United States Patent

Phillips

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[45] **Aug. 29, 1972**

[54] **WRITING IMPLEMENT**

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[52] **U.S. Cl.** **401/134,** 401/265, 401/292

[51] **Int. Cl.**.....**B43k 5/14,** B43k 5/04

[58] **Field of Search**.....401/134, 135, 265, 267, 192, 401/132, 133, 261

[56] **References Cited**

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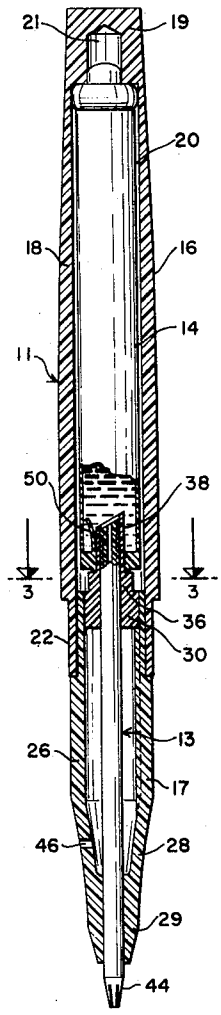
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Primary Examiner—Lawrence Charles

[57] **ABSTRACT**

A writing implement, such as a marking instrument, includes separably coupled coaxial upper reservoir and lower barrel sections. A writing nib extends along and projects beyond the ends of the lower barrel section and has an ink feed bore along its length and terminates in a tapered writing tip. A piercing tube extends upwardly from the barrel bottom section and engages the top part of the nib and a venting passage of lesser maximum dimensions than the ink feed bore extends along the inner feed of the piercing tube and communicates with the exterior of the barrel bottom section. A replaceable liquid ink cartridge is housed in the reservoir section and is engaged by the piercing tube.

8 Claims, 4 Drawing Figures



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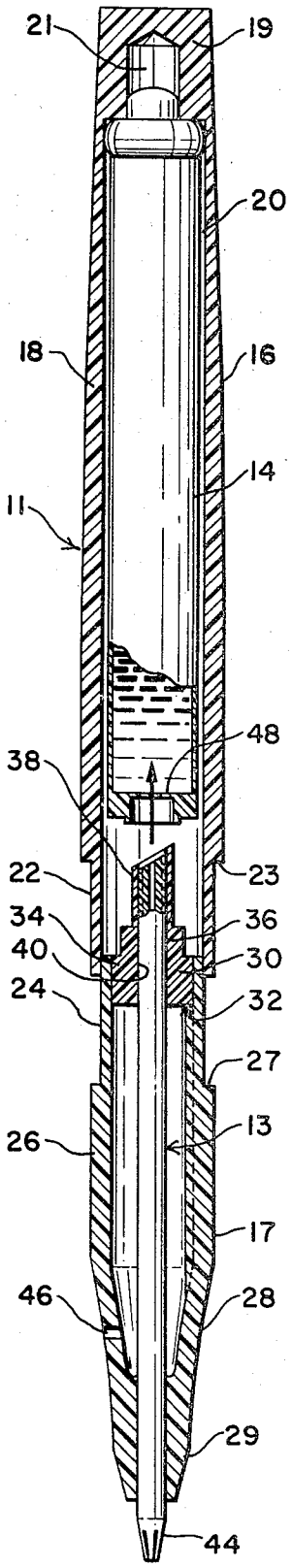


Fig. 1.

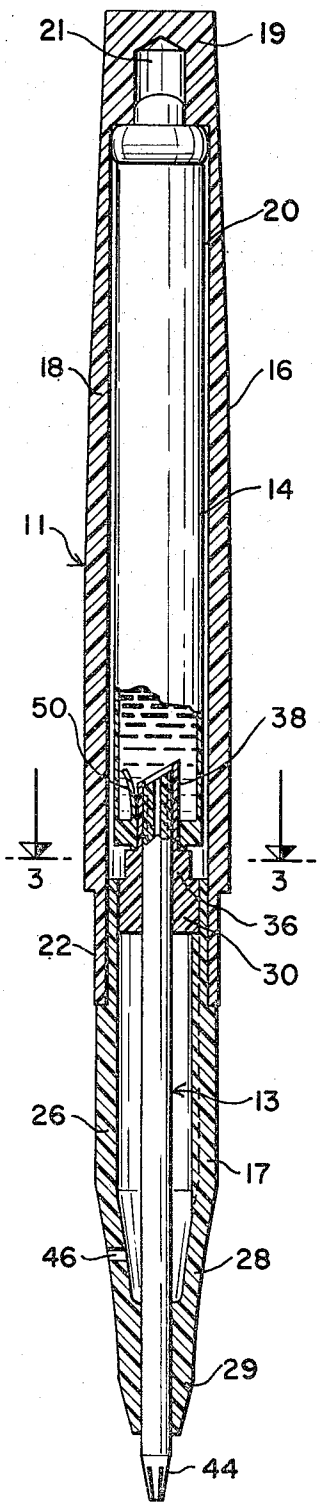


Fig. 2.

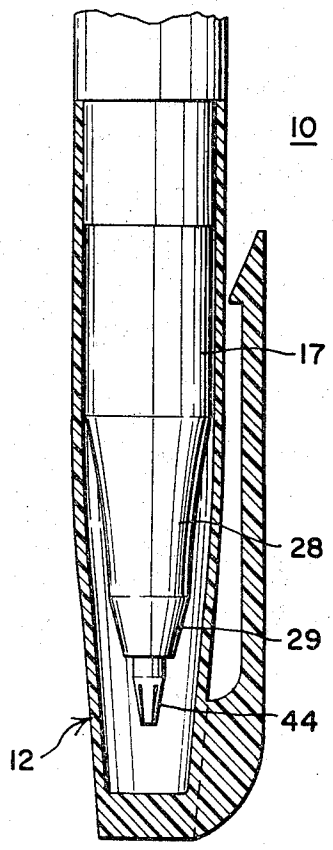


Fig. 4.

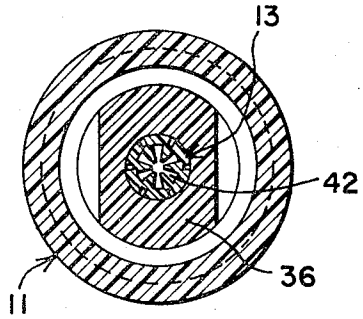


Fig. 3.

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WRITING IMPLEMENT

The present invention relates to a writing or marking implement of the kind embodying a reservoir for writing or marking fluid and more particularly, it relates to a marking implement which contains a nib for the transfer of the writing fluid from the reservoir to the surface upon which is to be written or marked.

A fluid writing instrument has been divided into essentially three types: (1) using a marking tip or nib through which the writing fluid flows or is conveyed; (2) a marking instrument which maintains a capillary wick in fluid communication with the writing fluid; and (3) the ballpoint pen which utilizes a rotating ball to transport a more viscous writing fluid from the supply to the writing surface.

The split nib **10** has been admired because of its ability to produce a mark of consistent width and density. The marking instrument field has been attempting to find a nib to provide a writing line comparable to that produced by either the nib pen or the ballpoint pen and various forms of fibers have been bundled together to try to produce this type of line.

It is therefore an object of the present invention to provide a writing implement that can utilize liquid writing or marking ink which can provide the writing ease of a nib and yet permit a wide range of writing positions and uniformity.

Another object of the present invention is to provide a writing instrument characterized by a writing element being fed with a large source of liquid ink and having the capillary action sufficient to present a smooth introduction of ink from the reservoir to the tip of the writing element.

It is a still further object of the present invention to provide a marking implement that has a source of liquid ink, which can be readily replaced and which provides an ink flow to adjust automatically to a wide range of writing positions and uses.

Yet another object of the present invention is to provide a writing implement as described above which is inexpensive to fabricate, easy to use, durable in use and low in cost.

Further features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings in which:

FIG. **1** is a longitudinal sectional view of a marking instrument embodying the present invention illustrated in an assembled condition attendant to the piercing of its housed ink cartridge;

FIG. **2** is a view similar to FIG. **1**, illustrated in an operative condition with the writing element coupled to the ink cartridge;

FIG. **3** is an enlarged sectional view taken along line **3—3** of FIG. **2**; and

FIG. **4** is a fragmentary partially sectional view of the pen with a closure cap applied thereto.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing which illustrates a preferred embodiment of the present invention, the reference numeral **10** generally designates the improved pen which comprises a tubular barrel **11**, a cap member **12**, a writing element **13**, and a liquid ink cartridge **14**. The barrel **11** includes separably end-to-end

coupled coaxial upper reservoir section **16** and separable lower section **17**, and is advantageously formed of a polymeric resin such as a polyolefin, polyvinyl chloride or the like.

The upper barrel section **16** is open at its bottom and includes an upwardly tapered peripheral wall **18** and a top wall **19** which delineate a cartridge chamber **20**. Top wall **19** has an axial cartridge positioning wall **21** formed in its underface. The lower end of peripheral wall **18** is of reduced outside diameter to define a bottom sleeve **22** delineated from the upper part of wall **18** by a downwardly facing peripheral shoulder **23**.

The lower barrel section **17** includes a cylindrical tubular upper part **24** having an outside diameter approximately equal to the inside diameter of peripheral wall **18**, a tubular cylindrical intermediate part where the outside diameter is equal to that of sleeve **22**, and which is delineated from upper part **24** by an upwardly facing peripheral shoulder **27**, and a downwardly tapered bottom part **28**. Bottom part **28** terminates in an axially bored bottom tip **29**. The upper part **24** of barrel lower section **17** tightly slidably engages sleeve **22** to permit the separable coupling of barrel sections **16** and **17**. In the fully coupled condition of barrel sections **16** and **17**, shoulder **27** abuts the bottom end face of sleeve **22** as shown in FIG. **2**.

The upper end of lower barrel section **17** supports writing element **13**. As shown a writing element holder **30** is positioned within barrel section **17**, and has an outer diameter substantially equal to the inside diameter of upper part **24** of lower barrel section **17**. Holder **30** is supported within lower barrel section **17** on an inner shoulder or wall **32**. This support can either be a continuous shoulder or vertical ribs terminating at a uniform height below the upper end of lower barrel section **17** sufficient to properly position holder **30**. Extending upwardly from lower section **34** of holder **30** is a coaxial stepped extension **36**, terminating in a piercing tube **38**. As shown, the upper end of tube **38** is angled to provide a cutting surface for piercing the end of cartridge **14** in a manner that will be shown. Holder **30** contains a bore **40** extending therethrough for rigidly holding writing element **13**. Writing element **13** is received within bore **40** and is also tightly held in bottom tip **29** of lower barrel section **17** and is supported at two spaced points. Writing element **13** extends outwardly beyond tip **29** and terminates within piercing tube **38**.

Writing element **13** has inner capillary conduits **42** which extend entirely through element **13** and terminate at the rear end of element **13** disposed within tube **38**. Writing element **13** has a conically sharpened tip portion **44** which extends outwardly beyond bottom tip **29** of lower barrel section **17**. Disposed longitudinal within bore **40** of holder **30** is one or more air slits having a dimension less than the dimensions of the capillary passages **40** in writing element **13**. It has been found that the air slits could have a thickness of about twenty-five thousandths of an inch in total. Lower barrel section **17** has an air passageway **46** communicating with the interior thereof to provide a passage for air flow into ink cartridge **14**.

In use a cartridge **14** is positioned within the open end of upper barrel section **16** so that its entrance **48** is disposed adjacent to the opening. Lower barrel section

17 with holder 30 disposed within it and writing element 13 positioned therein is slidably inserted within the sleeve 22 so that the piercing tube 38 is received within cartridge entrance 48 forcing the sealing flap 50 outwardly and having the rear end of writing element 13 engage the ink disposed within cartridge 14. Lower barrel section 17 is coupled to upper barrel section 16, in the manner shown in FIG. 2. With the upper end of writing element 13 in engagement with the ink within cartridge 14, ink is introduced to inner capillary conduit 42. As the ink flows through the capillary paths 42 in writing element 13, air is smoothly introduced into cartridge 14 via air opening 46 and air vents within bore 40 of holder 30. The venting passages or slits contained within the interior of bore 40 of holder 30 are smaller in size than the capillary paths through writing element 13.

Cartridge 14 is changed once the ink flow stops. This is performed easily by substituting a fresh cartridge for the exhausted one contained within reservoir section 16 in the manner described above.

The protective cap 12 is placed on the bottom part 28 of lower barrel section 17 and is held in position by friction.

There has been thus described a new and improved marking pen which combines many of the advantages of a conventional fountain pen with the features found in a marker but provides a smooth low long line point to produce a fine writing line.

What is claimed is:

1. A writing implement comprising an elongated barrel including an upper hollow reservoir section and a coaxial lower section separably joined to the lower part of said upper section and having coaxial aligned bases proximate its upper and lower ends, a piercing tube projecting upwardly from said lower barrel section and coaxial with the bores of said sections, an elongated writing nib engaging said bores and having a tapered writing tip projecting below said barrel bottom section and a capillary bore extending along the length thereof, the inside face of said piercing tube and said upper bore and the confronting face of said nib delineating a venting passage of lesser maximum width than said capillary bore and said barrel lower section having an opening formed therein communicating with said venting passage and an ink cartridge replaceably housed in the reservoir section in said barrel upper section and having an end part engaged with said piercing tube.

2. A writing implement of claim 1, wherein said piercing tube is part of a collar positioned within the upper part of said lower barrel section and extends beyond the end of said lower barrel section.

3. A writing implement as in claim 2, wherein said collar is tightly positioned within the bore of said lower section so that said piercing tube extends beyond the upper end of said lower barrel section.

4. A writing implement as in claim 3, wherein said nib end opposite to the writing tip of said nib is positioned within said piercing tube.

5. A writing implement as in claim 4, wherein said collar has a bore and said writing nib is received within said bore.

6. A writing instrument as in claim 5, wherein the writing tip of the nib extends beyond the lower end of said lower bottom barrel section and opposite end of said nib is received within said piercing tube.

7. A writing implement as in claim 1, wherein said nib is made of plastic.

8. A writing nib as in claim 1, wherein said capillary bore of said nib is within range of 0.046 inches and said venting passage has a cross sectional area of about 0.020 to 0.030 inches.

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