March 13, 1945. A. C. McGRATH 2,371,534

KEY-LOCK CONDITIONER

Filed Oct. 21, 1941

Fig. 1

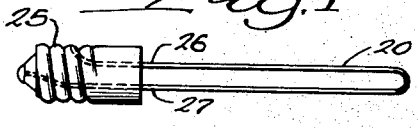


Fig. 3

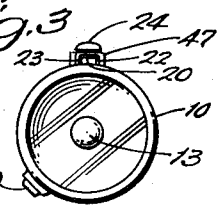
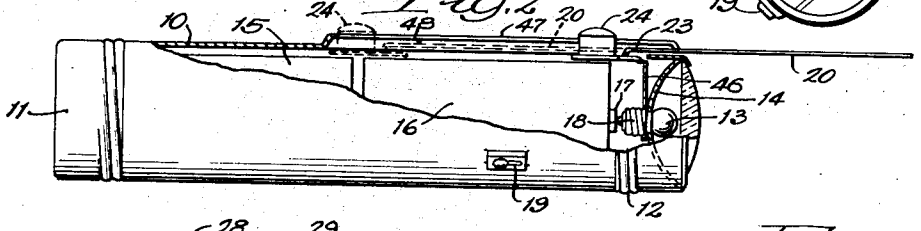


Fig. 2



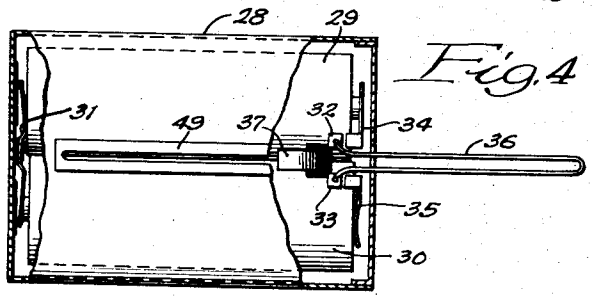


Fig. 4

Fig. 6

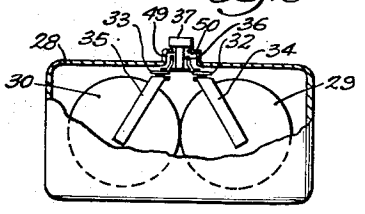


Fig. 5

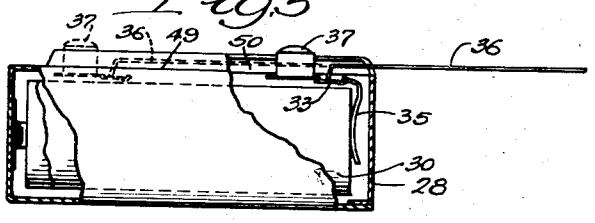


Fig. 8

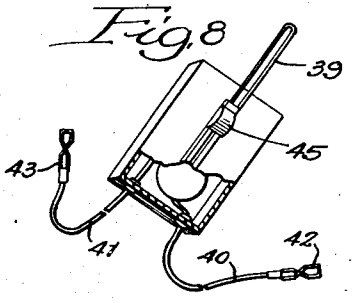
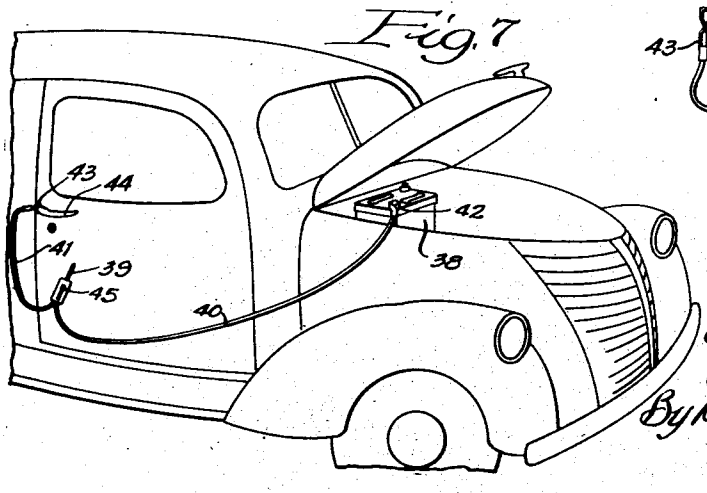


Fig. 7



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Patented Mar. 13, 1945

2,371,534

UNITED STATES PATENT OFFICE

2,371,534

KEYLOCK CONDITIONER

Arthur C. McGrath, Chicago, Ill.

Application October 21, 1941, Serial No. 415,877

3 Claims. (Cl. 219—19)

This invention relates to a key lock conditioner, and more particularly to a device for treating key locks to free the same from binding on account of ice, hardened grease and the like.

An object of the invention is to provide a device for treating locks having keyholes therein by heating the lock adjacent the keyhole. Another object is to provide a flexible member which may be readily inserted into apertures of different sizes and shapes to contact all portions of the lock adjacent the keyhole and to heat the same. Still another object is to provide a device for heating the inner portion of a lock equipped with a keyhole to remove any frosty condition which the lock may have acquired, to remove therefrom hardened grease and to remove moisture from the lock.

When locks are subjected to high moisture and conditions of low temperature, the moisture in the lock freezes and binds the lock to prevent its operation and use. This problem is particularly acute in door locks in automobiles where the lock is often exposed to water and to cold weather conditions. Moreover, it is difficult to thaw such locks because of their concealment in the door of the automobile. The present invention contemplates a flexible heating element which may be inserted in the keyhole of the lock to heat the interior of the lock adjacent the keyhole and to thaw the same.

Other features and advantages will appear from the following specification and drawing, in which—

Fig. 1 is a detailed elevational view of the heating member; Fig. 2 is a side elevational view partly broken away of an embodiment of the invention; Fig. 3 is an end elevational view of the same device; Fig. 4 is a plan view of a modification of the invention with the top of the casing being broken away; Fig. 5 is a side elevational view of the same modification with the casing broken away; Fig. 6 is an end elevational view of the same modification with the casing being broken away; Fig. 7 is a perspective view of another modification of the device as applied to an automobile; and Fig. 8 is a perspective view partly broken away of the device shown in Fig. 7.

In one embodiment of the invention described herein, and referring particularly to Figs. 2 and 3, a casing 10 of the type normally used in flashlights and the like is provided with a removable cover 11 which threadedly engages one end of the casing. The other end of the casing 10 removably and threadedly receives a closure member 12 which is equipped with a lamp 13 in a reflector 14.

Within the casing 10 are a pair of batteries 15 and 16 which are arranged in electrically connecting relation with the positive electrode 17 of the battery 16 engaging the conducting base 18 of the lamp 13. A switch 19 opens and closes the circuit of the batteries to light or extinguish the lamp 13.

The arrangement of the batteries and lamp in the casing may be of the conventional type normally used in flashlights and will not be described in greater detail herein.

A flexible electrical resistance wire 20, preferably arranged in the form of a loop, is received within the casing 10 at 21. The ends 22 and 23 of the loop 20 extend within the casing to the switch 24. The switch 24 which may be of any suitable or conventional type is arranged to bring one of the ends of the loop into electrically conducting relation with the contact 46 which extends upwardly from the base 18 of the lamp 13. The other end of the loop 20 may be grounded through the switch. The switch 24 is thus adapted to close and open the circuit of the electrical resistance element 20 when moved to and from a position of engagement with the contact 46.

The casing 10 is preferably equipped with a projecting portion 47 which provides a recess 48 for slidably receiving the resistance element 20. The switch 24 is slidably mounted on the projecting portion 47 of the casing 10 and with the resistance element 20 is movable therein. When the switch 24 is moved to the rear portion of the recess 48 as shown in dotted outline in Fig. 2, the resistance element 20 is withdrawn into the casing and is thus protected against damage and injury. The retractability of the resistance element 20 permits it to be withdrawn into the casing when it is not in use.

The electrical resistance heating element 20 may be of any suitable type. Preferably, the element is in the form of a looped wire and may be composed of Chromel wire or Nichrome wire or any other suitable high resistance wire. If desired, the wire may be resilient so that it will return to its normal shape after distortion

The electrical resistance heating element 20 is provided with suitable means for insulating the same from electrical contact with the lock or other surface. Preferably a thin coating of insulation which does not interfere with the flexibility of the element is applied to the wire. For example, a thin coating of a synthetic resin in the form of a lacquer may, if desired, be applied

to the looped wire which forms the resistance element.

Instead of mounting the wire on the casing independently of the lamp 13, the wire, as seen in Fig. 1, may be connected to a lamp base or socket 25 with the end 26 of the loop being connected to the peripheral surface of the base and the end 27 being connected to the central positive connection. In this event the heating element may be substituted for the lamp in an ordinary flashlight and its operation is controlled by the usual switch in the flashlight.

In the modification of the invention shown in Figs. 4 to 6 inclusive, a casing 28 receives a pair of dry cells or batteries 29 and 30 which are arranged in side by side relation within the casing. At the rear end of the casing, a conducting clip 31 connects the positive electrode of one battery to the negative pole of the other. At the other end of the casing, contacts 34 and 35 extend upwardly from the positive and negative poles respectively of the batteries 30 and 29. The pair of dry cells or batteries 29 and 30 are, therefore, connected in series, although, if desired, they may be arranged so as to be connected in parallel.

The looped electrical resistance wire 36 is connected at its ends to the contacts 32 and 33. A slidable switch 37 is adapted to bring the contacts 34 and 35 into engagement with the contacts 32 and 33 respectively to provide a closed circuit in which the current flows through the electrical resistance heating element 36. As seen in Fig. 5, the circuit is closed when the slidable switch 37 is in forward position.

The casing 28 is equipped with a projection 49 providing a recess 50 which serves as a support for the slidably mounted switch 37. The switch 37 and the looped electrical resistance wire 36 connected thereto are slidable within the recess 50 and may be moved to rear position as seen in dotted outline in Fig. 5 to withdraw the wire 36 from exposed position. The wire 36, like the wire 20, is covered with a suitable insulating medium.

In the operation of the devices shown in Figs. 1 to 6, the dry cells within the casing serve to energize the heating element by passing a current therethrough when the switch of the circuit is closed. The passage of the current through the electrical resistance element, of course, heats the element, which may be inserted in the keyhole of a lock and by contact with the inner surface of the lock about the keyhole heats the same.

By reason of the flexibility of the heating element it may be readily inserted into keyholes of any size or shape and may be brought into contact with any portion of the lock adjacent the keyhole. When the lock is frozen because of the presence of ice therein the engagement of the heating element with the inner surface of the lock rapidly thaws the same and permits operation of the lock.

The device is also particularly adapted for removing from a lock hardened grease and the like which may interfere with the operation of the lock. By inserting the heating element the lock and the grease therein may be readily heated and the grease becomes fluid and readily flows from the lock.

The arrangement of the lamp 13 immediately adjacent the heating element 20 with the reflector 14 arranged to direct the beam of light forwardly adjacent the heating element permits the lamp to illuminate a keyhole into which the heating element is to be inserted.

The embodiment of the invention shown in Figs. 7 and 8 is similar to the other embodiments except that the storage battery 38 of an automobile (wherever located) may be used as a current source to heat the flexible resistance wire heating element 39. Electrical connections 40 and 41 extend from the ends of the looped wire 39 and are provided with contact clips 42 and 43 which engage respectively the positive pole of the battery 38 and an suitable means for grounding the circuit, such, for example, as the handle 44 of the door of the automobile.

A switch 45 controls the operation of the heating element 39.

The operation of this embodiment of the invention is exactly the same as the other embodiments in that the flexible heating element is inserted in the keyhole of the lock to heat the portions of the lock adjacent the keyhole.

The foregoing detailed description has been given for the purpose of illustrating the invention and no unnecessary limitations should be understood therefrom. It will be apparent that modifications and changes may readily be made without departing from the spirit of the invention.

I claim:

1. A key-lock conditioner comprising a frame, an exteriorly insulated flexible resilient electrical resistance wire in the form of a loop carried by said frame and extending forwardly therefrom, the insulation on said wire being flexible whereby the insulated wire may be inserted in a lock, a battery carried by said frame, electrical connections providing a circuit between said battery and said resistance wire whereby the current from said battery is adapted to pass through the wire and heat the same, and a switch in said circuit for opening and closing the same.

2. A key-lock conditioner comprising a casing, an exteriorly insulated member projecting from said casing and extending therefrom, said member having therein an electrical resistance heating element, said member being retractable into the casing and being adapted to be inserted into said lock when in extended position, a source of electrical current carried by said casing, a lamp supported by said casing, electrical connections providing a circuit between said current source and said resistance element and between said current source and said lamp, and switches for independently opening and closing said circuits.

3. A key-lock conditioner comprising a casing, an exteriorly insulated flexible resilient electrical resistance wire in the form of a loop carried by said casing and extending forwardly therefrom, the insulation on said wire being of a resinous material and being flexible, said loop being retractable into the casing, a lamp mounted on said casing adapted to direct a beam of light forwardly therefrom, a dry cell battery carried by said casing and providing a source of electrical current, electrical connections providing a circuit between said battery and said wire and between said battery and said lamp, and a switch in each of said circuits for opening and closing the same.

ARTHUR C. McGRATH.