June 17, 1969 H. BRUCKER 3,450,859

DEVICE FOR HEATING KEYS FOR DEFROSTING FROZEN LOCKS

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Fig. 1

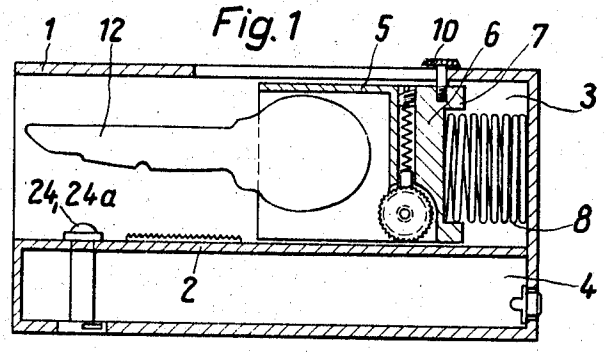


Fig. 2

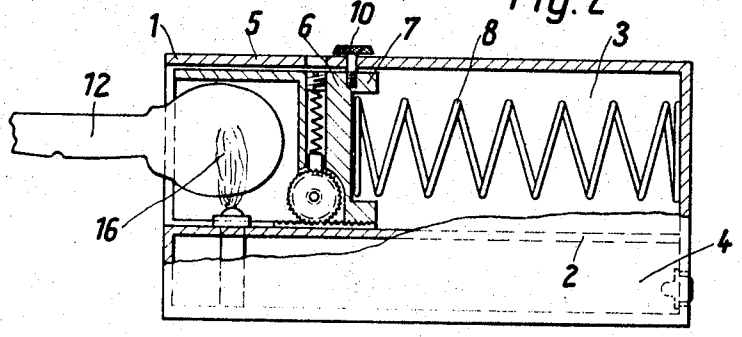
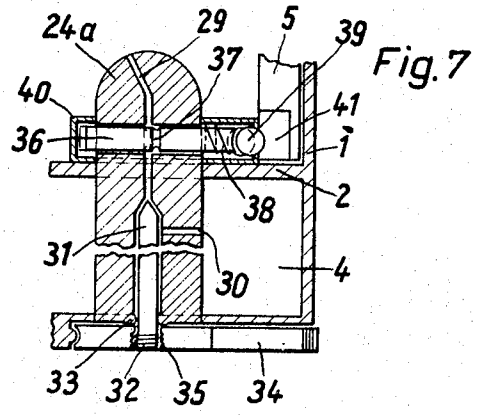


Fig. 7



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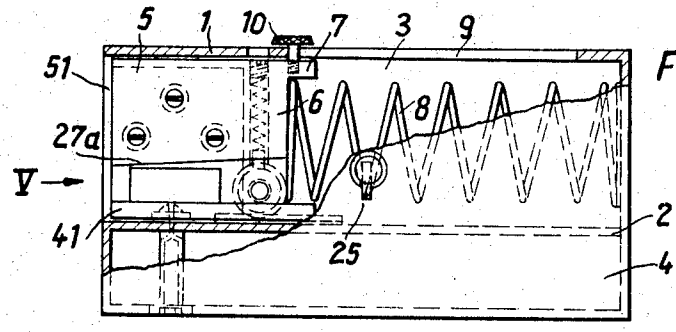


Fig. 3

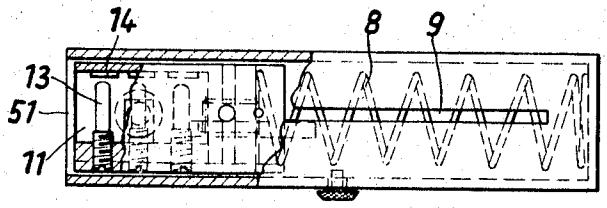


Fig. 4

Fig. 6

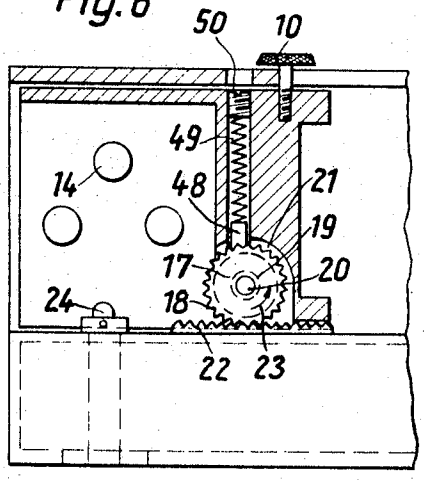
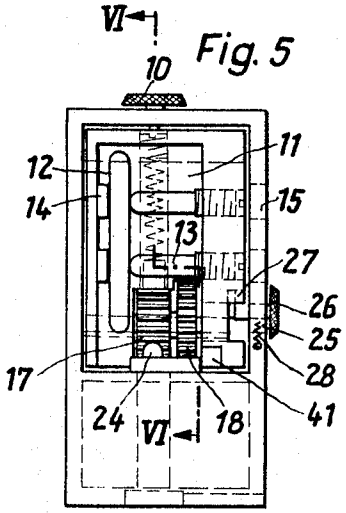


Fig. 5



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Fig. 8

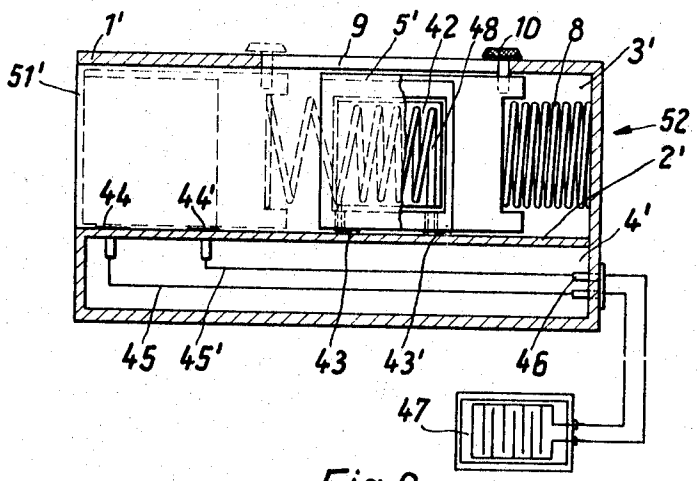
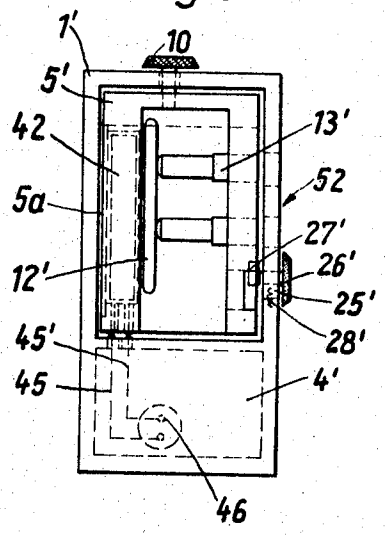


Fig. 9



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3,450,859

DEVICE FOR HEATING KEYS FOR DEFROSTING FROZEN LOCKS

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Int. Cl. H05b 3/00; F23q 1/02
U.S. Cl. 219—201 9 Claims

ABSTRACT OF THE DISCLOSURE

A device for heating keys for defrosting frozen locks comprises a housing having an opening at one end and a carriage having clamping means for clamping the head of a key and which is movable backwardly and forwardly to project the shank portion of the key into and out of the housing. The housing includes heating means such as a burner which is started and ignited by the movement of the carriage from an inward retracted position to an outward position at which it projects the shank portion of the key out of the housing.

Brief summary of the invention

The present invention relates in general to a device for heating keys for defrosting frozen locks and particularly to a new and useful device which includes means for holding the key in a housing and for projecting the end of the key out of the housing so that it may be inserted into a lock while means are actuated to heat the key.

The freezing of locks is particularly dangerous on motor vehicles since the doors cannot be opened before the lock is defrosted. It was found that a lock can be defrosted by introducing a hot key into this lock. Heating of the lock by matches it not sufficient in most cases. If the open flame of a cigarette lighter is employed for heating the key, there is a danger that the flame will be blown out by a windblast or there is the further danger that the flame will damage the varnish or paint of the vehicle.

In accordance with the present invention this problem is solved by providing a key housing which includes a reciprocating carriage having means thereon for clamping the head of the key. The housing contains means for heating the head of the key which is advantageously actuated when the carriage is moved to a position at which the end of the key or the shank portion is projected out of the housing. The housing may be of relatively small size not greater than a customary pocket lighter. The total length of the device in accordance with the invention may be about twice the length of the key which is to be heated. Because the key is mounted in a metallic carriage retained within the carriage, a considerable quantity of heat may be imparted to the key through the head portion thereof. The carriage acts as a heat chamber or heat reservoir which heats up the key by conduction. The heat source is arranged inside the housing and may advantageously comprise a burner which will operate within the housing without any disadvantageous effect. Thus, the entire heat from the burner will pass over the key and into the materials of the lock so that the lock will be rapidly defrosted. A feature of the construction is that the housing acts as an extension and handle for operating the key to be inserted into the lock and permits the continuous application of heat to the key without burning one's hand.

In the preferred arrangement means are provided for securing or locking the carriage together with a key secured thereto in a rearmost position with the key contained well within the housing. A compression spring is provided for producing an outward movement of the carriage with

the key to project the shank portion of the key outwardly from the housing after it is unlocked. The carriage may be easily moved backwards by actuating a return button which projects from the top of a housing through an oblong slot defined therein. Actuation of the burner is effected by movement of the carriage so that the complete operation including projection of the shank of the key into the lock and heating of the key may be carried out with one's hand. In the preferred form, the arrangement for locking the carriage in a retracted position is such that when the lock is released, the compression spring forces the carriage rapidly to an operative position so that the heating means is actuated. In one form the igniting or starting of the heating means is effected by producing a spark to ignite a burner by the rotation of a friction wheel against a flint member which will take place by the movement of the carriage under the force of the spring. The carriage includes a recessed bottom portion which will be oriented over the flame of the burner and is positioned such that the head of the key will be exposed directly to the flame during the heating operation. Very little transfer of heat from the key to the housing or carriage takes place since the key is clamped in the carriage by means of one or two point contact friction members which engage the head portion.

In the embodiment of the heating device in which the gas burner is provided, valve means are actuated by movement of the carriage to open the gas connection to the burner from a gas supply tank. Similarly, in the event that electric heating elements are provided, the carriage actuates contact members for connecting the heating elements to the electrical circuit. The device may advantageously include means for connecting heating elements to the battery of the motor vehicle with which the device is to be employed.

Accordingly it is an object of the invention to provide an improved device for heating keys which are to be used in association with frozen locks for the purpose of thawing out the parts of the lock.

A further object of the invention is to provide an improved key heating device which includes a housing having a carriage for holding the head of a key by clamping elements thereon, the carriage being movable inwardly into the housing to retract the key completely therein or outwardly to project the shank portion of the key out of the housing and to effect the actuation of heating means for continuously applying heat to the head of the key which is held within the housing.

A further object of the invention is to provide a heating device for keys which includes a gas burner for applying an open flame to the head of a key and which includes means for igniting the burner and for opening the gas valve from the burner to a gas supply tank upon movement of a carriage containing the key.

A further object of the invention is to provide an electrical device for heating keys which includes electricaly powered means which is actuated by movement of a carriage which may hold the key to apply heat to the head of the key at a location within a housing with the shank portion of the key being located out of the housing for orientation in a frozen lock.

A further object of the invention is to provide a device for heating keys which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

Brief description of the drawings

In the drawings:

FIG. 1 is an axial sectional view of a key heating device constructed in accordance with the invention;

FIG. 2 is a view similar to FIG. 1 indicating the parts in an actuated position;

FIG. 3 is a partial sectional and partial elevational view of the device indicated in FIG. 1 but without the key positioned therein;

FIG. 4 is a partial top plan view and sectional view of the heating device indicated in FIG. 3;

FIG. 5 is a front elevational view of the heating device;

FIG. 6 is a partial longitudinal sectional view taken along the lines V—V of FIG. 5;

FIG. 7 is an enlarged partial sectional view of the details of the burner for the heating device of FIG. 1;

FIG. 8 is a longitudinal sectional view of another embodiment of key heating device; and

FIG. 9 is a front elevational view of the device indicated in FIG. 8.

Detailed description

Referring to the drawings in particular, the invention embodied therein FIGS. 1 to 7 comprises a housing **1** which is divided by a partition wall **2** into an upper portion **3** and a lower portion **4**. The upper portion **3** contains a carriage **5** which moves backwardly and forwardly on the partition **2** and it is provided with a rear wall **6**. The rear wall **6** is provided with rearwardly extending cross bar portions **7** which engage around one end of a compression spring **8**. The compression spring **8** includes an opposite end which is biased against the rear end of the housing **1**. The compression spring **8** is of a size and force such that it will produce a full stroke movement of the carriage **5** from the locked position indicated in FIG. 1 to the actuated position indicated in FIG. 2 in which a key **12** held by the carriage is positioned so that a shank portion extends out of the housing. The limiting of the extent of movement of the carriage is effected by means of a screw or actuating button **10** which is secured to the carriage and extends through an oblong slot **9** defined in the top wall of the housing.

The front part of the carriage is substantially U-shaped in cross section and is provided with an opening at the bottom. The walls of this part of the carriage **5** enclose a heating chamber **11** which serves to receive and secure the key **12**. Fastening of the key is effected by three set screws **13** which are arranged opposite projections or elevations **14** which engage on the opposite side of the head of the key (see Fig. 5). The key **12** is clamped between the set screws **13** and the projections **14**. Only the set screws **13** project through the chamber **11** so that heat from a burner flame may pass freely through the chamber **11** to insure complete and continuous heating of the key **12**.

In order to initially clamp the key **12** in position, the set screws **13** are aligned with openings **15** in the side wall of the housing **1** to permit insertion of a turning tool therethrough. The key is introduced into the housing from the front end through an opening **51**.

In accordance with the invention, the carriage **5** is provided with key heating means and with heat actuating means or ignition means. The heat actuating means includes a flint wheel **17** which is rotatably supported on the carriage **5** in a position to engage with a rack **22** located a short distance inwardly from the heating means comprising a burner **24**. When the carriage **5** is moved by the spring **8** after release of the carriage, it causes the flint wheel **17** to rotate by action of the teeth **18** on the rack **22** to cause sparking of a flint **48** which is biased downwardly by a spring **49** which is retained in a vertical slot by a set screw **50**. The flint wheel **17** is contained in an annular recess **21** defined in a portion of the carriage **5**. The burner **24** may be a gas or benzine burner and ignition will take place by rotation of the flint wheel **17** after the burner **24** is connected to the fuel supply tank **4**. The

connection is automatically effected by movement of the carriage **5** by means of an actuator bar **41** carried by the carriage, as indicated in FIG. 7. The bar **41** causes movement of a ball member **49** against the force of a biasing spring **38** carried around a valve member **36**. The valve member is therefore shifted from the solid line position indicated in FIG. 7 to the dotted line position to orient an annular groove **37** of the member in alignment with the fuel line **29** which extends obliquely through the burner head **24***a*. Fuel, in this instance preferably gas, will flow from the gas tank **4** to the line **30** around a needle valve **31** and upwardly through the gas passage **29** of the burner head **24***a*, so that it will be ignited when the carriage is moved further to rotate the flint wheel **17** and produce the spark. The valve **36** is slidable in a valve housing extension **40** of the burner **24**. A needle valve may be adjustably threaded into a threaded opening **35** by thread portion **32** which is provided at its outer end. The screw thread **32** is sealed by a lip seal **33**. The adjustment is effected by a rocking lever **34** having a female thread **35** for receiving the male thread **32** of the nozzle needle **31**. The rocking lever **34** is arranged in the housing **1** for pivotal movement but is also axially movable. The fuel chamber **4** may advantageously be provided with cotton which may be saturated with benzine or the tank may be filled with gas under pressure.

The carriage **5** may be locked within the housing to hold the key completely retracted within the housing as indicated in FIG. 1 by means of a locking button **26** which moves vertically in a housing slot **25** (FIG. 5). The button **26** includes a nose **27** which extends beyond the front edge of the carriage **25**. The locking button **26** is spring actuated by a spring **28** which urges the locking button **26** into its upper portion in which the carriage **5** is locked in its rear position. The carriage **5** has an inclined striking surface **27***a* which ends at a level which corresponds to the position of the nose **27**. During the return movement of the carriage **5** the locking nose **27** is automatically compressed and snaps automatically behind the front edge of the carriage to lock it in position. In order to release the carriage **5**, the locking button **25** is pressed downwardly and the compression spring **8** will relax to permit the carriage to move into the front end position up to the limit of the movement of the button **10** in the slot **9**. In this front end position as indicated in FIG. 2, the burner **24** will already have been ignited to produce a heating flame for continuously heating the head of the key **12**. The shank portion of the key **12** may be inserted into the lock which requires defrosting and the heat will be transmitted from the key to the locking parts to cause rapid defrosting thereof.

In the modified arrangement indicated in FIGS. 8 and 9, there is shown a key heating device generally designated **52** which includes a housing **1'** having a partition wall **2'** which supports a carriage **5'** for movement back and forwardly thereon within the housing. A key **12'** may be clamped in the carriage **5'** as in the other embodiment by means of clamping bolts **14'**. The locking mechanism for the carriage is similar to that of the embodiment of FIGS. 1–7. In this embodiment the projections **14** are not provided so that there will be a very good contact between the head of the key and the heated leg of the carriage for good heat transfer. A heating element **42** is embedded within a heating leg **5***a* of the carriage and it is connected to sliding contact elements **43** and **43'** which the adapted to engage respective contact elements **44** and **44'** disposed at spaced locations adjacent the front or opened end of the housing **1'**. The actuated position of the carriage **5'** is indicated in dotted lines in FIG. 8 in which position the contacts **43** and **43'** will be in contact engagement with the contacts **44** and **44'** to complete the electrical circuit from a power source such as battery **47** to a plug box **46** and cables **45**, **45'** and to one of the terminals **44** or **44'** and thence to the heater **42** and then back to the ground side of the battery. The

plug box **46** may comprise either sleeve contacts or plug pins. In the front position of the carriage **5'** the connection with the power source **47** is established automatically and the carriage will be heated electrically to heat the key. In the retracted position of the carriage the sliding contacts **43** and **43'** move off the contacts **44** and **44'** to break the circuits so that no heating will be carried out. Instead of a heating element with resistance wires **48**, the resistance may be built into the carriage construction. The plug box may advantageously provide a connection for a jumper to connect the device through a cigarette lighter of the automobile if desired.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for heating keys for defrosting frozen locks comprising a housing having an opening, means in said housing for holding one end of a key in the housing in a position adjacent the opening to permit at least a portion of the key to project outwardly from the housing, and heating means in said housing for heating the key, said means for holding one end of a key comprising a carriage which is movable in said housing toward and away from the opening of said housing, and heat actuating means associated with said heating means and responsive to movement of said carriage for starting said heating means.

2. A device for heating keys for defrosting frozen locks comprising a housing having an opening, key holding means in said housing for holding one end of a key in the housing in a position adjacent the opening to permit at least a portion of the key to project outwardly from the housing, heating means in said housing for heating the key, and a partition dividing the interior of said housing with one side being in communication with the opening of said housing, said key holding means comprising a carriage located on said one side of said partition and being movable toward and away from the opening of said housing, said heating means comprising a burner positioned at the opposite side of said partition from said carriage at a location adjacent said opening and having a nozzle portion for producing a flame which is directed through said partition toward the portion of the key held by said carriage, and wherein said heat actuating means comprises an ignitor for igniting said burner.

3. A device for heating keys for defrosting frozen locks comprising a housing having an opening, key holding means in said housing for holding one end of a key in the housing in a position adjacent the opening to permit at least a portion of the key to project outwardly from the housing, heating means in said housing for heating the key, said key holding means including a carriage movable in said housing having a support abutting one side of said key, and a clamping screw being rotatably mounted in said carriage and adapted to be tightened against the key to said support.

4. A device for heating keys for defrosting frozen locks comprising a housing having an opening, key holding means in said housing for holding one end of a key in the housing in a position adjacent the openings to permit at least a portion of the key to project outwardly from the housing, and heating means in said housing for heating the key, said key holding means including a carriage which is movable in said housing, said heating means comprising an electrical heater disposed in said housing at a location to heat said key and means connected to said heater to actuate said heater when said carriage is positioned in a predetermined location in respect to the opening of said housing.

5. A device according to claim **1**, wherein said carriage includes walls defining a heating receptacle for said key, fastening means associated with said wall means for fastening a key to said carriage, spring means in said housing urging said carriage toward the opening of said housing, means connected to said carriage and projecting out of said housing for manual engagement for returning said carriage to a position away from said opening and to compress said spring, and means for locking said carriage to a position removed from said opening with said spring compressed.

6. A device according to claim **1**, said heat actuating means including a flint engaged with said flint wheel, and means disposed along the path of movement of said carriage for rotating said flint wheel to produce a spark for igniting said burner when said carriage is moved to a position adjacent the opening of said housing.

7. A device according to claim **2**, wherein said burner is a gas burner, a gas supply tank located in said housing, and valve means connected between said gas supply tank and said burner for supplying said burner with gas for producing a heating flame, said carriage having an actuating member adapted to contact said valve means to actuate said valve means to cause flow of gas to said burner upon movement of said carriage toward the opening of said housing.

8. A device according to claim **2**, wherein said carriage is provided with spaced side walls with a bottom opening, said carriage being positionable adjacent the opening of said housing in a position such that the bottom opening of said carriage will be aligned over said burner to permit heating of the portion of the key held in said carriage by said burner.

9. A device according to claim **4**, wherein said heater is mounted on said carriage, said carriage having spaced contacts, an actuating circuit for energizing said heater including a power source, spaced counter contacts located in said housing in a location to be connected in said spaced contacts in said carriage when said carriage is positioned in a predetermined position in order to connect said heater to said power source.

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U.S. Cl. X.R.

126—229; 431—275