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PATENT SPECIFICATION



Application Date: April 7, 1938. No. 10691/38.

514513

Complete Specification Left: March 6, 1939.

Complete Specification Accepted: Nov. 10, 1939.

PROVISIONAL SPECIFICATION

Improvements in or relating to Self-filling Fountain Pens

We, MABIE TODD & COMPANY, LIMITED, of Sunderland House, Curzon Street, Mayfair, London, W.1, a Company organised under the laws of Great Britain and Northern Ireland, LESLIE WILLIAM JOHNSON, of "St. Helier", Marsworth Avenue, Pinner, Middlesex, and EDWARD STEPHEN SEARS, of 23, Oaklands Avenue, Oxhey, Hertfordshire, both British Subjects, do hereby declare the nature of this invention to be as follows:—

The invention relates to self-filling fountain pens, preferably, but not necessarily, of the kind having an air tube extending from the writing point section into the interior of the ink reservoir by means of which air in the reservoir is adapted to be evacuated and replaced by ink during the operation of filling or replenishing the said reservoir.

As an initial step to the filling of such pens it has been necessary hitherto to immerse the writing point and part of the writing point section in the ink, the ink for filling or replenishment passing by way of the writing point section to the interior of the reservoir with a result that when the pen was withdrawn it became necessary to wipe the writing point and writing point section before the pen was fit for use, while the operation of filling the pen rendered the writing point liable to injury due to the writing point striking the bottom of the ink bottle. Further, ink was invariably retained in various channels of the writing point and feed bar section making the pen liable to blob when first put to use after filling, in addition to possible damage to the user's clothing caused by leakage of ink when the pen was carried in the pocket of the user.

The object of the invention is to provide a self-filling pen such that the before mentioned disadvantages will be eliminated. The air tube (where such is used) is sealed in the writing point section so that there is no danger of leakage by way of the nib due to the air entering the reservoir via the air tube and causing excessive air pressure in the reservoir.

The invention also makes it possible to utilise, to the last drop, the ink in the

bottle or other container, a feature which was not before possible where the feed bar and nib projected beyond the writing point section.

With these and other objects in view the present invention consists in a self-filling pen wherein the ink is admitted to the reservoir from that end of the pen remote from the writing point.

The inlet passage to the ink reservoir of the pen is preferably adapted, after the reservoir has been filled, to be closed by a spring pressed valve member, which may be conveniently disposed in a cap forming a removable closure to the back end of the pen.

Where the pen is of the kind having an air tube extending from the writing point section to a point proximate the inlet this valve member may take the form of a spring projected disc having an extension in the form of a stem the proximate end of which is adapted to enter the bore of the air tube and thus act as a stiffener thereto when the pen is in use.

As previously stated the invention is more particularly applicable to self-filling pens having such an air tube and the following particulars of a preferred construction are intended to apply to a self-filling pen of this particular kind.

The ink inlet member of the pen may conveniently take the form of a sleeve plug disposed at that end of the pen remote from the writing point section and preferably coaxial with the said reservoir. The inner end of this sleeve is of reduced diameter externally to form a means of attachment of one end of the ink reservoir, the opposite end of the reservoir being secured to the writing point section. Immediately beneath this surface of attachment of the reservoir to the sleeve (assuming the pen is in a vertical position with the writing point uppermost) the sleeve is of enlarged diameter and screwed externally to act as a plug to the internally screwed end of a tubular outer casing adapted normally to partially enclose the ink reservoir. Immediately beneath this enlarged portion of the sleeve the external surface is screwed with a plus thread, (i.e. a thread

[Price 1/-]

- of larger diameter than the sleeve), a short distance, whereby it may removably receive a cap adapted to enclose the projecting end of the sleeve and also to retain the spring projected disc valve adapted to maintain the inlet end of the sleeve in a fluid-tight condition when the cap is screwed into position and the pen is ready for use.
- The sleeve plug is centrally bored with two different diameters of approximately equal length, the upper or lesser bore being slightly larger than the diameter of the air tube in order to permit the passage of ink there-between.
- The air tube which is disposed axially of the pen is adapted to be fixed to the feed bar by any suitable means. This feed bar acts as a seal or closure to the fixed end of the air tube and is associated with a writing point section and nib.
- The air tube is provided at or adjacent the part where it enters the feed bar with a lateral hole making communication between the bore of the air tube and the ink reservoir which hole limits the height to which ink is adapted to enter the reservoir.
- In a convenient construction the ink reservoir may be in the form of two parts, one part consisting of a rigid tubular member which may be wholly or partially of transparent or translucent material being secured at one end to the writing point section in a fluid-tight manner and the opposite end may be of slightly reduced diameter and extended in the form of a thimble to take one end of a flexible and/or resilient sac forming the other part of the ink reservoir; the opposite end of which is secured to a small lip formed on the inner confronting end of the sleeve plug forming the inlet to the reservoir.
- A helical spring is preferably disposed between that portion of the rigid reservoir of reduced diameter and the confronting end of the sleeve plug which spring tends to return the parts to their normal position after the flexible sac has been collapsed by endwise pressure during the operation of filling the pen.
- That end of the rigid reservoir in which the writing point section is mounted is screwed externally to take an external cap, preferably of the kind adapted to maintain a fluid-tight engagement between the cap and the writing point section, and which, when in position, serves the double purpose of protecting the writing point when the pen is not in use and also of preventing the passage of air to or from the reservoir by way of the writing point section during the filling operation.
- That part of the rigid reservoir adjacent the writing point section is adapted normally to project from an outer barrel or casing, the opposite end of which is secured by screwing to an external thread formed on the sleeve plug intermediate its two ends. The rigid part reservoir is preferably polygonal in cross section and the end of the casing or barrel immediately before-mentioned is correspondingly formed interiorly to prevent relative rotary movement between the parts. The writing point section, however, and the rigid part of the reservoir is adapted for endwise movement against the action of the helical spring and relative to the outer barrel or casing, which operation causes a part of the air in the upper part of the reservoir to pass by way of the transverse hole in the air tube outward through the upper part of the sleeve plug and from thence through the ink supply, being replaced by ink when the parts return to their normal position under the action of the spring.
- Dated this 7th day of April, 1938.
MEWBURN ELLIS & Co.,
70 & 72, Chancery Lane, London, W.C.2,
Chartered Patent Agents.

COMPLETE SPECIFICATION

Improvements in or relating to Self-filling Fountain Pens

We, MABLE TODD & COMPANY, LIMITED, of Sunderland House, Curzon Street, Mayfair, London, W.1, a Company organised under the laws of Great Britain and Northern Ireland, LESLIE WILLIAM JOHNSON, of "St. Helier", Marsworth Avenue, Pinner, Middlesex, and EDWARD STEPHEN SEARS, of 23, Oaklands Avenue, Oxhey, Hertfordshire, both British Subjects, do hereby declare the nature of this invention and in what manner the

same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to self-filling fountain pens of the kind wherein the ink is admitted to the reservoir thereof through an inlet at that end of the pen remote from the writing point.

According to the invention a self-filling fountain pen of the kind described is provided with an air tube by means of

which air in the reservoir is evacuated during the operation of filling.

The inlet passage to the ink reservoir of the pen is provided at the extreme base of the pen or adjacent the end thereof and the reservoir filled by suction means. After filling, the inlet is closed by a spring pressed valve member which may be conveniently disposed in a cap forming a removable closure to the back end of the pen, or by other means such as herein-after described.

As previously stated, the invention is more particularly applicable to self-filling pens having such an air tube and such tube is sealed in the writing point section so that there is no danger of leakage by way of the nib due to the air entering the reservoir via the air tube and causing excessive air pressure in the reservoir.

In order that the invention may be clearly understood reference is directed to the accompanying drawings, wherein:

Figure 1 is a longitudinal sectional elevation of a self-filling fountain pen constructed in accordance with the invention and wherein a centrally disposed air tube forms an essential part of the invention.

Figure 2 is an elevation of the reservoir and associated parts of the fountain pen shown in Fig. 1, and

Figure 3 is an elevation of the barrel part of the fountain pen shown in Fig. 1.

Figure 4 is a longitudinal section of a modified form of fountain pen constructed in accordance with the invention and of a type similar to Fig. 1, that is to say, wherein a central air tube is provided.

Figure 5 is a longitudinal sectional elevation similar to Fig. 1 showing the parts of the modification shown in Fig. 4 in a different position, and

Figure 6 is a sectional elevation of a cap for closing the barrel end of the pen shown in Figs. 4 and 5.

Figure 7 is a still further modified form of fountain pen embodying a central air tube and constructed in accordance with the invention, and

Figure 8 is an elevation of Figure 7 with the end caps thereof removed and shown separately.

Throughout the drawings the same reference numerals have been used for the same or similar parts.

In the drawings the self-filling fountain pens comprise a barrel member 1, a point section 2 and a cap 3, in certain instances the reservoir comprising the barrel 1 and in other instances a sac 4, an independent reservoir 5 or both a sac 4 and reservoir 5 as shown in Fig. 1. Referring more particularly to the latter

figure and Figures 2 and 3, the ink inlet member of the pen conveniently takes the form of a nipple 6 disposed at that end of the pen remote from the writing point section 2 and co-axial with the said reservoir 5. The nipple 6 is screw threaded to form a means of attachment to one end of the barrel 1 and to receive a barrel cap 7. The barrel cap 7 encloses the projecting end of the nipple 6 and serves to hold a spring mounted disc valve 8 which closes the ink inlet when the cap 7 is screwed into position.

The central bore 9 of the nipple houses a screw threaded sleeve 10 which is flanged at its lower end to clamp the end of the sac 4 in position against the base of the nipple 6; the upper end of the sleeve 10 receives a nut 11 which holds the parts together. The face of the nut 11 forms a seating for the disc valve 8. The central passage 12 of the sleeve 10 is of a diameter that the end of an air tube 13 may freely fit in order to permit the passage of ink therebetween. The passage 12 also receives an extension 14 of the disc valve 8 which together with a washer 15 maintains a tight joint when the pen is in use.

The air tube 13 which is disposed axially of the pen is fixed to the feed bar 16 of the point section 2 by any suitable means, the feed bar acting as a seal or closure to the fixed end of the air tube.

The air tube 13 is provided with a lateral hole 17 making communication between the bore of the air tube and the ink reservoir which hole serves for air outlet and ink inlet and to limit the height to which ink is adapted to enter the reservoir.

As shown in Figures 1 and 2 the ink reservoir is in two parts, a rigid tubular member 5 which may be wholly or partially of transparent or translucent material and extended at one end in the form of a thimble 18 to take one end of the flexible sac 4 forming the other part of the ink reservoir, the opposite end of which is secured as previously described to the nipple 6.

A helical spring 19 is disposed around the air tube between a shoulder 21 formed thereon and the abutment provided by the sleeve 10. The spring tends to return the parts to their normal position after the flexible sac has been collapsed by endwise pressure during the operation of filling the pen.

That end of the rigid part 5 of the reservoir in which the writing point section 2 is mounted is screwed externally to take the external cap 3, and which, when in position, serves the double purpose of protecting the writing point when

the pen is not in use and also of preventing the passage of air to or from the reservoir by way of the writing point section during the filling operation.

5 The barrel 1 encloses the sac 4 and has an engagement with the reservoir 5, the reservoir being preferably polygonal in cross section, and the end of the barrel is fitted with a decorative band 20 correspondingly formed interiorly to act as a guide and to prevent inadvertent relative rotary movement between the parts. Alternatively the barrel may be moulded with shape corresponding to that of the reservoir to serve the same purpose. The writing point section, however, and the rigid part 5 of the reservoir are adapted for endwise movement against the action of the helical spring 19 and relative to the barrel 1 which operation causes a part of the air in the upper part of the reservoir to pass by way of the transverse hole in the air tube outward through the nipple and from thence bubbling through the ink supply, being replaced by ink when the parts return to their normal position under the action of the spring 19.

The central tube 13 is preferably of non-corrodible metal, and in conjunction with the sleeve 10 the disc seal 8 and spring 19 acts as a rigid means to prevent backward movement of the reservoir when pen is in use.

In assembling the pen illustrated in Figures 1, 2 and 3 and assuming the reservoir is fitted up as shown in Figure 2 minus the lock nut 11, the whole movement is inserted from the back end of the barrel, and the nipple 6 is passed over the sleeve 10 and screwed into position in the barrel 1, the lock nut 11 is screwed on to the sleeve 10 and tightened against the top end of the nipple 6, drawing a sac fender 22 against the bottom end face of the nipple 6 and locking the whole movement securely in the barrel 1. The fender 22 may be of rubber, fibre or like material.

Filling is accomplished by securely screwing the cap 3 in position in the usual way as when closing the pen for the pocket. Barrel cap 7 is removed and the base of the pen immersed, i.e., the tapered portion of the nipple 6, in the ink, approximately $\frac{1}{16}$ ". The barrel 1 is held between the thumb and middle finger, the forefinger on top of the cap 3. Pressure of the forefinger will move the reservoir and air tube 13 forward against the action of the spring 19, the air tube 13 moving into the sleeve 10. The sac 4 folds and deflates forcing out air in the bore in the sleeve 10. In releasing the finger pressure and upon the consequent return movement,

the sac 4 resumes its normal shape and position drawing in ink for the air displaced, which forms a liquid seal above the sleeve 10. Further depression and return movement will ultimately fill the reservoir, air passing out and ink passing in via the tube 13 and the passage in the sleeve. The barrel cap 7 is replaced and the pen is ready for use.

Figures 4, 5 and 6 illustrate a somewhat different form of the invention applied to a self-filling fountain pen embodying a central air tube 13 and in which the filling is effected by a piston pump. In this case use is made of a rubber, or other suitable plunger 23, utilizing the air tube 13 which is plugged at 24 as one portion of the piston rod of the pump. A sleeve 25 attached to the tube 13 carries at its extremity the plunger 23, and the piston rod is completed by a rod 26, fixed in a knob 27, which is removably secured into the cap 3. The cap 3 is fitted with an inner liner 28 which forms a bearing for that portion of the piston rod 26 when moved to and fro. The piston rod extension 26 is provided with a small collar 30, or the end of the rod may be pressed at a suitable point to increase its diameter, to act as a stop and to prevent the rod being removed from the cap.

The sleeve 25 is squared or it may be of other polygonal form or D shaped to slidably engage a correspondingly shaped bore 9 in the nipple 6 and thus prevent turning when screwing on the barrel cap 7. The sleeve 25 at its inner end is formed with a collar 31 which acts as a stop for the spring 19. The opposite end of the sleeve 25 is threaded for attachment of the plunger 23 and a plunger nut 32. The plunger 23, of resilient material, is preferably "saucer" shaped as shown and the plunger nut 32 is threaded internally for attachment to the sleeve 25 as at 33 and externally as at 34 for removable attachment to the barrel cap 7. The plunger 23 co-operates with a cylindrical bore 35 formed by a tubular extension 36 of the nipple 6. Figure 4 illustrates the cap 7 in position, the pen being closed with the plunger nut 32 holding back the plunger 23, sleeve 25 and air tube 13 which forms part of the piston rod. Figure 5 shows the pen ready for filling; upon the barrel cap being removed, the plunger 23 moves into the bore 35 of the nipple 6 when the knob 27 is removed from the cap 3. The tubular extension 36 is provided with an enlarged bore 37 at the end where it contacts with the seal 15. This enlargement provides a space round the plunger 23 at one end of its movement and thus forms a passage for ink to enter prior to its being forced by

the plunger 23 into the reservoir, which is constituted by the barrel 1. The nipple 6 is also provided with a collar or enlarged part 38 between screws, one face of which is adapted to abut against the end of the barrel 1 and the other against the end face of the barrel cap 7 in the closed position. The recess 39 in the nipple is provided as a seating for one end of the spring 19, the nipple bore 9 serving as guide for the sleeve 25. Packing may be necessary between the member 28 and the rod 26, but it has been found that this is not essential as the size of the plunger may be such that the suction therefrom is greater than the pressure of air passing at the front and may merely mean, possibly, one more pumping action to the number required to fill the pen. This is preferable commercially to a complicated packing or packing of any sort for that matter.

Filling is accomplished as follows. The barrel cap 7 is removed, the knob 27 unscrewed, whereupon the plunger, under the action of the spring 19, recedes into the cylinder 35 forcing the knob 27 to extend beyond the cap 3, Fig. 5. The end of the extension 36 is placed in the ink and the knob 27 pressed down. The plunger 23 moves down expelling air and forming a vacuum in the cylinder 35 which becomes filled with ink when the plunger 23 reaches the enlargement 37. On release of the knob 27 the ink is lifted into the reservoir, via the bore 9 in the nipple and air is expelled via the lateral hole 17 in the air tube 13. It will be seen, therefore, that air is expelled from the reservoir on the return movement of the plunger and not as is usual on the forward movement. Following further reciprocations of the plunger the pen is filled, the knob 27 is screwed home in the cap 3, the pen removed from the ink supply, and the barrel cap 7 replaced, screwing on to both plunger 32 and nipple 6.

Figures 7 and 8 show a bulb filling type of self-filling fountain pen which embodies a central tube 13. In this construction the end of the barrel is reduced to receive the barrel cap which is removably screwed thereon. The end of the barrel is formed with a bore 41 for the entry of ink, the bore being closed by a seal 15 when the cap 7 is in place. The filling means in this construction is a flexible bulb 42 attached to a screwed bush 43 by metal band 44 or other suitable means. The bush 43 is firmly fixed in the cap 3 and removably receives a secondary cap 45 which houses the bulb 42. The bush is formed with a left hand thread. The air tube 13 is fixed in the

feed 16 of the section 2 and the free end terminates just within the bore 41. The method of filling is as follows: Screw cap 3 and secondary cap 45 completely on to the barrel as is usual until the face of the bush 43 contacts with the face of the section 2. This occurs, of course, in all cases, but by reference thereto the reason for the left hand thread on the bush is obvious, for if turning is continued after the faces of the bush and section meet, the secondary cap 45 unscrews and exposes the sac 42. The barrel cap 47 is removed and the pen is ready for filling by pressure on the bulb in known manner.

It will be appreciated that we have only given a brief survey and description of the various types of fountain pens embodying central air venting tubes to which the present invention is applicable and the majority of which are of a known form; for this reason the descriptions have been limited to those parts which are concerned in any way with the invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A self-filling fountain pen of the kind described having a central air tube for the purpose specified.

2. A self-filling fountain pen as claimed in claim 1 wherein the end of the pen remote from the writing point is provided with a nipple having an ink inlet passage communicating with the reservoir of the pen and closable by an end cap removably attached to the barrel which latter is reciprocable to fill said pen by alternately collapsing and extending said reservoir.

3. A self-filling fountain pen as claimed in claim 2 wherein the nipple is fitted with a sleeve which cooperates with the central air tube, whereby filling of the reservoir may be effected by reciprocating movement of the reservoir relatively to said nipple.

4. A self-filling fountain pen as claimed in claim 1 wherein the end of the barrel remote from the filling point is provided with a nipple having a tubular extension forming the cylinder of a plunger pump, the plunger of which is carried by the central air tube slidably mounted in said nipple under the action of a spring and reciprocable to operate said plunger pump to fill the reservoir of the pen.

5. A self-filling fountain pen as claimed in claim 4 wherein the plunger pump is reciprocated by means of a piston

rod slidably mounted in the cap of the fountain pen.

5 6. A self-filling fountain pen as claimed in claim 1 comprising a barrel
remote from the writing point and clos-
able by a cap and wherein the writing
point section has attached thereto a rub-
ber bulb by means of which ink may be
10 withdrawn through said passage into the
reservoir of the pen, air being expelled
through the central air tube.

7. Improved self-filling fountain pen
substantially as described with reference
15 to Figures 1, 2 and 3 of the accompanying
drawings.

8. Improved self-filling fountain pen
substantially as described with reference
to Figs. 4, 5 and 6 of the accompanying
drawings. 20

9. Improved self-filling fountain pen
substantially as described with reference
to Figures 7 and 8 of the accompanying
drawings.

10. Improvements in self-filling 25
fountain pens substantially as herein
described.

Dated this 6th day of March, 1939.

MEWBURN, ELLIS & Co.,
70 & 72, Chancery Lane, London, W.C.2,
Chartered Patent Agents.

Fig. 1.

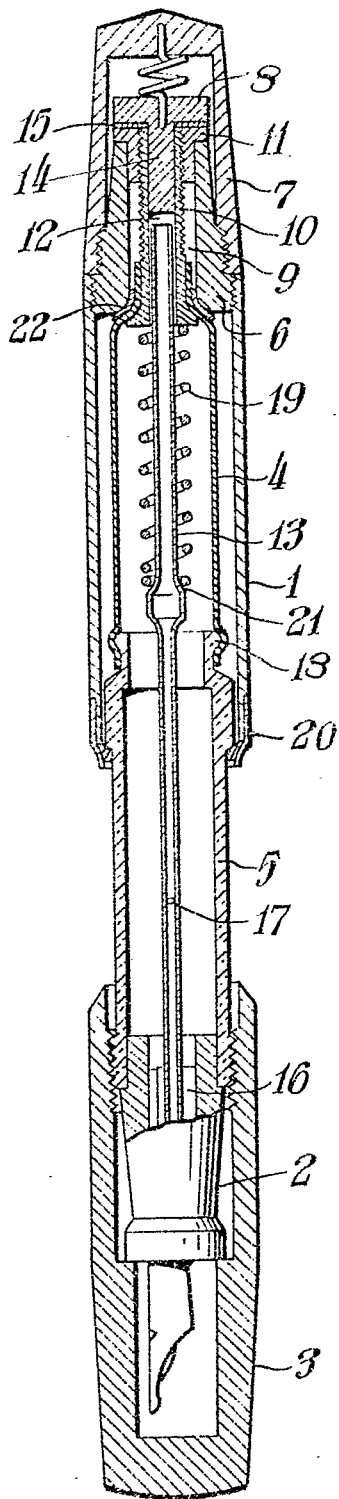


Fig. 2.

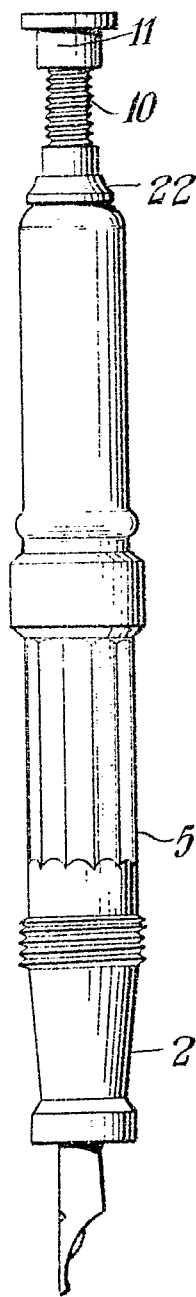
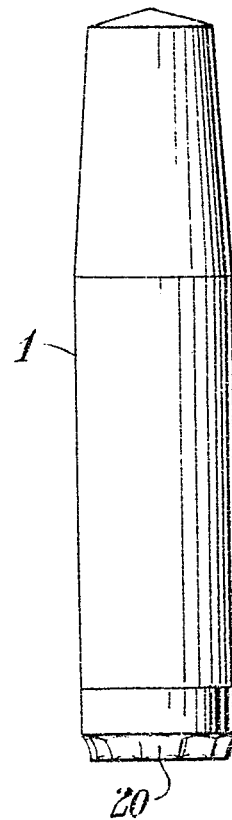


Fig. 3.



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Fig. 3.



Fig. 4.

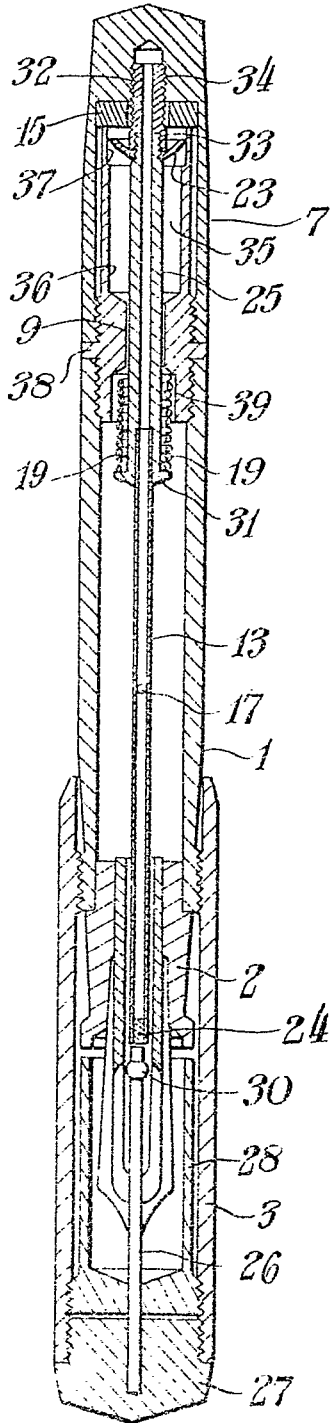


Fig. 5.

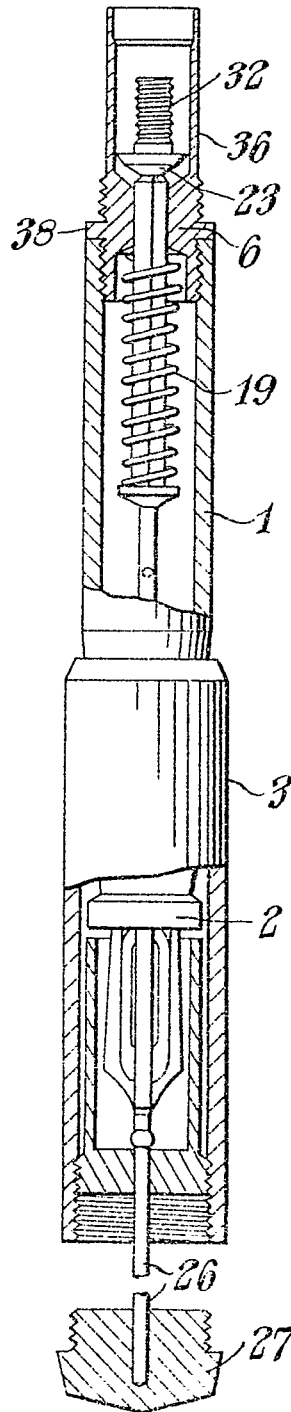


Fig. 6.

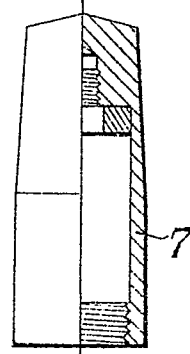


Fig. 6.

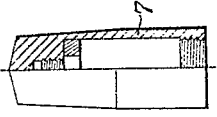


Fig. 5.

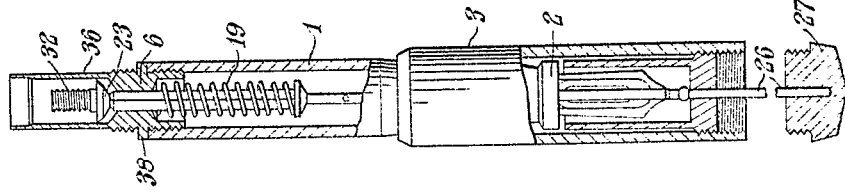


Fig. 4.

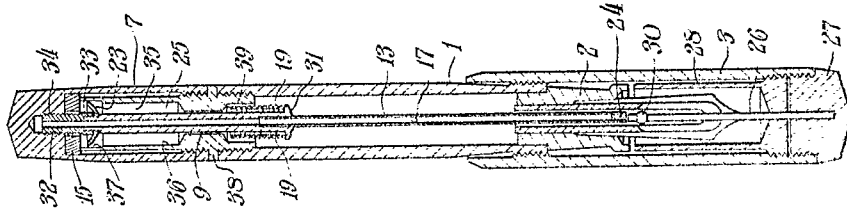


Fig. 3.

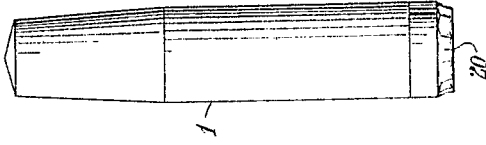


Fig. 2.

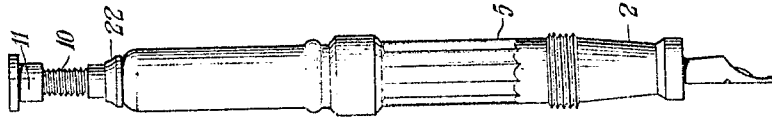
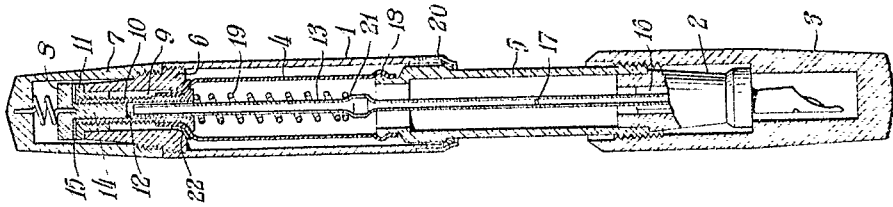


Fig. 1.



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Fig. 7.

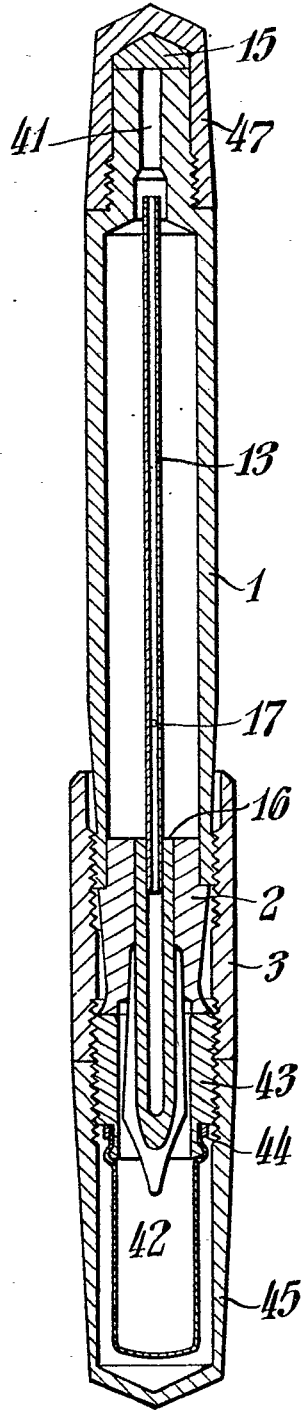
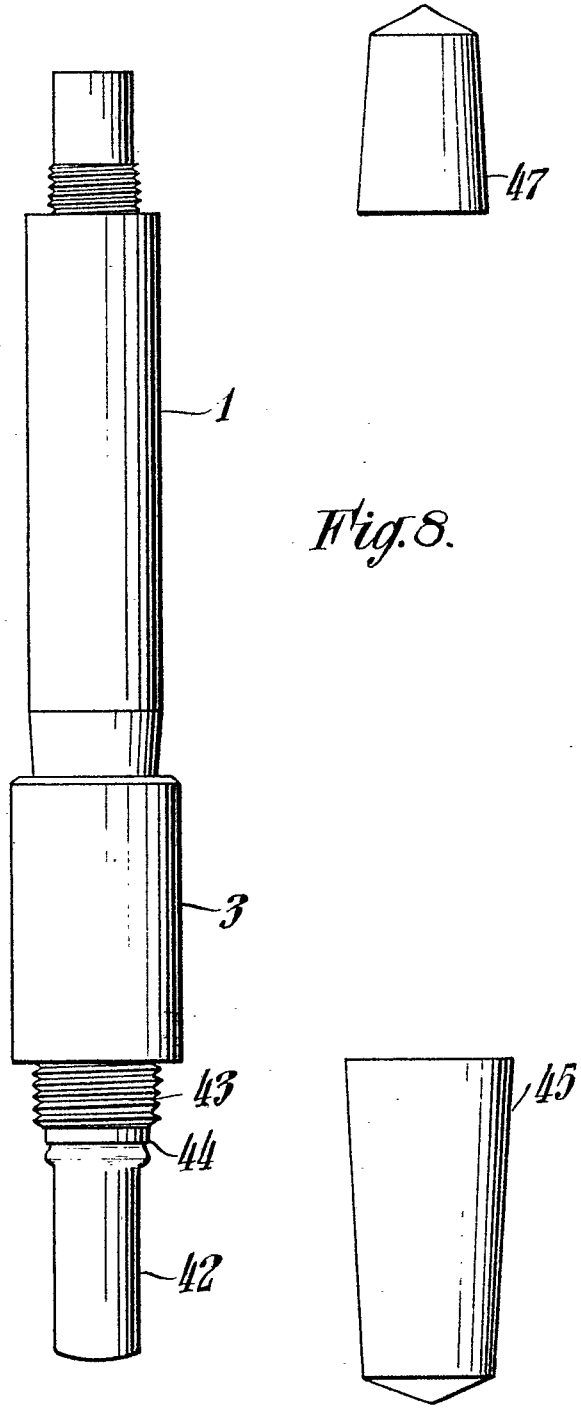


Fig. 8.



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