Oct. 23, 1951 R. E. PHELON 2,572,514

HOLDER FOR ARTICLES OF MAGNETIC MATERIAL

Filed Feb. 18, 1948

Fig. 1.

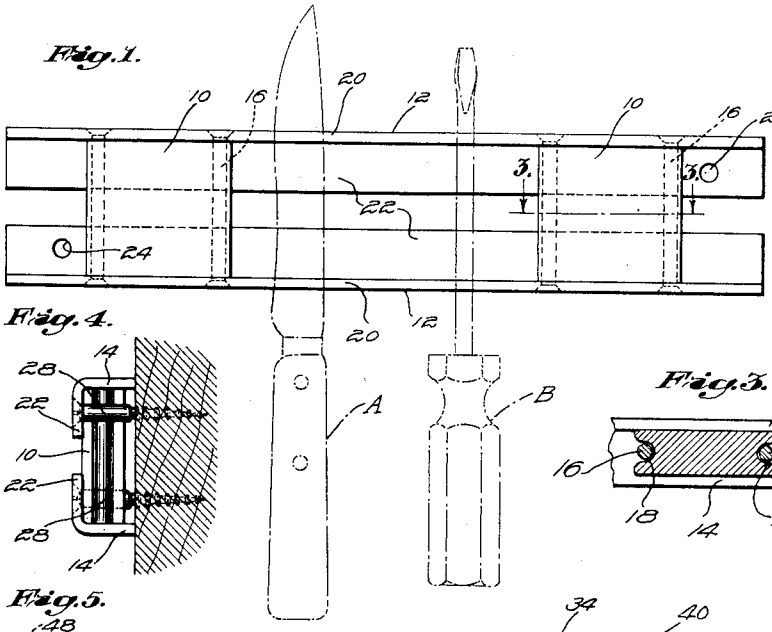


Fig. 2.

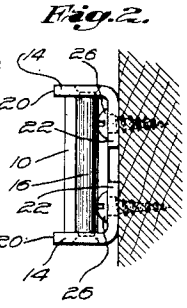


Fig. 4.

Fig. 3.

Fig. 5.

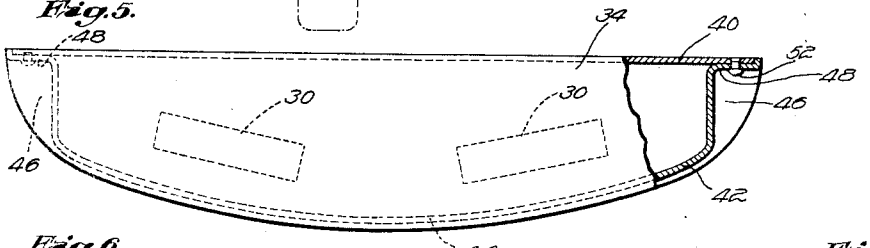


Fig. 6.

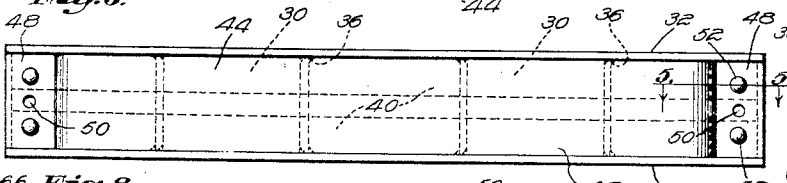


Fig. 7.

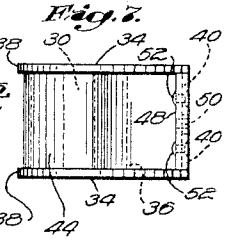


Fig. 8.

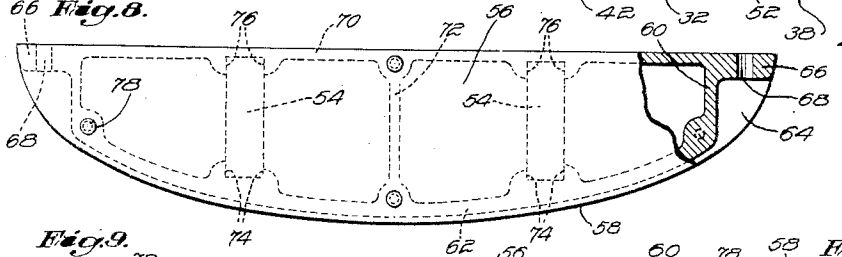


Fig. 9.

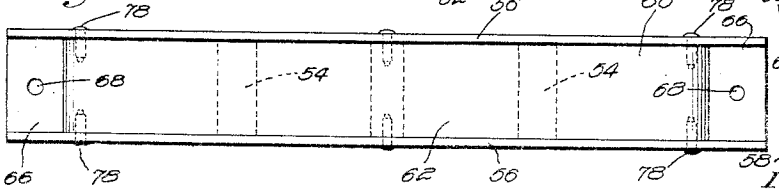
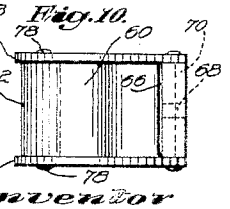


Fig. 10.



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Patented Oct. 23, 1951

2,572,514

UNITED STATES PATENT OFFICE

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HOLDER FOR ARTICLES OF MAGNETIC MATERIAL

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Application February 18, 1948, Serial No. 9,134

4 Claims. (Cl. 175—367)

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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 for instance in a kitchen, for holding cutlery, shears and the like. A holder embodying the invention is also adapted for use in a work shop 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.

Other 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 different 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 magnetic holder.

Fig. 2 is an end view.

Fig. 3 is a fragmentary longitudinal sectional view taken along the line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 2 but showing an alternative mounting for the holder shown in Figs. 1 to 3.

Fig. 5 is a combined plan and sectional view of a magnetic holder embodying the invention, the section being along the line 5—5 of Fig. 6.

Fig. 6 is a front view of the holder shown in Fig. 5.

Fig. 7 is an end view of the holder shown in Fig. 5.

Fig. 8 is a combined plan and sectional view of an alternative holder embodying the invention.

Fig. 9 is a front view of the holder shown in Fig. 8.

Fig. 10 is an end view of the holder shown in Fig. 8.

Referring to the drawing, particularly Figs. 1 to 3 thereof, 10, 10 are similar permanent magnets which may be formed of a suitable magnetic material, such as an iron-nickel-aluminum-cobalt alloy. As illustrated, there are two such magnets but the number may be varied and for a very small holder a single magnet may suffice.

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Each magnet 10 has opposite parallel faces at its respective poles, and when two or more magnets are provided they are so arranged that the pole faces of one polarity are all in one plane and the pole faces of the opposite polarity are all in another plane.

The magnets 10, 10 are positioned with their opposite pole faces at the top and at the bottom and two similar pole pieces 12, 12 are provided, these being formed of magnetic material such as iron. The pole pieces 12, 12 are of approximately the same length and they have horizontal relatively thin flat portions 14, 14 which are held in engagement respectively with the opposite pole faces of the magnets 10, 10. The pole pieces are of substantial length and they extend longitudinally in opposite directions from the magnets.

The horizontal flat portions 14, 14 of the pole pieces are suitably connected with the magnets and as shown in Figs. 1 to 3 they are so connected by means of connecting members 16, 16. The said connecting members may be rivets extending transversely between the said horizontal portions of the pole pieces and through suitable holes therein. The connecting members or rivets 16, 16 serve not only to connect the horizontal portions of the pole pieces, but also to maintain the magnets in fixed relationship with the pole pieces and with each other. The magnets cannot be readily machined and they are therefore preferably provided with cast grooves 18, 18 formed in the opposite edges thereof, the rivets 16, 16 extending through these grooves.

The front edges 20 of the thin horizontal flat portions of the pole pieces are in vertical register with each other and they serve as narrow article holding faces. At least certain portions of the said edges or faces are spaced forwardly from the magnets and in the construction shown in Figs. 1 to 3 the said edges or faces are straight and are in their entirety spaced forwardly from the magnets.

Connected with the horizontal flat portions 14, 14 of the pole pieces is a vertical flange means which is located adjacent the rear edges of the said flat portions and is positioned for engagement with a vertical rear supporting wall. As shown in Figs. 1 to 3, the said vertical flange means comprises vertical longitudinal flanges 22 which are integral with the horizontal flat portions 14, 14 of the pole piece, these flanges being spaced apart vertically and being in vertical register with each other. Preferably and as shown, the said flanges 22, 22 extend toward each

other. Ordinarily the flanges 22, 22 are at the rear and are adapted to engage a vertical supporting wall to which the holder may be attached.

Preferably there are two means spaced longitudinally from the magnets for the attachment of the holder to a rear supporting wall. When the vertical flange means comprises flanges such as 22, 22, the said means for the attachment of the holder to a rear supporting wall are in the form of holes such as 24, 24 formed in the said flanges. As shown, one hole 24 is near one end of one flange and the other hole 24 is near the opposite end of the other flange. Devices such as screws 26 may be inserted through the holes 24, 24 for attaching the holder to the wall.

In use the holder is suitably mounted on a supporting wall as shown, the registering article holding faces 20, 20 being vertical. Articles formed in whole or in part of magnetic material can be placed in contact with the faces 20, 20 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 20, 20 provide small areas of contact with the parts that are to be held in place. 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 the flux density. Still another important advantage is that each article is held at two relatively widely spaced positions, thus assuring a favorable leverage effect on the article.

When the holder is to be used primarily for tools or other items such as screw drivers which are round in cross section instead of flat, it may be preferable to reverse the mounting of the holder as shown in Fig 4. With an item which is round in cross section there is only a line contact with the faces of the pole pieces and it is therefore desirable to provide wider faces so as to increase the amount of magnetic flux. When the holder is to be mounted as shown in Fig. 4 it is preferably held by flat head screws 28, 28 instead of by round head screws 26, 26 as shown in Fig. 2.

Figs. 5 to 7 show a magnetic holder embodying the invention, this differing in important respects from the holder shown in Figs. 1 to 3. Two magnets 30, 30 are provided which are generally similar to the magnets 10, 10, but not provided with grooves. Two pole pieces 32, 32 are provided which are generally similar to the pole pieces 12, 12. The pole pieces 32, 32 have horizontal flat portions 34, 34 which are held in engagement respectively with the opposite pole faces of the magnets 30, 30. The flat portions 34, 34 of the pole pieces are shown as being connected with the magnets by soldering as indicated at 36, 36.

The front edges 38, 38 of the horizontal flat portions of the pole pieces are in vertical register with each other and they serve as narrow article holding faces. The said faces 38, 38 longitudinally span the magnets and, instead of being straight, are continuously curved 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 faces 38, 38 have substantially greater curvature at the end zones thereof than at the central portions or zones thereof. The central portions of the said faces 38, 38 are spaced forwardly from the magnets 30, 30. Preferably the magnets are positioned angularly so that their vertical longitudinal faces are generally parallel with the immediately adjacent portions of the curved faces 38, 38.

Connected with the horizontal flat portions 34, 34 of the pole pieces is a vertical flange means which is located adjacent the rear edges of the said flat portions and is in position for engagement with a vertical rear supporting wall. As shown in Figs. 5 to 7, the said vertical flange means comprises in part vertical longitudinal flanges 40, 40 which are integral with the horizontal flat portions 32, 32. These vertical flanges are spaced apart vertically and are in vertical register with each other. The flanges 40, 40 extend toward each other and are adapted to engage a vertical supporting wall to which the holder may be attached.

Preferably a filler member 42 is provided which has a length at least as great as that of the pole pieces and which has a front wall 44 extending longitudinally throughout the major portion of the length of the said filler member. The wall 44 extends vertically between the horizontal flat portions 34, 34 of the pole pieces and at least a portion of the wall is at the front of the magnets 30, 30. When the front faces 38, 38 are curved as shown and described, the wall 44 is similarly curved, but it is spaced rearwardly from the said faces.

The filler member 42 preferably has open front notches 46, 46 at its ends, each notch having a rear wall 48. The front wall 44 extends longitudinally between the notches 46, 46. The rear walls or flanges 48, 48 of the notches cooperate with the said vertical flanges 40, 40 to complete the aforesaid vertical flange means. The two means for the attachment of the holder to a rear supporting wall comprise holes 50, 50 in the vertical flange means for the reception of attachment devices such as screws. As shown, the holes 50, 50 are in the walls 48, 48 and are so located that the screws can extend between the flanges 40, 40 of the pole pieces.

While the invention is not necessarily so limited, the filler member 42 is shown in Figs. 5 to 7 as comprising a strip of nonmetallic metal such as brass or aluminum, this being bent to form the curved front wall 44 and to form the notches 46, 46 and the rear walls or flanges 48, 48 thereof. The rear flanges 48, 48 of the notches are connected, as for instance by rivets 52, 52, with the flanges 40, 40 of the pole pieces, the filler member being thus held in place.

The manner of use of the holder as shown in Figs. 5 to 7 is similar to that described in connection with Figs. 1 to 3. Inasmuch as the pole pieces have curved front faces, the total length available for engagement with articles to be held is substantially greater for a holder of the same overall length. Inasmuch as the curvature at

the end zones is less than at the central zones, different radii of curvature are available for different articles. Some articles will be more effectively held at the portions of greater curvature and other articles will be more effectively held at the portion of smaller curvature.

With pole pieces having straight front faces, as shown in Figs. 1 and 2, a broad flat article or tool when engaged with the said faces carries such a large portion of the total available magnetic flux that smaller articles also engaged with the said faces may not be held with sufficient force to be retained in place. This difficulty is avoided when the front faces of the pole pieces are convexly curved as shown in Figs. 5 to 7. With the faces so curved it is impossible for the said faces to be engaged through any substantial portions of their length by a broad flat article or tool. The broad article engages the said faces only at narrow zones and the total amount of flux is thus limited. With the front faces of the pole pieces curved, the holder presents a much more attractive appearance. The appearance of the article is still further improved by the filler member **42** which conceals the magnets. The filler member not only improves the appearance but it serves to prevent articles from being brought into direct contact with the magnets.

Figs. 8 to 10 show an alternative embodiment of the invention which is in many respects similar to that shown in Figs. 5 to 7. Two magnets **54, 54** are provided which are similar to the magnets **30, 30**, but differently positioned. Two pole pieces **56, 56** are provided which are similar to the pole pieces **32, 32**, having similarly curved narrow front edge faces **58, 58**. The pole pieces **56, 56** differ from the pole pieces **32, 32** in that they are not provided with integral longitudinal vertical flanges at the rear. The pole pieces **56, 56** are in engagement respectively with the opposite pole faces of the magnets **54, 54**, but they are not directly connected therewith.

A filler member **60** is provided which has substantially the same length as the pole pieces **56, 56** and which preferably has a curved front wall **62** similar to the wall **44**. The filler member is shown as having open front notches **64, 64** at its ends which are similar to the notches **46, 46**. Each notch **64** has a rear wall **66** similar to the rear wall **48**. The walls **66, 66** of the filler member collectively constitute a vertical flange means which is located adjacent the rear edges of the flat portions of the pole pieces **56, 56** and which is in position for engagement with a vertical rear supporting wall. The walls **66, 66** have holes at **68, 68** for the reception of devices such as screws for the attachment of the holder to a supporting wall.

The filler member **60** may be cast or molded and it may advantageously be molded from a suitable plastic material, although the invention is not so limited. The member **60** is shown as comprising not only the front wall **62**, a portion of which is preferably at the front of the magnets, but also a rear wall **70** which is at the rear of the magnets and which is positioned to engage the supporting wall to which the holder may be attached. The said front and rear walls **62** and **70** may be connected by a transverse wall **72**.

The filler member **60** is provided with vertical interior faces positioned to substantially fit portions of the magnets so as to prevent relative horizontal movements thereof. As shown, the front wall has faces **74, 74** for engaging the magnets at the front and the rear wall **70** has faces **76, 76** for engaging the magnets at the rear.

The pole pieces **56, 56** are connected with the filler member **60** by means of members **78, 78**. These members may be screws engaging threaded apertures in the filler member, or they may be headed pins or the like having force fits in unthreaded apertures in the filler member. It will be seen that the pole pieces by reason of their connection to the filler member are held in engagement with the end faces of the magnets.

The holder as shown in Figs. 8 to 10 is not herein claimed specifically, this being set forth and claimed in my copending application for Holder for Articles of Magnetic Material, Serial No. 129,929, filed November 29, 1949, now Patent No. 2,565,625, as a continuation-in-part of this present application.

What I claim is:

1. In a holder for articles of magnetic material, the combination of a plurality of similar permanent magnets spaced apart longitudinally and having opposite horizontal pole faces at the top and bottom, all of the magnet pole faces of one polarity being in one plane and all of the magnet pole faces of the opposite polarity being in another plane, two pole pieces of magnetic material extending longitudinally between the magnets and beyond them and having horizontal flat portions held in engagement respectively with the top and bottom pole faces of all of the magnets which flat portions of the pole pieces have straight rear edges located rearwardly from the magnets and adjacent the rear plane of the holder and which flat portions of the pole pieces also have vertical article holding faces positioned in vertical register with each other and located in part forwardly from the magnets, the said vertical article holding faces longitudinally spanning the magnets and being continuously curved convexly from end to end and extending at their ends to the said straight rear edges of the pole pieces, and a filler member of nonmagnetic material having substantially the same length as the pole pieces and extending vertically from one to the other, the said filler member comprising a front wall located in part at the front of the magnets and behind the article holding faces of the pole pieces which front wall is curved in conformity with the curvature of the adjacent portions of the said article holding faces and the said filler member comprising end walls at opposite sides of the magnets and spaced inwardly inward from the ends of the pole pieces which end walls extend rearwardly from the filler member front wall and the said filler member comprising flanges adjacent the rear plane of the holder and extending longitudinally from the filler member end walls which flanges have holes therein for receiving devices for attaching the holder to a rear supporting wall.

2. In a holder for articles of magnetic material, the combination of a permanent magnet having opposite parallel pole faces at the top and bottom, two pole pieces of magnetic material having horizontal flat portions held in engagement respectively with the top and bottom pole faces of the magnet and extending longitudinally in opposite directions therefrom which pole pieces have front article holding faces positioned in vertical register with each other and spaced forwardly from the magnet, and a filler member of nonmagnetic material having substantially the same length as the pole pieces and having open front notches at its ends and between the flat

portions of the pole pieces which notches are formed with longitudinal rear flanges having holes for the reception of devices for attaching the holder to a supporting wall, the said filler member having a front wall extending longitudinally between the notches which wall extends vertically between the flat portions of the pole pieces with a portion thereof at the front of the magnet.

3. In a holder for articles of magnetic material, the combination of a permanent magnet having opposite parallel pole faces at the top and bottom, two pole pieces of magnetic material having horizontal flat portions held in engagement respectively with the top and bottom pole faces of the magnet and extending longitudinally in opposite directions therefrom which pole pieces have front article holding faces positioned in vertical register with each other and spaced forwardly from the magnet, and a filler member comprising a strip of nonmagnetic metal extending longitudinally throughout the length of the pole pieces and extending vertically between the said flat portions thereof, the said filler strip being bent to provide a front wall spaced rearwardly from the front faces of the pole pieces with a portion of the said wall at the front of the magnet and the said filler strip being further bent to form open front notches at its ends which notches have longitudinal rear walls connected with the pole pieces.

4. In a holder for articles of magnetic material, the combination of a permanent magnet having opposite parallel pole faces at the top and bottom, two pole pieces of magnetic material having horizontal flat portions held in engagement respectively with the top and bottom pole faces of the magnet and extending longitudinally in opposite directions therefrom which pole pieces have front article holding faces positioned in

vertical register with each other and spaced forwardly from the magnet, the said pole pieces also having vertical flanges at the rear of the magnet and extending toward each other, and a filler member comprising a strip of nonmagnetic metal extending longitudinally throughout the length of the pole pieces and extending vertically between the said flat portions thereof, the said filler strip being bent to provide a front wall spaced rearwardly from the front faces of the pole pieces with a portion of the said wall at the front of the magnet and the said filler strip being further bent to form open front notches at its ends which notches having longitudinal rear walls connected with the said flanges of the pole pieces.

RUSSELL E. PHELON.

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