Dec. 1, 1970 KAZUO SUGIYAMA 3,543,547

MANUALLY UNLOCKING DEVICE OF ELECTRIC LOCK

Filed Jan. 3, 1968

FIG. 1

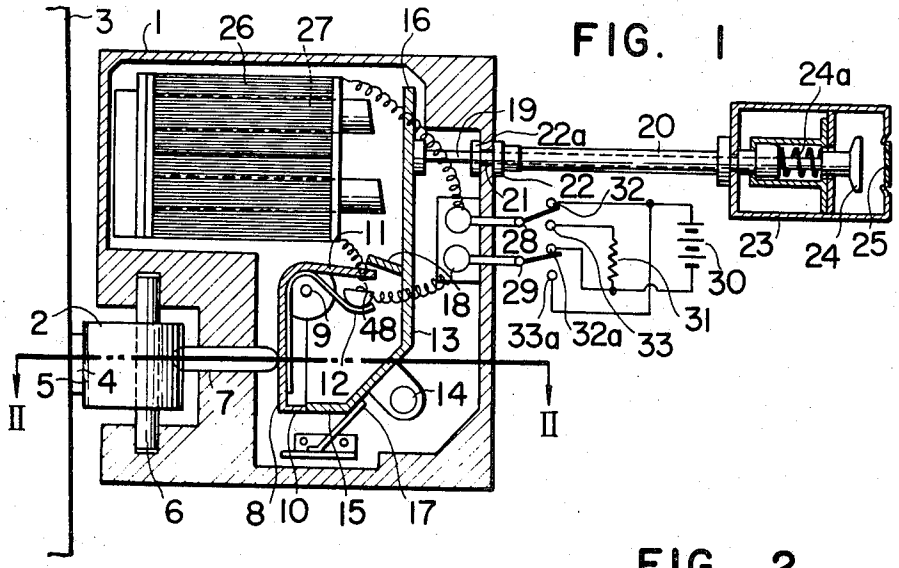


FIG. 2

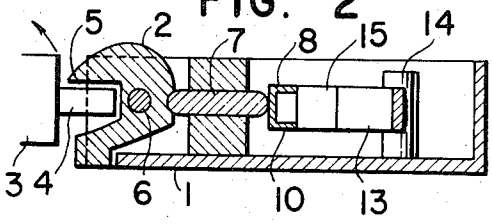
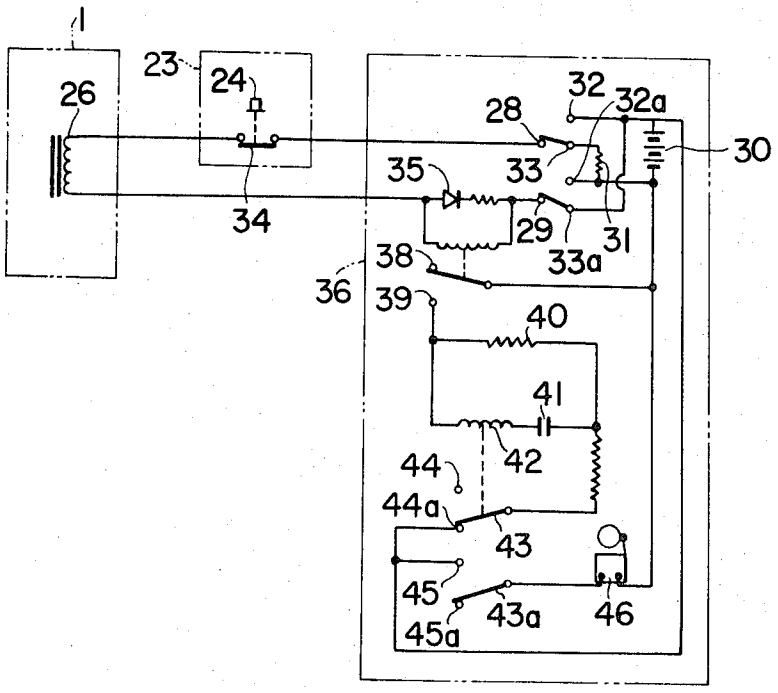


FIG. 3



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MANUALLY UNLOCKING DEVICE OF ELECTRIC LOCK

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U.S. Cl. 70—277 3 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to a device for manually unlocking an electric lock or, more specifically, in an electric lock which performs locking and unlocking electrically, a device for manually releasing the electric lock in an emergency such as a fire or when it becomes impossible to operate the lock electrically because of trouble in theelectric circuit due to other causes making it possible to release the lock of a door by a manual operation but the electrical unlocking operation by a pushbutton provided near the door and an attracting iron piece of said electric lock interlocked mechanically with said pushbutton.

TECHNICAL DISCLOSURE

An electric lock operates to lock and unlock by means of an electromagnet and an iron piece attracted thereto. However, in order to maintain the lock in a locked or released state, electric current must be allowed to flow to the electromagnet continuously. This is a waste of electric power. Thus, the applicant applied for a patent of an electric lock wherein the current is passed to the electromagnetic coil only when the switching from unlocked state to locked state or the reverse switching is effected with an iron core of great residual magnetism used for the electromagnet so that the current is not wasted in maintaining a state after switching, whereby the iron core is magnetized by a direct current passed for a short duration to the electromagnetic coil to attract the iron piece and to release the lock. The iron piece is kept in a static condition being attracted by the magnetic force of the iron core to maintain an unlocked state, and in locking, the iron core is demagnetized by either a weak direct current flow in a reverse direction to that of the flow of said current or an alternating current flow to the electromagnetic coil for a short period to interrupt attraction of the iron piece which then separates from the iron core to effect locking and maintain the locked sate thereafter.

Such an electric lock is advantageous in that power consumption is reduced and that in a big building, central control of the locks of a number of doors for locking and unlocking is facilitated, but has a drawback in that the iron core must be excited for unlocking so that in the event of trouble such as breaking of wires in the electromagnetic coil, unlocking is not effected.

SUMMARY OF THE INVENTION

The present invention is intended to remove the foregoing defect and, for releasing a desired door in an emergency when the electrical unlocking operation is not practicable because of trouble in the electromagnetic coil or caused by a fire, to make it possible to release the door by manually unlocking the lock near the door, thus preventing a possible disaster in an emergency.

DRAWING

FIG. 1 is a cross-sectional side view showing main parts of an embodiment of the invention. FIG. 2 is a cross-sectional plane view taken along the line II—II in FIG. 1. FIG. 3 is a circuit diagram of another embodiment with an alarm device attached to the manually unlocking device of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a cross-sectional side view of one embodiment of the invention, showing an electric lock **1** deposited in the frame door **3**. When the door is closed, a normally projecting lock keeper **4** of door **3** fits in jaw **5** of cam latch **2** which is rotatably supported by a vertical shaft **6**. As the door is opened, it drives latch **2** to rotate. Latch **2** is in contact with one end of push pin **7** the other end of which is in contact with L-shaped operating arm **8** which is pivoted to the shaft **9** and is biased in a clockwise direction by spring **12**. Operating arm **8** has a coupling part **10** which engages coupling arm **16** of L type lever **13** pivoted to shaft **14**. The other arm of the L type lever **13** has an attracting iron piece **16** provided thereon against an iron core **27** of an electromagnetic coil **26**. The L type lever **13** is in contact with a weak spring **17** so that it rotates in a clockwise direction, and has rotatable ancillary projection **18** provided thereon. The ancillary projection **18** is switchable between the position facing toward drive projection **11** of operating arm **8** and a retracted position not engaged with drive projection **11**. Latch cam **2** is so shaped that at the position where the door is closed or the lock keeper **4** of the door **3** fits in jaw **5** of latch cam **2**, stop part **10** of operating arm **8** and coupling arm **15** of L type lever **13** are engageable with each other, with push pin **7** positioned at the extreme left in FIG. 1. As the cam rotates from the foregoing position in the clockwise direction in FIG. 2, push pin **7** is driven to the right by latch cam **2**.

The circuit of electromagnetic coil **26** has an operative contact **48** which is opened or closed as the operating arm **8** rotates for connection thereto in series. The terminals at both ends of said circuit are connected to swtiches **28** and **29**, switch **28** is switchable to a contact **32**, another contact **33** and a neutral point between them and switch **29** to a contact **32***a*, another contact **33***a* and a neutral point between them simultaneously. Between contacts **32** and **32***a*, a source of direct current **30** is connected directly, and, between contacts **33** and **33***a*, the same source of power **30** is connected with the polarity reversed across resistor **31**.

The foregoing is the general configuration of the electric lock. In the present invention, such a configuration is further provided with a flexible wire **20** secured to the chassis of the electric lock by means of a fastener **22***a*, one end having a push member **19** which fits in the electric lock to face the iron piece **16** on the L type lever **13** at the opposite side of the iron core **27** and the other end being connected to pushbutton **24** in a manual operator **23**, said pushbutton **24** having a spring **24***a* in pressure contact underneath and facing a resin glass **25** fitted in