July 2, 1929. C. IHARA 1,719,374

FOUNTAIN PEN

Filed Jan. 30, 1926

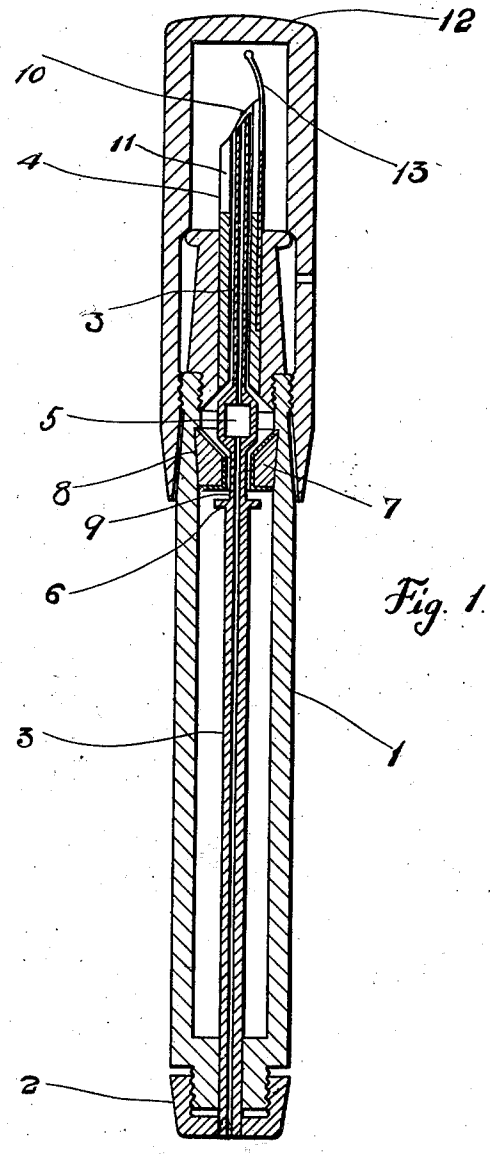


Fig. 1.

Fig. 2.

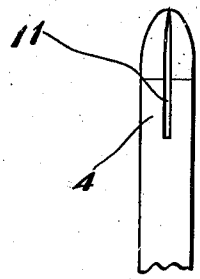
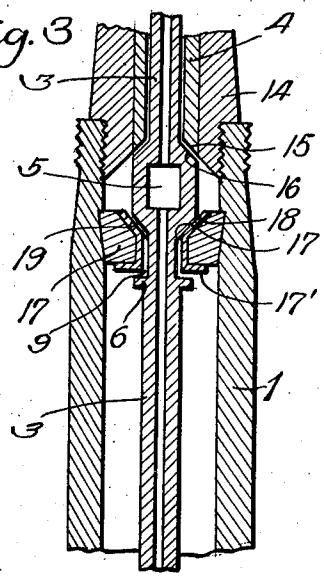


Fig. 3



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UNITED STATES PATENT OFFICE.

CHOKICHI IHARA, OF TOKYO, JAPAN.

FOUNTAIN PEN.

Application filed January 30, 1926, Serial No. 84,942, and in Japan February 9, 1925.

This invention has reference generally to improvements in that class of inventions known as stationery and more particularly relates to a fountain pen.

The object of the invention is to provide a fountain pen in which the ink contained therein is not mixed or disturbed by air so that it is not effected by the oxidizing action of the air.

Another object of the invention is to provide a fountain pen in which the ink does not leak from the pen even if the ink barrel is warmed during use or when it is in the pocket of the user while the parts are arranged so that it is unnecessary to shake the pen when beginning to use the same.

Other objects as well as the nature, characteristic features and scope of the invention will be more readily apparent from the following description taken in connection with the accompanying drawings and pointed out in the claim forming a part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Fig. 1 is a longitudinal section of the fountain pen constructed in accordance with the invention,

Fig. 2 is a partial enlarged view of the suction tube of the pen, and

Fig. 3 is an enlarged fragmentary sectional detail of the middle part of the pen.

Similar characters of reference are employed in all of the above described views to indicate corresponding parts.

Referring now, more particularly, to the accompanying drawing there is provided a hollow ink barrel 1 one end of which is reduced and threaded to receive a threaded knob 2. A capillary or adjusting tube 3 is fixed to the knob and is arranged centrally through the adjacent end and body of the barrel. The opposite end of the tube 3 is projected into a suction tube 4 which is carried in a plug 14 and removably threaded in the opposite end of the barrel. The capillary tube 3 is provided with an enlarged recess 5 adjacent the suction tube 4. A collar 6 is also formed exteriorly of the tube 3 beneath and spaced from the recess 5. Arrangement about the tube 3 and slidably frictionally engaged with the inner surface of the barrel is a plunger 7 formed of elastic material and reinforced on its inner surface by an annular metallic member 17′ which is slightly spaced on its inner surface to the tube so as to leave an ink passage 9. The inner surface of the barrel 1 is provided with a recess 8 at a point off the enlargement 5 which is the normal position of the plunger 7. The enlarging of the tube 3 on the forming of the recess 5 provides a shoulder having conical portions 16 and 17 which coact respectively with the seats 15 and 18 provided in turn on the inner end of the suction tube and plug 14 and on the annular reinforcing member 17′ carried by the plunger. The conical portion 16 coacts with the seat 15 when the resilient material of the plunger 7 is slightly deformed from its normal position by pressing action of the collar 6. It is also to be noted that the conical portion 17 is provided with a small groove 19 so as to provide a duct between the conical portion 17 and the seat 18 when they are engaged with each other. The outer end of the suction tube 4 is slit axially as at 11 while the outer end of the slit is considerably narrowed to promote capillary tube action as will hereinafter become fully apparent. A pen point 13 is arranged between the tube 4 and the plug 14 while a cap 12 is arranged about the point 13 and tube 4 and removably engaged with the barrel.

When supplying the pen with ink, the knob 2 is removed and the capillary tube 3 drawn toward the outer end of the barrel. After the seat 17 touches the adjacent face of the reinforcing member of the plunger 7, the plunger is forced to move along the inner wall of the barrel. Therefore any air enclosed in the barrel between the plunger and the outer end gradually escapes through the passage 9 and duct 19 to the space between the plunger 7 and the inner end of the suction tube 4. When this preliminary operation is completed the tube 4 is dipped into an ink well and the knob 2 is pressed inwardly causing a closure of the ink passage 9 by the collar 6. Here a partial vacuum is created inside the barrel which is promoted until the plunger 7 reaches the flared part or recess 8 of the barrel. At this instance the plunger suddenly moves into its normal position and the ink passage 9 is opened so that the ink in the well suddenly rushes into the barrel to the passage 9 to fill the vacuum thereof.

According to the invention if the barrel is slightly warmed due to the heat of the user's hand, any air or ink enclosed in the barrel is expanded, the ink will be spread out of the hole 10 of the tube 4 and when it reaches the

end thereof it seals the opening of the capillary tube and is sucked into the capillary tube by the action of this tube so that none of the ink will accidentally drop down the tube. This capillary action is promoted by the special form of the slitted end of the tube 4 so that it acts to preserve a moderate dampness of the tip of the pen with ink and eliminates the necessity of shaking the pen at the beginning of its use.

When the pen is placed in the pocket of the wearer and is slightly heated the air enclosed in the space between the cap 12 and the suction tube 4 is expanded. The excess of the expanded air will escape into the atmosphere so that no hole will be required for the corresponding part of the cap 12.

It is believed in view of the foregoing description that a further detailed description of the operation of the invention is entirely unnecessary. Likewise it is believed that the advantages of the invention will be readily apparent.

Having thus fully described the invention what is claimed as new and desired to be secured by Letters Patent is:—

A fountain pen including in combination a barrel, a closure ferrule therefor, a suction tube arranged through the ferrule and having the outer end projecting therefrom and slotted, a plunger in the barrel, and a capillary tube movably arranged through the barrel and suction tube and operably connected with the plunger, one end of the tube being in communication with ink flowing through the suction tube and the other end being opened to the atmosphere, substantially as and for the purposes set forth.

In testimony whereof I affix my signature.

CHOKICHI IHARA.