Aug. 28, 1951 R. E. PHELON 2,565,625

HOLDER FOR ARTICLES OF MAGNETIC MATERIAL

Filed Nov. 29, 1949

FIG. 1

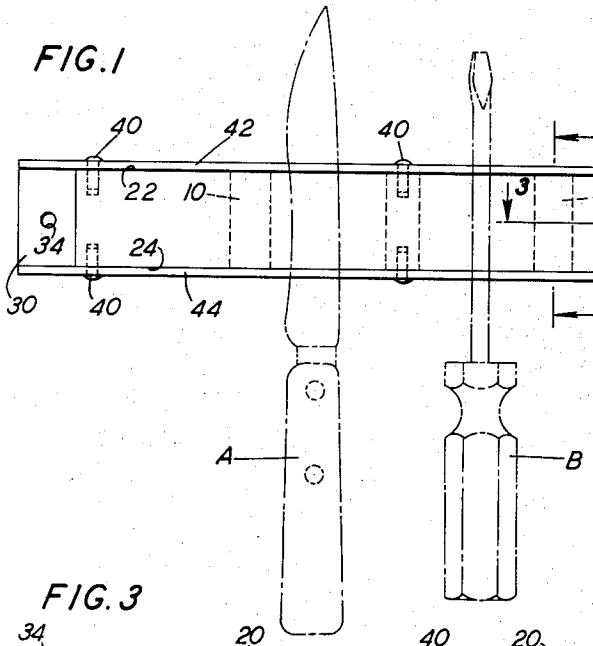


FIG. 2

FIG. 4

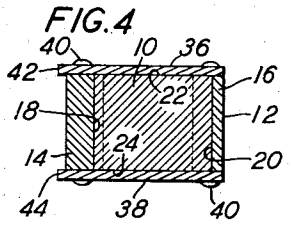


FIG. 3

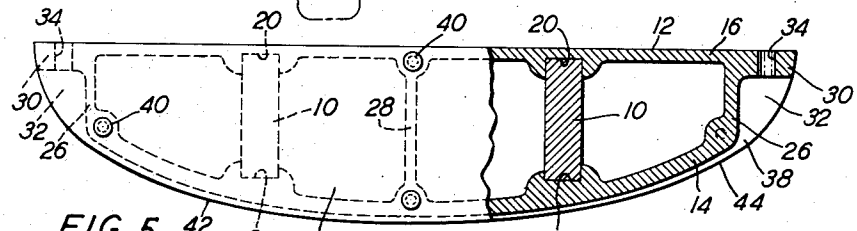


FIG. 5

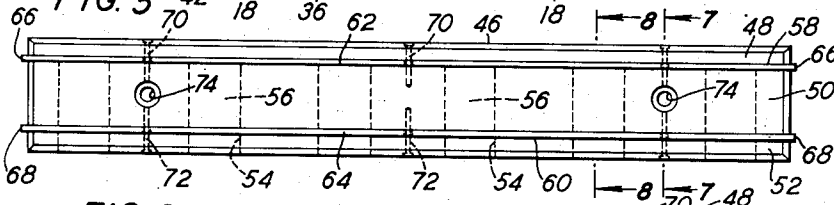


FIG. 6

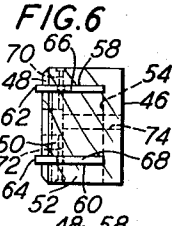


FIG. 9

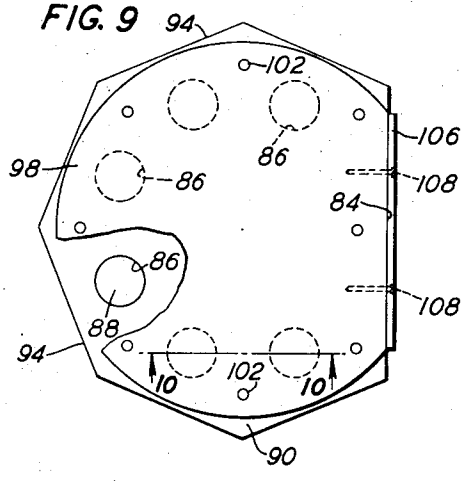


FIG. 7

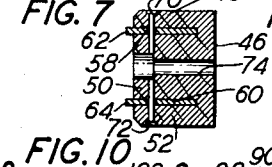


FIG. 8

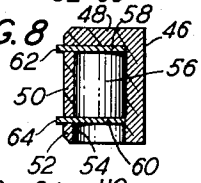
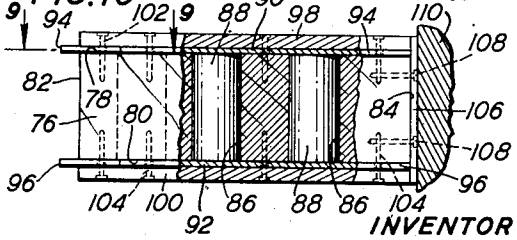


FIG. 10



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Patented Aug. 28, 1951

2,565,625

UNITED STATES PATENT OFFICE

2,565,625

HOLDER FOR ARTICLES OF MAGNETIC MATERIAL

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Application November 29, 1949, Serial No. 129,929

3 Claims. (Cl. 175—367)

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This application is a continuation-in-part of my copending application for Holder for Articles of Magnetic Material, Serial No. 9,134, filed Feb. 18, 1948.

The invention relates to a rack or holder utilizing one or more permanent magnets and adapted for holding articles consisting in whole or in part of magnetic material. A holder embodying the invention is particularly adapted for domestic use, as forinstance in a kitchen, for holding cutlery, shears and the like. A holder embodying the invention is also adapted for use in a workshop or elsewhere for holding various small machinist's or carpenter's tools or other small articles.

The general object of the invention is to provide a holder of the type referred to which is simple and inexpensive, which has ample holding capability and which is attractive in appearance.

A more specific object of the invention is to provide a holder of the type referred to wherein the magnet or magnets are enclosed within an opening or openings in a nonmagnetic body and are vertically insertable in the said opening or openings and wherein the pole pieces are secured to the body above and below the magnet or magnets and in engagement therewith, the said pole pieces or at least one of them serving to secure the magnet or magnets in place and to prevent relative vertical movement thereof.

Other more specific objects of the invention will be apparent from the drawing and from the following specification and claims.

In the drawing I have shown in detail several embodiments of the invention, but it will be understood that various changes may be made from the constructions shown and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

Fig. 1 is a front view of a holder embodying the invention.

Fig. 2 is a right end view.

Fig. 3 is a combined plan and sectional view, the section being taken along the line 3—3 of Fig. 1.

Fig. 4 is a vertical sectional view taken along the line 4—4 of Fig. 1.

Fig. 5 is front view of an alternative holder embodying the invention.

Fig. 6 is a right end of the holder shown in Fig. 5.

Fig. 7 is a vertical sectional view taken along the line 7—7 of Fig. 5.

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Fig. 8 is a vertical sectional view taken along the line 8—8 of Fig. 5.

Fig. 9 is a plan view of another alternative holder embodying the invention, a portion being broken away and shown along the line 9—9 of Fig. 10.

Fig. 10 is a combined right end and sectional view of the holder shown in Fig. 9, the section being taken along the line 10—10 of Fig. 9.

Referring more particularly to Fig. 1 to 4 of the drawing, 10, 10 are longitudinal spaced permanent magnets each having opposite horizontal pole faces at the top and bottom. The magnets may be formed of any suitable magnetic material, such as an iron-nickel-aluminum-cobalt alloy. While two magnets are shown, it will be understood that the invention is not so limited and that a different number of magnets may be provided. The magnets are shown as being rectangular in horizontal cross section but the cross sectional shape may be changed.

A body 12 of the nonmagnetic material is provided, the body horizontally surrounding the magnets 10, 10 and having vertical interior faces engaging the said magnets to prevent relative horizontal movement thereof. As shown, the body 12 has transversely spaced vertical front and rear walls 12 and 16 between which the magnets are located. The said walls are provided with longitudinally spaced pairs of separate interior notches for receiving the magnets which notches have vertical faces. The front wall 14 has notches 18, 18 for receiving and fitting the front portions of the magnets and the rear wall 16 has notches 20, 20 for receiving and fitting the rear portions of the magnets.

The body 12 has initially exposed upper and lower horizontal faces 22 and 24 which are so spaced that they register with the opposite pole faces of the magnets. Inasmuch as the upper and lower body faces 22 and 24 are initially exposed, the notches 18, 18 and 20, 20 are open at the top and at the bottom and the magnets can be inserted vertically, either downward or upward, as may be preferred.

The body 12 is preferably a single piece of material, such as molded resin, and it comprises not only the beforementioned front and rear walls 14 and 16 but also end walls 26, 26 which connect the front and rear walls. In addition there may be a transverse central wall 28. The spaces between the aforesaid walls are entirely open at the tops and at the bottoms thereof. Extending longitudinally from the end walls 26, 26 are walls 30, 30 which cooperate with the end

walls 26, 26 to provide open front notches 32, 32. The walls 30, 30 are apertured at 34, 34 for the reception of screws by means of which the entire holder can be attached to a vertical supporting wall. The said notches 32, 32 provide spaces for the heads of the screws and permit ready access thereto.

Two relatively thin pole pieces 36 and 38 are provided, these being formed of magnetic material. The pole pieces respectively engage the upper and lower faces 22 and 24 of the body and they also engage the top and bottom pole faces of the magnets. The pole pieces are suitably connected with the body and are preferably connected therewith by means of a plurality of headed pins 40, 40 which extend through apertures in the pole pieces and into registering apertures in the body. The last said apertures in the body are initially slightly smaller than the pins so that the pins must be driven into place by them, being held frictionally so as to retain the pole pieces. It will be seen that the pole pieces, by reason of their engagement with the magnets and by reason of their connection with the body, serve to retain the magnets in place and to prevent any relative vertical movement thereof.

The pole pieces 36 and 38 have vertically registering narrow edge faces 42 and 44 which are spaced outward or forward from the body. The said edge faces 42 and 44 of the pole pieces longitudinally span the magnets and they are preferably continuously curving convexly between points which are near the respective ends of the pole pieces and which are spaced longitudinally beyond the respectively adjacent magnets. Preferably the said edge faces 42 and 44 of the pole pieces have substantially greater curvature at the end zones thereof than at the central portions or zones thereof.

In use the holder is suitably mounted on a vertical supporting wall in horizontal position as shown, the registering edge faces 42 and 44 of the pole pieces being vertical. Articles formed in whole or in part of magnetic material can be placed in contact with the faces 42 and 44 and they will be held magnetically. Fig. 1 of the drawing shows a knife A and a screw driver B which are so held. It will be understood that while the knives and other articles are held sufficiently firmly so that they will not be separated by gravity or vibration, they can be readily removed when desired by grasping them and pulling them off.

The narrow front faces 42 and 44 provide small areas of contact with the parts which are to be held. This makes it impossible to shunt so much magnetism through a few articles at one end of the holder that there is not enough left to support articles at the other end. This results from the fact that the available amount of magnetism for each linear unit of length is limited by the saturation of the iron in the areas of contact with the articles. Another advantage in making the engaging faces narrow is that a high flux density between the articles and the said engaging faces is assured, thus providing effective holding power inasmuch as the holding power is proportionate to the square of flux density. Still another advantage of a holder embodying the invention is that each article is held at two relatively widely spaced positions, thus assuring a favorable leverage effect on the article.

The alternative holder shown in the Figs. 5 to 8 is similar in many respects to that shown in Figs. 1 to 4 but it nevertheless differs in various details. There is provided a unitary one-piece body 46 formed of nonmagnetic material which material may advantageously be wood. The body 46 is preferably generally rectangular in cross section and it may have any desired length within reasonable limits. The body 46 has two vertically spaced longitudinally extending horizontal slots therein. These slots are thin and relatively deep and they are initially open at the front. By reason of the slots the body has an upper portion 48, a central portion 50 and a lower portion 52, but the said portions are integral with each other.

The body 46 also has therein a plurality of similar longitudinally spaced separate vertical holes 54, 54. Each of the holes extends between the said vertically spaced horizontal slots and also extends vertically beyond one of the slots to the exterior of the body. As shown the holes extend downward through the lower portion 52, being open at the bottom. The said holes preferably do not extend upward through the upper portion 48.

Similar permanent magnets 56, 56 are located in the respective holes 54, 54, the said magnets having opposite pole faces at the tops and bottoms thereof. The magnets are of such length and are so positioned that their upper pole faces are in the plane of the lower face of the upper slot and that their lower pole faces are in the plane of the upper face of the lower slot. The magnets are vertically insertable in the holes 54, 54 through the lower open ends thereof. While the invention is not necessarily so limited, it is ordinarily preferable that the holes 54, 54 be round and that the magnets 56, 56 be cylindrical and of such size as to approximately fit the holes.

Two flat horizontal pole pieces 58 and 60 of magnetic material are provided. The said pole pieces are located in and fit the said slots in the body 46 and they respectively engage the top and bottom pole faces of the several magnets 56, 56. The pole pieces have vertically registering narrow front faces 62 and 64 which are spaced forward from the front face of the body 46. Preferably the pole pieces also have end faces 66, 66 and 68, 68 which are spaced longitudinally from the end faces of the body.

Inasmuch as the pole pieces 58 and 60 engage the top and bottom pole faces of the magnets they serve to prevent relative vertical movements thereof. During assembly the magnets are first inserted through the open ends of the holes 54, 54 and then the pole pieces are entered in the slots, the magnets thus being securely placed and being prevented from vertical movement out of the said holes in the body.

The upper pole piece 58 is secured in place by means of a plurality of vertical pins or nails 70, 70 which extend downward from the top of the body through the upper portion 48, through the pole piece and into the central portion 50 of the body. The pole piece preferably has preformed holes therein for receiving the pins or nails, but when the body is formed of wood no preformed holes are provided in the body itself. When the nails have been driven into place they serve not only to lock the pole piece 58 in place but also to connect the upper body portion 48 with the central body portion 50. The lower pole piece 60 is similarly held in place by a plurality of pins or nails 72, 72 which are similar to the nails 70, 70. A repetition of the detailed description is unnecessary.

Preferably the body 46 is provided with two or more longitudinally spaced horizontal holes 74,

74 for receiving screws by means of which the entire holder can be secured to a suitable supporting wall.

The manner of use of the holder as shown in Figs. 5 to 8 is similar to that of the holder as shown in Figs. 1 to 4 and a repetition of the description is unnecessary. The holder may be manufactured in long units, which may be sawed transversely between any two magnets so as to provide shorter units having the lengths required for particular purposes.

The alternative holder shown in Figs. 9 and 10 is also similar in many respects to that shown in Figs. 1 to 4 but it is different as to details. There is provided a body 76 formed of nonmagnetic material which material may advantageously be wood. The body 76 has initially exposed upper and lower horizontal faces 78 and 80. The horizontal cross sectional shape of the body may be widely varied, but as shown the body has a vertical outer face 82 which is convexly curved through a substantial angle which is preferably 180° or more. The said outer face 82 may advantageously conform to a cylinder. Preferably and as shown, the body has a rear flat face 84.

The body 76 has therein a plurality of similar separate vertical holes 86, 86 each of which extends through the body between the upper and lower faces 78 and 80. The holes 86, 86 may be variously positioned, but preferably and as shown the holes 86, 86 are positioned with their centers spaced along an arcuate line uniformly spaced from or concentric with the convexly curved outer face 82. The holes are near the said outer face and are substantially uniformly spaced therefrom.

Similar magnets 88, 88 are located in the respective holes 86, 86 in the body, the said magnets having opposite pole faces at the tops and bottoms thereof. The magnets are of such length and are so positioned that their upper pole faces register with the upper face 78 of the body and that their lower pole faces register with the lower face 80 of the body. The magnets are vertically insertable in the holes 86, 86, either downward or upward, as may be preferred.

Two relatively thin pole pieces 90 and 92 are provided, these being formed of magnetic material. The pole pieces respectively engage the upper and lower faces 78 and 80 of the body and they also engage the top and bottom pole faces of the magnets. The pole pieces 90 and 92 are connected with the body as hereinafter described, and by reason of such connection they serve to retain the magnets in place and to prevent any relative vertical movements thereof.

The said pole pieces 90 and 92 have a plurality of pairs of vertically registering straight edge faces 94, 94 and 96, 96. The edge faces of each two adjacent pairs are at angles to each other and the edge faces of each pair are tangent to arcs spaced outward from the outer face 82 of the body and conforming to the curvature thereof.

Thin flat upper and lower members 98 and 100 are preferably provided, these being formed of nonmagnetic material which material may advantageously be wood. The upper member 98 engages the upper pole piece 90 and the lower member 100 engages the lower pole piece 92. Preferably the said upper and lower members 98 and 100 have the same or approximately the same shape as the body 76. The members 98 and 100 protect the pole pieces and prevent any contact therewith, except at or near the edge faces thereof.

The upper nonmagnetic member 98 and the upper pole piece 90 are connected to the body 76 by means of a plurality of vertical pins or nails 102, 102 which extend downward through the said member 98, through the said pole piece 90 and into the body 76. The pole piece preferably has preformed holes therein for receiving the pins or nails, but when the member 98 and the body 76 are formed of wood no preformed holes are provided therein. When the nails have been driven into place they serve to firmly secure the upper member 98 and the pole piece 90 to the body. The lower member 100 and the lower pole piece 92 are similarly connected to the body by a plurality of pins or nails 104, 104 which are similar to the nails 102, 102. A repetition of the detailed description is unnecessary.

The holder as shown and described can be attached to a vertical supporting wall in any desired manner, but preferably and as shown a thin flat plate 106 is connected to the body 76 by means of pins or nails 108, 108. The plate 106 is formed of a nonmagnetic material of such character that it is particularly adapted to be held by a suitable glue or cement. The holder is adapted to be mounted on a vertical supporting wall such as 110 by applying glue or cement to the plate 106 or to the wall or to both and by allowing the cement to harden so as to securely attach the plate 106 to the wall.

The manner of use of the holder shown in Figs. 9 and 10 is similar to that of the holder shown in Figs. 1 to 4 and a repetition of the description is unnecessary. However, it is pointed out that articles to be held can be engaged with any one of the several pairs of angularly disposed straight edges 94, 94 and 96, 96.

What is claimed is:

1. In a holder for articles of magnetic material, the combination of a longitudinally extending unitary one-piece body of nonmagnetic material having two vertically spaced longitudinally extending horizontal slots therein initially open at the front, the said body also having a plurality of longitudinally spaced vertical holes therein each of which extends between the said slots and also extends vertically beyond one of the slots to the exterior of the body, a plurality of similar permanent magnets located in the respective holes and having opposite pole faces at the tops and bottoms thereof which magnets are of such length and are so positioned that their upper pole faces are in the plane of the lower face of the upper slot and that their lower pole faces are in the plane of the upper face of the lower slots, the said magnets being vertically insertable in the holes in the body through the portions of the said holes which extend to the exterior of the body, and two flat horizontal pole pieces of magnetic material located in and fitting the said slots in the body and having vertically registering front edge faces which are spaced forward from the body, the said pole pieces respectively engaging the upper and lower pole faces of the magnets and one of the pole pieces by reason of its engagement with the magnets preventing the vertical movement thereof out of the said holes in the body.

2. In a holder for articles of magnetic material, the combination of a longitudinally extending unitary one-piece body of nonmagnetic material having two vertically spaced longitudinally extending horizontal slots therein initially open at the front, the said body also having a plurality of longitudinally spaced vertical holes therein

each of which extends between the said slots and terminates at the upper slot and each of which also extends vertically downward beyond the lower slot to the exterior of the body, a plurality of similar permanent magnets located in the respective holes and having opposite pole faces at the tops and bottoms thereof which magnets are of such length and so positioned that their upper pole faces are in the place of the lower face of the upper slot and that their lower pole faces are in the plane of the upper face of the lower slots, the said magnets being insertable upwardly in the holes in the body through the lower portions of the said holes which extend to the exterior of the body, and two flat horizontal pole pieces of magnetic material located in and fitting the said slots in the body and having vertically registering front edge faces which are spaced forward from the body, the said pole pieces respectively engaging the upper and lower pole faces of the magnets and the lower pole piece by reason of its engagement with the magnets preventing the downward movement thereof out of the said holes in the body.

3. In a holder for articles of magnetic material, the combination of a longitudinally extending unitary one-piece body of nonmagnetic material having two vertically spaced longitudinally extending horizontal slots therein initially open at the front, the said body also having a plurality of longitudinally spaced vertical holes therein each of which extends between the said slots and also extends vertically beyond one of the slots to the exterior of the body, a plurality of similar permanent magnets located in the respective holes and having opposite pole faces at the tops and bottoms thereof which magnets are of such length and are so positioned that their upper pole faces are in the plane of the lower face of the upper slot and that their lower pole faces are in the plane of the upper face of the lower slots, the said magnets being vertically insertable in the holes in the body through the portions of the said holes which extend to the exterior of the body, two flat horizontal pole pieces of magnetic material located in and fitting the said slots in the body and having vertically registering front edge faces which are spaced forward from the body, the said pole pieces respectively engaging the upper and lower pole faces of the magnets and one of the pole pieces by reason of its engagement with the magnets preventing the vertical movement thereof out of the said holes in the body, an upper plurality of vertical pins extending downward from the top of the body through the upper pole piece and into the central portion of the body below the upper slot, and a lower plurality of vertical pins extending upward from the bottom of the body through the lower pole piece and into the central portion of the body above the lower slot.

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