Oct. 20, 1959 M. F. SAXTON 2,909,384

MAGNETIC DOOR CATCH

Filed April 30, 1954 2 Sheets-Sheet 1

FIG. 1

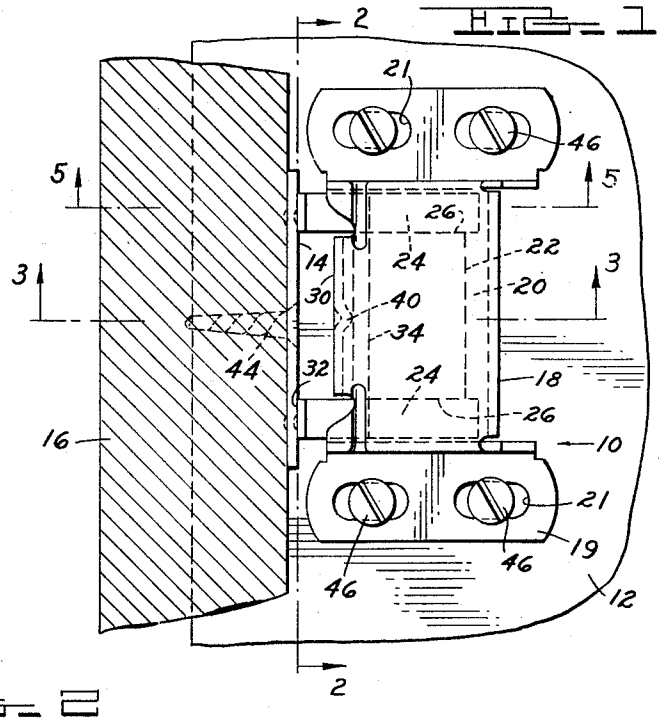

FIG. 2

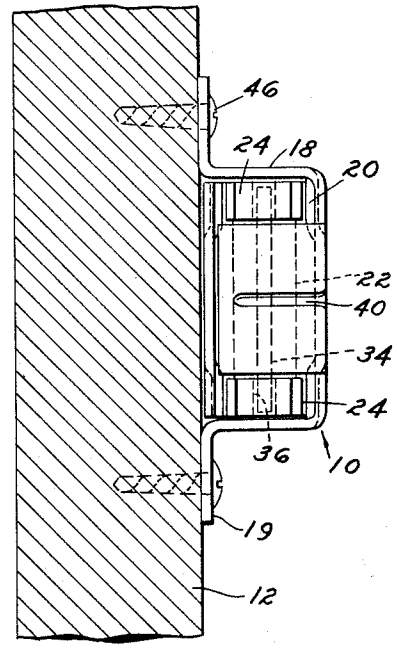

FIG. 3

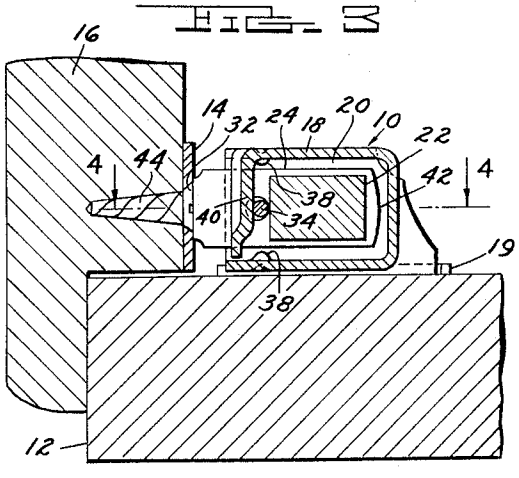

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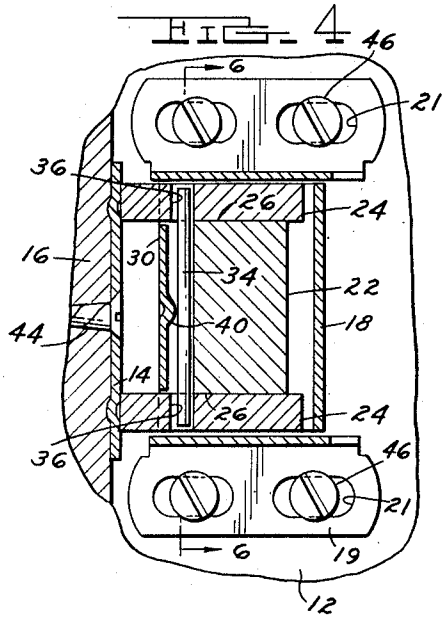
FIG. 4



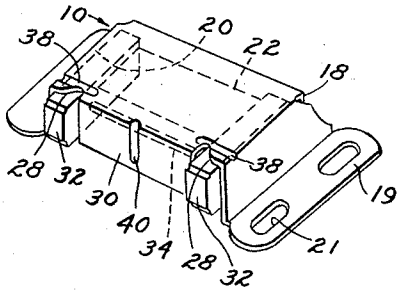


FIG. 7

FIG. 5

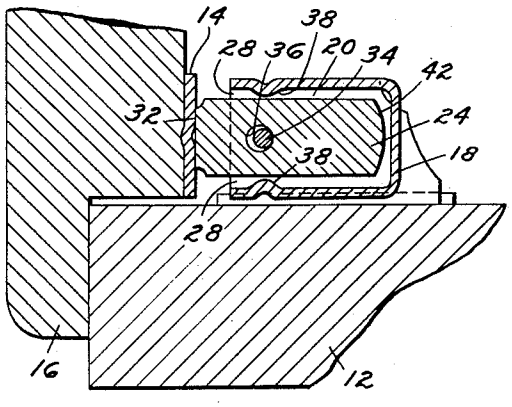
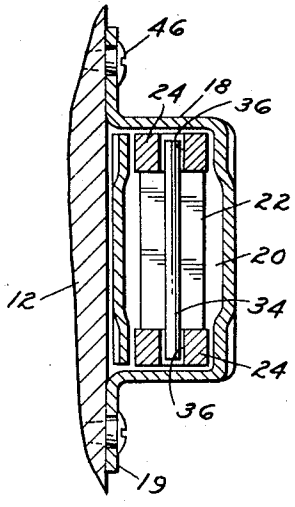


FIG. 6



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MAGNETIC DOOR CATCH

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Application April 30, 1954, Serial No. 426,765

22 Claims. (Cl. 292—251.5)

This invention relates to a magnetic door catch adapted for use on cupboard doors and the like.

My co-pending application, Serial No. 357,701, now Patent No. 2,792,249, granted May 14, 1957, discloses a door catch having a striker plate of magnetic material mounted on a door and a magnet holder mounted on the door frame and supporting a magnet somewhat loosely so that it can shift to adjust to occasional changes in the position of the striker upon warping, swelling or shrinking of the door structure. The magnet is horseshoe shaped and it directly engages the striker. It is an object of this invention to provide an improvement over the structure disclosed in that application.

In accordance with the invention, a bar magnet with pole pieces thereon is loosely confined in a housing with portions of the pole pieces projecting outwardly to engage the striker. A rod loosely connected between the pole pieces positively prevents them from being pulled out of the housing by the striker. Fulcrum means are provided at various locations in the housing to facilitate adjustment of the pole pieces to the position of the striker. One form of the invention is shown in the accompanying drawings, which may be briefly described as follows:

Fig. 1 is a plan view of the device of this invention mounted on a door frame with a portion of the door shown in section.

Fig. 2 is a view on line 2—2 of Fig. 1.

Fig. 3 is a sectional view on line 3—3 of Fig. 1.

Fig. 4 is a sectional view on line 4—4 of Fig. 3.

Fig. 5 is a sectional view on line 5—5 of Fig. 1.

Fig. 6 is a sectional view on line 6—6 of Fig. 4.

Fig. 7 is a perspective view of the magnet unit separate from the door frame.

Shown in the drawings is the magnet unit 10 of this invention mounted on a door frame 12 and a striker plate 14 mounted on a door 16 which is shown in the drawings in closed position with the striker plate magnetically engaged by the magnet unit.

The magnet unit comprises a single piece body or magnet housing 18 formed of a non-magnetic material such as sheet aluminum or a plastic and defining a closed chamber 20 with a bar magnet 22 and pole pieces 24 loosely confined in the chamber. Housing 18 has integral mounting flanges 19 with elongate screw openings 21 therein. The magnet is relatively small yet strong enough to hold the door 16 firmly in closed position. A satisfactory magnet may be made of a ferrous alloy such as that commercially known as Alnico No. 5. The ends 26 of the magnet are ground flat and pole pieces 24 are magnetically engaged thereby but are preferably independent thereof so that they can shift on the magnet.

The body 18 has openings 28 in one side 30 and end portions 32 of the pole pieces project through the openings for magnetically engaging striker plate 14. A non-magnetic restraining rod or bar 34 lies adjacent the interior face of side 30 and is loosely connected to the pole pieces preferably by engaging the ends of the rod in relatively larger diameter apertures 36 in the pole

pieces. Thus, the magnet assembly as a whole can shift within the housing and the pole pieces can shift independently on the magnet.

Opposite sides of housing 18 have upset portions providing inward projections or fulcrums 38 for engaging apposing sides of each pole piece at an intermediate location as best illustrated in Fig. 5. Similarly, an intermediate portion of side 30 is provided with inward projection or fulcrum 40 for engaging a central portion of rod 34. The pole pieces may rotate on projections 38 in one plane and the magnet assembly may rotate on projection 40 in another plane, thereby increasing the latitude of adjustment on the pole pieces. The inner ends 42 of the pole pieces may be rounded to facilitate their rotation on projections 38 (Fig. 5).

In use, striker plate 14 is mounted on door 16 by such means as a screw 44 and the magnet unit 10 is mounted on door frame 12 by screws 46 extending through openings 21 in flanges 19. The magnet unit is initially properly positioned for engaging the striker by shifting it on screws 46, this adjustment being permitted by the elongate shape of openings 21. The screws are then tightened to secure the magnet unit in place.

The door is held in closed position shown in the drawings by magnetic engagement of the pole pieces 24 with striker 14. The door is opened simply by pulling it and the striker away from the pole pieces and in this action the pole pieces are retained within housing 18 by engagement of restraining rod 34 against side 30 of the housing. When the door is closed, the pole pieces engage the striker and hold the door closed until it is again opened by manual force.

Door 16 and door frame 12 may, by reason of their construction, be out of square, or after the catch has been installed, the door or its frame may shrink, swell or warp to change the relative positions of the striker plate and the magnet unit. To adjust to the varying positions of the striker, ends 32 of the pole pieces can shift outwardly and inwardly of the magnet housing, can rock upwardly or downwardly as viewed in Fig. 5 on projections 38 and can turn from side to side as rod 34 rocks on projection 40. The pole pieces, being only magnetically secured on the magnet, can move independently of each other to further increase the latitude of adjustment. Where an adjustment is required which exceeds the range of movement of the pole pieces in the housing, screws 46 need merely be loosened, the housing shifted thereon and the screws retightened.

Thus it is seen that the invention provides a magnet unit requiring only a small inexpensive bar magnet and at the same time having an extraordinary latitude of movement for adjusting to changing positions of the striker plate.

In addition, it will be noted that the use of the restraining rod 34 in conjunction with the fulcrum 40 results in a maximum magnetic attraction in relation to the size of the magnet. Rod 34 serves to equalize the pull between the two magnets so that both magnets resist opening of the door with the same force. In this respect, the rod 34 cooperates with fulcrum 40 in the manner of a whippletree. When the door is opened, the center of pressure resisting such opening is always localized at fulcrum 40. Thus, the magnetic attraction is overcome at the same instant at both magnets. Thus, the magnetic attraction is divided equally between both magnets.

I claim:

1. A magnetic catch for use with a door provided with a magnetic striker comprising, a body member adapted to be mounted on a door frame, a magnet assembly including a magnet having opposite poles at opposite ends thereof and pole pieces magnetically adhering to said op-

posite poles, said pole pieces having striker engaging portions, said body member loosely supporting said magnet assembly with said portions of the pole pieces projecting outwardly of said body, whereby said pole pieces may shift within said body, and a restraining element loosely connected to said pole pieces to prevent removal of said pole pieces from the body member.

2. The combination called for in claim 1 including means on and projecting inwardly from said body member forming fulcrums, said fulcrums being positioned to be rockably engaged by said pole pieces whereby to facilitate such shifting of the pole pieces.

3. The combination called for in claim 1 including means on and projecting inwardly from said body member forming a fulcrum positioned to be rockably engaged by said restraining element whereby to facilitate such shifting movement of said pole pieces.

4. A magnetic catch for use with a door provided with a magnetic striker comprising, a non-magnetic body member having a closed chamber and being adapted to be mounted on a door frame, said body having openings therein, a magnet assembly including a magnet with pole pieces shiftable thereon, said pole pieces having striker engaging portions, said magnet assembly being loosely confined in said chamber with said portions of the pole pieces projecting through said openings, whereby said pole pieces may shift for properly engaging a striker, and a non-magnetic restraining element loosely connected to said pole pieces and positioned for engagement with a portion of said body member to prevent removal of said pole pieces from the body member.

5. A magnetic catch for use with a door provided with a magnetic striker comprising, a non-magnetic body member having a closed chamber and being adapted to be mounted on a door frame, said body having one side with spaced apart openings therein, a magnet assembly including a magnet with pole pieces shiftable thereon, said pole pieces having striker engaging portions, said magnet assembly being loosely confined in said chamber with said portions of the pole pieces projecting through said openings, whereby said pole pieces may shift for properly engaging a striker, and a non-magnetic restraining element loosely connected to said pole pieces and positioned for engagement with a portion of said side of the body member between said openings to prevent removal of said pole pieces from the body member.

6. A magnetic catch for use with a door provided with a magnetic striker comprising, a non-magnetic body member having a closed chamber and being adapted to be mounted on a door frame, said body having one side with spaced apart openings therein, a magnet assembly including a magnet with pole pieces shiftable thereon, said pole pieces having striker engaging portions, said magnet assembly being loosely confined in said chamber with said portions of the pole pieces projecting through said openings, whereby said pole pieces may shift for properly engaging a striker, a non-magnetic restraining element loosely connected to said pole pieces and positioned for engagement with a portion of said side of the body member between said openings to prevent removal of said pole pieces from the body member, and inwardly projecting means on said side of the body portion positioned to be rockably engaged by said restraining element to facilitate such shifting of said pole pieces.

7. A magnetic catch for use with a door provided with a magnetic striker comprising, a non-magnetic body member having a closed chamber and being adapted to be mounted on a door frame, said body having one side with spaced apart openings therein, a magnet assembly including a magnet with pole pieces shiftable thereon, said pole pieces having striker engaging portions, said magnet assembly being loosely confined in said chamber with said portions of the pole pieces projecting through said openings, whereby said pole pieces may shift for properly engaging a striker, and a non-magnetic restraining element loosely connected to said pole pieces and positioned for engagement with a portion of said side of the body member between said openings to prevent removal of said pole pieces from the body member, and inwardly projecting means on said side and on other sides of the body portion positioned to be rockably engaged respectively by said restraining element and said pole pieces to facilitate such shifting of said pole pieces.

8. A magnetic door catch of the type defined in claim 7 and characterized in that said pole pieces have openings therein and said restraining element comprises a rod having a diameter substantially smaller than the openings in said pole pieces with the end portions of said rod engaged in said openings in the pole pieces.

9. A magnetic catch for use with a door provided with a magnetic striker comprising, a non-magnetic hollow body member adapted to be mounted on a door frame and having openings therein, a magnet assembly loosely confined within said body member and including a magnet, pole pieces shiftable on said magnet and a non-magnetic restraining element loosely connected to said pole pieces, said pole pieces projecting through said openings, said restraining element having a portion positioned adjacent a portion of said body member, said portions interengaging to prevent removal of said pole pieces from said body member, means forming a fulcrum on one of said portions positioned so that said restraining element may rock on said body member, said pole pieces and body member having apposing opposite sides, fulcrum means associating said sides and positioned so that said pole pieces may rock on said body member, whereby to facilitate shifting of said magnet assembly for engaging said striker.

10. A magnetic door catch comprising, a non-magnetic housing provided with means for mounting the housing on a support, a bar magnet shiftably supported within said housing and having opposed poles at its opposite ends, said housing having one face extending generally parallel to the axis of said magnet and having a pair of openings therein, one adjacent each pole of the magnet, said magnet having a pole piece magnetically adhering to each pole thereof and projecting outwardly of the housing through said openings, means on said pole pieces preventing withdrawal of the pole pieces from said housing through said openings, said pole pieces having substantial clearance with the walls of said housing and said openings, and means on said housing forming a fulcrum intermediate the ends of said magnet and permitting pivotal movement of the magnet about an axis generally parallel to said face of said magnet.

11. A magnetic door catch comprising, a non-magnetic housing provided with means for mounting the housing on a support, a bar magnet shiftably supported within said housing and having opposed poles at its opposite ends, said housing having one face extending generally parallel to the axis of said magnet and having a pair of openings therein, one adjacent each pole of the magnet, said magnet having a pole piece magnetically adhering to each pole thereof and projecting outwardly of the housing through said openings, means on said pole pieces preventing withdrawal of the pole pieces from said housing through said openings, said pole pieces having substantial clearance with the walls of said housing and said openings, and fulcrum means on said housing permitting pivotal movement of said pole pieces about an axis generally parallel to the axis of the magnet.

12. A magnetic door catch comprising, a non-magnetic housing provided with means for mounting the housing on a support, a bar magnet shiftably supported within said housing and having opposed poles at its opposite ends, said housing having one face extending generally parallel to the axis of said magnet and having a pair of openings therein, one adjacent each pole of the magnet, said magnet having a pole piece magnetically adhering to each pole thereof and projecting outwardly of the hous-

ing through said openings, means on said pole pieces preventing withdrawal of the pole pieces from said housing through said openings, said pole pieces having substantial clearance with the walls of said housing and said openings, means on said housing forming a fulcrum intermediate the ends of said magnet and permitting pivotal movement of the magnet about an axis generally parallel to said face of said magnet, and fulcrum means on said housing permitting pivotal movement of said pole pieces about an axis generally parallel to the axis of the magnet.

13. A magnetic door catch comprising a housing having a pair of spaced apart openings in one wall thereof, a pair of pole pieces loosely retained in said housing and projecting out through said openings at one end, a magnet within said housing extending between said pole pieces, a rod within said housing extending between and loosely engaging said pole pieces at opposite ends thereof and means positioned between said one wall of said housing and said rod forming a fulcrum about which said rod is adapted to pivot, said last mentioned means being disposed generally midway between said pole pieces.

14. The combination called for in claim 13 wherein said pole pieces are provided with aligned sockets therein, the opposite ends of said rod projecting into said sockets.

15. The combination called for in claim 13 wherein said fulcrum means permit pivotal movement of said rod in the plane of said pole pieces.

16. The combination called for in claim 15 wherein a clearance is provided between the inner ends of said pole pieces and the adjacent wall of the housing whereby said pole pieces are permitted to shift bodily in said housing.

17. A magnetic door catch comprising, a non-magnetic housing provided with means for mounting the housing on a support, a bar magnet shiftably supported within said housing and having opposed poles at its opposite ends, said housing having one face extending generally parallel to the axis of said magnet and having a pair of openings therein, one adjacent each pole of the magnet, said magnet having a pole piece magnetically adhering to each pole thereof and projecting outwardly of the housing through said openings and means on said pole pieces preventing withdrawal of the pole pieces from said housing through said openings, said pole pieces having substantial clearance with the walls of said housing and said openings.

18. A magnetic door catch comprising a non-magnetic housing provided with means for mounting the housing on a support, a magnet shiftably supported within the housing and having opposed poles at its opposite ends, a pole piece magnetically adhering to each pole of the magnet and each being bodily movable relative to the magnet, said pole pieces having edge portions thereof projecting outwardly of the housing and means on said pole pieces engageable with a portion of the housing for preventing withdrawal of the pole pieces from the housing, said pole pieces having a substantial clearance with the walls of the housing whereby the pole pieces may shift independently in the housing to permit said edge portions to move into contact with an armature plate through at least a major portion of their length.

19. A magnetic door catch for magnetically contacting an armature plate, said catch comprising a housing having a chamber therein and adapted to be secured to a support, a magnetic assembly within the chamber including a permanent magnet member having poles at its opposite ends and a pair of pole pieces magnetically adhering to the poles of the magnet, each pole piece being mounted for independent pivotal movement within the housing, said pole pieces each having edge portions projecting outwardly of the housing and means interengaging said pole pieces and the housing for preventing withdrawal of the pole pieces from the housing, said pole pieces having edges within the chamber spaced from the walls thereof whereby said pole pieces may pivot independently in the chamber to permit said outwardly projecting edge portions to move into contact with said armature plate through at least a major portion of their length.

20. A magnetic door catch for magnetically contacting an armature plate, said catch comprising a housing having a chamber therein and adapted to be secured to a support, a magnetic assembly within the chamber including a permanent magnet member having poles at its opposite ends and a pair of pole pieces magnetically adhering to the poles of the magnet, means on said housing forming a fulcrum about which the pole pieces are independently movable, said pole pieces each having edge portions projecting outwardly of the housing and means interengaging said pole pieces and the housing for preventing withdrawal of the pole pieces from the housing, said pole pieces having edges within the chamber spaced from the walls thereof whereby the pole pieces may pivot about said fulcrum means independently in the chamber to permit said outwardly projecting edge portions to move into contact with said armature plate through at least a major portion of their length.

21. A magnetic door catch for magnetically contacting an armature plate, said catch comprising a housing having a chamber therein and adapted to be secured to a support, a magnetic assembly within the chamber including a permanent magnet member having poles at its opposite ends and a pair of pole pieces magnetically adhering to the poles of the magnet, means on said housing forming a fulcrum about which the pole pieces are independently movable, said pole pieces each having edge portions projecting outwardly of the housing, means interengaging the pole pieces and the housing for preventing withdrawal of the pole pieces from the housing in the direction of said projecting edge portions and additional means interengaging the pole pieces and the housing for preventing withdrawal of the pole pieces from the housing in the opposite direction, said pole pieces having edges within the chamber spaced from the walls thereof whereby the pole pieces may pivot about said fulcrum means independently in the chamber to permit said outwardly projecting edge portions to move into contact with said armature plate through at least a major portion of their length.

22. A magnetic door catch comprising a non-magnetic housing provided with means for mounting the housing on a support, a magnet shiftably supported within the housing and having opposed poles at its opposite ends, a pole piece magnetically adhering to each pole of the magnet and each being bodily movable relative to the magnet, said pole pieces having edge portions thereof projecting outwardly of the housing annd means on said pole pieces engageable with a portion of the housing for preventing withdrawal of the pole pieces from the housing, there being an intentional clearance between the pole pieces and the walls of the housing greater than that necessary to facilitate manufacture and assembly whereby the pole pieces are freely and easily movable independently of one another within the housing to permit said edge portions of the pole pieces to engage through at least a major portion of their length with a misaligned armature plate.

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