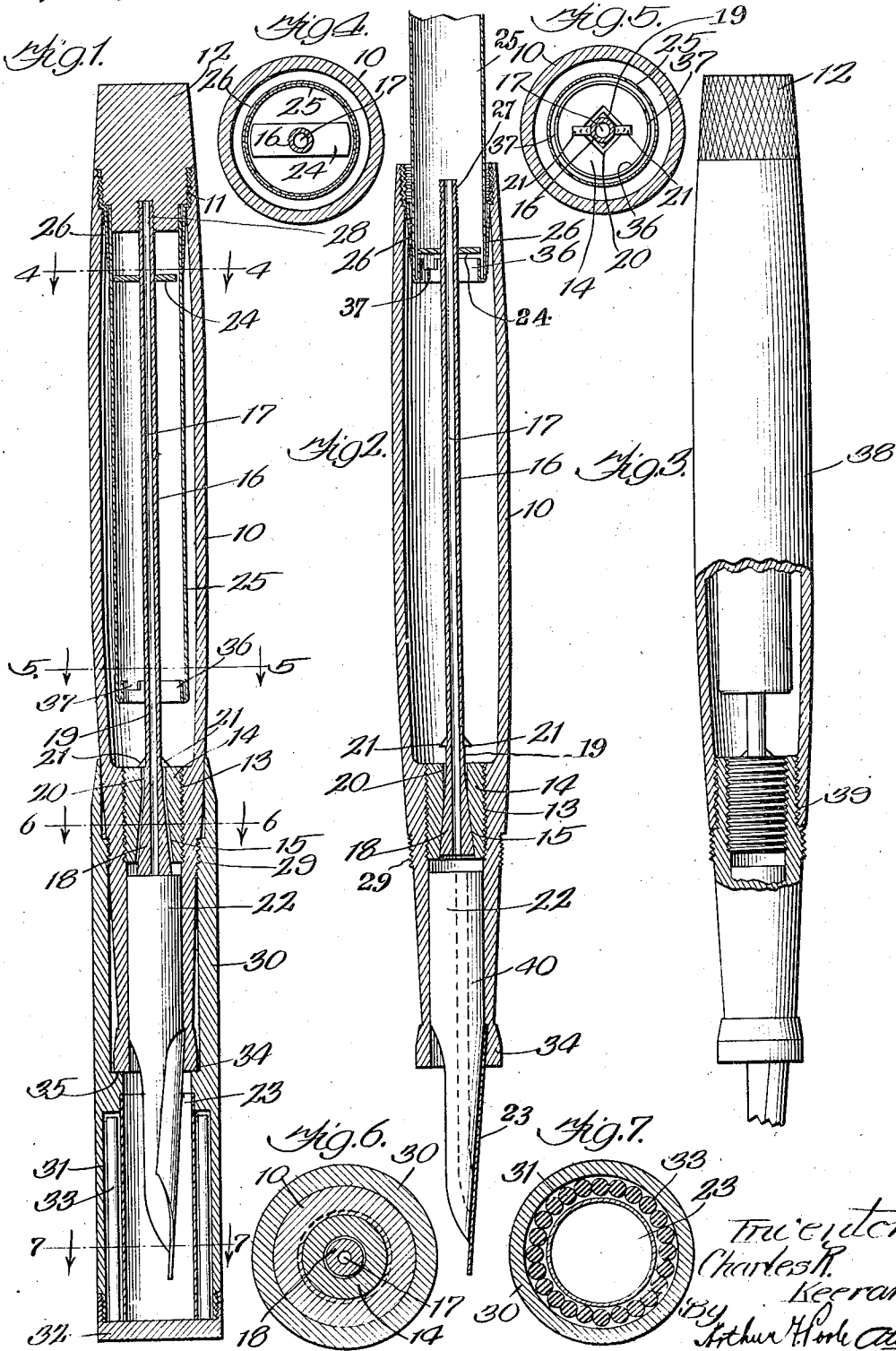


C. R. KEERAN.
FOUNTAIN PEN.
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1,351,575.

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UNITED STATES PATENT OFFICE.

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FOUNTAIN-PEN.

1,351,575.

Specification of Letters Patent. Patented Aug. 31, 1920.

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To all whom it may concern:

Be it known that I, CHARLES R. KEERAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification.

My invention is an improved fountain pen embodying means to refill the pen with ink without the use of the customary ink dropper, and one of the objects of my invention is to provide an improved structure for a pen of this general class.

Another object of my invention is to provide a pen which may be filled by a series of pumping operations by manipulation of the rear part of the casing thereof and which will have a greater ink capacity and be more reliable in its operation than self-filling pens of this class now in use.

A further object of my invention is the provision of a self-filling fountain pen in which the customary joint for the plug serving to support the pen nib shall be eliminated.

Another object of my invention is the provision of an improved self-filling fountain pen which shall be readily manufactured and easily assembled.

These and other objects of my invention will be apparent to those skilled in the art and will be set forth in the following specification and claims:

My invention may be more readily understood by reference to the accompanying sheet of drawings, in which—

Figure 1 is a longitudinal section of my improved pen;

Fig. 2 is a longitudinal section showing the rear portion withdrawn for the purpose of pumping ink into the interior of the pen;

Fig. 3 is a view partly in section of a modified structure showing some details of the front portion of said modified structure;

Fig. 4 is a section along the line 4—4 of Fig. 1;

Fig. 5 is a section along the line 5—5 of Fig. 1;

Fig. 6 is a section along the line 6—6 of Fig. 1, and

Fig. 7 is a section along the line 7—7 of Fig. 1.

Like reference numerals refer to the same parts in all of the figures.

Referring particularly to Fig. 1, 10 is the pen casing which is preferably of hard rubber and is made of somewhat oval shape. In its rear end is a screw thread 11, into which is screwed the rear plug 12, said plug serving as a handle to operate a certain plunger during the refilling operation. In the front portion of the casing 10 is a screw thread 13, into which is screwed a plug 14, having a tapered hole 15 therein. In the center portion of the pen is a hollow rod 16, having a hole or channel 17 extending the entire length thereof, and having its front portion formed into a valve 18, which is adapted to contact with and close the conical hole 15. The lower portion 19 of the rod 16 is made of squared, elliptical or other non-circular section, and the upper portion 20 of the hole 15 is made of corresponding section (Fig. 5), so that the rod 16 cannot be turned relative to the plug 14. The rod 16 is provided with a stop 21, which bears against the surface of the plug 14 and serves to limit the motion of the rod 16 and associated valve 18 in respect to the plug 14. In the front part of the casing 10 is placed the customary plug 22, in which is the usual feeding channel 40 for supplying ink to the pen nib 23. At the rear end of the tube 16 and rigidly attached thereto is a cross piece 24, whose functions will be hereinafter described. Attached to the plug 12 is a tube 25, and said tube is adapted to slide in a bushing 26 seated in the rear end of the pen casing 10. The rear portion of the rod 16 has a thread 27 thereon of the same pitch as the thread 11, and said thread 27 is engaged by the thread 28, cut into the plug 12. The lower end of the tube 25 is provided with an inwardly-turned ridge 36, having notches 37 therein, said notches being adapted to engage cross piece 24. On the front end of the casing 10 is a suitable thread 29, which serves to hold the cap 30 in place when the pen is not in use. On the forward end of the cap 30 is an annular recess 31, which is closed by a cap 32, and said recess serves as a magazine for ink tablets 33. These tablets are the usual kind which, when dissolved in water, will make a supply of ink. The front portion of the tube 10 is provided with a ledge 34, which contacts with a ledge 35 in the cap 30 and thereby provides a seal for the pen when the same is not in use.

The operation of filling my improved pen is as follows: The cap 30 is removed and the penpoint dipped in ink below the ledge 34. The rear cap 12 is then unscrewed and it will be noted that this action will free the cap from the upper end of the tube 16. The cap 12 is then withdrawn into the position shown in Fig. 2, thus creating a partial vacuum within the casing 10, which permits the air on the outside of the casing to force ink into the casing through the feed channel 40, and tube 17. The tube 25 is prevented from being pulled clear out of casing 10, by ridge 36 striking against cross piece 24. This pull of considerable force on cross piece 24 moves the rod 16 from the position shown in Fig. 1 to that shown in Fig. 2, causing cone valve 18 to set tight in the valve seat 15, thus closing communication between feed channel 40 and ink reservoir except through the tube 17. The tube 25 is then returned to a position near its normal one. In doing this, the air in the interior of the reservoir will be expelled through the tube 17, since the contact of the valve 18 with the seat 15 will effectually seal the opening in said plug 14. The rear cap 12 is again withdrawn and an additional quantity of ink is pumped into the reservoir. This operation is continued until the reservoir is filled. The cap 12 is then screwed into place and the pen is ready for writing. During the last few turns of the cap 12, in returning it to its normal position, said cap exerts a pressure on the end of tube 16 in the direction of its axis, causing the valve 18 to unseat itself, thus establishing communication between ink reservoir and feed tube through valve 18. The ink will then run down to feed tube as needed. Air to take the place of ink used will pass up through the tube 17.

In order to assemble my improved pen, the tube 17 is first placed inside of the plug 13, the cross piece 24 is then fastened to said tube, and by slightly tilting the tube and attached cross piece they can be inserted inside of the tube 25. The rear cap 12 is then screwed onto the thread 28 on the rear end of the tube 16, and by turning said cap 12, the tube 16 will turn therewith and by means of the portion 19, turn the then attached plug 14, which is screwed into the threaded portion 13 of the casing 10. When the plug 14 has thus been seated, the plug 12 may be unscrewed from the said threaded portion without disturbing the plug 14, since the friction of said plug on the thread 13 is much greater than the friction of the threaded portion 28 of the tube 16 on the plug 12. The pen is then ready for operation, as clearly hereinbefore described.

In case it is necessary to disassemble the pen, this can be readily done by pulling out the rear plug 12 and engaging the cross

piece 24 within the notches 37. The plug 14 can then be readily unscrewed from the casing.

In Fig. 3 I have shown a modification of the pen shown in Figs. 1 and 2, in which modification I employ the casing 10 in two portions. There is a rear portion 38 and in this rear portion is screwed a plug 39, into which plug is inserted the pen nib and customary feeding channel. This construction is somewhat easier to assemble than the one-piece casing shown in Figs. 1 and 2 and renders the thread 27 on the end of the tube 16 unnecessary, since the said tube may be inserted in the plug 39 and then said plug screwed to its position. However, I do not consider the modification shown in Fig. 3 as advantageous as the form shown in Figs. 1 and 2, since in the latter figures the casing 10 is made in one piece and therefore the possibility of a leaky joint at the plug 39 is avoided. In using the ink tablets 33 it is not necessary to dissolve them in water and then fill the pen with the ink thus manufactured. Instead, the pen may be taken down as above described and the ink tablet or stick dropped into the ink reservoir. The pen is then assembled and filled with water, which will quickly dissolve the tablet, and the pen will then be ready for use.

Many advantages which result from my improved structure will be apparent to those skilled in the art and many modifications may be made in the precise structures herein shown without departing from the spirit of my invention, since I claim:

1. In a fountain pen, the combination of a casing, a valve seat at one end thereof, a valve having a stem extending longitudinally of the casing, a plug mounted in said casing and adapted to be moved longitudinally thereto, said plug having a projection extending into the interior of the casing, and means mounted on said valve stem and adapted to be engaged by said projection to manipulate said valve thereby when said plug is removed from the casing.

2. In a fountain pen, the combination of a casing, a valve seat at one end thereof, a valve having a stem extending longitudinally of the casing, an air passage in said stem, a plug mounted in said casing and adapted to be moved longitudinally thereto, said plug having a projection extending into the interior of the casing, and means mounted on said valve stem and adapted to be engaged by said projection to manipulate said valve thereby when said plug is removed from the casing.

3. In a fountain pen, the combination of a casing, a valve seat in said casing, a valve having a longitudinal stem extending into said casing and mounted non-rotatably with respect to said valve seat, an air passage in

said stem, a cross piece attached to said stem, and means slidably mounted with respect to said casing adapted to engage said cross piece and thereby close said valve.

6 4. In a fountain pen, the combination of a casing, a valve seat in said casing, a valve having a longitudinal stem and mounted non-rotatably with respect to said valve seat, and a cross piece attached to said valve stem, whereby said valve may be manipulated, 10 said cross piece being free from said casing.

5. In a fountain pen, the combination of a casing, a valve seat screwed in the forward end of said casing, a valve slidably mounted 15 with respect to said valve seat, means located in said valve seat to prevent said valve turning relative to said valve seat, a cross piece attached to said valve and means adapted to manipulate said cross piece and located in the 20 end of said casing.

6. In a fountain pen, the combination of a casing, a valve seat screwed in one end thereof, a valve and stem slidably but non-rotatably mounted with respect to said seat, an 25 air channel extending the length of said valve and stem, a cross piece also attached to said casing and having means at one end thereof to engage and rotate said cross piece.

30 7. In a fountain pen, the combination of a casing, a valve seat located at one end thereof, a valve and attached stem slidably but non-rotatably mounted with respect to said seat, an air channel through said valve stem, 35 and means to produce a partial vacuum on the inside of said casing.

8. In a fountain pen, the combination of a casing, a valve seat located at one end thereof, a valve and attached stem slidably but 40 non-rotatably mounted with respect to said seat, an air channel through said valve stem, and a tube slidably mounted in said casing and arranged to be withdrawn therefrom, thereby producing a partial vacuum in said 45 casing.

9. In a fountain pen, the combination of a casing, a valve seat mounted therein, a valve cooperating with said seat and having a

channel throughout its length, engaging means on said stem, and a tube arranged to 50 be withdrawn from said casing and engage said means at the end of its stroke.

10. In a fountain pen, the combination of a casing, a valve mounted therein, a stem on said valve, an operating plug adapted to be 55 screwed into said casing and having a thread of similar pitch adapted to engage said valve stem.

11. In a fountain pen, the combination of a casing having a valve seat screwed on one end 60 thereof, and a plug screwed in the other end thereof, a valve slidably but non-rotatably mounted in said seat, and an operating plug having the thread adapted to engage the thread in the rear end of said casing, and a 65 thread of like pitch adapted to engage said valve stem.

12. In a fountain pen, the combination of a valve stem, a cross piece mounted on said stem, an operating tube having a ridge on 70 the inside thereof, said ridge being adapted to engage said cross piece and thereby operating said valve.

13. In a fountain pen, the combination of a casing, a valve seat mounted therein, a 75 valve slidably but non-rotatably mounted in said seat, a cross piece attached to said valve, an operating tube having a ridge at the lower end thereof adapted to engage said cross piece, and a notch in said ridge also 80 adapted to engage said cross piece, whereby said valve may be turned and thereby remove said valve seat from said casing.

14. In a fountain pen, the combination of a casing, a valve seat screwed in one end 85 thereof, a valve and stem slidably but non-rotatably mounted with respect to said seat, an air channel extending the length of said valve and stem, a cross piece also attached to said stem, and a tube slidably mounted in 90 said casing and having means to engage and rotate said cross piece.

In witness whereof I have hereunto subscribed my name.

CHARLES R. KEERAN.