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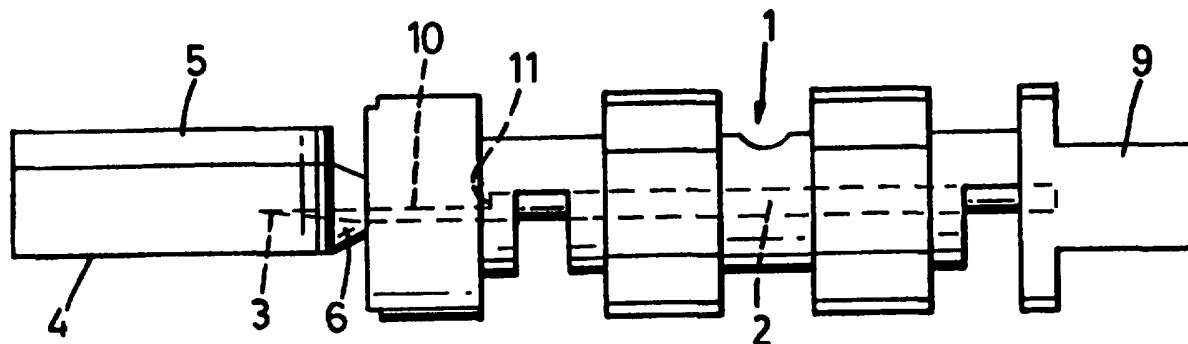
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(54) Title: BLOOD SAMPLING DEVICE



(57) Abstract

A lancet has a needle (2) embedded in a plastics body (1), its tip (3) projecting from the forward end but being initially encased in a cap (4). This cap (4) may be integrally moulded with the body, around the needle tip (3), and be sheared away before use. The needle (2) can be pushed back in relation to the body (1) after use, conveniently by applying the cap (4) to the tip (3), until the tip is safely flush with, or set back with respect to the leading end of the body (1). The rear end of the body (1) has a structure (9) to prevent the rear end of the needle (2) being pushed forwards again.

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BLOOD SAMPLING DEVICE

This invention relates to blood sampling devices, and in particular to a lancet for pricking the skin to draw a small drop of blood for analysis. Such prickers are widely used by diabetics, for example, who need to know their sugar level. However, there are many other applications.

There is an obvious need to make the sharp tip of the lancet safe after use. There have been various proposals for having the lancet as part of a cheap, disposable device which, after a single use, can be thrown away with the lancet automatically retracted inside the body and thus made safe. These are very handy, but in the long run it is more expensive to use them than to have a permanent firing mechanism and to load it when required with a lancet. But then the lancet must be made safe after removal.

The usual form of lancet has a steel needle encased in an elongate plastics body. A cap is moulded integrally with this body and initially the tip of the needle is embedded in it. But the connection between the cap and the body is weak and the cap can be pulled free to expose the tip. After use, the cap may be used to cover the needle tip again, and it may be re-oriented to fit over the forward end of the body.

The needle tends to be smooth and the plastics material of the body does not have much grip on it. It can happen that, when breaking the cap free, the cap is squeezed or angled with respect to the body sufficiently to pull the needle forwardly by its tip with respect to the body. There is then a lancet with a needle tip extending too far.

There is also a trend towards making the needle thinner, to achieve an even sharper point, and therefore a less noticeable prick. But the needle also serves to give some strength to the lancet as a whole, providing a reinforcing rod along its axis. If it is too thin, the lancet is
5 able to bend rather easily, and this is unsatisfactory.

It is the aim of aspects of this invention to remedy these faults.

According to one aspect of the present invention there
10 is provided a lancet for a skin pricker comprising a needle, an elongate body of moulded plastics material encasing most of the needle, and a breakaway cap integrally moulded with the body and initially encasing the tip of the needle, which is exposed at the forward end of the body when the cap is
15 removed, the needle being longitudinally movable rearwardly within the body to retract the needle tip after use.

Thus, instead of trying to place the cap back over the end of the lancet after use, the needle is pushed backwards in relation to the body until the tip is flush with or
20 recessed into the forward end. This pushing may be done using the original cap, which may be adapted for the operation. For example, the leading end of the body may be recessed, and the cap may have a projection which can enter the recess when pushing the tip of the needle.

25 Conventionally, the needle extends along the entire length of the plastics body. If it is shifted rearwardly after use, it will project from the rear end; and then one knock on that end will send it forwards again to project the

needle tip. To avoid this, the rear end of the body will preferably be adapted to shield the rear end of the needle when the needle is retracted.

Preferably, the needle has a formation whose engagement
5 by the plastics body prevents its longitudinal movement in the forward direction relative to the body beyond the initial tip projecting position, but does not impede such movement in the rearward direction.

The needle may be of reduced cross-section over a
10 leading length portion, the enlargement to a full cross-section being within the plastics body and preventing the forward movement. The needle will usually be generally cylindrical and a flat formed over the leading length
15 portion can make the reduced cross-section. The flat may be substantially diametral and the enlargement a forwardly facing shoulder formed by the rear end of the flat.

According to another aspect of the present invention there is provided a needle for a lancet, the needle having a sharp point at its forward end and an enlargement in
20 cross-section to the rear of the tip.

The needle is preferably generally cylindrical but with its leading end portion having a flat formed therein and being tapered to a sharp point.

The flat may be substantially diametral, and the
25 shoulder formed at its rear end will provide the enlargement. When embedded in a plastics body, this shoulder will provide an abutment preventing the needle from being pulled forwards when the cap is removed. But of course it will be

no impediment to the needle being pushed rearwardly.

The flat also helps to achieve a really sharp point, with a cross-sectional size of a thin needle, but it leaves most of the length of the needle with its original cylindrical form, so that its reinforcing properties are not significantly impaired.

For a better understanding of the invention, one embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:

10 Figure 1 is a side view of a lancet in a pre-use condition,

Figure 2 is another side view of the lancet viewed in the direction A of Figure 1, showing its encased needle.

Figure 3 is a rear end view of the lancet,

15 Figure 4 is a perspective view of the needle that forms part of the lancet, and

Figure 5 shows stages of use of the lancet.

The lancet has an elongate body 1 of moulded plastics material. It resembles the spool of a spool valve, having 20 alternating large and small diameter sections. Co-axially encased within it there is a needle 2, indicated in broken lines in Figure 2, which projects in a sharp tip 3 at the forward end.

This tip is initially encased in a cap 4 which is in 25 the form of a disc with a diametral rib 5. This could be shortened to a central stud. The cap is integrally moulded with the body 1 and connects to it by a neck 6 which will be weak enough to be sheared off from end surface 7 by a

twisting action. The forward end of the body 1 has a transverse recess 8 in which the surface 7 forms the base.

At the other end, the body 1 is extended by two opposed wings 9 projecting rearwardly. In the initial state, the rear end portion of the needle 2 is fully embedded in the body with its end face aligned with the roots of these wings.

The larger diameter portions of the body 1, at least towards the rear, are not smoothly cylindrical on their outer surfaces. They have indentations as best seen in Figure 3. This is to afford a grip for formations within the firing device to stop the body 1 rotating about its axis when the cap 4 is twisted off.

Referring to Figure 4, the needle 2 is cylindrical over most of its length. But at its forward end a flat 10 is formed, conveniently by grinding, before or during the operation to produce the sharp tip 3. This flat extends back from the extremity of the tip to a radial, semi-circular shoulder 11.

Referring to Figure 5, stage (a) shows the lancet in its pre-use state, as in Figures 1 and 2. The cap 4 is then twisted off to leave the needle tip 3 exposed as in stage (b). The pricker is then used. Although the needle 2 is slidable within the body 1 there is considerable friction preventing this. The resistance of the user's skin to the sharp tip will be substantially less than the force needed to shift the needle relative to the body, and so for the actual pricking operation the needle will remain fast with

the body.

After use, the cap 4 is offered up as in stage (c) with its rib 5 towards the forward end of the lancet body 1. It is then pressed against it to achieve stage (d). Here, the rib 5 has pushed the needle rearwardly and entered the recess 8, so the tip of the needle is flush with the surface 7 and thus safe. At the same time, the rear end of the needle 2 projects, but is shielded between the wings 9. The cap can then be thrown away, and so can the lancet be discarded, it now being in the state illustrated at stage (e).

It will be appreciated that the shoulder 11 will stop the needle 2 being drawn forward out of the body 1 when the cap is removed, but will not impede the needle being pushed backwards.

Instead of relying on friction to hold the needle in the forward position during the pricking operation, other measures could be taken. For example, the body moulding could form a thin plastics membrane over the rear end of the needle. This would be strong enough to remain unbroken while the skin was being pricked, but weak enough to be pierced by the rear end of the needle when the cap was pushed against the tip. Another way would be to make a very small flat at the rear end of the needle, whose main length could be forced through the resultant slightly narrowed throat formed by the flat.

CLAIMS

1. A lancet for a skin pricker comprising a needle, an elongate body of moulded plastics material encasing most of the needle, and a breakaway cap integrally moulded with
5 the body and initially encasing the needle, which is exposed at a forward end of the body when the cap is removed, the needle being longitudinally movable rearwardly within the body to retract the needle after use.

2. A lancet as claimed in Claim 1, wherein the cap is
10 adapted to serve as an implement for pushing the tip of the needle, after use, back into the body.

3. A lancet as claimed in Claim 2, wherein the forward end of the body is recessed and the cap has a projection which can enter the recess when pushing the tip
15 of the needle.

4. A lancet as claimed in Claim 1, 2 or 3, wherein the rear end of the body is adapted to shield the rear end of the needle when the needle is retracted.

5. A lancet as claimed in any preceding claim,
20 wherein the needle has a formation whose engagement by the plastics body prevents its longitudinal movement in the forward direction relative to the body beyond the initial tip projecting position, but does not impede such movement in the rearward direction.

25 6. A lancet as claimed in Claim 5, wherein the needle is of reduced cross-section over a leading length portion, the enlargement to a full cross-section being within the plastics body and preventing the forward movement.

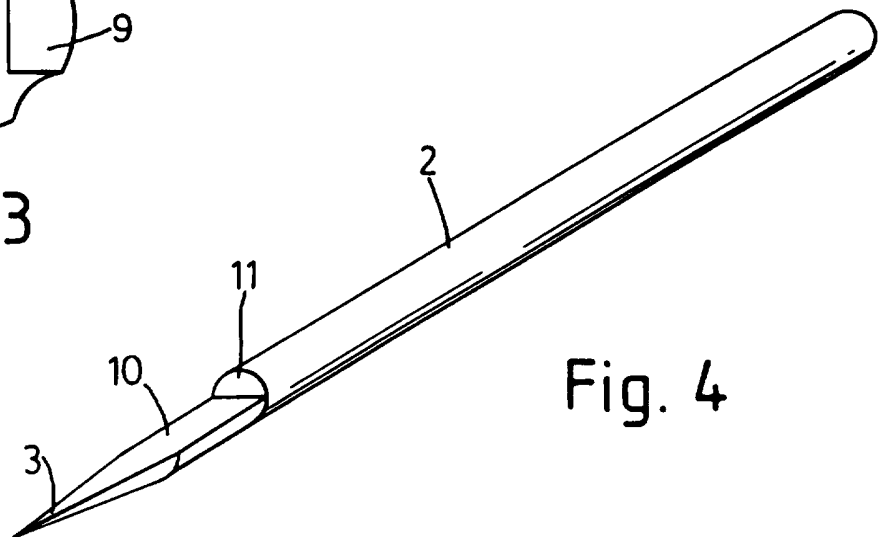
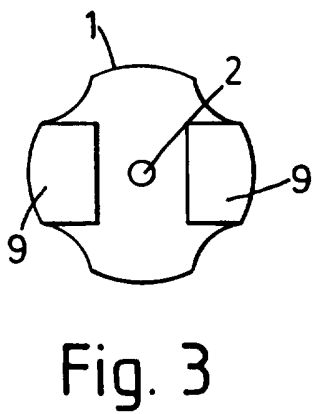
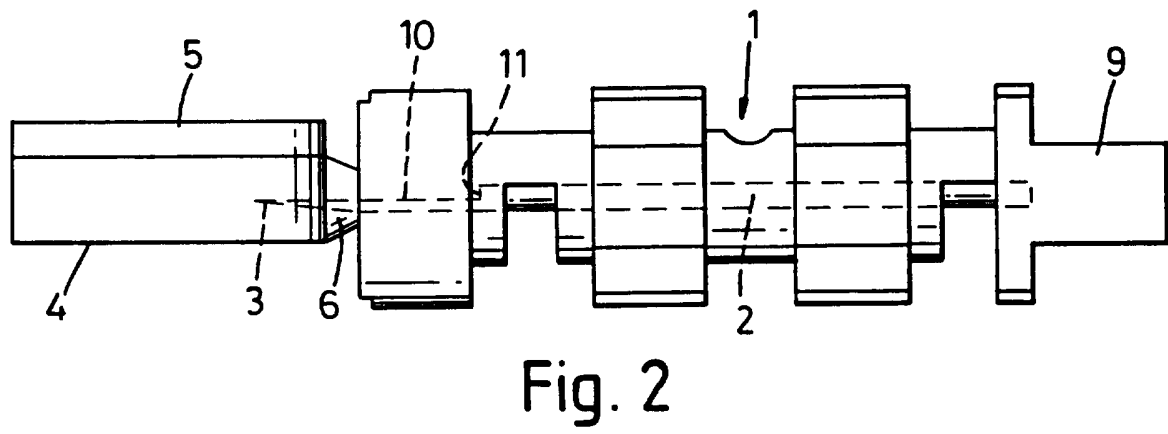
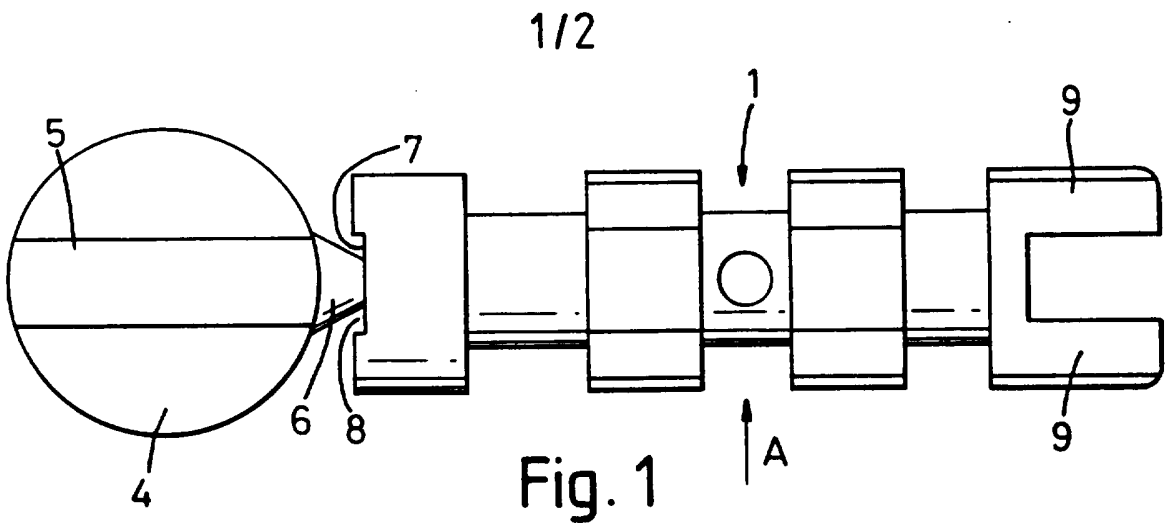
7. A lancet as claimed in Claim 6, wherein the needle is generally cylindrical with a flat formed over the leading length portion to make the reduced cross section.

8. A lancet as claimed in Claim 7, wherein the flat is substantially diametral and the enlargement is a forwardly facing shoulder formed by the rear end of the flat.

9. A needle for a lancet, the needle having a sharp point at its forward end and an enlargement in cross-section to the rear of the tip.

10. A needle as claimed in Claim 9, wherein the needle is generally cylindrical but with its leading end portion having a flat formed therein and being tapered to said sharp point.

11. A needle as claimed in Claim 10, wherein the flat is substantially diametral and the shoulder formed at its rear end provides the enlargement.



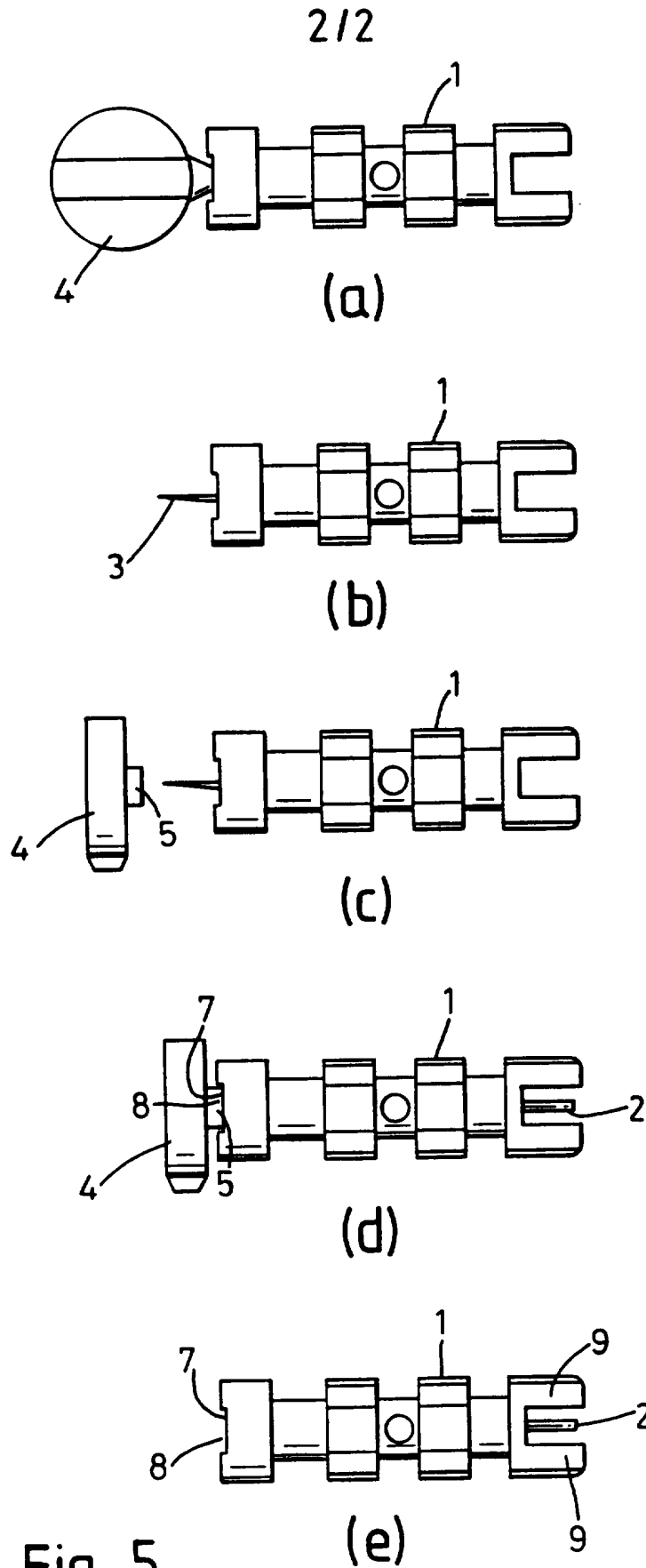


Fig. 5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 95/01652

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4889117	26-12-89	NONE	
FR-A-2595237	11-09-87	NONE	

INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61B5/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61B A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,4 889 117 (P.A. STEVENS) 26 December 1989	1,2,5,9
X	see column 2, line 61 - column 3, line 59; figures 1-5	10

A	FR,A,2 595 237 (C.J. SALAUN) 11 September 1987 see page 4, line 6 - page 5, line 25	1,6-11

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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