

# United States Patent

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[33]		<b>Japan</b>
[31]		<b>44/68633</b>

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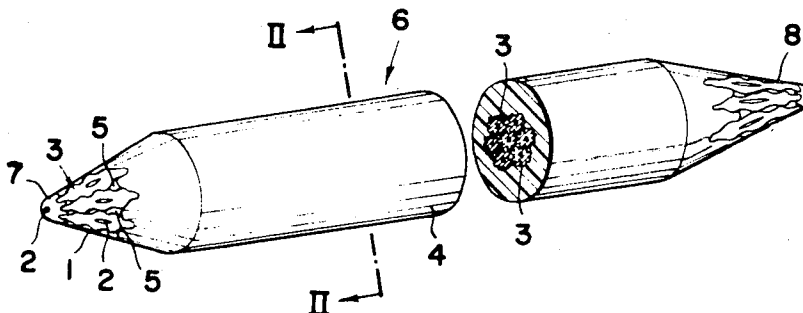
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[54] **PENPOINT STRUCTURE OF WRITING IMPLEMENTS**

**5 Claims, 3 Drawing Figs.**

[52]	U.S. Cl.....	401/198, 401/292
[51]	Int. Cl.....	B43k 8/00
[50]	Field of Search.....	401/198, 199, 292

**ABSTRACT:** This invention provides an improved structure of the point of a writing pen and inks contained in this invention can be sucked up spontaneously by the means of fine tube openings formed in penpoint core elements and of fine spaces formed between the sheath and core elements as well as between adjoining core elements thereby increasing writing efficiency of the pen.



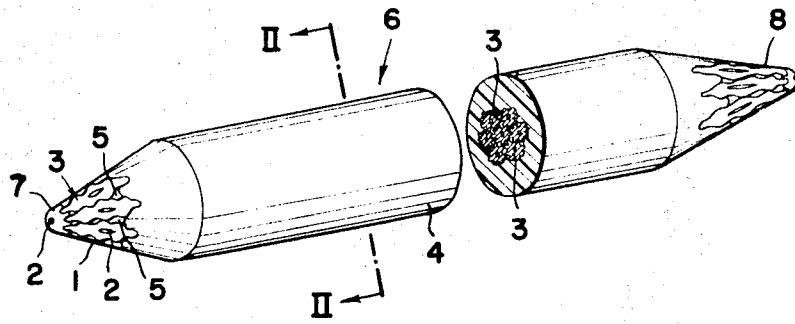


FIG. 1

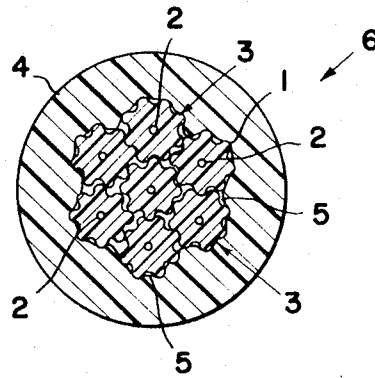


FIG. 2

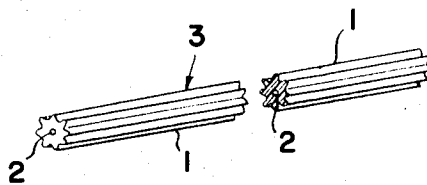


FIG. 3

## PENPOINT STRUCTURE OF WRITING IMPLEMENTS

This invention relates to an improved structure of the point of a writing pen such as a standard felt-containing pen or a marking pen, whereby ink contained in a stem can be sucked up spontaneously in response to the capillary action of the penpoint to facilitate the desired writing performance.

Most of the conventional penpoints used for this type of writing instruments have been and are formed by pointing or shaping into a penpoint the tip of an elongated rod structure made of a plurality of longitudinally extending and coaxially arranged filaments combined and consolidated into a penlike stick or into a tip containing elongated rod assembly structure. Such penpoints, however, have not sufficient hardness and are deficient in wear-resistance whereby they are subject to excessive wear in use and are readily broadened resulting in the writing of unsatisfactorily heavy characters. Such excessive wear also causes the partial clogging of the capillary structure which restricts the passage of ink to the penpoint.

According to the present invention, there is provided an improved penpoint structure comprising a plurality of core elements made of wear-resistant and inkproof synthetic resin material, each of said core elements being gear shaped in transverse section by having a plurality of spaced ridges formed about its peripheral surface and extending along the full axial length thereof, a fine tubular bore opening being formed in the center of each of said core elements and the plurality of core elements being aggregated or combined together to form an element bundle of substantially columnar shape. The entire outer periphery of this bundle of core elements is coated with a readily meltable liquid synthetic resin of the same material as said core elements by means of an extruder or other suitable means to thereby mold a sheath, a plurality of fine spaces being formed at the boundary between said sheath and core elements as well as between said core elements themselves, and the tip of said core element assembly being shaped into a penpoint.

Therefore, an object of the present invention is to provide an improved writing penpoint structure which is generally solid and rigid construction, has sufficient "point" hardness and is strongly resistive against deformation which may be caused by external pressure applied during writing.

Another object of the present invention is to provide an improved writing penpoint structure which is substantially wear-resistant and is therefore not "broadened" during writing and which eliminates any partial clogging of the fine tubular bore openings of the core elements and of the small spaces formed between the sheath and core elements as well as between adjoining core elements through capillary action, thereby facilitating the constant smooth flow of ink.

Still another object of the present invention is to provide a penpoint structure of the type described which may also be used for a marking pen.

A preferred embodiment of the present invention will now be described in detail with reference to the accompanying drawings, in which:

FIG. 1 is a partially cutaway perspective view of the penpoint structure according to the present invention;

FIG. 2 is a sectional view as taken on the line II-II of FIG. 1; and

FIG. 3 is a partially cutaway perspective view of a core element according to the present invention.

As will be appreciated from the illustrations in the drawings, the present invention is characterized by providing a plurality of core elements 3, each made of wear-resistant and inkproof synthetic resin material such as for example polyacetal resin, polyamide resin, polypropylene resin or polyethylene resin. Each of said core elements is generally gear shaped in transverse section and has a plurality of spaced ridges 1 formed about its periphery so as to extend along the full axial length thereof, and with a fine tubular bore opening 2 being formed in the center of each element and extending axially therethrough. The core elements 3 are all combined or ag-

gregated into a substantially columnar bundle of adjacent core elements and then the entire exposed outer peripheral surface of this columnar core element bundle is coated with a readily meltable liquid synthetic resin of the same material as said core elements so as to thereby mold a sheath 4 about the core elements, with a plurality of spaces 5 being formed at the boundary between the sheath 4 and the bundle of core elements 3, as well as between adjoining core elements. Subsequently the tip of the elongated combined penpoint stem structure 6, may be shaped by a grinder or other means into a substantially conical configuration so as to thereby form a penpoint 7.

Reference number 8 in FIG. 1 denotes a conical portion which may be optionally formed, if desired, at the distal end of the elongated stem structure, opposite that of penpoint 7 so that, in use, the stem structure area which is contacted by ink may be enlarged in order to enhance the positive suction of ink.

In the application of the present penpoint structure having the above-described construction to a writing implement, such as a pen, the penpoint structure is inserted into the pen rearwardly through an end opening in the neck of the pen such that the rear end portion 8 of the sheathed structure 4 contacts an ink source housed in the penholder contiguous to said neck portion, whereby ink is conveyed toward the conical penpoint portion 7 at the other end of the stem structure through the spaces 5 formed between the plurality of ridges 1 provided on the peripheral surface of each core element 3 along the axial length thereof, as well as through the spaces 5 at the boundary between said core elements 3 and the sheath 4 covering said elements, and also through the fine tubular bore openings 2 formed in said elongated core elements 3. Consequently the tip of the penpoint 7 is always supplied with a suitable amount of ink which will assure superior writing performance.

## EXAMPLE

In manufacturing a penpoint structure according to the present invention, seven pieces of the elongated core elements 3, each of which has been previously prepared from polyacetal resin by molding it with an extruder into an elongated structure which is gear shaped in transverse section and each of which has a length of 50 to 100 meters and a central bore of about 0.1 mm., are aggregated into a bunch of elements having a columnar shape and the entire peripheral surface thereof is coated with a film of readily meltable synthetic resin of the same type as used in forming the core elements, so as to thereby form an elongated sheathed structure. This structure is then cut into sections of a suitable length, such as 30 mm., with the end of each section then being machined by a grinder or other suitable means to form a penpoint 7. The above manufacturing sequence can be carried out on a mass-production basis. Each of the gear-sectioned core elements preferably has an outer diameter of about 0.4 mm. and a root diameter of about 0.3 mm. across the ridges. As will be understood from the foregoing, the present invention has eliminated most of the disadvantages encountered in conventional penpoint devices for this type of writing implements and should therefore be highly economical for its practical utility.

What I claim is:

1. A penpoint structure for a writing or marking pen and the like, comprising; a plurality of elongated core elements formed from an essentially wear-resistant, inkproof synthetic resin material, said core elements each having a plurality of peripherally spaced ridges extending axially along substantially the full length thereof so as to define a gear-shaped configuration in transverse section, a small tubular bore opening extending axially through the center of each of said core elements, said plurality of core elements being positioned in a columnar bundle of adjacent core elements, and a sheath means encompassing said bundle of core elements to form a sheathed structure having a plurality of small spaces formed at

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the boundaries between said sheath means and said core elements and between adjoining core elements, said sheath means comprising a readily meltable resin material of generally the same composition as that of the core elements and adapted to be coated in liquid form on to the entire exposed peripheral surface of said bundle of core elements so as to form said sheath means, and at least one end tip portion of said assembled sheathed structure having the shape of a penpoint.

2. A penpoint structure as claimed in claim 1, wherein each of said core elements includes approximately eight to 10 of said axially extending peripherally spaced ridges.

3. A penpoint structure as claimed in claim 1, wherein the

peripheral ridges of each of said core elements form an outer core element diameter of about 0.4 mm. and a root diameter of about 0.3 mm.

4. A penpoint structure as claimed in claim 1, wherein the tubular bore opening extending through each of said core elements has a diameter of about 0.1 mm.

5. A penpoint structure as claimed in claim 1, wherein the synthetic resin material forming said core elements and said sheath means is a plastic material constituted from the group containing polyacetal resin, polyamide resin, polypropylene resin or polyethylene resin.

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