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(54) **Cremone bolt with external plastic shell**

(57) A cremone bolt for door and window fixtures comprises a handle (12), at least one movable driving element (13, 14) for opening/closing the fixture and a motion-transmitting mechanism from the handle to the driving element, said mechanism comprising a toothed rotor (17) integral with the handle and suitable for engagement with at least one rack (18, 19) integral with at least one driving element, the cremone bolt comprising an external shell (15) defining a cavity (16) inside which

the motion-transmitting mechanism is housed, said cavity (16) being open on the side facing a section bar of the fixture in use, and a cover (20) being present which can be fastened to the shell to close the opening of the cavity (16) at least partly. The external shell (15) is made of plastic material, the rotor and rack being made of metal, at least one rib (40, 41) for guiding the rack (18, 19) jutting out from the cover (20) towards the inside of said cavity (16).

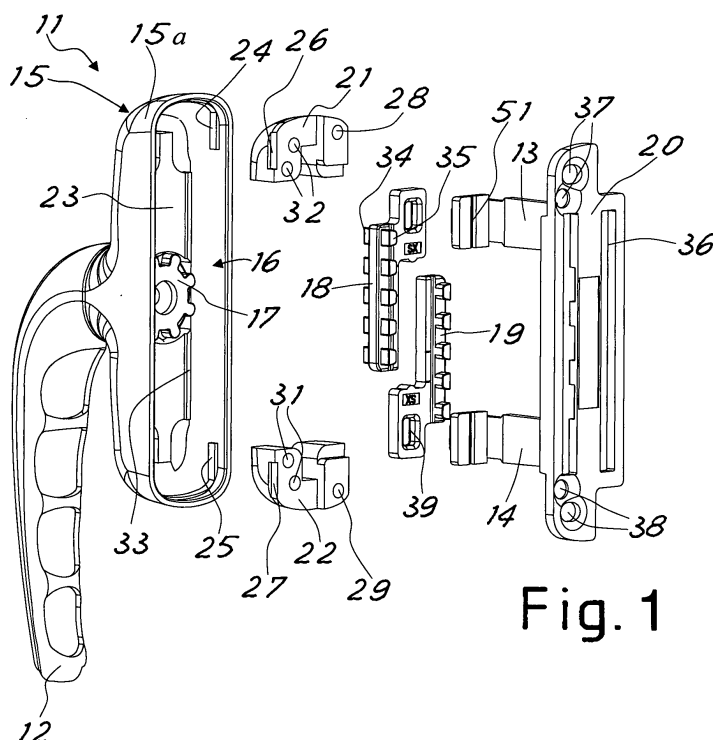


Fig. 1

Description

[0001] The present invention relates to a cremone bolt formed with a shell of plastic material, but having internal metal mechanisms.

[0002] Manufacture of cremone bolt systems for operating closure/opening of door and window frames or fixtures has been known since long. Typically, they comprise a handle, an external shell and driving elements suitable for moving corresponding rods for closing/opening the fixture. A motion-transmitting mechanism from the handle to the driving elements is accommodated inside the external shell.

[0003] The cremone bolts known in the art are usually fully made of die-cast metal. This involves large investments for equipping the dies for producing these articles of manufacture made of die-cast metal, also due to the continuous requirements of offering new aesthetic solutions on the market. In addition, the metal parts need to be surface-treated by appropriate painting processes, which brings about a further increase in the manufacturing costs.

[0004] Also known in the art are cremone bolts fully made of plastic material. These solutions however have limits in terms of resistance to mechanical stresses generated by daily use, so that an appropriate lifetime is not ensured. To solve this drawback, the components' thickness is to be increased, but this can give rise to surface moulding faults due to shrinkage during the step of cooling the piece. In addition, with known plastic handles, there is the drawback that fastening to the fixture takes place inside the body of plastic material.

[0005] In addition, solutions adopting a closed actuating unit made of metal have been also proposed in which the body of plastic material of the cremone bolt/handle is snap-superposed thereon; the product thus made has the drawback that the actuating unit must be made ad hoc with components having reduced sizes for insertion into a metal box that in turn must be contained in the external plastic shell. The different elements require availability of particular equipment for producing them, and the details thus made cannot be used in traditional cremone bolts made of die-cast metal. Therefore costs for producing this type of cremone bolt are very high.

[0006] The present invention aims at obviating the above mentioned drawbacks by providing a cremone bolt that is of cheap manufacture and long lifetime.

[0007] Another aim of the invention is to provide a cremone bolt equipped with components that can be also used for cremone bolts of the known art.

[0008] It is a further aim of the invention to provide a cremone bolt that can be personalised from an aesthetic point of view, in a cheap manner.

[0009] It is a still further aim of the invention to provide a handle that can be assembled in a simple, quick and efficient manner.

[0010] In view of the above aims, a cremone bolt for door and window fixtures has been conceived in accordance with the invention, which comprises a handle, at least one movable driving element for opening/closing the fixture and a motion-transmitting mechanism from the handle to the driving element, said mechanism comprising a toothed rotor integral with the handle and suitable for engagement with at least one rack integral with at least one driving element, the cremone bolt comprising an external shell defining a cavity inside which the motion-transmitting mechanism is housed, said cavity being open on the side facing a section bar of the fixture in use, and a cover being present which can be fastened to the shell to close the opening of the cavity at least partly, characterised in that the external shell is made of plastic material, the rotor and rack being made of metal, at least one rib for guiding the rack jutting out towards the inside of said cavity.

[0011] For better explaining the innovative principles of the present invention and the advantages it offers over the known art, a possible embodiment applying said principles will be described hereinafter, by way of example, with the aid of the accompanying drawings. In the drawings:

- Fig. 1 is an exploded perspective view of a preferred embodiment of the cremone bolt in accordance with the invention;
- Fig. 2 is a side view of the cremone bolt seen in the preceding figure in an assembled condition;
- Fig. 3 is a section view taken along the plane III-III in Fig. 2;
- Fig. 4 is a further section view taken along the plane IV-IV in Fig. 2.

[0012] With reference to the drawings, shown in Fig. 1 is a cremone bolt 11 designed to be applied to a fixture (a window frame, door frame or others) for operating closure/opening of same.

[0013] The cremone bolt 11 comprises a rotatable handle 12, two movable driving elements for opening/closing the fixture 13, 14 and a motion-transmitting mechanism from the handle to the driving element. This mechanism comprises a toothed rotor 17 integral with handle 12 and suitable for engagement with two racks 18, 19, each of them being integral with a respective driving element 13, 14. The driving elements are connected in use to suitable rods mounted along the fixture section bars to operate the closing/opening movement of known elements suitable for engagement with the fixed frame of the fixture.

[0014] The cremone bolt 11 is provided with an external shell 15 defining a cavity 16 inside which the components 17, 18, 19 of the motion-transmitting mechanism are housed. The external shell 15 has an elongated shape, its major extension being parallel to the sliding direction of the at least one driving element.

[0015] The external shell 15 of the cremone bolt is made of plastic, while the rotor 17 and racks 18, 19 are made of metal. The driving elements 13, 14 too are advantageously made of metal. The outer shell 15 forms a

hole for receiving the rod of rotor 17 fastened to the cremone bolt handle.

[0016] Cavity 16 defined by the external shell 15 is open on the side facing the fixture section bar in use. The cremone bolt also comprises a cover 20 to be fastened to shell 15 to close the opening of cavity 16 at least partly. Cover 20 is made of metal, advantageously with a body in the form of a plate.

[0017] As clearly shown in Figs. 3 and 4, projecting from cover 20 towards the inside of cavity 16 are two ribs 40, 41 on opposite sides of the cremone bolt. Each rib 40, 41 constitutes a holding and guide element for a respective rack 18, 19, being disposed on the opposite side of the rack relative to rotor 17, interposed between the rack and the external shell. Due to this expedient, the side wall of the external shell 15 will not be adversely affected by the efforts transmitted by the rack 18, 19 during opening/closing of the cremone bolt.

[0018] Advantageously, racks 18, 19 are almost in contact with opposite side walls of the cavity 16 of the external shell 15. This allows bulkiness of the cremone bolt in a direction transverse to the movement direction of the racks to be limited. In addition, racks 18, 19 can be made with standard sizes to be also used in normal cremone bolts fully made of metal, since they are not to be inserted in a metal box of reduced sizes as it happened in the known art involving an external shell made of plastic material applied to the metal box by snap fixing.

[0019] Rack 18, as shown in Fig. 1, comprises a sequence of teeth 34 for meshing with the rotor and on the opposite side is provided with a sequence of teeth 35 too, for engagement with rib 40 projecting from cover 20. Rack 19 has the same structure.

[0020] Advantageously, the cremone bolt comprises a pair of metal inserts 21, 22, suitable for fastening to the inside of cavity 16 at two opposite ends of the external shell. Formed in the inserts are holes 28, 29 for fastening of the cremone bolt to the section bar of the fixture.

[0021] Inserts 21, 22 are also provided with holes 31 and 32 respectively, for fastening of cover 20 to the external shell. Holes 32 are in register with holes 37 on cover 20, while holes 31 are in register with holes 38 on the cover.

[0022] The external shell comprises consoles 24, 25 suitable for engagement with respective seats 26, 27 formed in inserts 21, 22 for fitting of the inserts on the shell. Consoles 24, 25 (only two consoles are shown in the figure, but consoles are also formed on the opposite side for a total amount of four consoles) form an undercut in which the inserts are engaged, so that the latter cannot come out of cavity 16 in shell 15.

[0023] Alternatively, shell 15 could be moulded on said inserts 21, 22.

[0024] Preferably, the external shell 15 consists of two pieces, a first piece 15a forming the external casing in sight of the cremone bolt, while the second piece 23 forms the seat for receiving rotor 17 and is disposed on the bottom of cavity 16. Piece 23 embodies a guide surface

for the rack on the bottom of cavity 16. Advantageously formed in said guide surface are two ribs 33 (only one shown in Fig. 1, the latter being a mirror image of the former), on opposite sides relative to rotor 17, jutting out towards the inside of cavity 16, parallel to the sliding direction of the driving elements 13, 14. Each rib 33 is associated with a corresponding groove 54, 55 in a respective rack 18, 19 (see Figs. 3 and 4). Ribs 33 are suitable for engagement into the grooves in the racks so as to promote correct running of same during the closing/opening movement.

[0025] Cover 20 is also provided with a central rib 50 (shown in Fig. 4) jutting out towards the inside of cavity 16, said rib being suitable for engagement into a groove 51 of the driving element parallel to the sliding direction thereof. This expedient too allows guiding of racks 18, 19 to be improved.

[0026] The driving elements 13, 14 are L-shaped. Referring to element 14 in Fig. 3, a leg 14b is located at the inside of cavity 16 and is adapted to engage a respective rack 19. The second leg 14a projects outwardly of the cavity through a slot 36 in cover 20. The driving element 13 is shaped in the same manner as element 14.

[0027] Each rack 18, 19 comprises a planar portion at its ends close to the ends of the external shell 15, in which planar portion a hole is formed for engagement with a corresponding projection of the driving element. Shown in Fig. 3 is projection 53 of the driving element 14 that will engage in hole 39 of rack 19.

[0028] At this point it is apparent that the intended purposes of the present invention are reached.

[0029] In particular, a cremone bolt is provided which is made of materials enabling the production costs of same to be reduced. The cremone bolt can have a different aesthetic appearance by merely changing the external shell made of plastic. In addition, the cremone bolt has a satisfactory lifetime since the inner components of the mechanism are made of metal. These components have standard sizes, since they are not to be inserted in holding metal boxes of reduced sizes, and therefore they can also be used for assembling normal cremone bolts fully made of metal. This allows the production costs to be further reduced, thanks to economies of scale.

[0030] By virtue of the expedient of creating ribs projecting from the rear closing cover of the cremone bolt, the operating efforts from the racks during opening/closing are discharged onto the metal part, and do not adversely affect the wall of plastic material of the external shell, thus avoiding premature wear of the latter.

[0031] In addition, fastening of the cremone bolt to the fixture section bar is strong and safe, as it takes place at the metal body of inserts 21, 22.

[0032] Obviously, the above description of an embodiment applying the innovative principles of the present invention is given by way of example only and therefore must not be considered as a limitation of the patent rights herein claimed.

[0033] For instance, the cremone bolt could also be

provided with only one rack and not two racks as shown in the preferred embodiment of the invention.

Claims

1. A cremone bolt for door and window fixtures comprising a handle (12), at least one movable driving element (13, 14) for opening/closing the fixture and a motion-transmitting mechanism from the handle to the driving element, said mechanism comprising a toothed rotor (17) integral with the handle and suitable for engagement with at least one rack (18, 19) integral with at least one driving element, the cremone bolt comprising an external shell (15) defining a cavity (16) inside which the motion-transmitting mechanism is housed, said cavity (16) being open on the side facing a section bar of the fixture in use, and a cover (20) being present which can be fastened to the shell to close the opening of the cavity (16) at least partly, **characterised in that** the external shell (15) is made of plastic material, the rotor and rack being made of metal, at least one rib (40, 41) for guiding the rack (18, 19) jutting out from the cover (20) towards the inside of said cavity (16).
2. A cremone bolt as claimed in claim 1, **characterised in that** said at least one rib is disposed on the opposite side of the rack (18, 19) relative to the rotor (17).
3. A cremone bolt as claimed in claim 1, **characterised in that** the cover (20) is made of metal material.
4. A cremone bolt as claimed in claim 1, **characterised in that** the cover (20) is formed of a body in the form of a plate.
5. A cremone bolt as claimed in claim 1, **characterised in that** said rib is disposed in the vicinity of a lateral side of the external shell (15).
6. A cremone bolt as claimed in claim 1, **characterised in that** the rack (18, 19) is almost in contact with an inner side wall of the cavity (16) of the external shell (15).
7. A cremone bolt as claimed in claim 1, **characterised in that** it comprises a pair of inserts (21, 22) made of metal material and adapted to be fastened to the inside of the cavity (16) at two opposite ends of the external shell (15), said inserts being provided with holes (28) for fastening of the cremone bolt to the fixture section bar.
8. A cremone bolt as claimed in claim 7, **characterised in that** said inserts (21, 22) are provided with holes for fastening of said cover to the external shell.
9. A cremone bolt as claimed in claim 7, **characterised in that** the external shell (15) is moulded on said inserts (21, 22).
10. A cremone bolt as claimed in claim 7, **characterised in that** the external shell (15) comprises undercuts (24, 25) in which respective portions (26, 27) of the inserts (21, 22) engage for preventing the inserts from coming out of the shell cavity.
11. A cremone bolt as claimed in claim 1, **characterised in that** it comprises a pair of racks (18, 19) in mirror image relationship disposed on opposite sides of the rotor (17), each of them being integral with a driving element (13, 14).
12. A cremone bolt as claimed in claim 11, **characterised in that** the cover (20) is provided with one rib (40, 41) for each of the two racks (18, 19), on opposite sides of the cremone bolt.
13. A cremone bolt as claimed in claim 1, **characterised in that** the external shell (15) forms a surface for guiding the rack on the bottom of the cavity (16).
14. A cremone bolt as claimed in claim 1, **characterised in that** the external shell (15) is made up of two pieces, a first piece (15a) forming the external casing in sight and a second piece (23) forming the seat for receiving the rotor.
15. A cremone bolt as claimed in claims 13 and 14, **characterised in that** said surface for guiding the shell consists of said second piece (23) also forming the receiving seat for the rotor (17).
16. A cremone bolt as claimed in claim 13, **characterised in that** said guiding surface comprises a guide rib (33) jutting out towards the inside of the cavity (16), which is suitable for engagement into a corresponding groove (54, 55) formed in the rack.
17. A cremone bolt as claimed in claim 1, **characterised in that** a central rib (50) projects from the cover (20) towards the inside of the cavity (16), said rib being suitable for engagement into a groove (51) of the driving element (13, 14) parallel to the sliding direction thereof.
18. A cremone bolt as claimed in claim 1, **characterised in that** said driving element (13, 14) has an L-shaped configuration with a first leg (14b) at the inside of the cavity (16) which is suitable for engagement with the respective rack and a second leg (14a) projecting towards the outside of the cavity.
19. A cremone bolt as claimed in claim 1, **characterised in that** said driving element projects through a slot

(36) of the cover (20).

- 20.** A cremone bolt as claimed in claim 1, **characterised in that** the rack (18, 19) comprises a planar portion provided with a hole (39) for engagement with a corresponding projection (53) of the driving element (13, 14). 5
- 21.** A cremone bolt as claimed in claim 1, **characterised in that** the external shell (15) has an elongated shape the major extension of which is parallel to the sliding direction of the at least one driving element. 10
- 22.** A cremone bolt as claimed in claim 1, **characterised in that** the at least one driving element (13, 14) is made of metal material. 15
- 23.** A cremone bolt as claimed in claim 1, **characterised in that** the external shell (15) is provided with a hole for receiving the rotor rod fastened to the handle of the cremone bolt. 20

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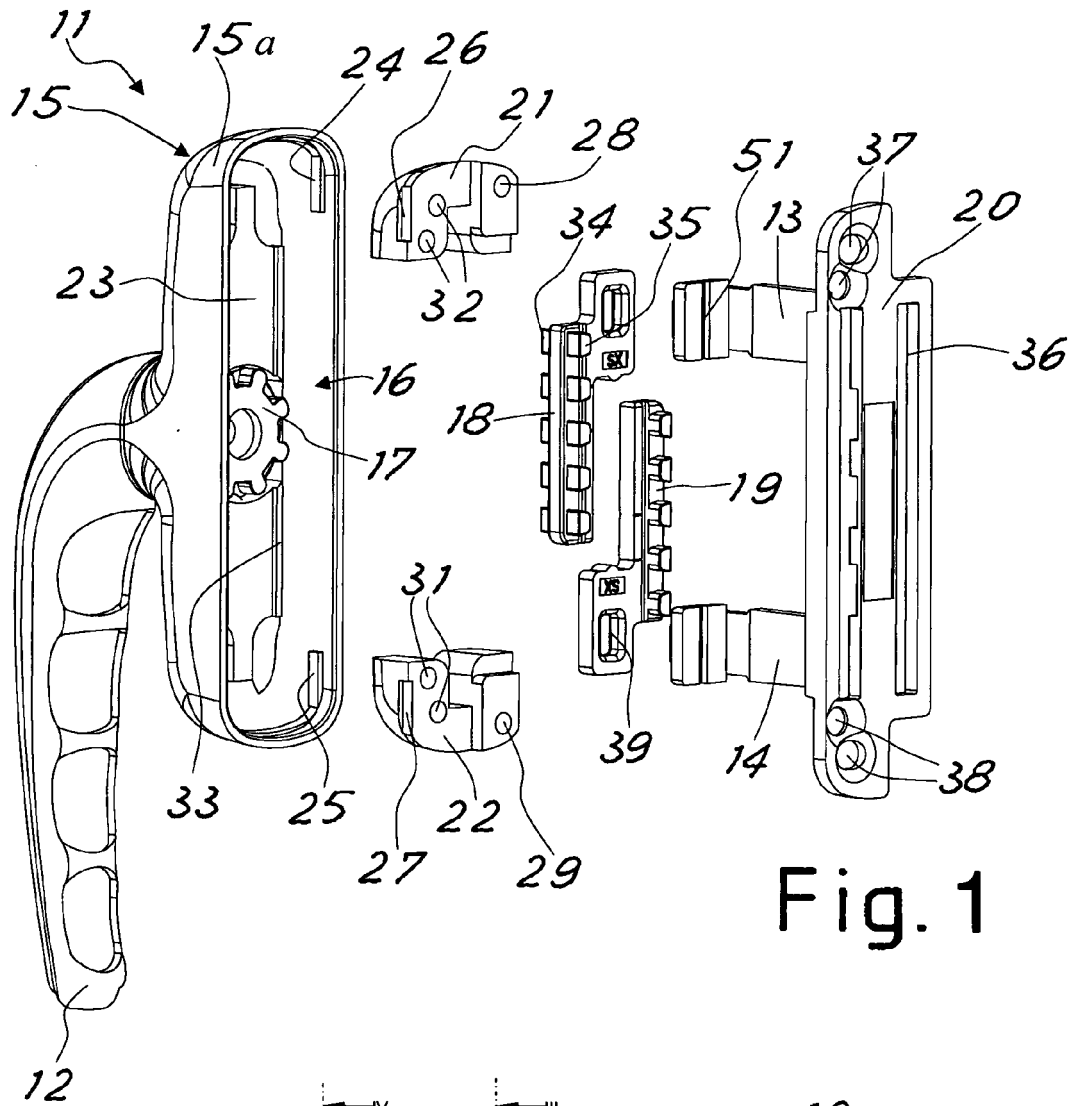


Fig. 1

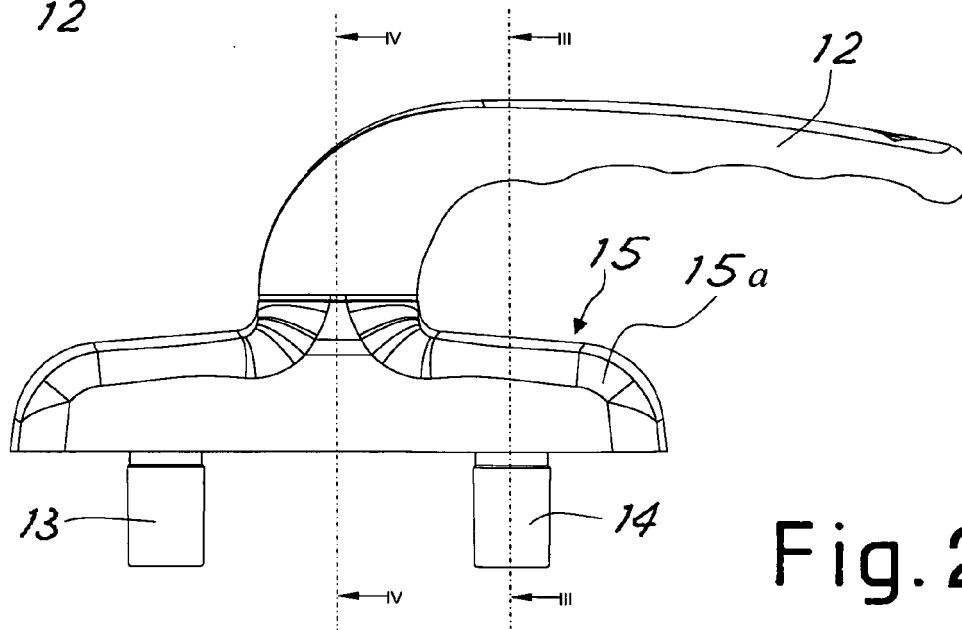


Fig. 2

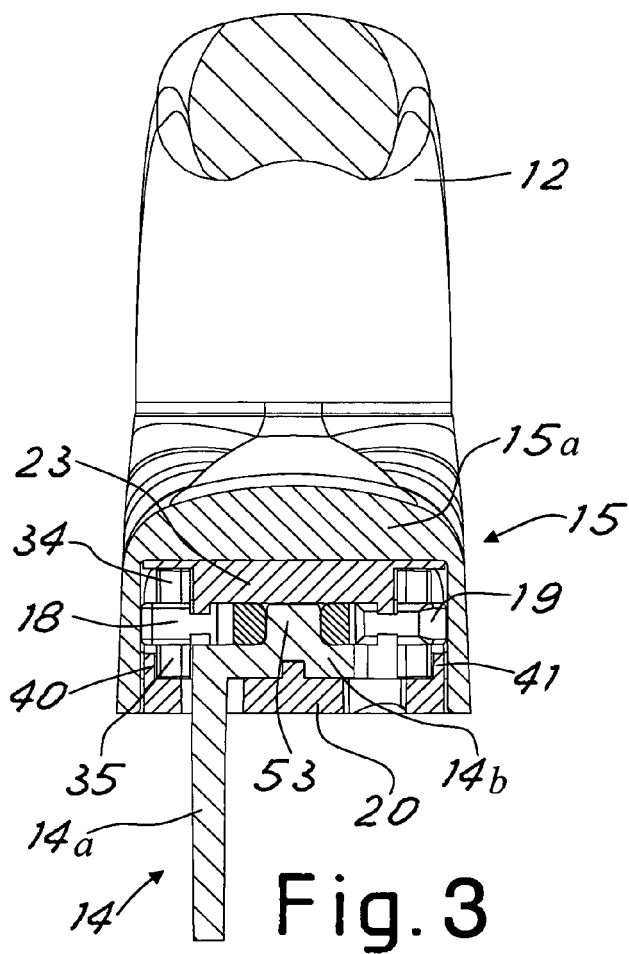


Fig. 3

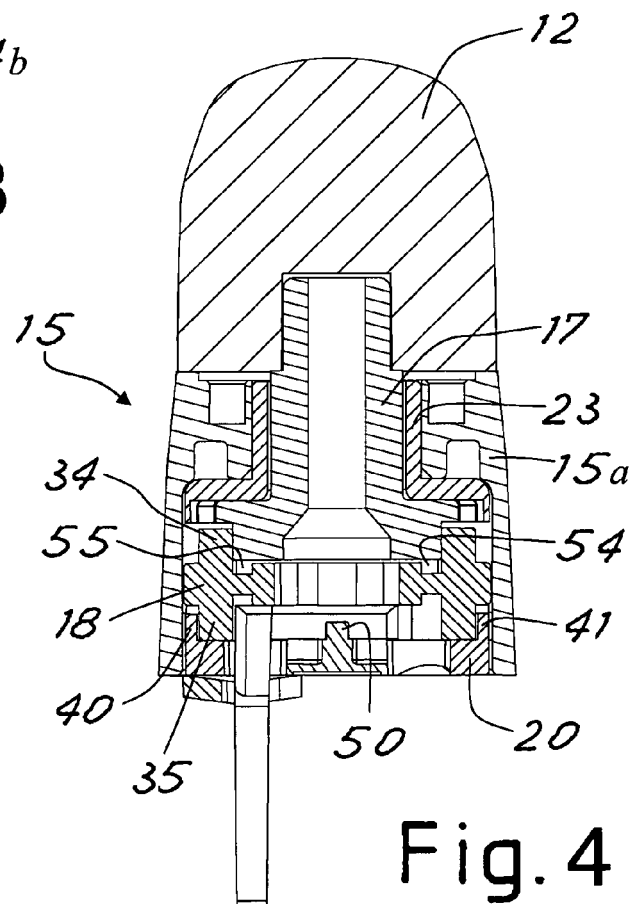


Fig. 4