975,244

PATENT SPECIFICATION

DRAWINGS ATTACHED

975,244

Date of Application and filing Complete Specification Feb. 18, 1963.
No. 6424/63.
Application made in Japan (No. 16815) on April 30, 1962.
Application made in Japan (No. 47258) on Oct. 22, 1962.
Complete Specification Published Nov. 11, 1964.

Index at acceptance: —B6 P(9E4, 11A, 11D2, 11M, W6)
International Classification: —B 43 c

COMPLETE SPECIFICATION

Fountain Pen

We, PAIROTTO MAN-NEN-HITSU KABUSHIKI KAISHA, a Japanese Corporate Body, of 7—3, 2-Chome, Kyobashi, 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:—

This invention relates to ink-storing writing instruments commonly known and hereinafter referred to as fountain pens, and more particularly it relates to an improved fountain pen of capless construction of the type in which the pen nib or pen point can be projected and retracted through an aperture in the front barrel portion and in which shutter means are provided for closing said aperture when the nib or pen point is retracted into the barrel.

The main object of the invention is to provide an improved fountain pen of this type and in particular to provide an improved construction of shutter means for opening and closing the aperture in the front barrel portion.

A further object of the invention is to provide a fountain pen of the type described in which the pen nib is projected through the aperture in the front barrel portion for use and retracted thereinto for protective housing by the mere rotative twisting of the holder barrel.

With these objects in view the fountain pen according to the invention comprises front and rear barrel portions, an aperture in the front end of the front barrel portion through which a pen nib can be projected outwardly and retracted inwardly, a shutter blade for opening and closing the said aperture adapted to be freely movable forwardly and rearwardly through a guide part, and driving means including a guide cam slot provided within the said front barrel portion for actuating the said shutter blade.

The nature and details of the invention as well as the manner in which its objects may best be achieved will be more clearly apparent from the following detailed description of a preferred embodiment and some modifications thereof, with reference to the accompanying drawings in which like parts are designated by like reference numerals, and in which:

Figure 1 is a longitudinal section of a preferred embodiment of fountain pen according to the invention,

Figure 2 is an end elevational view showing the writing end (left and as viewed in Figure 1) of the fountain pen shown in Figure 1,

Figure 3 is a cross-sectional view taken along the line III—III of Figure 1,

Figure 4 is a cross-sectional view taken along the line IV—IV of Figure 1,

Figure 5 is a longitudinal section, of the front barrel portion in which a guide cylinder is fixed;

Figure 6 is a cross-sectional view taken along the line VI—VI of Figure 5,

Figure 7 is a side elevational view showing a shutter blade,

Figure 8 is an end elevational view of the left end of the shutter blade shown in Figure 7,

Figure 9 is a side elevational view, with a portion omitted, showing a rotating cylinder,

Figure 10 is a top plan view of the rotating cylinder of Figure 9,

Figure 11 is a longitudinal sectional view of a fixed cylinder,

Figure 12 is a cross-sectional view taken along the line XII—XII of Figure 11,

Figure 13 is a side elevational view, of a movable writing unit consisting of an integral assembly of a nib, a feed stem, a sleeve, and an ink reservoir,

Figures 14 and 15 are side elevational views, partly in longitudinal section, for a

description of the operation of the fountain pen of this invention,

Figure 16 is a side elevational view, in longitudinal section, of a front barrel in which a guide cylinder provided with a cover is fixed, and which illustrates another embodiment of the invention,

Figure 17 is a cross-sectional view taken along the line XVII—XVII of Figure 16,

Figure 18 is a side elevational view, in longitudinal section, showing the principal parts of a movable writing unit in the case wherein a protruding pin is fixed to the nib,

Figure 19 is a side elevational view, in longitudinal section, showing the principal parts of a movable writing unit in the case wherein a protruding pin is fixed to a nib feed cover, and

Figure 20 is a side elevational view, in longitudinal section, showing the principal parts of a movable writing unit in the case wherein a protruding pin is fixed to one end of the ink reservoir.

Referring to these drawings, the external structure of the fountain pen according to this invention consists of a front barrel portion 1 and a rear barrel portion 16. The front barrel portion is provided at its front end with an aperture 2 and contains, at its front end, a guide cylinder 6 fitted against its inner wall and a fixed cylinder 3 which has a longitudinal guide slot 4 at its lower part and a front end part 5 which is fitted into the near end part 7 of the said guide cylinder 6. A guide groove 8 is formed at the lower part by the front barrel portion 1 and the guide cylinder 6. In this guide groove 8 is fitted, in a freely slidable manner, a flexible shuter blade 9 which has a pin 9*a* at its rear end, and which, by means of its front end 10, opens or shuts the aperture 2 of the front barrel portion 1.

A rotating cylinder 11 is fitted in a freely rotatable manner in close contact with the inner wall of the barrel 1, to the rear of the guide cylinder 6 ,and encompassing the fixed cylinder 3. This rotating cylinder 11 is provided with a front cam slot 12, a rear cam slot 13, and a short slot 14 connecting the cam slot 13. The front cam slot 12 has the function of actuating the shutter blade 9, and the rear cam slot 13 has the function of actuating a movable writing unit which comprises a nib 24, a feed stem 18, a sleeve 25, and an ink reservoir 26 and moves longitudinally along the interior of the holder barrel. The rotating cylinder 11 is fitted rotatably between the inner wall of the front barrel portion 1 and the outer surface of the fixed cylinder 3, and the rear end 15 of this rotating cylinder 11 is fitted into the inner wall of the open end 17 of the freely rotatable, rear barrel portions 16. A key 17*a*, which is fixed to the inner wall of the open end 17 of the rear barrel 16 is fitted in and engaged with the short slot 14 of the rotating cylinder 11, whereby the rotating cylinder 11 is caused by the rotation of the rear barrel portion 16 to rotate in the same direction.

The aforementioned feed stem 18 is provided on its outer periphery with several capillary cells 19 for retaining over-flowing ink tending to drip and with an ink feed slit 20 and an air slot 21 in its longitudinal direction. The nib 24, which is provided with a hole 22 and a slit 23 from its extreme tip to the said hole 22, is fitted onto the front end of the feed stem 18, which is secured at its rear end to the sleeve 25 provided with a pin 25*a*. The sleeve 25 is fitted into the open end 27 of the cylindrical ink reservoir 26 for storing ink therein. The rear end 28 of the ink reservoir 26 is constantly pressed toward the front end of the pen by a coil spring 31 retained at its rear end by a rear cap-screw 30 which is secured by threads to the rear end 29 of the rear barrel 16.

When the nib 24 is housed within the front barrel 1, as most clearly shown in Figures 1 and 14, the pin 9*a* of the shutter blade 9 is at one end 12*a* of the front cam slot 12 of the rotating cylinder 11 and, at the same time, extends into the guide slot 4 of the fixed cylinder 3. Furthermore, the front end 10 of the shutter blade 9 is in its position of closure of the aperture 2 of the front barrel portion 1, and the pin 25*a* of the sleeve 25 extends through the guide slot 4 of the fixed cylinder 3 and, at the same time, is at one end 13*a* of the rear cam slot 13 of the rotating cylinder 11.

The fountain pen according to the present invention operated in the following manner.

In order to project the nib 24 through the aperture 2 of the front barrel portion 1, the rear barrel portion 16 is manually rotated in the direction indicated by the arrow (A) in Figure 1 relative to the front barrel 1, whereupon the rotating cylinder 11 is caused by the key 17*a* fixed to the inner wall of the open end 17 of the rear barrel portion 16 to rotate integrally with this rear barrel portion 16, and since the pin 25*a* of the sleeve 25 is engaged with the rear cam slot 13 of the rotating cylinder 11, the pin 25*a* is caused by this rear cam slot 13 to move simultaneously in a straight line longitudinally along the guide slot 4 of the fixed cylinder 3 toward the aperture 2. Consequently, the movable writing unit also moves in a straight line in the same direction.

Since the pin 9*a* of the shutter blade 9 is engaged with the front cam slot 12 of the rotating cylinder 11, the pin 9*a* is caused by this front cam slot 12 to move, simultaneously with the shifting movement of the movable writing unit, along the guide slot 4 of the fixed cylinder 3 toward the interior of the pen, that is, in the direction away from the aperture 2, whereby the shutter blade 9

to which this pin 9a is fixed is caused to move rearwardly in a straight line in the longitudinal direction. When the pin 9a reaches the other end 12b of the front cam slot 12, the front end 10 of the shutter blade 9 is in the position whereby the aperture is fully open, at which time the pin 25a of the sleeve 25 reaches the other end 13b of the rear cam slot 13, and the straight-line shifting movement of the movable writing unit is stopped. Accordingly, the nib 24 is stopped in the projected exposed position through the aperture, and the fountain pen is ready for use as indicated in Figure 15.

Then, in order to retract the nib 24 into the front barrel portion 1, the rear barrel portion 16 is manually rotated in the direction opposite that indicated by arrow (A) in Figure 1 relative to the front barrel portion 1, whereupon the rotating cylinder 11 also rotates integrally therewith, and the pin 25a of the sleeve 25 is caused by the rear cam slot 13 of the rotating cylinder 11 to shift longitudinally in a straight line along the guide slot 4 of the fixed cylinder 3 toward the interior of the front barrel portion 1. Accordingly, the nib 24 is retracted through the aperture 2 into the front barrel portion 1, and, simultaneously, the pin 9a is caused by the front cam slot 12 to move longitudinally in a straight line along the guide slot 4, and when it reaches the end 12a of the slot 12, the front end 10 of the shutter blade 9 moving integrally with the pin 9a closes the aperture 2. When the front end 10 of the shutter blade 9 completes closure of the aperture 2, the pin 25a of the sleeve 25 reaches the end 13a of the rear cam slot 13, and the straight-line movement of the movable writing unit stops. Accordingly, the nib 24 also stops in a state in which it is fully housed within the front barrel portion 1.

While in the above-described embodiment, a construction wherein a guide cylinder 6 is fitted into and against the inner wall of the front barrel portion is indicated, it will be apparent to those skilled in the art that such a construction as indicated in Figure 16 is also with the scope of the present invention. That is, in the case of the arrangement shown in Figure 16, a cover 1a is further introduced and fitted in between the front barrel portion 1 and the guide cylinder 6, and the shutter blade 9 is inserted in a freely slidable manner in a guide groove 8 formed between the guide cylinder 6 and the cover 1a.

Furthermore, while in the above described embodiment the pin 25a is provided on the sleeve 25, the point at which this pin 25a is fixed need not be so limited, it being possible to use any suitable point on the movable writing unit which moves longitudinally in a straight line together with the rotation of the rotating cylinder 11. For example, the pin 25a can, of course, be fixed to such a point as the nib 24, a feed stem cover 18a, or the front end of the ink reservoir 26 as indicated respectively, in Figure 18, 19 and 20.

From the foregoing description, it is to be observed that the present invention provides a fountain pen which achieves the objects of the invention stated hereinbefore. That is, the invention provides a fountain pen which does not require a cap and, moreover, has a greatly simplified operation for preparing the fountain pen for use, and which, furthermore, has an asthetically pleasant and functional design.

Although this invention has been described with respect to a particular embodiment and some modifications thereof, it must be understood that changes and further modifications can be made therein without departing from the scope of the invention, as defined by the appended claims.

WHAT WE CLAIM IS:—

1. A fountain pen comprising front and rear barrel portions, an aperture in the front end of the front barrel portion through which a pen nib can be projected outwardly and retracted inwardly, a shutter blade for opening and closing the said aperture adapted to be freely movable forwardly and rearwardly through a guide part, and driving means including a guide cam slot provided within the said front barrel portion for actuating the said shutter blade.

2. A fountain pen comprising a holder forming the outer casing of the fountain pen and comprising a front barrel portion having an aperture at its front end, a rear barrel portion, a fixed cylinder provided with a linear slot, a guide cylinder for retaining the said fixed cylinder and fitted in the interior of said front barrel portion, a shutter blade provided at its one end with a fixed pin and slidably fitted in a guide part formed by and between the said front barrel portion and the side guide cylinder, a rotating cylinder provided in its peripheral wall with a first cam slot and a second cam slot and assembled with the said fixed cylinder, and a movable member having fixed thereto a pin which is engaged with the said linear slot of the said fixed cylinder and with the said first cam slot of the said rotating cylinder, the said pin of the said shutter blade being engaged with the said second cam slot of the said rotating cylinder and with the said linear slot of the said fixed cylinder.

3. A fountain pen according to claim 2, wherein a guide cylinder having a cover fitted thereabout is retained within the interior of the said front barrel portion and the fixed cylinder is fixed to the said guide cylinder.

4. A fountain pen according to claim 2 or 3, wherein the said movable member is a sleeve.

5. A fountain pen according to claim 2 or

3, wherein the said movable member is a pen nib.

6. A fountain pen according to claim 2 or 3, wherein the said movable member is a feed stem cover.

7. A fountain pen according to claim 2 or 3, wherein the said movable member is an ink reservoir.

8. Fountain pens constructed and adapted to operate substantially as herein described with reference to the accompanying drawings.

A. A. THORNTON & CO.,
Northumberland House,
303/306, High Holborn, London, W.C.1,
For the Applicants.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1964.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

975244 COMPLETE SPECIFICATION
3 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

Fig. 1.

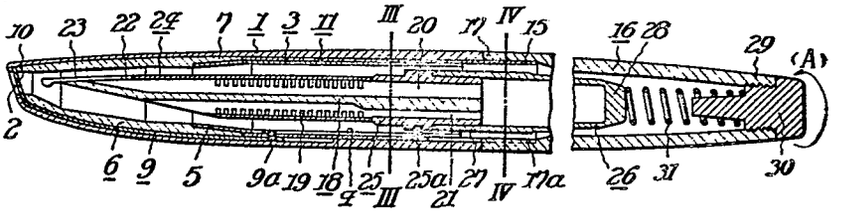


Fig. 2. Fig. 3. Fig. 4.

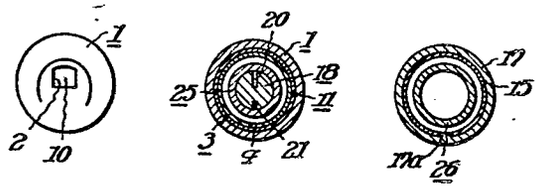


Fig. 5.

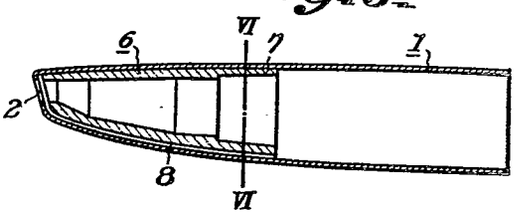


Fig. 6. Fig. 7. Fig. 8.

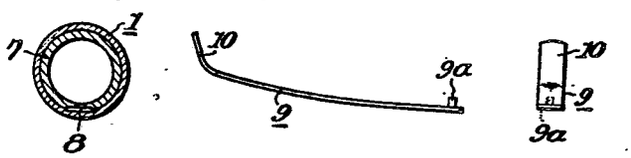


Fig. 9.

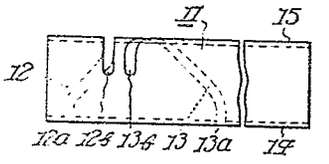


Fig. 10.

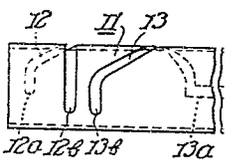


Fig. 11.

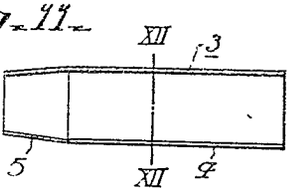


Fig. 12.

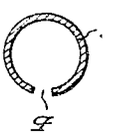


Fig. 13.

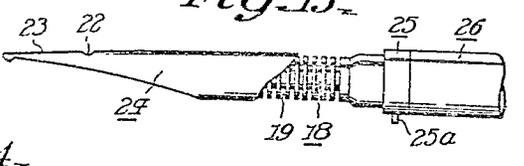


Fig. 14.

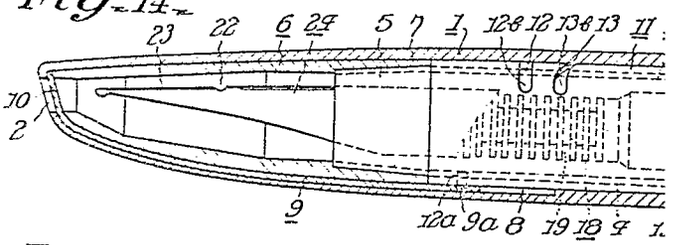
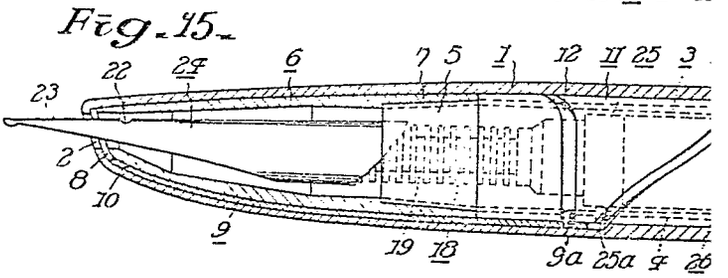


Fig. 15.



975244 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 2 & 3

Fig. 10.

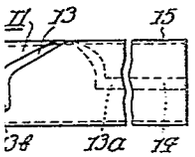
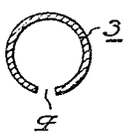
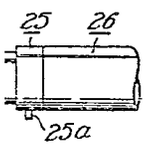
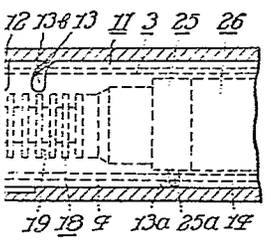


Fig. 12.







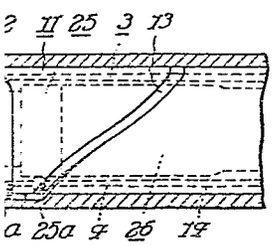


Fig. 16.

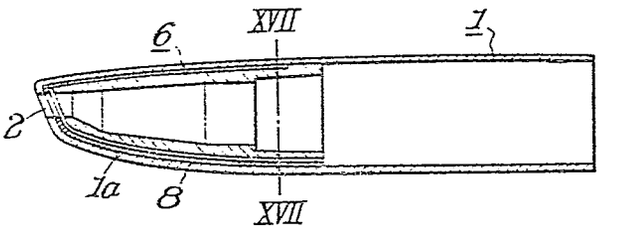


Fig. 17.

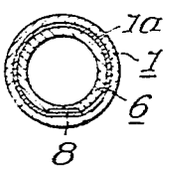


Fig. 18.

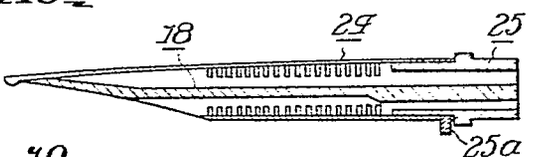


Fig. 19.

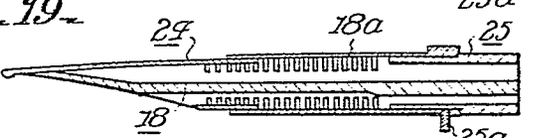
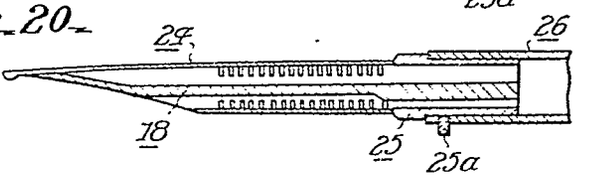


Fig. 20.



975244 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 2 & 3

Fig. 9.

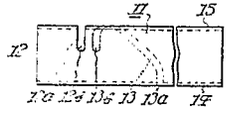


Fig. 10.

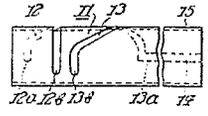


Fig. 11.

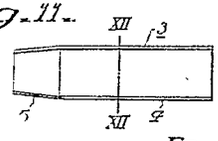


Fig. 12.

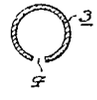


Fig. 13.

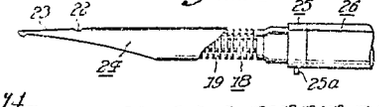


Fig. 14.

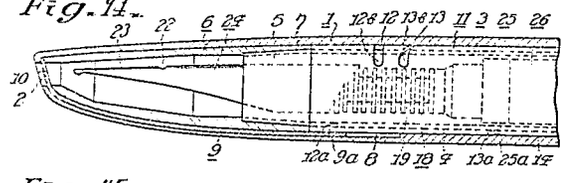


Fig. 15.

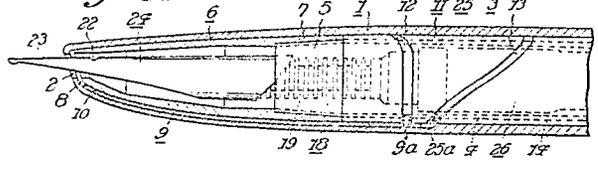


Fig. 16.

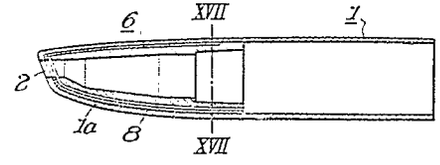


Fig. 17.

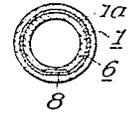


Fig. 18.

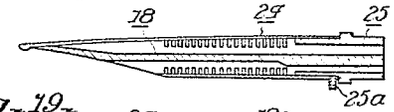


Fig. 19.

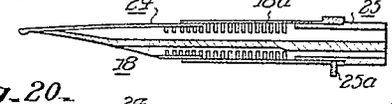


Fig. 20.