July 15, 1952 M. SEGRE 2,603,189

FOUNTAIN PEN

Filed May 5, 1947 3 Sheets-Sheet 1

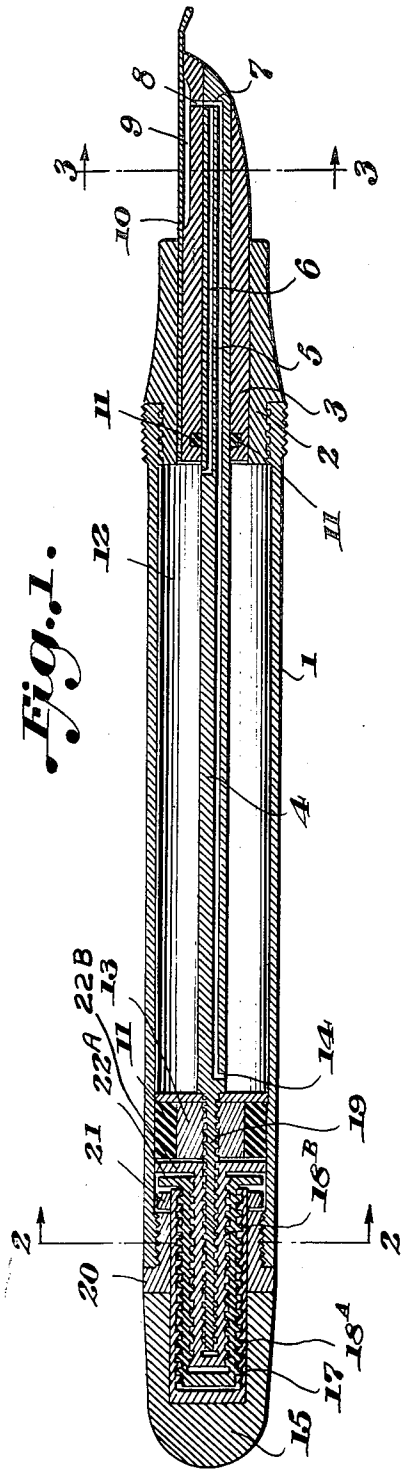


Fig. 1.

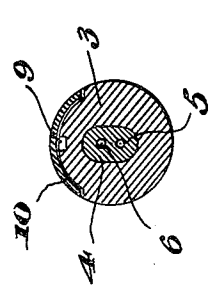


Fig. 3.

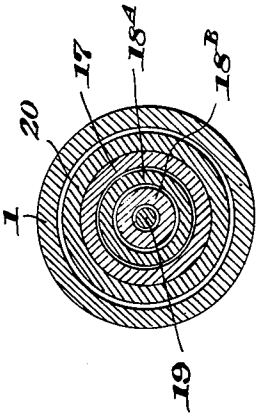


Fig. 2.

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FOUNTAIN PEN

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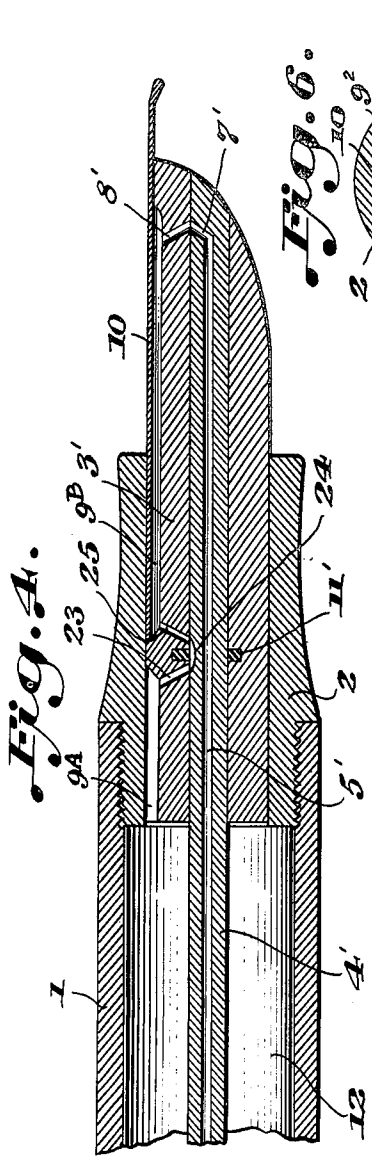


Fig. 4.

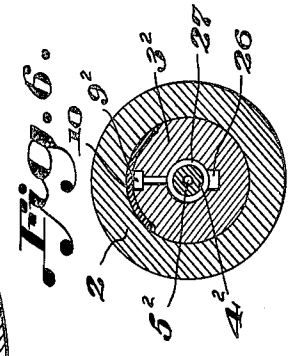


Fig. 6.

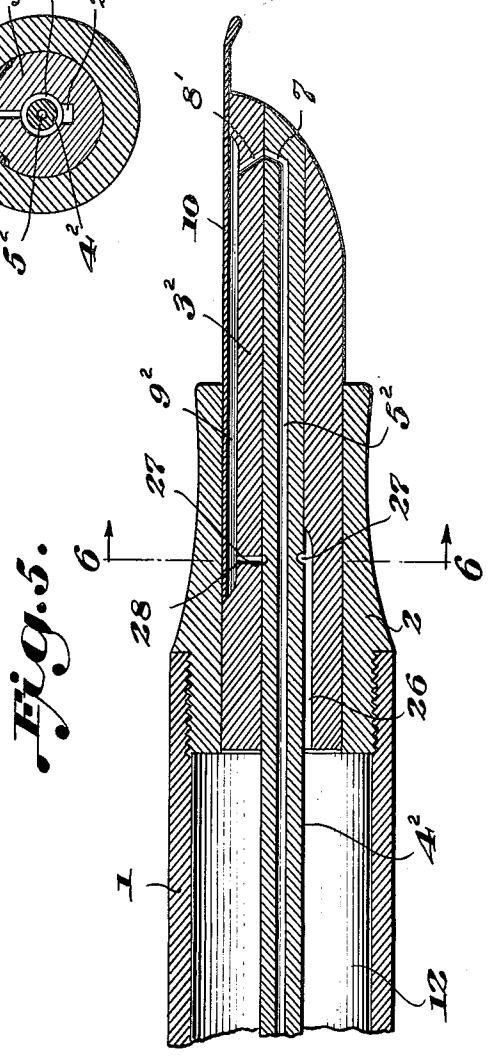


Fig. 5.

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FOUNTAIN PEN

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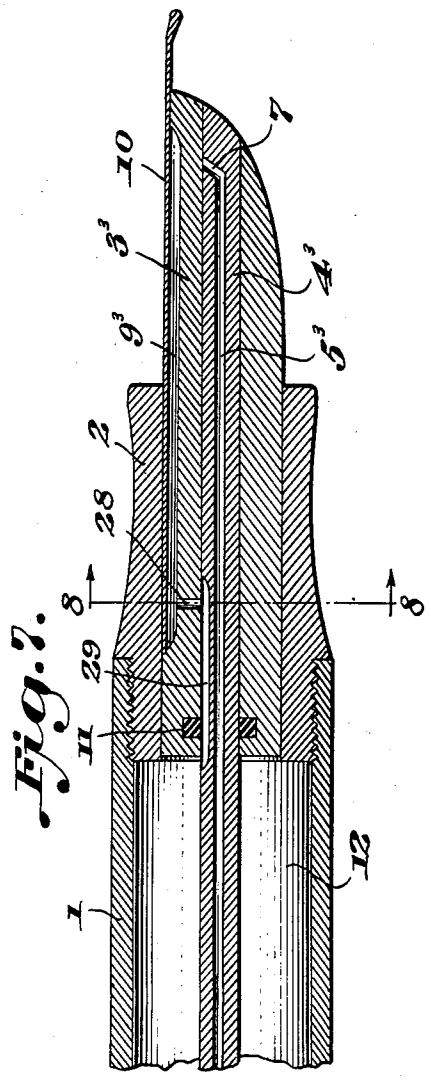


Fig. 7.

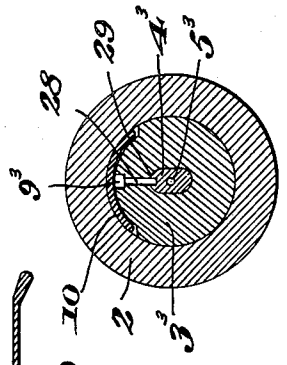


Fig. 8.

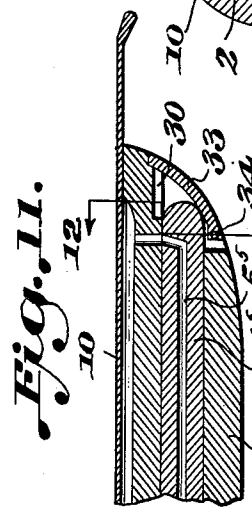


Fig. 11.

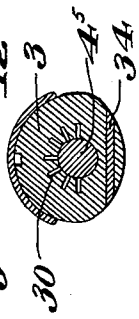


Fig. 12.

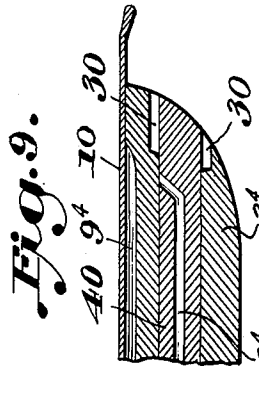


Fig. 9.

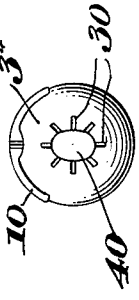


Fig. 10.

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Patented July 15, 1952 2,603,189

UNITED STATES PATENT OFFICE

2,603,189

FOUNTAIN PEN

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Application May 5, 1947, Serial No. 745,997

8 Claims. (Cl. 120—47)

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This invention relates to fountain pens in general and more particularly to a fountain pen having a large ink capacity in comparison with known fountain pens of the automatic filling type.

An object of the present invention is to provide a fountain pen wherein the filling is attained by a single easy continuous action and wherein the pen will be completely filled without the necessity of a continuous pumping action of a piston.

A further object of the invention is to provide a fountain pen of the type described wherein the filling of the pen can be effected with no discharge of the ink from the reservoir.

A still further object of the invention is to provide a fountain pen so arranged and constructed that when filling the pen, the pen proper and surrounding pen support and pen holder will remain out of the filling ink supply and consequently will not be in contact with the ink.

Another object of the invention is to provide a pen which is not effected by changes in pressure or temperature and wherein means are provided whereby the pen proper will not be flooded with ink even after immediately filling the pen and wherein the flow of ink from the reservoir to the pen is always the same regardless of the quantity of ink therein.

Still another object of the invention is to provide a sturdy and simple construction of a fountain pen susceptible of easy assembly and disassembly and in which all parts are not susceptible of easy damaging.

Other and further objects of the invention will be apparent from the following detailed discussion of preferred embodiments of the invention, taken together with the accompanying drawings in which

Figure 1 is a longitudinal sectional view of the fountain pen of the present invention;

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a partial sectional view of a modification of the filling means for the pen;

Figure 5 is a partial sectional view of still another filling means for the pen;

Figure 6 is a cross-sectional view taken on the line 6—6 of Figure 5;

Figure 7 is a partial sectional view of still another filling means for the pen;

Figure 8 is a cross-sectional view taken on the line 8—8 of Figure 7;

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Figure 9 is a partial sectional view of a modification embodying ink absorbing and retaining means;

Figure 10 is a front elevational view of the embodiment of Figure 9;

Figure 11 is a partial cross-sectional view of a still further embodiment of the invention disclosing means for preventing foreign material from entering the pen when in use, and

Figure 12 is a cross-sectional view taken on the line 12—12 of Figure 11.

The pen has a tube 1 at the end of which a penholder 2 is attached by screwing or by pressure. In the penholder 2 there is an opening into which a pen 10 together with a pen-support 3 are inserted in such a manner that no ink may pass from the reservoir 12 formed by the tube 1 between the penholder and the pen or, between the penholder and the pen-support. The pen-support 3 has an oblong opening through which passes a filler-needle 4 which in the specification will be referred to as a "needle." The needle 4 has on its upper end a piston 13 fixed thereto in any desired manner and which fits exactly into tube 1 and serves for filling and emptying reservoir 12. An extension of needle 4 passes through the piston 13 and forms a bolt 19 which has screw threads thereon. This bolt is screwed into a tube 18B which is screw-threaded on the inside and also has screw-threads outside which again are screwed into a tube 18A of similar construction as 18B. Tube 18A is screwed into tube 17 which is internally screw-threaded, thus forming a system of multiplication of screw-threads. Tube 17 passes through piece 20 in which it is fixed by ring 21 which allows rotation thereof but prevents it from being detached. Tube 17 is, on one end, fixed to button 15 so as to be easily turned by hand. When the button 15 is turned to the right or to the left, the various threads in combination screw or unscrew and thus, the piston 13 with the needle 4 are moved with respect to the tube 1. To guide tubes 18A and 18B there may be provided respective rings 22*a* and 22*b* for each, which are loosely inserted in tube 1.

The number of screw-threads and multiplying pieces may be increased or decreased according to the necessities of construction, size of the fountain-pen and the amount of ink in relation to the size of the fountain-pen itself.

The needle 4 has two tubular channels 5, 6 therein. Channel 5 extends substantially completely through the needle, from an opening 7 adjacent the lower end to opening 14 at the

upper end. The other tubular channel 6 starts in the opening 7 but, its upper end is situated opposite the lowest point of reservoir 12 when the needle is in retracted position or completely inside, i. e. the piston in its highest position. When the needle 4 is in this position, opening 7 is situated oposite a channel 8 leading to space 9 which is situated below the pen 10 and is for supplying ink to the pen. This space also serves as an ink-deposit under the pen 10 and can be so constructed that it may contain a maximum of ink and at the same time have a large retaining capacity by means of cells or, any retaining system but always permitting an adequate supply to the pen. To avoid leakage of air or ink between needle 4 and pen-support 3 a round packing 11 as shown in Figure 1 can be inserted around needle 4.

The needle 4 is preferably oval in shape in this embodiment and the oblong opening through pen-support 3 is of a conformingly oval cross section in order to prevent its turning together with the piston 13 fixed to it, as the turning of the needle 4 would prevent functioning of the system of screw-threads and consequently the system of filling the pen. The needle could also have other shapes, for example, flat with round edges.

The described fountain pen operates as follows: to fill it, button 15 which is joined to tube 17 is rotated to move the piston 13 until ink commences to flow out of the end of needle 4. When the ink thus begins to flow out, the end of needle 4 together with opening 7 is immersed into the ink and button 15 is then rotated in the opposite direction so as to retract piston 13 into the reservoir 12 together with the needle, which should during this time remain in the ink. A vacuum is thereby created within reservoir 12 and the ink will therefore pass through opening 7, tubular channel 5 and through opening 14 into the reservoir. When the piston 13 and needle 4 reach the fully retracted position, the fountain-pen is completely filled and communication is then established between reservoir 12 through channel 6, opening 7, channel 8 up to the space 9 which supplies pen 10 as in other type fountain-pens. The communication through channel 6 to the pen is established only when the piston 13 and needle 4 are in their fully retracted position and the filling operation is finished. Tubular channel 6 is solely for providing ink to space 9 which forms supply and deposit means for ink behind the pen.

When filling the reservoir 12 is completed, the needle is empty because the last part of the piston movement is done without thte needle 4 being immersed in the ink. Immediately, a circulation is established between reservoir 12 and spaces 6, 7, 8, 9. Therefore the ink flows from reservoir 12 to spaces 6, 7, 8, 9. Meanwhile air will escape through spaces 8, 7, 5, 14. When ink has filled space 9 (i. e. the pen is ready for writing), the flow of ink to the pen is interrupted. Subsequently the flow of ink continues normally by gravity and cohesion of the liquid.

In Figure 4 a modification of the construction is shown as regards the supply of ink to the pen. Needle 4' has, in this construction, only the tubular channel 5 which serves for filling the pen. The supply to the pen is effected through a channel 9a in support 3', and from there by way of channel 23 through channel 24 in needle 4' and channel 25 to space 9b situated beneath the pen 10 which is consequently supplied by it. When moving the needle for filling or emptying the fountain-pen, channel 24 changes its position thereby interrupting communication between channel 23 and channel 25 and cuts off the path of the ink to the pen. At the same time, this path of communication between the reservoir and the outside is cut off. Thus, communication between reservoir 12 and the exterior for filling and emptying the pen is established through channel 5' in the needle. It is possible in this modification to retain a channel 8' to insure the balance of ink inside the pen. Nevertheless, channel 8' is not an indispensable part of the supply system for the pen. A packing 11' can be used to prevent ink from passing from channel 23 to channel 25 when the pen is being filled or emptied.

In Figures 5 and 6 another embodiment of the supply system for the pen is shown. Here the ink flows from reservoir 12 through a channel 26 and an annular channel 27 around the needle 4^2 through a channel 28, to channel 9^2 which supplies the pen. By moving the needle with the annular channel 27, communication between channel 26 and channel 28 and thus, supply to the pen, is interrupted.

In Figures 7 and 8 a different supplying system for the pen is shown. The ink flows from reservoir 12 through a channel 29 formed in the needle 4^3 and through channel 28 to channel 9^3 which supplies the pen. By moving the needle 4^3 with channel 29, communication between the latter and reservoir 12 is interrupted.

Figures 9 and 10 show means to absorb ink remaining on the exterior surface of the needle 40 when it is drawn out of the ink after having filled the pen. In the lower end of pen-support 3^4 there are situated radially, around the opening of needle 40, channels which together form space 30. This space should possess sufficient capacity to absorb all ink adhering to the outer surface of the needle 40 and the channels comprising it should be so constructed as to possess a capillary action of adhesion.

Figures 11 and 12 show means for closing space 30 when the needle 4^5 is inside of the pen, to prevent spaces 30 and 5^5 from getting dirty while the pen is being used. It consists in a disc 33, pivotally connected at 34 which opens and closes together with the needle 4^5 as the needle is extended or retracted.

It is obvious that changes in construction and modifications of details can be effected without departing from the scope of the present invention as defined in the appended claims.

I claim:

1. In a fountain pen, in combination a barrel, a pen support in an end of said barrel, a point on said pen support, said pen support having a longitudinal bore therethrough, a filler-needle movably mounted in said barrel, an end of said filler-needle entering said bore in said pen support and being slidable therein, a piston fixed to said filler-needle in said barrel at an end remote from said pen support, said filler-needle having a channel therethrough and an opening from said channel in communication with said barrel adjacent one end thereof and another opening from said channel through the side of said filler-needle at the opposite end thereof, said pen support having an inwardly directed opening therein for coaction with said other opening in said filler-needle, means secured to said filler-needle for moving said piston and said filler-needle with respect to said barrel whereby the said other opening in said filler-needle is projected from

said pen support for filling and emptying of said pen, and ink feeding means for said pen point in communication with said opening in said pen support, said ink feeding means being operable only when said filler-needle and said piston are in fully retracted position when said longitudinal bore is in open communication with said opening in said pen support.

2. In a fountain pen as claimed in claim 1, said means for moving said filler-needle and said piston comprising a plurality of tubes having screw threaded surfaces thereon, said tubes being mounted one over the other and the screw threaded portions thereof of one said tube coacting with the screw threaded portion of an adjacent tube, the innermost of said tubes being in screw threaded contact with said filler-needle whereby upon rotation of the outermost of said tubes said piston and said filler-needle will be urged forwardly through said coacting tubes.

3. In a fountain pen as claimed in claim 1, said filler-needle having a second channel therein opening at one end into said barrel and at the other end thereof communicating with the said ink deposit for said pen point through said opening in said pen support, the first said opening of said second channel being closed upon forward movement of said filler-needle and the second said opening of said second channel being out of communication with said ink deposit upon forward motion of said filler-needle, said openings of said second channel being operable when said filler-needle and said piston are in fully retracted position to provide ink flow from said barrel to said pen point.

4. In a fountain pen as claimed in claim 1, said ink feeding means for said pen point comprising a channel in said pen support having two branches therein directed towards and in communication with the external surface of said filler-needle, said filler-needle having a recess therein normally in communication with both said branches when said filler-needle is in fully retracted position, the surface of said filler-needle cutting off communication between said branches when said filler-needle is moved forwardly for filling or emptying said pen.

5. In a fountain pen as claimed in claim 1, said ink feeding means for said pen point comprising a longitudinal channel in said pen support in open communication with ink in said barrel, an annular channel around the periphery of said filler-needle, said pen support having a second channel therein communicating at an end thereof with an ink deposit for said pen point and communicating with said annular channel when said filler-needle is in fully retracted position, said annular channel being out of communication with said second channel in said pen support when said filler-needle is moved forwardly.

6. In a fountain pen as claimed in claim 1, said ink feeding means comprising a longitudinal channel formed in the external surface of said filler-needle, a channel in said pen support communicating at one end thereof with an ink deposit for said pen point and at the other end thereof with said external channel in said filler-needle, an end of said external channel in said filler-needle being in communication with ink in said barrel when said filler-needle is in fully retracted position and being out of communication with ink when said filler-needle is moved forwardly.

7. In a fountain pen as claimed in claim 1, said pen support having a plurality of radially spaced channels in the free end thereof, said radially spaced channels together forming a capillary space for absorbing ink adhering to the outer surface of said filler-needle after said pen has been filled with ink.

8. In a fountain pen as claimed in claim 7, a disc hingedly connected to said pen support, said disc covering said radially spaced channels in said pen support when said filler-needle is in retracted position.

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