Nov. 29, 1960 A. TORCHI 2,961,999

FOUNTAIN PENS

Filed July 27, 1954

Fig. 1

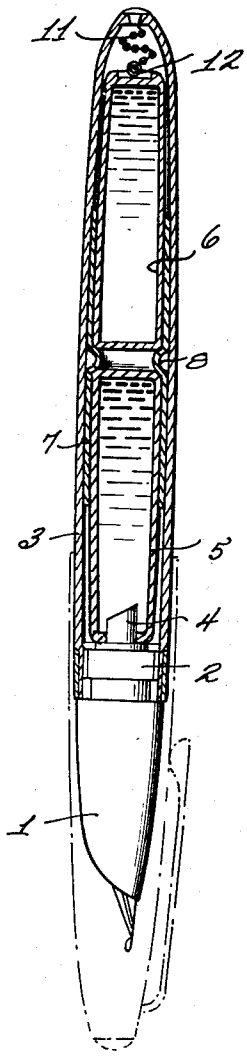


Fig. 2

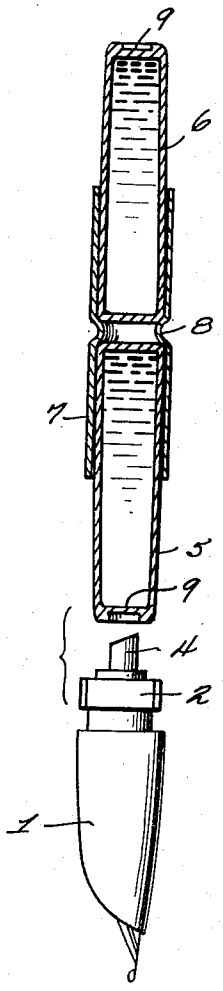
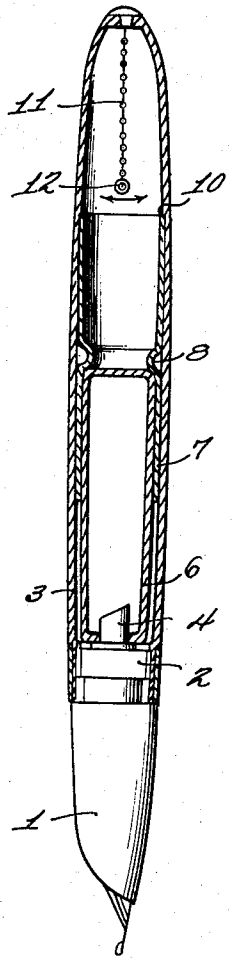


Fig. 3



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FOUNTAIN PENS

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1 Claim. (Cl. 120—42.16)

This invention relates to fountain pens in which the charge of ink is contained in a cartridge-type receptacle which occupies the body of the pen and which at one end is connected to the nib-holder by means of a perforated extension of said nib-holder which projects into the cartridge-type receptacle.

It is an object of this invention to provide a fountain pen of this type in which the receptacle containing the ink charge consists of two independent cartridges mounted coaxially in an intermediate support occupying a fixed position in the body of the pen.

In this manner, the pen, while having an ink reservoir in proportion to the capacity of its body, is less exposed to the disadvantages caused by the entry of air into the receptacle, which factor, when the volume is considerable, causes expulsion of ink because of the increase in the air pressure resulting from an increase in temperature.

According to one feature of the invention, each cartridge is closed at one end by means of a perforable diaphragm which is perforated the moment the pen is assembled by the action of the nib-holder connection made in the form of a perforator.

According to the invention the pen is also provided with indicator means showing whether the reservoir is complete with its two cartridges or whether the pen contains only one cartridge.

The accompanying drawing shows, by way of example, a fountain pen according to the invention.

Figure 1 is a view of the complete pen, partially in section;

Figure 2 shows, separately, the nib-holder and the ink reservoir;

Figure 3 shows the pen in axial section, with one cartridge only.

In these figures, 1 represents the nib-holder which is of the usual construction and which has a collar 2, on which is fitted the mouth of the body 3 forming the outer casing of the pen.

At the end of the nib-holder 1 remote from the nib, the conduit for the ink ends in a sleeve 4 with a chamfered cutting edge which is intended to perforate the diaphragm of the cartridge receptacle when the nib-holder 1 has been screwed into the body 3 of the pen with the ink reserve inside it.

According to the invention, the receptacle for holding the ink reserve consists of two tubular cartridges 5 and 6 which are mounted coaxially in two separate housings in a tubular socket 7 having a central constriction 8 which forms the bottom of each of the two housings. Each of the cartridges 5, 6 has, at the end intended to be outside the tubular socket 7, a thin diaphragm 9, which is preferably made integral with the body of the cartridge, and on which the connecting piece 4 of the nib-holder will act to make the perforation necessary for bringing the inside of the cartridge into communication with the conduit for the ink in the nib-holder 1.

The ink reservoir is represented by the two cartridges 5 and 6 engaged, as shown more clearly in Figure 2, in the socket 7. These cartridges may conveniently be made of plastic material and have sufficient mechanical strength to prevent crushing, whereas the mechanical strength of the diaphragm 9 is reduced to permit its perforation by the action of the connecting piece 4 of the nib-holder 1.

When it is desired to fill the pen, all that is necessary is to separate the nib-holder 1 of the pen from the body 3 and insert in the latter the reservoir consisting of the two combined cartridges as shown in Figure 2.

The two cartridges and their common support 7 take up a given position inside the body 3, said position being determined by projections 10 inside the body 3 near the end remote from the nib.

When the reservoir is housed inside the body 3 and the mouth of the latter is screwed onto the collar 2 of the nib-holder 1, of the pen, the diaphragm 9 of the cartridge 5 is perforated, as a result of which the interior of said cartridge 5, full of ink, comes into communication with the ink conduit in the nib-holder 1. This state of the newly filled pen is shown in Figure 1.

As shown in this figure, a small space is left empty at the end of the body 3 and is occupied by a chain 11 attached to the body 1 and provided with a small ball 12. When the reservoir is complete, the chain is confined in this small empty space and the small ball is not free to move.

When the cartridge 5 is exhausted, the nib-holder 1 is separated from the body 3 of the pen, and the reservoir formed by the cartridges 5 and 6 and by the intermediate support 7 is removed from said body. Then, when the empty cartridge 5 has been detached, the support 7 is reintroduced into the body of the pen with the single cartridge 6 in the reverse position, that is to say with its diaphragm 9 against the mouth of the body 3.

In these circumstances the reservoir assembly is shorter than before but the position which it occupies in the body 3 is still the same, in view of the fact that the edge of the socket 7 rests against the stops 10, and that it is held there when the collar 2 is screwed into the mouth of the body 3. In this operation, the connecting piece 4 cuts the diaphragm 9 in the cartridge 6 and the pen is in the state shown in Figure 3 of the drawing.

The empty space at the end of the body 3 of the pen is now considerably larger than in the circumstances shown in Figure 1, as a result of which the chain 11 is extended under the action of the weight of the ball 12, and forms a tiny clapper which, when the pen is moved, strikes against the body 3 thus indicating that the pen now only contains one ink-reserve cartridge.

As a result of the construction described, a very simple pen is produced in which the whole capacity of the body is used to contain ink and the latter is divided between two easily replaceable cartridges which can be inserted and exchanged simply by opening the pen.

What I claim is:

In a fountain pen comprising a hollow body, a tubular socket member adapted to be mounted in a fixed position in said body, two tubular ink-cartridges adapted to be inserted from opposite sides in said socket member, each of said cartridges having a thin perforable diaphragm at the end intended to be outside said socket member, a nib-holder detachably connected to said body and having a connecting sleeve adapted to perforate said diaphragm

of said cartridge when said nib-holder is screwed into the open end of said body, means within said body to indicate the absence of a cartridge, said means comprising a small ball attached by means of a chain within said body, at the end remote from the nib-holder, said chain being of a length substantially greater than the distance between said remote end and the rear end of the rearward ink-cartridge when two cartridges are present in said body whereby said chain will become taut and said ball will be adapted to swing freely therefrom and adapted to strike against said body when the corresponding cartridge is missing.

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