United States Patent

[11] **3,578,870**

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[73] Assignee **Uniline Corporation**

[54] **INK WRITING INSTRUMENT**
8 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **401/199,** 401/202
[51] **Int. Cl.** **B43k 8/00**
[50] **Field of Search** 401/196, 198, 199, 205, 207

[56] **References Cited**

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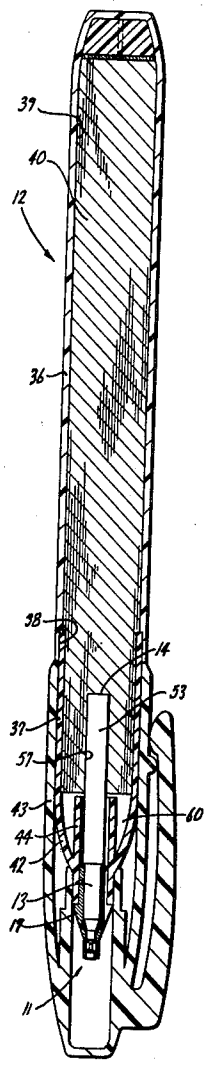
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ABSTRACT: An improved writing tip is provided for an ink pen particularly adapted for creating solid and relatively wide ink lines wherein an elongate porous ink-conducting nib for transferring ink between an ink cartridge and a writing end face of the nib is coaxially surrounded by an elongate hollow open ended housing with the nib writing face protruding from an end thereof. The nib is formed with a reduced cross section closely adjacent the writing face thereof to form a supplemental ink reservoir bounded by the housing and surrounding the porous nib closely adjacent the writing face for rapid and efficient transfer of the ink thereto and to provide a swivel mounting for the writing end of the nib for maintaining full face-to-face contact with the surface to be marked, and insuring uniformity of width of the ink line.



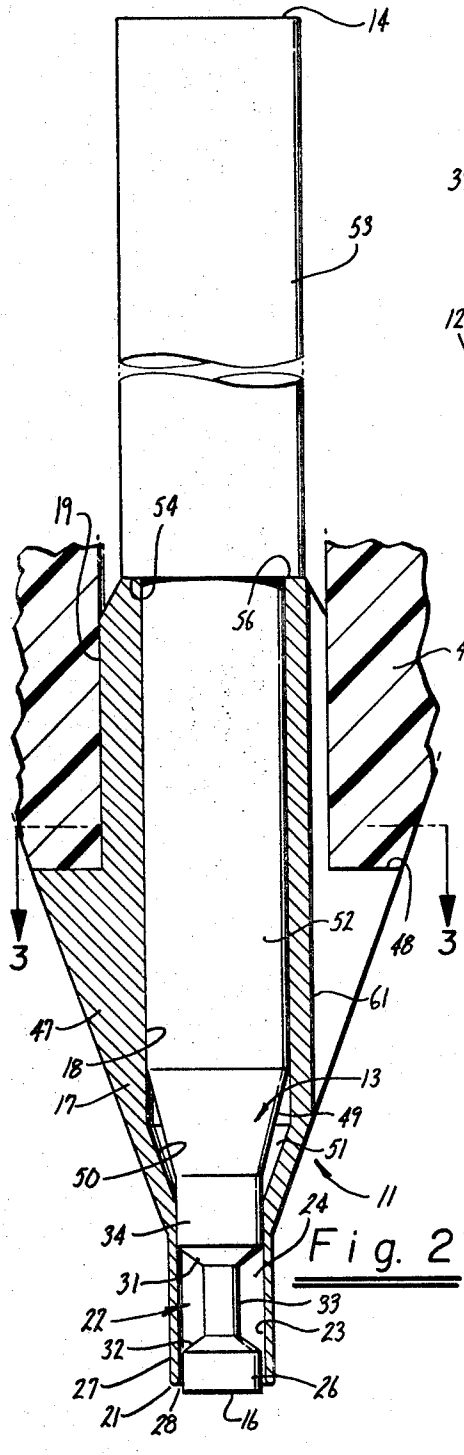


Fig. 2

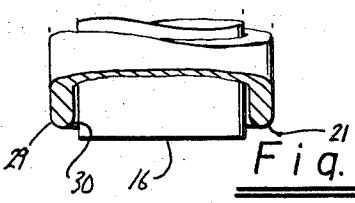


Fig. 4

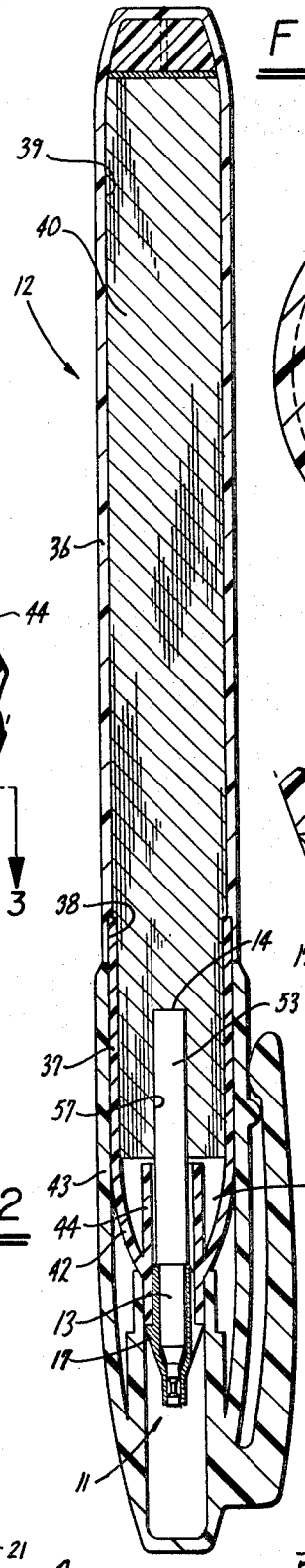


Fig. 1

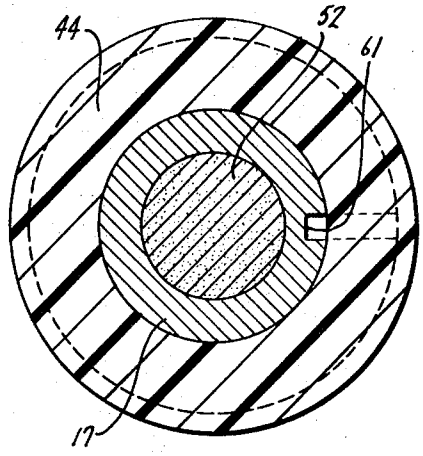


Fig. 3

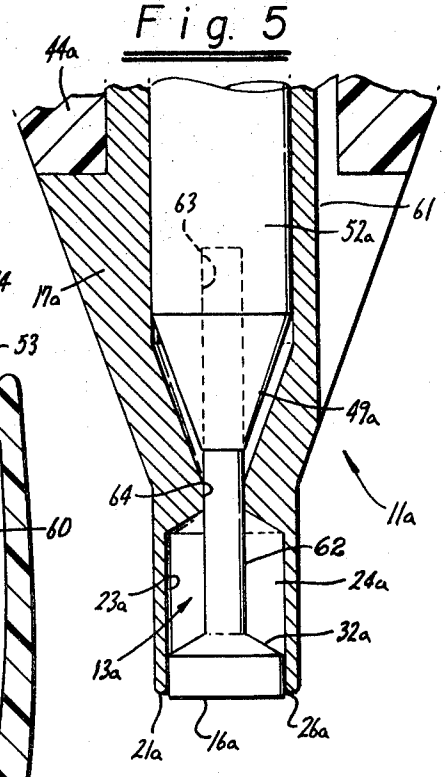


Fig. 5

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INK WRITING INSTRUMENT

The invention relates to ink-fed writing implements and more particularly to a writing tip therefor of the type having an ink-transmitting porous nib.

Ink pens of the character described generally include an ink storage compartment and a writing tip composed of a tubular tip housing and a porous ink-conducting member extending therefrom. The tip housing functions to support the porous member thereby permitting the use of a porous member of low structural strength. It also provides a bearing surface for the pen when used in conjunction with a lettering template or straight edge to prevent direct contact of the porous member with the template or guiding surface. One of the problems encountered with these pens have been that of efficiently controlling the flow of ink to the writing surface of nib. This problem has been particularly acute in pens having wide writing surfaces where ink must be continuously available over the full writing surface during the complete stroke of the pen and the flow of ink to such surface must be immediate and continuous even during a rapid stroke of the pen across the surface being inked. An interruption in such ink flow will affect the width of the line being inked and the solidarity or depth of color in such line.

Another problem encountered with such implements is the deviation in line width due to angulation of the pen relative to the printed surface during use. Usually, a user will hold the axis of the pen body with a slanted or pitched orientation relative to the paper which continuously varies in degree and causes a corresponding variation in the amount of surface area contact between the writing end of the nib and the paper so as to produce lines of deviant width and depth of color.

Accordingly, it is an object of the present invention to provide an ink-fed writing implement having a porous ink-conducting nib and surrounding shield constructed so as to effect a smooth, easy gliding action over the printed surface with an efficiently controlled and readily available ink flow from the nib resulting in a solid, uniform line having clean, sharp and straight side edges.

Another object of the present invention is to provide an ink-fed writing implement of the type characterized having excellent utility as a general writing instrument and being specially designed for use with lettering guides.

The invention possesses other objects and features of advantage, some of which will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming a part of the specification. It is to be understood, however, that variations in the showing made by the drawings and description may be adopted within the scope of the invention.

Referring to the drawings:

FIG. 1 is a longitudinal sectional view of the writing implement constructed in accordance with the present invention;

FIG. 2 is an enlarged sectional view of the writing tip of the implement shown in FIG. 1;

FIG. 3 is a transverse section taken along lines 3–3 of FIG. 2;

FIG. 4 is an enlarged sectional view of a portion of a writing tip for the implement shown in FIG. 1; and

FIG. 5 is an enlarged sectional view of a modified form of a writing tip.

Referring to FIGS. 1 and 2, the writing implement of the present invention is provided with a writing tip 11 disposed at one end of an elongated cylindrical pen body 12 and comprising an elongated nib 13 having one end 14 disposed for receiving ink within body 12 and an opposite end 16 protruding from body 12 and providing a nib writing surface; and an elongated housing or shield 17 having an axial bore 18 therethrough for receiving and coaxially surrounding and supporting nib 13. One end 19 of shield 17 is detachably connected to and supported by pen body 12 with the opposite end 21 of the shield extending outwardly therefrom substantially to but slightly inwardly spaced from nib writing end 16. Nib 13 is formed of porous, ink-transmitting material having sufficient rigidity to retain its structural integrity after being molded in a desired configuration. For example, a material manufactured under the trade name Porox, by Porex Materials Corporation, Fairburn (Atlanta), Ga. has been found satisfactory. As a principal feature of the present invention, nib 13 is molded or otherwise formed with a reduced cross section 22 forming with respect to the interior wall 23 of shield 17 a free space annular region 24 adjacent nib writing surface 16 thereby creating a supplemental ink reservoir for accumulating ink during nonwriting intervals and providing a ready supply of ink a short distance from writing surface 16 for rapid disbursement thereto during a writing stroke. Filling of reservoir 24 with ink is also facilitated by pumping of the porous member 13 as by pushing a pen down on surface 16 so as to effect a momentary axial compression of the porous member. This compression squeezes ink from the pores into reservoir 24 and on relaxation and reexpansion of the porous member ink is drawn from the main ink reservoir. The pumping or compression of the porous member also brings ink solvent to surface 16 so as to put into solution dried ink on this surface.

In a preferred form of the invention, writing end 16 is formed as a generally flat writing surface, as shown, whereby opposing edges of nib end 16 together with the adjacent end 21 of shield 17 cofunction to provide a solid ink line of uniform width and sharp marginal edges. For best results, the face of writing end 16 should remain in full contact with the surface to be printed. According to the present invention, reduced cross section 22 of the nib is formed and positioned so as to flexibly pivotally support a head portion 26 of nib 13 to allow radial swivel adjustment of face end 16 for full flush contact with the surface to be printed. As the pen is guided across a writing surface with the pen axis angulated relative to the perpendicular, the writing pressure causes head portion 26 to pivot and maintain end 16 in full face-to-face contact with the surface . Furthermore, reduced portion 22 lowers the resistance of nib 13 to axial compression forces providing retraction of surface 16 to a position generally flush with shield end 21, so that such action is readily accomplished in response to writing pressure. Such retraction effects a transfer of ink from surface 16 to the radially inward edge of end 21 during printing, enabling the latter to define sharp marginal edges of the ink line somewhat wider than the diameter of face 16. Preferably the reduced portion 22 is formed quite close to the writing surface 16 so as to locate the auxiliary ink reservoir in position for immediate availability. In this regard it will be noted that portion 22 is spaced from surface 16 a distance less than that of the width or diameter of the surface, and preferably the head or part 26 is formed with a diameter somewhat greater than its axial length. Shield 17 is formed with a thin wall hollow cylindrical tip portion 27 spanning reduced portion 22, as shown, and extending to surround a greater part of the axial length of head portion 26. The diameter of head portion 26 is dimensioned relative to tip portion 27 such that a slight circumferential clearance 28 is provided between the exterior cylindrical wall of head portion 26 and the portion of interior wall 23 coaxial therewith. This clearance accommodates the swivel action of head 26 and enhances the flow of ink by capillary action to the writing surface. To provide smooth, easy gliding of pen tip 11 over the surface to be inked, and to facilitate the flow of ink through clearance 28, housing end 21 is here provided with rounded edges 29 and 30 respectively adjacent the exterior and interior wall of tip portion 27 as shown in FIG. 4. Also in order to provide a full 360° or universal swivel support for portion 26 and writing surface 16, the reduced portion 22 is preferably of annular form thereby providing with the surrounding housing wall 23 an annular ink reservoir surrounding the reduced portion. Preferably, and as here shown, the end 32 of the reduced portion 22 contiguous with portion 26 is of frustoconical form diverging in the direction of portion 26. This arrangement provides improved strength for the porous member and increased surface area in communication with ink reservoir 24. Reduced portion 22 is here formed as a cylindrical section 33

preferably within the limits of three-fourths to one-fourth of the diameter of head portion **26** to provide a suitable balance between desired radial flexibility and strength. As here shown the diameter of section **33** is approximately one-half of the diameter of surface **16**. Preferably the opposite (inner) end **31** of the reduced portion is joined to the adjacent larger section of the porous member by a frustoconical wall diverging away from the reduced portion.

Pen body **12** is here composed of a pair of tubular housing sections **36** and **37** telescopically joined at **38** to provide an interior ink storage compartment **39** which may be filled with a suitable porous or fibrous material **40** for storing ink. Section **37** is formed with a forwardly tapered portion **42** and an adjoining tubular end wall **44** of reduced diameter dimensioned to telescopically receive shield end **19**. An end cap **43** is formed and dimensioned to fit over the writing tip and for sliding engagement upon pen section **37**. Wall **44** here extends both inwardly and outwardly from the tapered section portion **42**. Shield **17** is formed with a generally conical-shaped portion **47** between end **19** and tip portion **27** wherein a shoulder **48** abuts an end of wall **44**. Bore **18** of shield **17** is formed with an axially tapered annular interior wall **50** spaced from an axially tapered exterior annular wall **49** of nib **13** to form an annular free space region **51** which further facilitates flow of ink toward writing end **16**. Wall **49** of nib **13** diverges from portion **34** of the nib into an intermediate cylindrical nib body segment **52** which in turn connects to segment **53** having a larger diameter than segment **52**. The connection of segments **52** and **53** forms a shoulder **54** on nib **13** which engages and circumferentially rests upon a shoulder **56** of shield end **19**. Segment **53** of nib **13** extends coaxially within a central bore **57** provided within material **40** for communicating ink from the latter to the former.

With reference to FIGS. **2** and **3**, shield **17** is formed with an external longitudinal groove **61** which serves as a vent opening into the interior of wall **44** and section **37** for venting a free-spaced region **60** provided by the spaced orientation of material **40** within section **37** of the pen body.

With reference to FIG. **5**, a preferred alternative construction of the writing tip is shown in which the parts corresponding to those of FIGS. **1—4** are denoted with the same reference numeral together with a postscript *a*. In this instance, the porous ink-conducting member **13***a* is composed of two sections for simplifying manufacture. A first section is provided by head portion **26***a*, frustoconical portion **32***a* and an elongate reduced diameter stem **62** which extends interiorly of a second section **52***a* having tapered wall section **49***a*. For this purpose, an axial bore **63** is provided in section **52***a* into which stem **62** extends and is held by frictional engagement therewith. The interior end of section **52***a* is connected to the ink supply as in the above embodiment and ink is transmitted freely through the section to writing surface **16***a*. It will be appreciated that the embodiment of FIG. **5** provides in essence the same advantageous features as does writing tip **11** shown in FIG. **2**. However, the two component construction of nib **13***a* lends itself more readily to mass manufacture as each portion may be separately molded and thereafter assembled as shown in FIG. **5** to provide the axially intermediate reduced cross section portion. Furthermore, housing **17***a* may be formed as shown with an internal wall **64** surrounding and supporting stem **62** and which is spaced from head **26***a* to define ink reservoir **24***a*. With such construction, stem **62** may be extended upwardly internally of shield **17***a* and wall **44***a* to engage with material **40** for receiving ink therefrom and without necessitating nib portion **52***a*.

I claim:

1. In a pen, an ink-fed writing tip comprising:

a tubular tip housing;

a porous ink-conducting member mounted in said housing and having an end portion supported thereby with a writing, ink transfer surface protruding therefrom;

said member being formed with a reduced cross-sectional portion relative to and contiguous with said end portion, said reduced portion cooperating with the interior wall of said housing to provide a free space ink reservoir for supplying ink to said surface.

2. A writing tip as defined in claim **1**, said end portion surface protruding from the adjacent end of said housing and being formed with a substantially planar writing surface, and said member being formed of resiliently flexible material and said reduced portion being dimensioned to provide a swivel mounting for said end portion.

3. A writing tip as defined in claim **2**, wherein said reduced portion is of annular form providing with said housing an annular ink reservoir surrounding said reduced portion and wherein the latter functions to provide a universal swivel support for said end portion.

4. A writing tip as defined in claim **3**, wherein said end portion is of cylindrical form having a diameter larger than its axial length, and said housing is of cylindrical form coaxially surrounding said part over most of its axial length and terminating short of said surface.

5. A writing tip as defined in claim **4**, said end portion and housing being spaced to provide an annular clearance therebetween facilitating flexure of said reduced portion and communicating with said reservoir to provide ink flow to said writing surface.

6. A writing tip as defined in claim **4**, the end of said reduced portion contiguous with said part being of frustoconical form diverging to said part.

7. A writing tip as defined in claim **4**, wherein the diameter of said reduced portion is approximately one-half of the diameter of said surface.

8. A writing tip as defined in claim **1**, said member comprising, a section adapted for connection at one end to an ink supply and its opposite end being formed with an axially extending socket, and a second section having a relatively enlarged head providing said writing surface and a relatively reduced axially extending stem mounted in said socket.