Oct. 8, 1957 R. MAINHARDT 2,809,062

LATCH MECHANISM

Filed Sept. 13, 1954

Fig. 1.

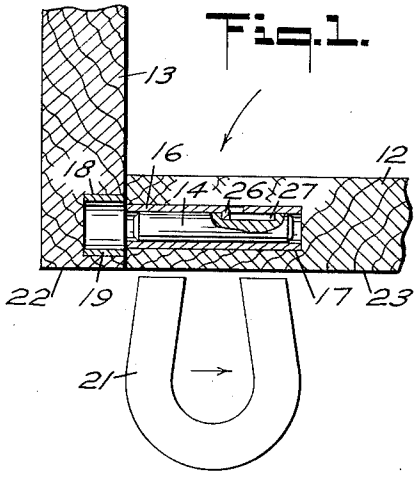
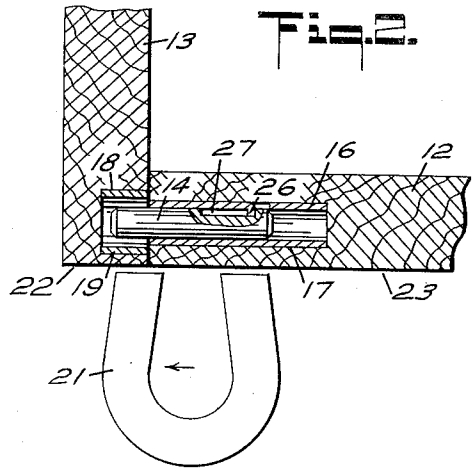



Fig. 2.



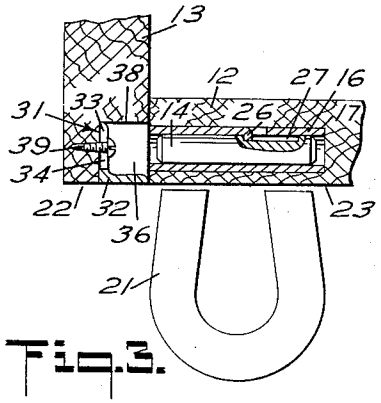




Fig. 3.

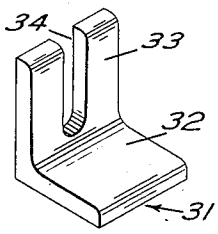



Fig. 4.

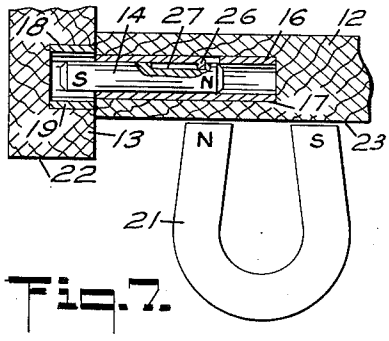



Fig. 7.

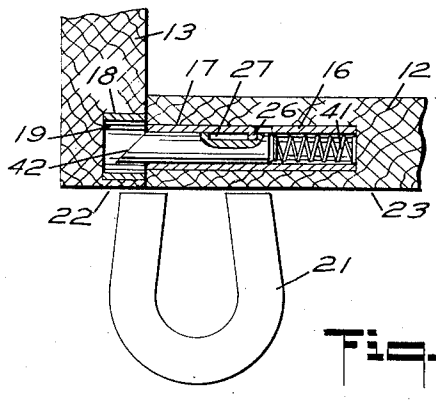



Fig. 5.

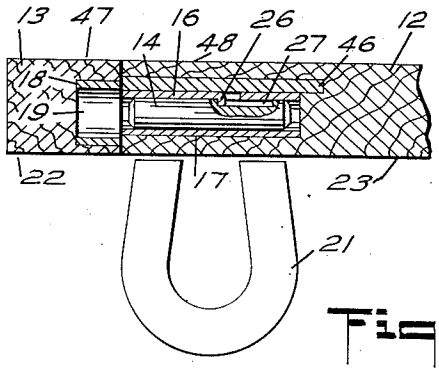



Fig. 6.

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# LATCH MECHANISM

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1 Claim. (Cl. 292—144)

This invention relates to locking or latching elements for releasably securing a movable member, such as a door, window or drawer, against movement relative to an adjacent frame or support member, and is more particularly directed towards a novel arrangement for selectively placing the lock element in its operative and inoperative positions.

It is an object of the present invention to provide a latching mechanism for doors, windows, drawers or the like in which an internal bolt element may be axially moved to either a locking position or a released position from exteriorly of the structure without requiring any mechanical operation such as knob or key rotation, and without necessitating any complicated installation for the mechanism.

Another object of my invention is to provide a lock arrangement of the character described in which a magnetic force is utilized for effecting movement of the latch or bolt in which the presence of the lock is completely unapparent from other side of the door.

A further object of this invention is to provide apparatus as above described in which means may be incorporated so that the aforementioned axial bolt movement may be affected from only one side of the structure, thereby permitting the use of such apparatus on windows or the like without danger of unauthorized opening from the outside of the structure.

A still further object of this invention is to provide a mechanism as hereinabove characterized which may be readily placed on cabinets, windows, doors, drawers, etc. to prevent children or other persons from opening the particular structure, with all of such installations being operable by a single magnet capable of attracting the ferrous bolt, or by a bar of ferrous metal capable of actuating a magnetic bolt.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claim.

Referring to said drawing:

Figure 1 is a cross-sectional view of a portion of a door and frame structure equipped with the latch of the present invention, the latch being illustrated in its open or inoperative position.

Figure 2 is a view similar to Figure 1, but showing the latch in its closed or operative position.

Figure 3 is a cross-sectional view of a modified form of the invention.

Figure 4 is a perspective view of a bracket shown in Figure 3.

Figure 5 is a view similar to Figure 1, illustrating another form of lock arrangement.

Figure 6 is a cross-sectional view of still another form of the invention.



Figure 7 is a cross sectional view of a further form of the invention.

Before discussing the details of construction and operation of the present mechanism, it will be noted that the drawing, for reasons of simplicity, shows the same in connection with a door and adjacent frame structure. However, it will be apparent that the same arrangement is equally effective on windows, drawers or other structures wherein a movable member is to be releasably secured to a relatively stationary member.

Referring first to the embodiment of the invention shown in Figures 1 and 2 of the drawing, a portion of a door **12** is shown in its closed position relative to a stationary frame or jamb portion **13**, and as will be understood, the door is movable about hinges or the like as suggested by the arrow in Figure 1. In order to maintain the door in its closed position, the lock mechanism of the present invention is utilized. As here illustrated, such mechanism will be seen to include a bolt member **14**, preferably of elongated cylindrical form, which is axially slidable in a sleeve **16** mounted in a bore **17** of the door. The sleeve is sufficiently long to receive the entire length of the bolt so that the bolt may assume the inoperative position illustrated in Figure 1 wherein the door is free to move relative to its frame. In order to lock the door, the frame or jamb is provided with a bore **18** of a larger diameter than but axially aligned with bore **17** when the door is shut. A sleeve **19** is mounted in bore **18** and as illustrated in Figure 2, when the bolt is moved to the left, a portion thereof will enter sleeve **19** and effectively prevent relative movement between the members **12** and **13**.

While the foregoing construction is not particularly novel, the manner of effecting the axial bolt movement constitutes an important feature of my invention. In accordance with this invention, I have completely eliminated the need for knobs, keys, and associated mechanisms, and control the bolt movement by magnetic forces. More particularly, the bolt element **14** is constructed of a ferromagnetic material such as iron, steel, nickel or cobalt, with the sleeves **16** and **19**, as well as the members **12** and **13** being constructed of a paramagnetic material. By way of example, if the members **12** and **13** are formed of wood, the sleeves may be formed of brass, copper, plastic material or other metals which exhibit virtually no properties of attraction, repulsion or magnetization when placed near a magnet or in a magnetic field. Thus, with the foregoing in mind, it will be apparent that by moving a magnet **21** along the axes of the sleeves adjacent the outer faces **22** and **23** of the jamb and door, the bolt will be correspondingly moved to selectively lock and release the door. By using a relatively strong permanent magnet, such as "alnico," "permalloy" or "hipernik," I have found that the bolt may be readily actuated through approximately one-half inch of paramagnetic material such as wood, plastic, etc.

The foregoing type of latch arrangement has been found highly satisfactory where, for example, the front of a cabinet or bureau is not provided with a locking mechanism or where there would be a disadvantage in having any portions of a lock mechanism visible from exteriorly of the cabinet. Also a child could be readily restrained from opening a door or drawer where dangerous substances may be contained, and the magnet or unlocking key can be stored in a convenient though inconspicuous place when not being used.

I also contemplate that the bolt **14** may be constructed of a permanent magnetic material, such as alnico, so that a mere piece of iron or steel could actuate the same. However, a horseshoe type magnet used exteriorly on a steel or iron bolt has been found more effective and positive in action. Also if a horseshoe magnet is used in

conjunction with a magnetized bolt, it would not be necessary to require linear movement of the magnet. The mere application of the appropriate pole of the magnet to the appropriate pole of the bolt will produce the required movement of the bolt. Likewise, by using a diamagnetic material such as copper for the bolt, there would be a repelling action when approached by a magnet.

Means may be provided for preventing complete withdrawal of the bolt from sleeve **16**, such as by using a lug **26** or inwardly struck portion on the sleeve engageable in an axial slot **27** of the bolt. The lug may be screwed or knocked through the sleeve after insertion of the bolt therein and the entire assembly may then be installed in the bore provided therefor.

In place of sleeve **19** on the door jamb, an angle bracket **31**, best illustrated in Figure 4 may be utilized. The bracket has a pair of flanges **32** and **33**, with the latter provided with an axial slot **34**, and may be installed as shown in Figure 3 in a notched portion **36** of the jamb with flange **33** directly opposed to bore **17** when the door is closed. Flanges **32** and **33** together with wall **38** of the notch provides a receiving cavity for the bolt and the slot permits ready adjustment of the bracket along the notched portion, it being understood that a wood screw **39** is used to hold the bracket in position. Here again, the bracket would be constructed of a paramagnetic material.

In Figure 5, another modification is illustrated where an automatic locking is desired upon door closure. The construction may be the same as that shown in Figures 1 or 3, except that a spring **41** is positioned in the door bore to bear against the innermost end of the bolt. Also, the striking end of the bolt would be beveled as shown at **42** to assist the same in readily entering the jamb opening upon door closure. Here again, a magnet is used to move the bolt against the spring pressure to permit withdrawal thereof from the jamb opening and subsequent opening of the door.

Figure 6 illustrates a still further embodiment, particularly well adapted to permit actuation of the bolt only from one side of a structure. For example, on a window, it would not be desirable to permit magnetic control of the bolt from exteriorly of the building. Accordingly, on one side of the bolt, I place a strip or piece **46** of iron, steel or other ferromagnetic material. Thus, a magnet positioned adjacent the faces **22** and **23** would actuate the bolt without interference, while the magnet placed adjacent the opposite faces **47** and **48** could exert no magnetic force on the bolt and hence would be ineffectual in moving the same.



In Figure 7, I have illustrated an arrangement particularly suitable for installations where the surfaces **22** and **23** of the frame and door are not in coplanar relationship. In this instance the magnet cannot be moved along the door and frame, and therefore, the bolt **14** is made of magnetic material so that one end thereof, e. g., the north pole may be positioned in one member to be selectively influenced by the north or south pole of a horseshoe magnet. As shown in the drawing the bolt has been moved into locking position by the repelled movement of the bolt when the two north poles were brought into adjacent relationship. By merely rotating the horseshoe magnet through 180 degrees and bringing the south pole into such position, the bolt will be moved to its unlocked position.

It will also be understood that in many instances it may not be desirable to drill holes in the members for receiving the bolts, and in such instances suitable apertured brackets could be utilized on the inner faces of a drawer, door or the like.

I claim:

A latch mechanism for mounting in a member having a bore therein extending to an edge of said member, including a sleeve made of paramagnetic material disposed within said bore, a generally cylindrical latch element axially slidable in said sleeve from a first position entirely within said sleeve to a second position extending outwardly of said sleeve and said edge of said member, said element being formed of a permanent magnetic material and having a north and south pole for influence by an exteriorly placed magnetic force, and a strip of ferromagnetic material is positioned between a surface of said member and said sleeve whereby actuation of said element may be affected only by application of a magnetic force on another surface of the member.

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