Feb. 25, 1964 D. A. POWERS 3,122,388

ELECTRIC STRIKE

Filed Nov. 7, 1960

FIG. 1

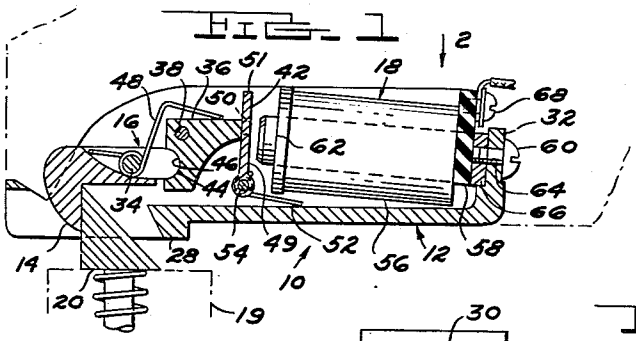


FIG. 2

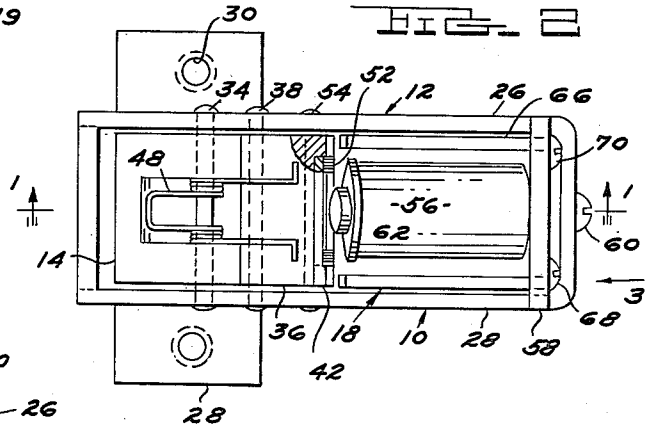


FIG. 3

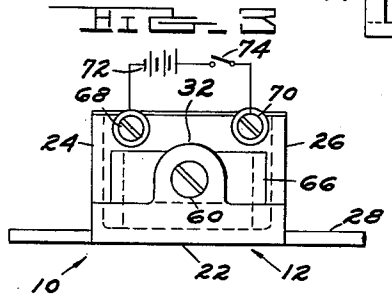


FIG. 4

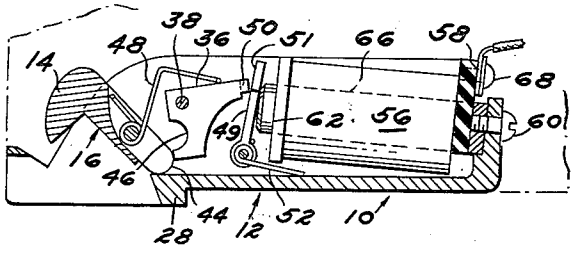
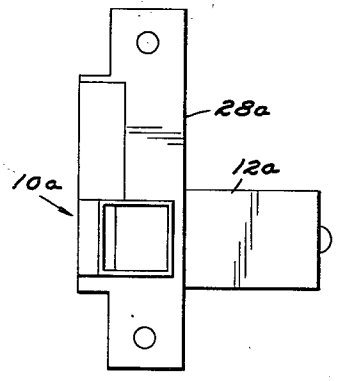


FIG. 5



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ELECTRIC STRIKE

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The invention relates to building hardware and refers more specifically to a compact simplified electric strike adapted to be installed transversely of a door frame.

Electric strikes of the type operable to prevent opening of a door associated therewith without an electric circuit first being completed have long been known. Such strikes are however not used as widely as they might be due to certain characteristics of prior electric strikes.

In the past electric door strikes have usually been bulky items which were not capable of being conveniently recessed in a normal door frame. This characteristics of prior electric door strikes is especially important with the modern trend toward thinner frames made of metal. Metal door frames are today often so restricted in size parallel to the door opening that the usual strike constructed and arranged to extend parallel to the door opening cannot be contained therein.

In addition prior electric strikes have been generally relatively complicated so that the cost thereof of installation in a metal door frame has been excessive.

It is therefore one of the objects of the present invention to provide an improved compact electric strike constructed and arranged to extend transversely of a door frame in which it is installed.

Another object is to provide an electric door strike constructed to be conveniently installed in door frames having standard prepared strike openings.

More specifically it is an object to provide a compact electric strike adapted to extend transversely of a door frame in which it is installed comprising a catch, mechanical means for locking the catch in a predetermined position to prevent opening of a door installed in the door frame and having a latch bolt engaged with the catch and electric means for actuating the mechanical means to release the catch to permit opening of the door.

Another object is to provide structure as set forth above wherein the catch is mounted for movement in two opposite directions and the mechanical means comprises a lock bar engageable with the catch to prevent movement of the catch in one of said directions and an armature engageable with the lock bar operable to prevent movement of the lock bar which would allow movement of the catch in the other of said directions.

Another object is to provide structure as set forth above wherein the electric means comprises a solenoid energizable to cause movement of the armature out of engagement with the lock bar to permit movement of the catch in the other said directions.

Another object is to provide structure as set forth above wherein means are provided for biasing the lock into engagement with the catch and for biasing the armature into engagement with the lock bar.

Another object is to provide an electric strike as set forth above wherein the face plate has an elongated lip and the catch, mechanical means and electric means are variably positionable along the length thereof so that the strike is adapted for use with standard manufacturers' locks conforming to government standards.

Another object is to provide an electric strike which is simple in construction, economical to manufacture and efficient in use.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken

in conjunction with the accompanying drawings, illustrating preferred embodiments of the invention, wherein:

FIGURE 1 is a longitudinal view of an electric strike acocrding to the invention which is shown installed transversely of a door frame and in a locked condition.

FIGURE 2 is a view of the electric strike shown in FIGURE 1 taken in the direction of arrow 2 in FIGURE 1.

FIGURE 3 is a right end view of the electric strike shown in FIGURE 2.

FIGURE 4 is a view of the electric strike of the invention similar to FIGURE 1 showing the strike in an unlocked condition with the catch rotated to allow movement of a latch bolt out of engagement with the strike catch.

FIGURE 5 shows a modification of the electric strike shown in FIGURES 1–4 wherein the strike opening may be variably located along the entire lip of the strike to accommodate the latch bolt of locks as manufactured by standard lock manufacturers conforming to government standard dimensions.

With reference to the figures a specific embodiment of the invention will now be disclosed.

As shown best in FIGURE 1 the electric strike 10 of the invention comprises a body 12 for supporting catch 14, mechanical means 16 and electric means 18. In operation catch 14 is locked in the position shown in FIGURE 1 by the mechanical means 16 to prevent opening of door 19 associated therewith which has a latch bolt 20 engaged with catch 14 when electric means 18 is not energized. When the electric means 18 is energized the mechanical means 16 is actuated to permit movement of catch 14 by bolt 20 and opening of door 19.

More specifically the body 12 as shown in FIGURES 1–4 is a generally channel shaped member having a web 22 and upstanding legs 24 and 26 longitudinally thereof. A face plate 28 is integrally formed with the body 12 and extends transversely thereof. Screw holes 30 are provided at the opposite ends of the face plate 28 for mounting the strike in a door frame. Body 12 is further provided with a flange 32 at one end thereof extending from the web in th same direction as legs 24 and 26 as shown best in FIGURES 2 and 3 to which the electric means 18 is secured as will later be considered.

Catch 14 shaped as shown is pivotally mounted on pivot pin 34 extending between the legs 24 and 26 of the body 12. Catch 14 is operable to pivot between the positions shown in FIGURES 1 and 4 to hold latch bolt 20 of door 19 in a locked position or permit opening of the door respectively.

Lock bar 36 is also pivotally mounted between the legs 24 and 26 of the body 12 on pivot pin 38. The lock bar 36 shaped as shown is pivoted counter-clockwise about pivot pin 38 on clockwise movement of catch 14 about pivot pin 34 when armature 42 is disengaged therefrom. The lock bar 36 is prevented from being rotated clockwise by catch 14 since the end 44 of catch 14 within the recess 46 in the lock bar 36 is caused to bind due to the relative positions of the pivot pins 34 and 38 when such movement is attempted.

Torsion spring 48 carried by pivot pin 34 is shaped to act between the catch 14 and the lock bar 36 to maintain the catch 14 in the position shown in FIGURE 1. The lock bar 36 and the catch 14 are locked against further rotation by spring 48 due to binding of end 44 of catch 14 in recess 46 as previously indicated.

Armature 42 is generally T-shaped as shown and has a stem 49 which fits within a recess 50 in the lock bar 36 and a cross-member 51 engageable with lock bar 36 to prevent counter-clockwise rotation of the lock bar when the armature 42 is in the position shown in FIGURE 1. Torsion spring 52 is provided to bias the armature 42

into the position shown in FIGURE 1. On actuation of the electric means 18 the armature 42 is pivoted about the pivot pin 54 on which it is mounted whereby the armature 42 disengages the lock bar 36 to permit rotation of catch 14 by latch 20 in a clockwise direction.

The electric means 18 comprises an electro-magnet 56 mounted at an angle to the web of the body 12 on an insulating terminal block 58 by means of bolt 60 and nut 62 which extends through the electro-magnet 56 and forms a core therefor as shown best in FIGURES 1 and 4. Bolt 60 extends through opening 64 in flange 32 as shown best in FIGURE 2, whereby the electro-magnet 56 is secured to body 12.

The electro-magnet 56 is thus easily removable and replaceable. Interchangeable electro-magnets for use with 6 to 8 volts direct current and 12 to 16 volts alternating current, 24 volts alternating and direct current and 48 volts direct current electric energy sources may be provided to facilitate use of the electric strike of the invention in installations where different energy sources are available.

The electric means 18 further includes a U-shaped soft iron member 66 supported between the flange 32 and the terminal block 58 by bolt 60. The member 66 is provided to concentrate the magnetic field created by the electro-magnet 56 so that the armature 42 is more readily pivoted on energization of the electro-magnet 56. Thus only a single electro-magnet need be provided to actuate the electric strike of the invention.

Electric terminals 68 and 70 are provided on terminal block 58 to which the ends of the electro-magnet 56 are secured and which are adapted to be secured to a source of electric energy 72 through a switch 74 indicated diagrammatically in FIGURE 3.

In operation the electric strike of the invention is recessed in a door frame and extends transversely thereof as shown best in FIGURE 1. With switch 74 open on closing of door 19 latch bolt 20 will cam over the catch 14 held in a locked position by lock bar 36 and armature 42 into the position shown in FIGURE 1. The door cannot then be opened by movement in the opposite direction until the switch 74 is closed.

On closing of the switch 74 the electro-magnet is energized whereby the armature 42 is pivoted toward the inclined electro-magnet. Movement of the armature 42 by electro-magnet 56 is aided by the provision of U-shaped member 66 and the inclined positioning of the solenoid so that only a single coil is required.

After the armature 42 moves toward the electro-magnet in opposition to spring 52 the lock bar 36 is permitted to be rotated counter-clockwise by clockwise rotation of the catch 14 in opposition to spring 48. Thus movement of the latch bolt 20 away from the electro-magnet as shown, will permit opening of the door associated with the latch bolt 20.

After the door has been opened the switch 74 may be again opened at which time the spring 48 returns the catch 14 to the locked position thereof as shown in FIGURE 1 wherein the lock bar 36 and catch 14 are prevented from further relative rotation due to the positioning of the pivot pins 34 and 38. The armature 42 is then caused to again engage the lock bar 36 due to spring 52 so that the catch 14 is locked in position. On subsequent closing of the door 19 the latch bolt 20 will again be locked in place by strike 10 until the switch 74 is closed.

Thus it can be seen that in accordance with the invention there is provided a compact electric strike which is extremely simple and therefore economical which is constructed and arranged to extend transversely of a door frame in which it is installed.

The modified electric strike 10*a* illustrated in FIGURE 5 is similar in all respects to the electric strike 10 disclosed above with the exception of the fact that the face plate 28*a* of the modified door strike 10*a* is separate from the body 12*a* thereof whereby the body 12*a* may be

secured to the face plate 28*a* at different positions longitudinally thereof. Thus the electric door strike 10*a* is adapted for use with door frames having government standard lock series 86 strike openings therein through the simple expedient of mounting the body 12*a* at the required position with respect to the face plate 28*a* and cutting the required opening through the face plate 28*a* for the latch 14*a*.

The drawings and the foregoing specification constitute a description of the improved electric strike in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. An electric strike comprising a pair of adjacent pivot means, a catch pivotally mounted on one of said pivot means having a latch engaging end and an opposite rounded end, a lock bar pivotally mounted on said other pivot means including a recess in one end thereof for receiving said rounded end of said catch, resilient means operably associated with and operable between said catch and lock bar for biasing said opposite end of said catch into said recess on relative rotation thereof in one direction, said catch and lock bar being dimensioned and said pivot mounting means being located for preventing further rotation of said catch and lock bar in said one direction after said end of said catch is received in said recess, a pivotally mounted armature positioned adjacent said lock bar, resilient means urging said armature into position for preventing pivotal movement of said lock bar in a direction to disengage said latch and lock bar and an electric solenoid positioned adjacent said armature operable on being energized to pivot said armature out of engagement with said lock bar for permitting relative movement of said catch and lock bar in a direction opposite said one direction.

2. Structure as set forth in claim 1 wherein said strike is constructed and arranged to extend transversely of a door opening a substantially greater distance than in any direction in the plane of said door opening and said catch, lock bar, armature and solenoid are positioned in line transversely across the opening.

3. Structure as set forth in claim 1 wherein a single solenoid is provided for actuating said armature and the solenoid is inclined with respect to the direction of longitudinal extent of the strike installed in a door opening.

4. Structure as set forth in claim 1 wherein a strike plate is provided in conjunction with said strike which is adjustable transversely of said strike for facilitating installation of said strike in door frames having standard strike openings therein.

5. In a door frame an electronic strike constructed and arranged to extend transversely of the frame comprising a substantially rectangular housing having a pair of parallel spaced apart sides and an end member extending from one side thereof, a latch opening in said one side thereof at the end thereof opposite said end member, pivot mounting means extending between said parallel sides, an L-shaped catch pivotally mounted on said pivot means including an end portion extending through said latch opening for engaging a door latch and a second arcuate end portion, second pivot means extending between said parallel walls of said housing, a lock bar pivotally mounted on said second pivot means adjacent said catch including a recess in one end thereof for receiving the rounded other end of said catch, a spring operable between said catch and lock bar for urging said catch into a latch engaging position with said rounded end thereof within said recess, said latch and catch being constructed and relatively positioned for preventing pivotal movement thereof in one direction about said pivot means on said rounded end of said catch being seated in said recess, third pivot mounting means extending between said parallel walls, an armature pivotally mounted on said third pivot means operable on being pivoted into engagement with said lock bar to prevent relative move-

ment of said catch and lock bar in a direction opposite said one direction, resilient means operable between said housing and armature for urging the armature in said one direction and a single solenoid rigidly secured to the end member of said housing and inclined to said one side thereof operably associated with said armature for pivoting said armature in a direction to disengage said lock bar on being energized to permit pivoting of said catch and lock bar in a direction opposite said one direction and allow relative movement of said catch with respect to an engaged latch and an adjustable strike plate positioned over said opening in said one side of said housing for permitting use of said strike with doors having standard strike openings.

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