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[54] CYLINDER MOUNTING PLATE AND ALARM ACTUATOR
4 Claims, 6 Drawing Figs.

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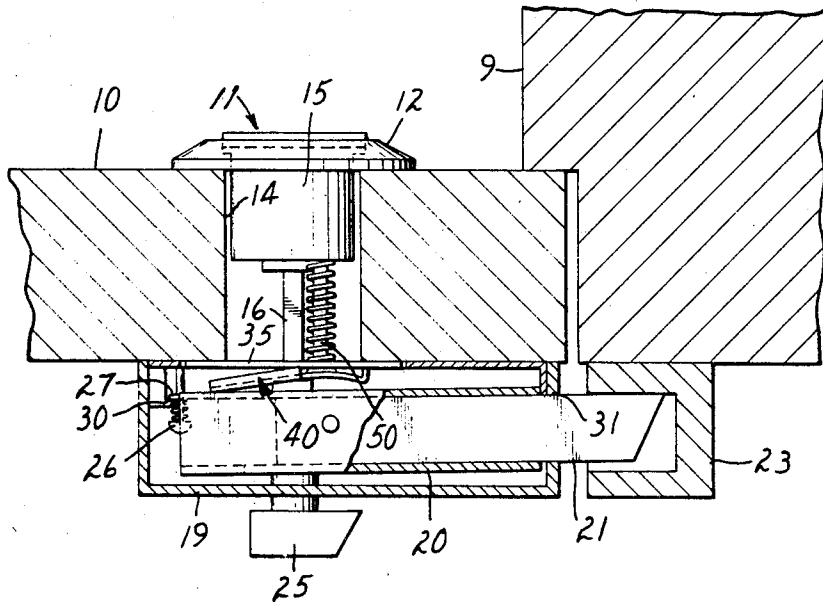
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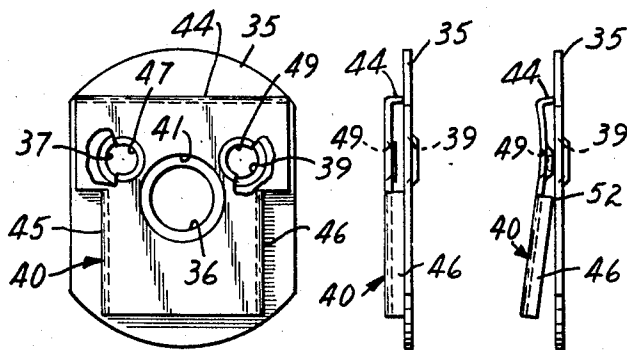
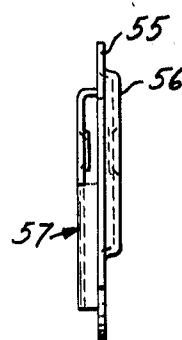
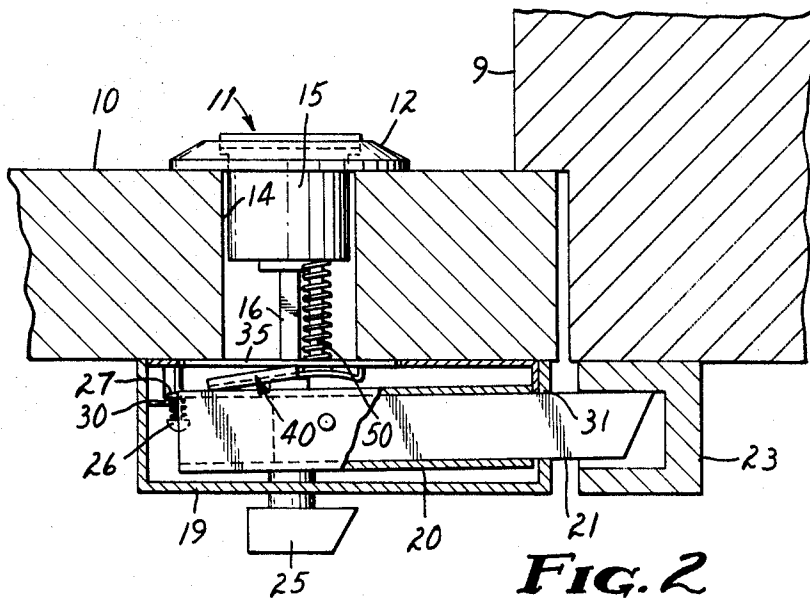
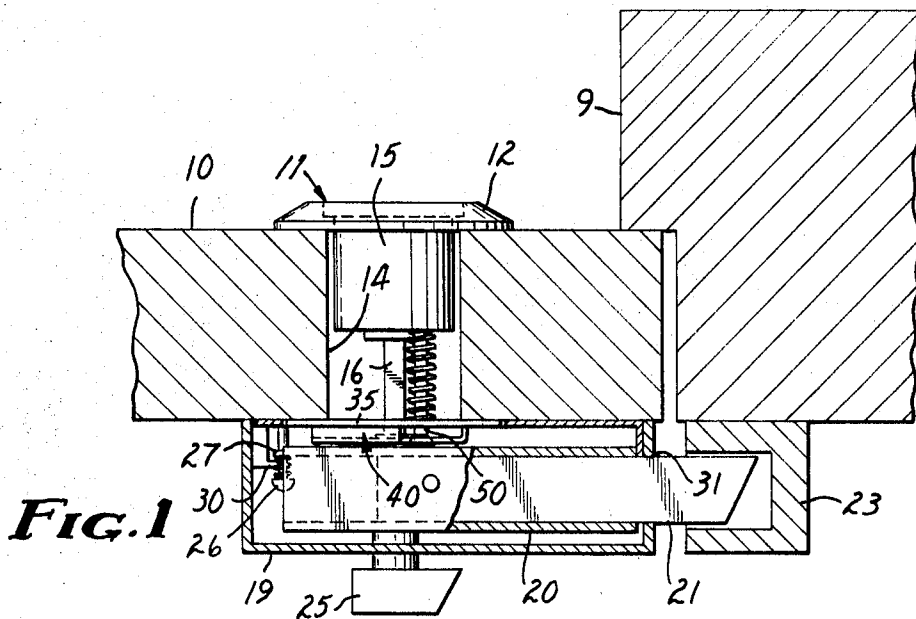
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ABSTRACT: The combination of a cylinder lock mounting plate and alarm actuating mechanism whereby attempted removal of the lock cylinder by prying or driving the same out of the door will result in operation of an alarm in response to deformation of the mounting plate caused by the application of a predetermined pressure.





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CYLINDER MOUNTING PLATE AND ALARM ACTUATOR

This invention relates to a mounting plate for cylinder locks and in one aspect to a deformable mounting plate for actuating an alarm upon attempted removal of a key actuated cylinder lock.

Various forms of mounting structures for cylinder locks are disclosed in the prior art to afford facile attachment of the cylinder, a secure mounting for the cylinder, and inexpensive mounting structures.

The prior art does not provide for a mounting member which will provide a rigid mounting structure for the cylinder under normal operating conditions, but yet one which upon exertion of a force exceeding a predetermined value will be deformed affording means for actuating a signal generating means and which will yet retain the lock cylinder to restrict unauthorized entry.

The present invention has an advantage in that it provides a secure and yet inexpensive mounting plate for lock cylinders and will yet afford means for actuating an alarm upon a predetermined force being exerted against the lock cylinder and exerted upon the mounting plate through the mounting screws.

The present invention provides an inexpensive mounting plate formed to be deformable upon the exertion of a predetermined force and upon deformation will actuate an alarm.

The present invention provides the combination of an improved mounting plate which may be deformed to permit limited axial movement of a lock cylinder and which will itself upon deformation serve as an actuator for moving a lever affording a switch to be closed to sound an alarm or give an alarm signal.

The present invention comprises a mounting plate for a lock cylinder structure designed to receive two generally axially extending bolts which will fit through the mounting plate and into the lock unit. The mounting plate comprises a first plate adapted to fit over the planar surface through which an enlarged opening is drilled to receive the lock unit and a second deformable mounting plate formed with an opening to align with an opening in the first plate to receive the spindle mechanism controlling the latching or bolting mechanism for the lock and extending from the plug of the lock cylinder. The second deformable mounting plate is generally rectangular and formed with a pair of ends at one of which is formed a first spacer or projection extending in one direction from the plane of the plate to space the deformable plate from the first plate and a second pair of spacers or projections are positioned generally intermediate the ends of the deformable plate and project in the same direction as the first projection to maintain the second plate in a predetermined spaced relationship to the first plate. A pair of openings for receiving the mounting screws are formed in the plates and positioned between the first projection and said second projections of the second plate. The position of the mounting screws is such that a moment arm is defined in the plate between the openings and projections and the second plate will be deformed between said projections upon the exertion of a predetermined axial force on the mounting screws causing the portion of the plate between the projections to move toward said first plate and to cause the opposite end of the second plate to fulcrum on the second projections and move in a direction away from the first plate. The deformation of the plate serves to actuate a signal generating means which will energize an audible alarm, visible signal, gaseous alarm, a telephone dialing system or a combination of these alarms or any other protective device.

The present invention will be more fully understood after referring to the accompanying drawings wherein:

FIG. 1 is a horizontal sectional view through a pair of building members formed with a lock unit and mounting assembly in accordance with the present invention;

FIG. 2 is a horizontal sectional view illustrating the lock mechanism in a position indicating an attempted unauthorized entry by attempted removal of the lock cylinder;

FIG. 3 is an elevational view of the mounting plates for the lock unit;

FIG. 4 is a side view of the mounting plates of FIG. 3 in their normal position;

FIG. 5 is a side view of the mounting plates in their deformed or actuated position; and

FIG. 6 is a side view of a pair of mounting plates showing a second embodiment of one of said plates.

Referring now to the drawing there is illustrated a first building member such as the door casing or jamb 9 and a second building member or relatively movable door member 10. The sectional view shown in FIG. 1 is taken through a lock unit generally designated 11 which comprises a bezel plate 12 which receives therein and supports within a bore 14 in the door 10 a pin tumbler-type lock cylinder 15 including key-operated plug having a rearwardly extending spindle 16 for operating the door latching or bolting mechanism in a conventional manner. The door latching or bolting mechanism comprises a casing 19 which is secured to the side of the door 10 opposite the bezel plate 12 and in which is mounted a separate housing 20 in which is received a dead bolt 21 movable from the retracted position in casing 19 to an extended position bridging the gap between the casing 19 and a keeper 23. The bolt 21 is slidable in the housing 20 upon rotation of the lock plug and the spindle 16 from the retracted to the extended position, from the extended to the retracted position. The bolt is also independently controlled by a thumb turn 25 mounted on the casing 19 and extending through the housing 20 to engage the inner end of the bolt 21. The bolt housing 20 is normally maintained in an aligned position with the casing 19 such that the bolt 21 is movable in a path generally parallel to the casing 19 into and out of the keeper 23. The housing 20 however is tiltable against the bias of suitable compressing spring members 26 to a pivoted position at which an element 27 movable with the bolt housing 20 will be moved to a position actuating or causing the actuation of a signal generating means or switch by contacting an element 30 held in a fixed position, enclosed within and supported by the casing 19.

Thus, when a predetermined force is applied against the housing 20 tending to pivot the same about an opening 31 in the casing 19 and against the bias of the springs 26 the element 27 will about the element 30 to energize a signal generating means by, e.g. closing an electrical circuit (not shown) to energize an audible, visual, gaseous alarm or other suitable signaling device indicating the abnormal condition of the bolt.

The element 27 could be one contact of a switch, the element 30 another. Alternatively the element 27 could be an operator for a switch plunger mounted at 30 or the element 27 could be a conductive bridge to join two spaced contacts mounted at 30.

The present invention is directed toward a combination including novel mounting plates provided for the lock unit 11 which affords means for generating the alarm signal or energizing the alarm upon an unauthorized attempt to remove the lock cylinder of the unit 11 from the building member 10 to which it is affixed.

The mounting structure for the lock unit 11 of the present invention comprises a first generally planar mounting plate 35 adapted to fit over the bore 14 through the building member 10 on the side thereof opposite the bezel plate or escutcheon 12 on the opposite side thereof. The plate 35 is provided with a central opening 36 and two smaller mounting screw openings 37 and 39. Positioned to be further inboard from the plate 35 is a second deformable, somewhat T-shaped, plate 40 formed with a central opening 41 to be aligned with the spindle opening 36 and opposed end portions, one being wide transversely and the other narrower. Adjacent one end portion of plate 40 is a first spacer or projection 44 positioned between the plates and formed on plate 40 and extending toward the plate 35 to maintain the plate 40 in spaced relation

to the plate 35. On the other end portion are projections 45 and 46 which define intermediate the ends of the deformable plate 40 a second spacer maintaining the intermediate portion of the plate 40 normally spaced and planar to the plate 35. Mounting bolt openings 47 and 49, which are countersunk to receive the heads of mounting screws 50 having a tensile strength to transfer a force sufficient to deform plate 40 without failure of the screws, are provided in the plate 40 to be aligned with the openings 37 and 39 in the plate 35. The openings 47 and 49 are positioned between the projection 44 and the two projections 45 and 46.

The mounting screws 50 extend through the plates 40 and 35 and terminate in threaded bores in the inner end of lock cylinder 15. The lock cylinder 15 may be a pin-tumbler lock cylinder or any other rim mounted lock cylinder.

It will be seen that should one attempt entry to the building by attempting removal of the lock cylinder 15 the force upon the cylinder 15 by the force applying tool may deform the mounting plate 40. One method of attempting removal of a lock cylinder is by inserting a pin or fender straightening tool, known in the automotive body shops, into the keyway of the lock cylinder and driving the weight thereon away from the cylinder to drive the cylinder in the axial direction away from the door. Other pry bars may be used but the exertion of a predetermined force on the mounting screws 50 will cause a force to be exerted on the plate 40 tending to deform the same between the projection 44 and the projections 45 and 46. This will cause deformation of a plate 40 in the area between the projection 44 and the projections 45 and 46, moving the same toward the plate 35 and the extended or opposite end of plate 40 is fulcrumed about one end of the projections 45 and 46. As this happens, the plate 40 adjacent the heads of the mounting bolts will move toward the plate 35, decreasing the normal spacing therebetween. The fulcruming of the deformable plate on tips 52 of the projections 45 and 46 cause the opposite end of the plate 44 to be driven away from the plate 35. This end of the plate will engage the bolt housing 20 causing it to be pivoted relative to the casing 19 against the bias of the springs 26 to move the element 27 into engagement with the element 30 to energize a signal generating means.

Alternatively, other more direct alarm or electrical switches may be operated by the deformation of the plate 40 but the collapse or deformation of the plate and its pivotal movement causes a variation in the normal spacing between the plates 40 and the plate 35 and this deformation can be utilized to actuate the signal energizing means.

In FIG. 6 there is shown a modification of the mounting plate 35. In this figure the first generally planar plate 55 is formed with a circular offset portion 56 which is adapted to be received in the bore 14 for aligning the spindle opening correctly for the lock cylinder. The second deformable plate 57

has a width and length sufficient to span the circular offset portion with the projections engaging the planar inboard face of the plate 55.

Having thus disclosed my invention what I claim is:

1. In combination, a lock unit comprising
 - a lock cylinder,
 - a first mounting plate to fit over an opening in a building structure and formed with an opening to receive a mounting screw for the lock cylinder, and
 - a second plate positioned generally parallel to said first plate, and
- spacer means positioned at spaced points between said first plate and said second plate for supporting the plates in a predetermined spaced relationship, said second plate having a screw opening through which extends a mounting screw for supporting said first plate and for engaging said lock cylinder and drawing said cylinder toward said first plate to hold the cylinder on a said building structure, said screw opening in said second plate being positioned between said spacer means defining a moment arm between said screw opening in said second plate and said spacer means when an axially directed force is applied to a said screw causing said second plate to become deformed upon said force exceeding a predetermined value and said predetermined spaced relationship to be changed.
2. The combination of claim 1 further comprising signal generating means positioned adjacent said second plate for operation upon deformation of said second plate.
3. The combination of claim 2 wherein said signal generating means comprises switch means operated by contact with said second plate upon deformation of said second plate.
4. A mounting structure for mounting a pin-tumbler lock cylinder in a building member, said structure comprising:
 - a first mounting plate to engage a building member on the side opposite the face of a said lock cylinder, said first plate having a generally planar surface and a first opening for receiving a portion of a said lock cylinder and openings for mounting screws, and
 - a second mounting plate having a generally planar surface and opposed end portions, said second plate being formed with openings to correspond with and align with the openings in said first plate and projections which extend from the surface of said plate opposite said planar surface to contact the planar surface of said first mounting plate and space said second plate therefrom, said projections being located along one end of said second plate and intermediate said ends, and said openings for mounting screws in said second plate being positioned between said projection along said one end and intermediate said ends.

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