Aug. 2, 1960 E. L. SCHLAGE ET AL 2,947,507

MAGNETIC DISPLAY MOUNT

Filed Dec. 5, 1958

2 Sheets-Sheet 1

Fig_1

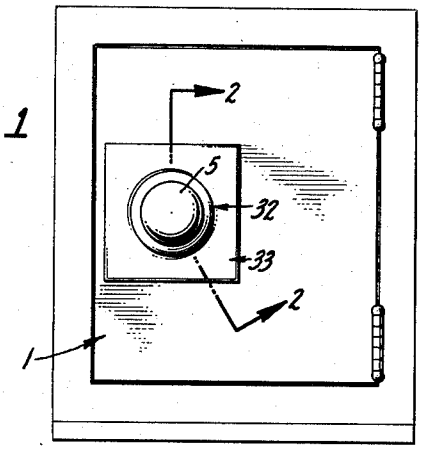
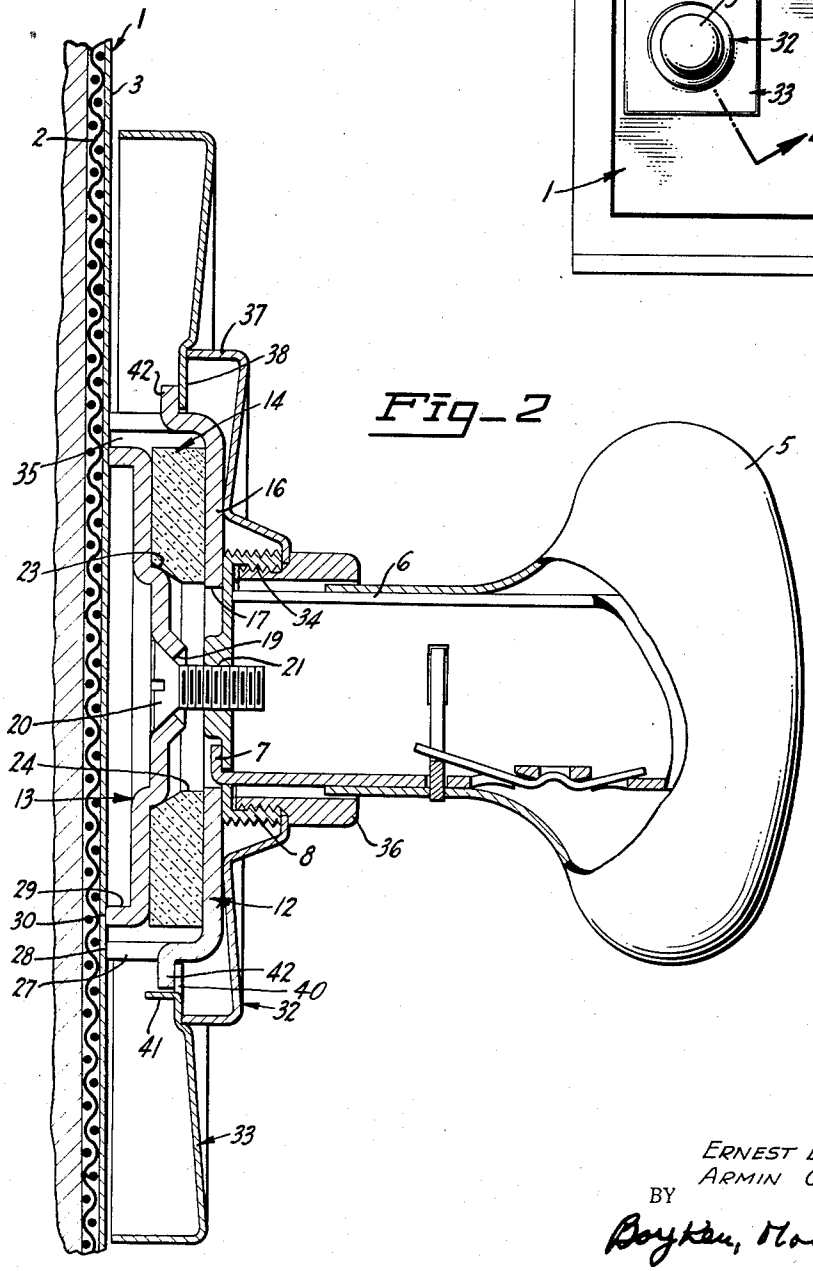


Fig_2



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Fig_3

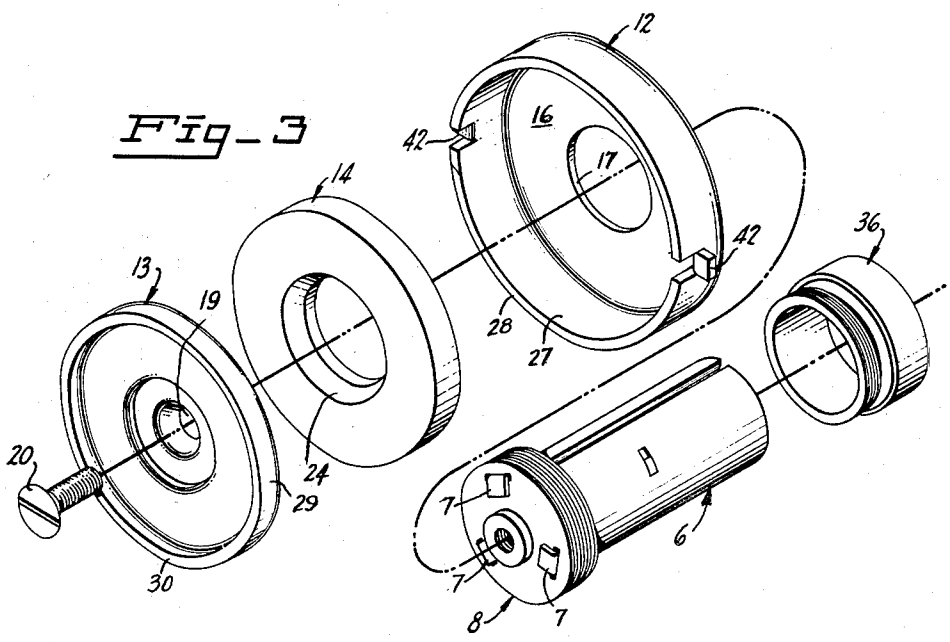
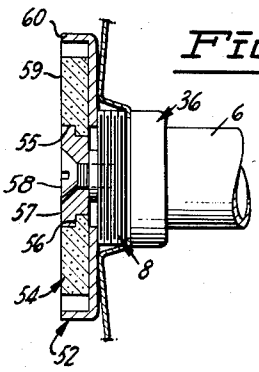


Fig_4



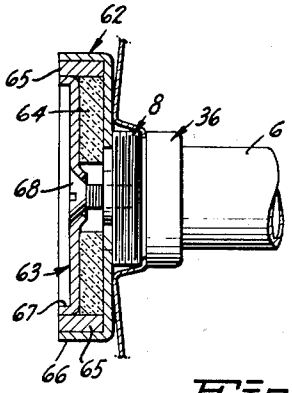


Fig_5

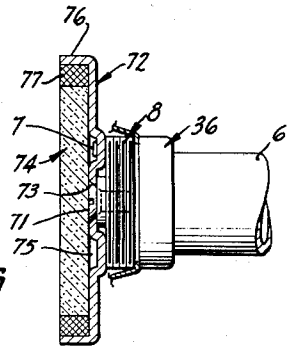


Fig_6

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MAGNETIC DISPLAY MOUNT

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This invention relates to a display mount for displaying articles on a display board. More particularly the invention relates to display means in which the article to be displayed is secured magnetically to the display board.

The importance of door knobs and their associated decorative plates has, in recent years, been more and more emphasized as an important consideration in the aesthetic design of an entrance whether it be residential or commercial. It is therefore important for the designer or prospective user or purchaser to be able to judge the effect of various combinations of colors and designs on the overall appearance of an entryway.

Most important to appearance of a doorway is the arrangement of the door knob, its rose or escutcheon and the background associated therewith. The present invention will therefore be described in connection with the display of a door knob and its associated decorative plates although it will be understood that the invention may apply to other articles.

The main object of the present invention is therefore the provision of a display mount which permits various combinations of door knobs, roses and escutcheon plates to be quickly assembled together on a display mount so as to faithfully convey the same appearance as when ultimately used on a door.

Another object of the invention is the provision of a display mount in which the displayed article is magnetically held on the display board so as to be readily installed and removed without the use of conventional fastening means.

Still another object of the invention is the provision of a magnetic mounting means which permits the use of a relatively inexpensive magnet and at the same time achieves optimum holding effect.

Yet another object of the invention is the provision of a magnetic mounting means particularly adapted for use in mounting a door knob on a display board of light, portable construction.

Other objects and advantages will be apparent from the following specification and from the drawings:

Fig. 1 is a front elevation of a door knob and its associated escutcheon plate mounted on a display mount in accordance with the invention.

Fig. 2 is an enlarged vertical cross section through the door knob and its associated structure as taken along lines 2—2 of Fig. 1.

Fig. 3 is an exploded perspective of the various elements of the mount.

Figs. 4, 5, 6 are cross sections of modified forms of the invention.

In detail, and with reference to the preferred form of the invention shown in Figs. 1, 2, a display board, generally designated 1, of any suitable material may be employed to simulate a door on which the articles to be displayed are mounted. However, the present invention lends itself to use with a light weight expanded metal display mount to which a light weight facing may be secured to simulate, for example, the wood finish of a door.

Thus, as best seen in Fig. 2, a vertically disposed sheet of expanded metal 2 is provided to which may be secured, as by a suitable adhesive, a sheet 3 of paper or thin cardboard to simulate the finished door. By this arrangement a backing of magnetic material is provided with a minimum of weight to afford portability and at the same time the viewer is provided with the same outward appearance as is presented by a real door.

The example used herein to illustrate the invention is that of a door knob 5 that is provided with a spindle 6. In a conventional lock the spindle 6 may be provided with rollback means for actuating the retractor but for demonstration purposes a plain spindle may be employed which is modified in a manner to be described.

The spindle of Fig. 2 is provided with preferably three integral lugs 7 (Fig. 3) which are adapted to pass through corresponding holes in a threaded hub 8 so that when said lugs are bent radially inwardly as shown in Fig. 2 the spindle and hub are, for all practical purposes, integrally secured together.

A magnetic mounting is adapted to be releasably secured to the end of spindle 6. Said mounting comprises an inner pole piece 12, an outer pole piece 13 and a magnet 14 of annular shape interposed between said pole pieces.

Pole piece 12 is generally dish-shaped and includes a circular bottom portion 16 which is provided with a central circular hole 17 through which the lugs 7 project. By making the diameter of hole 17 of a size to just fit around the three lugs 7, the inner pole piece 12 is automatically centered relative to the axis of spindle 6 when the former is positioned against hub 8 with the lugs 7 within hole 17.

Outer pole piece 13 is also dish shaped and is provided with a central aperture 19 for receiving therethrough the threaded shank of a flat head screw 20 which is adapted to be threadedly received in a threaded hole 21 in hub 8. Pole piece 13 is joggled to provide an annular shoulder 23 which is adapted to register with the complementarily formed radially inwardly directed face 24 of the annular magnet 14. Around central hole 19 the outer pole piece 13 is formed complementarily to the frustoconical head of screw 20 so that when the various parts are secured to hub 8 the two pole pieces 12, 13 and the annular magnet 14 are concentric with the axis of spindle 6.

Inner pole piece 12 is provided with an axially extending annular flange 27 covering the outer periphery of magnet 14 and terminating in a circular edge 28. Similarly, outer pole piece 13 is provided with a shorter flange 29 terminating in a circular edge 30 radially inwardly spaced from edge 28 of flange 27. Edges 28, 30 are coplanar so as to be magnetically secured to support 2.

At this point it should be noted that the axial distance between the end of spindle 6 and the edges 28, 30 should be no greater than is necessary to accommodate a rose 32 and an escutcheon plate 33 which are displayed in connection with the knob 5. Since said rose and escutcheon are relatively thin it is essential that the pole pieces and magnet occupy as little space as possible in a direction axially of the spindle 6. By the present invention the magnet 14 and pole pieces 12, 13 of Fig. 1 achieve a maximum holding power and at the same time occupy a minimum amount of space axially of the spindle 6.

The permanent magnet 14 is preferably of sintered barium ferrite known commercially under various trademarks such as Ferrimag, Indox and Ceramagnet. This material is ceramic in character, being a nonconductor, hard, brittle and relatively light in weight. Although the last mentioned characteristic is advantageous for the use herein described, the frangible nature of the material

requires that it be protected against injury as much as possible. From Fig. 2 it will be noted that this protection is achieved by the present invention because the annular magnet 14 is protected on all sides against injury by pole pieces 12, 13. Furthermore, as will be understood, even if the magnet 14 is broken during use the portions into which it is broken are prevented from falling out of the mount by the flanges 27, 29 of the pole pieces 12, 13 and the functioning of the magnet is not impaired.

As stated above, magnet 14 retains its magnet power even if broken. This results from the fact that, by the present invention it is magnetized in an axial direction, that is, in a plane at right angles to the opposite sides which engage pole pieces 12, 13.

Barium ferrite, of which the magnet 14 is preferably formed, is characterized by the fact that it develops its greatest coercive force when magnetized in a direction of its thinnest dimension. Thus, maximum holding power results from the arrangement of Fig. 2 and at the same time the dimension of the magnet mount in an axial direction is small enough to permit the rose and escutcheon plate to be displayed in their normally viewed positions relative to each other and to the door on which they are installed.

The magnetic field created is, of course, impressed upon pole pieces 12, 13 so that the inner pole piece 13 may become, for example, a "north" pole and pole piece 12 a "south" pole, or vice versa. It will be understood that the two radially spaced flanges 27, 29 of pole pieces 12, 13 respectively thus become, in effect, the magnet which is secured to the display board 1.

It will be understood that in the arrangement of Fig. 2 the width of the annular air gap 35 between flanges 27, 29 may be readily determined to suit the magnetic strength of magnet 14 so as to minimize "bleeding" which may occur if the poles are too close.

One method of installing the rose 32 is shown in Fig. 2 wherein the outer diameter of hub 8 is made about equal to the inner diameter of rose 32. Hub 8 is internally threaded as at 34 to receive a bushing 36 which, when screwed into hub 8, positions and holds rose 32 in a position coaxial with spindle 6.

If it is desired to view the knob 5 and rose 32 in combination with the escutcheon plate 33 it is merely necessary to place the assembled knob, spindle, rose and magnetic mount on the escutcheon with the outer flange 37 of the rose 32 received in the complementarily formed annular depressed portion 38 of escutcheon 33. The entire assembly, including the escutcheon, may then be applied to the display board as a unit to permit viewing the same. It is then a simple matter to remove the magnetically held mount and substitute a different escutcheon in order to make the desired comparison of appearance.

Escutcheon 33 is ordinarily provided with a plurality of radially inwardly opening notches 40 formed by striking out prongs 41. In such a case two or more lugs 42 may be struck from flange 27 of the inner pole piece 12 and bent radially outwardly as shown in Fig. 2 to pass through the notches 40 of the escutcheon plate. By rotating the magnetic mount relative to escutcheon 33 so that the latter is gripped between lugs 42 and rose 32 the entire assembly may be handled as a unit. Bushing 36 may be backed off slightly during the above described assembly and then screwed back into hub 8 to tighten rose 32 against escutcheon 33. It will be noted that sufficient space is left between escutcheon 33 and the mounting board to accommodate prongs 41 in the event they are made long enough to be imbedded in the door.

With respect to the above described embodiment it will be noted that an annular magnet of relatively large diameter is effected which creates a relatively high torque resisting the tendency of the display to be pulled off the board by gravity. Furthermore, the relatively large diameter of the magnet permits use on a board having large openings such as the expanded metal 2.

A modified form of the invention is shown in Fig. 4 which requires only one pole piece. The same spindle 6 may be employed and an inner pole piece 52 similar to pole piece 12 of Fig. 2 is secured against said spindle. However, in this case the annular magnet 54 is provided with a central aperture 55 formed with an outwardly directed shoulder 56 for receiving a complementarily formed ferrule 57 of nonmagnetic material. A flat head screw 58 similar to screw 20 serves to secure the assembly to the end of spindle 6.

Although the arrangement of Fig. 4 has the disadvantage of exposing the magnet 54 to injury, a somewhat stronger magnetic field is created because of the direct engagement of the outer side 59 of magnet 54 with the display board. Since the ferrule 57 is of nonmagnetic material the same desirable annular shape field is also formed. The flange 60 of inner pole piece of course creates a magnetic pole opposite to the pole of the outer face 59 of magnet 54 since the latter is magnetized in an axial direction as previously explained.

A somewhat more rugged construction is shown in Fig. 5 wherein inner and outer pole pieces 62, 63 are employed with annular magnet 64 therebetween in much the same way as shown in Fig. 2. In this case, however, a sleeve 65 of nonmagnetic material is inserted in the space between flanges 66, 67 of pole pieces 62, 63 respectively. Sleeve 65 if tightly fitted between the flanges 66, 67 does not require any special retaining means.

The presence of sleeves 65 in lieu of an air gap reduces leakage between the flanges 66, 67 and permits said flanges to be positioned more closely together thus enhancing the holding power.

The construction of Fig. 5 provides optimum protection for magnet 64, which may be of a simple annular shape, and no stresses, except for a small amount of compression applied by tightening screw 68, are applied to the magnet.

Another modified form, shown in Fig. 6, takes advantage of the good adhering qualities of some of the new plastics such as the epoxies, in assembling the various parts of the magnet.

Inner pole piece 72 of Fig. 6 is provided with a central recess 75 to receive therein lugs 7 of the spindle 6 and is provided with a countersunk hole 73 for receiving the complementarily formed head of flat head screw 71 for securing pole piece 72 to spindle 6. A disk shaped magnet 74 is positioned centrally of pole piece 72 and is secured thereto by a plastic material 77 of good adhering qualities such as epoxy resin. The plastic may be poured into the annular space between the magnet 74 and the flange 76 of pole piece 72 so that upon solidifying it establishes a bond between the pole piece and the magnet.

The arrangement of Fig. 6 gives optimum protection for the magnet 74 and even if the latter breaks its functioning is not impaired. Leakage between flange 76 and magnet 74 is also reduced.

It is seen that the herein described invention provides an effective method of mounting knobs and their associated roses and escutcheons in various combinations to appraise the aesthetic appeal of such combinations. No mechanical fastening means are required and the resultant display is in every respect the same as the final installation. The particular arrangements shown not only create maximum holding power but are sufficiently economical to justify practical use by hardware dealers and the like.

The very specific descriptions hereinbefore set forth are not to be taken as restrictive of the invention as it is obvious that various modifications in design may be resorted to without departing from the spirit of the invention.

We claim:

1. A door knob display comprising: an elongated spindle adapted to receive a knob thereon at one end

thereof, a circular pole piece centrally secured to the opposite end of said spindle and disposed at right angles to the axis of said spindle, said pole piece including a circumferential flange extending axially outwardly relative to said spindle and terminating in a circular edge adapted to be applied against a display board, a magnet positioned radially inwardly of said flange and in engagement at one of its opposite sides with said pole piece on the side of the latter opposite said spindle, said magnet being magnetized in a direction at right angles to said opposite sides whereby said edge has a magnetic polarity opposite to the polarity of the other of said opposite sides of said magnet, a second pole piece engaging said magnet on said other side and being positioned within the radially projected confines of said flange for establishing a magnetic pole opposite to the polarity of said flange.

2. A door knob display comprising: an elongated spindle adapted to receive a knob thereon at one end thereof, a circular pole piece centrally secured to the opposite end of said spindle and disposed at right angles to the axis of said spindle, said pole piece including a circumferential flange extending axially outwardly relative to said spindle and terminating in a circular edge adapted to be applied against a display board, a magnet positioned radially inwardly of said flange and in engagement at one of its opposite sides with said pole piece on the side of the latter opposite said spindle, said magnet being magnetized in a direction at right angles to said opposite sides whereby said edge has a magnetic polarity opposite to the polarity of the other of said opposite sides of said magnet, said magnet being secured to said pole piece by an adhesive material filling the annular space between said magnet and said flange.

3. A door knob display comprising: an elongated spindle adapted to receive a knob thereon at one end thereof, a circular pole piece centrally secured to the opposite end of said spindle and disposed at right angles to the axis of said spindle, said pole piece including a circumferential flange extending axially outwardly relative to said spindle and terminating in a circular edge adapted to be applied against a display board, a magnet positioned radially inwardly of said flange and in engagement at one of its opposite sides with said pole piece on the side of the latter opposite said spindle, said magnet being magnetized in a direction at right angles to said opposite sides whereby said edge has a magnetic polarity opposite to the polarity of the other of said opposite sides of said magnet, and a spacer of nonmagnetic material filling the annular space between said magnet and said flange.

4. A door knob display comprising: an elongated spindle adapted to receive a knob thereon at one end thereof, first and second pole pieces at the other end of said spindle and a magnet interposed between said pole pieces, means for securing said pole pieces and magnet to said other end of said spindle, said pole pieces being generally dish shaped and including annular flanges extending axially outwardly from said spindle and radially spaced apart relative to said spindle to provide an annular gap therebetween, said magnet being relatively thin with its opposite faces in engagement with said pole pieces respectively for magnetizing said flanges with opposite polarity.

5. Means for displaying a door knob comprising a spindle on which said knob is mounted at one end thereof, a magnet mounted on the other end of said spindle and a pair of pole pieces of magnetic material in engagement with said magnet and positioned on opposite sides of said magnet and formed with similarly disposed flanges terminating in radially spaced annular edges adapted to be magnetically held to a display plate.

6. Means for displaying a door knob comprising a spindle on which said knob is mounted at one end thereof, a magnet mounted on the other end of said spindle

and a pair of pole pieces of magnetic material in engagement with said magnet and positioned on opposite sides of said magnet and formed with similarly disposed flanges terminating in radially spaced annular edges adapted to be magnetically held to a display plate, said magnet being relatively thin and having a pair of opposite faces and being magnetized in a direction perpendicular to its opposite faces.

7. A door knob display comprising: an elongated spindle adapted to receive a knob thereon at one end thereof, a pair of pole pieces, a relatively thin magnet interposed between said pole pieces and engaging the opposed sides thereof, means for securing said pole pieces and said magnet to the opposite end of said spindle, said pole pieces being provided with corresponding peripheral flanges extending axially outwardly in the same direction relative to said spindle, said flanges being radially spaced apart and terminating in coplanar edges adapted to be applied against a display board, said magnet being magnetized in an axial direction whereby said edges are magnetized with opposite polarity.

8. A door knob display comprising: an elongated spindle adapted to receive a knob thereon at one end thereof, a pair of pole pieces, a relatively thin magnet interposed between said pole pieces and engaging the opposed sides thereof, means for securing said pole pieces and said magnet to the opposite end of said spindle, said pole pieces being provided with corresponding peripheral flanges extending axially outwardly in the same direction relative to said spindle, said flanges being radially spaced apart and terminating in coplanar edges adapted to be applied against a display board, said magnet being magnetized in an axial direction whereby said edges are magnetized with opposite polarity means carried by said spindle for tightening a rose around the same and overlying the pole piece adjacent said spindle.

9. A door knob display comprising: an enlongated spindle adapted to receive a knob thereon at one end thereof, a pair of pole pieces, a relatively thin magnet interposed between said pole pieces and engaging the opposed sides thereof, means for securing said pole pieces and said magnet to the opposite end of said spindle, said pole pieces being provided with corresponding peripheral flanges extending axially outwardly in the same direction relative to said spindle, said flanges being radially spaced apart and terminating in coplanar edges adapted to be applied against a display board, said magnet being magnetized in an axial direction whereby said edges are magnetized with opposite polarity, means carried by said spindle for tightening a rose around the same and overlying the pole piece adjacent said spindle, and means for securing an escutcheon plate to said last mentioned pole piece.

10. A display support comprising: outer and inner disks of magnetic material, a disk-shaped magnet having faces of opposite polarity disposed between said disks and in contact therewith, whereby said disks become pole pieces of opposite polarity, an annular flange on each disk, said flanges being of different diameter and terminating on a common plane and being spaced apart to form an annular space between the flanges, means securing the disks and magnet together as a unit, and means on the outer disk to receive and support a display.

11. A display support comprising: an outer and an inner disk of magnetic material each having an annular flange formed thereon, said flanged disk being disposed one within the other in a concentric position, and one disk being of smaller diameter than the other to form an annular space between the flanges, a disk-shaped magnet having faces of opposite polarity disposed between the flanged disks and in contact therewith, whereby said disks become pole pieces of opposite polarity, means securing the disks and magnet together as a unit, and means on the outer disk for receiving and supporting a display.

12. A display support comprising a disk having an annular flange disposed substantially at right angles thereto, a door knob spindle secured to the disk on the side thereof opposite the flange, said spindle being adapted to receive and support a door knob, means on the disk for receiving and supporting a rose, and a disk-shaped magnet secured within the flange of the disk and circumferentially spaced therefrom, said disk-shaped magnet having faces of opposite polarity with one face in contact with the flanged disk and the other face adapted to contact a magnetic display surface.

13. A display support comprising a disk having an annular flange disposed substantially at right angles thereto, a door knob spindle secured to the disk on the side thereof opposite the flange, said spindle being adapted to receive and support a door knob, means on the disk for receiving and supporting a rose, means on the disk for securing and supporting an escutcheon plate, and a disk-shaped magnet secured within the flange of the disk and circumferentially spaced therefrom, said disk-shaped magnet having faces of opposite polarity with one face contacting the flanged disk and the other face adapted to contact a magnetic display surface.

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