

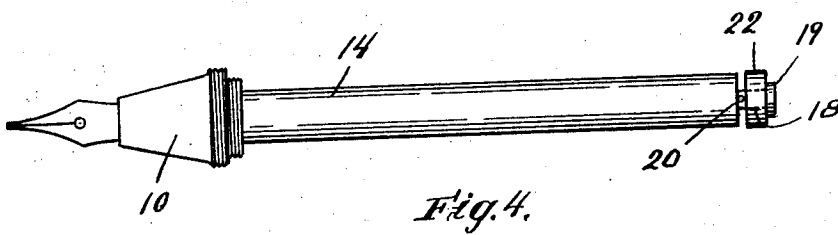
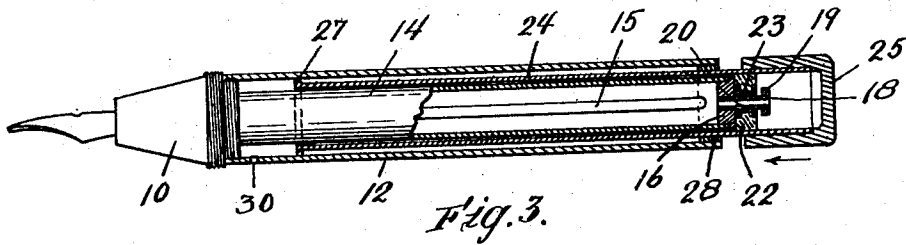
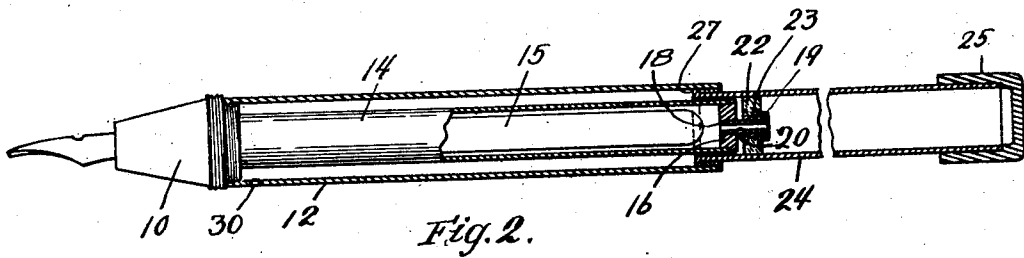
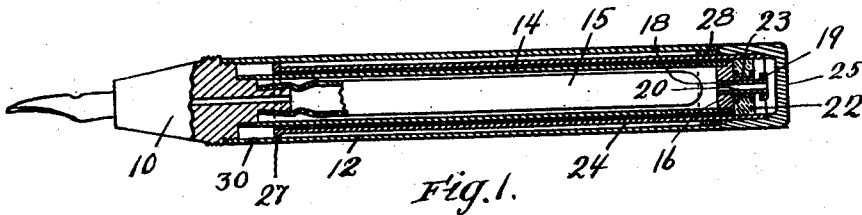
March 21, 1933.

W. J. FOLEY

1,902,633

FOUNTAIN PEN

Filed Oct. 24, 1931



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by *[Signature]*  
Atty.

# UNITED STATES PATENT OFFICE

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## FOUNTAIN PEN

Application filed October 24, 1931. Serial No. 570,817.

This invention relates to that type of fountain pens in which a rubber sack for containing the ink is collapsed by air pressure forced into the sack containing chamber by the action of a slidable barrel section and is permitted to expand by permitting the compressed air in said chamber to escape so that the sack may become filled.

In constructions of this type which have been placed on the market to the greatest extent, the ink sack is filled by confining the air in the sliding barrel section by closing a vent opening with the finger while the section is being pushed inward, and then removing the finger from the opening while the pen section is submerged in the ink, to permit the sack to become filled.

While this operation is simple, nevertheless much difficulty has been encountered in teaching the public generally how to perform it, and a further difficulty has been encountered in performing the operation due to the fact that frequently the vent opening is not closed tightly, so that the sack is only partly collapsed, and, therefore, is only partly filled.

The objects of the invention are to provide a fountain pen of the type above referred to in which the filling operation will be simplified, as compared with similar devices of this type and in which the necessity of the manual control of a vent aperture while performing the operation is entirely eliminated. Also to provide a construction which will permit the employment of certain dimensionally unstable material, such as compounds of celluloid, in the construction of the holder, without in any way affecting the operation of the sliding parts which are operated to fill the ink sack, and to provide a construction which is comparatively simple and durable and will favorably compare as to ink capacity with fountain pens which employ mechanical means for collapsing the ink sack.

These and other objects are accomplished by means of the construction hereinafter described and illustrated in the accompanying drawing in which:

Fig. 1 is a longitudinal central sectional

view of a fountain pen embodying the invention, with the parts in normal position.

Figs. 2 and 3 are similar views illustrating different steps in the filling operation.

Fig. 4 is a detail view of the ink holding section which is employed.

In the drawing a pen section 10 of ordinary construction is indicated, to which an outer barrel 12 is connected at one end, the opposite end thereof being open. Said barrel may be made of suitable celluloid compound, such as pyralin.

An inner barrel, or tube 14, of very thin metal is connected at one end to the pen section and the usual rubber ink sack 15 is located therein, the mouth of the sack being also connected to the pen section in the usual manner, so that an air chamber is formed about the sack, which fills the space within the tube 14 as completely as possible. A metal bushing, or plug 16 is fitted in and secured to the opposite end of the tube 14 from the pen section, and is provided with a central opening in which a tubular stem 18 is tightly fitted and secured, said stem 18 being extended beyond the bushing 16 and having a flange 19 at its opposite end and a small vent aperture 20 in one side in close proximity to the outer side of the bushing 16.

A circular piston disk 22, preferably of felt, and having a tubular metal bushing 23 therein, is slidably mounted on the stem 18 and is movable thereon between the flange 19 and the bushing 16, so that when the piston 22 is engaged with the bushing 16 it will close the vent and when it is engaged with the flange 19 the vent 20 will be open to the space outside the bushing 16.

A tubular plunger 24 of thin metal is slidably mounted internally on the inner tube 14, and its outer end is tightly closed by a cap 25, which may be of the same material as the outer barrel 12 and forms a continuation thereof when the plunger is in its innermost position. The opposite or inner end of the plunger 24 is provided with an out-turned flange 27 and a metal bushing 28 is secured within the barrel 12 at its opposite end from the pen section and is internally fitted to the exterior surface of the plunger 24, a suffi-

ciently strong frictional engagement being thereby provided to hold the plunger in any position to which it may be adjusted and said bushing serving as a stop to limit its outward movement. The piston 22 is also fitted to the inner surface of the plunger 24 and forms a practically air tight connection therewith in all relative positions thereof.

When the ink sack is to be filled, the plunger 24 is drawn outwardly until its inner flange 27 engages the bushing 28, as shown in Fig. 2, and then the end of the pen section is immersed in the ink and while the barrel 12 is held by one hand the plunger 24 is forced quickly downward with the other hand until the cap 25 thereon engages the end of the barrel.

As the plunger 24 has a frictional, air tight connection with the piston 22 in all relative positions, when the plunger is forced downward or inward, the piston will immediately be forced against the end of the tube 14, or bushing 16 therein, so that it will cover the vent 20 and prevent the escape of any substantial amount of air therethrough, and the air within the plunger will be forced through stem 18 and into the chamber containing the sack, causing the latter to be fully collapsed by the time the down stroke of the plunger has been completed as shown in Fig. 3. The air held under compression in the sack chamber will then begin to leak thru the vent 20 and beneath the piston 22 and will pass out between the inner surface of the plunger 24 and the outer surface of the inner tube 14, as these parts, although they are slidably fitted together, do not have an air tight connection. The barrel 12 may be provided with a vent aperture 30 through which the air may then escape, or it may be permitted to escape between the bushing 28 and the plunger, which have a close sliding fit, but not necessarily an air tight fit.

As soon as the air begins to escape from within the tube 14 the sack will begin to expand and draw in the ink thru the ink passage of the feed bar in the usual manner. In practice the ink passage in the feed bar is always very small, so that a slight leakage of air from the ink sack chamber will permit the sack to expand and become filled as rapidly as the ink can flow thru the feed bar passage.

In practice also the amount of air in the plunger which will be forced into the ink sack chamber will be somewhat in excess of what is necessary to collapse the sack, so that the sack will be fully collapsed even if there is a slight leakage of air from the sack chamber while the plunger is being pushed inward.

When the plunger is drawn outward, preliminary to the filling operation, the piston 22 will be moved into engagement with the flange 19, fully uncovering vent 20, so that air will be supplied to the space within the

plunger thru the vent 30, between the tube 14 and plunger and thru vent 20 and stem 18.

The filling operation may thus be performed by merely pulling out and pushing back the plunger 24.

I claim:

1. In a self-filling fountain pen having a collapsible ink sack, a tube enclosing said sack and having an air tight connection at one end with the mouth thereof, a piston disk mounted on the opposite end of said tube, arranged for limited movement axially thereof, and having a constantly open air passage therethrough to the interior of said tube, a tubular plunger closed at one end and telescopically fitted on said tube at its opposite end, with its inner surface having an air tight connection with the periphery of said disk in all relative positions thereof, said disk being inwardly movable by the frictional engagement of the plunger therewith when moved to force air into the tube thru said passage, and said tube having a vent passage arranged to be obstructed by said piston disk when moved inward and to be fully opened when the disk is moved outward.

2. In a self-filling fountain pen having a collapsible ink sack, a tube enclosing said sack and having an air tight connection at one end with the mouth thereof, a tubular stem mounted in the opposite end of said tube and protruding therefrom and providing open communication therethrough to the interior of the tube, said stem having a flange at its outer end and a relatively small leak opening in one side adjacent the end of the tube, a piston disk mounted on the protruding portion of said stem and movable between said flange and the end of said tube to open and close said leak opening, and a tubular plunger closed at one end and telescopically fitted at its opposite end on said tube and having an air tight connection internally with the periphery of the disk in all relative positions thereof.

In testimony whereof, I have signed my name to this specification.

WILLIAM J. FOLEY.