

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## Improvements in or relating to fountain pens.

### COMPLETE SPECIFICATION

We, PAIROTTO MAN-NEN-HITSU KABUSHIKI KAISHA, a Joint Stock Company of Japan, of No. 7—3, 2-Chome, Kyobahi, Chuo-Ku, Tokyo-To, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to fountain pens, and more particularly it relates to a built-in device forming part of a self-filling fountain pen, by means of which the fountain pen can be filled with ink.

15 It is an object of the present invention to provide a new and improved self-filling device for fountain pens, which has a construction which is simple, of low cost, durable, readily adaptable to quantity  
20 production, and of such configuration as to facilitate smooth collapse and restoration of the ink reservoir.

A device forming part of a self-filling fountain pen according to the present invention comprises a tweezer member having a spring loop connecting two limbs for compressing therebetween an elongated ink reservoir of flexible, resilient material, and a spacer stud within the spring loop.

25 The details of the invention will be made more clearly apparent by reference to the following description of one representative embodiment of the invention when taken in connection with the accompanying drawing, in which the same parts are designated in each figure by the same numerical references, and in which:

30 Fig. 1 is a longitudinal section of the embodiment of the invention in its assembled state within a pen barrel:

35 Fig. 2 is a side elevational view of the tweezer member of the embodiment, in the condition of Fig. 1;

40 Fig. 3 is a plan view corresponding projectionally to Fig. 2;

(Price 4s. 6d.)

Fig. 4 is a sectional view taken along the plane A—A of Fig. 2; and

Fig. 5 is an elevational view of a spacer to be used in the embodiment of Figs. 1—4.

Referring to the figures, the embodiment comprises in the assembled state a tweezer member 4 comprising a spring loop 1, joined to two limbs 3 at a junction 2, and a spacer stud 5, of which the cylindrical part 6 is fitted into the said spring loop 1. A tube 8 retains the free ends 3a of the limbs 3. A flexible, elastic ink reservoir 7 is arranged between the inner surfaces of the limbs 3 so that the two opposite sides of the cylindrical, mid-body part of the ink reservoir 7 are in intimate contact with the limbs 3. All the components described above are contained within a barrel 12, which is threadedly connected to a forward holder 9 and a tube 11 attached to the nib of the fountain pen.

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The tweezer member 4 is made in one piece of a material, such as for instance, metal, having sufficient and suitable springiness for satisfactory operation. In the embodiment illustrated, the tweezer member, in its free state when removed from the pen barrel 12 and the tube 8, has its limbs 3 spread apart at an appreciable angle, but in its assembled state the limbs 3 are substantially parallel, their ends 3a being fitted into and held by the tube 8. The cross section of the limbs 3 taken along a plane such as A—A in Fig. 2 consists of two, opposed, arcuate shapes as shown in Fig. 4, the inner radius of each being such that the parts 3 squeeze the ink reservoir 7 in a uniform manner.

As an alternative method of fixing the ends 3a to the forward holder 9, the threaded end 10 of the forward holder 9 may be suitably extended, and the ends 3a of the limbs 3 fitted thereinto.

The ink reservoir 7, which may be of the conventional, elongated bladder type, is made of some suitable material, such as

rubber, having sufficient resiliency to enable it to recover, upon release of external force thereupon, its full-volume capacity against the slight negative internal pressure due to the small hydrostatic head of the ink during the filling operation. The open end of the ink reservoir 7 is fitted in a conventional manner to the rear end of the tube 11 so that the interior of said reservoir communicates with a passage (not shown) leading to the pen nib.

In the operation of the device of the invention, that is, filling the fountain pen with ink, the barrel 12 is removed; the limbs 3 are held and squeezed by finger pressure to deflate the ink reservoir 7 against the resiliency of the spring loop 1 of the tweezer member and the ink reservoir 7; then, as the ink reservoir 7 is maintained in this condition, the pen nib portion (not shown) of the fountain pen is dipped into an ink storage container, and the limbs 3 are then released. Thereupon, the tweezer 4 and the ink reservoir 7 are caused by their respective resiliencies to recover their original configurations, whereby the ink is drawn into the interior of the ink reservoir 7 as in the case of conventional fountain pens of the bladder reservoir type.

The construction as described above has a significant advantage in that the fitting of the spacer 5 into the spring loop 1 prevents overstressing or overstraining of any portion of the tweezer member 4 due to excessive bending force. Accordingly, the life of the

tweezer member is prolonged.

Another significant advantage of the above-described construction consists in that a uniform and symmetrical squeezing action is applied to the ink reservoir 7 by the unique, pincer-like construction of the tweezer member 4. Such a uniform and symmetrical squeezing action forces the ink reservoir 7 to undergo extremely efficient and thorough deflating and inflating movements, yet it subjects the said ink reservoir 7 to minimum stress such as would hasten fatigue and shortening of its life.

#### WHAT WE CLAIM IS:—

1. A device forming part of a self-filling fountain pen, comprising a tweezer member having a spring loop connecting two limbs for compressing therebetween an elongated ink reservoir of flexible, resilient material, and a spacer stud within the spring loop.
2. A device according to claim 1, in which the tweezer member is made of one piece of resilient material.
3. A device forming part of a self-filling fountain pen, substantially as hereinbefore described with reference to the accompanying drawing.

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Fig. 1

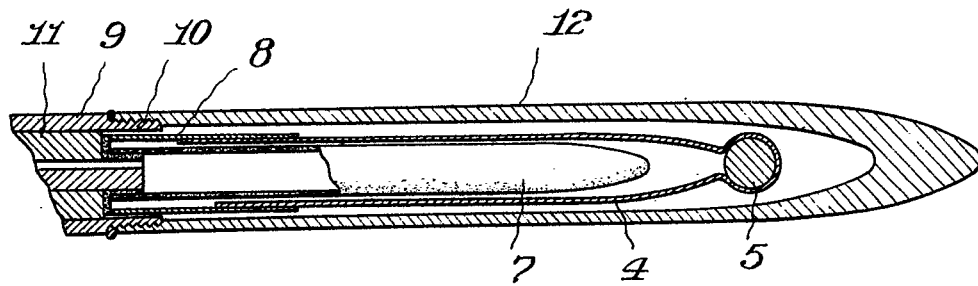


Fig. 2

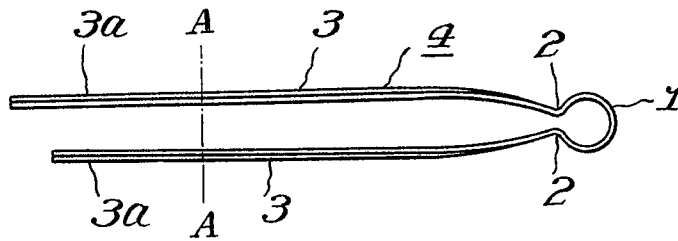


Fig. 3

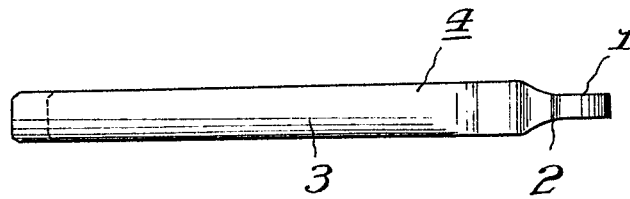


Fig. 4



Fig. 5

