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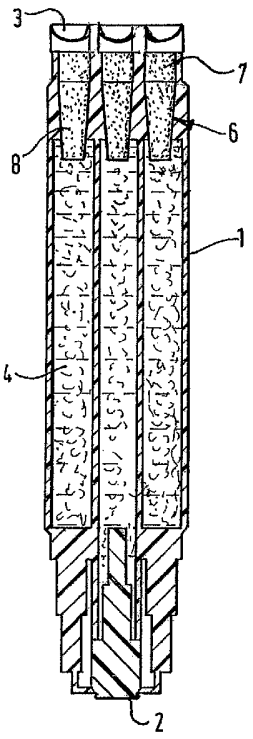
(54) Title: MARKER PENS



(57) Abstract: A marker pen comprises a housing from one end of which protrudes a plurality of fluid retaining nibs each shaped to define along an upper surface a ridge. The ribs are positioned side-by-side with adjoining ends of neighbouring ridges spaced apart by a distance of less than 1mm to define together a substantially continuous ridge. The spacing between neighbouring ridges is sufficient to inhibit migration of dye from adjoining nibs.

WO 2005/002772 A2

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MARKER PENS

This invention relates to marker pens.

Typically marker pens comprise a tubular housing having a fibrous felt-like nib connected via a liquid absorbent wick to an internal reservoir containing an indicator such as a water-based ink which contains a coloured dye. As the marker pen is used the fibrous nib is replenished with ink which travels from the reservoir by capillary action to the nib via the wick. Such pens are well known and are used *inter alia* to mark text and produce coloured effects on paper or similar materials. Known marker pens are generally used to produce a line of a single colour. Marker pens having two or more spaced nibs have been proposed. These produce two or more spaced lines of colour. To produce adjoining lines of different colour two or more pens are generally required, the nibs of the pens being in contact at their neighbouring edges. Such contact will inevitably produce colour migration from one nib to the other.

A drawing pen for drawing lines having different shades is disclosed in US-A-5388924. This pen includes a plurality of ink reservoirs positioned within a barrel and a plurality of absorptive drawing tips respectively connected to the ink reservoirs. The absorptive drawing tips have adjacent surfaces which are complementary and engaged to one another by a watertight bonding agent.

US-A-3887287 discloses a multi-colour marking implement having a body comprising a tubular container having a plurality of separate elongated internal liquid-tight chambers. Each chamber contains a different colour ink and communicates with one of a plurality of separate nibs each to provide a different marking colour for each nib.

DE-A-3918373 discloses a device capable of producing two different side-by-side or superimposed colours. The device comprises a housing including two containers for ink or paint. A collar fits over the open end of the housing and has two through holes for rods of absorbent material. These rods are enclosed in sleeves and their lower ends fit in the containers whilst their upper ends have tips suitable for writing or painting and are held apart at a defined distance by the holes in the collar.

DE-A-19933182 discloses two pens carrying the two different colours which adjoin one another and dip at the rear into fluids present in a colour-permeated sponge. The pens are separated by an impermeable dividing wall and the tip or endface of the one pen reaches beyond the other.

One object of the present invention is to provide a marker pen capable of producing in one stroke a stripe of two or more colours with no, or very limited, colour migration between neighbouring stripes.

According to the present invention in another aspect, there is provided a marker pen which comprises a housing from one end of which protrudes a plurality of fluid retaining nibs each shaped to define along an upper surface a ridge, the nibs being positioned side-by-side with adjoining ends of neighbouring ridges spaced apart by a distance of less than 1mm to define together a substantially continuous ridge, the spacing between neighbouring ridges being sufficient to inhibit migration of dye from adjoining nibs.

The spacing between neighbouring nibs is preferably around 0.5mm.

Each nib may be replenished by a coloured dye present in a chamber positioned within the housing. A separate chamber may be provided for each nib.

Two, three, or more nibs may be provided. The continuous ridge may, for example, be straight, curvilinear or angled.

The or each nib may be triangular in cross-section with the apex of the triangle defining the nib ridge. In this arrangement, the sides of the nib may each be inclined downwardly from the ridge at the same or approximately the same angle. Alternatively, one nib side may extend generally vertically from the ridge.

In an alternative arrangement, the or each nib comprises a wall whose upper edge defines a ridge, the wall upstanding from a generally horizontal base.

The ridge lengths of neighbouring nibs may be the same or may differ. Preferably, the dyes applied to neighbouring nibs are or different colour.

The nibs are preferably produced from a relatively inflexible and may comprise the material POREX. This is a porous fluid retaining substance which holds its shape when applied to a surface in the manner of a marker to paper, card or like material. Other materials having similar physical properties may, however, be used.

The nibs may be connected to receive fluid from the chambers through wicks. The chambers typically comprise transorbs. A transorb essentially comprises a quantity of fluid retaining fibrous material positioned within an impermeable sheath. The fluid retaining material may be a fibrous material. The sheath is typically open at both ends one of which receives the wick by which fluid present in the transorb is passed by capillary action to the respective nib of a marker pen.

The chambers may be tubular in cross-section with their outer walls lying adjacent to or in contact with the inner wall of the housing.

The fluids present in the chambers may comprise indicators such as a water-based ink containing coloured dyes, dispersed pigments or other colouring media. Alternatively, the fluids may comprise oil-based coloured dyes.

One or more of the transorbs may be retractably or removably mounted within the housing to vary the length of the continuous ridge or to change the colours to be applied by one or more of the nibs.

In another aspect, the invention provides a marker pen including a plurality of fluid retaining nibs protruding from one end of an elongate housing, and a relatively narrow ridge formed across the width of each nib and defining with the ridge or ridges of the other nib or nibs a substantially continuous ridge from which fluid can be transferred to a surface, neighbouring nibs being separated by a distance just sufficient to prevent or inhibit migration of fluid between neighbouring nibs.

A cap may be provided to locate on the pen housing and over the nibs. The rim of the cap preferably abuts an annular abutment surface formed in the casing and to seal the nibs from the atmosphere. A flexible 'O' ring seal is preferably positioned within an annular recess close to the abutment surface, the outer surface of the 'O' ring seal bearing against an opposed internal surface of the cap when the cap is fitted onto the housing.

The invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:-

Figure 1 is a side view of a marker in accordance with the invention;

Figure 1a is a side view of a cap for the marker illustrated in Figure 1;

Figure 2 is a section taken through the marker shown in Figure 1;

Figures 3 and 4 are respectively end and side views of a nib of the maker shown in Figure 1; and

Figures 5 and 6 are respectfully perspective and plan views from above of an assembly of three of the marker nibs shown in Figure 1.

The illustrated marker pen comprises an elongate hollow outer housing 1 typically produced from a plastics material. Other materials can however be employed. One end of the housing 1 is closed by a bung 2. This end may, however, be permanently sealed. Protruding from the other open end of the housing are three fluid retaining nibs 3.

Positioned within the casing are three elongate transorbs 4 each comprising a mass of fluid retaining fibrous material encased within an impermeable plastics sheath. The sheath material may comprise a sleeve of impermeable material, e.g. PVC. Each transorb 4 may be retained within a separate tubular chamber located within the housing; alternatively the transorbs may be positioned side-by-side within the housing with their impermeable sheaths in contact.

Each nib 3 is produced from a porous material such as that marketed under the trade name POREX. Other materials having the same or similar properties to POREX may be employed. POREX is a mouldable porous material produced by or on behalf of Porex Technologies Corporation. Essentially it comprises a sintered mass of thermoplastic polymer pellets, especially micropellets made by rapid water quenched pelletizing of the polymers. The pellets are generally of a uniform size and shape, each having approximately equal dimensions along three mutually perpendicular axes, have smooth surfaces, narrow pore size distributions, greater strength and other improved characteristics.

As will be seen from Figure 4, each nib is of generally triangular shape and includes a ridge 5 positioned at the apex of the triangle. Two inclined surfaces project downwardly from the ridge. Fluid from the respective transorb passes by capillary action to the ridge of each nib through a POREX wick 6. As will be seen from Figures 1, 2, 5 and 6 the nibs are separated by a small distance of no more than 1mm. Typically, the distance is around 0.5mm. A typical range of distances is between 0.25 and 0.75mm. The individual nibs thereby together define a single continuous ridge from which ink of, say, three different colours can be applied to a surface as a single line with one stroke of the marker pen. The width of the line produced will vary depending on the angle at which the nibs are presented to the surface.

As will be seen from Figures 1 and 1a, a cap 9 is provided to seal the nibs 3 from the atmosphere when not in use. An elastomeric 'O' ring seal 10 is located within an annular recess formed in the casing end close to a ridge 11 which defines an abutment surface against which the rim 12 of the cap can abut. When the cap 9 is positioned on the casing, the outer surface of the seal 10 bears against the cap interior to provide an additional seal for the nibs.

As will be seen from the drawings, that part of each POREX nib which acts as a wick has an upper collar portion 7 of generally constant diameter or thickness, and a tapering shank 8. Typically, the nib diameter (and therefore the ridge length) is of the order of 8.1mm and the collar diameter 6mm. The length of the collar is typically 5mm and the length of the shank is typically 14mm. The diameter of the end of the shank is typically 4mm.

One or more of the transorbs and contacting nibs may be retractable, removable or replaceable either to vary the number of nibs which are used simultaneously at any given time to change or the colours which can be applied to a surface by the marker pen.

As shown, the marker pen has three protruding nibs. Two or more than three nibs may be provided. Also, the length of the ridges 5 may vary; thus, the length of the outermost ridges of a pen having, for example, five nibs may be less than that of the central three pens to provide narrow and possibly darker margins for the multi-coloured line produced by the marker pen.

It will be appreciated that the foregoing is purely exemplary of marker pens in accordance with the Invention and that modifications can readily be made without departing from the three scope of the invention as set out in the appended claims.

CLAIMS:

1. A marker pen which comprises a housing from one end of which protrudes a plurality of fluid retaining nibs each shaped to define along an upper surface of a ridge, the nibs being positioned side-by-side with adjoining ends of neighbouring ridges spaced apart by a distance of less than 1mm to define together a substantially continuous ridge, the spacing between neighbouring ridges being sufficient to inhibit migration of dye from adjoining nibs.

2. A pen as claimed in claim 1 wherein the spacing between neighbouring nibs is approximately 0.5mm.

3. A pen as claimed in claim 1 or claim 2 wherein each nib is replenished by a coloured dye present in a chamber positioned within the housing.

4. A pen as claimed in claim 3 wherein a separate chamber is provided for each nib.

5. A pen as claimed in any one of the preceding claims wherein two, three or more nibs are provided.

6. A pen as claimed in any one of the preceding claims wherein the continuous ridge is straight, curvilinear or angled.

7. A pen as claimed in any one of the preceding claims wherein each nib is triangular in cross-section with the apex of the triangle defining the nib ridge.

8. A pen as claimed in claim 7 wherein the sides of each nib are each inclined downwardly from the ridge at the same or approximately the same angle.

9. A pen as claimed in claim 7 wherein one side of each nib extends generally vertically from the ridge.

10. A pen as claimed in any one of claims 1 to 6 wherein each nib comprises a wall whose upper edge defines a ridge, the wall upstanding from a generally horizontal base.

11. A pen as claimed in any one of the preceding claims wherein the ridge lengths of neighbouring nibs is the same.

12. A pen as claimed in any of the preceding claims wherein dyes applied to neighbouring nibs are of different colour.

13. A pen as claimed in any one of the preceding claims wherein the nibs are produced from a relatively inflexible material and may comprise a porous fluid retaining substance which holds its shape when applied to a surface.

14. A pen as claimed in any one of claims 3 to 13 wherein the nibs are connected to receive fluid from the chambers through wicks.

15. A pen as claimed in any one of claims 3 to 14 wherein the chambers are tubular in cross-section with their outer walls lying adjacent to or in contact with the inner wall of the housing.

16. A pen as claimed in any one of claims 3 to 15 wherein the chambers comprise transorbs.

17. A pen as claimed in claim 16 wherein one or more of the transorbs is retractably or removably mounted within the housing to vary the length of the continuous ridge or to change the colours to be applied by one or more of the nibs.

18. A marker pen including a plurality of fluid retaining nibs protruding from one end of an elongate housing, and a relatively narrow ridge formed across the width of each nib and defining with the ridge or ridges of the other nib or nibs a substantially continuous ridge from which fluid can be transferred to a surface, neighbouring nibs being separated by a distance just sufficient to prevent or inhibit migration of fluid between neighbouring nibs.

19. A pen as claimed in claim 18 including a cap locatable on the pen housing and over the nibs.

20. A pen as claimed in claim 19 wherein the rim of the cap abuts an annular abutment surface formed in the casing and to seal the nibs from the atmosphere.

21. A pen as claimed in claim 20 wherein a flexible "O" ring seal is positioned within an annular recess close to the abutment surface, the outer surface of the "O" ring seal bearing against an opposed internal surface of the cap when the cap is fitted onto the housing.

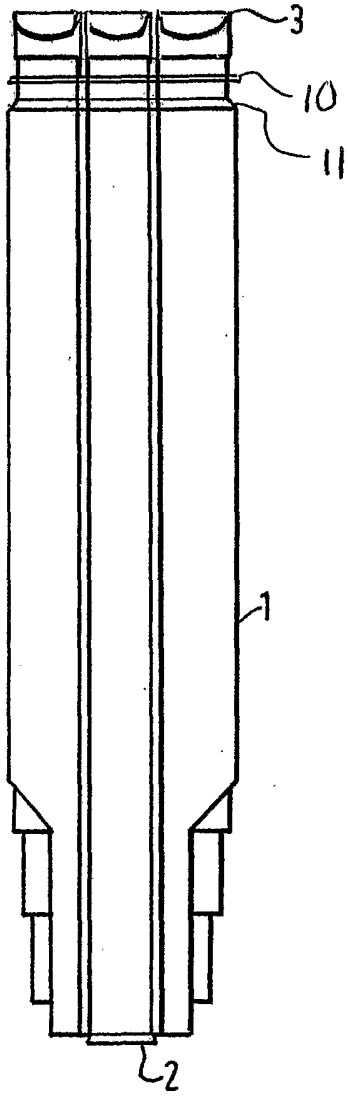

Fig.1.

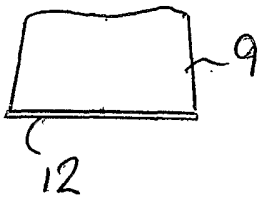

Fig. 1a.

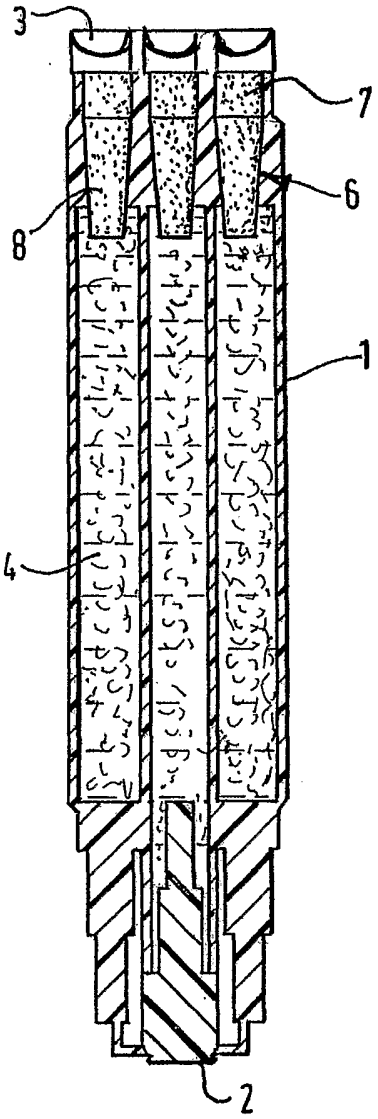

Fig.2.

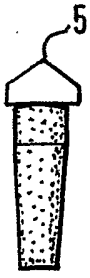

Fig.3.

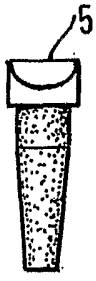

Fig.4.

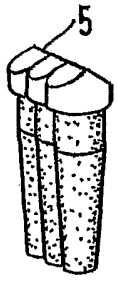

Fig.5.

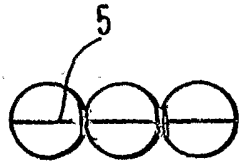

Fig.6.