Aug. 14, 1956 H. E. STEINBERG ET AL 2,758,568

INK WELLS

Filed Sept. 11, 1953 2 Sheets-Sheet 1

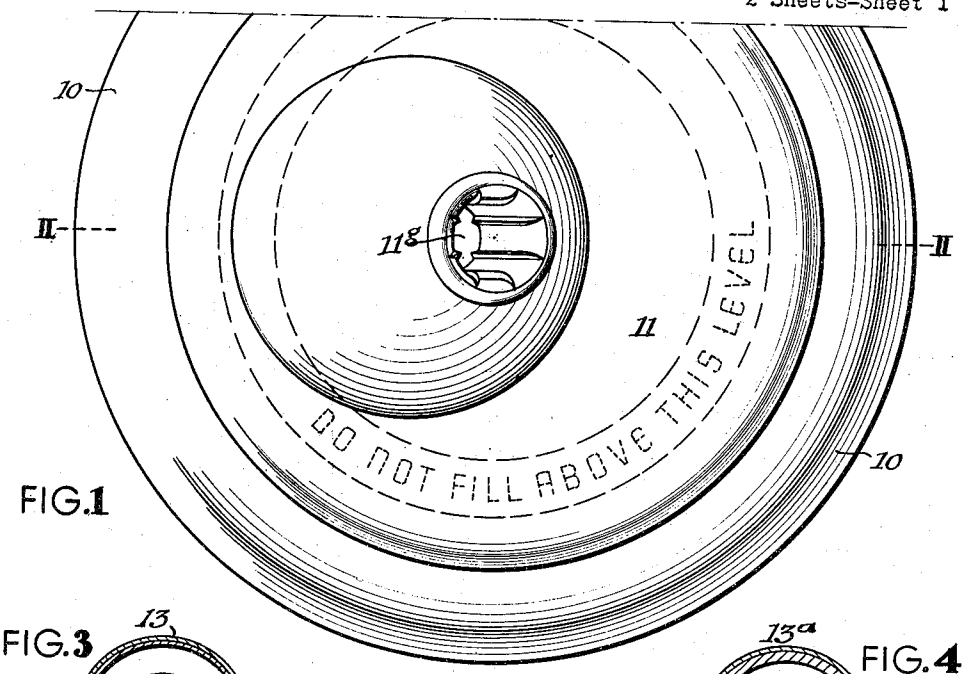

FIG. 1

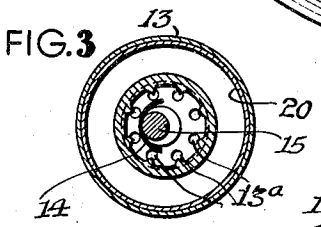

FIG. 3

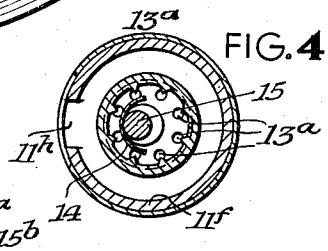

FIG. 4

FIG. 2

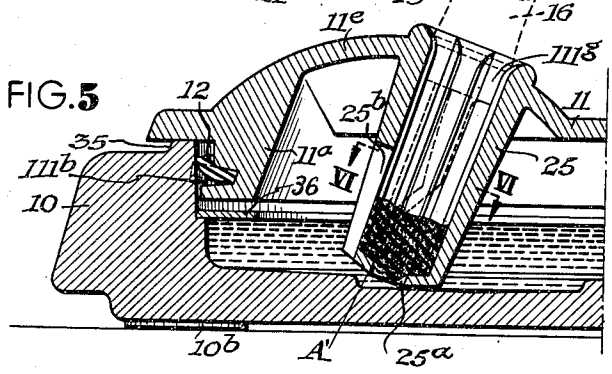

FIG. 5

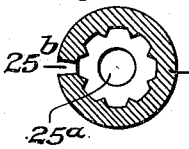

FIG. 6

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FIG. 7

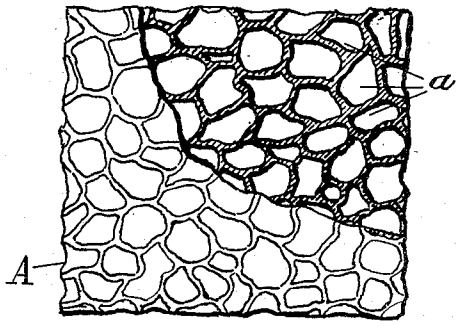


FIG. 8

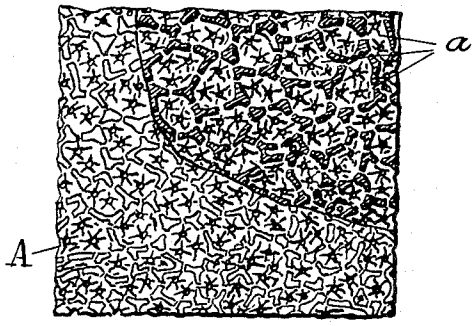


FIG. 10

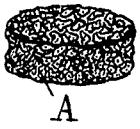


FIG. 11

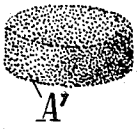
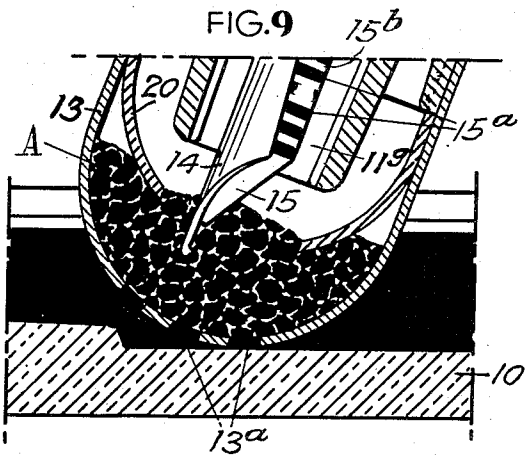


FIG. 9



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INK WELLS

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Application September 11, 1953, Serial No. 379,652

3 Claims. (Cl. 120—57)

This application is a continuation-in-part of our application for patent for Improvements in Ink Wells, filed December 31, 1948, Serial No. 68,485.

Our invention relates to ink wells, and one object of our invention is to provide a simple and efficient structure, which may be circular in contour, having a broad base which renders the structure non-tippable in ordinary use and provides for a relatively large ink-receiving space.

A further object of our invention is to provide means whereby a writing assembly comprising a pen point or nib and a fountain feed-bar may be kept supplied with ink while being supported in a dipping opening provided in a cover or closure for the ink well.

A further object of our invention is to provide an ink well comprising a receptacle for containing a supply of ink, a cover therefor having a dipping opening constructed to receive the point of a writing assembly, carrier means depending from said cover into the ink space of the receptacle and being disposed below the dipping opening and in liquid communication with the ink space, a unitary mass of multi-cellular elastic material disposed in said carrier; the cells of said material presenting a multiplicity of voids into which ink may flow by capillary action from said ink space and said material being of a nature such that it is readily penetrable by a writing point; said carrier means positioning said mass of material at a level such that a writing point received in said dipping opening penetrates and dips into at least the upper portion of said material and thereby is supplied with the ink stored in the cells of said material.

A further object of our invention is to employ as the multi-cellular elastic material a form of sponge rubber or similar elastic having communicating cells or interstices which will automatically fill with ink from the supply in the well for subsequent distribution to the pen point and feed-bar of the writing assembly when the latter is brought into contact with and enters at least the upper portion of said multi-cellular capillary material.

These and other features of our invention are more fully set forth hereinafter; reference being had to the accompanying drawings, more or less diagrammatic in character, in which:

Figure 1 is a plan view, partly broken away, illustrating one form of ink well within the scope of our invention.

Fig. 2 is a cross-sectional view on the line II—II, Fig. 1.

Figs. 3 and 4 are cross-sectional views on the lines III—III and IV—IV, respectively, Fig. 2.

Fig. 5 is a fragmentary view, similar to part of Fig. 2; showing another form of cover within the scope of our invention.

Fig. 6 is a cross-sectional view on the line VI—VI, Fig. 5.

Fig. 7 is a greatly enlarged view of a piece of sponge rubber as it comes from the mill; partly in section to represent its multi-cellular character.

Fig. 8 is a view similar to Fig. 7; showing the condition of the sponge rubber after it has been subjected to severe pressure to fracture or rupture its walls or septa whereby

the several cells may be in capillary communication with each other; such view being largely diagrammatic.

Fig. 9 is an enlarged view of a portion of the structure illustrated in Fig. 2; showing penetration of the pen point or nib into the multi-cellular mass supported in the ink space of the ink well.

Fig. 10 is a view in perspective, showing a small piece of the prepared sponge rubber shaped for insertion in the detachable carrier depending from the cover.

Fig. 11 is a view similar to Fig. 10, showing a section of foam rubber as prepared for insertion in the detachable carrier depending from the cover; such view being lightly stippled to indicate its initial porosity throughout.

The primary object of our invention is to provide a simple and efficient form of ink well with which a writing assembly comprising a pen point and a fountain feed-bar is associated and in which provision is made for supplying the storage space of the feed-bar with ink from a supply in the well by capillary action and wherein the pen point does not dip directly into the body of ink.

In the drawings, the ink well is indicated generally at **10**; comprising a body of suitable material, relatively heavy, and having a broad, shallow space for the reception of ink. This space is preferably provided with a sump, which may be centrally disposed, as indicated at **10a**. The outer wall of the well may be substantially thick, and the under surface or bottom may be provided with a layer of friction material, indicated at **10b**, to insure that the well will remain in a stable position when placed upon a desk, table, or the like.

The cover or closure for the well, indicated generally at **11**, is provided with an annular depending portion **11a** to fit into the upper part of the ink-receiving space, and this depending portion is annularly grooved at **11b** for the reception of a washer or gasket **12** which, when the cover is fitted in place, engages the inner sloping wall of the opening and, in addition to functioning as the means for retaining the cover in tight engagement with the wall, prevents evaporation and/or leakage of ink. The upper and lower wall surfaces of the annular groove **11b** may be outwardly beveled or flared, as shown.

Depending from the cover **11**, which may have a domed portion **11e**, is an annular wall portion or flange **11f** eccentrically disposed with respect to the depending portion **11a**, upon which is detachably mounted in any suitable manner—preferably by a friction fit—a cup-shaped shell or hollow receptacle **13**, which may be circular in cross section. The cover is also provided with a depending tubular portion **11x** disposed centrally of the depending annular wall portion or flange **11f**, and which defines a dipping opening **11g** for the reception of a writing assembly including a pen point **14** and a fountain feed-bar **15** carried by a penholder or pen staff **16**; such dipping opening being axially aligned with the shell **13**. The feed-bar is provided with a comb **15a** with spaces **15b** of capillary dimensions for the reception and storage of a supply of ink sufficient for the writing of a great many words from a single dipping in the well and entrance into the capillary cellular material therein.

For the purpose of supplying the fountain feed-bar of the writing assembly with ink, the shell **13** carried by the depending portion **11a** of the cover and which dips into the body of ink within the well, receives in its lower portion a unitary mass of multi-cellular elastic material, indicated at A. This material is more or less porous; being filled with individual communicating cells *a* of capillary dimensions so that ink entering the shell **13** through its apertures **13a** will fill the cells of this material by capillary action. The ends of the pen point and/or the feed-bar engage and enter the capillary material, and from this contact the capillary spaces **15b** of the feed-bar will fill with ink by capillary action; such ink remaining therein

until the writing assembly is put into use, and feeding to the pen point during a writing operation. The shell 13, having the bottom perforations indicated at 13a, may contact with the bottom of the well or with the bottom of the sump.

In order that the mass of multi-cellular material may be maintained against displacement in the form of our improved ink well illustrated in Fig. 2, and for the further purpose of trapping a portion of any loose ink that may be present initially adjacent the upper surface of such multi-cellular material, we provide the shell 13 with a liner 20; the latter fitting closely within the shell and having a lower inturned flange 20a which, in addition to engaging the multi-cellular material and preventing displacement thereof, defines a small annular space 21 above such material and between shell and liner. Any ink entrapped in this space is prevented from spilling should the well upset.

In the form of our improved ink well illustrated in Fig. 5, the cover 111 is shown as provided with domed portion 111e having with a depending portion 25, integral therewith and axially aligned with a dipping opening 111g receiving the writing assembly. The unitary mass of multi-cellular material indicated at A' is disposed in the lower portion of this depending member 25 which dips into the ink supply within the well to the full extent; touching the bottom of the same, or the sump shown centrally of such bottom. In order that ink may reach the interstices or cells of the mass of capillary material, the lower end of the depending portion 25 is slotted or apertured as indicated at 25a. Otherwise, the cover with the form of well shown in Fig. 5 is of the same character as that shown in Fig. 2 and fits the receptacle in the same manner; being retained in place by a similar sealing washer or gasket.

To prevent the ink surging when the cover is applied to the well after a filling operation, which condition might arise by reason of the air pressure developed in such replacement, provision is made for escape of air beneath the cover which finds its way out through the dipping opening. For this purpose the depending portion 11f of the cover may have a slot 11h adjacent its point of attachment to the cover, as shown in Fig. 2. In like manner, the tubular portion 25, integral with the form of cover shown in Fig. 5, is slotted at 25b.

It is essential that the cover be held in tight engagement with the well, and for this purpose we have provided the washer 12, mounted in the annular groove 11b. The upper and lower surfaces of the groove are flared or beveled in opposite directions, as indicated at 11c and 11d, and these surfaces cooperate with the washer or gasket when the cover is set in place. The washer is purposely made of such size that its inside diameter is slightly less than the diameter of the groove 11b at its root so that when the washer is set in place, its upper surface 12a will hug the upper beveled surface 11c of the groove. The effort to remove the cover from the well is relatively slight.

The ink well is preferably provided with a wall 35 of slight elevation projecting above the plane of the upper surface thereof adjacent its inner marginal edge *b*, and the cover rests on this wall when in final position. This arrangement provides a narrow space between the underside of the cover and the top of the well, and removal of the cover may be readily effected by a small pry—a thin coin—inserted in this space, and slight pressure is imparted thereto when it is desired to remove the cover for a fresh ink supply.

In all instances, by preference, the end of the pen point and/or the end of the feed-bar engages and enters the unitary mass of multi-cellular material carried by the cover of the ink well and the ink, which rises by capillary action and fills the interstices or cells of such mass, will rise further and fill the capillary spaces 15b of the feed-bar of the writing assembly by capillary action so that the pen point thereof is ready at all times for writing purposes. This supply is sufficient for the writing of several pages of manuscript without replenishment; further supply of ink being effected by capillary action as soon as the writing assembly is returned to the dipping opening.

The multi-cellular elastic material placed in the chamber or housed space communicating with the ink supply and the dipping opening of our improved ink well for the conveyance of ink from the supply to the pen point and feed-bar of the writing assembly may be of varied character; its function being to hold ink in its interstices or cells by capillary tension for transfer to the pen point and feed-bar. We have successfully used a form of "sponge rubber."

Sponge rubber per se as it comes from the mold or other instrumentality in which it is made is usually in the form of a relatively thick mass or sheet having a multitude of more or less minute cells individually complete and separated from each other by a septum whereby the contained gas is locked therein. This condition is highly desirable when the sponge rubber is to be used in the form of a cushion or pad. For the purpose of carrying out our invention, however, it is necessary, in the use of this form of sponge rubber, to rupture or fracture the septa enclosing the individual cells. For such purpose, sheets or other masses of the sponge rubber are subjected to heavy pressure and they may be successively passed between calendering or other rolls whereby the walls dividing the cells are broken so that the unitary mass becomes wholly porous and capable of receiving and retaining in the cells or interstices, entirely by capillary action and/or tension, any liquid in which such porous mass may be placed.

While we have referred to sponge rubber which we have used—a chemically blown mass the walls of whose cells must be ruptured or fractured—it is within the scope of our invention to use other forms of more or less similar material such as latex rubber foam sponge which breathes and does not require rupturing; being initially porous. It is to be understood therefore that the term "sponge rubber" wherever used in the specification and claims is that form of such material which is entirely porous; whether made so by rupturing the walls dividing the initially separate cells, or that form which is initially porous. In each instance, the sponge rubber contains definte and distinct cells, each receiving a small quantity of ink and in communication with adjacent cells.

In practice it has been desirable to treat the sponge rubber with a wetting agent for the purpose of promoting the adsorptive properties thereof. Any suitable wetting agent in an aqueous solution may be employed as long as it is of a type not affected by nor affecting the ink and/or the multi-cellular material such as sponge rubber, or the like.

In Fig. 7 we have a unitary piece of multi-cellular material—sponge rubber—as it comes from the mill; such view being very much enlarged and partly in section to illustrate the separate cells divided by solid walls or septa. In Fig. 8 we have shown a similar section of multi-cellular material—sponge rubber—after the walls or septa have been ruptured or fractured. Both views are largely diagrammatic.

Fig. 9 is an enlarged view of the lower part of the receptacle 13 which contains the mass of multi-cellular material, and the liner 20 which prevents displacement of the same; such view also showing the end of the pen point and the end of the feed-bar entering the upper part of the multi-cellular material.

In Figs. 10 and 11 we have shown views illustrating the general shape of the pieces of multi-cellular as prepared for placement in the receptacle 13; Fig. 11 being lightly stippled to indicate its initial porosity throughout its extent.

The base portion of our improved ink well is preferably made of a vitreous material—glass or the like—

which may be molded in any usual manner. It may be made of other materials such as any of the metals unaffected by ink acids; earthenware, thermoplastic or thermosetting resins, and/or the like. The inner wall surface of the portion receiving ink is slightly tapered; a necessity in an article made in a mold, and such inner wall may be slightly offset to provide an annular shoulder. By preference we place upon this shoulder an annular ring 36 displaying instructions for filling such as: "Do not fill above this level," as indicated by dotted lines in Fig. 1.

The dipping opening is preferably provided with longitudinal ribs and the grooves between these ribs form air passages. It will be understood therefore that any pressure of air that might build up as the cover is applied will escape through these passages—via the slot 11^h in the depending portion 11^f of the type of structure illustrated in Fig. 2, or the slot 25^b of the depending portion 25 of the type of structure shown in Fig. 5.

While it is desirable to provide a circular ink receptacle, the outer contour of the well may be of any other shape, oval, square, or the like.

It will be understood that the constructional details illustrated and hereinbefore described are for illustrative purposes only and not as limitations, since modifications may be made without departing from the spirit of our invention; all of which is deemed to be within the scope of the appended claims.

We claim:

1. The combination, in an ink well structure, of a hollow base having an ink-receiving space with a supply of ink therein, a cover for said well having a depending flange disposed substantially centrally of the underside thereof, a hollow receptacle having a perforated bottom fitting over said depending flange and dipping to the bottom of the ink-receiving space; said receptacle receiving ink from the supply in the well, a tubular element concentrically arranged with respect to said depending flange and carried by said cover; the bore of said tubular element defining a dipping opening, a seat at the upper and outer end of said dipping opening, a mass of multi-cellular material disposed in the lower part of said hollow receptacle and receiving ink by capillary attraction from the supply within the well, and an internal liner frictionally fitting the wall of the hollow receptacle and confining the multi-cellular material in place; said dipping opening being adapted to receive a pen point and a fountain feed-bar having capillary ink storage spaces extending from the end of a penholder resting upon its seat and said feed-bar and pen point engaging the capillary material and receiving ink therefrom in its capillary storage spaces.

2. An ink well comprising a receptacle for containing a supply of ink, a cover therefor having a depending tubular portion defining a dipping opening adapted to receive the pen point and fountain feed-bar of a writing assembly; said feed-bar having a plurality of ink-storage spaces, a depending annular portion or flange integral with and underlying said cover and concentrically disposed with respect to the tubular portion defining the dipping opening, a detachable hollow receptacle or shell frictionally supported on said annular portion or flange and extending to the bottom of the ink space and said receptacle being apertured in its lower wall portion for the passage of ink from said space, a unitary mass of ruptured multi-cellular elastic material disposed in said hollow receptacle; the ruptured cells of such material presenting a multiplicity of inter-communicating voids into which the ink may flow by capillary action from said ink space and said material being readily penetrable by a writing point; said hollow receptacle positioning said mass of material at a level such that a writing point and feed received in said dipping opening penetrates and dips into at least the upper portion of said material and whose capillary spaces are supplied with ink stored in the communicating cells of said material, and tubular means frictionally supported within the hollow receptacle for preventing displacement of the multi-cellular elastic material therein; said tubular means having an inturned lower edge.

3. An ink well comprising a receptacle for containing a supply of ink, a cover therefor having a depending tubular portion defining a dipping opening, a depending annular portion or flange integral with and underlying said cover and concentrically disposed with respect to the tubular portion defining the dipping opening, a detachable hollow receptacle or shell circular in cross section depending from said cover and frictionally supported on said depending flange and extending to the bottom of the ink space and said receptacle being apertured in its lower wall portion for the passage of ink from said space and said material being readily penetrable by a writing point; said hollow receptacle positioning said mass of material at a level such that a writing point and feed received in said dipping opening penetrates and dips into at least the upper portion of said material and whose capillary spaces are supplied with ink stored in the communicating cells of said material, and tubular means frictionally held within the hollow receptacle for preventing displacement of the multi-cellular elastic material therein; said tubular means having an inturned lower edge overlying said material, and said dipping opening being adapted to receive the pen point and feed-bar of a writing assembly; such feed-bar having capillary ink storage spaces and extending from the end of a penholder resting in the dipping opening and said feed-bar engaging the multi-cellular capillary material and receiving ink therefrom in its capillary storage spaces.

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