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O. B. HJORTH

FOUNTAIN PEN

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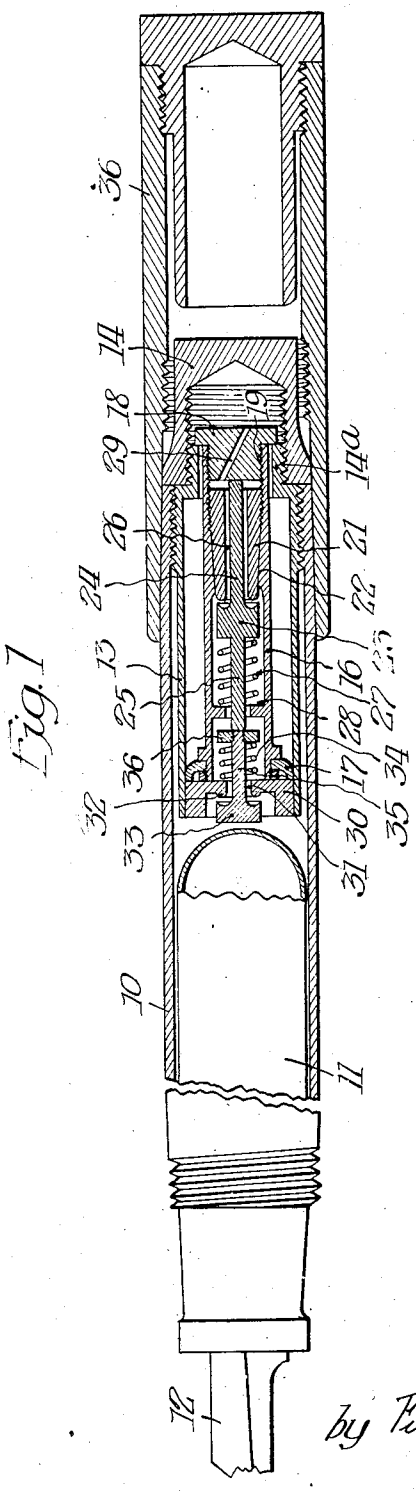


Fig. 1

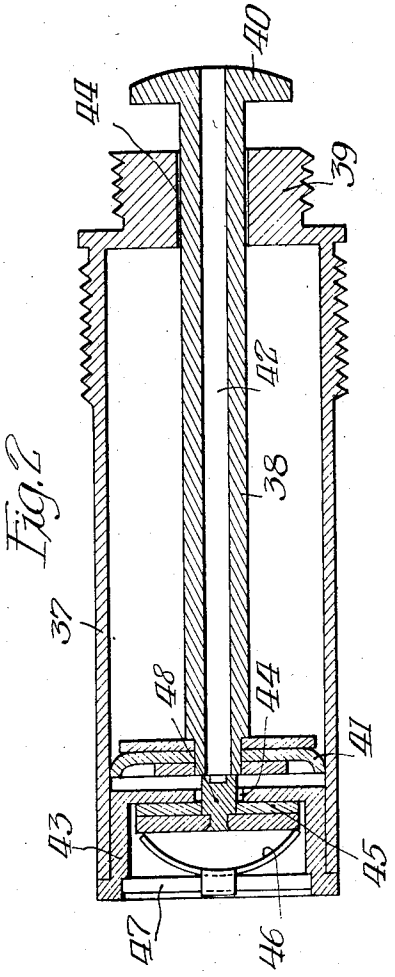


Fig. 2

Inventor:
Oscar B. Hjorth,
by Fisher, Poole, Clapp & Soans
Attys.

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UNITED STATES PATENT OFFICE.

OSCAR B. HJORTH, OF JANESVILLE, WISCONSIN, ASSIGNOR OF ONE-HALF TO WILLIAM H. SKILLEN, OF JANESVILLE, WISCONSIN.

FOUNTAIN PEN.

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This invention relates to fountain pens of the type commonly known as self-filling fountain pens and more particularly to that class of self-filling pens which are provided with a flexible ink-sack within the barrel. Usually a bar is provided for compressing the ink-sack when the pen is to be filled, but such pressure bar causes undue wear on the rubber sack, does not completely collapse it and reduces the capacity of the sack.

The present invention seeks to obviate these objections by providing a pen in which the bar, which is ordinarily used for collapsing the ink-sack, is eliminated, and having means for pumping air into the barrel to collapse the sack substituted therefor, which means will be comparatively short in length so as to provide room for a comparatively large diameter and long ink-sack within the barrel. Another object is to provide air-compressing means which will be simple in operation, of few working parts and which will be rigid in its construction so that it will withstand such handling as a fountain pen is commonly subjected to. Other objects and advantages of this invention will appear when reference is had to the following specification when considered in connection with the accompanying drawings, wherein a selected embodiment of the invention is illustrated and in which:

Fig. 1 is a sectional view taken on an axis of the pen, but showing the conventional writing end in elevation, and

Fig. 2 is a sectional view of a modified pump structure which may be substituted for the structure shown in Fig. 1.

Referring now to the drawings, a barrel 10 is shown having a flexible ink-sack 11 disposed therein, which sack is connected to a suitable pen point 12 to supply ink thereto in the usual manner. The ink-sack 11 occupies the greater portion of the pen barrel and a relatively short pump is provided in the outer end of the barrel. The pump comprises a cylinder 13 having threads at its outer end which are adapted to engage internal threads at the outer end of the barrel. The outer end of the cylinder is provided with a projecting stem 14^a which is exteriorly threaded to receive an internally threaded end piece or cap 14. A hollow piston rod 16 extends through the stem or neck 14^a and is provided with a piston 17 at its inner end. A knob 18 at the outer end of the piston rod is provided with a reduced threaded portion 19 which is adapted to engage internal threads at the outer end of the piston rod 16. This pump structure is provided with an inlet check valve for admitting air into the pump chamber or cylinder and to prevent its escape therefrom, and also with a discharge check valve through which compressed air is forced into the chamber occupied by the ink-sack, the pump being provided with means for unseating both of these valves to permit the escape of air from the sack chamber.

The inlet check valve comprises a plug 21 fitting a tapered seat 22 in the hollow piston rod and also screw-threaded therein as shown, and having a valve seat at its inner end, and a co-operating valve 23 having oppositely projecting stems 24 and 25. The stem 24 projects outwardly through an aperture 26 in the plug or seating member 21 and a spring 27 coiled about the stem 25 and engaging an annular flange 28 in the piston rod, tends to press the valve toward its seat.

A partition or closure 30 is disposed at the inner end of the pump chamber or cylinder 13 and is provided with an opening 31 surrounded by a seat 32 for the discharge check valve 33. A spring 34 coiled about the stem 35 of the valve extends between a flange 36 on the stem and the closure 30 and tends to press the valve toward its seat.

When the pen is filled, the cap 14 is removed and the knob 18 is unscrewed a few turns sufficient to permit the springs 27 and 34 to seat the valves 23 and 33. Then the piston is reciprocated by means of the knob 18, air entering the pump chamber through the inlet valve 23 during the out stroke and being forced into the ink-sack chamber through the discharge valve 33 during the forward stroke. A few strokes of the pump piston will force sufficient air into the ink-sack chamber to completely collapse the ink-sack. The point end of the pen is then inserted in an ink supply and the knob 18 screwed in to open the valves 23 and 33, and so relieve the air pressure in the ink-sack chamber. Thereupon the resiliency of the sack 11 will cause it to expand and ink will be forced into it by atmospheric pressure. When the ink-sack has been so filled, the

knob 18 is again unscrewed a few turns or sufficient to permit the valves 33 and 23 to close thereby preventing ink from entering the pump mechanism in case of breakage or leakage of the ink-sack. The cap 14 may then be replaced.

The cap 14 affords protection for the knob 18 and prevents its accidental displacement. A conventional cap 36 may be provided which is adapted to be placed over the pen point 12 to protect it when the pen is not in use and which may be placed on the opposite end of the barrel of the pen in order to lengthen it when the pen is to be used.

In Fig. 2 a modified pump construction is shown which has the advantages of greater simplicity and consequent lower cost of manufacture than the pump construction of Fig. 1. The modified structure includes a cylinder 37 substantially the same as the cylinder 13 of Fig. 1. A piston rod 38 is slidable through an opening in the outer end 39 of the cylinder 37 and is provided with a knob 40 at its outer end and a piston head 41 is secured to its inner end. The piston rod 38 is bored out to provide an air inlet passage 42 therethrough as will be hereinafter explained. The inner end of the cylinder is provided with an end piece or closure 43 having an opening 44 therein, that is adapted to be closed by a discharge check valve 45. The latter is pressed toward its closed position by an arcuate strap spring 46 which is held in place by cross bar 47 fastened in the end of the closure 43.

The operation of the above described pump is as follows: The piston 38 is reciprocated by means of the knob 40 and during the out stroke air will enter the pump chamber or cylinder 37 through the air passage 42, the valve 45 being held closed by means of the spring 46. During the forward stroke of the piston, passage 42 is closed at its outer end by placing a finger thereover so that the air in the cylinder will be compressed and forced through the check valve 45 into the ink-sack chamber. By reciprocating the piston a few times, an amount of compressed air sufficient to collapse the ink-sack is provided, as is the case with the pump in Fig. 1. By holding the piston 41 at the extreme inner end of its movement it will, by engagement with the short outwardly projecting stem 48 of the valve 45, hold the valve open and so relieve the air pressure in the ink-sack chamber, thus permitting the expansion and filling of the ink-sack when the pen point is dipped in ink. The spring 46 is preferably of sufficient strength to normally close the valve 45 when the piston is released whereby ink is prevented from entering the pump mechanism as explained above with reference to Fig. 1. A cap, similar to cap 14 shown in Fig. 1, is preferably provided and when threaded on the reduced outer end portion 39 of the pump cylinder prevents accidental operation of the piston.

The improvement provides a simple durable, self-filling pen. The pump structure is very compact so that ample space is provided for a comparatively large ink-sack without unduly increasing the size of the pen barrel. A few strokes of the pump piston suffices to completely collapse the ink-sack so that it is completely filled. There is little or no wear on the ink-sack and the filling device is such that it prevents leaking of ink from the barrel in case the ink-sack is broken.

Changes in the form and construction of the parts of the improved pen may be readily made without departing from the scope of the invention as defined in the following claims.

I claim as my invention:

1. In a fountain pen, the combination of a barrel having a chamber at one end for an ink sack, a flexible ink sack disposed in said chamber, a pumping device at the opposite end of said barrel and operable to compress air into said chamber to collapse said ink sack, a check valve opening inwardly towards said ink sack chamber for controlling communication therewith and operable to retain the compressed air within said chamber and means for holding said check valve open to permit the escape of the compressed air therefrom, thereby permitting the sack to expand and receive a supply of ink.

2. A fountain pen comprising a barrel divided transversely into two chambers, the chamber adjacent the outer end forming a pump chamber, a reciprocating piston in the latter chamber, a compressible ink sack in the other of said chamber and a check valve opening inwardly to the latter of said chambers for controlling communication between the pump chamber and the ink sack chamber.

3. In a fountain pen, the combination of a barrel, an ink-sack therein, a pump element in the outer end of the barrel, said pump element being operable to compress air into said barrel to collapse said sack, a check valve for preventing the escape of air so compressed, and means for holding said check valve open to relieve the air pressure within the barrel and permit said sack to expand.

4. In a fountain pen, the combination of a barrel, a flexible ink-sack therein at one end thereof, an air pumping device in the other end of the barrel and including a piston operable by a plurality of strokes to compress air into said barrel to collapse the ink-sack, means for preventing the escape of air so compressed into said barrel during the pumping operation, and means for re-

lieving the air pressure to permit the expansion of the ink-sack.

5. In a fountain pen, the combination of a barrel, an ink-sack located therein, a pump structure located in the outer end of the barrel, said pump structure including a piston operable by a plurality of reciprocations to compress air into said barrel and a check valve for preventing the escape of the air from the barrel during the compressing operation, the pump structure having means for unseating said valve to permit the escape of air.

6. In a fountain pen, the combination of a barrel, a flexible ink-sack located therein and a pump structure located in the barrel and forming a closure for the outer end thereof, said pump structure being operable to compress air into said barrel to collapse said ink-sack and including a pump chamber, a piston, and inlet and outlet check valves, said valves being operable to permit only inward passage of air during the pumping operation, and the pump structure having means for holding the valve open to relieve the pressure of air in the pen barrel.

7. In a fountain pen, the combination of a barrel, a flexible sack therein at one end thereof, and a pump structure in the outer end of the barrel and operable to compress air therein to collapse the ink-sack, said pump structure comprising a pump chamber provided at its inner end with a check valve operable to permit the passage of air into said barrel but to prevent its escape therefrom, a piston having a hollow piston rod forming an air inlet passage, a check valve mounted in said passage, and means for permitting the escape of the air from said barrel.

8. In a fountain pen, the combination of a barrel, a flexible sack therein at one end thereof and a pump in the outer end of the barrel and operable to compress air therein to collapse the ink-sack, said pump structure comprising a pump chamber provided at its inner end with a discharge check valve, a piston in the pump chamber having a hollow piston rod forming an air inlet passage, an inlet check valve in said passage, and means for holding both of said valves open to permit the escape of air from said barrel.

9. The combination in a fountain pen of a barrel, a flexible ink-sack within said barrel and connected to the pen point, a pump structure mounted as a unit within the outer end of the barrel and operable to compress air therein to collapse said sack, said pump structure including valve means for permitting the passage of air only into the barrel and also means for unseating said valve means to permit the escape of air from the barrel.

OSCAR B. HJORTH.