

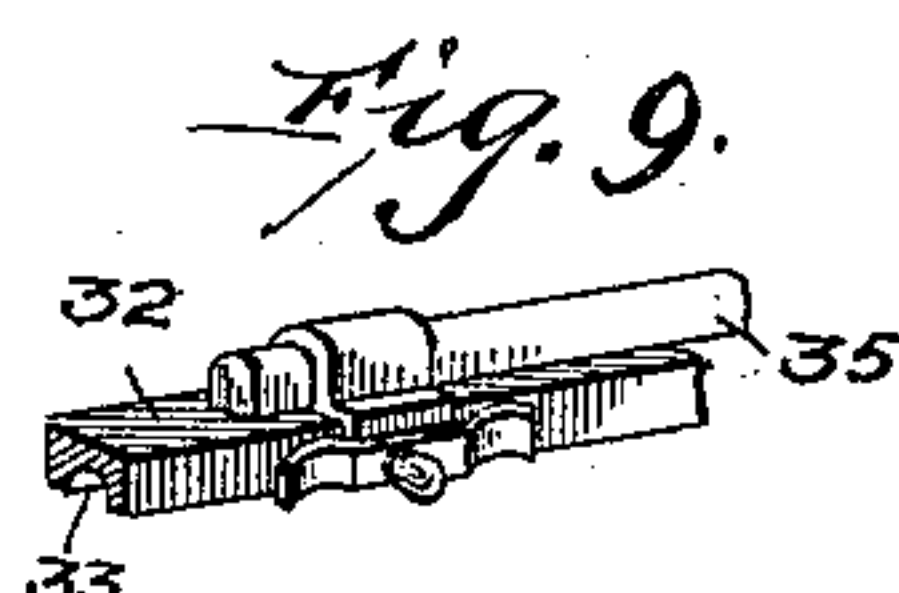
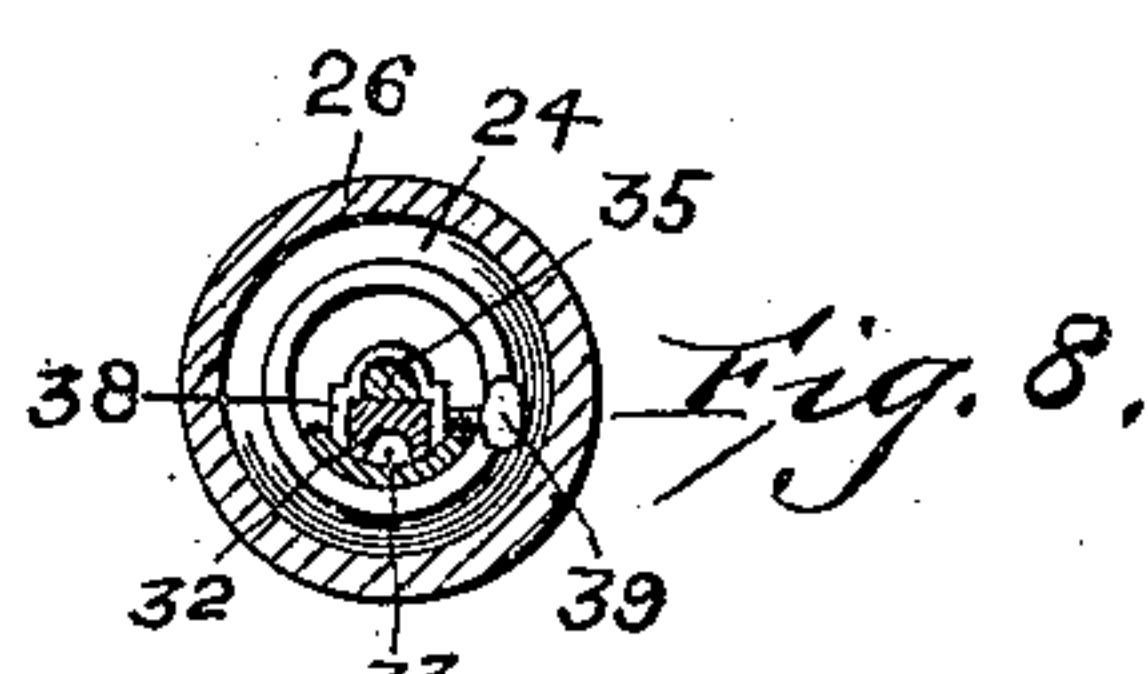
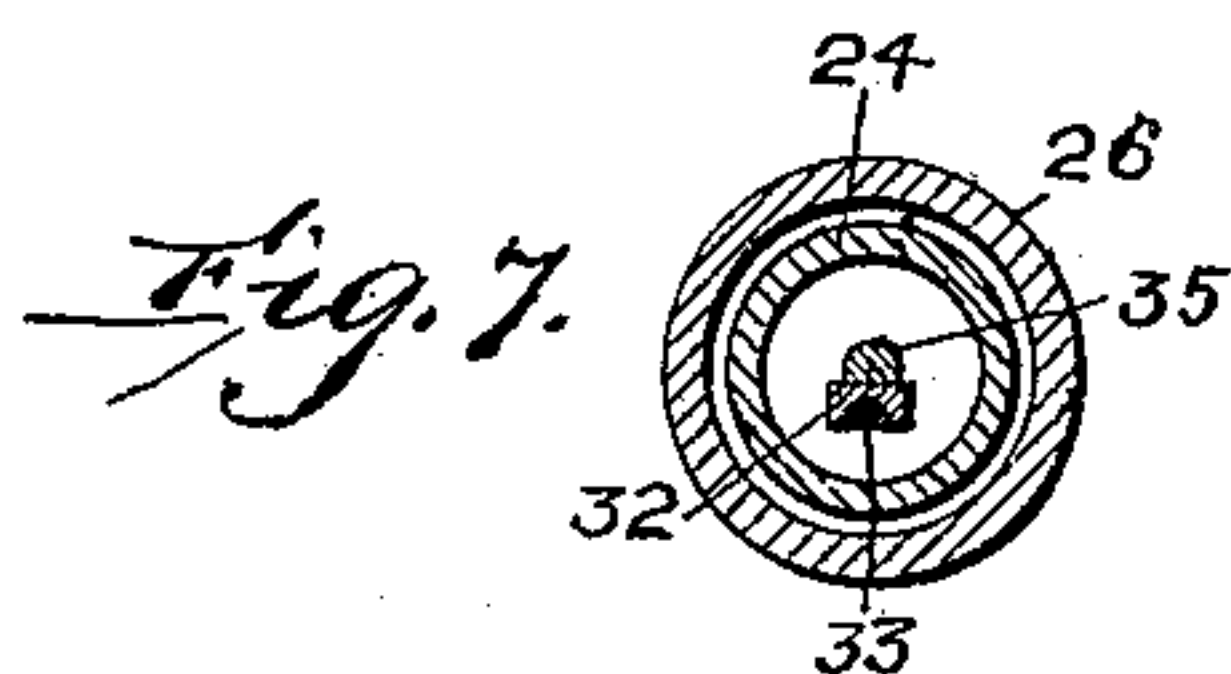
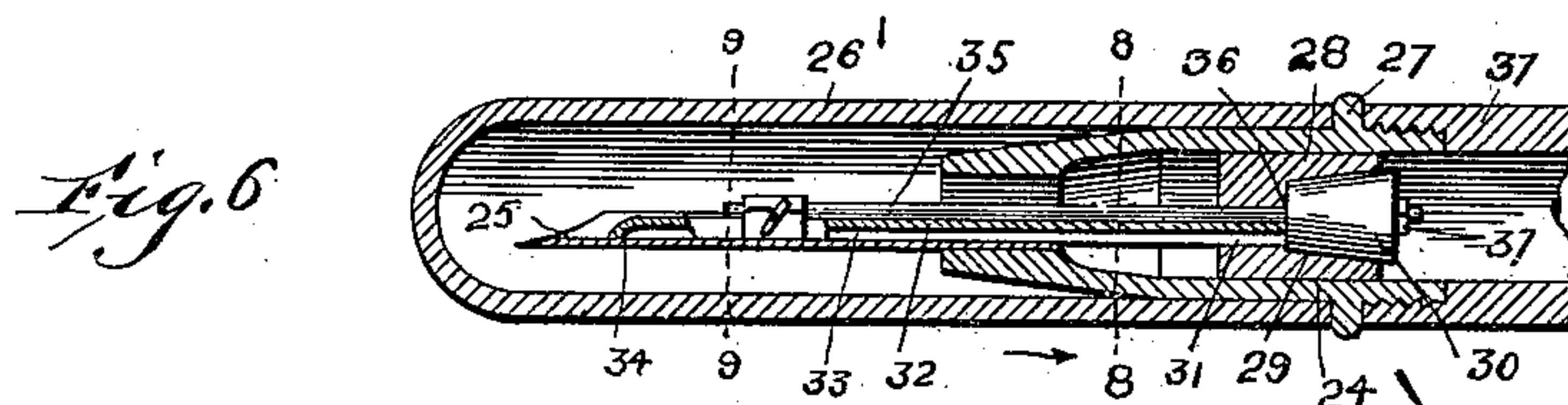
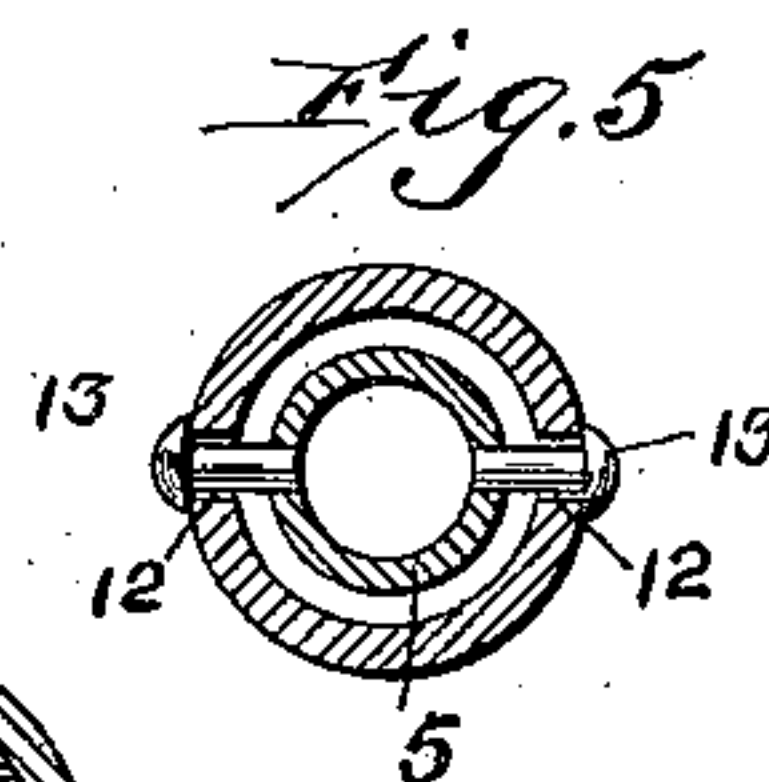
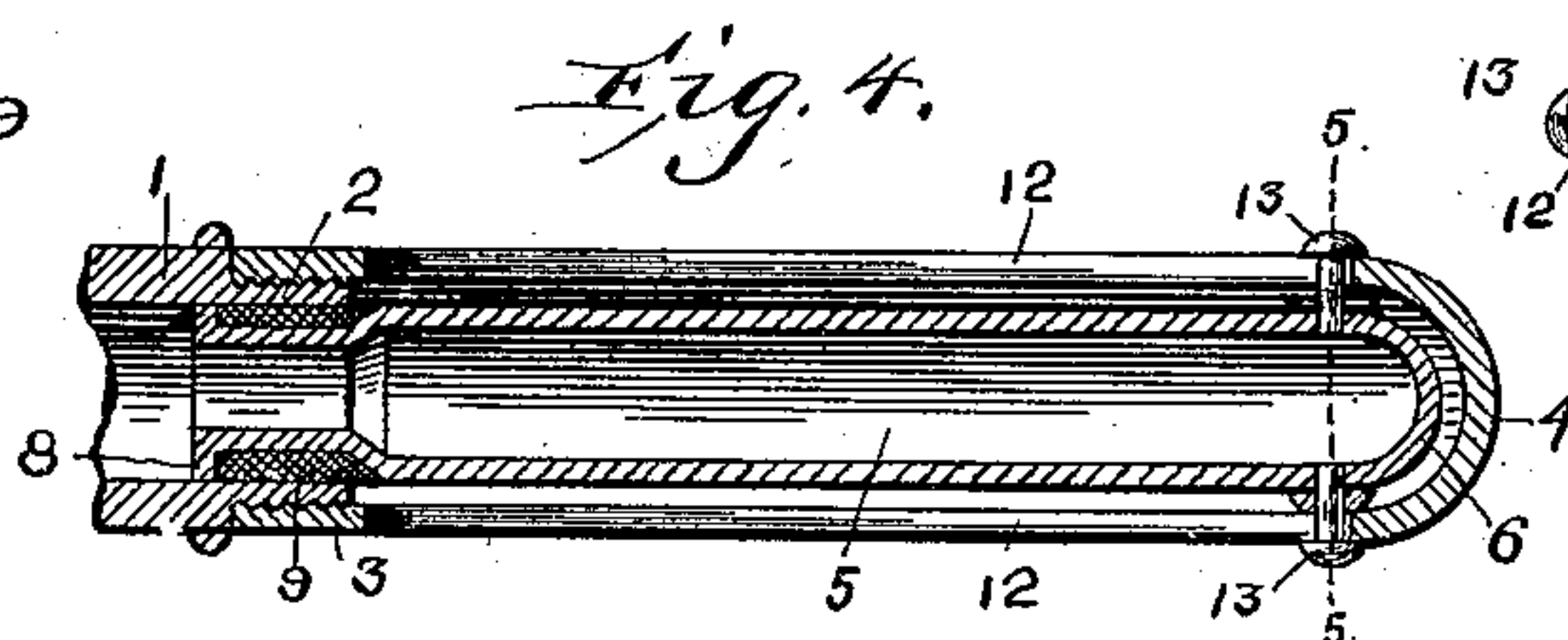
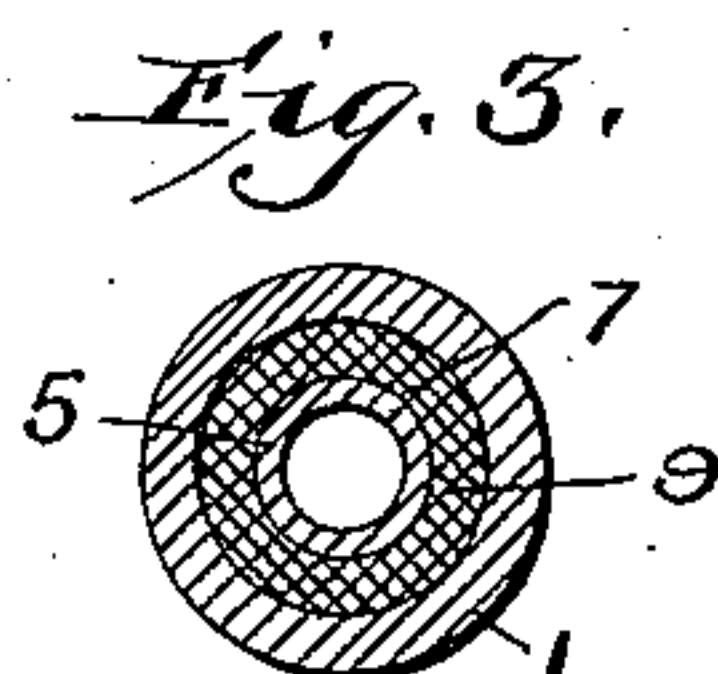
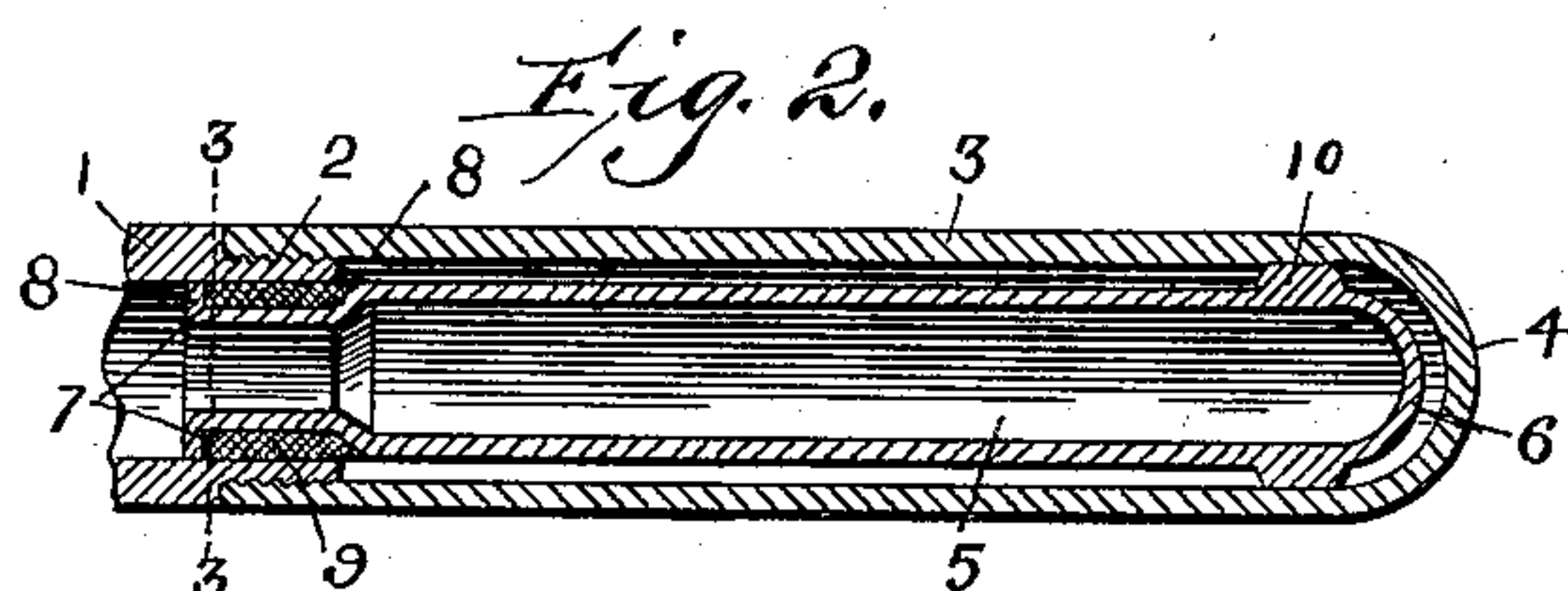
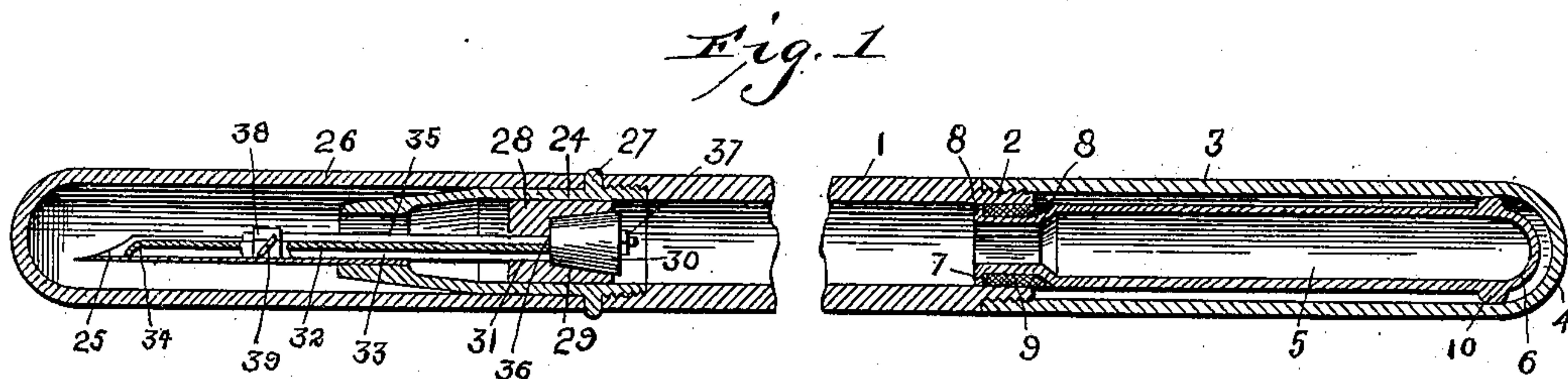
No. 618,976.

Patented Feb. 7, 1899.

S. D. BALL.
FOUNTAIN PEN.

(Application filed Mar. 12, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 618,976, dated February 7, 1899.

Application filed March 12, 1898. Serial No. 673,628. (No model.)

To all whom it may concern:

Be it known that I, SEYMOUR D. BALL, a citizen of the United States, residing at Lock Haven, in the county of Clinton and State of Pennsylvania, have invented certain new and useful Improvements in Fountain-Pens; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in fountain-pens of that class which employ an "underfeed" from a supply-reservoir to the pen proper.

In my present invention I have two primary objects in view—first, to provide means for quickly and easily replenishing the supply of ink in the reservoir contained in the tubular staff without resorting to the aid of independent devices for introducing the ink-supply to the reservoir, but attaining this end by means which are embodied in the construction of the pen to form an integral part thereof and which may be operated conveniently without soiling the fingers of the operator, and, secondly, to provide means by which the flow of ink may be entirely and completely shut off against accidental leakage from the reservoir to the pen, which devices are particularly serviceable when the implement is to be carried in the pocket of the user, so as to insure the retention of the ink in the pen and prevent it from soiling the clothing.

With these general objects in view the first part of my invention consists in a fountain-pen comprising a tubular staff, a reciprocating piston or plunger fitted therein, a slotted shield attached to the staff and forming a prolongation thereof, longitudinal slots in the shield and finger-grasps movable with the piston and arranged to travel in the shield-slots, whereby the grasps may be held in the fingers of one hand to operate the piston and effect its reciprocation in the tubular pen-staff, either to replenish the ink-reservoir by creating an inward suction therein or to cleanse the reservoir by drawing in a suitable cleansing agent, such as water.

The invention further consists in a means for feeding ink from the reservoir to the pen and for securely cutting off the flow of ink, comprising a feeder-bar extending from the

reservoir and arranged in operative relation to the pen, a valve to securely close the ink passage or chamber from the reservoir to the feeder-bar, a valve-operating stem attached to said valve, and suitable means for adjusting and for locking the stem; and the invention further consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others skilled in the art to understand my invention, I have illustrated different embodiments thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a longitudinal sectional elevation, on a slightly-enlarged scale, of a fountain-pen constructed in accordance with my invention. Fig. 2 is an enlarged fragmentary view of the upper part of the pen constructed as represented by Fig. 1. Fig. 3 is a cross-sectional view on the plane indicated by the dotted line 3 3 of Fig. 2. Fig. 4 is a longitudinal sectional elevation of a modified construction of the pen-replenishing means, and Fig. 5 is a cross-section on the plane indicated by the dotted line 5 5 of Fig. 4. Fig. 6 is an enlarged sectional elevation of the means for feeding ink to the pen and for securely closing the ink-passage from the reservoir to the pen proper. Fig. 7 is a vertical transverse section on the plane indicated by the dotted line 8 8 of Fig. 7, and Fig. 8 is a similar sectional view on the plane indicated by the dotted line 9 9 of Fig. 7. Fig. 9 is a detail fragmentary perspective view of a portion of one feeder-bar, the valve-stem, and the clamping-slide by which the valve may be fixed in its open or closed position.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

In carrying my invention into practice I provide a tubular or cylindrical staff 1 of proper length and diameter to serve as a support for all the operating parts of the implement and as a reservoir for the ink which is to be supplied to the pen for writing purposes. The upper end of the tubular pen-staff is reduced and externally threaded, as at 2, to receive the lower threaded end of a tubular or cylindrical sleeve 3, which is

screwed detachably to the said upper end of the staff. This cylindrical or tubular sleeve 3 is of a suitable length, and in diameter it corresponds to the staff 1, so that when it is attached or coupled thereto it serves as an extension or prolongation of the staff. The sleeve, however, forms no part of the ink-reservoir, which is contained wholly within the tubular staff; but this sleeve does serve as a housing or inclosure for the reciprocating piston, by means of which the ink-supply may be drawn into the reservoir-chamber of the tubular staff to replenish the latter, said piston also serving the useful purpose of drawing into the staff water, by which the interior walls of the ink reservoir or chamber may be cleansed of sediment which may accumulate thereon. The outer or upper end of the sleeve 3 is closed by an imperforate head 4, and as the sleeve is threaded to the staff it is readily detachable from or attachable to the staff.

In the embodiment of the invention as represented by Figs. 1 to 3, inclusive, the pen is equipped with a tubular piston 5, which forms in part a reservoir for the ink. This tubular piston consists of an elongated cylindrical tube, which is open at its lower end and closed at the opposite upper end by a suitable head 6. The diameter of the tubular piston is equal substantially to the interior diameter of the tubular staff 1, and near its lower open end this tubular piston is formed with an annular groove or channel 7, which provides the abrupt parallel shoulders 8 8, spaced at a proper distance from each other to receive between themselves a piston-packing 9. This piston-packing may consist of one or more fibrous layers of cotton or yarn, which may be wrapped or coiled within the channel or groove and between the shoulders thereof to be held in place by said shoulders and to project slightly beyond the cylindrical surface of the piston. In lieu of this fibrous packing I may employ a packing of rubber of a thickness proper to extend slightly beyond the face of the piston, or a composite packing of fibrous material and rubber may be employed. The type of packing which may be used is not material, however, as any substance adapted to yield or compress slightly may be employed, and in the service of the implement the packing may be removed and a new packing substituted therefor at a trifling cost to the owner. The tubular open-ended piston, packed in either of the described methods, is fitted in the tubular staff 1 by its packing to tightly engage with the cylindrical wall of said staff, thus making the lower end of the piston work tightly in the tubular staff; but the remaining length of the plunger or piston works freely in the sleeve, because such piston is of less diameter than the sleeve. To center the piston in the sleeve and keep it in alinement with the staff, I may provide the upper closed end of the tubular piston with an external ring or band 10, which is made an integral

part of the piston or separate therefrom, so as to be united rigidly thereto and travel with said piston, and said external ring or band is adapted to move freely in the sleeve.

In the practical service of the means for replenishing the ink-supply in the staff when constructed as just described it is preferable to remove the sleeve from the staff, so as to expose the tubular piston, and when the pen-staff is held in one hand the piston can be grasped and manipulated by the other hand, so as to create an inward and upward suction, which will draw ink into the reservoir formed by the tubular staff, after which the sleeve should be replaced by screwing it on the tubular staff and to afford protection to said piston against displacement by contact with external objects.

In the embodiment of the invention as represented by Fig. 4 the protecting and housing sleeve for the tubular piston is constructed to remain fixed to the pen-staff and to provide means by which access may be obtained to the piston for the convenient operation thereof without detaching the housing-sleeve from the staff. In this embodiment of the invention the lower threaded end of the protecting or housing sleeve is formed with an annular external reinforcement rib or flange 11 at the point where the sleeve is screwed to the open-threaded end of the staff, and this sleeve is further provided with longitudinal slots 12, located at diametrically opposite lines in the sleeve, said slots extending nearly the full length of the sleeve. To the guiding flange or band 10 of the tubular piston are rigidly attached or made as integral parts thereof the oppositely-projecting knobs 13, which pass through the longitudinal slots 12 in the housing-sleeve and protrude or extend a suitable distance therefrom, whereby the diametrically opposite extended and projecting knobs may be readily grasped by the fingers and the piston may be reciprocated within the protecting-sleeve and in the tubular staff without detaching the protecting-sleeve from the staff.

I will now proceed to describe the preferred embodiment of the means by which the ink may be conveyed from the reservoir in the staff to the pen and for securely closing the ink-passage against the leakage or accidental escape of ink to soil the clothing of the user when the pen is carried in the pocket.

To the lower threaded end of the pen-staff is rigidly but detachably connected a nozzle 24, which carries a pen 25, of any suitable or preferred construction, said nozzle being constructed with an external annular face to receive one end of a cap 26, and the nozzle being further provided with an annular radial flange or bead 27, that serves as a reinforcement to the nozzle and as a stop to limit the endwise movement of the cap when placing the latter in position over the nozzle to inclose the pen and afford a protection to the latter against catching in the clothing. Within the

nozzle 24, at an intermediate point of the length of the latter, is provided a plug 28, which occupies a permanent fixed position within said nozzle to prevent the downward passage and escape of ink from the reservoir in the tubular staff. This plug may be made as an integral part of the nozzle, or it may be separate therefrom and secured thereto; but in either event said plug must be arranged within the nozzle to overcome any tendency of the ink to leak between the nozzle and the plug. If desired, the pen may be received in the plug, or it may be contained wholly at its heel in the nozzle; but this is not material. In the upper or inner side of the plug is formed a chamber 29, preferably slightly tapered or of conical form in the direction of its length; but this chamber does not extend entirely through the plug, as it stops or terminates in an abrupt wall or face, said face and the annular wall of the chamber forming the seat for the plug-valve 30. This plug-valve is of conical form to correspond to the form and dimensions of the chamber in which the valve is designed to be tightly seated, and said valve may be made of cork or other suitable material adapted to be tightly compressed and drawn to its seat in the plug 28. From the chamber in the upper side of the plug 28 extends a channel or passage 31, which opens into the chamber and through the lower front face of the plug. In this passage 31 in the plug is securely fitted and held one end of the feeder-bar 32, which is arranged below the pen 25, within and opposite to the concave under side thereof. This feeder-bar extends longitudinally of the implement, its outer extremity terminating at a point within the nibs of the pen and its inner end lying at the chamber or valve-seat in the plug. The feeder thus occupies a fixed position beneath and within the concave side of the pen, and the upper end of the feeder is adapted to receive the ink from the reservoir in the staff when the valve is opened and conduct the same to the pen and the nibs thereof. The upper face of the feeder-bar opposite to the pen and nozzle is provided with a longitudinal groove or conduit 33, which extends from the upper inner extremity of the feeder-bar at the point where it terminates at the chamber or valve-seat in the plug down to a point near the extremity of said feeder-bar opposite to the ink-slot in the pen; but this last-described end of the slot does not extend through the lower end of the feeder-bar because it terminates within said end of the feeder-bar in the form of an abrupt shoulder or ledge 34, which affords a barrier against the passage of ink clear to the lower outer extremity of said feeder-bar, thereby reducing to a minimum any tendency of the ink to become suddenly precipitated in the form of a blot upon the paper or other writing material.

The conical plug-valve is independent of the feeder-bar, which occupies a fixed position with relation to the pen and the plug,

and to provide for the convenient adjustment of this valve by externally-accessible appliances I make the channel or passage in the plug a little larger than the cross-sectional area of the feeder-bar in order to accommodate an endwise-movable valve-stem 35. The feeder-bar may be of rigid or flexible material; but the under face thereof or that side opposite to its channeled or grooved side is made imperforate, smooth, and continuous to enable the valve-stem to be fitted laterally and closely thereto. This valve-stem lies closely against the fixed feeder-bar to slide endwise thereon, and one end of the valve-stem passes through the passage or opening in the plug. Said end of the stem is formed with an annular shoulder 36, adapted to abut against one end of the valve, and the extremity of the valve-stem is threaded and extended through the valve to receive a nut or bur 37, by which the stem may be rigidly fixed to the valve. The stem is not equal in length to the feeder-bar, so that its outer end terminates within the extremity of said bar, and said outer or lower end of the valve-stem is flanged at its sides to form a clasp 38, which closely embraces the sides of the feeder-bar. This clasp of the valve-stem serves to retain the stem in slidable operative relation to the feeder-bar, and in one side of the clasp is provided a threaded opening which receives the shank of a clamping-screw 39, which is readily accessible to the operator for the purpose of rotating the same to cause the screw to impinge against the feeder-bar and hold the valve and the stem in the desired position.

When it is desired to refill the reservoir in the tubular staff with ink, one end of the implement is thrust into ink in a suitable vessel, so as to cover the mouth of the nozzle. The operator holds the staff firmly in one hand, and with the other hand the piston is reciprocated or drawn upward to create an inward suction and draw the ink from the vessel into the reservoir of the staff.

To use the pen, the cap is removed and the valve-stem is adjusted to move the valve from its seat, thus permitting ink to pass from the reservoir to the grooved feeder-bar, by which the ink is supplied to the pen and the nibs thereof. The valve may be opened more or less to regulate the flow of ink to the pen; but to enable the implement to be carried in the pocket the stem, its slide, and the valve are moved endwise to draw the valve tightly home to its seat or chamber in the plug, after which the screw is tightened to hold the stem and valve to their adjusted positions, and finally the cap is placed over the nozzle to inclose the pen. The described means permits the ink-passage to be so tightly closed as to overcome any leakage of the ink.

By the use of the tubular piston the pen can be supplied with a large quantity of ink in the following manner: After taking in a certain quantity of ink supplied by one passage of the piston in the staff the operator may in-

vert and hold the pen in a perpendicular position, with the tubular piston below, thus allowing the ink to flow into the tubular piston, and while the pen is in said position the tubular piston may be gently pressed into the staff. The nozzle of the pen may now be immersed in the ink in the vessel from which it is to be taken, and by again drawing upward on the piston to move the whole length of the staff an additional quantity of ink may be added to the ink already contained in the reservoir.

I am aware that changes in the form and proportion of parts and in the detailed construction of the invention as herein shown and described may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of the invention, and I therefore reserve the right to make such modifications and alterations as fairly fall within the scope of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a fountain-pen, the combination with a reservoir-staff, of the housing-sleeve secured removably to said staff and provided with longitudinal slots, a tubular piston having a contracted flanged open end provided with an external packing arranged to fit tightly in said staff, and the headed finger-knobs attached to said tubular piston and projecting through the slots in the housing-sleeve, substantially as described.

2. In a fountain-pen, the combination with a staff, and a nozzle, of a fixed feeder-bar having a continuous feed-channel, a valve, and a valve-stem independent of the feeder-bar and slidably fitted thereto, said valve-stem being accessible from one side of the feeder-bar and attached to the valve for adjusting the latter independently of any movement of the feeder-bar, substantially as described.

3. In a fountain-pen, the combination with a nozzle, and a channeled feeder-bar, of a valve-stem slidably fitted to said feeder-bar, a valve movable with the stem independently of any adjustment of the feeder-bar, and means for locking the stem and valve to their adjusted positions, substantially as described.

4. In a fountain-pen, the combination with a nozzle, and a plug, of a channeled feeder-bar fixed to said plug, a valve-stem having a clasp slidably fitted to the feeder-bar, a valve adjustable with the stem independently of any adjustment of the feeder-bar, and a clamping device carried by the clasp and adapted

for engagement with the feeder-bar, substantially as described.

5. In a fountain-pen, the combination with a staff, a nozzle, and a pen, of a plug having a valve-seat, a feeder-bar fixed within said plug and in operative relation to the pen, a valve adapted to be fitted to the seat in the plug, and a valve-stem slidably fitted to the feeder-bar and connected to the valve and readily accessible outside of the nozzle, substantially as described.

6. In a fountain-pen, the combination with a staff, and a nozzle, of a plug having a valve-seat, a manually-adjustable valve, a feeder secured in the plug, and a clamp for holding said valve in its adjusted position, substantially as described.

7. In a fountain-pen, the combination with a nozzle, and a feeder-bar, of a plug having a valve-seat, a valve, a stem slidably attached to the feeder-bar, and a clamp for holding the valve and stem to their adjusted positions, substantially as described.

8. In a fountain-pen, the combination with a nozzle and a staff, of a fixed plug within the nozzle, a feeder fixed to the plug and having a longitudinal groove or channel to deliver ink to a pen, and a manually-adjustable valve, substantially as described.

9. In a fountain-pen, the combination with a staff and a nozzle, of a plug fixed in the nozzle and having a transverse opening and a valve-seat, a grooved feeder-bar, a valve, a slidable stem having a clasp fitted to the feeder-bar and attached to the valve, and a clamp mounted in the clasp for engagement with the feeder-bar, substantially as described.

10. In a fountain-pen, the combination of a tubular staff adapted to form the ink holder or fountain, proper, an inner, opened-ended tubular piston, with its packed head fitted into tight sliding contact with said tubular staff, said tubular piston adapted to form an extension, and to supplement the holding capacity of said staff or ink-holder, and the outer sleeve or housing adapted to be connected to said staff, and to guard said tubular piston against movement when the pen is in use and to prevent the subsequent displacement of its contents, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SEYMOUR D. BALL.

Witnesses:

A. W. BRUNGARD,
C. R. GEARHART.