

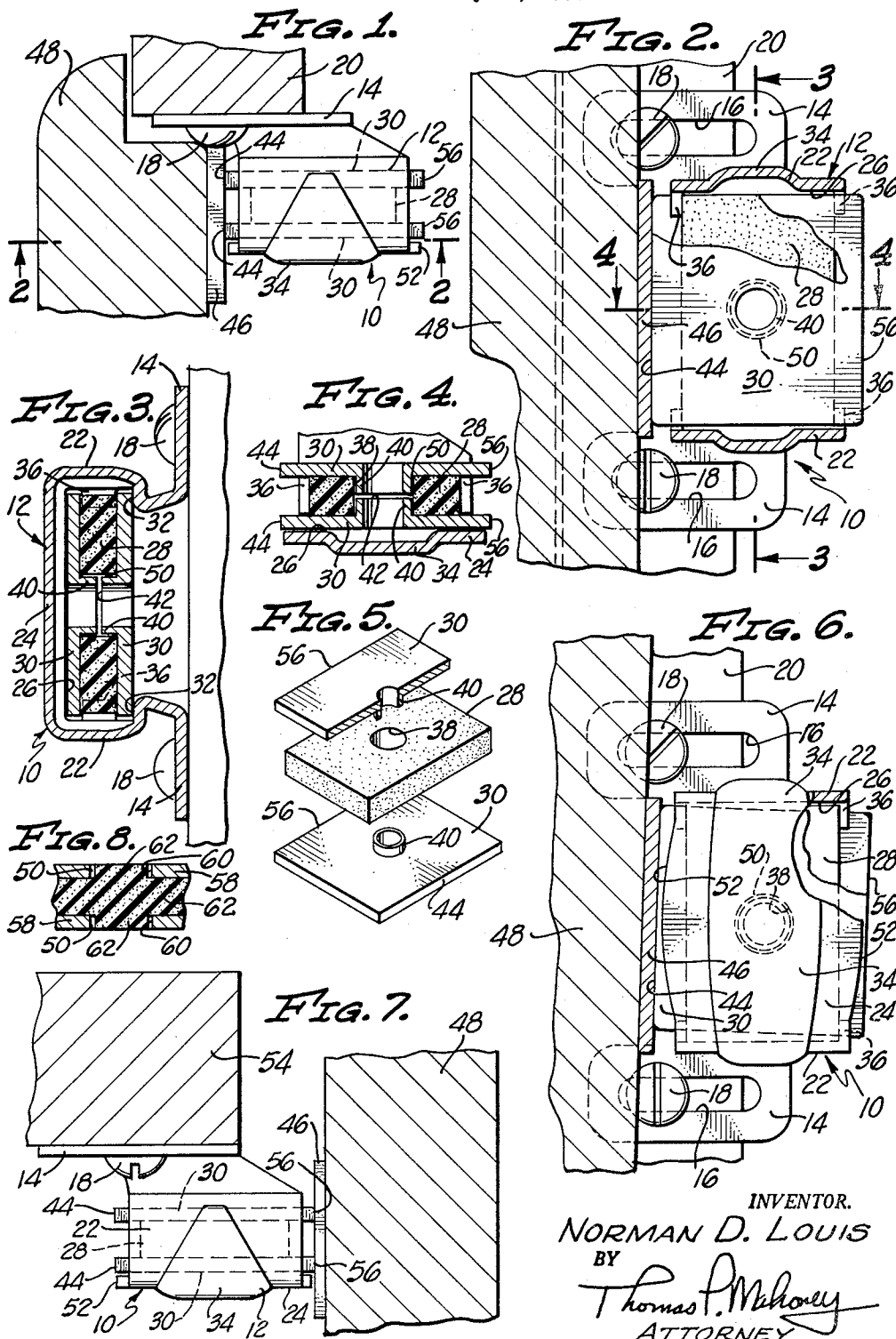
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MAGNETIC CATCH

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MAGNETIC CATCH

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The present invention relates to a magnetic catch, and more particularly to a magnetic catch adapted for use on cupboard doors and the like.

Magnetic door catches are widely used on relatively small doors such as cupboard and cabinet doors to keep such doors firmly closed without rattling. To accomplish this purpose, the pole pieces of the permanent magnet are loosely mounted for exact accommodation to the plane of the magnetic strike, thereby deriving maximum holding power from the magnet. This is important, not only to provide maximum use of the magnetic properties of the magnet, but also to enable the pole pieces to properly engage the strike where the structures mounting the catch and strike are misaligned. Various structures have been devised to mount the pole pieces adjacent the magnet and also permit the desired freedom of movement of the pole pieces, but each of these structures has been characterized by certain disadvantages.

According to the present invention, the magnet is securely held in its housing so that the danger of impact damage to the magnet is greatly reduced. Further, the pole pieces are carried on opposite sides of the magnet and are completely free of any restraining connection to the housing. Instead, the magnet and pole pieces have mutual engaging portions which maintain the pole pieces within the housing, the clearance between such portions being sufficient, however, to permit limited movement of the pole pieces into and out of the housing for proper alignment with the strike. In addition, the mutual engaging portions are located to permit free pivotal movement of the pole pieces relative to the magnet, the extent of pivotal movement being limited only by the walls of the housing, which are generously spaced from the pole pieces.

The housing is open-ended so that the pole pieces may engage a strike at either end of the magnetic catch, the catch thereby being reversible in position for particular applications. The outermost or end edges of the housing are preferably arcuate and extend a distance sufficient to permit engagement of the edges with the magnetic strike at any time that the clearance between the mutual engaging means is taken up, as by forcible slamming of the associated cupboard door. The magnet is thereby protected against breakage.

This construction affords the desired freedom of movement of the pole pieces and is characterized by a simplicity of design that makes mass production possible.

Therefore, it is an object of this invention to provide a magnetic catch whose pole pieces are self-adjusting for continued alignment with the mating magnetic strike.

It is another object to provide a magnetic catch whose magnet is secured to the housing, but whose pole pieces are completely free of any connection to the housing, being held within the housing by mutual engaging portions of the magnet and the pole pieces.

A further object of the invention is the provision of a magnetic catch having pole pieces which are mounted for pivotal movement within the magnet housing, and also for limited movement into and out of the housing independently of each other.

Another object of the invention is the provision of a magnetic catch having an open-ended housing with the pole pieces of the magnet extending out of both ends for

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reversible positioning of the catch in particular applications where this is desirable.

Another object of the invention is to provide a magnetic catch which is attractive in appearance and relatively inexpensive to manufacture.

Other objects and advantages of the invention will be apparent from the following specification, and the accompanying drawing, which is for the purpose of illustration only, and in which:

FIG. 1 is an elevational view of the magnetic catch of the present invention mounted on a door frame with a portion of the door shown in section;

FIG. 2 is a view taken along the line 2—2 of FIG. 1;

FIG. 3 is a view taken along the line 3—3 of FIG. 2;

FIG. 4 is a view taken along the line 4—4 of FIG. 2;

FIG. 5 is an exploded view, in perspective, of the magnet and the pole pieces;

FIG. 6 is a plan view of the magnetic catch, illustrating the pivotal accommodation of the pole pieces to the magnetic strike of a misaligned door;

FIG. 7 is an elevational view of the magnetic catch mounted to a shelf and engageable with a magnetic strike carried by a door, the opposite ends of the pole pieces being engaged by the magnetic strike as compared with the arrangement of FIG. 1; and

FIG. 8 is a cross-sectional view similar to FIG. 4, but illustrating another arrangement for interengaging the magnet and the pole pieces.

Referring now to the drawing, and particularly to FIGS. 1 through 5, a magnetic catch 10 is illustrated, and comprises a single piece body or housing 12 made of a nonmagnetic material such as plastic or sheet aluminum, and formed to include a pair of mounting flanges 14 which incorporate elongated screw openings 16 for receiving a pair of screws 18 to mount the magnetic catch to a supporting structure, such as a door frame 20.

The housing 12 is open at its ends, including a pair of opposed side walls 22 joined by an upper wall 24 to define an enclosure 26 for receiving a rectangular bar magnet 28, made of an alloy such as the well-known "Alnico," or a magnetic ferrite material, sintered or in a suitable binder, either oriented or nonoriented, and a pair of rectangular plates constituting pole pieces 30 arranged on opposite sides of the magnet 28. The bases of the side walls 22 are inwardly formed to provide ledges 32 to support the magnet assembly, constituted by the magnet 28 and the pole pieces 30, within the enclosure 26.

To strengthen the housing 12 against deformation, the housing 12 includes an integral, outwardly formed saddle portion 34 which extends between the side walls 22 and transversely across the upper wall 24.

The housing 12 includes integral retaining elements or tabs 36 at the ends of the housing 12, the tabs extending from the side walls 22 of the housing, 12, and bent inwardly to engage the opposite ends of the magnet 28. The magnet 28 is thus retained within the enclosure 26 of the housing 12, although the magnet 28 is movable to a limited extent toward and away from the upper wall 24.

As best illustrated in FIG. 5, the magnet 28 includes a centrally located opening 38 which pivotally receives a pair of bosses 40 integral, respectively, with the pole pieces 30. The bosses 40 extend into the opening 38 and in opposed relationship with each other, the ends of the bosses 40 being spaced apart at 42, FIG. 4, to insure that the associated pole pieces are in engagement with opposite sides of the magnet 28. The mutual engagement between the bosses 40 and the walls defining the opening 38 retain the pole pieces 30 within the housing 12, and permit pivotal movement of the pole pieces 30 relative to the magnet 28, about the axis of the opening 38.

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Normally, the outer ends of the pole pieces 30, constituting strike engaging portions 44, engage a magnetic strike 46 carried by a door 48 in the manner illustrated in FIG. 1. However, in the event that the door frame 20 or the door 48 become misaligned with each other, the ability of the pole pieces 30 to pivot relative to the magnet 28 and the housing 12 permits the strike engaging portions 44 of the pole pieces 30 to accommodate themselves to the misaligned position of the magnetic strike 46, as best illustrated in FIG. 6.

A clearance 50, FIGS. 2 and 4, is provided between the bosses 40 and the walls defining the opening 38 in the magnet 28 to permit a limited shifting of the pole pieces 30 relative to the magnet 28. Thus, the pole pieces 30 are shiftable inwardly to a limited extent to absorb the shock occasioned by a sudden slamming of the door 48 and consequent forcible engagement between the pole pieces 30 and the magnetic strike 46. In addition, the clearance 50 permits the pole pieces 30 to be inwardly shiftable independently of each other so that the pole pieces 30 are alignable with a magnetic strike 46 which is inclined with respect to a plane passing through the strike engaging portions 44 in their normal positions.

To further insure against damage to the magnet 28 upon forcible closure of the door 48, the housing 12 is provided at both ends with an arcuate extension 52 of the upper wall 24. The arcuate shape of the extension 52 permits the magnetic strike 46 to engage the strike engaging portions 44 in their pivoted positions, as illustrated in FIG. 6, but is engageable with the magnetic strike 46 whenever the pole pieces 30 are shifted inwardly a distance sufficient to eliminate or take up the clearance 50 and bring the mutual engaging surfaces of the magnet 28 and the pole pieces 30 into forcible contact.

Referring now to FIG. 7, there is illustrated the magnetic catch 10 mounted to the underside of a cupboard shelf 54, the pole pieces 30 being engageable with the magnetic strike 46 of the door 48 in a manner similar to that described in connection with the arrangement of FIG. 1. However, it will be observed that in the arrangement of FIG. 7, the opposite ends, constituting strike engaging portions 56, of the pole pieces 30 engage the magnetic strike 46, as compared with the engagement of the strike engaging portions 44 of the arrangement illustrated in FIG. 1. Thus, the double ended construction of the housing 12, and the manner of mounting the magnet 28 and the pole pieces 30 therein, permit the magnetic catch 10 to be reversed in position, as required by the particular application. In FIG. 1, the housing 12 is inwardly recessed with respect to the door 48, whereas in FIG. 7, the magnetic catch 10 projects outwardly of the shelf 54.

Referring now to FIG. 8, there is illustrated another arrangement for mutual engagement between the magnet and the pole pieces of the catch 10, the pole pieces 58 in this embodiment including central openings 60 which pivotally receive a pair of integral bosses 62 formed on opposite sides of the magnet 64. The previously described clearance 50 is provided between the pole pieces 58 and the magnet 64, and in all other respects the function of the embodiment of FIG. 8 is identical to that previously described in connection with FIGS. 1 through 7.

Thus, there has been described a magnetic catch 10 which includes pole pieces independently self-adjusting for alignment with a mating magnetic strike. The pole pieces are completely free of any connection with the associated housing, and are held within the housing by mutual engagement with the magnet, the mutual engagement being such that the pole pieces are relatively pivotable with respect to the magnet. The clearance between the mutual engaging portions of the magnet and the pole pieces is sufficient to permit limited movement of the pole pieces radially of the pivotal axis of the pole pieces to compensate for any misalignment which may exist between the magnetic catch 10 and the strike 46, and this clearance is also sufficient to permit a limited shiftable

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movement of the pole pieces into and out of the housing for the purposes described. The double-ended construction of the housing permits the present catch 10 to be reversed in position, as desired, to suit the particular application for which it is intended.

While the invention has been described by means of certain embodiments, the invention is not limited thereto, since obvious modifications and variations will occur to those skilled in the art without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A magnetic catch comprising: a magnet; a nonmagnetic housing for said magnet; and a pair of pole pieces on opposite sides of said magnet having strike engaging portions extending out of said housing, said housing including magnet retaining elements in engagement with said magnet and preventing movement of said magnet outwardly of said housing, said magnet and said pole pieces having mutual engaging means to retain said pole pieces in said housing and permit pivotal movement of said pole pieces relative to said magnet, the clearance between said mutual engaging means being sufficient to permit limited movement of said pole pieces radially of the pivotal axis of said pole pieces.

2. A magnetic catch comprising: a pair of pole pieces; a magnet disposed between said pole pieces; and a nonmagnetic housing for said magnet, portions of said pole pieces extending out of said housing for engagement with a magnetic strike, said housing including means in engagement with said magnet and preventing movement of said magnet outwardly of said housing, said magnet and said pole pieces having mutual engaging means retaining said pole pieces in said housing and permitting pivotal movement of said pole pieces whereby said portions of said pole pieces may properly engage a magnetic strike, the clearance between said mutual engaging means being sufficient to permit limited movement of said pole pieces radially of the pivotal axis of said pole pieces whereby said portions of said pole pieces are movable to a limited extent into and out of said housing.

3. A magnetic catch comprising: a magnet having a pair of opposed flat surfaces; a nonmagnetic housing for said magnet; and a pair of plates constituting pole pieces slidably disposed upon the opposed flat surfaces of said magnet, the outer edges of said pole pieces extending out of said housing for engagement with a magnetic strike plate, said housing including integral magnet retaining tabs in engagement with said magnet and preventing movement of said magnet outwardly of said housing, said magnet and said pole pieces having mutual engaging means to retain said pole pieces in said housing and permit pivotal movement of said pole pieces relative to said magnet, the clearance between said mutual engaging means being sufficient to permit limited movement of said pole pieces radially of the pivotal axis of said pole pieces.

4. A magnetic catch comprising: a pair of pole pieces; a substantially centrally apertured magnet disposed between said pole pieces; and a nonmagnetic housing for said magnet, portions of said pole pieces extending out of said housing for engagement with a magnetic strike, said housing including means in engagement with said magnet and preventing movement of said magnet outwardly of said housing, said pole pieces having bosses extending and rotatable within the aperture of said magnet to retain said pole pieces in said housing and permit pivotal movement of said pole pieces whereby said portions of said pole pieces may properly engage a magnetic strike, the clearance between said bosses and the walls of said aperture being sufficient to permit limited movement of said pole pieces radially of the axis of said aperture whereby said portions of said pole pieces are movable to a limited extent into and out of said housing.

5. A magnetic catch comprising: a magnet having a pair of opposed sides provided with bosses; a nonmagnetic

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housing for said magnet; and a pair of pole pieces provided with central apertures pivotally receiving said bosses, respectively, said pole pieces having strike engaging portions extending out of said housing, said housing including magnet retaining elements in engagement with said magnet and preventing movement of said magnet outwardly of said housing, the clearance between said bosses and the walls of said apertures being sufficient to permit limited movement of said pole pieces radially of the pivotal axis of said pole pieces.

6. A magnetic catch comprising: a pair of rectangular pole pieces, each provided with a central boss; a magnet disposed between said pole pieces and including a central opening for pivotally receiving said bosses, the ends of said bosses being spaced apart to insure engagement between said magnet and said pole pieces; and a nonmagnetic housing for said magnet including walls limiting the pivotal movement of said pole pieces, portions of said pole pieces extending out of said housing for engagement with a magnetic strike, said housing including means in engagement with said magnet and preventing movement of said magnet outwardly of said housing, said pole pieces being slidably pivotable relative to said magnet and said housing for alignment with a magnetic strike, the clearance between said bosses and said opening being sufficient to permit limited movement of said pole pieces radially of the axis of said opening whereby said portions of said pole pieces are movable to a limited extent into and out of said housing.

7. A magnetic catch comprising: a magnet; a nonmagnetic housing for said magnet; and a pair of pole pieces on opposite sides of said magnet having strike engaging portions extending out of said housing, said housing including magnet retaining elements in engagement with said magnet to prevent movement of said magnet outwardly of said housing, said magnet and said pole pieces hav-

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ing mutual engaging means to retain said pole pieces in said housing and permit pivotal movement of said pole pieces relative to said magnet, the clearance between said mutual engaging means being sufficient to permit limited movement of said pole pieces radially of the pivotal axis of said pole pieces, said housing including an arcuate outer edge for engaging the magnetic strike upon inward movement of said pole pieces a distance eliminating said clearance and bringing said mutual engaging means into forcible contact.

8. A magnetic catch comprising: a pair of pole pieces; a magnet disposed between said pole pieces; and an open-ended nonmagnetic housing for said magnet, portions of said pole pieces extending out of both ends of said housing for engagement with a magnetic strike at either end of said housing, said housing including means in engagement with said magnet and preventing movement of said magnet outwardly of said housing, said magnet and said pole pieces having mutual engaging means retaining said pole pieces in said housing and permitting pivotal movement of said pole pieces whereby said portions of said pole pieces may properly engage the magnetic strike, the clearance between said mutual engaging means being sufficient to permit limited movement of said pole pieces radially of the pivotal axis of said pole pieces whereby said portions of said pole pieces are movable to a limited extent into and out of either end of said housing.

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