Nov. 19, 1957

A. G. JANOS

2,813,741

MAGNETIC LATCH

Filed Oct. 5, 1955

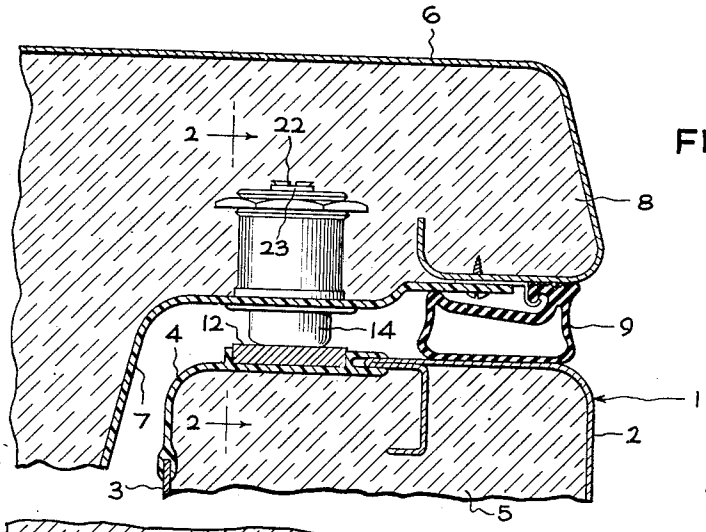

FIG. 1

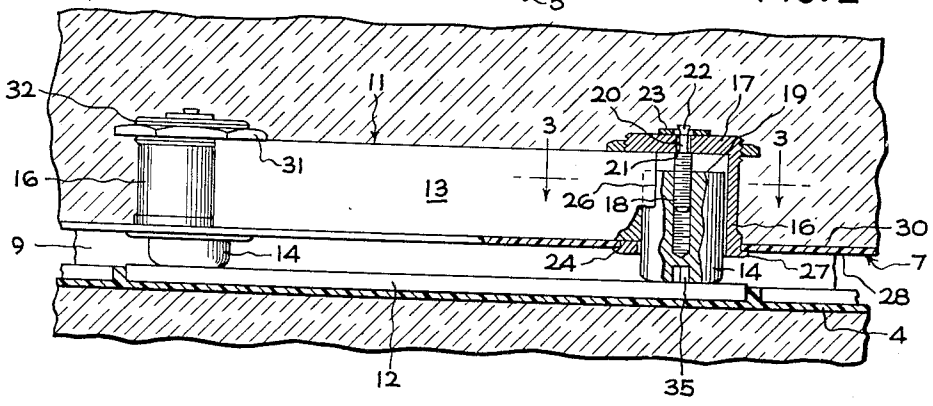

FIG. 2

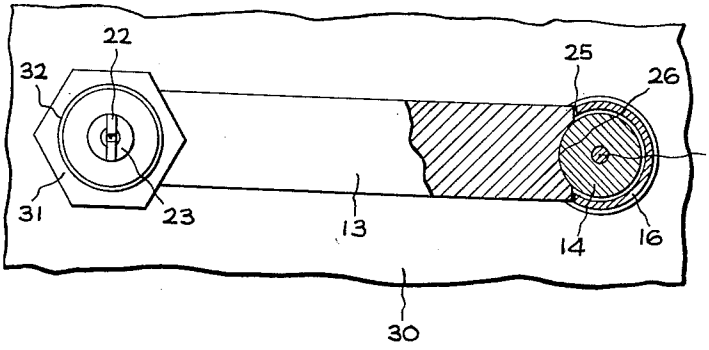

FIG. 3

INVENTOR.
ALFRED G. JANOS
BY Walter F. Rule
HIS ATTORNEY

United States Patent Office

2,813,741

Patented Nov. 19, 1957

2,813,741

MAGNETIC LATCH

Alfred G. Janos, Louisville, Ky., assignor to General Electric Company, a corporation of New York

Application October 5, 1955, Serial No. 538,736

4 Claims. (Cl. 292—251.5)

The present invention relates to a magnetic latch and is more particularly concerned with a magnetic latch arrangement for cabinets such as refrigerator cabinets including double-walled doors.

It is an object of the present invention to provide an improved magnetic latch assembly including a simple and low cost arrangement for mounting the assembly on a non-magnetic supporting member.

It is a more specific object of the present invention to provide a magnetic latch including a permanent magnet and cooperating pole pieces and simple and effective means for supporting these elements on a non-magnetic supporting structure such as the inner wall of a refrigerator door.

In carrying out the objects of the present invention, there is provided a magnetic latch comprising a magnet and a pair of pole pieces magnetically engaging the opposite ends of the magnet. Means for securing these magnetic elements to a non-magnetic supporting wall structure comprises a pair of non-magnetic tubular members which loosely receive and support the pole pieces and which are adapted to be received in suitable apertures provided in a supporting wall structure. Each of the tubular members includes flanges on the forward ends thereof which, in the final assembly, overlie the face or outer surface of the wall structure. Longitudinal slots in the side wall of the tubular members receive the ends of the magnet so that it is in magnetic engagement with the pole pieces carried within the tubular members. The magnet is engaged by clamping nuts threaded onto the opposite or rear ends of the tubular members and is thereby held in contact with the rear surface of the supporting wall structure. This clamping action also serves to hold the flanges tightly against the face portion of the supporting members.

For a better understanding of the invention, reference may be had to the accompanying drawing in which Fig. 1 is a horizontal sectional view of the latch-side portion of a household refrigerator incorporating the present invention;

Fig. 2 is a view of the magnetic latch of the present invention generally along line 2—2 of Fig. 1 with parts broken away to show the internal structure of the mounting means; and

Fig. 3 is a rear view of the latch structure with portions broken away generally along the line 3—3 of Fig. 2.

Referring to Fig. 1 of the drawing, there is shown a portion of a refrigerator including a cabinet member 1 comprising an outer wall 2 and a spaced inner wall 3, this inner wall or liner 3 forming a storage compartment within the cabinet. A heat insulating breaker strip 4 seals the space between the outer wall 2 and the inner wall 3 and suitable insulation 5 is provided between these walls.

For closing the access opening to the storage compartment, there is provided a door having an outer wall 6 and an inner wall 7, the inner wall being composed of a plastic or other suitable heat insulating and non-magnetic material. Suitable insulation 8 fills the space between these inner and outer door walls. In accordance with the

usual practice, a compressible gasket 9 is provided around the periphery of the storage compartment access opening to seal the space between the door and the cabinet. It is to be understood that the door is pivotally mounted on the cabinet by means of hinges (not shown) provided on the opposite side of the door to that shown in Fig. 1.

For holding the door in a closed, gasket-sealing position, there is provided a magnetic latch including a magnet assembly generally indicated by the numeral 11 and a cooperating armature 12. In the modification shown, the magnet assembly 11 is mounted on the non-magnetic inner wall structure 7 of the refrigerator door and the armature 12, composed of magnetic material, is secured to the non-magnetic breaker strip 4. In addition to a permanent magnet 13, the magnet assembly comprises a pair of cooperating pole pieces 14 which are in physical contact with the armature 12 when the door is in its closed position.

In order to secure the magnetic elements 13 and 14 to the non-magnetic wall 7, there is provided in accordance with the present invention a pair of non-magnetic tubular members 16 which house or substantially enclose the pole pieces 14. In the preferred form of the invention these tubular members 16 have cylindrical inner walls and the poles 14 are also of cylindrical shape but of a somewhat smaller diameter than the interior of the tubular members. Each of the pole pieces 14 is loosely connected to or supported by the tubular members and for this purpose, each of the members 16 are preferably cup-shaped so that the poles 14 can be conveniently secured to the bottom walls 17 of the members 16. As is shown in Fig. 2 of the drawing, each pole piece 14 is preferably attached to the respective member 16 by means of a stud 18 which extends through bottom wall 17 and is threaded axially into the rear or inner end 19 of the pole piece. In order to provide for the axial adjustment of the pole piece 14, means are provided for preventing rotation of the stud 18 when the pole piece is rotated about its axis. This means conveniently comprises a square or rectangular neck portion 20 on the stud 18 which extends through a similarly shaped slot 21 in the bottom portion 17 of the housing 16 and is anchored therein by means of ears 22 on the ends of the stud, which ears are bent laterally to overlie the washer 23.

Each of the tubular members 16 is provided with a longitudinal slot 25 of a width sufficient to receive the arcuate or cylindrically grooved ends 26 of the magnet 13 in such a manner that the ends 26 extend slightly into the interior of the tubular members 16.

For attaching this latch assembly to the non-magnetic wall structure 7, a pair of spaced apertures 24 are formed in the wall 7 for receiving the tubular members 16. With the housings or tubular members 16 in place in their respective apertures, the ends of magnet 13 are then inserted into the opposed longitudinal grooves 25 so that the magnet is in contact with the rear surface 30 of the wall 7. In order to rigidly mount the entire assembly on the wall 7, there is then required only the nuts 31 threaded onto the rear ends of the tubular members 16 into contact with the magnet 13. Upon tightening these nuts, the magnet is clamped firmly into engagement with the rear surface 30 of the wall 7 and at the same time the tubular housings 16 are anchored in the apertures 24 with the flanges 27 in contact with the face surface 28 of the wall member 7. The magnet and pole pieces are thereby firmly supported on the wall member and the pole pieces 14 can be adjusted inwardly and outwardly or, in other words, axially, merely by rotation thereof relative to the mounting stud 18.

For the purpose of obtaining good magnetic engagement between the pole pieces 14 and the ends 26 of the magnet, the magnet preferably extends a slight distance into the

interior of the tubular member 16 and is provided with arcuate end surfaces corresponding in curvature to the cylindrical surfaces of the poles 14. Limited movement of the poles within the tubular housing members 16 is permitted by making the slot 21 slightly larger than the neck portions 20 of the mounting studs 18 so that the pole piece can move radially or laterally within the housing 16 to establish a firm engagement with the magnet ends 26. To facilitiate rotation and adjustment of the pole pieces, the forward or exposed ends thereof may be suitably recessed as indicated by the numeral 35 to receive an Allen head wrench.

From the foregoing it will be seen that there has been provided by the present invention a magnetic latch assembly which can be quickly and easily mounted on a supporting wall structure and which requires only the mounting means to hold the magnet and pole pieces in operative relation. Furthermore, the same mounting means can be employed for magnets of different lengths thereby permitting the use of the same parts in the assembly of various latches including magnets of different strengths.

While there has been shown and described a particular embodiment of the present invention, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the invention, and it is intended by the appended claims to cover all such changes and modifications which fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A magnetic latch for holding a door member in a closed position relative to a cabinet member and including a magnet assembly adapted to be mounted essentially on the rear side of a non-magnetic wall portion of one of said members, said assembly comprising a pair of non-magnetic tubular members each having a flange on the forward end thereof, said tubular members being adapted to be positioned respectively in cooperating spaced apertures provided in said wall portion with the flanges thereof on the face side of said wall portion, a longitudinal slot in each tubular member, a magnet having the ends thereof respectively extending into said slots, a magnetic pole piece disposed within each of said tubular members for magnetic engagement with the adjacent end of said magnet, and anchoring means engaging the rear end portion of each of said tubular members and overlying the adjacent end of said magnet to clamp said magnet in contact with the rear face of said wall portion and said flanges in engagement with the face side of said wall portion.

2. A magnetic latch for holding a door member in closed position relative to a cabinet member and including a magnet assembly adapted to be mounted essentially on the rear side of a non-magnetic wall portion of one of said members, said assembly comprising a pair of non-magnetic cup-shaped members each having a flnage on the forward end thereof, said cup-shaped members being adapted to be positioned respectively in cooperating spaced apertures provided in said wall portion with the flanges thereof on the face side of said wall portion, a longitudinal slot in the side wall of each cup-shaped member, a magnet having arcuate ends respectively extending into said slots, a magnetic pole piece disposed within each of said cup-shaped members for magnetic engagement with the adjacent end of said magnet, and a nut threaded onto the bottom portion of each of said cup-shaped members and overlying the adjacent end of said magnet to clamp said magnet in contact with the rear face of said wall portion and said flanges in engagement with the face side of said wall portion.

3. A magnetic latch comprising a magnet, a pair of pole pieces magnetically engaging the opposite ends of said magnet and means for securing said latch to a non-magnetic supporting wall structure having a pair of spaced apertures therein, said securing means including a pair of non-magnetic tubular members, each of said tubular members loosely receiving and supporting one of said pole pieces and adapted to be disposed in one of said apertures, each of said tubular members having a longitudinal slot therein for receiving one end of said magnet positioned on the rear side of said wall structure, a flange on the forward end of each of said tubular members overlying the face surface of said wall structure, and anchoring means carried by the opposite end of each of said tubular members for holding said magnet and said flanges in engagement with said wall structure.

4. A magnetic latch comprising a magnet having an arcuate recess in each end thereof, a cylindrical pole piece disposed in each of said recess in said magnet, and means for securing said magnet and pole pieces to a non-magnetic supporting wall structure having a pair of spaced apertures therein, said securing means including a pair of non-magnetic cup-shaped members, each of said cup-shaped members containing one of said pole pieces and being adapted to be disposed in one of said apertures, a stud extending loosely through the bottom of each of said cup-shaped members and threaded axially into the pole piece contained therein, each of said cup-shaped members having a longitudinal slot therein for receiving the adjacent end of said magnet positioned on the rear side of said wall structure, a flange on the forward open end of each of said cup-shaped members overlying the face surface of said wall structure and a nut threaded onto the bottom portion of each of said cup-shaped members for holding said magnet and said flanges in engagement with said wall structure.

References Cited in the file of this patent

UNITED STATES PATENTS

2,673,377 Gaugler ---------- Mar. 30, 1954