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(72) Inventors:
• **Dolman, Keith Neville**
Walsall, West Midlands WS2 7NQ (GB)
• **Dolman, Terence James**
Walsall, West Midlands WS2 7NQ (GB)

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(74) Representative: **Skinner, Michael Paul**
c/o Swindell & Pearson
48 Friar Gate
Derby DE1 1GY (GB)

(71) Applicant: **Trojan Hardware & Designs Ltd.**
Walsall,
West Midlands WS2 7NQ (GB)

(54) **Bolt arrangement and lockable window handle**

(57) A bolt arrangement (20) has a washer (28) held, in use, at a fixed position relative to a button (26). The washer (28) is integral with a bolt (22) and connected by a live hinge (39). The button (26) is connected with the

bolt (22) by links (32,36) which meet at a live hinge (34). When the button (26) is depressed, with the washer (28) held, forces applied to the links (32,36) cause them to fold together at the hinge (34), raising the bolt (22) about the hinge (39).

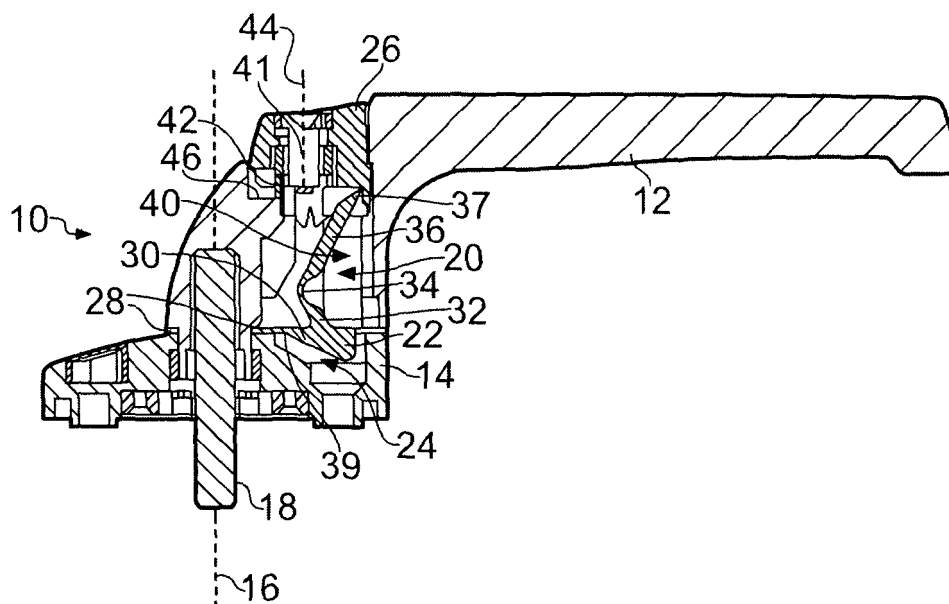


Fig. 1

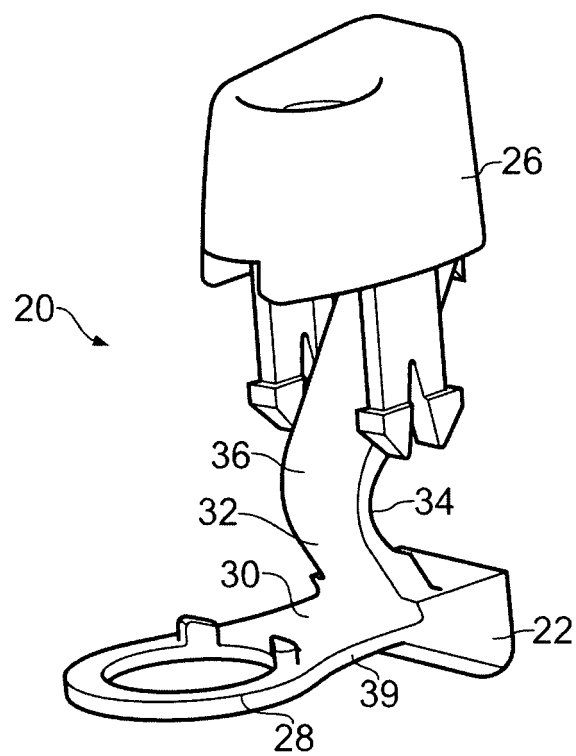


Fig. 5

Description

[0001] The present invention relates to bolt arrangements.

[0002] Bolt arrangements may be required in many circumstances, for example to secure window handles. Many types of window handle arrangement have previously been proposed, particularly for windows made of metal or plastics extrusions, which may incorporate security mechanisms such as locks, espagnolette mechanisms and the like. It is desirable to be able to disable these handle arrangements by means of a simple mechanism, in the interests of economy, reliability and the like.

[0003] The present invention provides a bolt arrangement comprising:

- a bolt member having an advanced position and a withdrawn position;
- link members extending away from the bolt member to define a substantially fixed angle between them at the bolt member;
- a first of the link members being hingedly connected to a fixed position away from the bolt member; and
- a second of the link members being hingedly connected with an actuator member away from the bolt member,

so that movement of the actuator member causes the bolt member to move.

[0004] Preferably, the bolt member and the link members are integrally moulded. They may be moulded of a resilient material. The resilience preferably tends to urge the bolt member to the advanced position.

[0005] The hinge connections of the link members may be provided as live hinges.

[0006] Preferably, a manual control member is provided to move the actuator member. The manual control member may be a button member. Lock means are preferably associated with the manual control member and releasably operable to disable movement of the control member. The actuator member may be hingedly connected at respective positions to the second link member and to a manual control member. Alternatively, the manual control member may press on the actuator member, when moved, to cause the actuation member to move.

[0007] The axes of the hinge connections are preferably substantially parallel. The actuator member is preferably constrained, at a position away from the connection with the second link member, to a linear movement. The linear movement is preferably perpendicular to, and offset relative to the hinge axes.

[0008] The invention also provides a window handle arrangement comprising a base member mountable on a window, a handle member rotatably attached to the base member, and a bolt arrangement according to any of the preceding definitions, the bolt member of the bolt arrangement, when in the advanced position, serving to secure the handle member against rotation.

[0009] Preferably the bolt arrangement is housed within the handle member to engage the base member when in the advanced position.

[0010] Preferably the first link member is hingedly connected with a washer member of the rotatable attachment between the handle member and the base member.

[0011] An example of the present invention will now be described in more detail, by way of example only, and with reference to the accompanying drawings, in which:

Figs. 1 and 2 are sections through window handle arrangements incorporating a bolt arrangement of the present invention;

Figs. 3 and 4 are enlarged side elevations of the bolt arrangement in isolation, in the advanced and withdrawn positions, respectively;

Fig. 5 is an enlarged perspective view of the bolt arrangement in its relaxed condition; and

Fig. 6 illustrates a position to which the bolt arrangement is manipulated for assembly of the handle arrangement of Figs. 1 and 2.

Window Handle Arrangement (Overview)

[0012] Figs. 1 and 2 show a handle arrangement 10, which may be used with a metal or plastics extrusion window. The arrangement 10 includes a handle 12 which is rotatably mounted on a base 14 for turning about an axis 16. The base 14 is, in turn, mounted on the window (not shown). A spindle 18 is mounted at the axis 16 to turn with the handle 12. The spindle 18 extends through the base 14 to engage and operate mechanisms within the window frame, such as espagnolette mechanisms (not shown).

[0013] A bolt arrangement indicated generally at 20 is provided within the handle 12 and includes a bolt member 22 which has an advanced position (Fig. 1) in which it engages a bolt recess 24 in the base 14 to prevent the handle 12 turning relative to the base 14. The bolt member 22 also has a withdrawn position (Fig. 2) clear of the bolt recess 24, allowing the handle 12 to turn on the base 14. A manual control member in the form of a button, indicated generally at 26, is provided for controlling the bolt member 22. For example, the button 26 may be depressed by the thumb of a hand gripping the handle 12, in order to release the bolt member 22 from the recess 24.

[0014] Further details of the handle arrangement, with the exception of the bolt arrangement 20, will be readily understood by the skilled reader and are not described further.

Bolt Arrangement

[0015] The bolt arrangement 20 includes a one-piece moulding of appropriate material (such as a synthetic

plastics material) including portions which serve as a washer 28, the bolt member 22, a first link member 30 between the bolt member 22 and the washer 28, a second link member 32 from the bolt member 22 to a hinge 34, and an actuator member 36 from the hinge 34. A second moulding forms the button 26. The tip 37 of the actuator member 36 sits in a concave corner formed in the button 26. A second hinge 39 is provided between the first link 30 and the washer 28.

[0016] The washer 28 is centred on the axis 16 in the assembled handle 10, as can be seen from Fig. 1, to form a washer within the connection between the handle 10 and the base 14. This provides for smoother movement of the handle 10, and also fixes the position of the washer 28 and the hinge 39. A cavity 40, within the handle 12, accommodates the button 26, the actuator member 36 and the second link 32. The bolt 20 is accommodated either in the recess 24, when advanced, or within the cavity 40, when withdrawn.

[0017] The button 26 incorporates a lock mechanism 41 generally of the type described in our British patent GB 2375371 and incorporates a short tang 42 which can be turned around a second axis 44 by means of a key operating the lock 41. In the locked position (Fig. 1), the tang 42 engages a ledge 46 formed in the wall of the cavity 40 to hold the button 26 in the position of Fig. 1. When the lock 41 is operated to turn the tang 42 away from the ledge 46, the button 26 is freed to be pushed into the cavity 40, to the position shown in Fig. 2. It is to be understood that the lock 41 is not an essential feature of the invention. There may be applications in which it is not necessary for the button 26 to be lockable.

[0018] Movement of the button 26 is constrained to a linear movement parallel with the axes 16, 44.

Bolt Arrangement (Geometry)

[0019] A description of the geometry of the bolt arrangement 20 is important in understanding the operation of the arrangement being described.

[0020] The washer 28 is held at a fixed position relative to the handle 12, as has been described and thus, the first link 30 is connected to this fixed position through the hinge 39. The hinge 39 is away from the bolt 22. That is, the first link 30 is attached at one end to the bolt 22, and hingedly connected at its other end to the washer 28.

[0021] The second link 32 is also attached at one end to the bolt 22. It is important to note that neither link 30, 32 is hingedly connected to the bolt 22. This may be achieved by providing thicker material in the region of the bolt 22 than in the region of the live hinges 34, 39 so that movement takes place preferentially at the hinges. The choice of material for the arrangement 20 may result in some distortion of the moulding in the region of the junctions between the links 30, 32 and the bolt 22, during use, but it is the intention that the angle between the links 30, 32, at the bolt 22, is substantially fixed and that any folding of the arrangement 20 (to be described) will occur

at the hinges 34, 39.

[0022] The hinge 34 is free to move within the cavity 40. The hinge 39 is fixed by the washer 28. The position of the tip 37 is also important and is constrained by the shape of the button 26 to move on a linear path parallel with the axes 16, 44.

[0023] Finally, it is to be noted that in the relaxed position (Fig. 1), the hinge 34 forms an elbow between the link 32 and the actuator 36. In this condition, the bolt 22 is advanced and the handle 12 is retained against turning on the base 14.

Bolt Arrangement (Operation)

[0024] When the button 26 is depressed, by means of a user's thumb, or otherwise, the button 26 moves to the position of Fig. 2. As it does so, the downward force from the button 26 is conveyed to the actuator 36, pressing down on the tip 37. The angled orientation of the actuator 36 results in a force being applied to the link 32, at the hinge 34, in the direction of the vector 48 (Fig. 1). Thus, there is a component of force in the direction of the vector 50. This causes the upper end of the link 32 to be pushed toward the axis 16. Since the angle between the links 30, 32 is fixed at the bolt 22, the hinge 39 provides the only articulation between the hinge 34 and the washer 28, and accordingly, the direction of the vector 50 will cause the bolt 22 to turn in an anti-clockwise direction (as viewed in Fig. 1) around the hinge 39, thus causing the bolt 22 to move into the cavity 40 from the recess 24, and thus releasing the handle 12 from the base 14 and allowing the handle 12 to turn.

[0025] When the button 26 is released, the hinges 34, 39 will relax, causing the button 26 to rise and the bolt 22 to return to the recess 24. Once the button 26 has returned to the position of Fig. 1, the lock 41 can be operated to lock the button 26 in that position.

Handle Arrangement (Assembly)

[0026] Assembly of the handle arrangement 10 is a relatively simple matter, as can be described with reference to Figs. 6 and 7 in conjunction with Figs. 1 and 2.

[0027] Since the handle 10 consists mainly of four components, namely the handle 12, base 14, button 26 and bolt arrangement 20, the main steps of assembly are to introduce the button 26 and bolt arrangement 20 into the handle 12, and to assemble the base 14 to the handle 12.

[0028] The button 26 is first introduced into the position of Fig. 1. Introduction of the bolt arrangement 20 into the handle 12 can then be achieved by manipulating the moulding of the arrangement 20 to the position indicated in Fig. 6, in which the actuator 36 has been bent over at the hinge 34 to align the actuator 36 and the second link member 32. This allows the arrangement 20 to be introduced into the cavity 40 from below (as illustrated in Fig. 1), first introducing the actuator 36 and continuing to in-

sert the arrangement 20 until the tip 37 engages the button 26 in the assembled position of Fig. 1. At this point, the bolt 22 will have moved through the lower mouth of the cavity 40. The washer 28 is then manipulated to place the washer 28 in the appropriate position around the handle, centred on the axis 16, as illustrated in Figs. 1 and 2.

[0029] The base 14 can then be assembled to the handle 12, in a manner conventional in itself. This traps the washer 28 in its final position. Other components, such as the spindle 18, are then introduced.

Variations and Modifications

[0030] Many variations and modifications can be made to the apparatus described above, without departing from the scope of the present invention. In particular, many different choices can be made for the shape and configuration of the components, materials of manufacture and the like.

[0031] The actuator 36 has been described as having a tip 37 which bears on the button 26. In an alternative example, the actuator 36 is joined to the button 26 by a further live fringe, so that the tip 37 is permanently fixed to the button 26.

[0032] Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. A bolt arrangement comprising:

a bolt member having an advanced position and a withdrawn position;
link members extending away from the bolt member to define a substantially fixed angle between them at the bolt member;
a first of the link members being hingedly connected to a fixed position away from the bolt member; and
a second of the link members being hingedly connected with an actuator member away from the bolt member,

so that movement of the actuator member causes the bolt member to move.

2. An arrangement according to claim 1, wherein the bolt member and the link members are integrally moulded.

3. An arrangement according to claim 2, wherein they are moulded of a resilient material.

4. An arrangement according to claim 3, wherein the resilience tends to urge the bolt member to the advanced position.

5. An arrangement according to any preceding claim, wherein the hinge connections of the link members are provided as live hinges.

6. An arrangement according to any preceding claim, wherein a manual control member is provided to move the actuator member.

7. An arrangement according to claim 6, wherein the manual control member is a button member.

8. An arrangement according to claim 6 or 7, wherein lock means are associated with the manual control member and releasably operable to disable movement of the control member.

9. An arrangement according to any of claims 6 to 8, wherein the actuator member is hingedly connected at respective positions to the second link member and to a manual control member.

10. An arrangement according to any of claims 6 to 8, wherein the manual control member presses on the actuator member, when moved, to cause the actuation member to move.

11. An arrangement according to any preceding claim, wherein the axes of the hinge connections are substantially parallel.

12. An arrangement according to any preceding claim, wherein the actuator member is constrained, at a position away from the connection with the second link member, to a linear movement.

13. An arrangement according to claim 12, wherein the linear movement is perpendicular to, and offset relative to the hinge axes.

14. A window handle arrangement comprising a base member mountable on a window, a handle member rotatably attached to the base member, and a bolt arrangement according to any of the preceding claims, the bolt member of the bolt arrangement, when in the advanced position, serving to secure the handle member against rotation.

15. An arrangement according to claim 14, wherein the bolt arrangement is housed within the handle member to engage the base member when in the advanced position.

16. An arrangement according to claim 14 or 15, wherein the first link member is hingedly connected with a

washer member of the rotatable attachment between the handle member and the base member.

17. A bolt arrangement substantially as described above, with reference to the accompanying drawings. 5
18. A window handle arrangement substantially as described above, with reference to the accompanying drawings. 10
19. Any novel subject matter or combination including novel subject matter disclosed herein, whether or not within the scope of or relating to the same invention as any of the preceding claims. 15

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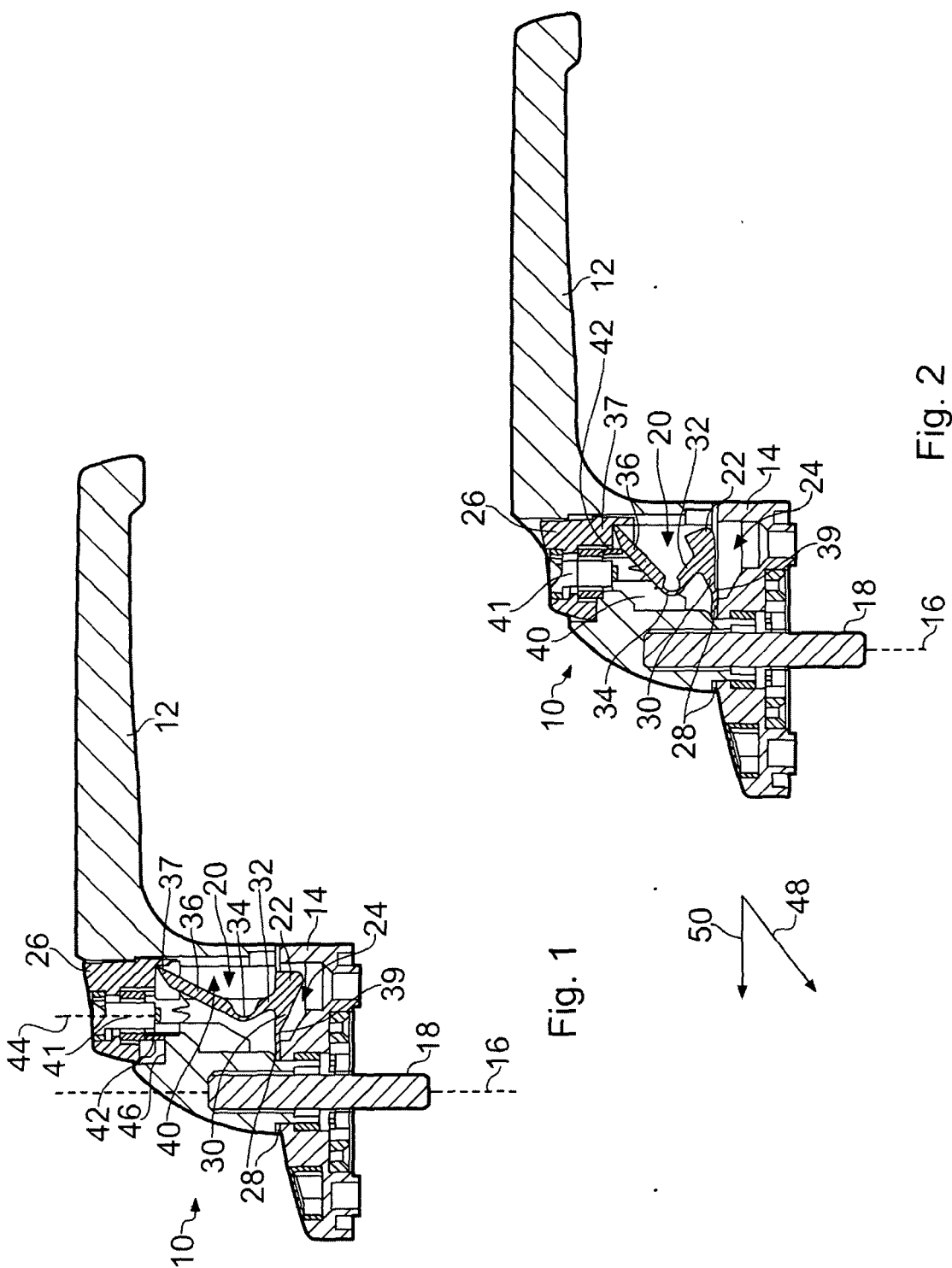
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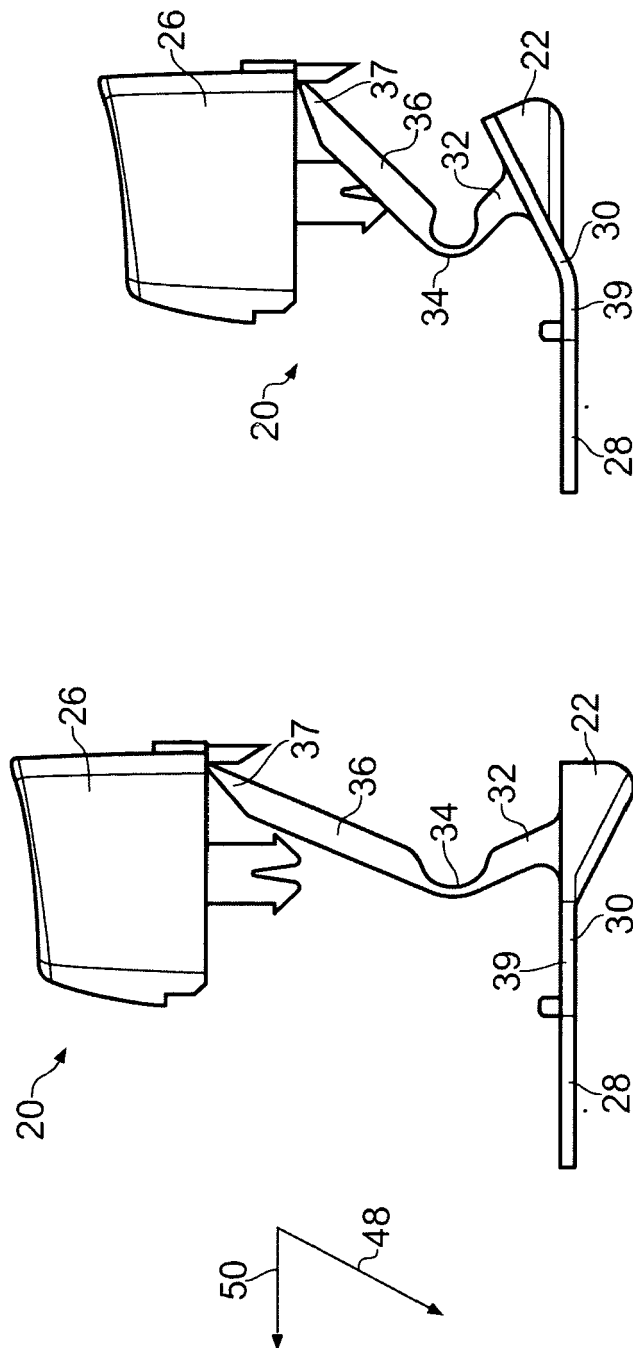


Fig. 4

Fig. 3

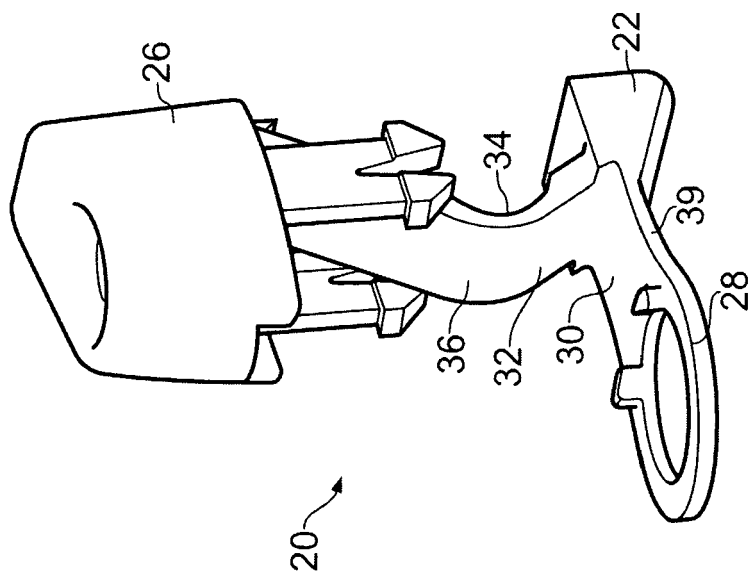


Fig. 5

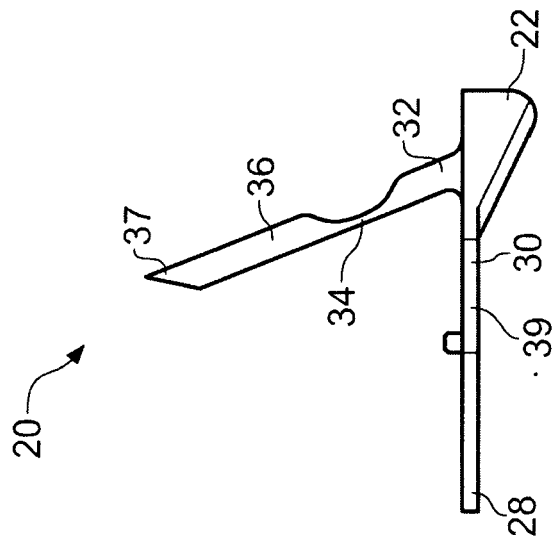


Fig. 6



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Application Number

which under Rule 45 of the European Patent Convention EP 06 25 6458
shall be considered, for the purposes of subsequent
proceedings, as the European search report

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INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims. Claims searched completely : Claims searched incompletely : Claims not searched : Reason for the limitation of the search: see sheet C			
Place of search Munich		Date of completion of the search 29 March 2007	Examiner WAGNER, A
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	
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PARTIAL EUROPEAN SEARCH REPORT

Application Number
EP 06 25 6458

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Claim(s) searched completely:
1-16

Claim(s) not searched:
17-19

Reason for the limitation of the search:

The subject-matter of claims 17 to 19 are unclear, since these claims fail to define any technical features (Article 84) EPC. A meaningful search can therefore not be carried out for claims 17 to 19.

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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