

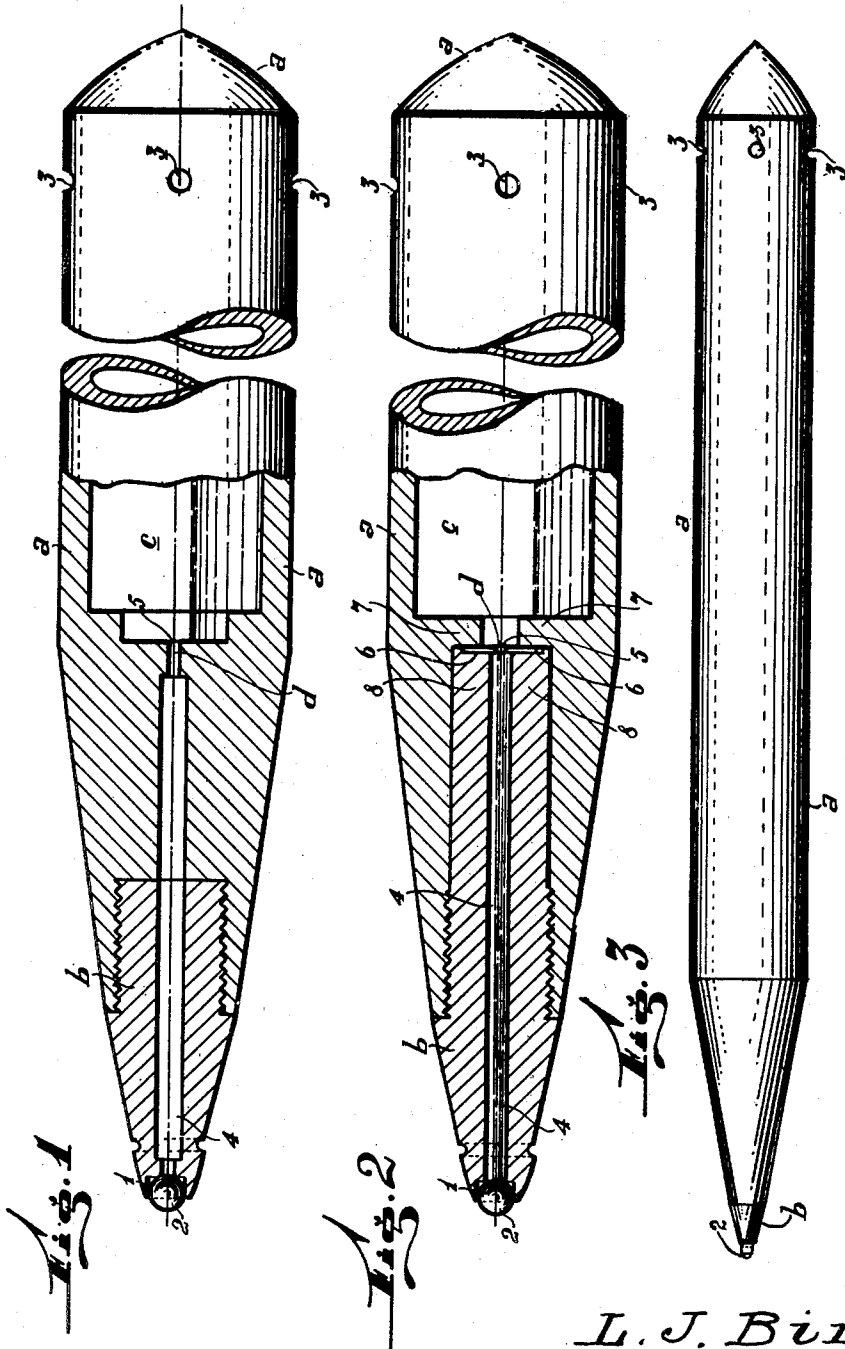
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WRITING INSTRUMENT

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WRITING INSTRUMENT

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This invention relates to improvements in writing instruments of the fountain-pen type, and particularly to a writing instrument of this character which will ensure the regular and constant ink-feed, without the necessity of auxiliary elements or mechanical complications.

Many experiments have been carried out with different types of fountain-pens and writing instruments, and while satisfactory results have been obtained with the system comprising a rotatable ball as the writing element, certain difficulties have been encountered in the production of this ball terminal, which requires feed conduits of a capillary nature, with the consequent increase in the cost of manufacture. On the other hand, while such capillary conduit is necessary in order to hold a portion of ink in a column next to the ball constituting the active writing element, such capillary conduit is often occluded, specially when certain classes of ink are used, due to coagulation or other causes, with the consequent interruption in the feed.

The ideal method would be to keep such ink column next to the active ball, with means which would render the instrument easy to manufacture and reliable, and this is precisely what is attained by means of the present invention.

The invention comprises a feed conduit which may proportionately be regarded as having a sufficiently large section to allow an abundant feed, but having the particular feature that in a portion adjacent to the connection with the ink reservoir the conduit is reduced to such an extent that it assumes a capillary nature. Thus, the ink passing to said conduit is retained sufficiently to provide said ball with an adjacent amount of ink, sufficient to assure certain operation, regardless of the position in which the instrument is placed.

The invention may be carried out in different manners. In fact, the passage of smaller section may be obtained by means of an orifice of such length as to be properly termed a channel, and also through a simple perforation in a relatively thin diaphragm; also, several orifices may be used instead of one, provided they constitute a minimum passage which will avoid the retrogradation of the ink from the feed conduit to the ink reservoir.

An object of the present invention is to provide means which will enable the use of pasty ink fed by gravity in ball-tip writing instruments.

A further object of the invention is to provide economical structures for instruments of

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this nature which will be both effective and reliable.

Other objects and advantages of the present invention will become apparent from the course of the following description, when read in conjunction with the accompanying drawing, illustrating the invention by way of example and in a preferred embodiment.

In the drawing:

Fig. 1 is a longitudinal sectional view of the writing instrument, showing the feed conduit, the communicating passage of which receives the ink from the reservoir, through a capillary channel of smaller section.

Fig. 2 is a somewhat modified embodiment, wherein the passage connecting the reservoir with the feed conduit comprises an orifice provided in a diaphragm; and

Fig. 3 is a general view of the complete instrument.

The same reference characters have been used to indicate like or corresponding parts or elements throughout the drawing.

As may be seen from the drawing, *a* indicates the tubular body forming the instrument handle, which is formed with the tip *b* terminating in a seat *1* serving to set the rotatable ball *2* constituting the active writing element.

Said body *a* is provided therein with a reservoir *c* for the purpose of containing the charge of ink, and inasmuch as the present instrument is intended to act as a fountain pen wherein the ink is fed to the writing ball *2* by gravity, said reservoir communicates with the atmosphere by means of air intakes *3*.

A feed conduit *4* receives ink from said reservoir *c* and communicates with the concave of the setting *1*, thus reaching the surface of the ball *2*, so that the ink, which should be dense and very adhesive, may enable the ball to mark the corresponding strokes upon being rolled over a writing surface.

The section of said conduit *4* is sufficiently large to form a column of ink of a predetermined capacity, but inasmuch as the direct derivation from the reservoir *c* would involve a simple extension of the latter, the semi-liquid ink would flow from one part to another by gravity, according to the position given to the instrument, thereby making it impossible to maintain the necessary amount of ink against the ball, when the latter is located at a higher level relative to the remainder of the fountain pen.

According to the present invention, the above drawback is overcome by means of a passage of

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smaller section *d* located between the reservoir and the conduit 4. Said passage of smaller section comprises one or more orifices 5 of capillary section.

In the embodiment of Fig. 1, the orifice 5 forming the passage of smaller section *d* extends in a channel-like manner and is coaxial relative to the reservoir *c* and feed conduit 4.

In the embodiment of Fig. 2, the orifice 5 of the portion of smaller section *d* is formed as a simple perforation in a diaphragm 6, which is removable and held pressed in place with the aid of the internal portion 7 of the body *a*, relative to the seat on the end of the extension 8 of the tip *b*.

In this manner, the passage of ink from the reservoir *c* to the conduit 4 takes place through the orifice or orifices 5, and since the latter are of a capillary section, the portion of dense ink passing to the cavity of conduit 4 will be held therein, as the lack of an air intake at the ball renders practically impossible the return thereof to the reservoir *c*. Thus, the ink reaching said conduit will remain there as an immediate permanent charge for feeding the rotatable ball 2.

This allows the handling of the above-described instrument at will, that is to say, that even in the event of placing the ball terminal upwards, there will still be an immediate charge of ink sufficient to begin writing immediately.

In short, the structure of the present invention consists of a capillary portion of smaller section located in the passage connecting the reservoir *c* with the feed conduit 4, so that once the ink has passed from the reservoir *c* to said conduit 4, it will remain stationary due to the lack of an air intake at the ball necessary for its return to said reservoir, thus providing an immediate charge for the corresponding feed of said writing ball.

It is evident that several modifications in the details of construction may be made by those skilled in the art, without departing from the scope of the invention as clearly set forth in the appended claims.

I claim:

1. In a fountain pen comprising a body portion, an ink reservoir therein formed with an air vent, a channel connecting at one end with said reservoir by means of a reduced section of such small cross-section that ink in said channel is prevented by capillary action from returning to the reservoir by gravity, a ball comprising a writ-

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ing element, and a seat within which said ball is mounted for free rotation, said seat communicating with said channel.

2. In a fountain pen comprising a body portion, an ink reservoir therein formed with an air vent, a channel connecting at one end with said reservoir by means of a reduced section of such small cross-section that ink in said channel is prevented by capillary action from returning to the reservoir by gravity, a ball comprising a writing element, and a seat within which said ball is mounted for free rotation, said seat communicating with said channel, said reduced section of the channel being formed by means of a perforated diaphragm.

3. In a fountain pen comprising a tip section and a body section, an ink reservoir in the body section formed with an air vent, a channel connecting at one end with said reservoir by means of a reduced section of such small cross-section that ink in said channel is prevented by capillary action from returning to the reservoir by gravity, a ball comprising a writing element, and a seat formed in said tip section within which said ball is mounted for free rotation, said seat communicating with said channel, said reduced section of the channel being formed by means of a perforated diaphragm held between said tip section and said body section.

4. A fountain pen comprising a body portion, a ball writing element, a seat at one end of said body portion for rotatably supporting said ball writing element, an ink reservoir within said body portion, an ink feed channel for interconnecting said ink reservoir and said seat, and a channel of capillary section interposed between said first channel and said reservoir for preventing ink in said first channel from returning to said reservoir by gravity.

5. A fountain pen comprising a body portion, a ball writing element, a seat at one end of said body portion for rotatably supporting said ball writing element, an ink reservoir within said body portion, an ink feed channel for interconnecting said ink reservoir and said seat, said body portion having a vent whereby the ink is always subjected to atmospheric pressure, and a channel of capillary section interposed between said first channel and said reservoir for preventing ink in said first channel from returning to said reservoir by gravity.

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