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(54) Handle for hand tools with interchangeable heads

(57) A handle is provided for hand tools with interchangeable heads. The handle has a tube (1) which has a cross-section with which is defined by a curved triangle which has one of its vertices in the lower position, and which is delimited by curvo-convex sides (2) which are connected by rounded edges (3). The tube (1), in its front opening, receives inside it a locking element (4) whose cross-section is the same as that of the said tube (1) and is adjusted by sliding it with respect to the inside of the tube. The tube (1), in addition to the channel (5) for inserting the flat rod (6) and the smooth shank of the interchangeable head, has on its upper face a vertical blind cavity (7) which, on its front wall, communicates with the said insertion channel (5), and in which a locking piece, or immobiliser (8), moves with vertical displacement, which immobiliser is mounted against a spring (9) which causes it to adopt an upper position in which a suitable tooth (10) is housed across a window (11) of the said flat rod (6) of the interchangeable head. The immobiliser (8) is capable of adopting a lower position, against the said spring (9), in which the said tooth (10) is outside the said window of the flat road (6), and wherein the immobiliser (8) faces at the top an opening (12) of the said tube.

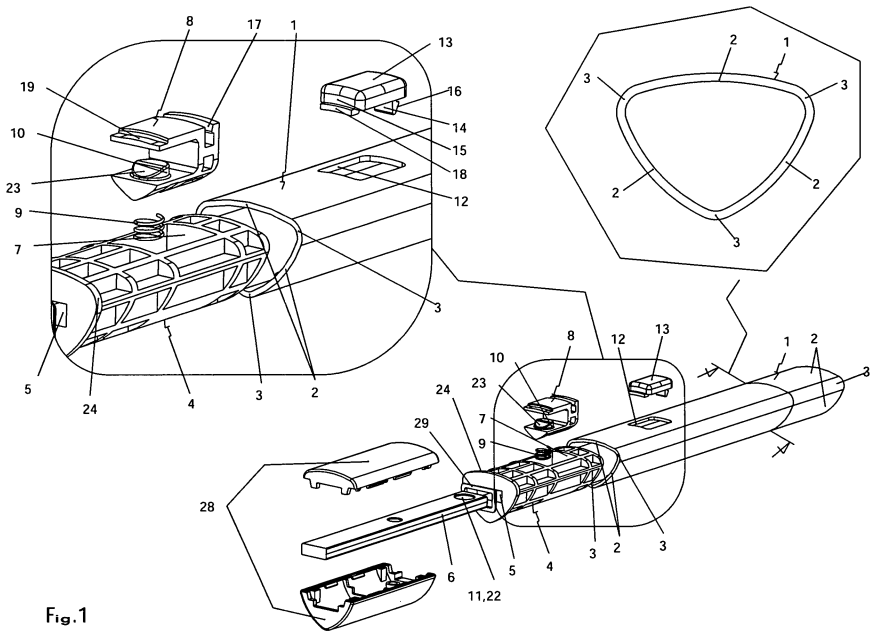

Fig.1

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Description

SCOPE OF THE INVENTION

[0001] This invention relates to a handle which is designed especially to be coupled to any of a plurality of hand tool heads intended for different applications (DIY, gardening, etc.).

STATE OF THE PRIOR ART

[0002] Various solutions are known in this field which conform to the general concept of comprising a tubular handle (which constitutes the body of the handle proper), which in its front part incorporates internally means for rapid, simple fixing of a flat rod with a smooth shank (without thickness offsets on its upper and lower faces), which rod belongs to the interchangeable hand tool head. It is known that this flat rod has a suitable housing in which penetrates a locking element which can be removed at any time by actuating axially (in the radial or transverse direction of the tubular handle) a pushbutton when one head is required to be changed for another head, or simply to protect the head during use once the operator has finished working with it.

[0003] Particular designs are known within this general overall concept in which the tubular handle is wholly cylindrical in shape, which on the one hand suffers from a lack of quality required for an ergonomic grip, and on the other makes it possible for the adverse effect of the torsion of the tubular handle to act upon the said internal means of rapid fixing of the rod of the interchangeable head, which reduce the efficiency of its work and progressively damages the product since the clearances and movements that take place between the tubular handle and its said internal means of rapid fixing steadily increase.

[0004] A known attempt to avoid this torsion effect has consisted in flattening the tubular handle in the front section which accommodates the rapid fixing means. This results in other new disadvantages: because the fixing means operate vertically (according to the gripping position during work with the tool), the handle has been flattened towards the horizontal, which means that the greatest axis of inertia is horizontal, that is to say in the most unfavourable position for resisting the application of a hammer, for example, which tends to cause the said flattened front part to fold upwards.

[0005] Other attempts in this direction have maintained the cylindrical shape throughout the width of the tubular handle, and have formed the flattened configuration in an embellishing element coupled to the tip of this tubular handle. This solution involves assigning to the embellisher a task which is not appropriate to it and is proved to have little effect since the said torsion effect now acts on the coupling of the embellisher to the tubular handle, which ultimately means that the problem has been transferred in terms of location but has not been finally solved.

[0006] On the other hand, as far as the means of rapid fixing are concerned, various solutions are known, all of which share the peculiar feature that the pushbutton is fitted so that it forms part of the assembly which is inserted through one of the openings in the tubular handle, which requires a minimum cross-sectional dimension of this handle, having negative effects on the cost and ergonomics of the handle. Solutions are also known in which the element which is designed to retain the assembly of the flat rod is a kind of longitudinal strip or leaf spring of considerable width which extends from a point close to the tip of the tubular handle to the location of a pushbutton, which is situated in the position furthest from this tip of the tubular handle; this type of solution calls into question the firmness and robustness of the fixing, including its reliability over time, since the considerable width of the strip causes it to lose its elastic properties over time.

EXPLANATION OF THE INVENTION AND ADVANTAGES

[0007] In view of this situation the essential object of this invention is to provide a handle for hand tools with interchangeable heads which is characterised in that it consists of a tube which, throughout its width, has the cross-section of an ergonomic handle which is defined by a curved triangle which has one of its vertices in the lower position, and which is delimited by curvo-convex sides which are connected by rounded edges, which tube, in its front opening, receives inside it a locking element whose cross-section is identical to that of the said tube, and is adjusted by sliding it relative to the interior of the same. In addition to the channel for inserting the flat rod and the smooth shank of the interchangeable head, this tube also has, on its upper face, a vertical blind cavity which, on its front wall, communicates with the said insertion channel, and in which a locking piece, or immobiliser, slides vertically and is mounted against a spring which retains it in an upper position, in which a suitable tooth is housed across a window of the said flat rod of the interchangeable head, which immobiliser is capable of adopting a lower position, against the said spring, in which the said tooth remains outside the said window of the flat rod, and which immobiliser faces at the top an opening of the said tube, enabling it, with sliding peripheral adjustment, to project from a pushbutton provided with coupling means which, without the insertion of any elastic means, operate in conjunction with other existing means on the upper face of the said immobiliser and possibly with the aid of the actual upper wall of the tube. This proposed configuration provides a grip of ergonomic quality that is far superior to that of a cylindrical handle, because on the one hand it adapts itself better to the shape of a clenched fist and on the other because its polygonal contour favours a firmer, more secure grip which prevents the handle from turning in the hand, unlike the grip of a cylindrical handle; all this favours comfortable, efficient use of the tool whilst at the same time re-

ducing the possibility of the appearance of blisters on the skin caused by erosion. Moreover, this cross-sectional shape provides the most favourable axis of inertia for applications in which the tool is used as a hammer.

[0008] The present invention proposes two embodiments of the coupling means of the pushbutton. One preferable solution is that in which the pushbutton is provided with a rear flange and a front flange so that the rear flange forms a rear claw which, due to elastic displacement, is capable of projecting from the rear edge of the said opening of the tube and hooking under a counter-claw formed on the upper face of the said immobiliser, whilst at the same time the front flange forms a front shoulder which is seated in a step cut into the front edge of the upper face of the said immobiliser so that the vertical wall of this step bears against the rear side of the said front flange of the pushbutton. This solution enables the pushbutton to be fitted from the outside of the tube once the locking element has been inserted in it until it occupies its operating position. As may be clearly seen in the graphic representation attached, this is achieved by a simple operation consisting in inserting the front flange between the immobiliser and the wall of the tube, then by simple rotation producing an elastic displacement which causes the claw of the rear flange of the pushbutton to hook under the counter-claw of the immobiliser. This solution is suitable when it is intended to produce a finer handle, since the inner half of the tube is not subject to the requirement that the pushbutton must be installed inside this tube together with the locking element.

[0009] The other embodiment of the coupling means of the pushbutton consists in bending its front and rear walls at its lower end to form two lugs, front and rear, which are identical to one another and are seated in a completely flat upper face of the said immobiliser. This design requires the pushbutton to be located inside the tube together with the locking element, this pushbutton having a very simple configuration.

[0010] On the other hand, this invention has the particular feature that, relative to the position of the rod coupled to the handle, there is an embellisher having the same cross-sectional shape as the said tube and locking element in the part of this flat rod adjacent to the front of the locking element inserted in the tube. This solution has the advantage of intuitively indicating to the user the correct position for inserting the rod of the head of the tool in the tube.

[0011] These and other features of the invention are shown in the graphic representation attached of a preferred embodiment of the same, including the possible variants.

DRAWINGS AND REFERENCES

[0012] For a better understanding of the nature of the invention we represent in the attached drawings an industrial embodiment which is in the nature of an illustrative, non-limiting example.

Figure 1 shows an exploded perspective view of a handle which is constituted according to the invention. It incorporates an enlarged detail showing the cross-sectional shape of the tube (1) of the handle, coinciding with the cross-sectional shape of the locking element (4); it also incorporates an enlarged detail of a preferred embodiment of the locking means of the flat rod (6).

Figure 2 shows the longitudinal half section indicated by II-II in Figure 3, corresponding to the object of the invention according to the embodiment shown in Figure 1.

Figure 3 shows an upper plan view corresponding to Figure 2.

Figure 4 shows an enlargement of detail IV shown in Figure 2, which in turn incorporates both enlarged details relating to the rear (14) and front (15) flanges of the pushbutton (13).

Figure 5 shows an enlargement of section V-V, shown in Figure 2.

Figure 6 shows an exploded perspective view similar to Figure 1, but relating to a different embodiment of the locking means of the flat rod (6).

Figures 7 and 8 are similar to Figures 2 and 3, but relate to the embodiment shown in Figure 6.

Figure 9 shows an enlargement of section IX-IX shown in Figure 7.

[0013] The following references are indicated in these figures:

1. - Tube
2. - Curvo-convex sides of the tube (1)
3. - Rounded edges of the tube (1)
4. - Locking element
5. - Channel of the locking element (4)
6. - Flat rod and smooth shank of the interchangeable head
7. - Vertical blind cavity in the locking element (4)
8. - Immobiliser or locking piece
9. - Spring
10. - Tooth of the immobiliser (8)
11. - Window of the flat rod (6)
12. - Opening in the tube (1)
13. - Pushbutton (13)
14. - Rear flange of pushbutton (13)
15. - Front flange of pushbutton (13)
16. - Rear claw of rear flange (14)
17. - Counter-claw of the immobiliser (8)
18. - Front shoulder of front flange (15)
19. - Front step on the upper face of the immobiliser

(8)
20. - Front lug of pushbutton (13)
21. - Rear lug of pushbutton (13)
22. - Opening of rod (6)
23. - Front bevel of tooth (10)
24. - Front peripheral projection of the locking element (4)
25. - Drilled hole in the locking element (4)
26. - Fastening element
27. - Hole in tube (1)
28. - Embellisher
29. - Anti-play joint.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0014] A preferred embodiment of the object of the invention, which relates to a handle for hand tools with interchangeable heads, is shown in the attached plans with reference to the drawings and references listed above.

[0015] As shown in Figure 1, this preferred handle comprises a tube (1) which, throughout its width, has a cross-section for an ergonomic grip defined by a curved triangle which has one of its vertices in the lower position and is delimited by curvo-convex sides (2), which are connected by rounded edges (3), which tube (1), in its front opening, receives inside it a locking element (4) whose cross-section is the same as that of the said tube (1) and which is adjusted by sliding it with respect to the inside of the same, and which tube (1), in addition to the channel (5) for inserting the flat rod (6) and smooth shank of the interchangeable head, has on its upper face a vertical blind cavity (7) which, on its front wall, communicates with the said insertion channel (5), and in which a locking piece, or immobiliser (8) sides vertically, which immobiliser is mounted against a spring (9) which causes the immobiliser to occupy an upper position in which a suitable tooth (10) is housed across a window (11) of the said flat rod (6) of the interchangeable head, which immobiliser (8) is capable of adopting a lower position, against the said spring (9), in which the said tooth(10) is outside the said window of the flat rod (6), and which immobiliser (8) faces at the top an opening (12) of the said tube (1) enabling it, by sliding peripheral adjustment, to project from a pushbutton (13) provided with coupling means which, without the insertion of ay elastic means, operate in conjunction with other means existing on the upper face of the said immobiliser (8), and possibly with the aid of the actual upper wall of the tube (1). The mere sight of this cross-sectional shape of the tube (1) demonstrates its advantageous ergonomic properties compared to designs in which a completely cylindrical shape is chosen. Moreover, in the light of the above, this solution provides the most favourable axis of inertia for use of the tool acting as a hammer. Another distinctive quality of this proposed solution is the considerable firmness, robustness and reliability of the locking of the flat rod (6) compared too strip-based solutions of the prior art.

[0016] In relation to this cross-sectional shape proposed by this invention, provision is made, in relation to the position of the rod (6) coupled to the handle, for an embellisher (28), which has the same cross-sectional shape as the said tube (1) and locking element (4), to be provided in the part of this flat rod (6) adjacent to the front of the locking element (4) inserted in the tube (1). This solution enables the user to determine intuitively the correct position in which to insert the flat rod (6) of the interchangeable head of the tool.

[0017] Figures 1 to 5 illustrate an embodiment relating to the coupling means of the pushbutton (13). It consists in that this pushbutton (13) is provided with a rear flange (14) and a front flange (15) so that the rear flange (14) forms a rear claw (16) which, by elastic displacement, is capable of projecting from the rear edge of the said opening (12) of the tube (1) and hook under a counter-claw (17) which is formed in the upper face of the said immobiliser (8), whilst at the same time the front flange (15) forms a front shoulder (18) which is seated in a step (19) cut into the rear edge of the upper face of this immobiliser (8) so that the vertical wall of this step (19) bears against the rear side of the side front flange (15) of the pushbutton (13). The operation required to install the pushbutton (13) from the outside of the tube (1) is clearly understood by examining Figure 4, the locking element (4) being located in its operating position shown in Figure 2 and in Figure 4 itself. For this purpose, with the pushbutton inclined, the front shoulder (18) of the front flange (15) is inserted under the upper wall of the tube (1) on the front edge of the opening (12). By pivoting on the front shoulder (18) itself, a lowering rotation of the pushbutton (13) is then produced in which, by elastic displacement, the rear flange (14), terminates with its rear claw (16) hooked in the counter-claw (17), whilst at the same time the front flange (15) is seated in the step (19). As described above, the thickness of the tube (1) with this solution is not conditional upon the pushbutton being inserted through one of the openings of the tube (1) together with the remaining coupling means. This thickness may therefore be reduced to provide an application advantage in cases where it is necessary for the handle to be finer than can be achieved by other means.

[0018] Another embodiment is that illustrated in Figures 6 to 9, where the said coupling means of the pushbutton (13) consist in that its front and rear walls, at their lower end, are bent to form two lugs, a front (20) and a rear lug (21), which are identical to one another and which are seated in a completely flat upper face of the said immobiliser (8). In this case the pushbutton is mounted with the remaining coupling means before the whole assembly is inserted inside the tube (1); the configuration of the pushbutton (13) is the simplest configuration, with two identical flanges (20, 21), which simply rest on a flat upper face of the immobiliser (8).

[0019] According to a preferred embodiment of this invention the said tooth (10) of the immobiliser (8) has a cylindrical contour which, with a recess adjustment, op-

erates with respect to an opening (22) in the said flat rod (6), relative to the operating coupling position of this flat rod (6) in the locking element (4) whose cylindrical contour has a front bevel (23) which faces the rear opening of the said channel (5) of this locking element (4). When the handle is not in operation the immobiliser (8) occupies its upper position imposed by the spring (9), in which the front bevel (23) faces channel (5). When the flat rod (6) is inserted through this channel (5) it acts on the front bevel (23), causing the immobiliser (8) to be lowered against the spring (9). When the flat rod (6) reaches its final position, the tooth (10) penetrates the opening (22) by elastic recovery of the spring (5) and the locking of the flat rod (6) inside the tube (1) is established. It will be seen that this opening (22) is functionally identical to the window (11) referred to above. The reason for assigning different numerical references is that the window (11) operates according to a general concept which is independent of its specific shape (it need not necessarily be cylindrical in shape), whilst the opening (22) does have a particular shape, cylindrical.

[0020] In order to limit the penetration of the locking element (4) in the tube (1), this locking element (4) is extended peripherally at the front by means of a projection (24), as seen in Figures 1 and 6.

[0021] In order to fix the locking element (4) in relation to the tube (1), this locking element (4) has a drilled hole (25) in which it is able to receive a fastening element (26) established across a hole (27) made in the wall of the tube (1), as shown in Figures 2 and 4.

Claims

1. Handle for hand tools with interchangeable heads, **characterised in that** it comprises a tube (1) which, throughout its width, has a cross-section with an ergonomic grip which is defined by a curved triangle which has one of its vertices in the lower position, and which is delimited by curvo-convex sides (2) which are connected by rounded edges (3), which tube (1), in its front opening, receives inside it a locking element (4) whose cross-section is the same as that of the said tube (1) and is adjusted by sliding it with respect to the inside of the same, and which tube (1), in addition to the channel (5) for inserting the flat rod (6) and the smooth shank of the interchangeable head, has on its upper face a vertical blind cavity (7) which, on its front wall, communicates with the said insertion channel (5), and in which a locking piece, or immobiliser (8), moves with vertical displacement, which immobiliser is mounted against a spring (9) which causes it to adopt an upper position in which a suitable tooth (10) is housed across a window (11) of the said flat rod (6) of the interchangeable head, wherein the immobiliser (8) is capable of adopting a lower position, against the said spring (9), in which the said tooth (10) is outside the said window of the flat road (6), and wherein the immobiliser (8) faces at the top an opening (12) of the said tube (1) and therefore projects, with a sliding peripheral adjustment, from a pushbutton (13) provided with coupling means which, without inserting any elastic means, operate in conjunction with other means present on the upper face of the said immobiliser (8), and possibly with the aid of the actual upper wall of the tube (1).

2. Handle for hand tools with interchangeable heads according to claim 1, **characterised in that** the said coupling means of the pushbutton (13) consist in the fact that it is provided with a rear flange (14) and a front flange (15) so that the rear flange (14) forms a rear claw (16) which, by elastic displacement, is able to project from the rear edge of the said opening (12) of the tube (1) and hook underneath a counter-claw (17) which is formed in the upper face of the said immobiliser (8), whilst at the same time the front flange (15) forms a front shoulder (18) which is seated in a step (19) cut into the front edge of the upper face of this immobiliser (8) so that the vertical wall of this step (19) bears against the rear side of the said front flange (15) of the pushbutton (13).

3. Handle for hand tools with interchangeable heads according to claim 1, **characterised in that** the said coupling means of the pushbutton (13) consist **in that** its front and rear walls at their lower end are bent to form two lugs, a front (20) and rear lug (21), which are identical to one another and which are seated in a completely flat upper face of the said immobiliser (8).

4. Handle for hand tools with interchangeable heads according to claim 1, **characterised in that** the said tooth (10) of the immobiliser (8) has a cylindrical contour which, with recess adjustment, operates with respect to an opening (22) in the said flat rod (6) in relation to the operating coupling position of this flat rod (6) in the locking element (4), whose cylindrical contour has a front bevel (23) which faces the rear opening of the said channel (5) of this locking element (4).

5. Handle for hand tools with interchangeable heads according to the preceding claims, **characterised in that** the said locking element (4) extends peripherally at its front by means of a projection (24).

6. Handle for hand tools with interchangeable heads according to the preceding claims, **characterised in that** the said locking element (4) has a drilled hole (25) in which it is capable of receiving a fixing element (26) established through a hole (27) made in the wall of the tube (1).

7. Handle for hand tools with interchangeable heads according to the preceding claims, **characterised in that**, relative to the position of the rod (6) coupled to the handle, an embellisher (28), which has the same cross-sectional shape as the said tube (1) and locking element (4), is provided in the part of this flat rod (6) adjacent to the front of the locking element (4) inserted in the tube (1).

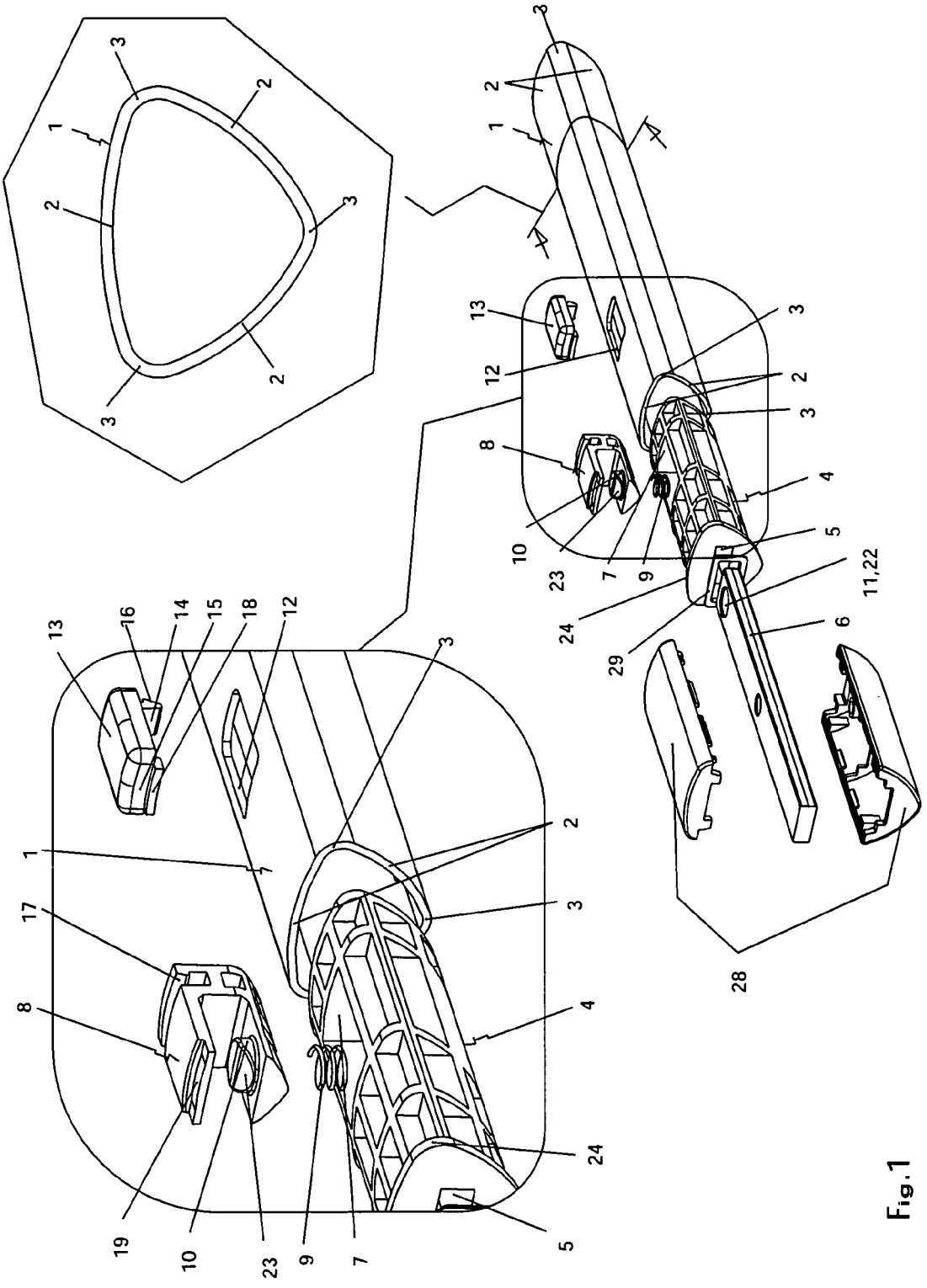


Fig.1

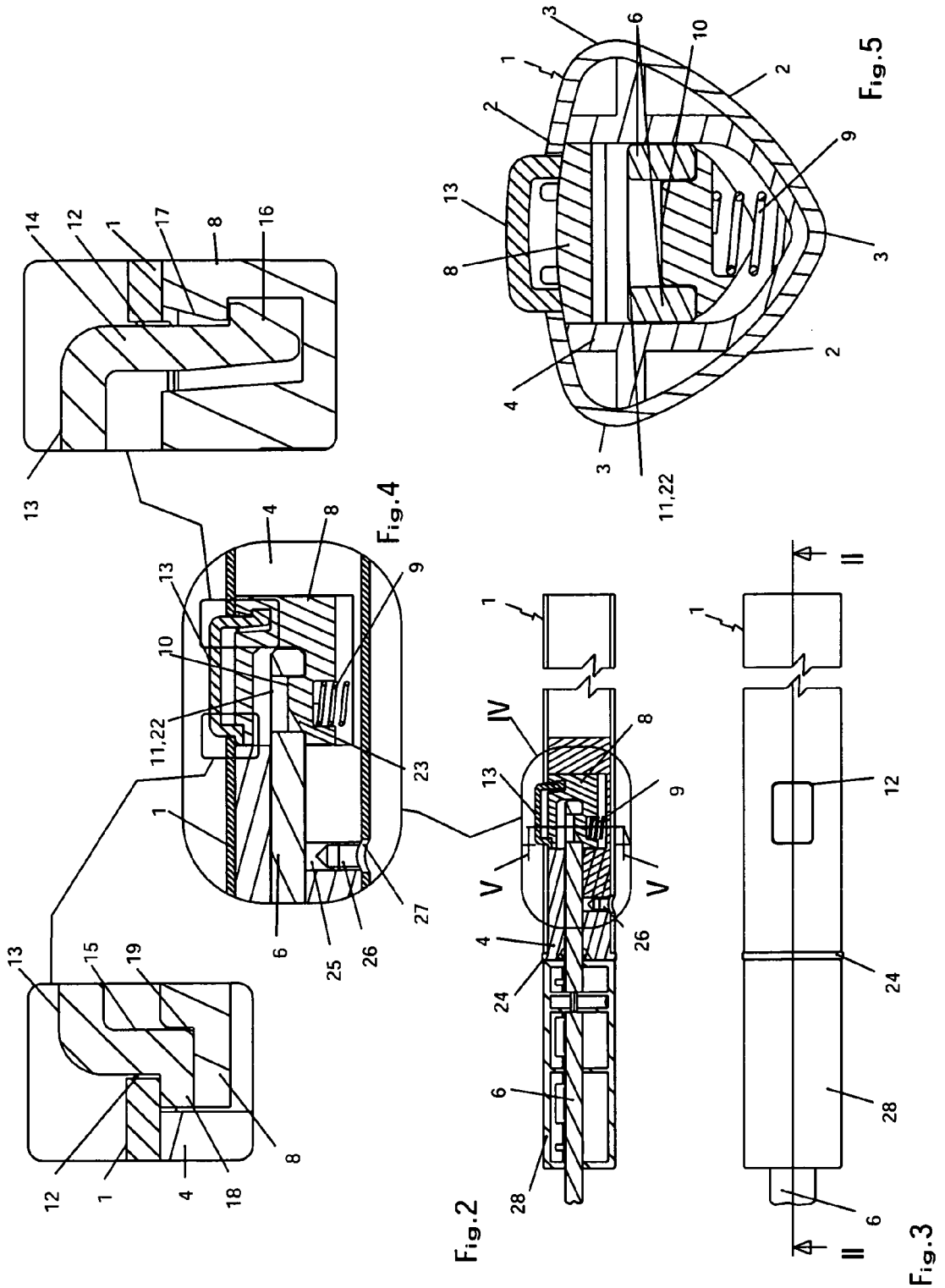
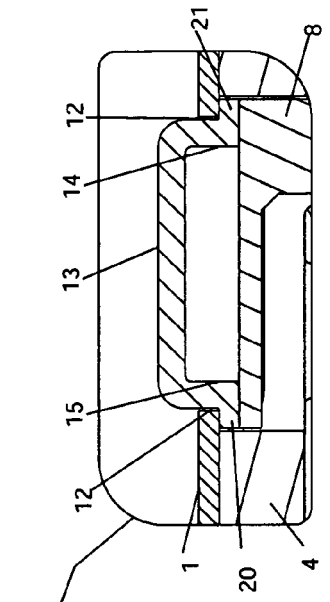


Fig.5
Fig.4
Fig.2
Fig.3
IV
V
II



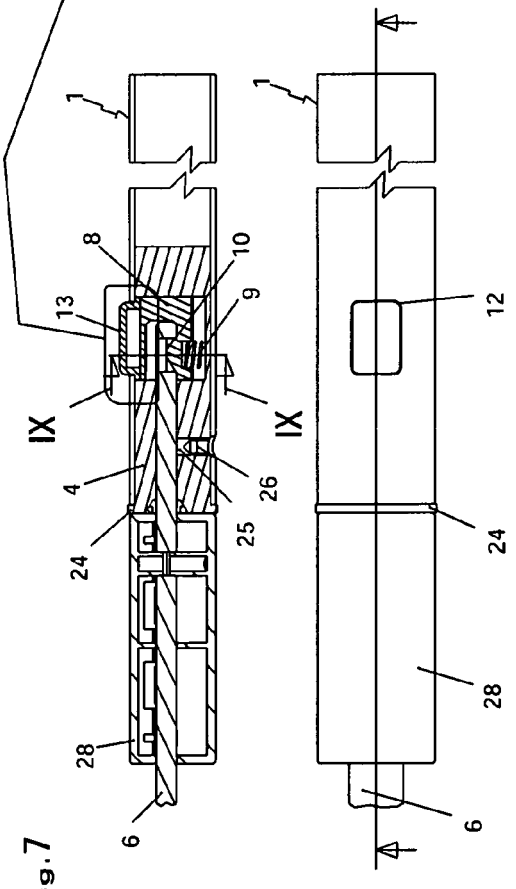


Fig.7

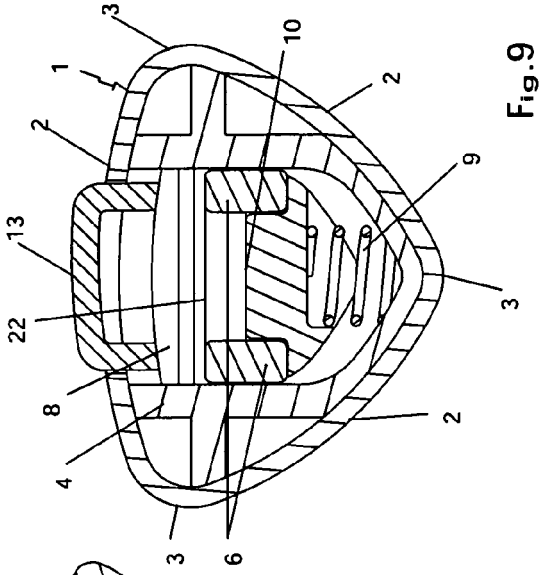


Fig.9

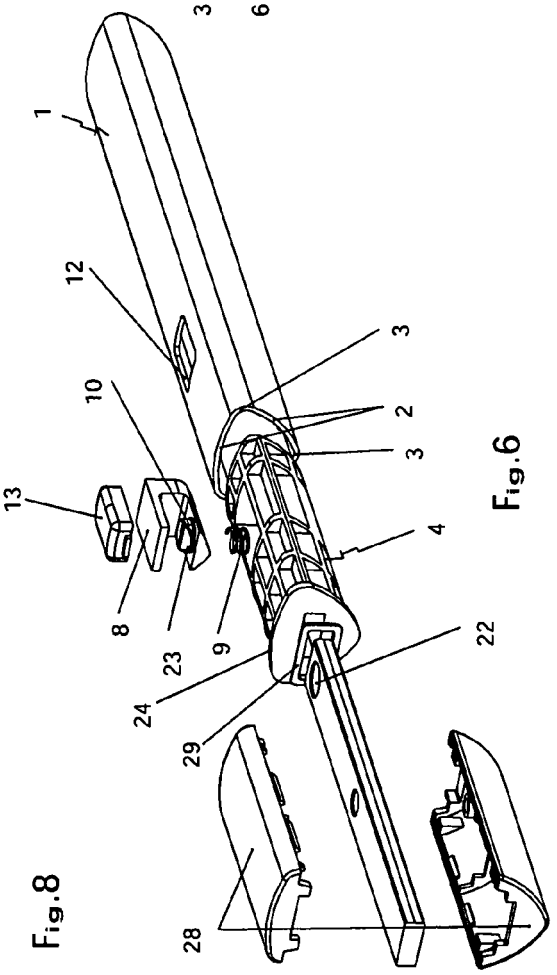


Fig.8

Fig.6