This invention relates to improvements in magnetic means for yieldably holding a closure member in an operative position. While the invention is intended for use wherever it may be advantageously employed, to hold any type of closure member in a closed position, it is illustrated in the drawing and hereinafter described as applied to a door adapted to be used for bookcases, cupboards, cabinets or similar structures.

Objects of the invention are to provide an improved magnet of simple construction which may be quickly and conveniently secured to a structure having a closure member and used in connection with an armature whereby the member when closed will be maintained in that position under normal conditions and which can be easily and conveniently opened when desired.

Further objects are to provide magnetic door holding means which can be quickly and securely mounted in an operative position on a structure by positioning the same in a bore formed in the door or a portion of the structure adjacent thereto; to provide an externally threaded cylindrical magnet having means for forming threads in the wall of such bore whereby the same may be threaded in a wooden structure and adjustably retained therein and to provide additional means for securing the magnet in an operative position.

The above objects are accomplished and additional advantages are obtained by the novel construction hereinafter described with reference to the accompanying drawing wherein there is shown an illustrative embodiment of the invention, it being understood that the invention may be adapted in various ways to various structures and that changes and modifications may be made which come within the scope of the claims hereinafter appended.

In the drawing:

Figure 1 is a side elevational view of a permanent magnet constructed in accordance with this invention.

Figure 2 is a plan view of same.

Figure 3 is a central, vertical, sectional view taken as indicated by the lines 3—3 of Figure 2.

Figure 4 is a cross sectional view of a door frame having a door operatively positioned therein and showing one manner of operatively attaching my improved holding means thereto.

Figure 5 is a sectional view showing a portion of a door and a portion of a stile with holding means constructed in accordance with this invention operatively attached thereto.

Figure 6 is a similar view illustrating another manner of using my improved holding means.

Figure 7 is a sectional view showing a portion of a metallic structure and illustrating the manner of securing my improved holding means thereto.

Figure 8 is a cross sectional view taken as indicated by the lines 8—8 of Figure 7.

Figure 9 is a central, vertical, sectional view taken as indicated by the lines 9—9 of Figure 10 and illustrating a modified form of magnet which may be used in reducing the invention to practice.

Figure 10 is a front, elevational view of same.

The invention will now be described with reference to the particular adaptation thereof illustrated. The numeral 11 denotes a permanently magnetized horseshoe magnet which is of cylindrical form and which is provided with a diametrically extending cut 12 which extends therein from the executive face thereof and terminates adjacent the rear end thereof, thus providing a horseshoe magnet having two prongs 13 and 14. The walls of the cut 12 diverge inwardly from the executive face of the magnet to a transverse plane adjacent the rear end thereof and terminate in a rounded end wall.

The magnet 11 is provided with external screw threads 15 which are preferably interrupted at circumferentially spaced intervals with the longitudinal grooves 16. The grooves 16 are positioned therein to form sharp ends on the threads 15 which facilitate the cutting of threads in the wall of the bore formed in a wooden structure as hereinafter described. The slot 12 forms a gap between the prongs of the magnet and serves as a kerf in which a screw driver blade may be inserted to operatively position the magnet in a bore. The rear end portion of the magnet 11 is provided with an axial bore 17 which extends through from the cut 12 to the rear end thereof and which is designed to receive a screw 18 or other fastening means adapted to hold the magnet in an operative position. At the forward face of the magnet the middle portion of the cut 12 is enlarged to form an opening 17b which is in coaxial alinement with the bore 17 and is adapted to receive a screw driver blade which may be used to operate the screw 18.

In Figure 4 there is shown the forward portion of a structure in which a door 19 is hingedly secured between the stiles 20 and 21 by means of the hinges 22. In this particular structure the free edge of the door 19 closes against a strip 23 which overlaps the free edge of the door when the door is in a closed position.

The overlapping portion of the strip 23 is pro-
vided with a bore 24 which is formed therein from the forward side thereof. A magnet 11 is secured in the bore 24 with the executive face thereof with the forward face of the strip 23. The armature 25 is secured to the inner face of the door 19 by means of the screws 26 or other suitable fastening means whereby the door when closed will position the armature 25 in operative relation to the poles of the magnet 11.

It will be seen that the armature 25 will be attracted by the magnet 11 and that the door will be yieldably held in a closed position with sufficient force to prevent its being unintentionally opened.

In Figure 5 there is shown a portion of a frame member 27 in which is mounted a door 28 which is shown in a closed position. The member 27 is provided with a bore 29 which there is mounted a magnet 11 which may be of the type illustrated in Figure 1 but which as shown is provided with a smooth exterior surface. In this adaptation of the invention the magnet 11 is secured in the bore 29 by means of the screw 18 with the executive face of the magnet flush with the face of the member 27.

The door 28 is provided on the contacting edge thereof with an armature 30 which is formed of a plurality of layers of magnetically permeable material. The layers 30 are secured to the edge of the door 28 where the armature will be in an operative position to the magnet 11 when the door is closed by means of the screw 31. The armature 30 is thus constructed of a plurality of layers so that one or more layers may be selectively employed to regulate the force with which the door is held in a closed position.

In Figure 6 there is shown a frame member 27 and a door 28 with one magnet 11 positioned in the member 27 and the other magnet 11 positioned in the door. The magnets 11 are thus arranged with each pole of each magnet presented to the opposite pole of the other magnet, thus providing a strong magnetic pull which will normally hold the door in a closed position.

In Figure 7 there is shown a portion of a metallic structure 32 having a metal door 33. A holding member 34 is secured to the structure 32 by means of the screws 35 or any suitable means. The holding member 34 is constructed of rubber, Bakelite, brass or any suitable material.

The holder is provided with a suitable bore 36 in which is snugly received a permanent magnet 11a. The holding member 34 thus presents the magnet to the edge of the door 33 which forms an armature for the magnet and holds the door in a closed position.

In Figures 8 and 10 I have shown a bar magnet 11a having a kerf 12a in the forward face thereof. The magnet 11a is provided with an axial bore 17a in which a screw or other fastening member may be inserted. The bar magnet 11a may be provided with screw threads 15 and a screw driver blade inserted in the kerf 12a to operatively position it in a bore.

In the particular adaptation of the invention shown, the bore 17a is enlarged at the forward end thereof to receive the head of a screw or other fastening means and the bore 11a is enlarged adjacent the rear end thereof to form a shoulder 37 which may be engaged by a tool to pull the magnet 11a from a bore in which it is mounted.

While I have illustrated and described an improved form of horseshoe magnet adapted to be threaded into a bore, it will be understood that the magnet 11 may be made of any suitable, cross sectional shape adapted to be fitted in a seat formed in either the closure member or the frame member.

It will thus be seen that I have provided a door holding means which may be quickly and conveniently applied to a door, door frame or other part of a door structure which will not project in the door opening or present any protruding parts and which will be very efficient in yieldably holding a door in a closed position.

Having thus illustrated my invention and described the same in detail, what I claim as new and desire to secure by Letters Patent is:

1. In a permanent magnet, a cylindrical magnetized body, external screw threads on said body, said threads being interrupted at circumferentially spaced intervals to provide edges for cutting a thread in the wall of a bore.

2. In a permanent magnet, a cylindrical magnetized body, external screw threads being interrupted at circumferentially spaced intervals to provide edges for cutting a thread in the wall of a bore, said body provided with a central bore for receiving a securing screw.

3. In a permanent magnet, a cylindrical magnetized body, external screw threads being interrupted at circumferentially spaced intervals to provide edges for cutting a thread in the wall of a bore, said body provided with a central bore for receiving a securing screw; the central bore being enlarged at both ends to provide shoulders whereby the securing screw may be wholly recessed into the magnet and whereby hook means may be engaged with the inner shoulder to facilitate removal of the magnet from a recess.

4. In a permanent magnet, a cylindrical, magnetized body, external screw threads on said body, said body provided with a central bore for receiving a securing screw, the central bore being enlarged at both ends to provide shoulders whereby the securing screw may be wholly recessed in said body and whereby hook means may be engaged with the inner shoulder to facilitate removal of the magnet from a recess.

WALTER E. BURTON