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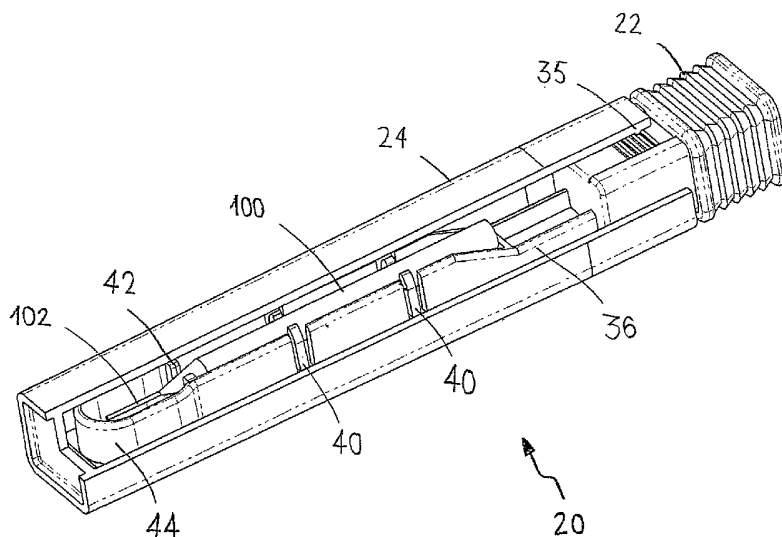
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(54) Title: PRECISION TOOL CASE



(57) Abstract: A precision-tool case, for storing a precision tool, the tool comprising a shank and a processing tip. The case (20) comprises: a cap (24) comprising a walled cavity, having an opening; a carrier (22) comprising a base (30) adapted to be plugged into the opening of the cap, a portion of the base left exposed outside the cap for holding the base when opening the case, and a carrier platform (32) adapted to be spaciouly nested within the cap, when the base is plugged into the cap in a closed state of the case, the carrier platform projecting from the base for carrying the tool, the carrier comprising two substantially parallel protective walls (36, 38) defining a space between them in which the tool is to be positioned, at least two support members (40) for supporting the shank of the tool, and stoppers (46, 42) limiting the tool, when in position, from traveling back and fro in between the protective walls, the protective walls joining at a distal end to form a peripheral protective wall.

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PRECISION TOOL CASE

FIELD OF THE INVENTION

The present invention relates to packing. More particularly it relates to packing of
5 precision tools.

BACKGROUND OF THE INVENTION

Precision tools, and in particular micro tools, are processing tools (such as, for example,
cutting, chipping, milling tools) that have a very delicate, vulnerable tip. Typical micro
10 tools have a tip that is very thin and small and its radius varies from 0.1 mm to 1 mm.
The tip may vary in shape, according to the intended use. The tip is usually coupled to a
shank of greater diameter (typically of 3-4 mm).

Due to their delicate nature, micro tools are manufactured with special care, and shipped
in protective casing, where great attention is directed to keeping the tip intact. Any
15 inadvertent touching of the tip may result in irrecoverable damage. In order to avoid that
the tool must be secured in position, prevented from shifting and moving within the
casing, and the protecting cover must remain distanced from the tip.

It is an object of the present invention to provide novel casing for micro-tools.

Another object of the present invention is to provide such casing that is easily handled.

20 Another object of the present invention is to provide such casing that renders the
charging and discharging of the tool simple and safe.

Other advantages and aspects of the present invention will become apparent after
reading the present specification and reviewing the accompanying drawings.

25 SUMMARY OF THE INVENTION

There is thus provided, in accordance with a preferred embodiment of the present
invention, a precision-tool case, for storing a precision tool, the tool comprising a shank
and a processing tip, the case comprising:

a cap comprising a walled cavity, having an opening;
30 a carrier comprising a base adapted to be plugged into the opening of the cap, a portion
of the base left exposed outside the cap for holding the base when opening the case, and
a carrier platform adapted to be spaciouly nested within the cap, when the base is

plugged into the cap in a closed state of the case, the carrier platform projecting from the base for carrying the tool, the carrier comprising two substantially parallel protective walls defining a space between them in which the tool is to be positioned, at least two support members for supporting the shank of the tool, and stoppers limiting the tool, when in position, from traveling back and fro in between the protective walls, the protective walls joining at a distal end to form a peripheral protective wall.

5

Furthermore, in accordance with a preferred embodiment of the present invention, the cap is shaped in the form of a rectangular box.

Furthermore, in accordance with a preferred embodiment of the present invention, the rectangular box has a tapered portion.

10

Furthermore, in accordance with a preferred embodiment of the present invention, a bottom wall is provided on which the protective walls are erected.

Furthermore, in accordance with a preferred embodiment of the present invention, an opening is provided in the bottom wall about the distal end, so as to allow the tip to protrude if the tool is picked up with its shank first.

15

Furthermore, in accordance with a preferred embodiment of the present invention, a dent is provided in the bottom wall so as to allow pressing down an end of the shank of the tool and raising it to be picked up from the carrier.

Furthermore, in accordance with a preferred embodiment of the present invention, the two substantially parallel protective walls are provided with an inclination exposing a tip of the shank in the vicinity of the dent so as to facilitate convenience access to the tip of the shank.

20

Furthermore, in accordance with a preferred embodiment of the present invention, the base is provided with a rough surface and the cap is provided with a protruding rim in order to enhance friction between the cap and carrier when in a closed position, preventing inadvertent disengagement between the cap and the carrier.

25

Furthermore, in accordance with a preferred embodiment of the present invention, the support members comprise incomplete rings, having two arms with a gap in between them.

Furthermore, in accordance with a preferred embodiment of the present invention, the gap between the arms is narrow enough to allow the the shank of tool to be forced in.

30

Furthermore, in accordance with a preferred embodiment of the present invention, the exposed portion of the base is provided with a rough surface.

5 BRIEF DESCRIPTION OF THE DRAWINGS

In order to better understand the present invention, and appreciate its practical applications, the following Figures are provided and referenced hereafter. It should be noted that the Figures are given as examples only and in no way limit the scope of the invention. Like components are denoted by like reference numerals.

10 Fig. 1 illustrates a precision-tool case, in accordance with a preferred embodiment of the present invention, in a closed position.

Fig. 2 illustrates the case shown in Fig. 1, in a partially opened state.

Fig. 3 illustrates a see-through view of the case shown in Fig. 1, in a closed state.

Fig. 4 illustrates the carrier portion of the case shown in Fig. 1.

15 Fig. 5a illustrates a cross-sectional view of the carrier portion of the case shown in Fig. 1.

Fig. 5b illustrates a top-view of the carrier portion of the case shown in Fig. 1.

20 DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

A main aspect of the present invention is the provision of a case for a precision-tool, that provides both protection and housing for the tool, by way of two intersliding parts, a carrier and a cap acting as a cover into which most of the carrier is plugged in, when closed. The carrier is designed to carry the tool, supporting from at least two supporting
25 points, while at the same time providing protection for its vulnerable tip.

Reference is made to Fig. 1, illustrating a precision-tool case, in accordance with a preferred embodiment of the present invention, in a closed position.

The case, generally assigned numeral 20, comprises two main parts: plug 22 and cover 24. In the closed position most of the plug (whose design is revealed in the following
30 figures) is inserted within cover 24. Cover 24 has a rectangular cross-section, presenting a rectangular box, closed from all but one sides, but in fact may as well have any other covering shape, corresponding to the plug, that is designed to be inserted within. The

walls of front portion 26 are substantially parallel, designed to receive base 30 of plug 22 (see Fig. 2), whereas the remaining portion 28 of cover 24 is tapered. Note that this design for the cover is merely a suggestion, and indeed other protective cover designs will do too.

5 Fig. 2 illustrates the case shown in Fig. 1, in a partially opened state. Plug 22 is preferably provided with a rough surface (here in the form of ribs 23) at the exposed holding end (which remains outside cover 24, when the case is in the closed position), in order to enhance friction and facilitate better grip. Adjacent the holding end is base 30, here in the form of a box, designed to closely fit front portion 26 of cover 24, so as
10 to secure the carrier and lock it in position within the cover, and ensure no accidental inadvertent disengagement occurs. Base 30 is preferably provided with ribs 34 interacting with eminence 35 (see Fig. 3) provided on the inside of cover 24, close to its rim, when the case is closed, offering further enhanced friction to hold the carrier in place within the cover. Micro-tool 100 (its shank showing) is placed within two
15 substantially parallel walls 36, 38, on carrier platform 32 projecting from base 30.

Fig. 3 illustrates a see-through view of the case shown in Fig. 1, in a closed state. Tool 100 is in fact supported within the case on two support (incomplete) rings 40, having a gap in between the arms of the ring through which the tool (the shank) is inserted, and which hold the tool in position. An additional support 42 is provided for the tapered
20 portion of the shank at the end of which the tool's tip is located. The additional support 42 is narrower than the diameter of the shank, and ensures that tool 100 does not slide forward, hitting the cover or other part of the case with the tip. The rest of the tool is suspended in air and does not touch any other part of the case.

The arms of the incomplete rings are preferably designed with a gap that is narrow
25 enough to allow the the shank of tool 100 to be forced in, so that some friction is exerted by the arms on the shank when it is mounted on the carrier platform or dismounted from it, requiring some force to be used in the process, and thus ensuring that the tool is held in place and prevented from undesired dismounting off the carrier platform. For that aim the gap between the arms ought to be equal to the diameter of the
30 shank or even slightly smaller, provided the arms possess some flexibility, allowing them to be pushed apart, to regain their position after the shank is positioned in place.

Fig. 4 illustrates the carrier portion of the case shown in Fig. 1. Note that a stopper wall 46 is provided on carrier platform 32 to prevent the tool from sliding backwards, whereas support 40, due to its narrower opening, prevents the tool from sliding forward. Note that parallel walls 36 and 38 are provided with optional inclination 39, so as to expose the end of the shank.

Fig. 5a illustrates a cross-sectional (line A-A, see Fig. 5b) view of the carrier portion of the case shown in Fig. 1. The tip 102 of tool 100 is protected by perimeter wall 44, defining, together with support 42 a closure in which the tip is kept. This offers peripheral protection to the tip. Note that carrier platform 32 ends beneath support 42, leaving an opening 45, so that the tip is accesible and can be viewed both from top and bottom. Dent 37 is optionally provided on carrier platform 32. so as to allow tool 100 to be removed from the case by pressing down its distal tip (end of the shank), causing it to rise above the protective walls of the case, and picking it up. However, in the event of erroneously picking up the tool from its distal tip, the absence of platform beneath the tip makes it possible for the tip to protrude downwads, without hitting any wall. Inclination 39 is provided to allow accessing the tip of the shank and pressing it down. Also note that the arms of the support ring 40 that is located nearest to support 42, is designed to provide some support to the tool when in its raised position, so as to allow its resting in that position. This is achieved by designing the gap between the arms to exert some force and cause friction on the shank when in between them.

Fig. 5b illustrates a top-view of the carrier portion of the case shown in Fig. 1, with cross-section line A-A indicated on it.

The case may be manufactured from a large variety of materials, and it is recommended to manufacture it from plastics.

It should be clear that the description of the embodiments and attached Figures set forth in this specification serves only for a better understanding of the invention, without limiting its scope.

It should also be clear that a person skilled in the art, after reading the present specification could make adjustments or amendments to the attached Figures and above described embodiments that would still be covered by the present invention.

CLAIMS

1. A precision-tool case, for storing a precision tool, the tool comprising a shank and a processing tip, the case comprising:
a cap comprising a walled cavity, having an opening;
5 a carrier comprising a base adapted to be plugged into the opening of the cap, a portion of the base left exposed outside the cap for holding the base when opening the case, and a carrier platform adapted to be spaciouly nested within the cap, when the base is plugged into the cap in a closed state of the case, the carrier platform projecting from the base for carrying the tool, the carrier comprising two substantially parallel protective
10 walls defining a space between them in which the tool is to be positioned, at least two support members for supporting the shank of the tool, and stoppers limiting the tool, when in position, from traveling back and fro in between the protective walls, the protective walls joining at a distal end to form a peripheral protective wall.
2. The case of claim 1, wherein the cap is shaped in the form of a rectangular box.
- 15 3. The case of claim 2, wherein the rectangular box has a tapered portion.
4. The case of claim 1, wherein a bottom wall is provided on which the protective walls are erected.
5. The case of claim 4, wherein an opening is provided in the bottom wall about the distal end, so as to allow the tip to protrude if the tool is picked up with its shank first.
- 20 6. The case of claim 4, wherein a dent is provided in the bottom wall so as to allow pressing down an end of the shank of the tool and raising it to be picked up from the carrier.
7. The case of claim 6, wherein the two substantially parallel protective walls are provided with an inclination exposing a tip of the shank in the vicinity of the dent so as
25 to facilitate convenience access to the tip of the shank.
8. The case of claim 1, wherein the base is provided with a rough surface and the cap is provided with a protruding rim in order to enhance friction between the cap and carrier when in a closed position, preventing inadvertent disengagement between the cap and the carrier.
- 30 9. The case of claim 1, wherein the support members comprise incomplete rings, having two arms with a gap in between them.

10. The case of claim 9, wherein the gap between the arms is narrow enough to allow the shank of tool to be forced in.
11. The claim of claim 1, wherein the exposed portion of the base is provided with a rough surface.
- 5 12. A precision tool case, substantially as described in the present specification, accompanying drawings and appending claims.

Fig. 2

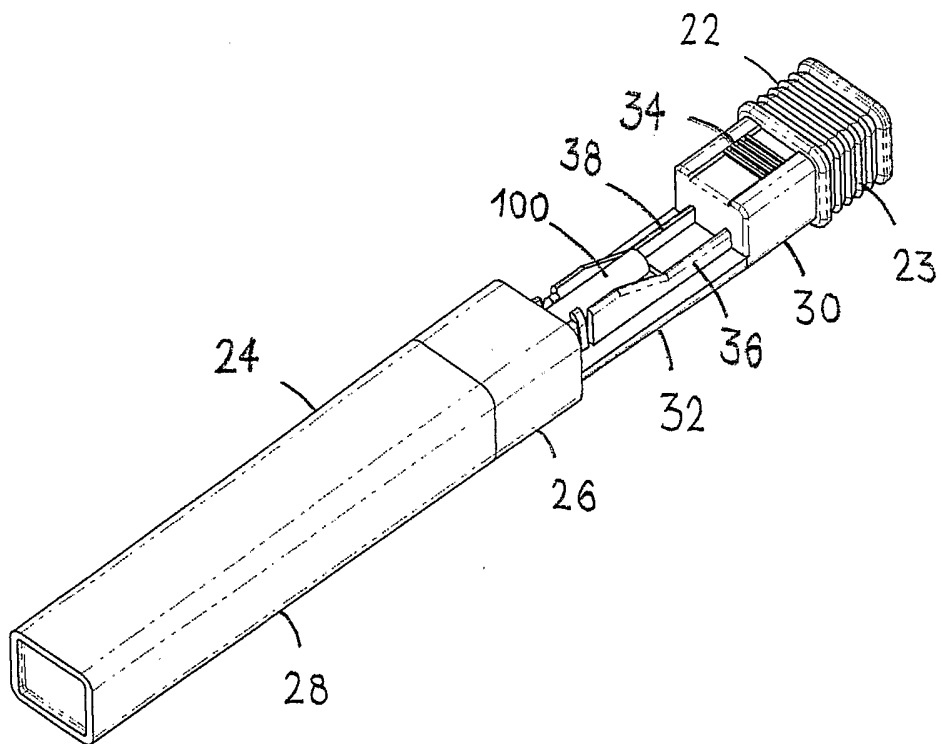


Fig. 3

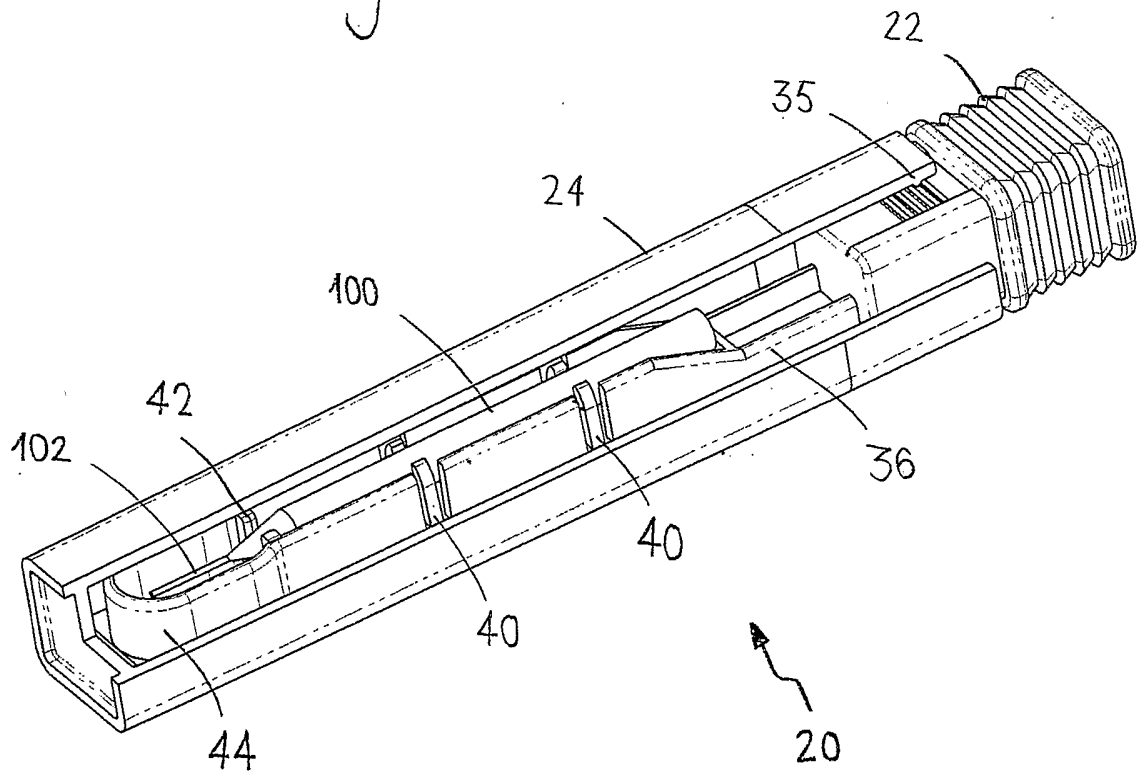


Fig. 4

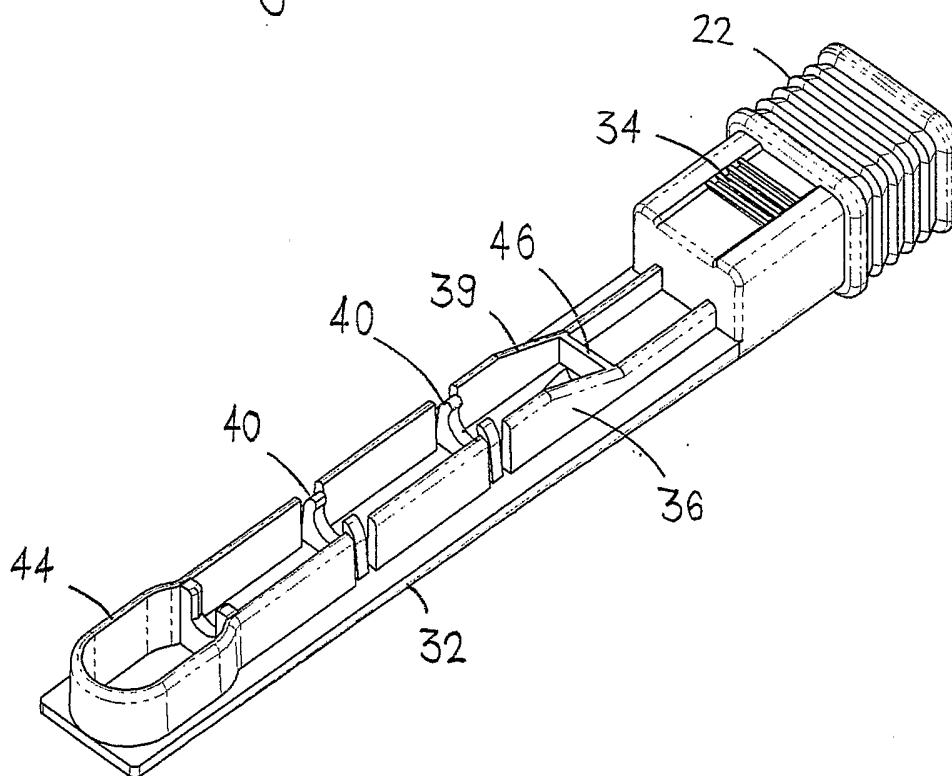


Fig. 5a

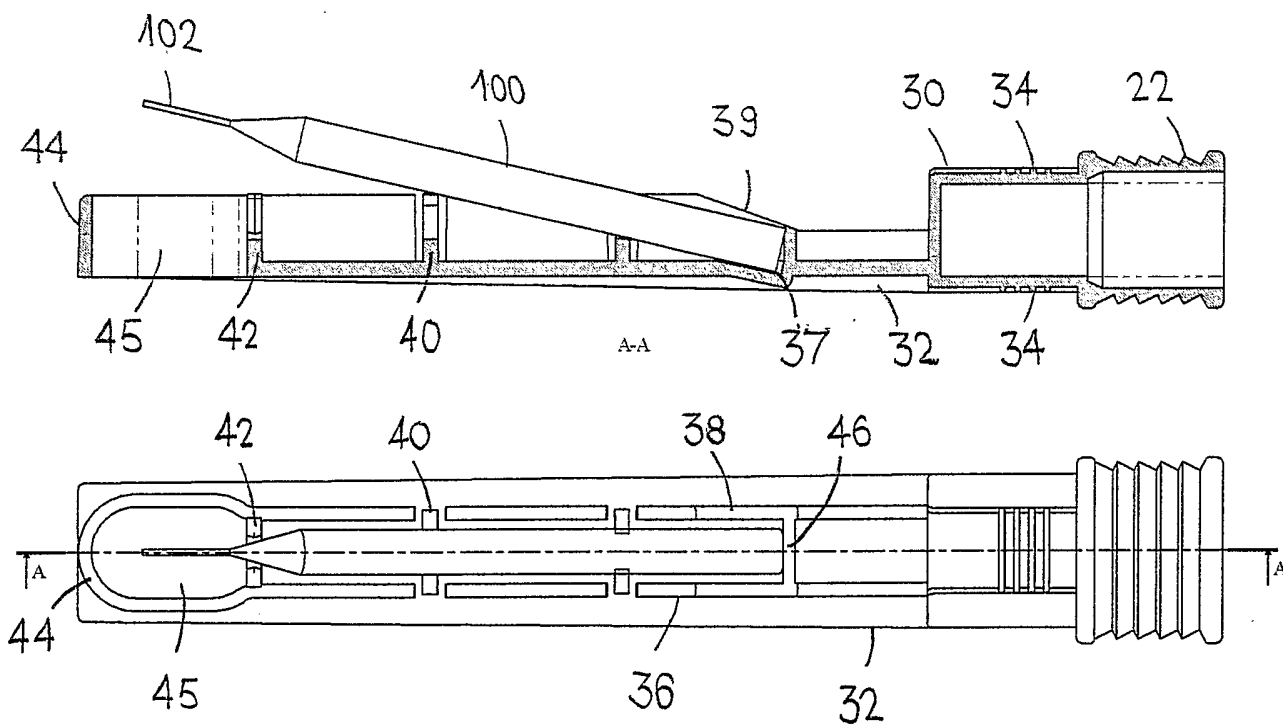


Fig. 5b