

[54] DOOR LOCK MECHANISM

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[58] Field of Search: 292/254, 144, 173, 292/341.15, 341.16, 33, 40; 70/161

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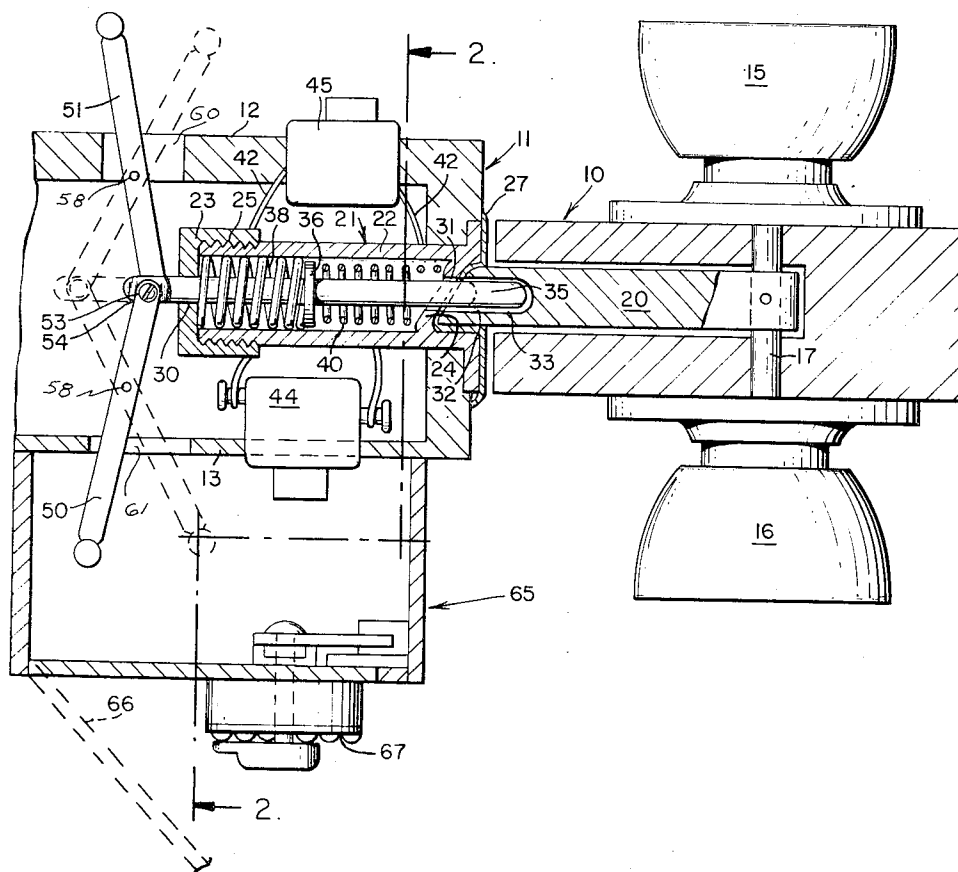
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[57] ABSTRACT

A door lock mechanism having a safety pin of magnetic material to prevent unauthorized intrusion. The safety pin is a bolt supported in a housing located in a door jamb and extending through an aperture located within a standard receptacle for receiving the standard door-mounted bolt. The pin is reciprocated upon a spring and normally is extended by the spring toward the door-mounted bolt. The pin extends into a longitudinal bore located at the end of the door-mounted bolt which rests in the receptacle when the door is closed. Two wall-pivoted lever arms are connected to one end of the pin to provide means for manually reciprocating the pin. Access to the arms is through a locked box. A coil surrounding the pin may be activated with electric current through an interconnecting switch to cause the door bolt to be magnetically held by the striker plate receptacle and the pin.

7 Claims, 2 Drawing Figures



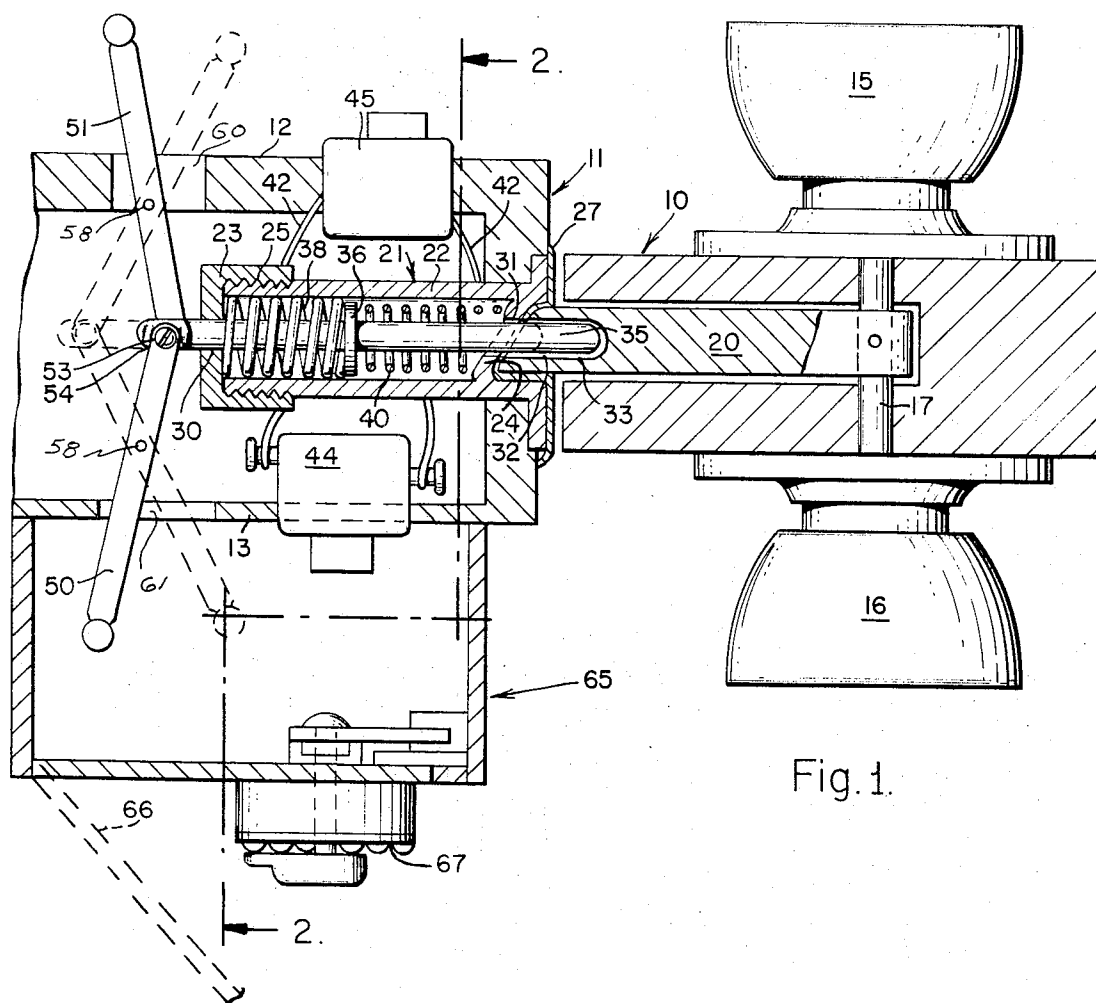


Fig. 1.

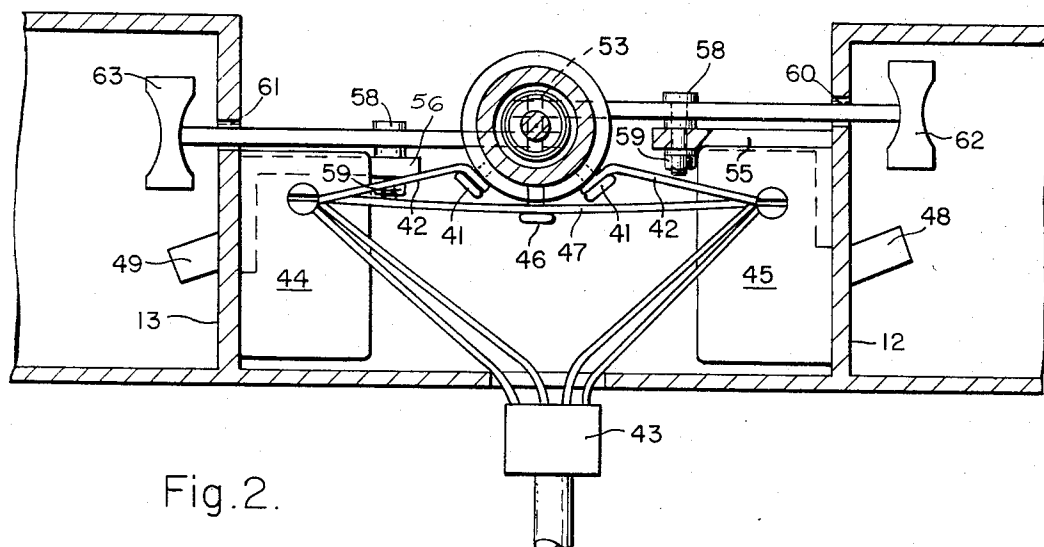


Fig.2.

DOOR LOCK MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

A two bolt door lock which is manually and/or electrically operated.

2. Description of the Prior Art

A standard door lock includes a latch operable by an outside knob when the door is unlocked and by an inside knob at any time. The latch is located at the swinging edge of the door. The frame of the door is provided with a striker plate and a door stop. In operation, the door swings against the stop and the latch is forced into a recess formed by the striker plate. One side of the latch prevents the door from swinging open until the knob is turned to retract the latch from the recess and the door is free to open. The door is locked by conventional key locking of the knob.

Numerous mechanically and electrically operated locks have been designed to prevent unauthorized intrusion. Conventionally, electrically operated locks electromagnetically hold a fixed bolt in the frame within the recess of a normally retracted latch bolt located in the door. The latch bolt is attracted to the fixed bolt when the electromagnet within the frame is activated. In other conventional devices the latch bolt rests in the striker plate recess until a solenoid or electromagnetic device is activated causing a plunger to retract the latch or the striker plate to be withdrawn so the door will open.

U.S. Pats. illustrating the prior art as described are: Electrically Controlled Lock No. 1,071,657; Lock No. 1,270,468; Electromagnetic Lock No. 2,727,772; Door Control System No. 3,354,677.

Electrically operated door locks should provide secure locks when no electric power is available, the electrically operated feature only securing the lock in addition to the mechanical or manually operated feature. Electromagnets used to hold a bolt in place have the disadvantage that when the electric current supply is terminated the bolt is released and the door free to open. Electromagnets used to open rather than lock the door also are disadvantageous because when electric current is not available the door cannot be opened.

The described disadvantages of the present art are overcome by this invention which provides a lock which is manually operable and electrically operable. A safety pin is a bolt supported in a housing located in the door jamb and extending through an aperture located within a standard receptacle for receiving a door-mounted bolt. The pin is reciprocated upon a spring which normally extends the pin toward the door-mounted bolt. When the door is locked the pin extends into a longitudinal bore in the door-mounted bolt. A wall-pivoted lever arm is connected at the opposite end of the pin and the arm is exposed beyond the wall surface so it can be manipulated. Movement of the exposed arm will reciprocate the pin in and out of the bore. An electric current conducting coil surrounding the pin forms an electromagnet which when activated attracts the door-mounted bolt to the pin and striker plate, thus further securing the pin and bolt and locking the door. When no electric current is supplied to the coil, the pin remains in the bore locking the door until the lever arm is manually adjusted to retract the pin from the bore.

These advantages and others will be fully understood from the following description and accompanying drawings. This disclosure is intended merely to exemplify the invention.

SUMMARY OF THE INVENTION

Briefly, the invention is a door lock mechanism for use with a door-mounted bolt having an elongated bore. The door lock mechanism comprises a bolt having an elongated bore. The bolt is adapted to be mounted on a door for movement relative to the door and beyond the door. A housing is adapted to be mounted on a the door jamb adjacent the bolt. An apertured receptacle is located on the housing to receive the bolt when the door is in a closed position. A pin is connected the housing and extendable through an aperture of the receptacle and beyond the housing and door jamb. The pin is extendable upon a line coincident with a centerline of the elongated bore of the bolt. Means is connected to the pin for moving the pin across the space between the door and door jamb and into the bore of the bolt and out of the bore. Further, means is connected to the bolt for moving the bolt across the space between the door and door jamb into and out of the housing receptacle.

DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a plan view of an embodiment of the invention with sectioning to expose internal parts.

FIG. 2 illustrates an end view of a portion of the embodiment of the invention shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, FIG. 1 illustrates a door 10 and door jamb 11 between inside wall 12 and outside wall 13. Door 10 has inside knob 15 and outside knob 16 mounted on a shaft 17 which is linked to retractable latch bolt 20. The door is of conventional design with the bolt 20 being withdrawn from the jamb 11 by rotation of either knob 15, 16. Standard locks may be incorporated in the door. For example, knob 16 may be locked to prevent rotation while knob 15 is free to rotate and retract latch bolt 20, release of the knob allowing counter-rotation of the shaft and return of the latch bolt to its extended position.

A housing 21 is mounted within door jamb 11 opposite bolt 20 when the door 10 is in a closed position. Housing 21 comprises a cylinder 22, an end cap 23, and a receptacle 24 integrally formed at one end of cylinder 22. Cap 23 is screwed onto cylinder 22 upon threads 25. Receptacle 24 is shaped complementary to the shape of bolt 20 so that the bolt can be received into the receptacle. The bolt is of a magnetic material. The housing 21 is mounted on the door jamb 11 through an aperture therein and is fastened thereto by screws extending through flanges of the receptacle into the door jamb. A striker plate 27 of the same shape as the receptacle 24 is fastened to the receptacle to form an outside layer thereon between the bolt 20 and receptacle 24. Apertures 30, 31, 32 are formed in end cap 23, receptacle 24, and striker plate 27, respectively. A longitudinal bore 33 is located in the free end of latch bolt 20. The centerlines of apertures 30, 31, 32 and bore 33 are substantially coincident so that the apertures will line up with the bore when the door is closed.

Pin 35 is a bolt slightly smaller than apertures 30, 31, 32 and bore 33 and is made of magnetic material. A shoulder 36 is formed on the pin between its ends. A spring 38 is located between the end cap 23 and the shoulder 36 within cylinder 22. A coil 40 surrounds the pin 35 between the shoulder 36 and receptacle 24 within cylinder 22 and is of a material which will conduct electric current, such as copper. Electric contacts 41 extend through the walls of the cylinder. The coil 40 is connected to the contacts 41 at the inside of the cylinder and electrical wires 42 are connected to contacts 41 at the outside of the cylinder. Wires 42 lead to a power source 43 through outside switch 44 and inside switch 45. A contact 46 extending through the cylinder wall provides a common ground. The switches 44, 45 are made three-way by connecting the coil ground to contact 46 and providing wire 47 connected to contact 46 and leading to power source 43 through switches 44, 45. Each switch is mounted on an opposite wall with the switch lever arm 48, 49 extending beyond the respective inside and outside surfaces of walls 12, 13.

Two lever arms 50, 51 are connected to pin 35 to provide a means for reciprocating the pin into and away from the bore 33. A bolt 53 extends through pin 35 and one end of each of the arms 50, 51 is located on opposite sides of the pin. Arms 50, 51 are secured to the pin by nuts 54 which thread onto bolt 53. Arms 50, 51 are free to pivot upon the bolt. Brackets 55, 56 extend into the hollow between the inside wall 12 and the outside wall 13 and are fastened to walls 12, 13, respectively. Arms 50, 51 are pivotally mounted to the brackets 55, 56, by nuts and bolts, 58, 59, respectively. The free ends of arms 50, 51 extend through apertures 60, 61 to be exposed beyond the walls 12, 13, respectively. Gripping handles 62, 63 are fastened at the free ends of arms 50, 51, respectively.

A box 65 is mounted on outside wall 13 enclosing the free end of arm 50 and switch arm 49. Box 65 has an access door 66 and a conventional lock, as illustrated by combination lock 67, mounted on the door and accessible from outside the box to lock door 66 so that the box cannot be entered and arms 49, 50 manipulated.

In operation, the door 10 is locked with pin 35 extending into bore 33 and spring 38 forcing the pin into the bore. For additionally locking security the electric current is supplied to the coil 40 to establish a magnetic field. The magnetized pin 35 is attracted to the receptacle 24 and internal walls of the bore 33 and is held against them until the current is shut off. If the lock in knob 16 is breached so that latch bolt 20 otherwise can be withdrawn, the magnetic force between the latch and pin will resist the withdrawal. In the event the magnetic force is not sufficiently strong to prevent withdrawal of the latch, the pin will extend sufficiently to remain in the bore and prevent opening of the door.

To open the door from the outside at knob 16, door 66 is opened by unlocking lock 67. The electric current to the coil is shut off by throwing switch arm 49. Arm 50 is repositioned by moving the gripping handle 62 to the position shown in dotted lines in FIG. 1. The repositioning of arm 50 withdraws pin 35 to a position shown in dotted lines. The free end of pin 35 extends slightly into bore 33 but does not extend beyond the striker plate 27. With the pin withdrawn the knob 16 is unlocked to allow withdrawal of bolt 20 so that the pin is removed from bore 33 and the end of bolt 20 clears the

adjacent wall of the striker plate. The door may now be opened. Once on the other side of the door, the door may be closed and locked by positioning arm 51 as shown in solid line. Thereby, the pin 35 is reinserted in the bore and held in position by the spring as above-described. Switch arm 48 is thrown to resupply electric current to coil 40 and magnetize pin 35 so that it will be attracted to receptacle 24 and the internal walls of bore 33 as above-described.

Should electric current be shut off due to a power failure, the door will remain locked because the pin 35 remains in the bore 33. Under such condition, the door may be unlocked manually by withdrawing the pin from the bore upon repositioning of the lever arm connected to it.

Numerous undisclosed modifications of the embodiments disclosed become apparent and are intended to fall within this invention. For example, other mechanical means for reciprocating the pin may be substituted for the lever arms. A spring need not be used to bias pin 35. The lock need not employ the electromagnet. These embodiments and others are intended to fall within the scope of the claims set forth hereinafter.

I claim:

1. A door lock mechanism, comprising:

a bolt having an elongated bore, said bolt adapted to be mounted on a door for movement relative to the door and beyond the door;

a housing adapted to be mounted on a door jamb adjacent the bolt, said housing having an apertured receptacle to receive the bolt when the door is in a closed position;

a pin connected to the housing and extendable through the aperture of the receptacle and beyond the housing and door jamb, said pin extendable upon a line coincident with a centerline of the elongated bore of the bolt;

means connected to the pin for moving the pin across the space between the door and door jamb into and out of the bore of the bolt; and

means connected to the bolt for moving the bolt across the space between the door and door jamb into and out of the housing receptacle.

2. A door lock mechanism as recited in claim 1 wherein the movement of the bolt is reciprocative, and the elongated bore is longitudinal substantially transverse to the door edge.

3. A door lock mechanism as recited in claim 2 and further comprising:

a striker plate mounted upon a wall of the receptacle intermediate the receptacle wall and the bolt.

4. A door lock mechanism as recited in claim 3 and further comprising:

a box mounted upon the outside portion of the wall near the door and enclosing exposed portions of the pin moving means, said box having a door; and means for locking the box door.

5. A door lock mechanism as recited in claim 4 wherein the pin moving means comprises an inside lever arm and an outside lever arm each pivotally connected to one end of the pin, the inside arm extending through the inside wall and the outside arm extending through the outside wall, both arms being pivotally connected to the wall at a location intermediate the pin connection and the free end of the arm.

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6. A door lock mechanism as recited in claim 5 wherein the pin and receptacle are of a magnetic material, and further comprising:
a coil surrounding the pin, said coil adapted to conduct electric current;
means for supplying electric current to the coil; and
an outside switch means located within the box for

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controlling the electric current supplied to the coil.
7. A door lock mechanism as recited in claim 6, and further comprising:
an inside switch means mounted on the inside wall for controlling the electric current supplied to the coil.

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