

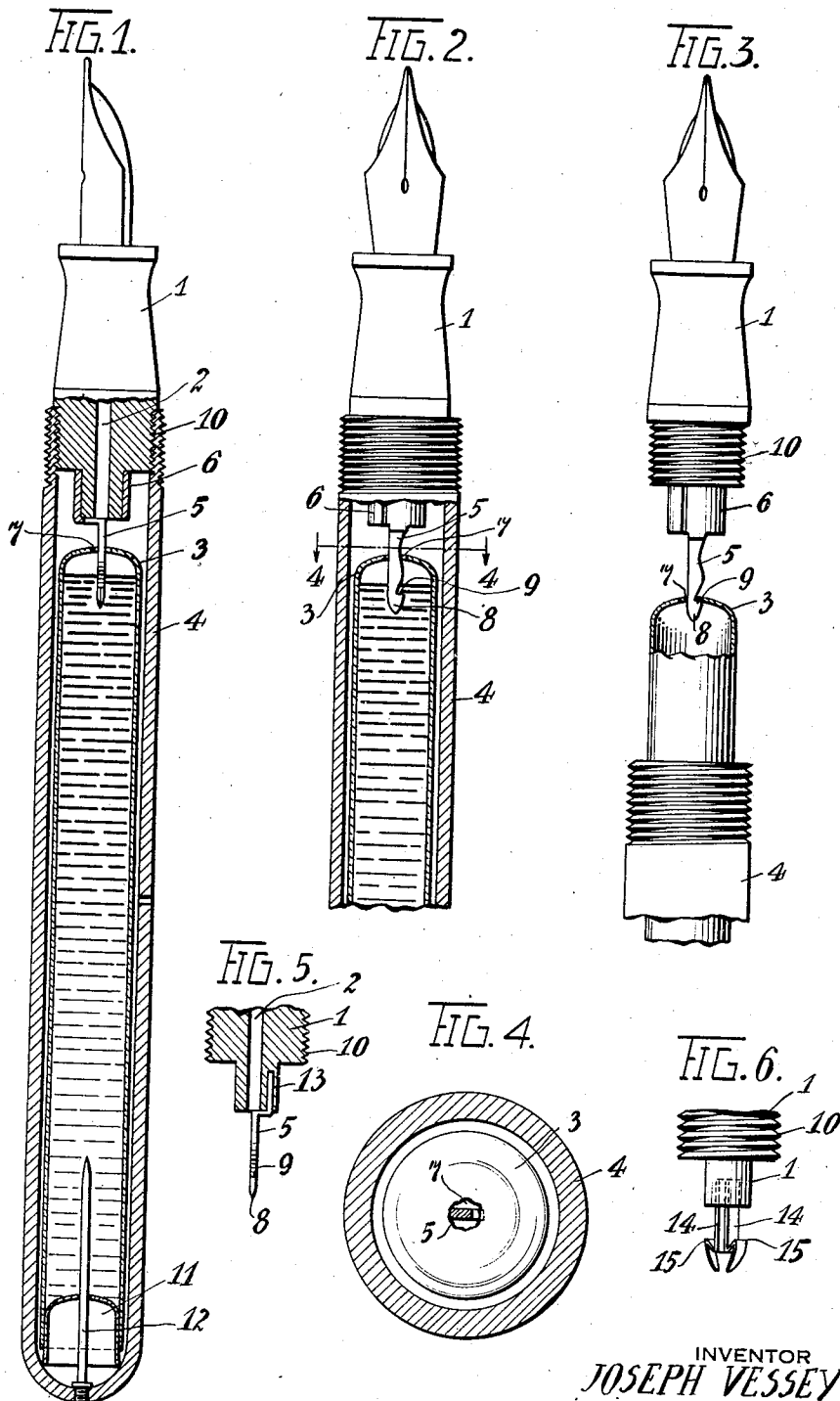
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FOUNTAIN PEN

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FOUNTAIN PEN

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5 Claims. (Cl. 120—42)

This invention relates to improvements in pens and has more particular relation to improvements in fountain pens in which a supply of ink is carried and automatically fed to the penpoint.

One of the several objects of the invention is to provide a refill capsule or cartridge containing ink that may be readily dropped into the hollow barrel of the pen and as readily removed after it is empty for a fresh capsule.

Another object of the invention is to provide a refill ink containing capsule and a pen barrel with puncturing points for the capsule to effect not only the puncturing of an orifice for the outlet of ink, but also a companion orifice for the inlet of air to allow a free flow of ink.

A further object of the invention is to provide a removable capsule containing ink and also a detachable pen holding end formed with a device for removing the empty capsule without soiling the fingers.

The invention also has other objects, all of which will be hereinafter more particularly set forth and claimed.

In the accompanying drawing forming part of this specification,

Figure 1 represents a central vertical section through a fountain pen embodying my invention, the capsule removing hook being shown in section.

Figure 2 represents a detail vertical section partly in elevation taken at right angles to the section shown in Figure 1.

Figure 3 represents a detail side elevation of the upper part of the pen, the screw end being removed, and removing the capsule.

Figure 4 represents a horizontal section through the pen on the line 4—4 of Figure 2.

Figure 5 represents a detail vertical section of a modified form of puncturing pin and hook, and Figure 6 represents a side elevation of a further modified form of puncturing pin and hook.

Described in general terms, the present invention relates particularly to providing for a free flow of ink from an inserted ink capsule.

The invention further contemplates the removal of the capsule after its contents are exhausted by devices forming part of the pen itself, and, as a matter of fact, using the same devices by which the capsule is punctured to effect the removal of the capsule when its supply is depleted.

Heretofore it has been old to employ capsules and to puncture these capsules to allow the ink to seep therefrom. A serious objection has developed in such type of holders, however, in that

the ink becomes trapped when the capsule is inverted with the puncturing end downward, and that no ink can flow therefrom unless a corresponding amount of air is allowed to enter the capsule at the end where the ink is sealing the puncture. This structure is rather a hit and miss arrangement which may work and which may not work.

With the present invention, however, the applicant has designed a free flow of ink from the lower end of the capsule by admitting air to the upper end of the capsule when the pen is inverted.

Described in detail in referring to Figure 1, 1 represents the removable screw tip holding the regular pen assembly. This tip is apertured centrally or to one side if desired as at 2 to allow the flow of ink to the pen. The capsule 3 of celluloid or other light and easily punctured material, is mounted in the barrel 4. An upper puncturing pin and hook 5 is formed on a spring sleeve which may be snapped about the usual sac projection found in all fountain pens. The object of this structure is to enable applicant's improved devices to be applied to fountain pens already in use.

The puncturing hook 5 is flat in construction and projects centrally downward from the pen tip 1 so that as it is rotated to screw it into position, the flat structure will force down through the upper end of the capsule containing the ink and will form in this capsule an enlarged aperture 7, through which the ink from the capsule will flow to the pen when the latter is in writing position. The hook 5 is pointed as at 8, see Figure 2, and is formed with an arch 9 for hooking in the side wall of the aperture 7 when the tip 1 is screwed out of the pen proper.

The pen barrel 4 and the tip 1 are screw threaded as at 10 so that they may be separated or screwed together at will.

The split ring 6, of course, permits the puncturing hook 5 to be fixed on different size sac tips already in use.

When the contents of the ink capsule become exhausted, the tip 1 is screwed out of the pen barrel and in coming out the hook 5 catches over the edge of the aperture 7 and pulls the capsule out of the pen barrel without soiling the fingers, as best shown in Figure 3.

By reference to Figure 4, the peculiar flat structure of the hook is shown and the nature of the hole formed when this flat hook is rotated.

The lower end of the hook, however, it will be seen by reference to this figure, is in position to

catch over the edge of the aperture 7 at any time when the end 1 of the pen is screwed out.

The lower part of the capsule 3 is closed preferably by an inverted cup shape piece 11, and the lower part of the pen barrel 4 is provided with a long puncturing pin 12 that is screw threaded to screw into a suitable aperture in the pen barrel or otherwise mounted in position so that when the capsule 3 is inserted in the barrel, a puncture is always made in the lower end of the capsule so that when the pen is inverted for writing this punctured end will allow the entrance of air at this point to permit a free feed of ink from the aperture 7 to the pen point.

The structures above described are intended more particularly for use when the invention is applied to fountain pens already in use but when the present devices are manufactured complete including the pen, the puncturing pin and hook 5 are forced into an aperture 13 formed in the pen tip 1 and the split ring 6 is omitted as best shown in Figure 5.

In the modified form of the invention shown in Figure 6, the tip 1 is provided with two oppositely faced puncturing hook members 14. As the tip 1 is screwed into position, the lower pointed ends of these hook members engage and cut through the upper end of the capsule and being of spring metal the parts 14 are forced together as the hole is being cut so that when the hooks 15 finally pass below the upper end of the capsule, these hooks will spring outward in opposite directions to take a firm hold of the capsule so that at any subsequent time when the tip 1 is removed, the capsule will be drawn out positively with it.

It will be seen that whereas in the usual form of fountain pen, a very small quantity of ink is all that may be drawn into the rubber sac for subsequent use, in the present instance the whole body of the pen is practically filled with ink which will, of course, last a considerable time without replenishing. This replenishment is effected by merely unscrewing the tip 1, drawing out the depleted capsule by means of hook 9, removing the old capsule from the hook, inserting a new capsule in the barrel, forcing it down on the pin 12, and then again screwing in the tip 1 with pin 5 which will open up the end of the capsule so that when the pen is inverted, ink will flow freely and unobstructed by the formation of a vacuum from the capsule to the pen point.

It will be understood that the puncturing pin

12, while it is shown as being cylindrical in the drawing, may, if necessary, be made flat similar to the pin 5 to prevent any tendency of the capsule to rotate when it is being punctured by the sharp point of the flat hook 5 which is forced down by the rotary tip.

It will, of course, be understood that while I have shown the puncturing hook 5 as flat, that it may be of any cross sectional configuration that is uneven so that as it is rotated, it will form a hole in the capsule that will not fit the sides of the hook closely at all points.

It will also be understood that the functions of the puncturing devices and hooks are not dependent upon their location as described above.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a fountain pen, the combination with a pen barrel and removable tip, of a puncturable ink capsule arranged to be inserted in the barrel and means connected to the assembly tip for puncturing the capsule and removing it when the tip is drawn upward.

2. In a fountain pen, the combination with a pen barrel and removable tip, of a puncturable ink capsule within the barrel, and a spring hook mounted on the removable tip and arranged to puncture the capsule when the tip is applied and engage and remove the capsule when the tip is removed.

3. In a fountain pen, the combination with a pen barrel and removable tip, a puncturable ink capsule within the barrel and a hook mounted in the removable tip and arranged to engage the capsule to remove it when the tip is removed.

4. In a fountain pen, the combination with a pen barrel and assembly tip, of a puncturable ink capsule in the barrel and a puncturing pin for the capsule having spring friction means for removably attaching it to the ordinary removable point assembly of a fountain pen.

5. In a fountain pen, the combination with a barrel and removable tip, of a puncturable ink capsule within the barrel, means for screwing the tip on to the barrel and a flat puncturing pin carried by the tip to operate on the axis of rotation of the tip and arranged to puncture an enlarged hole in the capsule with ink passages on each side of the pin when the pen assembly tip is rotated to attach it to the pen barrel and puncture the capsule.

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