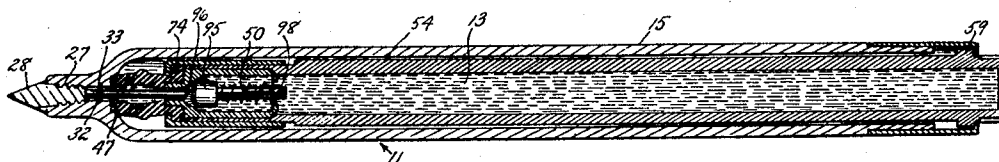


[11] 3,589,824

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[54] CARTRIDGE MARKER CONSTRUCTION	
4 Claims, 9 Drawing Figs.	
[52] U.S. Cl.	401/206, 401/273
[51] Int. Cl.	B43k 5/14
[50] Field of Search	401/198, 199, 205, 6, 273, 278, 33, 258—260, 202

ABSTRACT: A cartridge marker having a permanent outer tube element and an expendable inner tube element containing a supply of marking fluid dispensed through a valve at one end thereof. A marking-fluid-dispensing nib is mounted in the outer tube element, and opens the valve in the inner tube element upon the exertion of pressure at an opposite end of the inner tube element resulting in relative movement between the inner and outer tube elements.



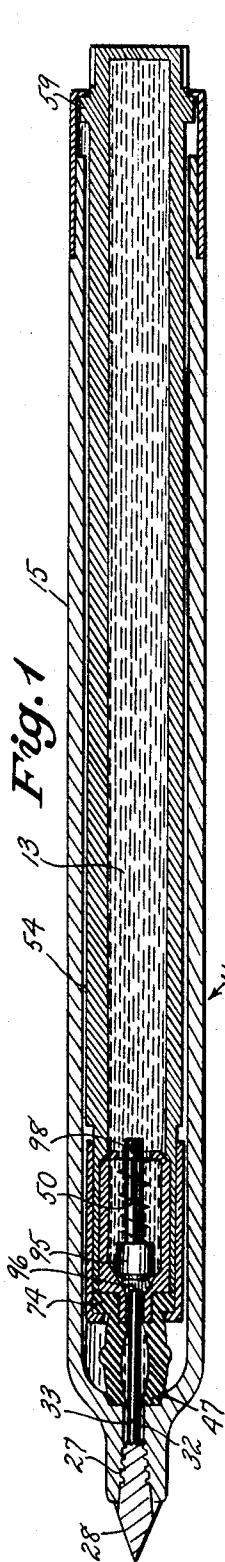


Fig. 1

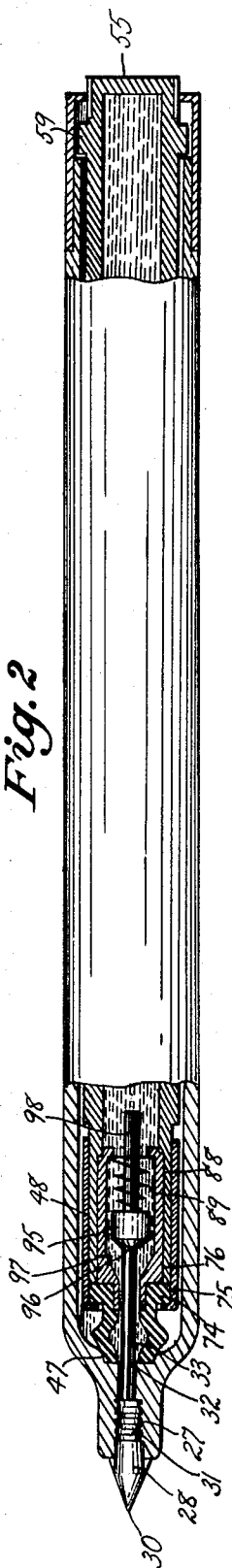


Fig. 2

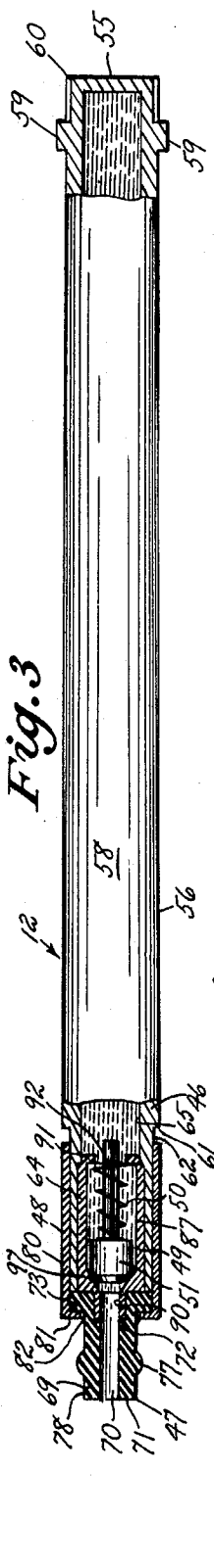


Fig. 3

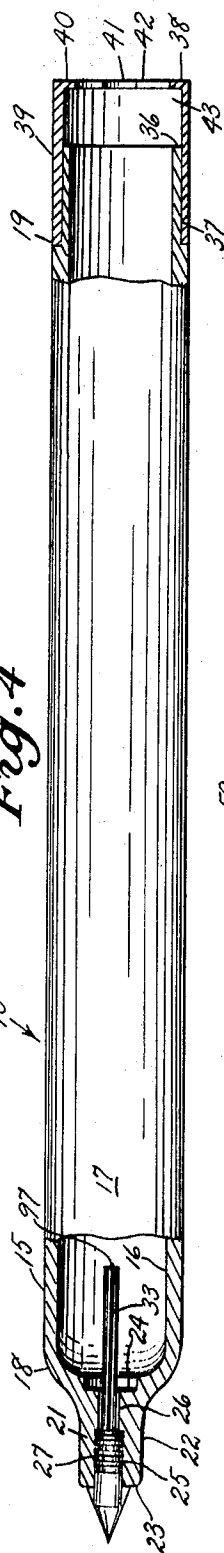
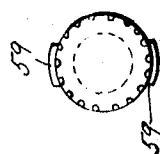


Fig. 5

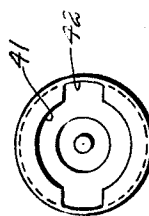


Fig. 6

Fig. 7

Fig. 8

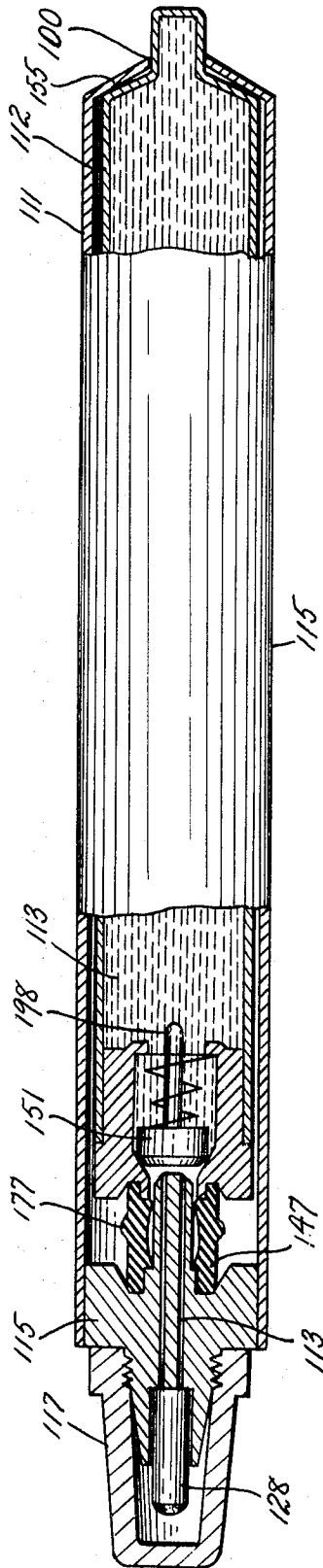
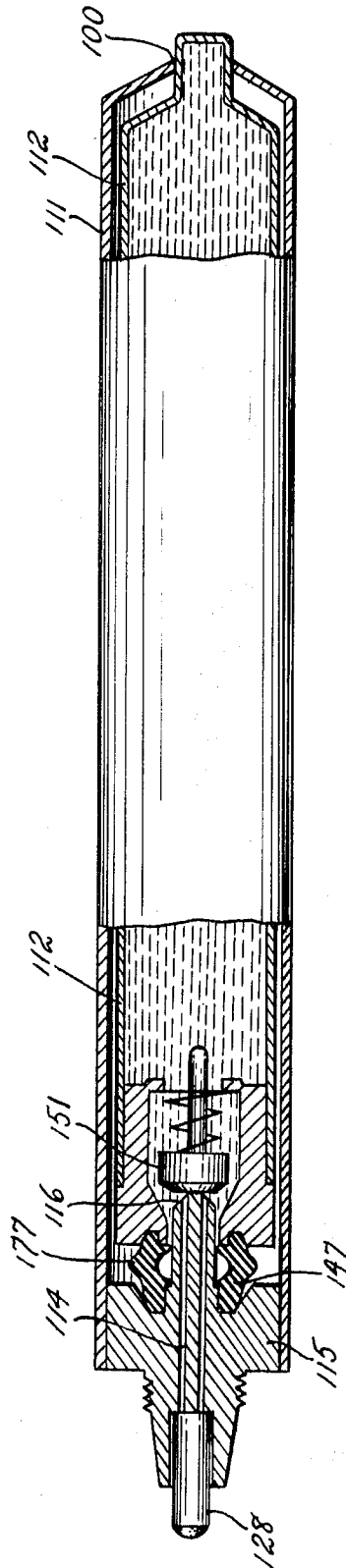


Fig. 9



CARTRIDGE MARKER CONSTRUCTION

This invention relates generally to the field of marking devices, and more particularly to an improved fluid marker of the type employing a marking fluid cartridge.

It is among the principal objects of the present invention to provide a marker using a porous-type nib, in which the marking fluid supply is contained within a replaceable cartridge, thereby facilitating the replacement thereof with a minimum of inconvenience, and without the necessity of soiling the fingers of the user.

Another object of the invention lies in the provision of an improved marking-type pen in which the cartridge containing the ink supply is provided with a self-contained valve element which is selectively operated by manipulation of the cartridge with respect to an outer tube element in which it is disposed.

Yet another object of the invention lies in the provision of an improved marking-type pen of the class described, in which the nib or brush is placed in direct communication with a valving element leading to the ink supply means, whereby it is instantly saturated with ink upon the opening of the valve element.

Yet another object of the invention lies in the provision of an improved marking pen in which the cost of fabrication, particularly of the expendable parts thereof, may be of a reasonably low order, thereby permitting consequent wide sale, distribution and use.

A feature of the disclosed embodiment lies in the provision of elastomeric sealing means surrounding the path of ink flow to prevent leakage between the ink supply and the writing nib.

These objects and feature, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several view.

FIG. 1 is a longitudinal sectional view of an embodiment of the invention.

FIG. 2 is a similar longitudinal sectional view, showing certain of the component parts in altered relative position.

FIG. 3 is a longitudinal sectional view of a replaceable inner tube element forming a part of the embodiment.

FIG. 4 is a longitudinal sectional view of an outer tube element forming a part of the disclosed embodiment.

FIG. 5 is an end elevational view as seen from the right-hand portion of FIG. 1.

FIG. 6 is an end elevational view as seen from the right-hand portion of FIG. 3.

FIG. 7 is an end elevational view as seen from the right-hand portion of FIG. 4.

FIG. 8 is a longitudinal sectional view of a second embodiment of the invention.

FIG. 9 is a similar longitudinal sectional view, showing certain of the component parts in altered relative position.

In accordance with the invention, the device, generally indicated by reference character 10, comprises broadly: an outer tube element 11 and an inner tube element 12, containing a marking fluid 13.

The outer tube element 11 may be formed of metallic materials, or conveniently molded from natural or synthetic materials. It includes a cylindrical sidewall 15 bounded by an inner surface 16 and an outer surface 17 extending between a first end 18 and a second end 19. The first end 18 is modified to form a nose member 21 having an outer surface 22, an end surface 23, and an inner surface 24 forming a seat, the purpose of which will more fully appear. A centrally disposed bore 25 includes a relatively smooth portion 26 and a ribbed or threaded portion 27 engaging a replaceable elongated nib 28 of felt or other material. The nib 28 includes a marking-fluid-spreading portion 30, a ribbed or threaded portion 31, and a slender rectilinear portion 32, and may include grooves 33 to facilitate the flow of marking fluid to the portion 30.

The second end 19 includes an edge surface 36 and a rabbet 37 which supports a collar 38. The collar includes a cylindrical wall 39 and an end wall 40 having a circular opening 41 communicating with oppositely disposed slots 42. The collar 38 forms a recess 43 surrounding one end of the inner tube element 12.

The inner tube element 12 is preferably molded and includes a main body member 46, elastomeric member 47, a retaining sleeve 48, a valve housing 49, a valve spring 50 and a valve 51.

The main body member 46 includes a cylindrical wall 54, an end wall 55 and a cylindrical wall extension 56. The cylindrical wall is bounded by an outer surface 58 having oppositely disposed lugs 59 adjacent the end 60, corresponding in shape to that of the slots 42. The oppositely disposed end 61 includes a rabbet portion 62 and a second rabbet portion 64, the former extending to the wall extension 56, and the latter extending from the inner surface 65 of the wall 54.

The elastomeric sleeve 47 includes a cylindrical portion 69 having a centrally disposed bore 70 extending from an outer end surface 71 to a counterbore 72 having an inner end surface 73. A radially extending flange 74 is bounded by an outer edge surface 75 of diameter equivalent to that of the wall extension 56, and an end surface 76 which rests thereagainst.

Referring again to the cylindrical portion 69, a rib 77 extends radially from the outer cylindrical surface 78 thereof to form a plane in which bending will occur upon the occurrence of axial compression (compare FIGS. 1 and 2).

The retaining sleeve 48 includes a cylindrical wall 80 which is frictionally retained by the wall extension 56, and an end wall 81 having a centrally disposed orifice 82 through which the cylindrical portion 69 projects, whereby the elastomeric member 47 is maintained in leakproof contact with the wall extension 56.

The valve housing 49 is most suitably formed as a molding. It includes a tubular body 87 bounded by an outer surface 88 and an inner surface 89. An outer end includes a circular lip 90 engageable within the counterbore 72. The opposite end includes a second concentric lip 91 retaining one end 92 of the spring 50.

The valve 51 is of inverted poppet type, including a head 95 having a seat 96 engaging a tapered surface 97 on the valve housing 49. The stem 98 extends through the spring 50 which serves to maintain the same in coaxial alignment.

The inner tube element 12 is inserted within the outer tube element 11 through the opening 41 in the end wall 40 to a position where the lugs 59 will clear the slots 42. At this point, the inner tube element is rotated through approximately 90° to be retained by the end wall 40. This degree of insertion will seat the outer end surface 71 in the counterbore 72 causing a limited degree of flex shown in FIG. 1.

To saturate the nib 28, the end wall 55 is further depressed inwardly, resulting in further elastic distortion of the cylindrical portion 47 (see FIG. 2), and contact of the free end of the rectilinear portion 32 of the nib with the valve head 95 to dislodge the same from contact with the valve body. As this operation is normally performed with the nib end down, writing fluid flows around the valve head to saturate the inner end of the nib, and ultimately flow to the ink-spreading portion 30. Release of the inner tube element results in the cylindrical portion 69 returning to its relatively undistorted position shown in FIG. 1, wherein the inner tube element moves to the position shown in that figure, further outward movement being prevented by the contact of the lugs 59 with the inner surface of the end wall 40. In this position, the valve spring 50 closes the valve 51, and writing fluid may be dispensed from the nib until replenishment of the marking fluid is again required.

We have found that the disclosed construction is suitable for both water base inks as well as those employing volatile organic solvents. It will be observed that not only the inner tube element 12, but the nib 28 may be replaced as required without difficulty.

Turning now to the second embodiment of the invention, parts corresponding to those of the first embodiment have been designated by similar reference characters, with the additional prefix "1," thereby avoiding needless repetition.

The second embodiment consists essentially of a simplified version of the first embodiment, which may be manufactured at somewhat lower cost, and is intended to be completely expendable when the supply of marking fluid 113 has been consumed.

To this end, the end wall 155 is formed integrally with the sidewall 115. It is of conical configuration, and includes a centrally disposed opening 100 to permit manual manipulation of the inner tube element 112.

During assembly, the inner tube element 112 is first inserted into the outer tube element 111 from the end opposite that of the opening 100. The nib 128 cooperates with passages 114 in a separately formed nib housing 115, the housing having a conical end surface 116 operating the valve 151. An overcap 117 is threadedly engaged with the member 115 for selective removal.

The second embodiment may also be fabricated to provide for replacement of the inner tube element 112 by substituting the force fit existing between the housing 115 and the outer tube element 111 with a threaded or bayonet interconnection (not shown).

This embodiment may be assembled by first placing member 147 in engagement with member 115, or first in engagement with the inner end of the member 112, by cementitious means, or by merely dropping the member 147 in position and allowing compression to form the sealed communication.

We wish it to be understood that we do not consider the in-

vention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

We claim:

1. A cartridge-type marker comprising: an outer tube element and an inner tube element; said outer tube element having an axially disposed first hollow bore and a nose member having a second bore communicating with said first-mentioned bore; a nib disposed in said second bore in such manner as to permit flow of a marking fluid therethrough; said inner tube element having a hollow bore therein, and being closed at one end thereof to form a marking fluid reservoir, and having valve means at a second opposite end thereof for the dispensing of marking fluid therethrough; elastomeric means interconnecting said marking fluid reservoir and said bore in said nose member to effect a sealed communication therebetween; and means adapted to periodically operate said valve member upon the occurrence of coaxial relative movement between said inner and outer tube elements.

2. Structure in accordance with claim 1, said inner tube element extending outwardly of said outer tube element at said closed end thereof, for manual manipulation relative to said outer tube element.

3. Structure in accordance with claim 2, including bayonet-type interconnecting means between said inner and outer tube elements.

4. Structure in accordance with claim 1, in which said elastomeric means possesses sufficient resiliency to maintain a sealed relation between said inner and outer tube elements irrespective of the relative axial position therebetween.

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