July 19, 1966 F. G. ALESSI 3,261,631

MAGNETIC LATCHING MECHANISM

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Fig. 1.

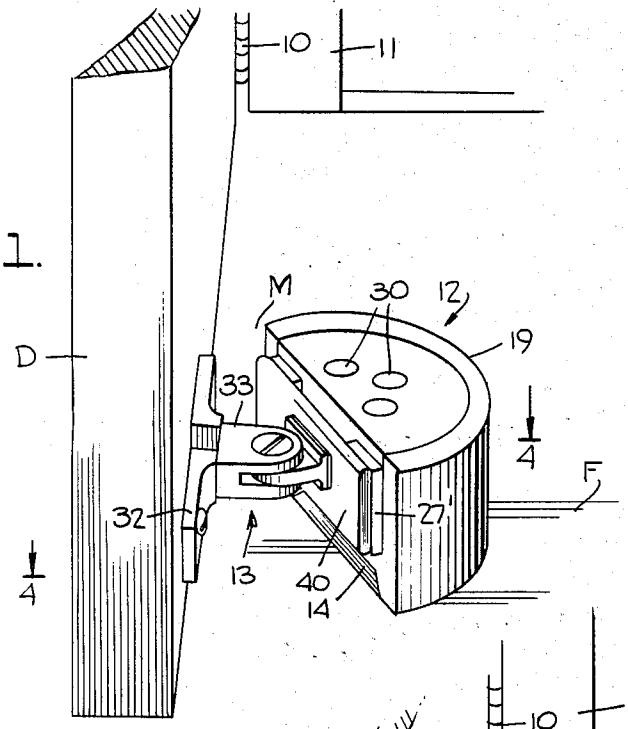
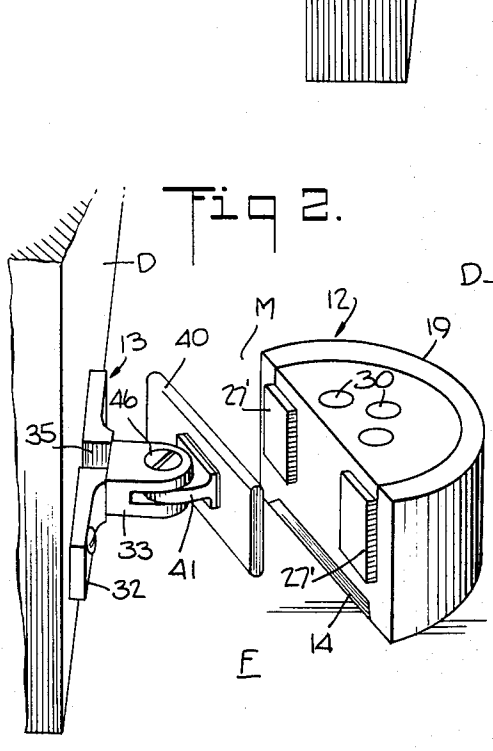


Fig 2.



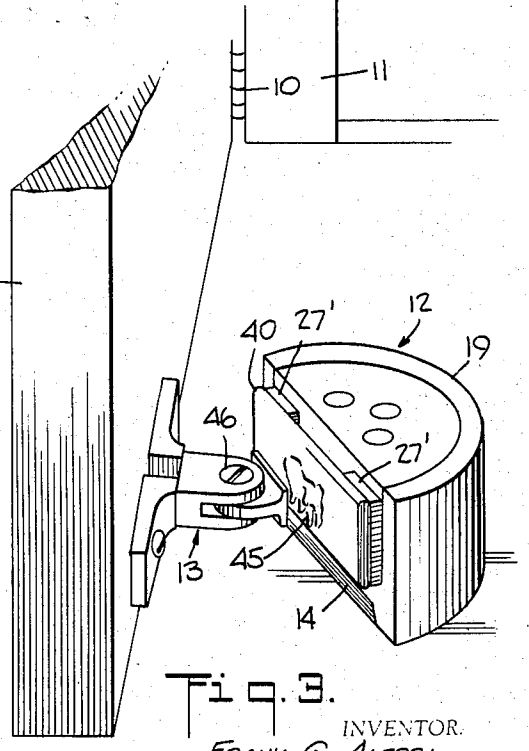


Fig. 3.

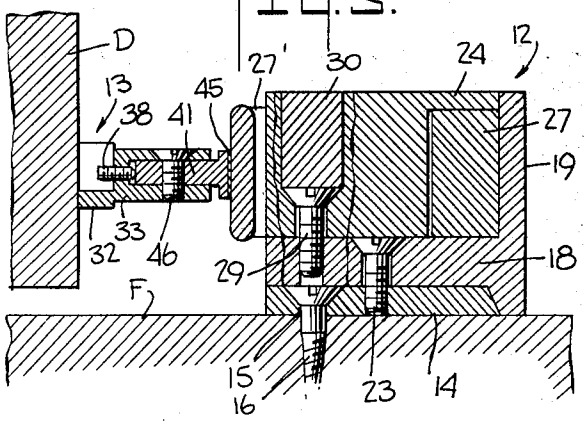
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Fig. 5.



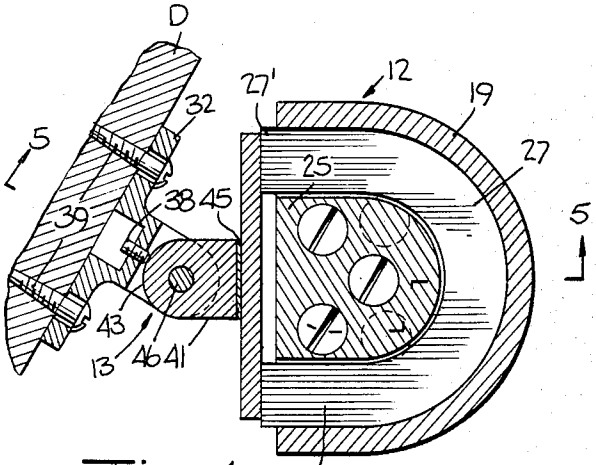


Fig. 4.

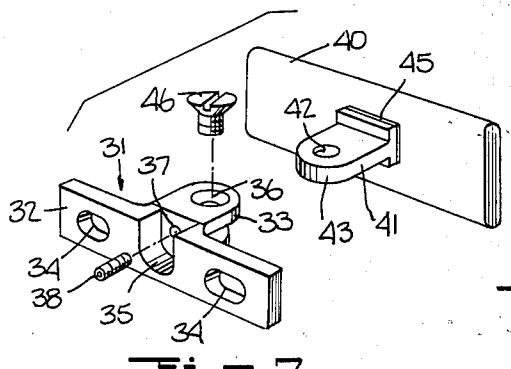


Fig. 7.

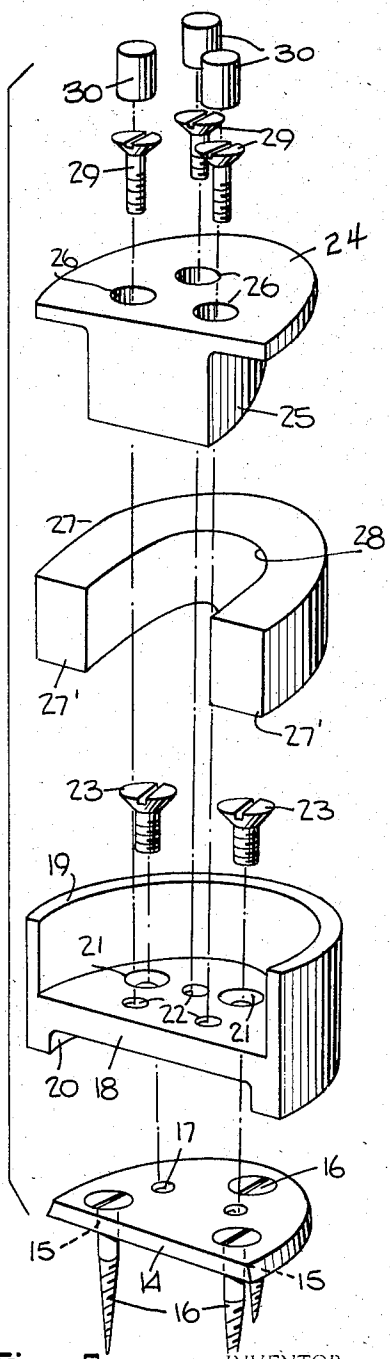


Fig. 6.

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MAGNETIC LATCHING MECHANISM

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7 Claims. (Cl. 292—251.5)

This invention relates to the art of latches and, more particularly, to a magnetic latching mechanism of improved construction and design.

The latching mechanism of this invention has wide application. It may be advantageously employed to releasably couple a movable structure in desired relative position to a stationary structure. The latching mechanism is especially useful to releasably maintain a door in open position and permit closing of the door upon applying a suitable force to the door or in response to predetermined ambient temperature conditions. Accordingly, the ensuing discussion and the detailed description that follows are directed, by way of example, to the use of my latching mechanism with a door.

It is frequently desirable to maintain a door in open position under normal use conditions. This is usually accomplished by means of a hook and eye arrangement and other mechanical devices. The latching mechanism of my invention permits a door to be readily swung to open position and automatically held in that position, as required. The door may be conveniently swung to closed position by applying a suitable closing force which effects uncoupling of parts of the latching mechanism. To this end, the latching mechanism of this invention comprises a pair of units, one of which is secured to the door and the other to the floor or other stationary support. One of the units includes a permanent magnet and the other unit includes a magnetic member.

One of the features of the invention resides in the provision of a fusible element connecting parts of the unit which includes the magnetic member. The fusible member comprises a material, such as a suitable solder, which becomes plastic or molten when the ambient temperature exceeds a predetermined value. Thus, when the door is being held in open position by the latching mechanism and when the fusible element becomes molten due to a rise in temperature above normal, certain parts of the mechanism become disconnected. This allows the door to be swung to closed position by a spring or similar device known to the art. It will be apparent from the foregoing that the latching mechanism of this invention is especially useful with fire doors.

It is the primary object of this invention to provide an improved magnetic latching mechanism having novel features of construction and design.

Another object of the invention is to provide a magnetic latching mechanism which may be readily adjusted at the time of installation.

Another object of the invention is to provide an improved magnetic latching mechanism including a fusible element which permits disconnection of parts when the ambient temperature exceeds a predetermined value.

The invention has for a further object the provision of a magnetic latching mechanism having its parts so constructed and arranged as to minimize the possibility of tampering or removal by unauthorized persons after installation.

A still further object of the invention is to provide a latching mechanism of the character indicated that is sturdy and durable in construction; that is reasonable in manufacturing and installation costs; and that is capable of performing its intended functions in a satisfactory manner.

The enumerated objects and additional objects, together with the advantages of the invention, will be readily understood by persons trained in the art from the following detailed description and the accompanying drawings which respectively describe and illustrate a recommended magnetic latching mechanism embodying the invention.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is an isometric view of a latching mechanism of this invention cooperatively associated with a door and a floor;

FIG. 2 is a view similar to FIG. 1 and illustrates the units of the latching mechanism in another relative position;

FIG. 3 corresponds to FIG. 2 and shows certain parts in another relative position;

FIG. 4 is a view taken along staggered line 4—4 of FIG. 1;

FIG. 5 is a view taken along staggered line 5—5 of FIG. 4;

FIG. 6 is an exploded view of one of the units of the latching mechanism; and

FIG. 7 is an exploded view of the other unit of the latching mechanism.

Referring initially to FIGS. 1 and 2, I have illustrated therein a preferred form of magnetic latching mechanism M of this invention cooperatively associated with a door D and a floor F. The door is hinged at **10** to a side **11** of a door frame to permit swinging movement of the door about a vertical axis from open position (FIG. 1) to closed position. The door is equipped with suitable means (not shown) for normally and yieldingly urging the door in the direction of closed position about its hinged connection with the frame.

Latching mechanism M consists of two units, namely a latch unit **12** and a catch unit **13** which will now be described.

Latch unit **12** comprises a floor plate **14** having a plurality of countersunk through openings **15** to receive screws **16** for firm attachment to floor F (FIG. 5). The floor plate is provided with a pair of taps **17** (FIG. 6). The latch unit also comprises a housing including a base **18** and an integral arcuate side wall **19**. The base is formed with a bottom recess **20** to accommodate floor plate **14**. The base plate is provided with a pair of countersunk through openings **21** and a plurality of taps **22**. The base plate is firmly anchored to the floor plate by means of brass screws **23** which extend through openings **21** and engage taps **17**. The housing also includes a cover **24** having an integral, depending, arcuate boss **25**. Extending through cover **24** and boss **25** are drill holes **26** which are axially aligned with corresponding taps **22** in base **18**. Each hole **26** is drilled on two diameters so that its upper portion is larger in diameter than its lower portion. Interposed between base **18** and cover **24** is a U-shaped permanent magnet **27** which terminates in end parts **27'** and which defines an opening **28**.

When the parts are assembled, boss **25** registers with magnet opening **28** and the end parts of the magnet extend slightly and beyond the housing, as best shown in FIG. 4. Cover **24** and magnet **27** are retained in place by brass screws **29** which extend through openings **26** and engage base taps **22**.

In order to prevent tampering by unauthorized persons after unit **12** is installed, I provide plugs **30** which are inserted in the portions of drill holes **26** above screws **29**. These plugs may be made of any suitable material and are preferably made of a material which may be readily drilled to permit access to screws **29** by authorized persons, as required.

All parts of latch unit **12**, with the exception of magnet **27**, are made of non-magnetic metals. Floor plate **14** and the several parts of the housing are preferably made

of aluminum, while screws **16**, **23** and **29** are preferably made of brass.

Catch unit **13** comprises a generally T-shaped bracket **31** consisting of a cross arm **32** and a bifurcated stem **33**. Arm **32** has a pair of spaced through openings **34** and is formed with a recess **35**. Stem **33** is provided with aligned openings **36**, at least one of which is in the nature of a tap. The bracket has a tap **37** which communicates with recess **35** and the opening defined by stem **33**. A set screw **38** engages tap **37**. Bracket **31** is adapted to be secured to door D by means of screws **39** which extend through openings **34** (FIG. 4).

The catch unit also comprises a bar member **40** which is made of a magnetic material, such as a suitable quality iron or steel, and a T-shaped brass member **41** having an opening **42** and an arcuate edge portion **43**. Bar member **40** and T-shaped member **41** are joined together by a fusible element **45**. The fusible element comprises a suitable low melting composition which is solid at normal room temperatures and which becomes plastic or molten at a predetermined elevated temperature, such as a temperature within the range of 130° F. to 145° F. Accordingly, element **45** may be made of any appropriate solder composition having requisite properties and characteristics that is known to the art.

As is clearly shown in several views, member **41** projects in the opening defined by bifurcated stem **33** and is pivotally connected thereto by a screw connector **46** which registers with openings **36** and **42**. The angular position of members **40** and **41** relative to bracket **31** may be readily adjusted prior to attaching the bracket to the door by means of set screw **38**. It is preferred to have the set screw inaccessible when the bracket is installed to minimize the possibility of tampering.

For the purpose of outlining the operation of the illustrated embodiment of the invention, it is assumed that the units **12** and **13** are assembled and respectively secured to floor F and door D, as shown in FIGS. 1 and 2. It is also assumed that door D is being swung in counterclockwise direction, and that units **12** and **13** are in the relative position shown in FIG. 2. As the door continues in a counterclockwise direction, unit **13** approaches unit **12** until magnetic unit **40** is engaged and held by permanent magnet **27** by magnetic attraction, as illustrated in FIG. 1. The door is maintained in this position under normal temperature conditions until such time as it is swung to closed position by applying a manual force to door D toward the left as viewed in FIG. 1. In the event the temperature in the room rises above a predetermined value, fusible element **45** becomes molten or plastic causing disengagement of magnetic member **40** from the remainder of unit **13** (FIG. 3). This allows the door to swing to closed position by the action of a spring or other door-closing device (not shown).

From the foregoing, it is believed that the construction, operation, objects and advantages of my present invention will be readily comprehended by persons skilled in the art without further description. It is to be clearly understood, however, that various changes in the construction described above and illustrated in the drawings may be made without departing from the scope of the invention, it being intended that all matter contained in the description or shown in the drawings shall be interpreted as illustrative only and not in a limiting sense.

I claim:

1. A latching mechanism for use with a support structure and a movable structure that is movable relative to the support structure, a first unit comprising a bracket that is adapted to be secured to one of said structures, a magnetic member, pivot means connecting the magnetic member to the bracket, and means comprising a locking member releasably connecting the bracket to the pivot means for adjusting the angular position of the magnetic member relative to the bracket, said first unit also including a fusible element that is solid at and below a preselected temperature and that becomes plastic at a temperature above said preselected temperature, said fusible element joining one portion of the first unit to the remainder thereof, and a second unit comprising a permanent magnet that is adapted to be secured to the other of said structures, the parts being so constructed and arranged that the first and second units are releasably coupled by magnetic attraction between the permanent magnet and the magnetic member when said structures are in one relative position.

2. A latching mechanism according to claim **1** wherein the pivot means includes a connector member interposed between the magnetic member and the bracket and wherein the fusible element connects the magnetic member to the connector member.

3. A latching mechanism according to claim **1** wherein the second unit also comprises a housing including a base, a side wall and a cover and wherein the permanent magnet is at least partly positioned within the confines of the housing, the housing having its parts so configured and arranged as to maintain the permanent magnet in a predetermined position with respect thereto.

4. A latching mechanism according to claim **3** wherein the permanent magnet is U-shaped, the ends of the permanent magnet extending through the housing.

5. A latching mechanism according to claim **1** wherein the pivot means includes a connector interposed between the magnetic member and the bracket, wherein the fusible element connects the magnetic member to the connector member, wherein the second unit also comprises a housing including a base, a side wall and a cover and wherein the permanent magnet is at least partly positioned within the confines of the housing, the housing having its parts so configured and arranged as to maintain the permanent magnet in a predetermined position with respect thereto.

6. A latching mechanism according to claim **5** wherein the permanent magnet is U-shaped, the ends of the permanent magnet extending through the housing.

7. A latching mechanism according to claim **1** wherein the locking member comprises a set screw.

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