

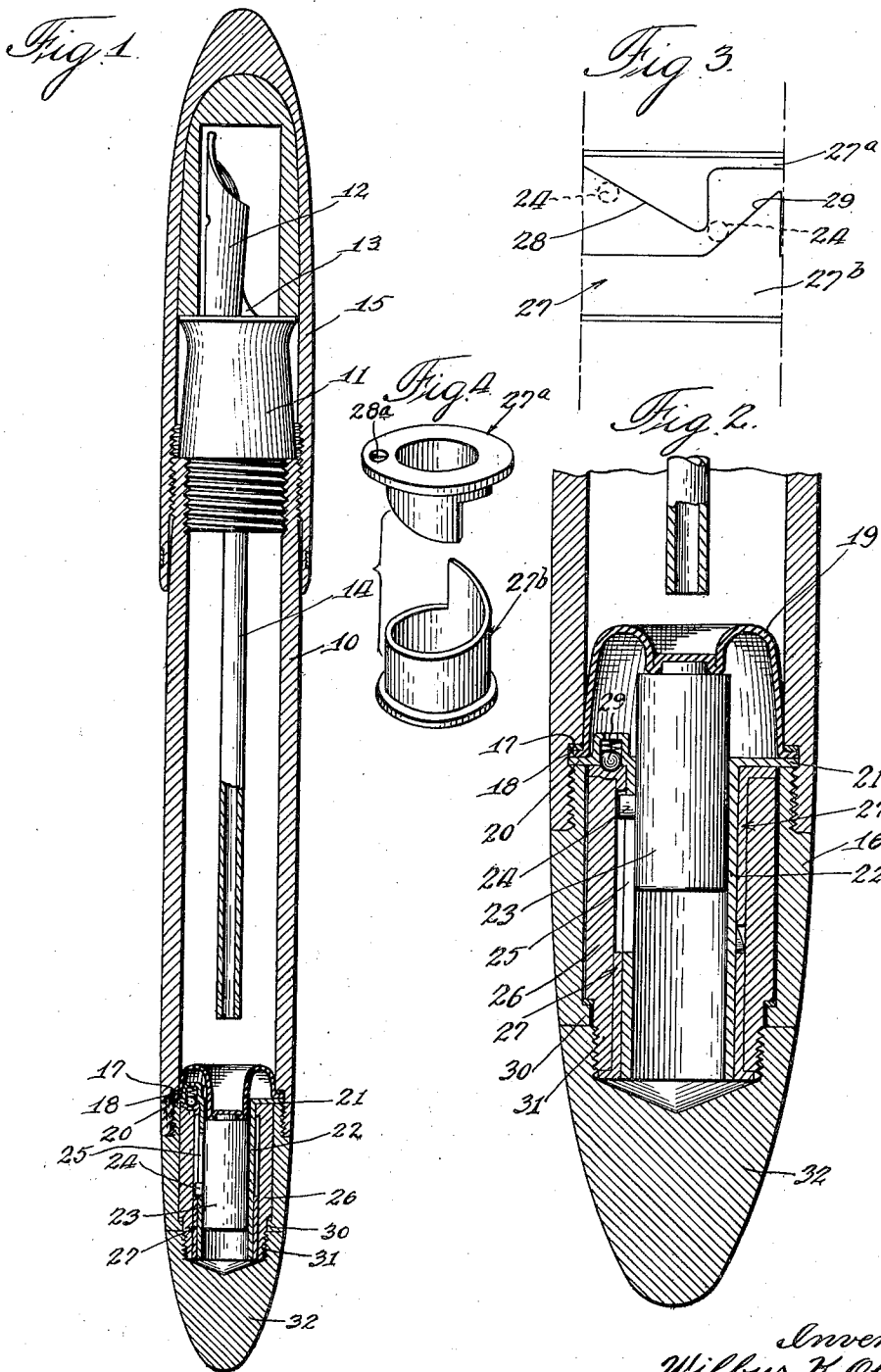
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FOUNTAIN PEN

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FOUNTAIN PEN

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This invention relates to a fountain pen and has special reference to a fountain pen in which the filling mechanism is operated by the rotation of an operating element to produce the suction for drawing the writing fluid into the barrel of the fountain pen.

More particularly, this invention relates to a fountain pen including a barrel having filling means therefor comprising an element manually operable by a rotation thereof about the longitudinal axis of the barrel, a flexible member closing the end of the barrel being reciprocated by a positive means on the manually operable element.

It is desirable in a fountain pen to provide a maximum ink capacity in the barrel thereof and one in which the filling device takes up only a relatively small portion of the interior of the barrel to permit a greater volume of the barrel to be utilized as an ink reservoir. Further, that the filling mechanism be of such a construction as will safeguard against leakage therethrough. The construction disclosed herein contemplates the provision of a relatively small filling means including a flexible member for reciprocation in the direction of the axis of the barrel by a member which is rotatable about the axis thereof, the flexible member being held about its perimeter in a manner to obviate leakage and being secured at a medial portion thereof on the outside of the fluid reservoir to a piston operated by the manually rotatable element.

It is one of the objects of this invention to provide a fountain pen of the above indicated character in which the filling mechanism thereof is leak-proof and fully housed and protected within the pen barrel.

Another object of this invention is to provide a fountain pen of the type heretofore referred to in which a maximum ink capacity is obtained with a relatively small portion utilized for obtaining the filling action.

A further object of this invention is to provide a fountain pen of the character noted above which is comparatively inexpensive to manufacture, and which is simple in operation.

Other objects and advantages will hereinafter be more particularly pointed out and for a more complete understanding of the characteristic features of this invention, reference may now be had to the following description when taken together with the accompanying drawing, in which latter:

Figure 1 is a central vertical sectional view of a fountain pen embodying the features of this invention;

Fig. 2 is an enlarged central sectional view of a fragmentary portion of the end of the fountain pen shown in Fig. 1 showing a changed position of the filling mechanism thereof;

Fig. 3 is a developed view of the cam of the filling mechanism of the preceding figures; and

Fig. 4 is an exploded view in perspective of the cam of Fig. 3.

Referring now more particularly to the drawing, the present invention is shown as embodied in a fountain pen having a barrel 10 enclosed on one end by the usual pen section 11, which latter is preferably screw threaded into the bore of the barrel. The pen section 11 carries a pen nib 12 and the usual feed bar 13, the latter being provided with an ink channel which opens within the barrel and extends outwardly therefrom to be covered by the pen nib. The feed bar communicates with a tube 14, which latter is mounted therein and extends within the barrel cavity to a point near the other end thereof. The writing point end of the barrel is provided with exterior threads for engaging the interiorly disposed threads of a cap 15.

The end of the barrel opposite to the writing point end is provided preferably with an enlarged threaded bore for engaging threads on a reduced extension of the housing 16. By reason of the reduced extension of the housing 16, it is possible to form the outer surface thereof coextensive with the outer diameter of the barrel. A washer 17 preferably of a non-corrosive metal is disposed at the shoulder formed by the juncture of the enlarged threaded bore with the reduced bore of the barrel for providing a seat upon which the peripheral edge 18 of a flexible diaphragm 19 may be engaged. The flexible diaphragm 19 is held against displacement by means of a flange 21 of the sleeve 22 bearing thereagainst and compressing the peripheral edge thereof against the metal washer 17. The flange 21, in turn, is urged against the peripheral edge of the flexible diaphragm by the threaded extension of the housing 16.

The flanged sleeve 22 is fixed against movement both in the direction of the axis of the barrel and against rotation in the direction about the axis thereof. A piston 23 is mounted for reciprocation in the bore of the sleeve 22, the piston being held against rotation therein and being guided in its reciprocal movement by a pin 24 which rides in a longitudinally extending slot 25 in the sleeve.

A reciprocal movement of the piston 23 is accomplished by a rotatable movement of a tubu-

lar element 26, which latter is provided with a cam element 27 shown more particularly in Figs. 3 and 4. The cam is preferably formed in two separate portions, one portion 27^a thereof having an inclined surface 28 along which the pin 24 rides to move the piston 23 in a direction away from the writing point end of the fountain pen, and the other portion 27^b of the cam having an inclined surface 29 for engaging the pin 24 and directing the same in an opposite direction to move the piston toward the writing point end of the fountain pen. Thus a positive means is provided for reciprocating the piston 23.

The cam member formed of the two portions 27^a and 27^b may readily be fixed within the tubular member 26 in any well known manner such as by a force fit and may occupy a fixed relation therein by means of the flange at the ends of the cam portions, the flange of the portion 27^b limiting the movement of the cam inwardly to a spaced distance from the portion 27^a, which latter likewise is limited in its movement into the bore of the tubular portion by its flange. The flange on the cam portion 27^a may contain a depression 28^a in which a spring pressed detent may be engaged, the latter being, for example, in the form of a spring pressed ball 29 seated in the flange 21 of the metal sleeve 22. Such means may indicate the initial position of the rotative movement of the cam or the lowermost point of the pin 24 on the cam surface 28.

The tubular portion 26 together with its cam portions 27^a and 27^b which are fixed therein are rotatable on the sleeve 22. Also, the tubular portion 26 and associated cam 27 rotate within the housing 16. In order to prevent endwise displacement of the tubular member 26, the housing 16 is provided with a reduced bore 30 at its outer end for providing a shoulder which engages a shoulder provided by a reduced extension 31 of the tubular member 26.

In order to manually operate the tubular member 26 and its fixed cam therein, a cap 32 fixedly engages the reduced extension 31 and may be held thereon merely by engaging threads or by a cementitious material or other locking means.

The flexible diaphragm 19, fixed at its peripheral edge to the barrel to seal the end thereof, is connected at a medial portion thereof outside of the barrel proper to the piston 23 by means of a cementitious material or other well known means and the diaphragm is flexed or reciprocated by the piston. In the operation of the fountain pen to fill the same, the cap 32 is rotated preferably in a continuous direction to rotate the tubular member 26 and cam 27. The cam engages the end of the pin 24, which latter projects through the longitudinally extending slot 25 in the sleeve to move the pin and thereby to operate the piston in a reciprocal movement longitudinally or in the direction of the axis of the barrel. The piston is held against rotatable movement by the longitudinally extending slot 25 and is thereby merely operated in a longitudinal direction. The flexure of the diaphragm creates a suction within the barrel to draw ink therein and the rotation of the cap is continued until the barrel is filled with ink.

While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications thereof may be apparent to those skilled in the art without departing from the spirit and scope of this invention and, therefore, the same is only to be

limited by the scope of the prior art and the appended claims.

I claim:

1. In a fountain pen having a barrel, filling means therefor comprising an element manually operable by a rotation thereof about the longitudinal axis of the barrel, means movable longitudinally of the barrel, a flexible member closing the end of the barrel and connected to said longitudinally movable means, and positive means on said manually operable element for connection with said longitudinally movable means for reciprocating said flexible member.

2. In a fountain pen having a barrel, filling means therefor comprising an element manually operable by a continuous rotation thereof about the longitudinal axis of the barrel, means movable longitudinally of the barrel, a flexible member closing the end of the barrel and connected to said longitudinally movable means, and positive means on said manually operable element for connection with said longitudinally movable means for reciprocating said flexible member.

3. In a fountain pen having a barrel, filling means therefor comprising an element manually operable by the rotation thereof about the longitudinal axis of the barrel, means movable longitudinally of the barrel, a flexible member closing the end of the barrel and connected to said longitudinally movable means, and cam means on said manually operable element for connection with said longitudinally movable means for reciprocating said flexible member in the direction of the axis of said barrel.

4. In a fountain pen having a barrel, filling means therefor comprising a fixed sleeve, a piston having reciprocal movement in said sleeve, guiding means between said sleeve and said piston to direct longitudinal movement of said piston and to prevent rotation thereof, a flexible member closing the end of the barrel and secured to said piston, and an element manually operable by the rotation thereof about the longitudinal axis of the barrel for reciprocating said piston and thereby said flexible member.

5. In a fountain pen having a barrel, filling means therefor comprising a fixed sleeve, a piston having reciprocal movement in said sleeve, said sleeve having a slot extending in the direction of the axis thereof for receiving a pin fixed on said piston to direct longitudinal movement of said piston and to prevent rotation thereof, a flexible member closing the end of the barrel and secured to said piston, and an element manually operable by the rotation thereof about the longitudinal axis of the barrel for reciprocating said piston and thereby said flexible member.

6. In a fountain pen having a barrel, filling means therefor comprising a sleeve fixed on said barrel having an axially extending slot, a piston having reciprocal movement in said sleeve and having a pin extending through said slot for guiding the movement of said piston, a flexible diaphragm having the peripheral edges thereof secured to said barrel for closing the end thereof and having a medial portion fixed to said piston, and an element manually operable by the rotation thereof about the longitudinal axis of the barrel for reciprocating said piston and thereby said flexible diaphragm.

7. In a fountain pen having a barrel, filling means therefor comprising a sleeve fixed on said barrel having an axially extending slot, a piston having reciprocal movement in said sleeve and having a pin extending through said slot for

guiding the movement of said piston, a flexible diaphragm having the peripheral edges thereof secured to said barrel for closing the end thereof and having a medial portion fixed to said piston, and a tubular member surrounding said sleeve having means for engaging said piston, said tubular member being manually operable by the rotation thereof about the longitudinal axis of the barrel for reciprocating said piston and thereby said flexible diaphragm.

8. In a fountain pen having a barrel, filling means therefor comprising a sleeve fixed on said barrel having an axially extending slot, a piston having reciprocal movement in said sleeve and having a pin extending through said slot for guiding the movement of said piston, a flexible diaphragm having the peripheral edges thereof secured to said barrel for closing the end thereof and having a medial portion fixed to said piston, and a tubular member surrounding said sleeve for rotation thereon, said tubular member having a cam on the inner periphery thereof for engaging said pin and the manual rotation of said tubular member reciprocating said pin to operate said piston and thereby to reciprocate said flexible diaphragm.

9. In a fountain pen having a barrel, filling

means therefor comprising a flanged sleeve having an axially extending slot, a piston having reciprocal movement in said sleeve and having a pin extending through said slot for guiding the movement of said piston, a flexible diaphragm, a housing for locking the flange of said sleeve against the peripheral edge of said diaphragm to close the end of the barrel and to fix said sleeve against movement, a medial portion of said flexible diaphragm being secured to said piston, and an element manually operable by the rotation thereof about the longitudinal axis of the barrel for reciprocating said piston and thereby said flexible diaphragm.

10. In a fountain pen having a barrel, filling means therefor comprising an element manually operable by a rotation thereof about the longitudinal axis of the barrel, means movable longitudinally of the barrel, a flexible member closing the end of the barrel and connected to said longitudinally movable means, positive means on said manually operable element for connection with said longitudinally movable means for reciprocating said flexible member, and stop means for indicating the initial position of said rotating movement.

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