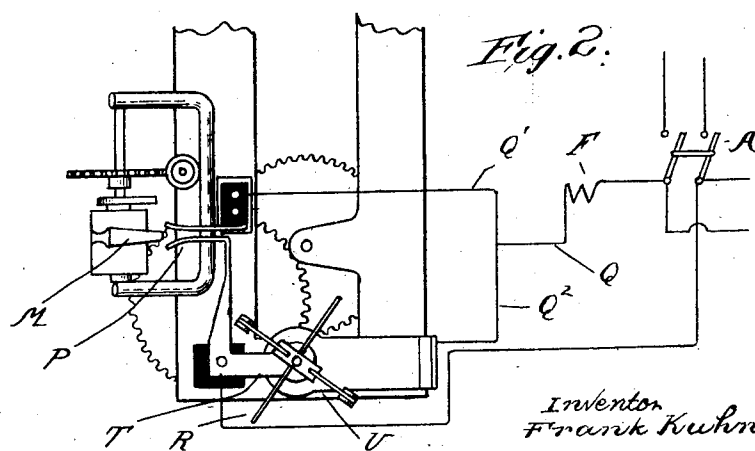
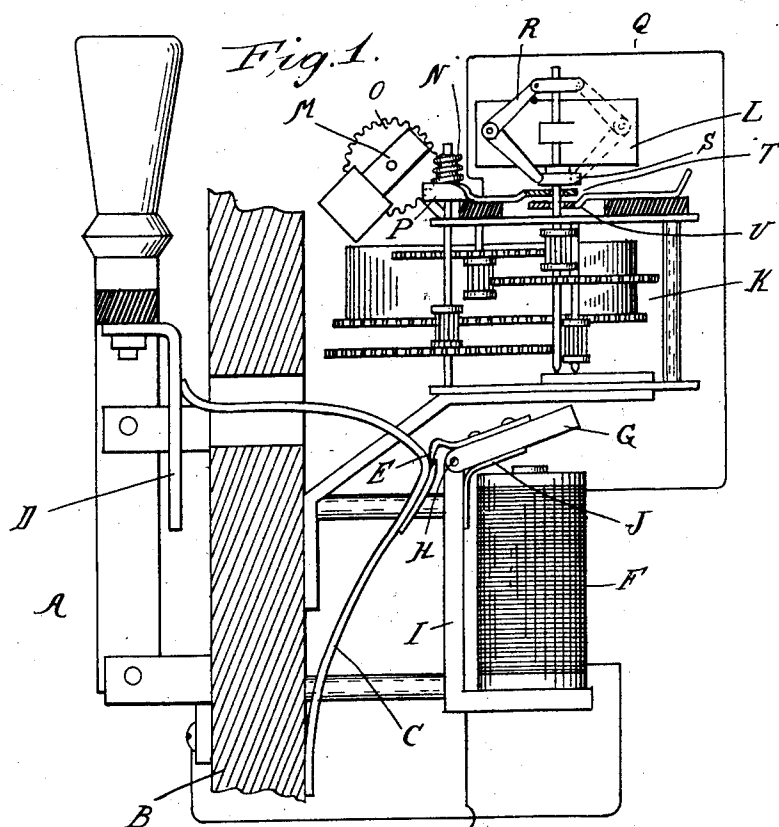


F. KUHN.
AUTOMATICALLY OPERATING SWITCH FOR ELECTRIC CIRCUITS.
APPLICATION FILED MAY 4, 1912.

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UNITED STATES PATENT OFFICE.

FRANK KUHN, OF DETROIT, MICHIGAN.

AUTOMATICALLY-OPERATING SWITCH FOR ELECTRIC CIRCUITS.

1,060,987.

Specification of Letters Patent.

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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 Automatically-Operating Switches for Electric Circuits, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to automatic switches for controlling electric circuits, being more particularly designed for use in connection with electric heaters.

It is the object of the invention to avoid danger by automatically opening the heater circuit after a predetermined time interval, thereby preventing a dangerous accumulation of heat in the unit.

It is a further object to guard against any failure due to the inoperativeness of the time mechanism or from any other cause interfering with the normal operation of the apparatus.

With these objects in view the invention consists in the construction as hereinafter set forth.

In the drawings.—Figure 1 is a sectional elevation of the automatic switch mechanism; Fig. 2 is a plan view of a portion thereof.

A is a controller switch of any suitable construction, preferably a double blade knife switch, B is the base upon which the switch is mounted, and C is a resilient arm engaging a bearing D upon the switch and operating to normally hold the switch in open position.

E is a latch detent for engaging the arm C in its retracted or tensioned position into which position it is forced by the closing of the switch A.

To provide for the opening of the switch after the desired interval, a time mechanism of any suitable mechanical construction is employed. Inasmuch however, as there is always danger of such a mechanism becoming inoperative and which would permit the switch to remain closed, I have provided means for automatically opening the switch not dependent upon the operativeness of the mechanism. This preferably consists in an electromagnet F, the armature G of which is connected with the latch detent E, being pivotally supported at H upon a bracket I and being held normally in latching position

by a spring J. The magnet F is included in an electric circuit which when closed to energize the magnet, will disengage the latch E and permit the spring C to open the switch A. The circuit for the magnet F is controlled by a time switch including a clock mechanism K and a retarding device such as the fan L.

M is a contact member which is slowly moved by the mechanism as for instance through the medium of a worm N and worm wheel O to periodically contact with a stationary contact member P. The electric circuit Q for the magnet F is closed by the contacts M and P which will energize the magnet, releasing the detent and throwing open the switch. If for any reason the time mechanism fails to operate, the contact M may be held in a position where it is separated from the contact P and which would therefore permit the switch to remain closed for an indefinite period. This is guarded against by a second switch which is open during the operation of the mechanism and closes whenever said mechanism is at rest. As preferably constructed, this second controller switch comprises centrifugally operated lever arms R mounted on the shaft of the fan escapement and which during the rotation of said shaft will move a member S longitudinally thereof so as to permit the separation of cooperating contact members T and U. On the other hand, when the rotation of the shaft ceases the levers R will assume a position where the member S presses the contacts T and U together. This will also close the magnetic circuit and by disengaging the detent permits the opening of the switch A.

In operation, the time mechanism may be wound by any suitable means (not shown), after which the switch A may be closed and will remain closed during the interval required for the movement of the contact member M into engagement with the contact P. When this occurs the circuit Q will be closed, energizing the magnet F, releasing the detent latch E and permitting the spring C to throw the switch open. During the movement the lever arm will be moved centrifugally to draw the member S from the contact members T and U, permitting the latter to separate. In the normal operation of the device these contact members T and U will remain separated during the entire interval in which the contact M is

moving to close with the contact P, but if the movement of the mechanism is prematurely arrested the contacts T and U will be closed, which will energize the magnet, trip the latch and open the switch. It will be noted that the two controlling switches are in parallel branches Q' and Q² of the electric circuit Q, so that the closing of either one will energize the magnet F and release the main switch.

What I claim as my invention is:

1. The combination with an automatically opening switch, of a detent for holding said switch in closed position, electromagnetic means adapted upon the energizing thereof to release said detent, a circuit for said electromagnetic means and a time mechanism controlling said electromagnetic means acting to automatically close the circuit upon the stopping of the mechanism, whereby the electromagnetic means is energized and the detent released.

2. The combination with an automatically opening electric switch, of a detent for holding said switch in closed position, an electromagnet for releasing said detent, an electric circuit for said magnet, a time mechanism, and a plurality of circuit closers for said circuit controlled by said time mechanism, one operating after a predetermined movement of said mechanism and another upon the cessation of movement.

3. The combination with an automatically opening electric switch, of a detent for holding said switch in closed position, an electromagnet for releasing said detent, a time mechanism, an electric circuit for said magnet, a centrifugal mechanism driven by said

time mechanism for opening the circuit of said magnet when said mechanism is in motion adapted on the stopping of said mechanism to close the circuit energizing said magnet, whereby the detent is released and said switch opened.

4. The combination with a knife switch, of a spring arm engaging said switch to open the same, a latch detent for engaging with said spring arm to hold the same in retracted position, an electromagnet adapted upon the energizing thereof to release said latch detent, a time mechanism, a circuit for said magnet and means controlled by said time mechanism for energizing said magnet alternatively upon the abnormal stopping of said mechanism or the normal completion of movement thereof.

5. The combination with an electric switch, means for automatically opening said switch, a latch detent for engaging said switch operating means upon the closing of the switch and holding the same in retracted position, an electromagnet for releasing said latch detent, a time mechanism, a circuit for said electromagnet, a plurality of circuit closers one being operated by said time mechanism after a predetermined interval, and centrifugal means operated by said time mechanism controlling the other circuit breaker and adapted to close the same upon the stopping of the mechanism.

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

FRANK KUHN.

Witnesses:

W. J. BELKNAP,
JAMES P. BARRY.