

April 21, 1931.

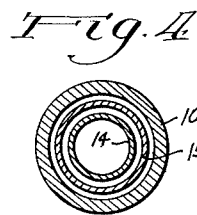
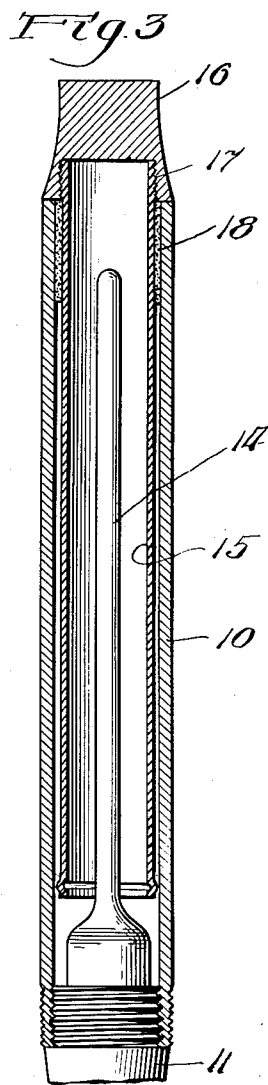
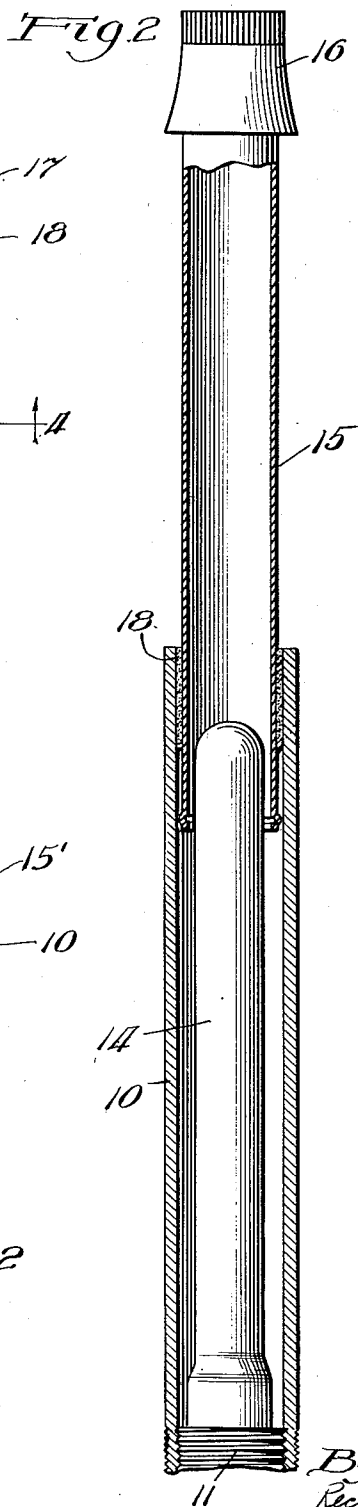
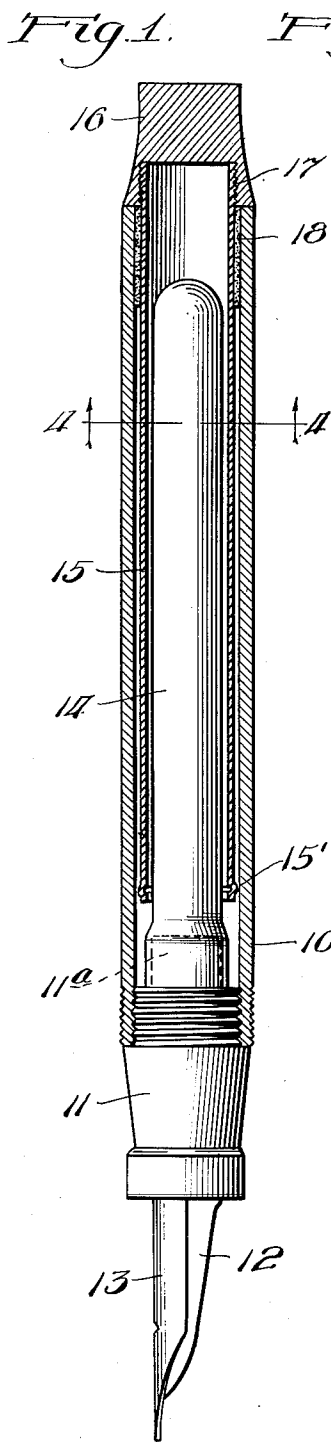
W. E. MOORE

1,801,635

FOUNTAIN PEN

Filed March 15, 1929

2 Sheets-Sheet 1



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Fig. 5

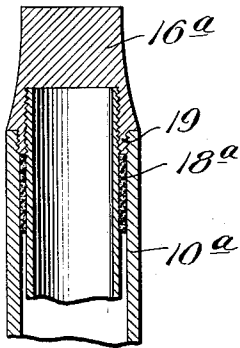


Fig. 6

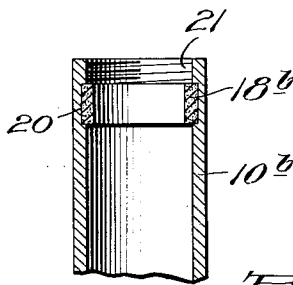


Fig. 7

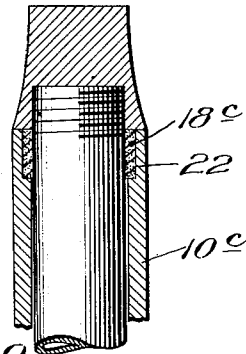
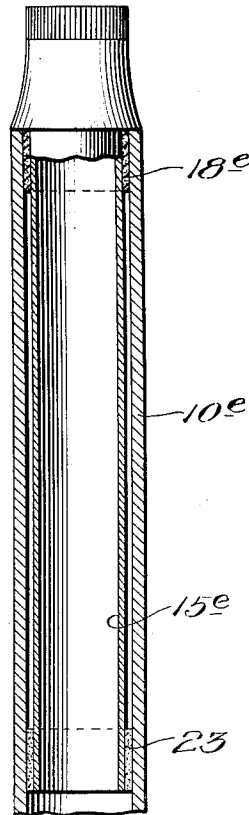
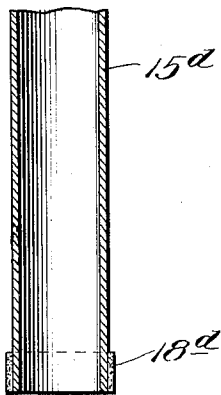


Fig. 9

Fig. 8



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# UNITED STATES PATENT OFFICE

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## FOUNTAIN PEN

Application filed March 15, 1929. Serial No. 347,205.

My invention relates generally to self-filling fountain pens and has to do more particularly with filling mechanism therefor.

One of the objects of my invention is to provide a simple and inexpensive fountain pen having a quick-fill filling mechanism which is highly efficient in operation and long-lasting, and which embodies but few operating parts.

Another object is to provide an improved fountain pen of a character employing a collapsible sac serving as an ink reservoir, which sac is mounted in a cylindrical pen barrel and is enclosed by another cylinder slidably mounted in the barrel and movable relative thereto to compress the air in the barrel and collapse the sac, the sac being allowed to expand to become filled with ink by restoring the barrel to its normal pressure condition after the sac has been collapsed.

A further object is to provide in a pen of the foregoing character a porous packing means between the pen barrel and the relatively movable cylinder whereby, as the cylinders are separated air is admitted within the pen barrel and cylinder through the packing, and when the cylinder is moved in the opposite direction or inwardly of the barrel, the air within the barrel and surrounding the sac is compressed to collapse the sac, and the air so compressed is quickly released through the packing means thereby restoring the barrel and cylinder to their normal pressure condition permitting the sac to expand and draw ink thereinto.

Additional objects are to provide a pen having parts easily repaired and replaced, all at a very small cost; to provide filling parts which are not liable to break and which will not wear out the filling sac as quickly as in the case of prior filling devices; to provide for the use of a greater capacity filler sac which will be entirely filled at each filling operation by the mere reciprocation of the filling or compression cylinder—all without increase in the overall size of the pen; and to provide an arrangement wherein the packing means between the barrel and cylinder is sufficiently flexible that a wide working tolerance is provided between the cylinder and

the barrel, without impairing the normal packing functions of the packing means, and whereby the proper working conditions between the cylinder and the barrel are provided even though warping of the cylinder or barrel should take place.

Other objects and advantages will become apparent as this description progresses and by reference to the drawings wherein,—

Figure 1 is a longitudinal section through the barrel portion of a pen embodying my invention;

Fig. 2 is a view similar to Fig. 1 (the lower part of the pen being omitted), and showing the compression cylinder withdrawn to its outer position ready for its compression stroke to collapse the sac;

Fig. 3 is a view similar to the previous figures, except showing the compression cylinder in its innermost position following its compression stroke with the sac collapsed;

Fig. 4 is a horizontal section taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a fragmental sectional view of the rear end of a modified form of pen;

Figs. 6 and 7 are fragmental sections of the rear portion of the pen barrel showing additional methods of mounting the packing means therein;

Fig. 8 is a fragmental section of another form of compression cylinder, wherein the packing means is carried by the innermost end of such cylinder; and

Fig. 9 is a sectional view of another form of my invention wherein the packing means is carried by both the rear end of the barrel and the compression cylinder.

The pen structure which I have chosen to illustrate my invention comprises a barrel having its lower or feed end threaded to detachably receive a feed-nozzle 11 which supports the usual feed bar 12 beneath the pen 13. If desired, the nozzle may be friction-fitted into the lower end of the barrel instead of being screwed thereinto, as shown. The rear or inner end of the nozzle 11 is provided with the usual reduced cylindrical extension 11<sup>a</sup> to which the open end of the rubber ink-reservoir sac 14 is securely attached. The feed bar 12 is provided with the ordinary

feed channel (not shown) which communicates with the interior of the sac 14 as will be well understood.

The reservoir sac 14 is filled with ink by alternately collapsing and expanding the same. This is accomplished as follows: The rear-end of the barrel 10 is open to slidably receive a somewhat smaller and open-ended cylinder 15 which I will refer to herein as the "compression cylinder". This compression cylinder is of sufficient length to extend substantially to the lower end of the barrel when it is fully inserted within the barrel. The outer end of this cylinder 15 rigidly carries a cap 16 which may be readily grasped by the hand for sliding the cylinder back and forth relatively to the barrel 10. The connection between the cap 16 and the rear end of the cylinder may be a threaded one, as indicated at 17 (Figs. 1 and 6), or it may be a friction fit or the cap may be pinned, or otherwise secured to that end of the cylinder without departing from the spirit and scope of my invention.

In operation, the compression cylinder 15 is moved outwardly and then inwardly to compress the filler-sac 14. The collapsing of the sac is accomplished by compression of the air in the barrel around the sac and this is made possible by employing a flexible packing 18 which is preferably carried by the pen barrel adjacent its rear end. In the preferred form, this packing 18 is glued, or otherwise fixed, to the inner wall of the barrel, and such packing is sufficiently porous to permit air to pass therethrough in the assembled position of the cylinder and barrel. The packing 18 may take the form of a piece of felt, chamois skin, or other similar porous material. In the use of this packing, it is obvious that when the compression cylinder 15 is moved to its outermost position (as shown in Fig. 2) air will be admitted through the packing 18 into the barrel-cylinder space surrounding the sac 14 to maintain a normal atmospheric condition in such space. After the compression cylinder has been moved to the position of Fig. 2, it is then moved inwardly to the position of Fig. 3 at such a rate that the air cannot escape fast enough through the packing 18 to prevent compression of the air within the barrel and around the sac. This results in collapsing of the sac 14 so that it assumes a condition such as illustrated in Fig. 3.

At the time of movement of the compression cylinder inward to the position of Fig. 3, the writing-end of the pen is inserted in a body of ink and it is left there (after movement of the cylinder 15 to the position of Fig. 3) for a sufficient length of time to permit the sac 14 to fully expand to the position of Fig. 1 and become filled with ink. The sac will expand due to the fact that the air compressed by the inward movement of

the cylinder 15 will gradually escape through the porous packing 18 until the barrel space and the space surrounding the sac is restored to an atmospheric condition. This condition permits the sac to assume its fully expanded condition so that it will be completely filled with ink. Withdrawal of the compression cylinder from the barrel is normally prevented by providing at its innermost end a circumferential beading 15' which acts as a stop by striking the inner end of the packing 18 when the cylinder is moved to its outermost position.

It may be desirable in some instances to provide a threaded connection between the compression cylinder cap and the pen barrel and, in Fig. 5, I have shown one method of doing this. The structure shown in Fig. 5 is the same as that of Figs. 1 to 4, inclusive, except that the cap 16<sup>a</sup> is provided with a reduced, cylindrical threaded portion 19 adapted to engage the rear threaded end of barrel 10<sup>a</sup>, and the packing 18<sup>a</sup> is mounted inwardly from the threaded barrel end.

The packing may be mounted on the pen barrel in various ways. In Fig. 6, I have shown the packing 18<sup>b</sup> glued, or otherwise fixed in a groove 20 which is located adjacent the rear end of the barrel 10<sup>b</sup>. The space between the packing 18<sup>b</sup> and the rear end of the barrel may be threaded as at 21 for attachment of the compression cylinder cap, or it may be unthreaded for a friction fit with the compression cylinder cap. In Fig. 7, the packing 18<sup>c</sup> is carried in an enlarged bore 22 at the extreme end of the barrel 10<sup>c</sup>.

While in the form of Figs. 1 to 4, inclusive, I have shown the cylinder packing as carried by the rear end of the pen barrel, yet it may well be carried by the innermost end of the compression cylinder or to both the innermost end of such cylinder and the rear end of the barrel as indicated in Figs. 8 and 9. Specifically, referring to Fig. 8, the compression tube 15<sup>d</sup> supports at its innermost end a porous packing 18<sup>d</sup> which snugly engages the barrel wall to provide for the same compression and air-release action as in the form of Fig. 1. Referring to Fig. 9, the barrel 10<sup>e</sup> may be provided with the porous packing 18<sup>e</sup> at its rear end and the compression tube 15<sup>e</sup> may also support a similar packing 23 at its innermost end. In all of these forms, the packing is of a sufficiently porous nature that when the compression cylinder is moved to its outermost position, air is permitted to pass through the packing into the barrel-cylinder space and when the cylinder is moved to its innermost position, the air within the barrel-cylinder space is compressed, and the sac collapsed, but this space is restored to its normal atmospheric condition by the escape of air through the packing as above described in connection with the preferred form.

The advantages of my invention will be obvious from the foregoing. It provides a quick-fill pen. Only a few parts are necessary and these parts are of such character that they are not likely to get out of order and require repair. They, naturally, will not wear fast and the pen, as a whole, is very long-lasting. The packing, by its inherent flexibility, reduces the necessity of accurate barrel and cylinder forming operations, quite liberal working tolerances being provided for. Regardless of slight warping, etc. by the cylinder and barrel, a free-sliding fit between the cylinder and the barrel is provided for with an insured compression and air escape action for collapsing and expanding the sac. Another advantage of my invention is that the pen may be made very cheaply, due to the elimination of bars, levers, etc., which, in addition to their cost, tend to rapidly wear the rubber sac. This particular construction also enables one to use a very thin pen barrel. The sac, which is always fully compressed in filling may be made larger than heretofore, whereby the ink capacity of the pen may be increased without increasing the overall size of the pen.

While I have shown several forms of my invention, it will be understood that other changes in details and arrangement of parts may be made without departing from the spirit and the scope of my invention as defined by the claims which follow.

I claim:

1. In a fountain pen, the combination of a barrel, ink-feed means at one end of said barrel, an ink reservoir sac mounted in said barrel, and means for collapsing and expanding said sac to fill the same with ink which includes an air-compression device mounted in said barrel, and a porous packing means between said barrel and said device providing for a release of air there-through from said barrel in the air-compressed position of said device.

2. In a fountain pen, the combination of a barrel, ink-feed means at one end of said barrel, an ink reservoir sac mounted in said barrel, and means for collapsing and expanding said sac to fill the same with ink which includes a cylinder slidably mounted in said barrel and adapted by its movement in one direction to compress the air in said barrel to collapse said sac, and air-vent packing means between said cylinder and said barrel for permitting escape of air from said barrel after collapsing of said sac and while said cylinder is in an air-compressing position to permit said sac to expand.

3. In a fountain pen, the combination with a barrel, a cylinder slidably mounted therein so arranged that movement of the same to its normal position compresses the air in said barrel, an ink filler-sac within said barrel collapsible upon compression of the air in

said barrel, and a porous packing between said barrel and cylinder of such a venting character that movement of said cylinder toward and into its normal position compresses the air in said barrel to collapse said sac, said compressed air gradually escaping through said packing means to restore said barrel to normal atmospheric condition and to permit said sac to expand, all without further manipulation of the part following the compressing movement of said cylinder.

4. In a fountain pen, the combination with a barrel member, a cylinder member slidably mounted therein, and an ink filler-sac within said barrel, of a flexible porous packing member carried by one of said members, said packing being adapted to admit air to said barrel member when said cylinder member is moved in one direction to collapse said sac and to permit escape of air from said barrel when said cylinder member is moved in the opposite direction to permit said sac to expand.

5. In a fountain pen having a plurality of telescoping members providing a chamber, a filler-bulb enclosed in said chamber, and porous packing means between said members providing for compression of air in said chamber upon movement of said members in one direction, and for venting air from said chamber after the compression movement of said members to restore said chamber to normal atmospheric condition without further actuation of parts.

6. In a fountain pen having a pair of cylinders telescoping each other in spaced relation and providing a substantially closed chamber, a filler-bulb enclosed in said chamber, a packing between said cylinders sufficiently compact for compression of air in said chamber upon relatively rapid movement in one direction of said members with respect to each other, said packing being of a character adapted for venting air through it from said chamber to atmosphere to restore the chamber to normal atmospheric condition when said members are at rest following the compression movement thereof.

7. In a fountain pen, a pen barrel, ink-feed means at one end of said barrel, a filler-sac within said barrel, a cylinder slidably mounted in the other end of said barrel, and semi-sealing means between said cylinder and barrel self-providing for compression of the air in said barrel to collapse said sac upon movement of said cylinder in one direction, and permitting escape of air from said barrel to restore the barrel to normal condition to permit said sac to expand when said cylinder is left at rest at the end of its said one-direction movement.

8. In a fountain pen, a pen barrel, ink-feed means at one end of said barrel, a filler-sac within said barrel, a cylinder slidably mounted in the other end of said barrel, and a flexible, porous fabric packing having a semi-

sealing surface between said cylinder and barrel providing for compression of the air in said barrel to collapse said sac upon movement of said cylinder in one direction and permitting escape of air directly through its semi-sealing surface from said barrel to restore the barrel to normal condition to permit said sac to expand when said cylinder is left at rest at the end of its said one-direction movement.

9. In a fountain pen, a barrel, a filler sac in said barrel, an air-compressor device mounted in said barrel for reciprocation, and an air vent packing between said device and barrel through which air is adapted to pass when said device is at rest and which sufficiently restricts the passage of air there-through when said device is reciprocated to compress the air in said barrel.

10. In a fountain pen, a barrel, a filler sac in said barrel, an air-compressor device mounted in said barrel for reciprocation, and a porous packing between said device and barrel providing for compression of the air in said barrel on the compression stroke of said device and providing for restoring said barrel to normal air pressure at the end of the compression stroke of said device when the latter is at rest.

In testimony whereof, I have subscribed my name.

WILLIAM EDGAR MOORE.

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