

March 10, 1959

G. E. CURTISS, JR., ET AL

2,877,040

MAGNETIC LATCH

Filed Nov. 24, 1954

FIG. 1

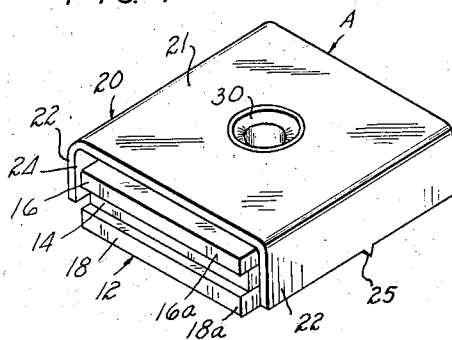


FIG. 2

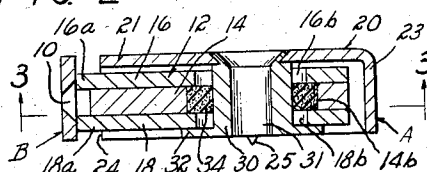
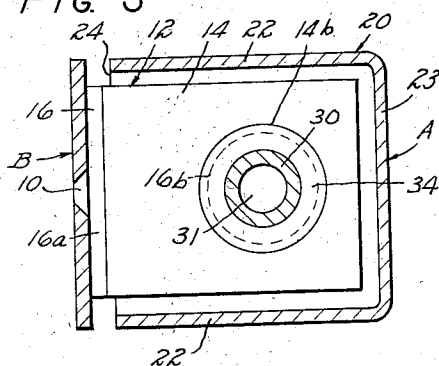


FIG. 3



INVENTORS

GEORGE E. CURTISS, JR.
JOHN D. CARROLL

BY

Lindsey and Prutzman
ATTORNEYS

1

2,877,040

MAGNETIC LATCH

George E. Curtiss, Jr., New Britain, and John D. Carroll, Kensington, Conn., assignors to The Stanley Works, New Britain, Conn., a corporation of Connecticut

Application November 24, 1954, Serial No. 470,846

7 Claims. (Cl. 292—251.5)

The present invention relates to latches and, more particularly, to a magnetic latch of the type adapted for use with cabinet doors and the like.

An aim of the present invention is to provide a magnetic latch having a built-in shock-absorbing action and constructed and arranged so as to afford self-alignment of the strike and latch, thereby facilitating installation of the latch and keeper and insuring effective operation even though variations in door position may occur.

A further aim of the invention is to provide a latch of the type referred to which can be fastened in place in a simple and easy operation requiring only ordinary skill whereby mounting of the latch can be accomplished in a minimum of time and with a minimum of effort.

Another aim is to provide such a latch which is of simple compact construction and formed of parts which can be easily and quickly fabricated and assembled. Included in this aim is the provision of a latch which will operate effectively over long periods of time without wear or failure of parts requiring repair or replacement.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Figure 1 is a perspective view of a magnetic latch constructed in accordance with the invention;

Figure 2 is a transverse cross-sectional view through the center of the latch and showing the latch in association with a keeper; and

Figure 3 is a cross-sectional view taken along the line 3—3 of Figure 2.

Referring to the drawings, the embodiment of the magnetic latch of the present invention is indicated generally by the reference letter A, while the keeper in the form of a simple rectangular metal piece is indicated by the reference letter B. In the usual installation of the latch, the keeper B will be secured to an inside surface of the door of a cabinet or the like such as by means of a screw adapted to be inserted through the aperture 10. The latch A usually will be fastened to a shelf or the top or bottom of the cabinet for cooperation with the keeper B, and in registry therewith when the door is in closed position. While the installation of the latch and keeper has been described particularly with reference to a cabinet door, it will be appreciated that this has been given by way of illustration and that many other types of installation are possible.

The latch A operates to hold the door in closed position by means of a composite magnetic holding member 12. The holding member 12 includes a center plate 14 formed of a permanent magnet material. It is contemplated that any available permanent magnet material may be used for this purpose but, in general, the maximum

2

holding power will be obtained by the use of the well-known Alnico permanent magnet. On the other hand, fabrication of the holding member is facilitated by using a moldable permanent magnet material such as that sold under the trademark "Indox," which is believed to be a mixture of magnetic metal oxides in a moldable carrier material. The magnet plate 14 is formed so that the north and south poles of the magnet are located at the upper and lower faces. The remainder of the holding member 12 comprises two outer plates 16 and 18 which are cemented to the faces of the magnet plate 14 to form a unitary structure. The outer plates 16 and 18 are formed of a material capable of carrying magnetic flux, such as soft steel, and the plates 16 and 18 are dimensioned so that the ends 16a and 18a extend beyond the adjacent edge of the magnet plate 14 to form the pole faces of the composite magnetic holding member 12.

The composite magnetic holding member 12 is mounted for limited floating movement and particularly reciprocal and oscillatory movement within a generally rectangular housing 20. The rectangular housing 20 is formed with a top wall 21, side walls 22, end wall 23, and has an open end 24 through which the composite magnetic holding member 12 extends for cooperation of the pole faces 16a, 18a with the keeper B. The housing 20 preferably is formed of non-magnetic material such as aluminum.

Centrally of the housing 20 and eyeletted to the top wall 21 is a grommet or stud 30 having a flange 32 at its lower end for engagement upon the supporting surface to which the latch is attached. Like the housing 20, the grommet 30 also preferably is made of non-magnetic material such as aluminum. The grommet 30 has a through opening 31 for receiving a screw by means of which the latch A may be attached to a supporting surface. The provision of the centrally located grommet 30 effectively strengthens the assembly and imparts rigidity to the housing structure 20 so that bending or other distortion is not likely to occur when the fastening screw is tightened. It is an advantage of the invention that a single screw may be utilized as the attaching means, which greatly facilitates and simplifies the fastening of the latch to a supporting surface such as a shelf or cabinet wall. As best shown in Figure 1 of the drawings, the side walls 22 are provided at their lower edges with a depending pointed prong 25 which is adapted to embed itself in the surface of the supporting member and effectively prevent turning of the housing 20, even though it is secured in place only by a single screw disposed in the through opening of the grommet 30.

As best shown in Figure 2, the grommet 30 extends through aligned apertures in the outer plates 16, 18 and the magnetic plate 14, which openings are denoted by reference numerals 16b, 18b and 14b, respectively. The diameters of apertures 16b, 18b, 14b are larger than the outer diameter of the grommet 30 so as to permit limited reciprocal movement of holding member 12 relative to the grommet 30. The diameter of opening 18b, however, is smaller than the diameter of the flange 32 so that the parts will be held in assembled position, preventing separation of the holding member 12 from the housing.

Also, as best shown in Figure 2, the diameter of aperture 14b of the magnet plate 14 is larger than that of the apertures 16b and 18b in the outer plates so as to form an enlarged pocket for receiving a bushing 34 formed of resilient material such as sponge rubber or a sponge plastic. The bushing 34 preferably firmly engages the holding member and snugly embraces the grommet 30 so as to form a resilient floating connection between the grommet and the magnetic holding member 12.

As will be appreciated from the foregoing description, the composite magnetic holding member 12 is thus mounted within the housing in such a manner that it may be swiveled or oscillated to a limited degree, depending upon the size of the end opening 24 about the grommet 30, and also may be reciprocated inwardly and outwardly of the casing opening 24. The resilient bushing 34, however, tends to maintain the holding member 12 in the normal position shown in the drawings. In addition to the two movements just described, it will be appreciated that the magnetic holding member 12 also may be tilted vertically to a slight degree on the grommet 30. Despite the provision for the movements just described, the latch is effectively held in assembled position by the flange 32 of the grommet.

By reason of the floating action of the magnetic holding member 12, there is created a self-aligning action between the latch A and keeper B. As will be appreciated, the latch A frequently has to be attached in places to which access can be had only when the door is open, and unless great care is taken to make accurate measurements, the latch frequently will be installed at least slightly out of alignment with the keeper B when the door is closed. Even if alignment were completely accurate at the time of installation, misalignment frequently would occur later on due to changes in door position and such factors as door shrinkage or warpage. Such misalignment, however is compensated for by the floating action of the latch of the present invention, just described, thus insuring effective contact between the keeper and the pole faces of the holding member 12 at all times.

In addition, the floating action just described permits installation of the latch for maximum efficiency of operation. A maximum latching force is provided when the pole faces 16a, 18a actually contact the keeper B when the door is in closed position; and, in order to insure such contact, the latch frequently is mounted so that, when the door is closed, the principal or initial engagement takes place between the keeper and the latch, rather than between the door and door jamb. This could easily result in breakage of the latch, particularly when the door is slammed shut. Such undesirable effect is avoided by the built-in shock-absorbing action of the latch of the present invention, inasmuch as there is provision for limited reciprocal motion of the holding member 12, which is damped by the resilient bushing 34.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

We claim:

1. A magnetic latch comprising a housing adapted to be mounted on a supporting surface and having an end opening, a generally rectangular holding member including a permanent magnet and parallel pole plates disposed on opposite sides of the magnet plate, said holding member being disposed in the housing with the pole faces thereof extending through the end opening of the housing, and a resilient support for the holding member depending from one side of said housing and extending through said magnet plate and said pole plates, said support being the sole means of retaining said holding member in said housing, said support having means for mounting said housing to a cabinet.

2. A magnetic latch comprising a housing adapted to

be mounted on a supporting surface and having an open end, a magnetic holding member comprising a permanent magnet plate and two parallel pole plates disposed on opposite sides of the magnet plate, the pole plates extending outwardly beyond one edge of the magnet plate to form pole faces, and means for mounting the holding member in the housing with the pole faces extending outwardly through the open end and for permitting limited movement of the holding member comprising a support fixed to said housing and depending from one wall thereof, said support extending through said magnet plate and pole plates for overlying engagement with the pole plate disposed opposite said one wall relative to said magnet plate, and a resilient connection between the support and holding member.

3. A magnetic latch comprising a housing adapted to be mounted on a supporting surface and having an end opening, a magnetic holding member comprising a permanent magnet plate and two parallel pole plates disposed on opposite sides of the magnet plate, the pole plates extending outwardly beyond one edge of the magnet plate to form pole faces, and means for mounting the holding member for limited reciprocal and oscillatory movement with the pole faces extending outwardly through the end opening of the housing comprising a post extending downwardly from the top wall of the housing through an aperture in the holding member, and a resilient bushing between the post and the holding member.

4. A magnetic latch comprising a housing having a top wall, side walls and an end opening, a magnetic holding member in the housing comprising a permanent magnet plate and two parallel pole plates disposed on opposite sides of the magnet plate, the pole plates extending outwardly beyond one edge of the magnet plate to form pole faces projecting through the end opening of the housing, a grommet fixed to the top wall of the housing and extending through an aperture in the holding member, said grommet having an axial opening for accommodating a holding screw, a resilient bushing disposed in said aperture between the grommet and holding member, and a pointed projection on the bottom edge of the side walls of the housing for engaging a supporting surface.

5. A magnetic latch comprising a generally rectilinear housing having an end opening, a grommet inside the housing secured to the top wall of the housing and having a bottom flange for resting on a supporting surface, said grommet having a through opening for accommodating a holding screw, a magnetic holding member in the housing comprising a permanent magnet plate and two parallel metallic pole plates disposed on opposite sides of the magnet plate, the pole plates extending outwardly beyond one edge of the magnet plate to form pole faces projecting through the end opening of the housing, said holding member having an aperture through which the grommet extends, the aperture having a diameter greater than that of the grommet but smaller than that of the flange on the grommet, and a resilient bushing between the grommet and holding member disposed in said aperture.

6. A magnetic latch comprising a magnetic holding member formed of a permanent magnet plate and two parallel metallic pole plates disposed on opposite sides of the magnet plate, the pole plates extending beyond one edge of the magnet plate to form outwardly projecting pole faces, a generally rectilinear housing for said holding member formed of non-magnetic material and having an end opening through which the pole faces project, a post secured to the top wall of the housing extending downwardly through aligned apertures in the magnet plate and pole plates and having a bottom flange for engaging on a supporting surface, and a resilient bushing between the post and the magnet plate, the aperture in the magnet plate being larger than the aper-

5

ture of the pole plates to accommodate the periphery of the bushing.

7. A magnetic latch comprising a housing adapted to be mounted on a supporting surface and having an open end, a flat magnetic holding member disposed in the housing and having its pole faces extending outwardly through said open end, a stud secured to the housing and extending transversely through the magnetic holding member, said magnetic holding member having a through opening loosely accommodating the stud to permit limited reciprocal and oscillatory movement of the

6

magnetic holding member, and means between the stud and magnetic holding member, forming a resilient connection between the magnetic holding member and the stud.

References Cited in the file of this patent

UNITED STATES PATENTS

2,240,035	Catherall	Apr. 29, 1941
2,690,349	Teetor	Sept. 28, 1954
2,701,158	Schmitt	Feb. 1, 1955