

Feb. 3, 1959

RYUJIRO UCHIDA ET AL

2,871,825

FOUNTAIN PEN

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2 Sheets-Sheet 1

Fig. 1

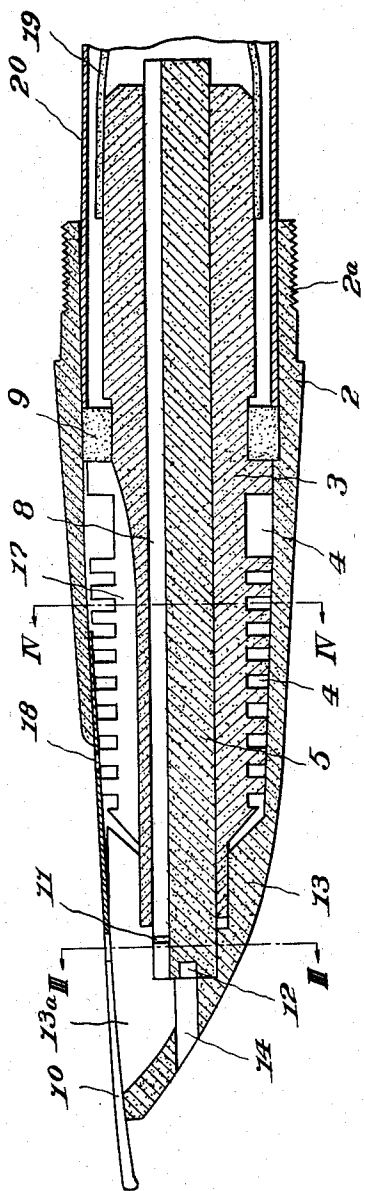


Fig. 2



Fig. 3

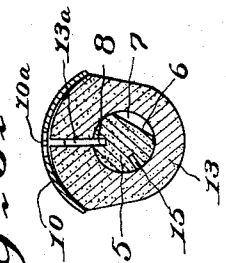
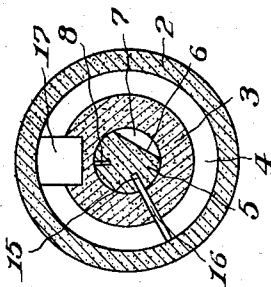


Fig. 4



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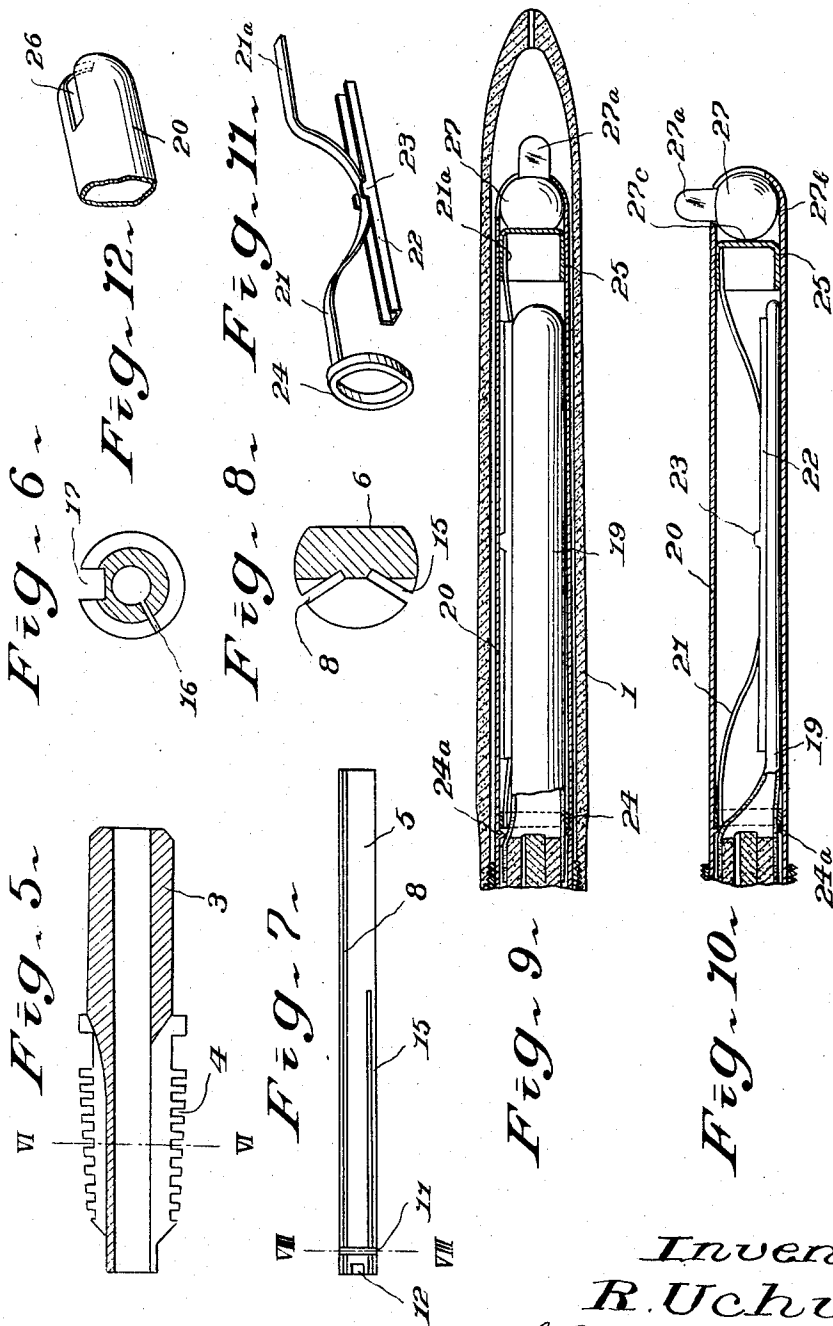
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2 Sheets-Sheet 2



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FOUNTAIN PEN

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2 Claims. (Cl. 120—46)

This invention relates to an improved fountain pen. In the fountain pens, it is desirable to prevent the pen from ink overflow and to obtain an ink sucking device of which construction and operation are simple.

Therefore, an essential object of this invention is to provide a fountain pen of which ink overflow can be effectively prevented even when the air contained in the ink sack expands remarkably.

Another object of this invention is to provide a fountain pen having an ink sucking device which is very simple in its construction and is very simple and effective in its ink sucking operation.

Said objects and other objects of this invention have been accomplished by the fountain pen which comprises another shell provided with a tip hole for the suction of ink and supporting a nib thereon, a barrel attached to said outer shell at their screw-threaded portions, a tubular ink collector supported in said outer shell, a feed bar fitted in said collector, and an ink sucking device; said nib being provided with an air hole at its center portion; said ink collector being provided with ink receiving capillary cells therearound, a longitudinal narrow slit communicated with said capillary cells, and an air channel formed at the position just under the above-mentioned air hole of the nib; said feed bar being provided with a longitudinal cut portion forming a longitudinal ink sucking channel together with the inner surface of the ink collector, a longitudinal ink discharging slit, and another longitudinal slit which is communicated with said ink discharging slit through a communicating slit formed near the front end of the feed bar, said ink sucking channel being made to communicate with the above-mentioned tip hole through a cut slot which is formed at the front end of the feed bar.

The novel features which are believed to be characteristics of the present invention are set forth with particularity in the appended claims, but the present invention itself both as to its construction and operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is an enlarged view of longitudinal section of the outer shell of an example of this invention.

Fig. 2 is a plan view of the nib in Fig. 1.

Fig. 3 is a transverse section taken on line III—III in Fig. 1.

Fig. 4 is a transverse section taken on line IV—IV in Fig. 1.

Fig. 5 is a view of longitudinal section of the tubular ink collector in Fig. 1.

Fig. 6 is a transverse section taken on line VI—VI in Fig. 5.

Fig. 7 is a side view of the feed bar corresponded to the ink collector in Fig. 5.

Fig. 8 is an enlarged transverse section taken on line VIII—VIII in Fig. 7.

Fig. 9 is a longitudinal section of the barrel of the example in Fig. 1.

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Fig. 10 is a longitudinal section of only the ink sack and intermediate pipe including said sack therein, said sack and pipe being same with those in Fig. 9 and being in their states just prior to ink sucking.

Fig. 11 is a perspective view of a resilient strip in the example in Figs. 9 and 10, said strip being used for pushing the ink sack.

Fig. 12 is a perspective view of an end portion of the intermediate pipe of the example in Figs. 9 and 10.

Referring to the fountain pen in the drawings, the outer shell 2 supporting a nib 10 thereon is detachably attached to the barrel 1 at its screw-threaded portion 2a, said nib providing with an air hole 18 at its center portion and with a slit 10a. In the outer shell 2 is supported a tubular ink collector 3 and in this collector is fitted a feed bar 5. The ink collector 3 is provided with ink receiving capillary cells 4 therearound, a longitudinal narrow slit 16 which is made along said cells 4 so as to be communicated with said cells 4, and a longitudinal air channel 17 which is formed at the position just under the air hole 18 of the nib 10, said slit 16 being communicated with the cells 4 as shown clearly in Fig. 4.

The feed bar 5 is provided with an end cut slot 12, a longitudinal cut surface 6 which forms a longitudinal channel 7 together with the inner surface of the ink collector 3, a longitudinal ink discharging slit 8, and a longitudinal slit 15 for the prevention of the nib from ink overflow, said slit 15 being communicated with said slit 8 through a communicating slot 11 such as shown clearly in Figs. 7 and 8 and being positioned so as to be communicated with the longitudinal slit 16 of the ink collector 3. The outer shell 2 is provided with a tip hole 14 and a slit 13a at its head portion 13 and with a packing 9 at its internal rear portion.

According to the construction in Figs. 1—8, when the nib 10 is immersed into the ink and the ink is sucked by the sucking device such as described in the latter, the ink will be sucked into the sack 19 through the tip hole 14, end cut slot 12, and longitudinal channel 7 of the feed bar 5.

When the pen is used, the ink flows out through the ink discharging slit 8, the slit 13a of the shell 2 and the nib slit 10a. In this case, the air for filling ink space enters into the sack 19 through the tip hole 14, cut slot 12, and channel 7.

However, when the air in the sack 19 expands remarkably, the overflowing ink enters into the slit 15 through the slit 8 and slit 11 and then into the ink receiving capillary cells 4 through the slit 16 communicated with said slit 15, whereby ink overflow through the nib 10 will be effectively prevented. In this case, the air contained in the capillary cells 4 can be pushed out through the air channel 17 and air hole 18 of the nib 10, so that the above-mentioned ink accumulation can be rapidly established.

In the writing, discharging of the ink in the capillary cells 4 is easier than that of the ink in the discharging ink slit 8 and air exchange in said cells is relatively easy, so that the ink in said cells will be rapidly used out.

When the channel 7 of the feed bar 5 is directly communicated with the tip hole 14, ink is liable to be scattered out due to any vibration of the fountain pen. According to this invention, however, the channel 7 is communicated with the tip hole 14 through the cut slot 12 which is perpendicular to both of said portions 7 and 14, so that the above-mentioned disadvantage due to vibration will be effectively reduced.

In the following, an improved ink sucking device will be described in connection with Figs. 9—12.

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Referring to Figs. 9-12, in the barrel 1, an intermediate pipe 20 and an ink sack 19 are concentrically supported, respectively, at their front opening portions by the rear portion of the shell 2 and rear stem of the ink collector 3. A resilient strip 21 provided with any suitable stopper, for instance, a ring-shaped stopper 24 at its one end and with a pad piece 22 attached therewith at its center portion 23 is constructed so that it may extend normally, but it may be bent as shown in Fig. 11 by longitudinal pushing thereof.

Between the pipe 20 and the ink sack 19 is inserted the resilient strip 21 and pad piece 22 so that the stopper 24 may be stopped by the projections 24a of the pipe 20 and the free end 21a of the strip 21 may be attached to a push-cap 25 which in turn is slidably put in the rear interior of the pipe 20, as shown in Fig. 9. The pipe 20 is provided with a cut slot 26 at its rear end as shown in Fig. 12 and between the push-cap 25 and the inner end surface of the pipe 20 is put a pusher 27 made of a ball or circular disc provided with a projection 27a and a flat portion 27b, said projection 27a protruding out of said cut slot 26.

When, as shown in Fig. 9, the pusher 27 takes the position in which the flat portion 27b engages with the push-cap 25; the resilient strip 21 takes almost straight state, so that the ink sack 19 is maintained in its expanded state due to its elastic force.

However, when as shown in Fig. 10, the barrel 1 is taken out from the outer shell 2 and the pusher 27 is turned sideways by pushing the projection 27a along the cut slot 26, the portion 27c of the pusher; said portion having larger radius than the portion 27b, pushes the push-cap 25, so that the resilient strip 21 bends as shown in Figs. 10 and 11, whereby the ink sack 19 is pushed down in its flat state by said strip through the pad-piece 22. When in said state, the nib is immersed into ink and the pusher 27 is restored in the state as shown in Fig. 9, the ink sack 19 expands as shown in Fig. 9, so that ink is effectively sucked into the sack 19. After said sucking, the barrel 1 is screwed on the shell 2 at their screw-threaded portion 2a so as to use the fountain pen.

According to the construction in Figs. 9-12, ink sucking can be easily carried out by mere turning of the pusher, so that the construction for the ink sucking is very simple and operation thereof is very easy and smooth, because sack pushing and releasing can be caused by mere turning of the pusher.

While it has been described and shown particular embodiments of this invention, it will, of course, be understood that it would not be limited thereto, since many modifications may be made and this invention, therefore, contemplated by the appended claims to cover all such modifications as fall within the true spirit and scope of this invention.

We claim:

1. A fountain pen comprising an outer shell, a barrel, means attaching the shell and barrel together, an ink reservoir in the barrel, a nib mounted on the outer shell, a tubular ink collector supported in the outer shell, a feed bar fitted in the ink collector, and an ink sucking means, the said nib being provided with an air hole at its center portion mounted on the top portion of the outer shell and supported at its back portion by the upper end portion of the outer shell, the outer shell having at its free end a tip hole for sucking ink into the reservoir as well as for sucking the substitute air to be supplied into the ink reservoir during writing, the ink collector being provided with ink receiving capillary cells therearound and a longitudinal narrow slit communicating with the capillary cells together with an air channel formed at the position immediately under the air hole

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of the nib, the feed bar having a longitudinally cut portion defining a longitudinal ink sucking channel together with the inner surface of the ink collector, said feed bar having a longitudinally extending ink discharging slit and another longitudinally extending slit communicating with said ink discharging slit through a communicating slot formed near the front end of the feed bar and at the position under the collector, the ink communicating channel being in communication with the tip hole of the outer shell through a cut slot formed in the front end of the feed bar, the said components being combined so that the path used for sucking ink into the ink reservoir as well as for sucking the substitute air into the reservoir during writing may be defined independently of the following ink discharging path by the tip hole of the outer shell, cut slot formed at the front end of the feed bar, air sucking channel of the feed bar and the ink reservoir, and an ink discharging path may be defined by the ink reservoir, longitudinal slit of the feed bar, the slit at the upper end portion of the outer shell and communicating with the said slit of the feed bar and the nib.

2. A fountain pen comprising an outer shell, a barrel, means attaching the shell and barrel together, an ink reservoir in the barrel, a nib mounted on the outer shell, a tubular ink collector supported in the outer shell, a feed bar fitted in the ink collector, and an ink sucking means, the said nib being provided with an air hole at its center portion mounted on the top portion of the outer shell and supported at its back portion by the upper end portion of the outer shell, the outer shell having at its free end a tip hole for sucking ink into the reservoir as well as for sucking the substitute air to be supplied into the ink reservoir during writing, the ink collector being provided with ink receiving capillary cells therearound and a longitudinal narrow slit communicating with the capillary cells together with an air channel formed at the position immediately under the air hole of the nib, the feed bar having a longitudinally cut portion defining a longitudinal ink sucking channel together with the inner surface of the ink collector, said feed bar having a longitudinal ink discharging slit and another longitudinal slit communicating with said ink discharging slit through a communicating slot formed near the front end of the feed bar and at the position under the collector, the ink sucking channel being in communication with the tip hole of the outer shell through a cut slot formed in the front end of the feed bar, the said components being combined so that the path used for sucking ink into the ink reservoir as well as for sucking the substitute air into the reservoir during writing may be defined independently of the following ink discharging path by the tip hole of the outer shell, cut slot formed at the front end of the feed bar, air sucking channel of the feed bar and the ink reservoir, and an ink discharging path may be defined by the ink reservoir, longitudinal slit of the feed bar, the slit at the upper end portion of the outer shell and communicating with the said slit of the feed bar and the nib, the ink sucking means including an intermediate pipe elongated in the barrel and having a spherical rear end provided with a cut slot, an ink sack concentrically arranged in the pipe, the pipe and sack being supported in an airtight manner at their front opening portions on the rear parts of the outer shell and ink collector, a push cap slidably positioned in the rear interior of the pipe, a resilient strip normally extending in a straight line, a stopper at the front end of the strip, a pad element attached at the center portion of the strip, the strip and pad element being inserted between the pipe and ink sack so that the stopper may be arrested at the projections formed at the inner surface of the pipe and the free end of the strip being at-

tached to the push cap, a spherical pusher positioned between the push cap and the spherical rear end of the pipe, and a projection on the pusher having a flat portion protruding out through the cut slot of the pipe capable of being turned along the cut slot so as to bend the resilient strip whereby the ink sack is caused to assume its flat state by the strip through the pad element thereof.

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