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MAGNETIC TOUCH LATCH

Filed June 26, 1968

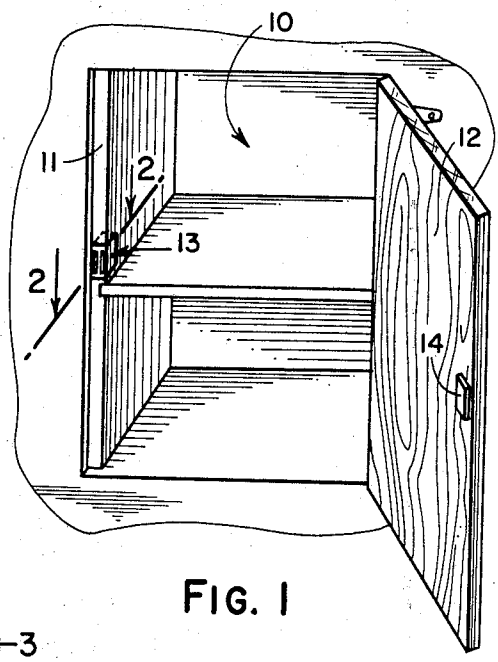


FIG. 1

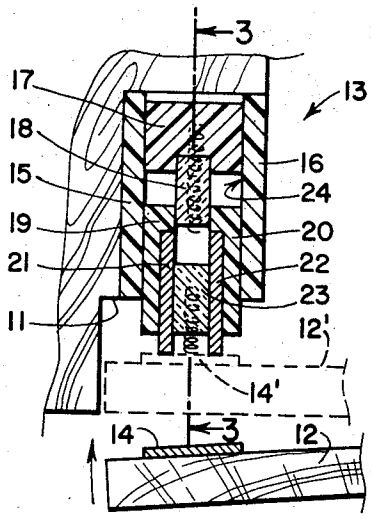


FIG. 2

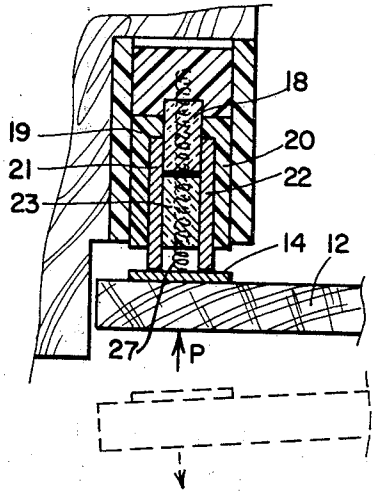


FIG. 4

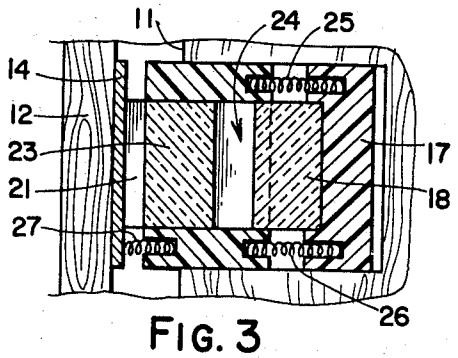


FIG. 3

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MAGNETIC TOUCH LATCH

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ABSTRACT OF THE DISCLOSURE

A touch type latch for cabinet doors is provided in the form of a magnetic catch device adapted to be secured to a cabinet frame for cooperation with a metallic plate adapted to be secured to the cabinet door in a position to be magnetically held by the catch device. The catch device itself includes means for decreasing the magnetic field strength of one portion of the magnet holding the plate, this means being responsive to a touching pressure on the door so that the door is thus released and opened. The means for decreasing the magnetic field strength takes the form of a member having a high permeability for magnetic flux which member may be either a soft ferrous metal or a second permanent magnet, is normally at a spacing from the permanent magnet holding the plate. Touching pressure on the door decreases this spacing in such a manner that the member short circuits the flux magnet thereby decreasing its attracting power to the plate and releasing the door. Suitable coiled springs are included to assure positive separation once the magnetic field strength has been decreased and to further restore the movable members to their original positions preparatory to a subsequent operation of closing of the door.

This invention relates to touch latches and more particularly to a novel magnetic touch latch for use with cabinet doors.

BACKGROUND OF THE INVENTION

Touch latches of the mechanical type are well known in the art. These devices generally include a catch device adapted to be secured to an inside frame portion of a cabinet for cooperation with a hook element secured to an inside surface portion of the cabinet door. When the door is closed, the hook element is received in the catch device so that the door is held closed. Opening of the door is accomplished by exerting a touching pressure on the exterior surface of the door in such a manner as to urge the hook element further into the catch device. This action results in a releasing of the hook element so that the door is freed to swing open.

Latches of the foregoing type are very popular in modern construction wherein it is desired that the exterior surface of a cabinet door be wholly free of any knobs, handles, or undercut recesses normally necessary in order to open and close the cabinet door.

While the aesthetic appearance of cabinet doors is greatly enhanced by such touch latches as noted above, there are encountered certain difficulties. These difficulties arise from the mechanical nature of the hook and latching mechanism therefor and are of two major types: first, in many instances the hook will fail to be retained in the catch mechanism secured to the cabinet frame such that the door will not positively remain closed. Second, the hook becomes properly engaged but the release mechanism responsive to touching pressure on the cabinet door fails to function with the result that the cabinet door is locked shut. This latter type of failure is most annoying and can only be corrected by unhinging the door or, if the hinges happen to be buried in the molding as is often the case, actually damaging the door itself.

BRIEF DESCRIPTION OF THE INVENTION

The present invention provides a novel magnetically operated touch latch having all of the advantages of prior mechanical type latches discussed heretofore but wherein the two major difficulties of failure to latch or unlatch are wholly eliminated.

More particularly, the invention contemplates a magnetic latch device including a permanent magnet arranged to be secured to the frame of a cabinet for cooperation with a plate member secured to an inside surface of the door in a position to be magnetically attracted to the magnet. The magnetic latch mechanism itself further incorporates means for decreasing the magnetic field strength of the permanent magnet at the portion thereof attracting the plate in response to a touching pressure on the door urging the plate against the permanent magnet. With this arrangement, the magnetic holding power is reduced sufficiently to release the door in response to touching pressure so that the door is free to open.

In the preferred embodiment of the invention, the means for decreasing the magnetic field strength constitutes a member of high permeability normally positioned at a given distance from the permanent magnet. This member may comprise a soft ferrous metal or alternatively a second permanent magnet. The distance between the member and permanent magnet is decreased in response to touching pressure on the door such that the member short circuits the flux of the permanent magnet thereby decreasing its field strength at its holding portion to the door plate. If the member takes the form of a second permanent magnet, it would, of course, be oriented to have its north and south poles reversed relative to the first mentioned permanent magnet. Hereafter, the phrase "member of the high permeability" is meant to include either a soft iron member or second permanent magnet.

The structure incorporates suitable spring means for assuring a positive separation of the door plate from the permanent magnet after the field has been weakened and for repositioning the movable parts to their normal spaced relationship preparatory to normal action when the door is again closed.

Since holding of the door in its closed position and releasing of the door depends solely on magnetic field strength, the two major problems discussed heretofore with respect to mechanical type push catches are substantially avoided. Moreover, the entire device incorporates only one moving part with the attendant advantage of simplicity and reliability.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the invention will be had by now referring to a preferred embodiment as illustrated in the accompanying drawings, in which:

FIGURE 1 is a fragmentary perspective view of a cabinet structure with the cabinet door in open position and wherein the novel magnetic touch latch of this invention has been incorporated;

FIGURE 2 is a fragmentary cross section taken in the direction of the arrows **2—2** of FIGURE 1 and further illustrating the door in a position immediately prior to complete closing;

FIGURE 3 is a cross section of the magnetic latch structure taken in the direction of the arrows **3—3** of FIGURE 2 showing the door in its completely closed position; and

FIGURE 4 is a cross section similar to FIGURE 2 illustrating the relative positions of the parts during the opening operation of the door.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to FIGURE 1, there is illustrated generally by the numeral **10** a cabinet having a frame por-

tion or jamb **11** against which a door **12** is arranged to be closed. The magnetic touch latch of the present invention includes a magnetic catch device **13** adapted to be secured to the frame **11** of the cabinet and a plate **14** adapted to be secured to an inside surface of the door **12** in a position to be magnetically attracted to the catch device **13** when the door is in its closed position.

Referring now to the cross section of FIGURE 2, it will be noted that the magnetic catch device **13** includes first and second side plates of non-magnetic material such as plastic designated **15** and **16** disposed on either side of a holder formed of plastic and designated by the numeral **17**. A member of high permeable material **18** is held in the holder **17** with a forward portion projecting into the space between the side plates **15** and **16**. This space between the side plates defines a channel having a forward open end facing outwardly from the cabinet or in the direction of the inside surface of the door when the door is closed. The holder **17** and member **18** constitute a fixed magnetic means and the side plates **15** and **16** define a guide channel.

Receivable in the foregoing described guide channel is a movable magnet means including clips **19** and **20** of nonmagnetic material secured to side plates **21** and **22** of magnetic material defining forward and rearward pole pieces for a permanent magnet **23**. The magnet **23** is in the form of a block, the forward and rear ends of the side plates **21** and **22** extending beyond the forward and rear surfaces of the block **23** as shown. The clips **19** and **20** are dimensioned to fit within the channel between the side plates **15** and **16**. In FIGURE 2, this channel is designated generally by the numeral **24**.

With particular reference to FIGURE 3, there are provided first spring means in the form of coil springs **25** and **26** disposed in opposing bores formed in the clips and holder **17**. These springs serve to hold the movable magnet **23** at a given distance relative to the fixed magnetic material in the form of the member **18**. The springs **25** and **26** will be compressed when the permanent magnet **23** is urged into the channel to decrease the spacing between the magnet and the member **18**.

As also illustrated in FIGURE 3, there is provided a second spring means in the form of a compression spring **27** extending from a bore in the movable magnet means towards the plate **14** when the door **12** is in closed position. This latter spring will be placed under compression when the plate **14** is closed against the forward poles defined by the side plates **21** and **22** for the magnet **23**.

FIGURE 4 illustrates the relative positions of the magnet poles **21** and **22** and magnetic material in the form of the member **18** when a touching pressure P is exerted on the door **12**. Thus, in the position of FIGURE 4 it will be evident that when the door **12** is urged further inwardly, the member **18** will be received between the rear poles of the side plates **21** and **22** for the magnet **23**. Because of the high permeability of the member **18**, there will be provided a short circuit for the flux of the magnet through the member **18** thereby decreasing the magnetic field strength at the forward poles of the side plates **21** and **22**. The second spring means **27** described in FIGURE 3 is of sufficient strength to overcome the small residual magnetic attraction of the pole pieces to the plate **14** when the magnetic field is decreased as described in FIGURE 4 so that the door **12** is then separated from the plate **14** after application of the touching pressure.

OPERATION

The operation of the magnetic touch latch of this invention wlil be evident from the foregoing description. Initially, the magneitc catch device **13** illustrated in FIGURE 1 is secured to the inside frame of the cabinet **11**. This may be accomplished by providing suitable screw hole brackets on the member itself or alternatively simply embedding the member in the frame structure as illustrated. The plate **14** is then held by a simple screw to the inside surface of the door **12** in a proper position to engage the forward poles of the side plates **21** and **22** when in closed position as illustrated by the dotted lines **12'** in FIGURE 2.

When the cabinet door is completely closed, it will assume the dotted line position **12'** illustrated in FIGURE 2 and will be held closed by the magnetic field of the magnet **23** appearing across the front portions of the side plates **21** and **22**. Because of the spacing between the permanent magnet **23** and the member **18**, maximum field strength will occur across the front poles so that proper holding of the door in its closed position will result. It should be noted that the second spring **27** of FIGURE 3 will be compressed slightly when the plate **14** engages the front poles of the side plates **21** and **22**. However, the attractive magnetic force is greater than the counterforce exerted by this spring so long as the spacing between the magnet **23** and the member **18** remains as shown in FIGURES 2 and 3.

Whenever it is desired to open the door, it is only necessary for a person to apply a slight touching pressure on the exterior of the door in the direction of the arrow P of FIGURE 4. This pressure will then urge the magnet **23**, side plates **21** and **22** and clips **19** and **20** into the channel **24** in such a manner that the member **18** will be received between the rear poles defined by the side plates **21** and **22**; that is, in a position adjacent to the permanent magnet **23**. Because of the high permeability of the member **18**, the flux will be short circuited through this member thereby greatly decreasing the magnetic field strength at the forward poles defined by the side plates **21** and **22**. In fact, the magnetic field is sufficiently weakened that the second spring **27** exerts a sufficient force against the plate **14** to readily separate it from the front poles of the side plates **21** and **22** so that the door is released.

In the foregoing operation, it will be understood that the first springs **25** and **26** of FIGURE 3 are compressed when the movable magnet means is received fully within the channel to the position illustrated in FIGURE 4. When the pressure P is released on the door **12**, these first springs will tend to retract the permanent magnet **23** and associated clips **19** and **20** along with the side plates **21** and **22** from the channel. However, there will simultaneously be applied pressure to the plate **14** by the second spring **27**. The position of the member **18** between the rear poles of the side plates **21** and **22** short circuits the magnetic field for a period of time necessary for the member **18** to be completely withdrawn from between these plates and it is during this interval of time that the second spring **27** has an opportunity to effect the separation. Once the separation is made, any residual magnetic attraction between the front poles of the side plates **21** and **22** and the plate **14** is further decreased because of the distance between the plate **14** and the poles; that is, the resulting small space upon initial separation. The operation is such that there is assured a positive separation of the door and an actual outward pressure by the spring **27** on the door so that after releasing the touching pressure, the door will readily open automatically.

With the door open, the components of the magnetic catch structure **13** are as illustrated in FIGURE 2 and to close the door, it is only necessary to place the plate **14** in contact with the front edges of the side plates **21** and **22** where they are held by magnetic attraction. The door will then not reopen until an intentional touching pressure is applied in the direction of the arrow P to again compress the springs **25** and **26**.

From the foregoing description, it will thus be evident that the present invention has provided a greatly improved touch latch mechanism for cabinet doors. As in the case of the mechanical type touch latches presently available, there is not necessary any external knobs,

handles or the like to open or close the cabinet door so that a desired aesthetic appearance is realized. In addition, however, there is no possibility of a positive locking of the door in a closed position since there is not involved mechanical moving parts subject to failure. It will be clear that there is essentially only one moving part, to wit the permanent magnet structure **23** with associated side plates **21** and **22** and guide clips **19** and **20**. This structure moves as a unit into the channel **24** defined between the plates **15** and **16**. Should this movable structure be locked in its innermost position by some fault, the field at the forward ends of the side plates **21** and **22** is decreased sufficiently that the door **12** will not be held closed and thus the catch mechanism is clearly exposed for ready repair. On the other hand, should the movable structure become stuck outwardly or bind outwardly for some reason, the door can still be held closed by the magnetic means and to open the same it is only necessary to apply sufficient outward force to overcome the magnetic attraction coupling poles **21** and **22** to plate **14**. This force can normally be applied without damaging the door or necessitating removing the hinges.

While the invention has been described with respect to mounting the permanent magnet portion on the cabinet frame and the attracting plate to the door, it is of course understood that these parts could be reversed. Further, while the non-magnetic portions of the device have been described as plastic, any other non-magnetic material such as brass or ceramic could be used.

What is claimed is:

1. A magnetic touch latch comprising, in combination:

(a) a magnetic catch device adapted to be secured to a cabinet frame and including

(1) a permanent magnet;

(2) means for decreasing the magnetic field strength at one portion of said magnet; and

(b) a plate member adapted to be secured to the inside surface of a door for said cabinet in a position to be magnetically attracted and held by said one portion of said magnet, said means for decreasing the magnet field strength of said one portion of said magnet comprising a member of high permeability normally spaced from another portion of said permanent magnet by a given distance, said given distance, being decreased by a touching pressure on said door urging said door against said magnet such that flux in said other portion of said magnet is short-circuited through said member to thereby decrease the magnetic field strength at said one portion, permitting said door to be released to an open position.

2. A latch according to claim **1**, including first spring means for holding said permanent magnet at said given distance from said member, said first spring means being compressed when said given distance is decreased; and second spring means between said permanent magnet and plate member exerting a separating force therebetween less than the magnetic attractive force on said plate when said member is at said given distance and greater than the magnetic attracting force when said magnetic field strength is decreased by decreasing said given distance, whereby said second spring means releases said plate from said one portion of said permanent magnet after said given distance is decreased.

3. A magnetic touch latch for holding a cabinet door closed against a cabinet frame by magnetic attraction and responsive to a touching pressure on the door urging the door towards said frame to magnetically release the door so that the same opens, comprising, in combination:

(a) magnetic catch device adapted to be secured to said frame, said device including

(1) a fixed magnetic means;

(2) non-magnetic guide means fixed to said magnetic means and defining a guide channel normal to and opening towards the inner surface of said door when said door is closed;

(3) a movable magnet means received in the open end of said channel;

(4) first spring means connected between said fixed magnetic means and said movable magnet means biasing said movable magnet means outward of said channel to a spaced position from said fixed magnetic means;

(5) second spring means extending from said movable magnet means towards said door; and

(b) a plate member adapted to be secured to the inside surface of said door in a position to compress said second spring means and be magnetically attracted to and held by said movable magnet means when in said spaced position, whereby application of a touching pressure to said door urges said movable magnet means into said channel to a position adjacent to said fixed magnetic means, said fixed magnetic means providing a new flux path for said magnet means whereby the magnetic attraction of said plate to said movable magnet means is weakened sufficiently to be overcome by said second spring means so that said plate is separated from said movable magnet means and said door is free to open when said touching pressure is relieved, said first spring means then returning said movable magnet means to its said spaced position.

4. A latch according to claim **3**, in which said fixed magnetic means comprises a magnetic member having a high permeability; a holder secured to the rear surface of said member, said guide means comprising plastic plates fixed to opposite siles of said holder and extending forwardly beyond a front surface of said member towards said door when closed to define therebetween said channel, the front portion of said member extending into said channel, said movable magnet means comprising a permanent magnet in the form of a block with side plates of magnetic material extending forwardly and rearwardly beyond the forward and rearward surfaces of said block to define front and rear poles; and non-magnetic clip means on said poles dimensions to be received in said channel and guide movement of said block and poles from said spaced position to an inner position in which the forward portion of said member is received between the rear poles thereby reducing the magnetic attraction of the front poles to said plate.

5. A latch according to claim **4**, in which said first spring means comprise compression springs received between opposing bores in said clip means and holder, said second spring means extending from a front bore in one of said clip means with a free end positioned to be engaged and compressed by said plate.

References Cited

UNITED STATES PATENTS

2,117,132	5/1938	Bagermann	292—251.5
2,673,111	3/1954	Teetor	292—251.5
2,854,273	9/1958	Cunningham	292—251.5
2,888,290	5/1959	Pierce	292—251.5
2,915,681	12/1959	Troy	317—123

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