

N^o 20,065



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PROVISIONAL SPECIFICATION.

Improvements in Reservoir Pens.

I, ALEXANDER MUNRO, of No. 49, Witton Road, Aston Manor, Birmingham, Inventor, do hereby declare the nature of this invention to be as follows:—

Where a fountain pen uses a small tube with internal grooves as an inkfeed to lead the ink from the reservoir chamber to the nib, and where such small tube at its lower termination is bent and touches the nib near the nib point and the tube runs parallel, or nearly parallel, along the length of the nib, at some little distance away from the nib, it frequently occurs that an accumulation of loose or excess ink takes place in the cavity of the nozzle of the pen. It is difficult to shake out or to eject the ink from its confined position in the cavity, while there is always the danger that such ink may be spilled on the paper during writing, or may be spilled inside the protecting cap when the pen is carried in the pocket. In order to obviate this danger and for other reasons, I provide the means as after mentioned whereby any ink lodging in the cavity may easily travel to the nib point. From the nib point it may be used up in the ordinary course of writing, or, as in the case of self filling pens having suitable apparatus, it may from the nib point be readily imbibed into the reservoir chamber. I fix the nib in position by using a hollow cylinder, the nib being wedged tightly and held in position between the hollow cylinder and the wall of the cylindrical cavity in the nozzle of the pen. The hollow cylinder has a tongue projecting downwards within the channel of the nib. This serves to draw any ink in the cavity to the one place at the point of the tongue, whence the ink may more readily pass down or be shaken down to the nib point. I find that a tongue made long, and extending as near as possible to the nib point, is the most efficient, and with such long tongue a further purpose is served in that any temporary excess of ink forced from the reservoir to the nib point when writing by the heat of the hand expanding the air in the upper part of the reservoir chamber, is afforded a means whereby it may readily diffuse itself upwards, and even into the cavity, and thus lessens the danger of ink being spilled on the paper when writing. The limited space between the tongue and the nib, although the tongue is lying close to and touching the nib, keeps the nib point and the cavity in capillary communication with each other, and any excess of ink in either is diffused to some extent over the area of both.

The use of the small tube as an inkfeed as already mentioned produces an exceptionally cleanly self filling pen. I use the following self filling means. The small tube forming the inkfeed slides in and out in a washer, preferably made of india rubber. A small stud or projection on the tube permits of the tube being readily pulled out or pushed in, by means of the finger nail or fingers applied to it. The washer is fixed in any suitable way in the lower part of the reservoir chamber. The hole through the tube affords the only entrance to, or exit from, the reservoir chamber when the pen is being used for writing, or when being filled. The washer is of cylindrical shape and of some length, say five sixteenths of an inch in length. The wall of the cylindrical washer is thicker towards both ends than it is midway, so that the tube passing through

[Price 8d.]



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the washer is supported by the thickened walls of the washer alone, while the tube does not touch the midway portion of the washer. There is therefore an empty space of some small extent left between the tube and the midway portion of the washer. The tube extends from near the nib point to the upper part of the reservoir chamber. Where the empty space in the washer occurs, two holes are made through the wall of the tube, at a distance of say one sixteenth of an inch apart, and between these two holes the central hole through the tube is blocked, and thus divided into two portions. Consequently, if any ink or air passes into the reservoir chamber, it must enter the tube at its lower opening near the nib point, pass out from the tube through one of the two holes referred to, pass through the empty space in the washer as by a bridge connecting the two portions of tube, re-enter the tube through the second of the two holes referred to, and thence pass upward through the second portion of the tube and reach the reservoir chamber at the opening of the tube in its upper part. A rubber bag of preferably a short length and with rather stout walls is situated in the upper end of the reservoir chamber, and suitably operated on. By alternately compressing and releasing the rubber bag, or by using any other means having a similar effect, the reservoir chamber may be filled when the lower end of the tube opening near the nib point is placed in ink. The following is what happens in filling. When the rubber bag is compressed, the air from the upper part of the reservoir chamber is forced through the tube, or what I have referred to as the two portions of tube, and through the empty space in the washer, and is ejected from the lower opening of the tube near the nib point. When the rubber bag is released, ink is drawn up through the same channel, and from the opening of the tube at the upper part of the reservoir chamber the ink falls down into the lower part of the chamber. These two operations of compression and release suffice to fill the pen when repeated a few times. During the filling, the blocked part of the tube before mentioned remains at or about the central part of the washer, and this position I call the filling position of the tube. When the tube is pulled a little further out or pushed a little further inwards, one or other of the two holes made through the wall of the tube comes opposite where the thickened wall of the washer touches and presses on the tube, and this position I call the inktight position, as the pen may then be carried in the pocket without any risk of spilling ink. When the tube is pushed further inwards, the two holes referred to are then clear of the washer and situated in the reservoir chamber proper, and this position I call the writing position.

The following modification of the self filling means is somewhat easier of construction and allows of the reservoir being filled without the necessity of pushing in or pulling out the tube. In this modification the tube has only one position, and this position serves both for writing and filling. In this modification the pen, however, is not rendered inktight for carriage in the pocket by pushing in or pulling out the tube as in the former case. The tube extends from near the nib point to the upper part of the reservoir chamber, and a rubber bag or other like means are provided as before mentioned. The tube may be fixed in any suitable way at the lower end of the reservoir chamber, but preferably I support the tube as in the case before mentioned by means of an india rubber washer. The washer is of hollow cylindrical form, and the tube may slide in the washer so that it can be readily adjusted as desired. Very small holes, or a slit or slits, are made through the wall of the tube at a point on the tube which is as low as possible in the reservoir chamber, so that there is a good capillary communication between the ink in the lower part of the reservoir chamber and the grooves in the tube. Preferably I make that length of the tube which passes through the reservoir chamber as a separate portion of tube and of smaller diameter, say of one sixteenth of an inch outside diameter. The portion of tube that extends from the lower part of the reservoir

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5 chamber to near the nib point may then have an inside diameter of one sixteenth
of an inch. The internal grooves upon this portion of the tube extend the whole
of its length. The smaller tube may be pushed for a short distance within the
larger tube, which affixes it with sufficient firmness. In this case it will be
10 seen that it is not needful to cut any slit in the tube to effect capillary com-
munication with the ink in the lower part of the reservoir chamber, as the
internal grooves in the lower tube reach to the top of it and thus effect the
communication. The operation of filling is performed exactly in the same way
as already mentioned, namely, the nib point with the lower end of the tube is
15 placed in ink, and the rubber bag is alternately and quickly compressed and
released a few times. It might be thought that the slits or other capillary channels
on the tube which give free capillary access between the lower part of the
reservoir chamber and the interior of the tube at that point and thus supply
20 ink for the nib in writing, would altogether or at least very seriously interfere
with the filling of the pen. It might be supposed that the compression of the
rubber bag would force ink rather than air out of the reservoir chamber, and
that the repetitions of compressing the rubber bag would force out ink from
the reservoir chamber as quickly as the expansions of the bag imbibed ink. It
25 must be remembered, however, that there is a comparatively large and clear
course from the air in the upper part of the reservoir chamber to the nib point,
while the ink passages are narrow. As a matter of fact, the modification of
the apparatus is likewise very successful in filling the reservoir within a very
few seconds, and without the risk of soiling the fingers or the nozzle of the pen
with ink. One reason of its cleanliness in filling is that the nozzle of the pen
30 need not be plunged into ink, it being sufficient if the lower opening of the
tube is immersed in ink. In this case, it is of course necessary that the hole
through the tube should afford the only entrance to, or exit from, the reservoir
chamber, and the use of the india rubber washer is a good and inktight way of
accomplishing this end. On the other hand, the modification of the self filling
35 means as last described may be used with a somewhat less effective result if the
india rubber washer is not used, and where there may be some small leakage
or exit from the reservoir chamber otherwise than through the tube. In this
case, and in proportion to the amount of leakage, it becomes necessary to insert
the nib point so deeply in the ink that the vulcanite nozzle of the pen becomes
40 soiled with ink. This is a manifest disadvantage, but inasmuch as a large
number of self filling pens are now made which have such a disadvantage, I
point out that the modification of the self filling means as last described may,
for the sake of cheapness or other reason, be used with a tube which is not fitted
to the pen in a good and inktight manner, and similarly it may also be used
45 with the usual form of plug feed or with any inkfeed in which there is only
one comparatively large duct. Although there is in the plug feed, for instance,
what may be said to be a capillary channel surrounding the whole circum-
ference of the plug feed, the effectivness of this self filling means is not destroyed
until this capillary channel becomes of somewhat large capacity.

50 Where a pen is constructed with the modification of the self filling means as
last described, it may be rendered inktight for the pocket by using a small
rubber bag or cap, which is slipped over the lower end of the tube at its termina-
tion near the nib point. This way of rendering a pen inktight which uses a tube
for an inkfeed, may be used with any pen where the hole through the tube
affords the only exit from the reservoir chamber.

Dated this Seventh day of September 1907.

ALEXANDER MUNRO.

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COMPLETE SPECIFICATION.

Improvements in Reservoir Pens.

I, ALEXANDER MUNRO, of No. 49, Witton Road, Aston Manor, Birmingham, Inventor, 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:—

The invention relates to what are commonly known as reservoir or fountain pens, and its object is to add to the cleanliness of the pen and to render the pen self filling in an improved way.

According to this invention I provide that class of pens which possesses a nib of the shape of the common steel nib and which possesses a tube leading from the reservoir to near the nib point to supply ink to the nib in writing, with means whereby any loose or surplus ink lying about the middle or upper part of the nib, or lying within the cavity of the nozzle of the pen, is conducted more easily to the nib point, and so used up in the course of writing or is otherwise disposed of in a cleanly manner. I also provide an improved self filling means which may be adapted to many classes of pens, and I show how it may be fitted to a pen employing a nib of the shape of the common steel pen-nib, to a pen employing a stylographic form of nib, and also to a pen employing the ordinary form of plug feed and a nib of the shape of the common steel pen-nib.

On the accompanying drawing

Figs. 1 and 2 illustrate the means for disposing of loose or surplus ink.

Fig. 3 illustrates a pen fitted with the improved self filling means and employing a nib of the shape of the common steel pen-nib.

Fig. 4 is a modification of the same.

Figs 5 and 6 illustrate a stylographic form of nib that may be used in conjunction with the self filling means or with its modification.

Fig. 7 illustrates the modification of the self filling means as adapted to a pen employing the ordinary form of plug feed and a nib of the shape of the common steel pen-nib.

Referring to Figs. 1 and 2, Fig. 1 is a longitudinal section of the lower portion of a pen fitted with the means for disposing of loose or surplus ink, and Fig. 2 is a view of such means. In Figs. 1 and 2 (1) is the nib holder or hollow cylinder, which may be split or unsplit. It has a tongue (2) extending downwards along the channel of the nib (3) and reaching nearly to the lower opening of the feed tube (4) which leads the ink from the reservoir and delivers it near the nib point. The nib (3) is tightly wedged and held in position between the nib holder (1) and the nozzle (5) of the penholder. The heat of the hand when writing, or the heat of the body when carrying the pen in the pocket, frequently causes ink to exude in excess from the lower opening of the feed tube (4), and such ink may by capillary attraction between the tongue (2) and the nib (3) diffuse itself along the whole length of the nib and occupy or partly occupy the cavity (6) in the nozzle of the penholder. The loose or excess ink is thus afforded a temporary accommodation, which prevents it from being spilled. If it lay there permanently, it would be in danger of spilling when the pen was shaken rather violently, or it might dry and be wasted. The tongue however affords it an easy access to the nib point, and it thus gets used up in the course of writing, or from the nib point it may, as in the case of self filling pens having the power to do so, be re-imbibed into the reservoir chamber. A short tongue is of considerable service, but the longer it is the more efficiently it acts.

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Fig. 3 is a longitudinal section of a pen fitted with the improved self filling means and employing a gold or other metal nib of the shape of the common steel pen-nib. The usual cap or end cover is not shown on the drawing. The reference numbers (1 to 6), and their description as in Figs. 1 and 2, apply also to Fig. 3. In Fig. 3 the tube (4) extends from where its tip (7) touches the nib (3) to the upper part of the reservoir chamber (8). By means of the stud or projection (9) the tube (4) may conveniently be pulled out or pushed further inwards, as it slides pretty freely in the india rubber washer (10). The washer is firmly fixed in position by means of the fillet (11) on its outer surface taking into a corresponding recess made in the penholder. In lieu of the washer any other suitable support in which the tube may slide can be used, but I find the rubber washer very inktight and efficient for the purpose, and it has the advantage that it throws the tip (7) of the tube against the under surface of the nib with a very light but most persistent spring, and enables the tube to follow the flexure of the nib in making a heavy downstroke and thus to supply ink to the nib at the moment it most requires it in writing. A cylindrical open space (12) surrounds the tube in the middle part of the washer, and the thickened outer ends of the washer alone support the tube. A length of 4 or 5 sixteenths of an inch is suitable for the washer. The tube (4) is open at both ends (7 and 21) and is blocked up at the point (13). On opposite sides of this blocked part of the tube are the two lateral holes (14 and 15) at a small distance apart, say one sixteenth of an inch. At the upper end of the reservoir chamber is the short length of india rubber tube (16), held in position by the internal ring (17) compressing it against the wall of the reservoir chamber (8), and the upper end of the india rubber tube is closed by the ring (18) compressing it against the plug (19). The sheathlike upper part (20) of the penholder or barrel screws or fits on to the lower part of the barrel. A thickness of one thirty-second part of an inch is suitable for the wall of the india rubber tube. A rubber bulb of the usual shape may be used in lieu of the rubber tube, or any other means may be used which have an effect similar to the alternate compression and release of a rubber bulb. I find that the particular construction of the india rubber tube described is very effective in use, as the plug within its upper end assists it in quickly regaining its shape after it has been compressed by the fingers. Its action is the same as that of a rubber bulb, and I will hereafter for convenience refer to it as the rubber bulb. It is desirable that it should not be too long, as a long length has a tendency to sag or collapse, and thus to interfere with the writing qualities of the pen. An inch length of rubber bulb is suitable, and this is sufficient to enable the reservoir to be filled with ink in a few seconds, and requiring the rubber bulb to be alternately compressed and released for 5 or 6 times. The following is the explanation of the use of the tube (4) in its three different positions. The position of the tube shown in Fig. 3 I call the writing position, as the ink in the reservoir chamber (8) is then able to find its way through the hole (14) and downwards through the tube to the nib point. By drawing the tube further out of the penholder, one of the two holes (14 and 15) will be within the washer and the other hole will be without the washer, and this position of the tube I call the inktight position, as the pen may then be safely carried in the pocket without risk of spilling ink. Drawing the tube out of the penholder until the two holes (14 and 15) are both within the washer, produces the filling position. In this position let the nib point with the lower opening (7) of the tube be submerged to a small depth in ink. On compressing the rubber bulb, air is expelled from the reservoir chamber through the tube, and in its course it passes inwards by the opening at (21), outwards through the hole (15), along the space (12) as by a bridge, inwards by the hole (14) to the interior of the tube, and so finds exit at the opening (7) of the tube near the nib point. On the bulb being released, it expands to its former size, and sucks up a quantity of ink which passes inwards by the same route but in the reverse direction. When such ink falls into the reservoir (8) through the opening (21)

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at the upper end of the tube it is trapped within the reservoir, and with each successive compression and release of the rubber bulb a further quantity of ink is drawn into the reservoir until it is quite full. This self filling device is something higher in its mechanical character than a squirt, and acts after the manner of a true pump in filling by regular and successive pulsations. A convenient result to the user of the pen, following from this pumplike property, is that he is apprised in the course of filling when the reservoir has become fully charged, and is not left in doubt in the manner usual with other self filling pens as to whether any ink has actually been injected. When, in filling, the ink within the reservoir chamber has risen to the height of the rubber bulb, its presence within the bulb can be felt by the fingers through the rubber, showing that the reservoir is then quite full.

Fig. 4 is a longitudinal section of a pen fitted with a modification of the self filling means, and in which the tube is the only part modified. The other parts are the same as in Fig. 3 and the same description applies to them. The tube is not blocked up or stopped in any part of its length from its lower opening (7) near the nib point to its upper opening (21) in the upper part of the reservoir chamber. It is somewhat cheaper and easier in construction than the self filling means shown in Fig. 3. The tube in the modification shown in Fig. 4 is only capable of one position, which serves it both for writing and for filling, and the pen is not rendered inktight for carriage in the pocket by pushing in or drawing out the tube as in the former case. The tube, however, within this one position may be slid a short distance in the washer for purposes of adjustment in writing. A small hole or holes, or a slit or slits, or other capillary channels, are made through the wall of the tube at a point (22) on the tube which is as low as possible in the reservoir chamber, so that there is a good capillary communication between the ink in the lower part of the reservoir chamber and the grooves (23) which run lengthwise in the interior wall of the tube. Preferably I construct the tube in 2 lengths, and that length of tube (24), which extends through the reservoir chamber (8), may have an outside diameter of say one sixteenth of an inch, while the lower length of tube (25) has an inside diameter of one sixteenth of an inch. The lower part of the tube (25) has a groove (23) or grooves for the whole of its length. The upper part of the tube may be affixed by being pushed for a short distance within the lower part of the tube as shown at the place marked (22), which affixes it with sufficient firmness. It will be seen that it is unnecessary in this case to cut any special small hole or slit to effect capillary communication with the ink in the lower part of the reservoir chamber, as the internal grooves in the lower part of the tube reach to the top of it and thus effect the communication. The operation of filling is performed exactly in the same way as already mentioned, namely, the nib point with the lower opening (7) of the tube is submerged in ink, and the rubber bulb (16) is alternately and quickly compressed and released a few times until the reservoir is filled. The explanation of its action is that the tube has at its upper end (21) a comparatively much larger opening into the reservoir chamber than it has at the place marked (22). When the rubber bulb is quickly compressed, the air in the upper part of the reservoir chamber gets sooner into motion, and is ejected through the tube at its opening near the nib point, before the ink finds its way to any large extent through the smaller and capillary passages at the place marked (22). This modification of the self filling means is likewise very successful in filling the reservoir in a few seconds, and is likewise without any probability of soiling the fingers or the nozzle of the penholder with ink. The cleanliness in filling is due to the circumstance that it is necessary to immerse in ink only the lower opening of the tube near the nib point. The only entrance to or exit from the reservoir chamber is through the tube, and the use of the rubber washer (10) is a good and inktight way of accomplishing this. I find the chamber in the washer an advantage in allowing the tube to slide more easily when adjusting it to the nib. On the other hand, the self

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filling means may be used with a somewhat less effective result if other than the rubber washer is used, and where there may be some small leakage or exit from the reservoir chamber other than through the tube. In this case, and in proportion to the amount of leakage, it becomes necessary to insert the nib point so deeply in ink in filling that the nozzle of the pen becomes soiled with ink. This is a manifest disadvantage, but inasmuch as self filling pens usually possess this disadvantage, I point out that, for the sake of cheapness or other reason, the self filling means may be used where the pen is not fitted in a good and inktight manner.

Fig. 5 represents a longitudinal section, and Fig. 6 a plan, of a stylographic form of nib that may be used with the self filling means or its modification. In Figs. 5 and 6 the feed tube (4) leading from the reservoir to the nib point is shown in dotted lines. The nozzle (5) of the penholder is also shown in dotted lines. The stylo tube (26) is soldered or otherwise secured to the under side of the metal piece (27) made in the usual metal pen-nib shape. The middle part (28) of the stylographic tube is nearly half cut away, giving a flat surface on which the tip (7) of the feed tube may lightly rest, and the feed tube is thus put in capillary connection with the stylographic wire, and so that there is a complete capillary communication (for part of the way this communication is by grooves in the interior wall of the feed tube) between the ink in the lower part of the reservoir chamber and the writing point (29). The stylographic wire (30) extends from the writing point (29) to the place (31) where it is soldered or otherwise affixed to the metal piece. The lower part of the wire passes through the stylographic tube, and its upper part has the usual coil to give it a spring. The self filling means or its modification may be fitted to a stylographic pen in a variety of other and simpler ways, but these other ways usually do not possess any cavity or recess near the nib point into which the loose or surplus ink ejected from the reservoir by heat may find temporary and safe accommodation. The stylographic form of nib shown in Figs. 5 and 6 does possess the accommodation referred to, and it is therefore clean, and on this account I favour it.

Fig. 7 is a longitudinal section of a pen fitted with the modification of the self filling means, and employing the ordinary form of plug feed and a nib of the shape of the common steel pen-nib. In Fig. 7, (32) is the plug feed, having the tube (24) squared at its lower end (33) and inserted a little way within the duct (34), usually made of square section, in the plug feed. This insertion within the duct holds it in position with sufficient firmness. The usual grooves (35) in the duct extend from the upper end of the plug feed to near the nib point. The description of the other parts of the pen shown in Fig. 7 is the same as for Fig. 4. The operation of the pen in filling is also the same as given for Fig. 4, with the exception that as there is necessarily some leakage with the fitting of the plug feed, it does not fill so quickly as with the arrangement shown in Fig. 4, and it usually requires the nozzle of the penholder to be submerged in ink to facilitate the filling.

I may add that I find that the writing qualities of a feed tube without grooves are generally unsatisfactory, but that with longitudinal grooves made therein they leave nothing to be desired for good writing qualities, and that in respect of liability to spill ink when the pen is carried in the pocket, and also in some other respects, the use of the feed tube is very advantageous. I have referred to the feed tube having an inside diameter of one sixteenth of an inch at a certain part, but no specific size of diameter can be quoted as preferable. I find that feed tubes with an inside diameter of one millimetre write very satisfactorily. I find also that for writing it sometimes makes an improvement to continue the grooving to the end of the tube in the upper part of the reservoir chamber although this of course cannot apply to the particular tube shown in Fig. 3, as the upper part of the tube is there inoperative except when filling. The tube may be built up in lengths where such course is more convenient in making.

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

1. In a reservoir pen, the combination of a nib of the shape of the common steel pen-nib, a feed tube extending from the upper part of the reservoir to near the nib point, and a nib holder with a tongue extending downwards along the channel of the nib, as and for the purposes set forth. 5

2. In a self filling reservoir pen, the combination of a rubber bag or bulb or other like means in lieu thereof at the upper end of the pen, a tube extending from the upper part of the reservoir chamber to near the writing point, two lateral holes made a little distance apart in the wall of such tube with the tube blocked up in the space intervening between the two lateral holes, and a washer with an internal open space, or other suitable means in lieu of such washer, at the lower end of the reservoir chamber to support the tube and in which it may slide in and out as and for the purposes set forth. 10 15

3. In a self filling reservoir pen, the combination of a rubber bag or bulb or other like means in lieu thereof at the upper end of the pen, a tube continuously open and extending from the upper part of the reservoir chamber to near the writing point, one or more capillary holes or slits made in the wall of the tube at that part of the tube which is situated in the lower part of the reservoir chamber, and a washer or other suitable means at the lower end of the reservoir chamber to support the tube, as and for the purposes set forth. 20

4. In a self filling reservoir pen, the combination of a nib of the shape of the common steel pen-nib, a plug feed or other form of inkfeed having only one comparatively large duct, a tube extending from the upper part of the reservoir chamber and joined to the said duct in the inkfeed, one or more capillary holes or slits or other capillary connection made between the ink in the lower part of the reservoir chamber and the interior of the tube or the duct in the ink-feed, and a rubber bag or bulb or other like means in lieu thereof at the upper end of the pen, substantially as set forth. 25 30

5. In a self filling reservoir pen, the arrangement, construction and combination of parts, substantially as herein set forth and illustrated in Fig. 3.

6. In a self filling reservoir pen, the arrangement, construction and combination of parts, substantially as herein set forth and illustrated in Fig. 4.

7. In a self filling reservoir pen, the arrangement, construction and combination of parts, substantially as herein set forth and illustrated in Fig. 7. 35

Dated the 7th day of March, 1908.

ALEXANDER MUNRO.

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

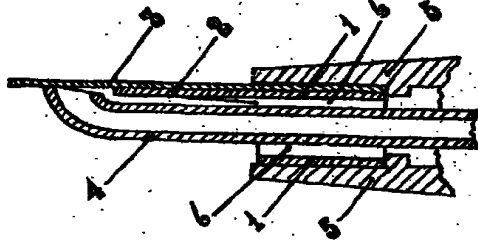


FIG. 2.

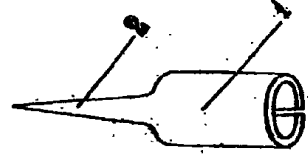


FIG. 3.

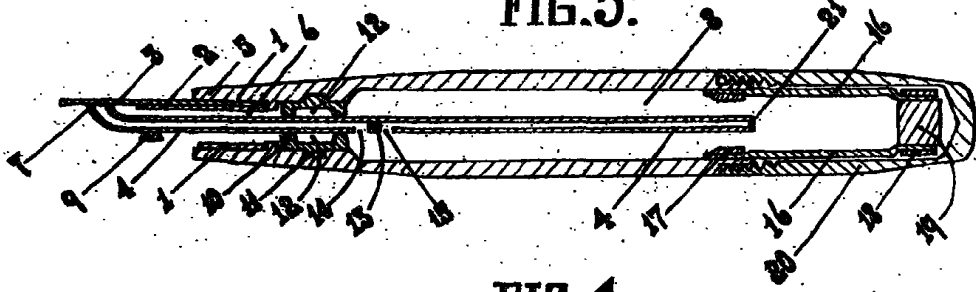


FIG. 4.

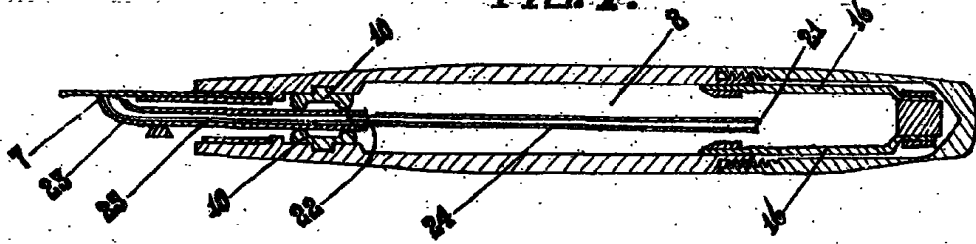


FIG. 5.

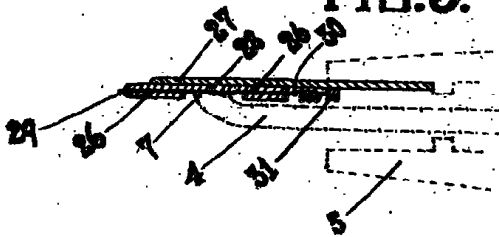
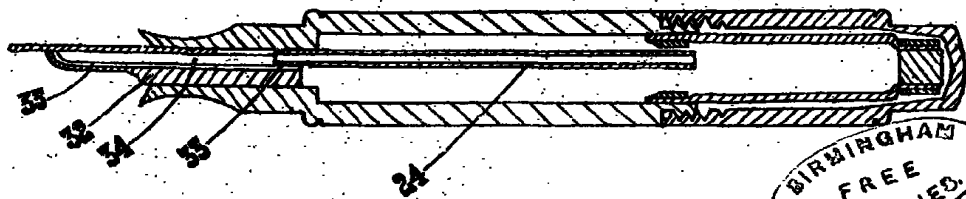


FIG. 6.



FIG. 7.



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