Sept. 23, 1969 G. E. BEYER ETAL 3,468,576

MAGNETIC LATCH

Filed Feb. 27, 1968

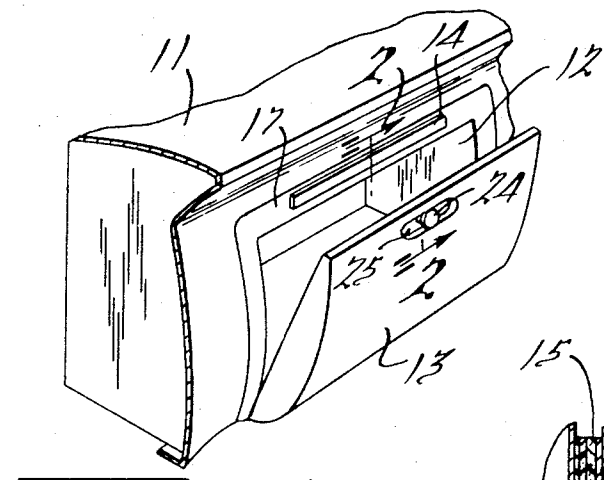


FIG. 1.

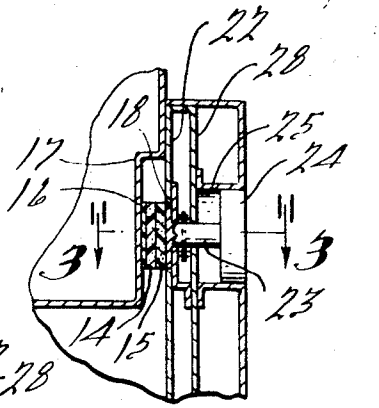


FIG. 2.

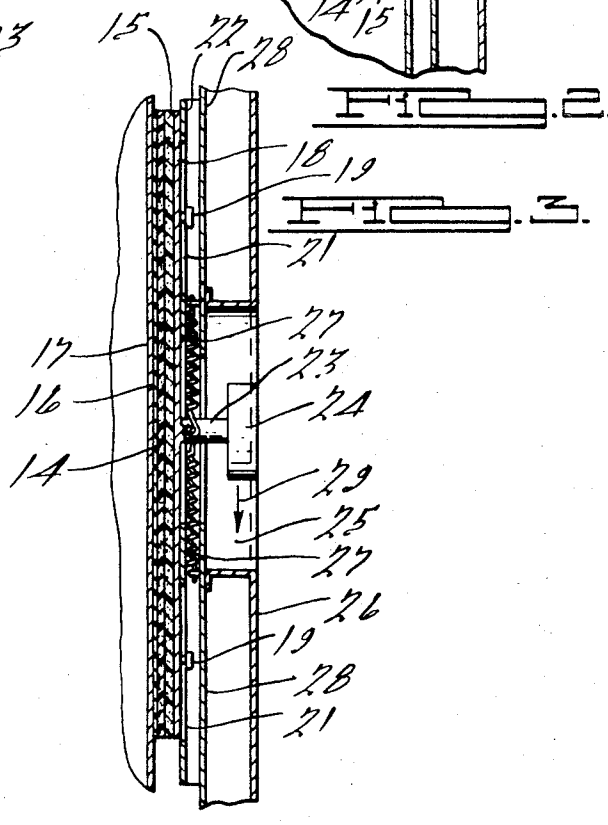


FIG. 3.

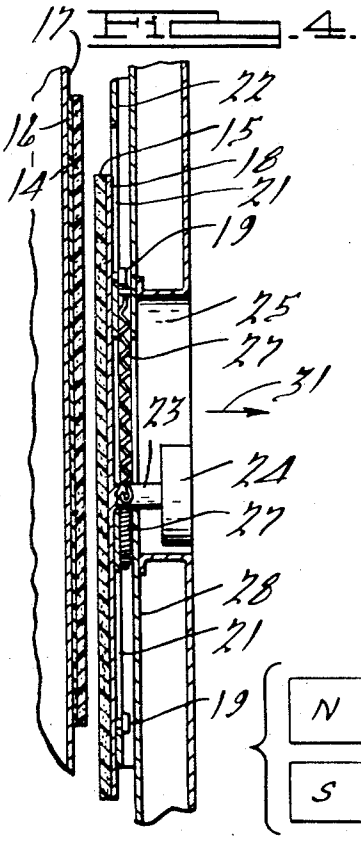


FIG. 4.

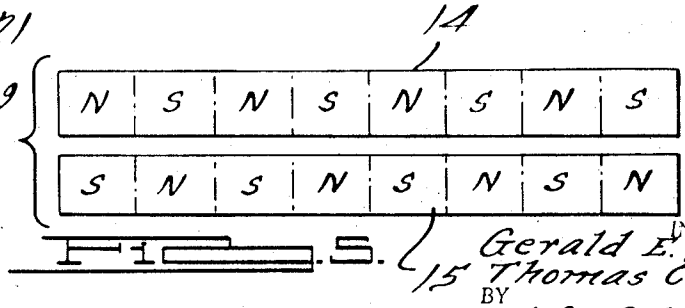


FIG. 5.

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MAGNETIC LATCH

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U.S. Cl. 292—251.5 1 Claim

ABSTRACT OF THE DISCLOSURE

A magnetic latch for a receptacle closure in which the latching function is achieved by plastic members mounted respectively on a receptacle and its closure. The plastic members are permeated with magnetic material magnetized to provide magnetic fields emanating from sequentially alternating pole faces along the plastic members. In closed position of the closure, pole faces of opposite polarity abut each other to provide a magnetic force acting to "latch" the closure. By lateral movement of the plastic members relative to each other, pole faces of like polarity are brought into abutting relationship thereby creating a magnetic force acting to "unlatch" the closure from the receptacle.

Background of the invention

Magnetic latching devices for cabinet doors, refrigerator doors and other closures are well-known in the prior art. As disclosed in U.S. Patent 2,932,545, such a magnetic latching device may comprise resinous or plastic compounds containing a pulverant magnetic oxide material mixed or blended therein. After the compound is extruded or formed into the desired shape, it is then magnetized to properly orient the domains of the magnetic particles to create a magnetic flux. When extruded or formed into elongated members, the magnetic particles can be so magnetized that the magnetic fields emanate from sequentially alternating pole faces along the extruded or formed members.

If the extruded or formed members are mounted on opposed surfaces, such as the wall of a receptacle and an opposing wall of a closure, so that unlike pole faces are in abutting relation to each other, a magnetic force is created for maintaining the closure in closed position with respect to the receptacle.

If it is desired to separate the two opposite pole faces in a direction normal to their abutting surfaces, the strength of the magnetic field must be relatively weak so that the closure may be opened without the exertion of undue force.

The use of weak magnets, however, has several disadvantages. When used in static structures such as household cabinets, the closures are too easily opened by children thus giving them ready access to areas in which medicines, condiments or alcoholic beverages are stored. When used in dynamic applications such as in automotive vehicles, a sudden shock to the vehicle could result in the closure, such as a glove compartment door, popping open.

It is the object of the present invention to utilize extruded or formed members having strongly magnetized particles. This is accomplished by providing mounting or retaining means which upon proper manipulation of an operating member moves one of the extruded or formed members on either the closure or receptacle surface relative to the other so that the magnetic attraction relationship is changed to a magnetic repulsion relationship.

Summary of the invention

The present invention relates to a magnetic latch for a receptacle having an opening and a closure for closing the opening. The magnetic latch comprises plastic members formed of magnetic material blended into a plastic material. A first retaining means mounts one of the plastic members on a receptacle surface and a second retaining means mounts another of the plastic members on a closure. The magnetic material in each of the plastic members is magnetized to provide magnetic fields emanating from sequentially alternating pole faces along the plastic members. The plastic members in closed position of the closure are positioned with pole faces of opposite polarity abutting each other thereby providing closed magnetic paths for creating a magnetic force to hold the closure in closed position. A similar structure is disclosed in U.S. Patent 2,932,545. The present invention embodies the improvement comprising the use of at least one retaining means mounting its associated magnetized member for movement relative to the surface on which it is mounted, while the other of the retaining means fixedly holds its associated magnetized member on the surface to which it is mounted. An operating means including an operating member is coupled to the movable plastic member for moving the latter relative to the fixed plastic member in a plane parallel to the abutting surfaces to position like pole faces in abutting relation to each other so that the respective magnetic fields will be in opposition thereby creating a magnetic force urging said closure toward an opened position.

Other objects, advantages and features of the present invention will be made more apparent as this description proceeds, reference being had to the accompanying drawing:

FIG. 1 is a perspective view of a fragmentary portion of a vehicle instrument panel having a glove compartment or receptacle with a door or closure for closing the compartment;

FIG. 2 is a sectional view taken substantially on the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is a view in part similar to FIG. 3 illustrating the parts in a second operative position; and

FIG. 5 is a diagrammatic view illustrating the sequentially alternating pole faces of the extruded or formed members as they would be related to each other in closed position of the door.

Detailed description

Referring now to the drawing, FIG. 1 represents an automotive application of the present invention. A fragmentary portion **11** of an automobile instrument panel is shown having a glove compartment or receptacle **12** therein. The receptacle **12** is adapted to be closed by a hinged door or closure **13** which is hinged to the lower edge of the receptacle frame by any conventional hinge means (not shown). In a conventional installation, the closure **13** would be maintained in closed position by a mechanical latch device of some type. The present invention embodies a magnetic "latching" means for achieving the latching function.

The magnetic latching means comprises plastic members **14** and **15** each of which is extruded or formed of a plastic binder or plastic material permeated with magnetic material such as small particles of barium ferrite. As explained in U.S. Patent 2,932,545, the plastic member, such as the plastic strip **14** or **15**, after being extruded or formed into the desired shape is then magnetized to properly orient the domains of the magnet particles to create a magnetic flux.

As shown in FIG. 5, the strips **14** and **15** preferably are magnetized to provide magnetic fields emanating from sequentially alternating pole faces along the length of the plastic members.

One of the plastic members, such as the member **14**, for example, may be bonded by a suitable bonding layer **16** or may be mechanically fixedly attached to a marginal flange **17** of the receptacle **12**.

The other plastic member, such as the member **15**, is bonded or mechanically fastened to a plate **18** having studs **19** projecting through slots **21** in a wall surface **22** of the closure **13**. Attached to the plate **18** is a centrally positioned shaft **23** carrying a knob **24**. The knob **24** is manually reciprocable in a recess **25** in the outer panel **26** of the closure **13**. Suitable springs **27** are anchored to an inner wall **28** and to the shaft **23** carrying the knob **24**.

In closed position of the closure **13**, the two plastic members **14** and **15** are in abutting relation to each other as shown in FIG. 3. In this abutting relation, the pole faces of opposite polarity are in alignment with each other as shown in FIG. 5. That is, each section of the strip **14** having a north pole is in abutting relation to a section of the strip **15** having a south pole, each section of the strip **14** having a south pole is in abutting relation to a section of the strip **15** having a north pole, and so on. There is thus created closed magnetic paths for creating a magnetic force to hold the closure in closed position.

It would be possible to open the closure **13** by pulling on the knob **24** in a direction normal to the surfaces of the magnetic members **14** and **15**. It is contemplated, however, that relatively strong magnets will be used to insure that the closure will not be popped open upon any sudden shock encountered by the vehicle body. As a result, anyone having a relatively weak grip or perhaps fingers too large to suitably grasp the knob **24** to pull the latter in a direction normal to the plastic member surfaces will be unable to exert sufficient force to overcome the magnetic attraction between the two plastic members **14** and **15**.

Relatively less force is required to slide the two plastic members **14** and **15** relative to each other. Therefore, if the knob **24** is pushed in the direction of the arrow **29** in FIG. 3, a condition is created in which the pole faces on the strip **15** are shifted laterally so that like poles will be in abutting relation on the two plastic members **14** and **15**. Since the magnetic fields of like poles oppose each other, the closure **13** will be forced in the direction of the arrow **31** in FIG. 4. Closure **13** thus will be moved from the "latched" position in FIG. 3 to the "unlatched" condition of FIG. 4 so that access to the interior of receptacle **12** may be readily obtained.

Upon release of the knob **24** the springs **27** will center the plastic member **15** in its normal position, as shown in FIG. 3, so that the next time the closure **13** is swung to a closed position pole faces of unlike polarity on the strips **14** and **15** again will be in alignment and the closure will be snapped shut as soon as the magnetic fields of the two plastic strips come into overlapping relationship.

It will be readily understood that the latching arrangement disclosed in the present invention is readily applicable to refrigerator doors, cabinet doors or any other closures which are retained in closed position by magnetic devices.

It is to be understood that this invention is not limited to the exact construction illustrated and described above or in the abstract preceding the specification, but that various changes and modifications may be made without departing from the scope and spirit of the invention.

We claim:

1. A magnetic latch for a receptacle having an opening and a closure for said opening,

said magnetic latch comprising plastic members formed of magnetic material blended into a plastic material,

a first retaining means mounting one of said plastic members on a receptacle surface,

a second retaining means mounting another of said plastic members on a closure surface,

the magnetic material in each of said plastic members being magnetized to provide magnetic fields emanating from sequentially alternating pole faces along the plastic members,

said plastic members in closed position of the closure being positioned with pole faces of opposite polarity abutting each other to provide closed magnetic paths for creating a magnetic force to hold the closure in closed position,

the improvement comprising:

one of said retaining means mounting its associated plastic member for movement relative to the surface on which it is mounted,

the other of said retaining means fixedly holding its associated plastic member on the surface to which it is mounted,

and operating means including an operating member for moving the movable plastic member relative to the fixed plastic member in a plane parallel to the abutting surfaces to position like pole faces in abutting relation to each other so that the respective magnetic fields will be in operation thereby creating a magnetic force urging said closure toward an open position,

said operating means including resilient means restoring said movable plastic member to premoved position upon release of the operating member.

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U.S. Cl. X.R.

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