AMENDED SPECIFICATION

Reprinted as amended under Section 8 of the Patents and Designs Acts, 1907 to 1946.

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PATENT SPECIFICATION 573,747

Application Date: Feb. 22, 1944. No. 3274/44.

Complete Specification Accepted: Dec. 4, 1945.

COMPLETE SPECIFICATION

Writing Instrument

I, LASZLO JOZSEF BIRO, a Hungarian subject, resident of Oro Street, No. 3040, Buenos Aires, Argentine Republic, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

This invention relates to writing instruments of the type in which a ball is mounted for rotation in a housing with part of the ball exposed and is supplied with ink from a suitable reservoir, the arrangement being such that as the ball is rotated such as by being moved relatively to and in contact with a writing surface the ball carries a quantity of ink through the housing, which ink is deposited on said surface and a trace is made.

An object of the present invention is to improve the construction of instruments of the aforesaid type. According to this invention an instrument of the said type is provided in which the ink reservoir for the ball is constituted by a capillary tube. The said tube is preferably open at one end to atmosphere and at the other end communicates with the rotatably mounted ball. It is preferably in the form of a series of limbs, each substantially parallel to the longitudinal axis of the instrument so that a comparatively long length of continuous tube can be accommodated in a comparatively small compass such as the usual type of fountain pen casing. The end of the tube remote from that end which is open to atmosphere conveniently communicates with the ball by way of a duct which is of the same diameter or cross sectional area as the internal diameter or cross sectional area of the tube or is smaller. The term tube as used herein where the context so permits includes a tube like duct formed in a body.

In order that the nature of the invention may be more readily understood reference will now be made to the accompanying drawings in which :—

Figure 1 is a cross sectional view illustrating by way of example one embodiment of the present invention.

Figure 2 is a diagrammatic representation of the embodiment illustrated in Fig. 1.

Figure 3 is a cross sectional view illustrating another embodiment.

Figure 4 is a cross section on line N.N. Fig. 3.

Figure 5 is a cross section on line S.S. Fig. 3.

Figure 6 is a diagrammatic representation of the embodiment illustrated in Figs. 3, 4 and 5.

Figure 7 is a perspective view of yet another embodiment and

Figure 8 is a cross section view on Fig. 7.

The same numbers and letters of reference have been used to indicate like or corresponding parts in all the several views.

As will be seen by referring to the drawings, *a* is the body part of the pen or holder, terminating in a point 1, whereat by means of a suitable housing 2, the small sphere or ball 3 which forms the writing element is rotatably mounted with part of the ball exposed ; said ball is in contact with the ink supplied by the feed channel 4 which, in turn, receives its supply from the reservoir *b*.

The reservoir *b* is formed by a duct, forming an extension of the feed channel 4, constituted by a plurality of lengths or duct sections 5, preferably arranged in parallel relationship to the longitudinal axis of the body of the holder *a* ; the reservoir thus forms a series or group of duct sections occupying the greater part of the body *a* ; said sections 5 are connected together and communicate in series, one in continuation of the other, so as to form, as a whole, one single channel, commencing at the inlet or air intake 6 and ending at the feed duct 4 of the ball 3.

This invention is adapted for construction in many ways, among which are to be particularly noted the embodiments shown in the several Figures of the accompanying drawings.

In the embodiment according to Fig. 1, the reservoir *b* is formed by a capillary duct or tube which, being connected to the

feed channel 4, extends parallel to the holder *a*, and as the tube is folded several times by a bend through 180°, the same will form a group of several sections 5 of reduced length with the bends 5^1 establishing communication between the several sections, so that all of the sections are connected in series. The ink reservoir *b* is removably housed within the holder *a*, which in this case is hollow.

The duct which forms the reservoir *b* is filled with a viscous or semi-fluid ink, thus establishing a fluid vein extending when the reservoir is full from a point near the inlet or air intake 6 to the ball 3, which is in contact with the ink; consequently when the ball is rotated such as by being rolled over a suitable surface, the ball will make a trace with the ink supplied from the said liquid vein.

In the embodiment of Figs. 3, 4, 5 and 6 the reservoir *b* is also formed by lengths or sections 5, but in this case, said sections are constituted by ducts formed in the body of the holder *a*.

Said ducts extend longitudinally in a parallel arrangement, and are closed at both ends, such as by means of the head piece *c*, constituting the point 1, and the head piece *d*. The head piece *c* is threaded at 7 into the body *a*, while the part *d* is threaded at 8 into said body *a*, as may be seen by referring to Fig. 3.

As shown, the channel sections 5 are enabled to communicate with each other, by means of passages 5^1, so that all the sections together form a continuous single linear duct.

One of the duct sections, indicated at $5''$, ends with an air intake 6, preferably directed towards the point 1, but at a certain distance short of the same.

In the embodiment illustrated in Figs. 3, 4, 5 and 6, when the instrument is filled with ink, a liquid vein is establised which extends without interruption up to the ball 3.

With reference to the embodiment shown in Figs. 7 and 8, it will be seen that the reservoir *b* is constituted by a striated body *e*, arranged to fit snugly within the cavity a^1 of the body *a*, which in this case is of tubular shape.

Said striated body *e* is formed with longitudinal grooves which together with the wall of the cavity a^1 constitutes the duct sections 5.

After inserting the striated body *e* within the body *a*, the parts *c* and *d* are fitted by screwing at 7 and 8, in a manner similar to that shown in Fig. 3; in this embodiment also, the duct sections 5 communicate one with another in series, so as to constitute a continuous linear duct forming the reservoir *b*. The body *c* is provided with an axial bore forming part of said duct which communicates with the feed duct 4 closed by the ball 3.

In all the embodiments the duct is charged with a viscous ink so that a continuous liquid vein is formed communicating with the ball 3.

It will be evident that in carrying the invention into practice, modifications may be introduced with regard to certain details of construction and shape of the instrument, without departing from the basic principles of the invention, as set forth in the claims hereto annexed.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An instrument of the said type in which the ink reservoir for the ball is constituted by a capillary tube.

2. An instrument according to Claim 1 in which the tube is open to atmosphere at one end and the other end communicates with the ball.

3. An instrument according to Claim 2 in which the tube communicates with the ball by way of a duct of the same or smaller cross sectional area or diameter than the tube.

4. An instrument according to any of the foregoing claims in which the tube is formed into limbs, substantially parallel to the longitudinal axis of the instrument.

5. An instrument according to Claim 4 in which the open end of the tube is directed towards but does not extend to the ball.

6. An instrument according to any of the foregoing claims in which the ink reservoir is adapted to be removably received within a casing.

7. An instrument according to any of the Claims 1 to 6 in which the tube is constituted by a duct formed in a body.

8. An instrument according to Claim 7 in which a series of parallel ducts is formed in a body positioned within an outer casing, said ducts being each connected by a passage, an end closure being provided (removably or otherwise) at each end of said body, one end of one duct being open to atmosphere and the arrangement and disposition of the parts being such that there is formed a single linear duct extending from the opening to atmosphere to the ball.

9. An instrument according to any of the foregoing claims when charged with a viscous or semi-fluid ink.

10. An instrument constructed and arranged substantially as described herein with reference to the accompanying drawings.

feed channel 4, extends parallel to the holder *a*, and as the tube is folded several times by a bend through 180°, the same will form a group of several sections 5 of reduced length with the bends 5^1 establishing communication between the several sections, so that all of the sections are connected in series. The ink reservoir *b* is removably housed within the holder *a*, which in this case is hollow.

The duct which forms the reservoir *b* is filled with a viscous or semi-fluid ink, thus establishing a fluid vein extending when the reservoir is full from a point near the inlet or air intake 6 to the ball 3, which is in contact with the ink; consequently when the ball is rotated such as by being rolled over a suitable surface, the ball will make a trace with the ink supplied from the said liquid vein.

In the embodiment of Figs. 3, 4, 5 and 6 the reservoir *b* is also formed by lengths or sections 5, but in this case, said sections are constituted by ducts formed in the body of the holder *a*.

Said ducts extend longitudinally in a parallel arrangement, and are closed at both ends, such as by means of the head piece *c*, constituting the point 1, and the head piece *d*. The head piece *c* is threaded at 7 into the body *a*, while the part *d* is threaded at 8 into said body *a*, as may be seen by referring to Fig. 3.

As shown, the channel sections 5 are enabled to communicate with each other, by means of passages 5^1, so that all the sections together form a continuous single linear duct.

One of the duct sections, indicated at 5^{11}, ends with an air intake 6, preferably directed towards the point 1, but at a certain distance short of the same.

In the embodiment illustrated in Figs. 3, 4, 5 and 6, when the instrument is filled with ink, a liquid vein is establised which extends without interruption up to the ball 3.

With reference to the embodiment shown in Figs. 7 and 8, it will be seen that the reservoir *b* is constituted by a striated body *e*, arranged to fit snugly within the cavity a^1 of the body *a*, which in this case is of tubular shape.

Said striated body *e* is formed with longitudinal grooves which together with the wall of the cavity a^1 constitutes the duct sections 5.

After inserting the striated body *e* within the body *a*, the parts *c* and *d* are fitted by screwing at 7 and 8, in a manner similar to that shown in Fig. 3; in this embodiment also, the duct sections 5 communicate one with another in series, so as to constitute a continuous linear duct forming the reservoir *b*. The body *c* is provided with an axial bore forming part of said duct which communicates with the feed duct 4 closed by the ball 3.

In all the embodiments the duct is charged with a viscous ink so that a continuous liquid vein is formed communicating with the ball 3.

It will be evident that in carrying the invention into practice, modifications may be introduced with regard to certain details of construction and shape of the instrument, without departing from the basic principles of the invention, as set forth in the claims hereto annexed.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An instrument of the said type in which the ink reservoir for the ball is constituted by a capillary tube.

2. An instrument according to Claim 1 in which the tube is open to atmosphere at one end and the other end communicates with the ball.

3. An instrument according to Claim 2 in which the tube communicates with the ball by way of a duct of the same or smaller cross sectional area or diameter than the tube.

4. An instrument according to any of the foregoing claims in which the tube is formed into limbs, substantially parallel to the longitudinal axis of the instrument.

5. An instrument according to Claim 4 in which the open end of the tube is directed towards but does not extend to the ball.

6. An instrument according to any of the foregoing claims in which the ink reservoir is adapted to be removably received within a casing.

7. An instrument according to any of the Claims 1 to 6 in which the tube is constituted by a duct formed in a body.

8. An instrument according to Claim 7 in which a series of parallel ducts is formed in a body positioned within an outer casing, said ducts being each connected by a passage, an end closure being provided (removably or otherwise) at each end of said body, one end of one duct being open to atmosphere and the arrangement and disposition of the parts being such that there is formed a single linear duct extending from the opening to atmosphere to the ball.

9. An instrument according to any of the foregoing claims when charged with a viscous or semi-fluid ink.

10. An instrument constructed and arranged substantially as described herein with reference to the accompanying drawings.



Dated this 21st day of February, 1944.
ERIC POTTER & CLARKSON,
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Eighteen Park Row, Nottingham,

Reference has been directed, in pursuance of Section 8, Sub-Section (2) of the Patents and Designs Acts 1907 to 1946, to Specification No. 571,698.

Leamington Spa: Printed for His Majesty's Stationery Office. by the Courier Press.—1947.
Published at The Patent Office, 25, Southampton Buildings. London, W.C.2, from which copies, price 1s. 0d. each (inland) 1s. 1d. (abroad) may be obtained.

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