Jan. 9, 1968 A. PAVESE 3,362,778

FOUNTAIN PEN

Filed Oct. 24, 1965

FIG.1

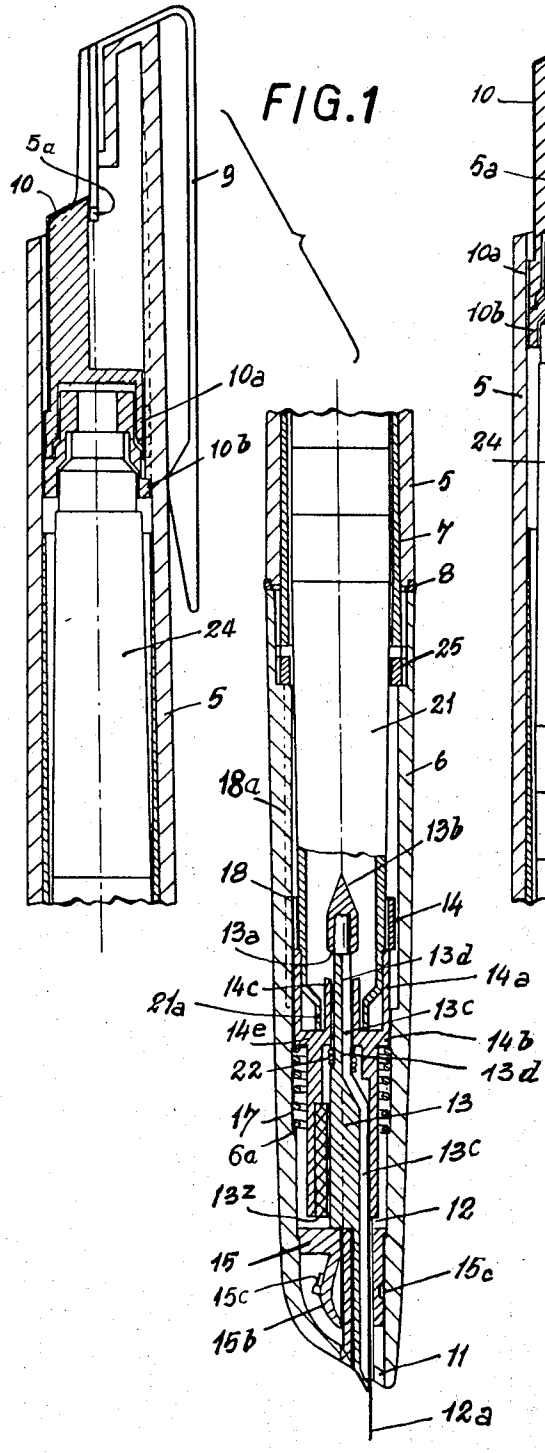
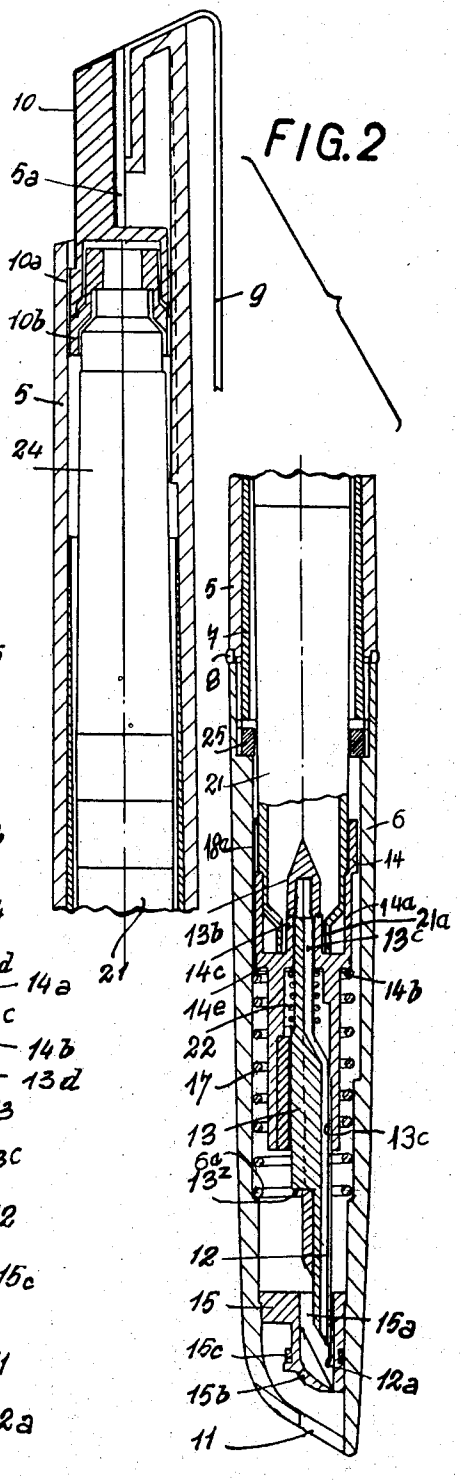


FIG.2



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FOUNTAIN PEN

Angelo Pavese, Corso Toscana 19, Turin, Italy

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4 Claims. (Cl. 401—107)

ABSTRACT OF THE DISCLOSURE

A nib-type fountain pen in which the writing implement slides within the outer sheath of the pen in such a manner that it comes into writing position by the locking action of a longitudinal key situated inside the barrel and, when in retracted position, has the flow of ink interrupted thereto automatically by a control valve. This control valve consists of an appendix mounted onto one end of the nib support and projecting within the ink well or cartridge together with the collar of a tubular element, said collar having a spoon-shaped extremity, elastically deformable, for sealing the lower extremity of the terminal of the pen sheath.

The present invention relates to writing implements in general, and specifically, to a nib-type pen in which the writing implement slides within and in relationship with the outer sheath in such a manner that the nib, which when not in use is in a withdrawn position within the sheath, is brought into a working position, that is, into a position which is terminally projecting from the sheath, by the locking action of a longitudinal key provided on the opposite terminus of the sheath.

The withdrawal of the nib back into the sheath is achieved by unlocking the longitudinal key through the reaction of a cylindrical spring which is under compression when the pen nib is in working position.

The main object of the present invention is to provide a pen which is substantially characterized by the fact that the ink flow is automatically controlled by a valve which closes and interrupts the flow of ink so that it no longer reaches the nib when this latter is in a withdrawn position and, conversely, opens the flow of ink to feed the nib when this is brought into writing position.

Another object of the invention is to provide a pen with a structure in the valve controlling the ink flow. This valve is composed of an appendix mounted onto one end of the nib support and projecting within the ink well, or ink cartridge, together with the collar of a tubular element. The relationship between this collar and the valve mentioned above is such that one achieves the closing or opening of the ink flow, in synchronization with the longitudinal sliding movement of the pen nib.

A further object of the invention is to provide a pen in which the above-mentioned collar traversed by the nib, is precast or premolded from an elastic material, such as a suitable plastic or rubber of a predetermined hardness, and is provided with a spoon-shaped extremity, elastically deformable and bendable, said extremity sealing the lower extremity or terminal of the pen sheath when the writing implement or nib is in a withdrawn position, thus preventing the nib from drying and concurrently avoiding possible ink leaks. The elastic spoon-like extremity, of course, opens under the thrust of the nib when this latter is brought into working position.

These and other objects and advantages of the invention will become apparent from the following descripition of its embodiment and from the accompanying drawings in which:

FIGURE 1 shows the device of the invention, subdivided into two parts, and cross-sectionally axially represented, in which the writing implement is in working position; and

FIGURE 2 is a similar longitudinal cross-sectional view of the pen with the writing implement or nib withdrawn within the sheath of the device.

With reference to the accompanying drawings, the hollow sheath of the pen is composed of two separable parts **5** and **6**, which may be assembled by a simple screwing action on the threaded skirt of the tubular element **7** and are separated by ring nut **8**. Obviously, parts **5** and **6** may be threaded directly one to the other.

The upper half of the sheath **5** is provided with a clip **9** and with a longitudinally sliding key **10**. The lower half of the sheath **6**, suitably shaped, is provided at its lower extremity with aperture **11** for the passage therethrough of terminus **12***a* of nib **12**, riding over a support **13**. Support **13**, in turn, is mounted telescopically within annual section **14–14***a*, in which section it slides without rotation. Elements **14** and **14***a* have different inside and outside diameters, as clearly shown in the drawings. In the terminal part of the lower sheath **6** there is incorporated a ring nut **15**, made of resilient material of suitable hardness. This nut **15** is provided with opening **15***a* and is sealed in front by a base **15***b*, partially connected to the body of the nut **15** and which may be opened by moderate pressure upon the elastically deformable material of which it is made and upon the elastically deformable ring **15***c* which surrounds it. Between the inner annular seat **6***a* and the shoulder **14***b* of the annular body **14** there is mounted a cylindrical spring **17**, the function of which is to maintain the writing implement in the position represented by FIGURE 2. The section **14–14***a* is mounted so as to axially slide within the lower sheath **6** but is prevented from revolving by the radial tooth **18**, which is engaged and slides in a corresponding inner groove **18***a* of sheath **6**. The element **14** is internally designed to receive the terminus **21***a* of the ink cartridge **21**.

The tubular inner appendix **14***c* is cut to a hollow and conically tapered profile so as to match the profile of tapered, trunco-conic base **13***a* of appendix **13***b* which is an integral component of support **13**. In the support **13** there are provided one or more small conduits **13***c* for the passage of the ink. On the rod-shaped member **13***d*, which is terminating with appendix **13***b*, there is mounted a cylindrical spring **22** which acts between diaphragm **14***e* and a seat appropriately obtained at the terminus of rod-shaped member **13***d*.

When the nib of the pen is in a withdrawn position (see FIG. 2) the action of spring **17** maintains this sliding implement withdrawn in the sheath. Key **10**, then, is blocked against tooth **5***a* obtained in the upper sheath **5** and reacts in relation to the thrust of spring **17**. The appendix **13***b* lodges its base **13***a* in the tapered terminal housing of collar **14***c* and, because of its relatively elastic characteristics, it hermetically seals the flow of ink to the nib. In this manner, the ink contained in the cartridge **21**, bored by appendix **13***b* cannot flow through channel **13***c*.

So as to bring the pen nib into working position (see FIG. 1), an adequate thrust or pressure is exerted downwardly on key **10**, until it overcomes the action of spring **17**. Although the sliding movement of the elements inside the pen sheath is remarkably rapid, it may be distinguished into two phases. In an initial phase, the terminal **12***a* of the nib **12** pushes the elastic spoon-shaped bottom **15***b* into the position shown by FIG. 1 and protrudes through aperture **11**, but it is not yet supplied with ink. In a second phase, as the axial longitudinal sliding movement of the nib continues, tooth **13***z* of support **13** meets ring nut **15**, before the spring **17** is sufficiently

compressed so as to allow key **10** to snap into its final arresting position; then, as this position of the key is reached, the spring **22** is fully compressed and the rod-shaped member **13***d* is forced to slide within and in relation to collar **14***c*, thus assuming the position represented in FIG. 2. At this point, the appendix **13***b* opens the ink flow route **13***c*, consisting of one or two little channels, and the nib **12** is consequently fed.

The sliding movement of member **13***d* within and in relation to collar **14***c* eliminates the possibility of sedimentary deposition of ink which in conventional pens is formed by the non use of the writing instrument.

By releasing or unblocking the key **10** from the blocking position shown by FIGURE 1, the reaction of spring **17** returns the axial sliding components of the pen in a contrary and opposite direction and the pen nib returns to the withdrawn position, represented in FIGURE 2.

The mechanism for blocking and releasing of key **10**, coacting with the rotating bush **10***a* and with the toothed cap head **10***b*, is well known and reference is made, for example, to U.S. Patent 3,153,401, where a similar mechanism is fully and clearly illustrated. A second reserve cartridge **24** is connected in an upside down position to cartridge **21**, so as to increase the supply of ink to the pen.

When the first cartridge of ink is exhausted it is simply sufficient to unscrew the sheaths **5**, **6** from each other and to turn the double cartridge upside down, thus engaging the reserve cartridge on appendix **13***b*, and then to rethread the two components **5** and **6**. Numeral **25** indicates a blocking ring nut which prevents the longitudinally inserted elements of the pen from being removed when sheaths **5**, **6** are disassembled.

From the above descripition of the device of the invention and the accompanying drawings, the simplicity of use, and the practicality and efficiency of the pen appear self-evident. There are no metal parts, exclusive of the nib, in contact with the ink, which further minimizes conventional corrosion and caking effects.

It is obvious on the other hand that the pen of the invention is not limited to the embodiment described hereabove, many modifications being possible without diverting from the scope and principles of the invention.

What is claimed is:

1. A pen with reversible ink-cartridge and with writing implement axially and longitudinally sliding within a

sheath and having automatic ink flow control, characterized by the combination of the following elements:

(a) An annular section having two members, each with different diameter;

(b) An elongated nib-support slidably engaged in said annular section and having an annular collar at the upper extremity thereof; said support being actuated in its movements within the sheath by a spring;

(c) A sealing valve connected to said nib-support and lodged on said collar and compressible thereagainst by spring action and having a pointed terminus capable of penetrating into the cartridge of the pen;

(d) One or more flow channels connected to said nib-support and said valve for the passage of ink therethrough;

(e) A terminal resilient ring nut having appropriate spoon-shaped resilient base with aperture therein for the passage therethrough of the pen ink; and

(f) A manually operated key in the upper portion of the sheath for projecting the pen nib through said aperture in the spoon-shaped base; said key being blockable by a retaining tooth to hold the pen nib in writing position and being releasable by a spring to withdraw the pen nib inside the sheath.

2. The pen according to claim **1**, wherein said sheath is composed of an upper and a lower portion threadable on each other.

3. The pen according to claim **1**, wherein said spring for sliding said nib-support and said spring for actuating said valve are helical springs.

4. The pen according to claim **2**, wherein a radial tooth is positioned in the lower part of the sheath and engaged in a suitable groove in said sheath to prevent the nib-support from falling out of the sheath when the two sheath portions are unthreaded.

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LAWRENCE CHARLES, *Primary Examiner.*