycle during the selected interval between successive operations.

In the specific construction shown, J is a rock arm, mounted on the shaft I which in its upward movement lifts a freely pivoted weighted arm K, and when the latter has passed its upright position it will fall, imparting a hammer blow to the dog F, which releases it from the lug G. This permits the spring C to operate, throwing the blades of the switch outward and breaking the circuit.

In operation, when the apparatus is in use the operator first winds or sets in operation the clock mechanism, and then closes the switch A. In case the clock has run down and is not again wound, the closing of the switch is prevented by the operation of a lever L, one end of which projects into the path of the expanding clock spring, while the other end engages with the dog F. The arrangement is such that when run down the spring M will move the lever L, so as to hold the dog F out of the path of the lug G, and consequently there is nothing to restrain the spring C, which will permit the switch blades to remain opened.

When the clock mechanism is properly wound and in operation, the switch A is closed and the work performed by the heater until the rotation of the shaft I will release the weighted arm K. This will trip the latch, permitting the spring C to open the switch, which will remain open until again closed by hand. If the operator is continuing the use of the instrument, it is only necessary for him to close the switch, whereupon the latch F will immediately reengage with the lug G and remain in engagement until the completion of another cycle.

To avoid the necessity of winding the clock every time the switch is used I preferably provide means for stopping the mechanism when the switch is open and also means for positively starting the mechanism when the switch is closed. For this purpose a brake N is employed which as shown engages the spindle O of the balance wheel. This brake is formed by a resilient arm attached to a rod P which is connected to a lever Q having one arm in the path of the spring C and the arrangement is such that whenever said spring is released it will actu-

ate the lever Q to apply the brake. The same mechanism is employed for positively starting the clock, in which operation the closing of the switch will move the spring
 5 C past the lever Q, actuating the rod P in the opposite direction and sliding the brake N out of contact with the spindle O. During this movement the friction of the brake on the spindle will rotate the latter and
 10 cause the initial movement of the balance wheel.

The latch F is preferably provided with an anti-friction roll F' which forms the detent for engaging the lug G and facilitates
 15 the passing of the same into engagement when the switch is closed.

What I claim as my invention is,—

1. The combination with an automatically opening switch, of a detent for holding
 20 said switch in closed position, constantly operating timed mechanism for periodically releasing said detent and permitting reengagement upon the closing of the switch, and means operating when the
 25 timed mechanism is not in condition to operate for preventing the engagement of said detent with the switch.

2. The combination with a knife switch, of a base upon which said switch is mounted,
 30 a spring arm mounted on the rear of said base and projecting through an aperture therein into the path of the switch handle, a latch dog for engaging said spring arm when said switch is manually closed
 35 and holding the same from movement, a clock mechanism, and a gravity arm periodically released by said clock mechanism to strike against said latch dog and release the same.

40 3. The combination with an electric switch, of a spring arm for opening said switch, a latch dog for engaging said spring arm when the switch is manually closed, a clock mechanism, an arm actuated by said
 45 clock mechanism to periodically complete a revolution, a gravity arm raised by said revoluble arm, and periodically released, said gravity arm being adapted in its movement to disengage said latch dog and instantly
 50 release the same.

4. The combination with an electric switch, of a spring operating to open said

switch, a latch dog for engaging said spring in the closed position of the switch, a clock mechanism, a gravity dog periodically released by said clock mechanism to engage
 55 said latch dog and release said spring, a lever projecting into the path of the spring of said clock mechanism and actuated thereby when in expanded condition to release
 60 said dog and prevent engagement of the same with said spring.

5. The combination with a manually closable switch, of mechanism for automatically opening the switch, including timed mechanism
 65 for periodically releasing said switch, and means operating when the timed mechanism is not in condition to operate for preventing the retaining of the switch in closing position.

6. The combination with a manually closable switch, of mechanism for automatically opening the switch, including means for holding said switch in closed position and
 75 timed mechanism for periodically actuating said means to release the switch, and means operating when the timed mechanism is not in condition to operate for preventing the same from retaining the switch closed.

7. The combination with a manually closable electric switch, of clock mechanism for recurrently opening said switch, a brake for stopping said clock mechanism and a member to which said brake is operatively connected,
 85 and a spring for automatically opening said switch positioned to actuate said member during the opening and closing movements of the switch to respectively release and apply said brake.

8. The combination with a manually closable electric switch, of a spring arm for opening said switch, clock mechanism for recurrently releasing said spring arm, and automatic means for stopping said clock mechanism when the switch is opened including a rock arm positioned in the path
 95 of said spring arm and adapted to be actuated thereby.

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

FRANK KUHN.

Witnesses:

JAMES P. BARRY,
 MARION B. FAY.