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E. BERGQUIST
PEN FILLING MECHANISM
Filed July 18, 1925

Fig. 1.

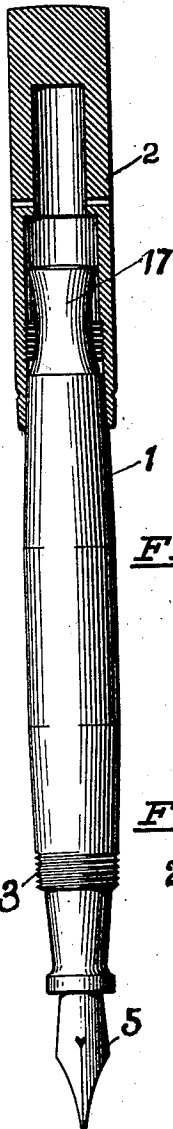


Fig. 2.

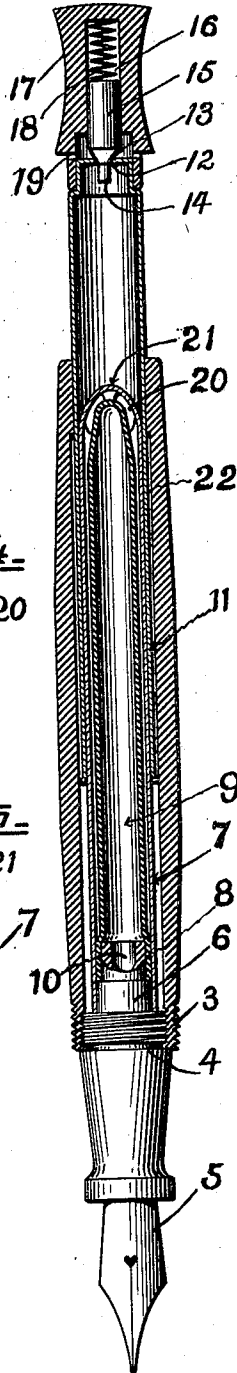


Fig. 3.

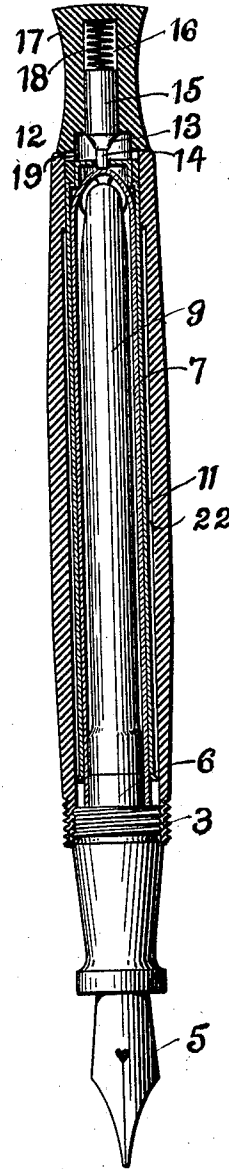
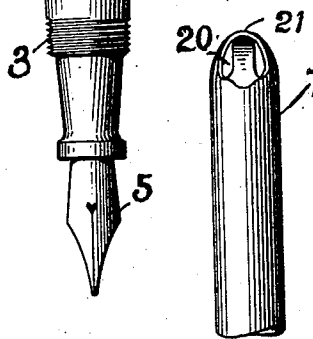


Fig. 4.



Fig. 5.



INVENTOR
Edward Bergquist,
BY *W. H. Barker*
ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD BERGQUIST, OF NEW YORK, N. Y.

PEN-FILLING MECHANISM.

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The invention hereinafter described relates to fountain pens and is directed particularly to the filling mechanism for the so called "self filling pen." Such pens, generally speaking, are not new and the usual type is one, which has a pen barrel, within which is arranged a flexible tube, usually of rubber, which serves as the "fount" or container.

These flexible tubes have ordinarily been inserted in the barrel in a holding clip and the rubber bag or "fount" has usually been folded back upon itself at one end where it is held by the clip.

The bag is ordinarily compressed by a lever arrangement which impinges upon the clip and thus serves to collapse the bag or "fount" or permit it to expand under its own resilience.

Pens of this type are somewhat limited in their ink capacity, part of the normal capacity of the bag being lost by the folding thereof.

Furthermore, the folded bag soon cracks and is destroyed by the lever, and clip action which compresses it to exhaust the charge, so that it may fill.

The invention herein defined contemplates overcoming the objections above named and has, as its objects, production of a device in which a maximum charge of ink may be drawn into the "fount"; obviating all cracking and distortion of the "fount"; protection of the "fount" against accidental operation and other features which will hereinafter be described.

Referring to the drawings:

Fig. 1, is a view of the pen with the cap broken away in section.

Fig. 2, is a view in section through the pen showing the telescopic tubes partially withdrawn.

Fig. 3, shows the tubes closed.

Fig. 4, is a view of the upper end of the inner tube 7.

Fig. 5, is a fragmentary view of said tube.

It is a well known fact that rubber, such as used in bags of fountain pens, or for any purpose in fact, if held under continued compression, very quickly loses its life and resilience. In the "rubber bag" pens, commonly employed, such a condition exists inasmuch as the end of the bag is turned back upon itself and pressed into the "U-shaped" clip which acts in conjunction with a lever for holding the bag and compressing it.

A casual examination of the drawings illustrated in the present invention, shows the immediate difference in structural form which obviates the objection above mentioned.

The "fount" or rubber bag, while always "active", is never under compression in the same sense as are the bags of pens commonly upon the market, which use a lever for deflating the bag or "fount" and employ a clip for holding the bag.

In carrying out the invention, I employ the usual type of barrel 1, and screw threaded cap 2. One end of the barrel 1, is interiorly threaded as at 3, to receive the head or tip 4, which bears the pen point 5, and the usual feed which is not specifically illustrated.

The tip 4, has a reduced cylindrical portion 6, to which is secured a tube 7, and it has a further reduced cylindrical portion 8, to which is secured a flexible or rubber bag 9, which forms the ink "fount." There is, of course, a duct 10, leading through the tip to the feed and pen point, so that ink from the "fount" 9, may be fed to the pen point.

Closely surrounding, and fitting the tube 7, there is a telescopic tube 11, which at its upper end, has an opening with a valve seat 12, which is controlled by a valve 13. The valve 13, has an extension 14, projecting within the tube 11, and a guide extension 15, extending into an opening 16, in the cap 17.

A light spring 18, normally holds the valve 13, to its seat 12. There is an air vent as at 19, above the valve seat 12, and the valve controls the passage of air into and out of the cylindrical tube 11.

The upper end of the inner tube 7, has openings therein 20, these being formed by cutting away a portion of the end of the turned up tube, leaving a central portion 21, which will impinge against the valve extension 14, to raise the valve when the tube 11, is forced down to its lowermost position with reference to the tube 7. The tube 7, serves as a binder for holding the ink "fount" or bag 9, in place upon the reduced end of the tip.

It will be observed that the "fount" or bag 9, may be of any desired length and dimension to suit the size of casing employed and that its entire interior capacity is available for an ink supply.

The long contact between the inner tube

7, and outer tube 11, makes what is essentially an air tight piston joint, thus making a charge of air in the tube 11, available for compression, and compressing the "fount" or bag 9.

The operation of the device is quite apparent, assuming that the "fount" is empty with the outer tube at its uppermost position, and the tube immersed in ink.

A depression of the outer tube over the inner tube 7, with the air valve 12, closed, will completely collapse the "fount" or bag 9, expelling all ink or air therefrom.

This action is due to the compression of the air in the space between the inner and outer tubes 7, and 11.

As soon as the outer tube has been forced down to bring the valve extension 14, into contact with the end 21, of the inner tube, the air valve is raised and the air pressure is released and atmospheric pressure drives the ink up into the now expanding "fount" or bag 9, until it is completely filled.

Figure 2, shows the outer tube partially compressed although the bag, for convenience, is shown in normal extended position.

Figure 3, shows the outer tube at the limit of its movement with the bag completely filled.

It is to be noted that the bag or "fount" 9, is completely out of contact with the tubular parts and is never compressed at one point more than another, by any lever or any clip. It stands upright for its entire length in its enclosing casing 7, and is collapsed wholly by the air pressure developed through operation of the telescoping tubes.

Attention is called to the position of the air valve 12, when the "fount" has been filled and the pen closed, ready for use. In this position, there is still an air vent which gives an atmospheric pressure about the bag, or "fount" and thus permits perfect feeding of ink to the point.

By preference, the barrel is counter bored as at 22, thus providing an insulating air chamber intermediate the "fount" and exterior of the barrel. There is an advantage in this, in that warmth of the hand or body is not transmitted to the "fount" to such an extent as to cause expansion and flooding of the ink.

Obviously, the elementary structure might be varied to a considerable extent without departing from the spirit or intent of the invention, and the exact type of valve illustrated, might be varied to suit the exigencies of any particular requirement, it being the main object of the invention to collapse and expand the flexible "fount" through differential fluid pressures.

As illustrated and described, the device is entirely without packings or piston pack-

ings, the telescoping tubes 7 and 11, fit closely one with reference to the other and require no packing.

The collapsible "fount" of rubber or other material, is practically indestructible, as there is nothing to impinge upon it to cause wear. The entire operation of the collapsible fount is controlled pneumatically and obviously, there is an even distribution of pressures which are conducive to long life.

What I claim as my invention and desire to secure by Letters Patent is:

1. A fountain pen having a barrel, pen point and connections thereto, a collapsible ink "fount" operatively arranged with reference thereto, and valve controlled pneumatic means for collapsing the "fount."

2. A fountain pen having a barrel, pen point, collapsible ink "fount" and a duct connecting the "fount" and pen point, pneumatic means for collapsing the ink "fount" and a pneumatic valve for releasing the pressures of the pneumatic collapsing means.

3. A pen filling mechanism consisting of a pair of telescopic tubes, a collapsible "fount" within said tubes and a valve for controlling the fluid pressures of the telescoping tubes.

4. A pen filling mechanism consisting of a pair of telescopic tubes, a collapsible "fount" within said tubes and a valve for controlling the fluid pressures of the telescopic tubes and the action of said pressure upon the collapsible ink "fount."

5. A pen filling mechanism, a collapsible tube, means for creating a fluid pressure on the exterior of said tube whereby it may be collapsed and valve controlled means for releasing said fluid pressure to permit expansion of the collapsible tube.

6. A pen filling mechanism comprising a collapsible tube, a housing therefor, a telescopic member closely fitting said housing and an atmospheric valve controlling the pressures between the telescopic members.

7. A pen filling mechanism, a collapsible tube, a housing therefor, a telescopic member movable with reference to the housing, a valve at one end of said telescopic member, and means appurtenant to the valve and telescopic members for opening said valve at pre-determined positions of the telescopic member.

8. A pen filling mechanism, a collapsible "fount," a housing therefor, a member telescoping on the housing, an atmospheric valve opening in said member, a valve controlling said opening, means for opening said valve upon pre-determined movement of said member and means for automatically closing said valve.

EDWARD BERGQUIST.