June 6, 1950 P. C. HULL 2,510,634

MAGNETIC DESK SET

Filed Nov. 3, 1945

Fig. 1.

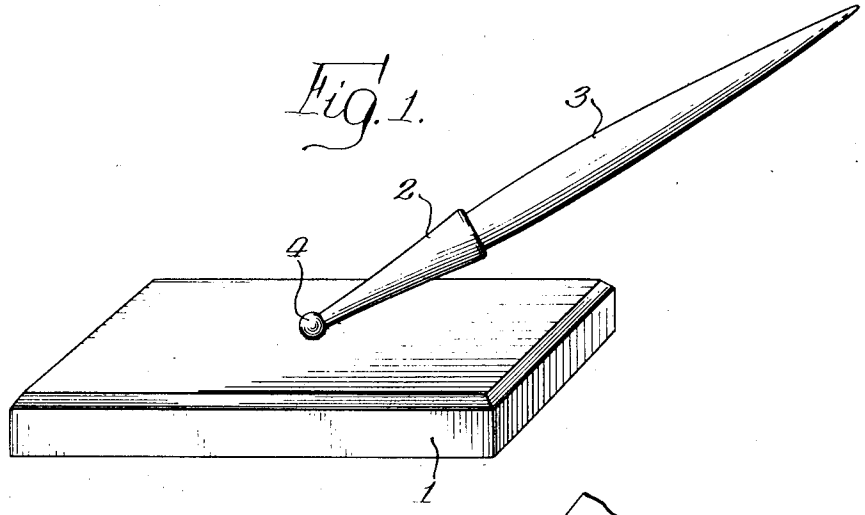
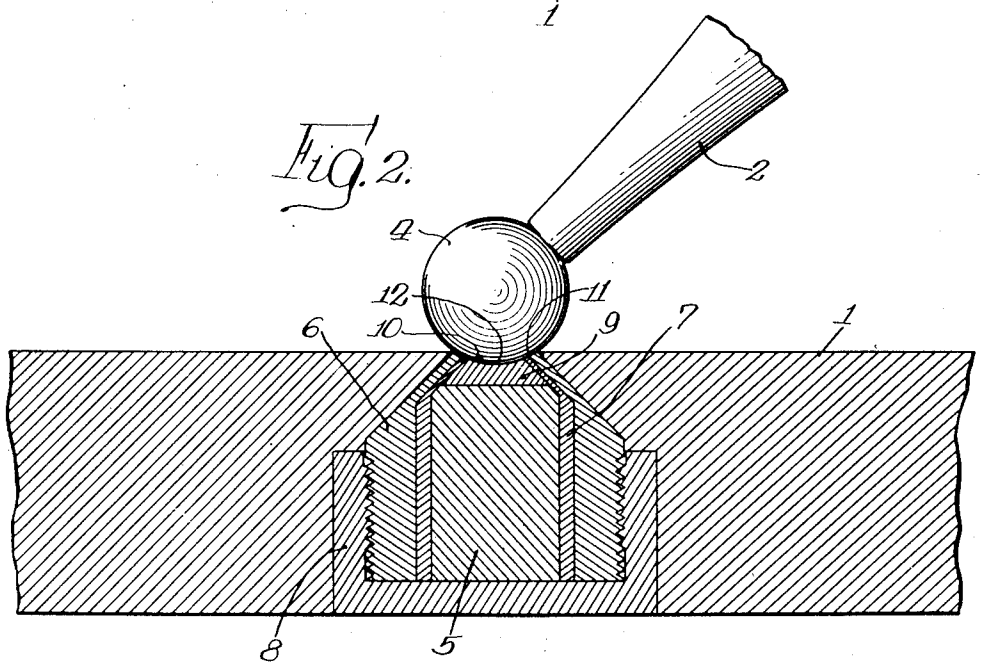


Fig. 2.



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Patented June 6, 1950

2,510,634

UNITED STATES PATENT OFFICE

2,510,634

MAGNETIC DESK SET

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Application November 3, 1945, Serial No. 626,459

5 Claims. (Cl. 175—367)

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This invention relates to pen desk sets and the like and has to do with an improved construction wherein the pen-holding receptacle is provided with a ball-like pivot member of paramagnetic material which is seated and magnetically held in a complementary socket in the base member in such manner that said receptacle can be rotated about its pivotal center and thereby adjusted to any desired angular position with respect to the base.

One of the objects of my invention is to provide a pen desk set having the foregoing improved arrangement.

Another object is to provide a ball and socket type of desk set of very simple and rugged construction which is devoid of all moving parts except the ball itself and wherein the socket member terminates short of the equator of the ball and encompasses a relatively small portion of the ball so that the socket is substantially concealed.

A further object is to provide a universally adjustable desk set unaffected by normal wear so that the pen-receiving receptacle, together with a pen contained therein, will always be properly retained in any angular and rotative position to which it may be moved.

Still another object is to provide a magnetic structure for the base member of the set which is capable of exerting such a strong magnetic pull that the arc of the ball-receiving socket may be made quite small—thus rendering it possible for the ball to overlie and conceal the socket to such an extent as will tend to create the illusion that the ball is standing on a flat surface.

Additional objects are to provide a desk set of the foregoing character in which the socket member does not project above the top surface of the base; to provide a ball and socket type desk set wherein the ball member is magnetically retained in the socket free for removal by merely applying sufficient force to overcome the magnetic attraction; and to provide an arrangement of the foregoing character wherein the magnetic circuit includes no air gap to diminish the available magnetic pull on the ball member while at the same time avoiding the objectionable effect which a stray magnetic field might have on adjacent objects.

Ball and socket desk sets as heretofore made have generally required somewhat complicated mechanical arrangements to meet the need for continuous pressure on the ball for the purpose of frictionally restraining the ball against rotation or angular movement under the weight of the receptacle and pen, while at the same time permitting the ball-and-receptacle unit to be manually moved quite easily whenever it might be desirable to alter the posture of the pen; and it has often happened that because of wear or weakening of parts, such as a spring or the like,

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such prior arrangements have in time failed to grip the ball with sufficient tenacity to properly hold the receptacle.

Through adoption of the present invention, which entails the use of a permanent magnet acting upon the ball, a minimum number of parts is required and it is insured that the amount of frictional restraint against rotation which is provided for at the outset will continue to be exerted in full throughout the life of the set notwithstanding any wear on the ball or socket which could normally occur.

In carrying out my invention the magnetic structure preferably is so arranged that both north and south poles terminate within the ball-receiving socket in contact with or at least in close juxtaposition to the ball itself, thus providing a greater pull on the ball than would otherwise be realized. This is due to the fact that all of the magnetic lines of force are caused to pass through the ball and are thus utilized to the fullest extent while at the same time rendering it practicable to employ a considerably smaller magnet—which latter preferably, but not necessarily, consists of one of the highly magnetizable alloys such as "Alnico."

The desirability of a desk set such as that which constitutes the subject matter of the present application lies not alone in its utilitarian merits but also in its uniqueness and artistry. The present invention is not only a contribution to structural and mechanical betterment, but is one which makes possible a new and distinctively fascinating appearance having a strong appeal to people of good taste.

In the drawing which accompanies this specification:

Fig. 1 is a perspective view of a desk set according to a preferred embodiment of the invention, and Fig. 2 is an enlarged sectional view showing details of construction.

The assembly shown in Fig. 1 comprises a base member 1, a pen-receiving receptacle 2 and a pen 3. A ball 4 of paramagnetic material, such as iron, steel, or nickel, is affixed to the lower end of the pen-receiving receptacle. Ball 4 is mounted in a base-carried socket 10 having magnetic means for retaining the ball 4 therein.

Specifically, a magnetic structure comprising a permanently magnetized core 5, preferably made of highly magnetizable material such as "Alnico," is embedded in base member 1 and preferably is flush with the top surface thereof. Core 5 is housed within an outer member 6 made of paramagnetic material such as soft iron or steel and is spaced therefrom all around by a liner 7 of diamagnetic material such as brass. Parts 5, 6 and 7 are held together by means of a cup 8 which may be internally threaded, as shown, to engage an external thread on outer member 6.

Cup 8 preferably is made of soft iron or steel. Resting on the upper end of core 5 is a pole-piece 9 which may conveniently be made of soft iron. This is held in place by liner 7. Pole-piece 9 is employed only for the reason that it is difficult to machine a highly magnetic alloy such as "Alnico."

The magnetic structure is formed at its upper end to provide the spherical concavity or socket 10 having a radius preferably equal to that of ball 4 and adapted to receive said ball, as shown.

Core 5 is so permanently magnetized that its upper end is of one polarity while its lower end is of opposite polarity; and since members 6, 8 and 9 are each of paramagnetic material, while liner 7 is of diamagnetic material, the magnetic circuit is such as to produce opposite poles at 11 and 12, respectively. As will be seen, said poles terminate in concavity 10 in juxtaposition to ball 4. As shown, both poles are in actual contact with ball 4.

Due to the fact that the magnetic structure is so designed as to produce, with ball 4, a magnetic circuit consisting wholly of paramagnetic material, that is to say, without any substantial air gap, the magnetic pull on the ball is considerably greater than would be the case, with a magnet of given strength, if only one pole were presented to the ball; and for that reason it is practicable to make concavity 10 of much smaller area than would otherwise be necessary in order to realize enough restraint on the ball to overcome the rotative force exerted by the combined leverage of receptacle 2 and pen 3 when the latter is positioned at an acute angle to the top surface of the base. By making concavity 10 of the small area stated, it is concealed by ball 4 and there is created an illusion that ball 4 is resting on the flat surface of base member 1.

While concavity 10 is preferably spherical, it obviously can be made of other than spherical form without departing from the invention and without altering the mode of operation.

I prefer to make ball 4 substantially a complete sphere, but, manifestly, there is no functional reason why something less than a complete sphere would not answer the purpose so long as the desired ball-and-socket effect is attained. Hence, in referring to element 4 as a ball, I mean to include within that term equivalent forms such, for example, as hemispheres.

I claim:

1. A magnet structure adapted to support a desk set pen receptacle having a holding element of paramagnetic material; said magnet structure comprising two pole portions of opposite polarities tapering toward one end and terminating at that end substantially concentrically and in close proximity to each other with their end faces positioned to act magnetically on said paramagnetic member when said member is positioned in engagement with said magnet pole portions, the inner of said faces being circular and continuous throughout and the outer of said faces being annular and circumferentially continuous.

2. A magnet structure adapted to support a desk set pen receptacle having a holding element of paramagnetic material; said magnet structure comprising pole portions of opposite polarities tapering toward one end and terminating at that end substantially concentrically and in close proximity to each other adjacent a surface of a supporting base, with their end faces formed to define a shallow spherically concave seat shaped

to receive and conform to the supporting surface of said holding element, the inner of said faces being circular and continuous throughout and the outer of said faces being annular and circumferentially continuous.

3. A magnet structure adapted to support a desk set pen receptacle having a holding element of paramagnetic material; said magnet structure comprising a permanent bar magnet, an outer member of paramagnetic material encompassing said bar magnet, inturned at one end to partially overlie the corresponding end of said bar magnet and connected magnetically to the other end of said bar magnet whereby said inturned end constitutes one pole portion of said magnet structure positioned to act on said holding element, and a cap member of paramagnetic material interposed between said inturned end and the corresponding end of said bar magnet and magnetically connected to said corresponding end thereof to constitute a second pole portion of opposite polarity to said first pole portion and positioned to act on said holding element.

4. A magnet structure adapted to support a desk set pen receptacle having a holding element of paramagnetic material; said magnet structure comprising a permanent bar magnet, a cap member of paramagnetic material abutting one end of said bar magnet to form one pole portion of said magnet structure, an outer member of paramagnetic material encompassing said bar magnet and said cap member and connected magnetically to the end of said bar magnet opposite said cap whereby said outer member forms a second pole portion of opposite polarity to said first pole portion, and a liner of diamagnetic material interposed between said outer member and said cap member and bar magnet, said outer member and said liner being inturned to partially overlie said cap member and retain it in position against said bar magnet.

5. A magnet structure adapted to support a desk set pen receptacle having a holding element of paramagnetic material; said magnet structure comprising a permanent bar magnet, an outer member of paramagnetic material encompassing said bar magnet and inturned at one end to partially overlie the corresponding end of said bar magnet, and a cup member of paramagnetic material receiving and secured to said outer member to retain said bar magnet in said outer member and abutting the adjacent ends of said bar magnet and said outer member to provide a low reluctance magnetic connection therebetween.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,561,554	Little	Nov. 17, 1923
1,778,481	Boucher	Oct. 14, 1930
1,854,625	Reix	Apr. 19, 1932
1,857,460	La Chance	May 10, 1932
1,861,171	Zimmerman	May 31, 1932
2,192,569	Williams	Mar. 5, 1940
2,269,149	Edgar	Jan. 6, 1942
2,297,806	Smith	Oct. 6, 1942
2,386,500	Parker	Oct. 9, 1945

FOREIGN PATENTS

Number	Country	Date
126,414	Switzerland	June 16, 1928