

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 82306247.6

51 Int. Cl.³: B 05 B 1/18

22 Date of filing: 24.11.82

30 Priority: 27.11.81 GB 8135849

43 Date of publication of application:
08.06.83 Bulletin 83/23

84 Designated Contracting States:
BE DE FR IT NL SE

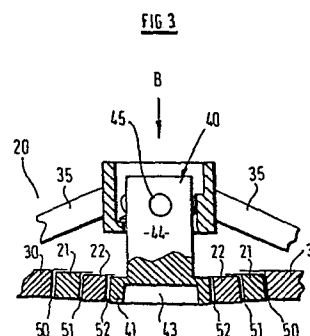
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54 **Method for releasably assembling components.**

57 The invention is concerned with releasably assembling component parts of a device such as the spray unit (20) of a shower head (10). A first component part (40) is formed with a cylindrical member (44) having three equispaced and radially extending lugs (45) and is adapted to engage within an annular portion (34) of a second component part (30). The annular portion (34) of component (30) includes three equispaced cam surfaces (36) formed in the inner walls thereof for co-operation with the said lugs (45), the cam surfaces having recesses (37) adapted to receive the lugs (45) of the first component (40), whereby insertion of the cylindrical portion (44) of the first component (40) into the annular portion (30) of the second component (30) and rotation thereof causes the lugs (45) to co-operate with the cam surfaces (36) and snap into the recesses (37) thereby locking the components together. At least one of the component parts should be formed from a resilient plastics material.



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"METHOD FOR RELEASABLY ASSEMBLING COMPONENTS"

The present invention relates to a method for releasably assembling together component parts of a device and is especially concerned with a method for
5 releasably assembling the component parts of a spray unit being one element of a shower bath shower head.

In general when two component parts of a device are required to be releasably assembled and retained in their assembled position by means of a single retaining means,
10 the one part is held to or within the other by a locking means such as a screw or a nut and bolt assembly. Thus a plurality of concentric spray rings located within a shower bath shower head are normally arranged to be retained in the head by means of a centrally
15 located screw passing through a hole in the centre spray ring and being received within a threaded hole formed in an appropriately positioned lug attached to the said head, the spray rings being tapered in such a manner that the retention of the centre ring prevents
20 adjacent rings from being removed from the unit.

We have now developed a method and apparatus for retaining one component part of a device in association with another component part which does not require the use of any additional locking means. Retention is
25 achieved by forming on one component part at least two lug portions extending therefrom and in or on the other component an equivalent number of cam surfaces with which the lugs can engage and can be moved into a locking engagement by rotation of one part with respect
30 to the other.

Preferably the cam surfaces include recessed portions in which the lugs engage when the said parts are in the

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locking position to prevent one of the said component parts being inadvertently rotated with respect to the other in the opposite direction thereby allowing the said component parts to be separated. It is further
5 preferred that at least one of the lugs or cam surfaces be formed of a resilient material, such as a plastics material, to provide a "snap fit" engagement of the lugs in the said recesses.

In one form of the invention the lugs extend
10 radially outwardly from a cylindrical portion extending from one component part and the cam surfaces and recesses are formed in one face of an annulus located within the said other component part and through which the cylindrical component and associated lugs may pass.

15 In another form the cam surfaces and recesses may be located within the annulus.

In yet another form the cam surfaces may be arranged around the outer surface of a projection extending from one component and the lugs extend inwardly of a hollow
20 element extending from the other component and adapted to receive said projection and extending lugs therein.

Clearly the dimensions and positioning of the cam surfaces and lugs should be such that the surfaces of the two components, that are required to be maintained in
25 contact with each other when the components are in the locked position, are in such position when the lugs engage in the recesses.

Preferably at least three lugs and three co-operating cam surfaces and recesses are provided on the respective
30 components.

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The invention may conveniently be applied to retaining releasable spray rings of a shower unit within the shower head. Thus a spray unit, in which all components are composed of a resilient plastics material such as acetal, and located within the head may comprise an outer annulus, adapted to be received within the said head and having a tapered inside wall portion to receive an inner spray ring, within which is contained a central annular member located in position by means of a plurality of arms extending radially inwardly from the said outer annulus. Cam surfaces may be formed in the inside walls of the central annular member, the said surfaces being directed downwardly with respect to one face of the outer annulus and including a portion parallel to the upper surface of the annulus containing a shallow recess extending towards said one face; axially extending slots opening into said one face communicating with the uppermost portion of each said cam face are formed in the inside walls of the annulus. A plurality of concentric annular tapered spray rings, adapted to fit one within the other, are located within the outer annulus and are retained in position by a central portion having a tapered outer periphery to engage with the corresponding tapered wall of the innermost spray ring. Extending inwardly of the spray unit from the said central portion is a cylindrical projection having formed thereon radially extending lugs dimensioned to pass through the slots formed in the central annulus to engage the cam surfaces. Rotation of the said central portion causes the lugs to move along the cam surfaces thereby drawing the central portion and the concentric spray rings and outer annulus into closer engagement. At the end of their travel along the cam surfaces the lugs "snap" into the recesses formed in the cam surfaces to lock the rings within the outer annulus. Because the material from which the components

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are formed is resilient, rotation of the central portion in the opposite direction cause the lug to "snap" out of the recesses and to be removable through the slots in the central annulus thereby releasing all of the 5 shower rings.

One device including an embodiment of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic representation of a 10 portion of a hand set forming part of a shower bath assembly,

Figure 2 is a diagrammatic representation of a shower head assembly for location in the hand set of figure 1,

15 Figure 3 is a diagrammatic representation in cross section of a fragment of a spray unit for use with the shower head of figure 2,

Figure 4 is a plan view of the outer annulus forming part of the assembly of figure 3 taken along arrow B,

20 Figure 5 is a cross sectional representation taken across A-A of figure 4,

Figure 6 is a cross sectional representation of the centre cylindrical portion of the assembly of figure 3 and,

25 Figure 7 is a representation of a plan view along arrow C in figure 6.

Referring to the drawings, a hand set comprises a body portion 1, one end of which terminates in an essentially cylindrical portion (not shown) threaded for 30 attachment to a supply of water. The other end includes substantially flat side walls 2 and upper 3 and end 4 portions which are open to receive a spray head. A cylindrical opening 5 is formed in the lower surface 6 through which the cylindrical spray unit located on

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spray head 10 may pass.

Spray head 10 includes a cylindrical end portion 11 which is capable of being received within the body 1 of the hand set and includes an annular slot 12 in which is located an O-ring (not shown) to provide a water tight seal within body 1 of the hand set. The opposite end of the shower head comprises front and top portions 14 and 13 to close the open upper and end portions 3 and 4 in the hand set, the upper wall of the hand set being received within recess 15 formed in the top portion 13 of the shower head. The lower portion of the shower head includes a downwardly extending cylindrical member 16 dimensioned to be a sliding fit within the cylindrical opening 5 of the hand set thereby retaining the head in position on the hand set. Cylindrical portion 5 is adapted to receive a spray unit, indicated generally at 20 (figure 3). The spray unit comprises an outer ring 30 (shown in greater detail in figures 4 and 5), inner spray rings 21 and 22 and a central locking portion 40 (shown in greater detail in figures 6 and 7).

Outer ring 30 includes wall 31 having shoulder 32 and dimensioned to be a sliding fit within cylindrical member 16, shoulder 32 engaging against the lower face 17 of said member. Ring 30 is retained in position by gluing to member 16. The lower inner portion 33 of wall 31 is tapered to receive the complimentary tapered outer wall of ring 21. A central annular member 34 is located concentrically of ring 30 by spider arms 35 projecting radially from the inner wall of ring 30. Three cam surfaces 36 having a recessed portion 37 are formed in the inner wall of member 34, the cam surfaces being inclined upwardly towards recess 37. A stop member 38 is provided at the edge of recess 37 remote from the cam surface. Three axial slots 39 are

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provided to communicate with the lower end of cam surface 36.

The outer tapered walls of rings 21 and 22 are grooved to provide spray holes 50 and 51 between ring 5 21 and the smooth inner tapered wall 33 of ring 30 and between ring 22 and the smooth inner tapered wall of ring 21 respectively.

Central locking portion 40 is formed with a frusto conical lower portion 41 in the outer wall of which are 10 cut grooves 42 to provide spray holes 52 between said wall and the smooth inner wall of ring 22. Slot 43 is formed in the base of portion 41. A cylindrical portion 44 of smaller diameter than frusto-conical portion 41 projects upwards therefrom and includes three lugs 45 15 projecting radially in the same plane and at angles of 120° . The diameter of portion 44 and the length of lugs 45 are such that they are a sliding fit within annular member 34 and slots 39 respectively.

To assemble the spray head rings 21 and 22 are 20 first positioned within outer ring 30 which is held in the inverted position. Central locking portion 40 is then introduced into the inner ring 22 the cylindrical portion passing into the central annular member 34 of outer ring 30, lugs 45 travelling along slots 39 to 25 engage the cam surfaces 36 formed in the walls of member 34. Rotation of locking member 40 by means of a screw driver engaging slot 43 causes lugs 45 to travel along the cam surface 36 until they "snap" into recesses 37, in which position the rings 21 and 22 are firmly 30 locked into outer ring 30. Over-rotation of member 40 is prevented by the presence of stop member 38. Inadvertant rotation of the locking member 40 in the opposite direction is prevented since lugs 45 are located in recess 37.

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Since the locking member 40 and annular members 34 are formed from a resilient plastics material, lugs 45 can be caused to "snap" out of the recess 36 by rotation of locking member 40 in the opposite direction 5 using a screw driver engaged in slot 43, thereby enabling the locking member to be withdrawn and rings 21 and 22 to be removed.

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CLAIMS:

1. A method for releasably retaining two component parts of a device in association with each other, characterised in that the method comprises forming on
5 said one component part (40) at least two lug portions (45) extending therefrom, and forming an equivalent number of cam surfaces (36) in or on said other component part (30) for co-operation with said lugs (45), whereby on relative movement between the said
10 components the lugs (45) and cams (36) co-operate to move into locking engagement to retain the said component parts in associataion with each other.
2. A method according to claim 1 characterised in that one component part (40) includes a cylindrical portion
15 (44) for engagement within an annular portion (34) of the other component part (30), said lugs (45) extending radially outwardly from said cylindrical portion (44) and said cam surfaces (36) being formed in or on the inner surface of said annular portion (34).
- 20 3. A method according to claim 1 characterised in that one said component part includes an annular portion and the other component part includes a cylindrical portion for engagement within said annular portion, the said lugs extending radially inwardly of said annular portion
25 and the said cam surfaces being formed in or on the peripheral surface of the said cylindrical portion.
4. A method according to claims 1, 2 or 3 characterised in that the cam surfaces (36) include recesses (37) within which the lugs (45) are engaged when the cams (36) and lugs (45) are in locking engagement.
- 30 5. A method according to claim 4 characterised in that

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at least one of the lugs (45) and cam surfaces (36) are formed from a resilient material to provide a snap fit engagement of the lugs within the said recesses.

6. A method according to any one of the preceding
5 claims wherein the device is a shower head (10)
including tapered outer (30) and inner spray rings
(21,22), a first component member comprising an outer
spray ring (30) received in and attached to said head
(10) and including a centrally located annular portion
10 (34) the said inner rings (21,22) being concentrically
located within the said outer rings (30) and retained
in position by a second component member (40),
characterised in that said second component member
includes a cylindrical portion (44) for engagement
15 within said annular portion (34) of said first member
(30), and a tapered peripheral portion (41) co-operating
with the corresponding portion of the innermost spray
ring (22), whereby on rotation of the second member
(40) the cylindrical portion (44) thereof rotates with-
20 in the annulus (34) of said second member (30) causing
the lugs (45) and cam surfaces (36) to move into
locking engagement to retain the spray rings within
the shower head.

7. An apparatus for releasably retaining two component
25 parts of a device in association with each other,
characterised in that one component part (40) includes
at least two lug portions (45) extending therefrom and
the other component part (30) includes an equivalent
number of cam surfaces (36) for co-operation with said
30 lugs (45), relative movement between the said components
(30,40) causing lugs (45) and cams (36) to co-operate
and move into locking engagement whereby the said
component parts are retained in association with each
other.

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8. An apparatus according to claim 7 characterised in that one component part (40) comprises a cylindrical portion (44) and said lugs (45) extend radially outwardly therefrom and said other component (30) 5 comprises an annular portion (34) and the said cam surfaces (36) are formed in or on the inner surface of said portion (34).
9. An apparatus according to claim 7 characterised in that one component part comprises an annular portion 10 and the said lugs extend radially inwardly thereof and the other component part includes a cylindrical portion and the cam surfaces are formed in or on the peripheral surface thereof.
10. An apparatus according to any one of claims 9-11 15 characterised in that the cam surfaces include recesses within which the lugs are engaged when the cams and lugs are in locking engagement.
11. An apparatus according to claim 12 characterised in that at least one of the lugs and cam surfaces are 20 formed from a resilient material to provide a snap fit engagement of the lugs within the said recesses.

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FIG. 1

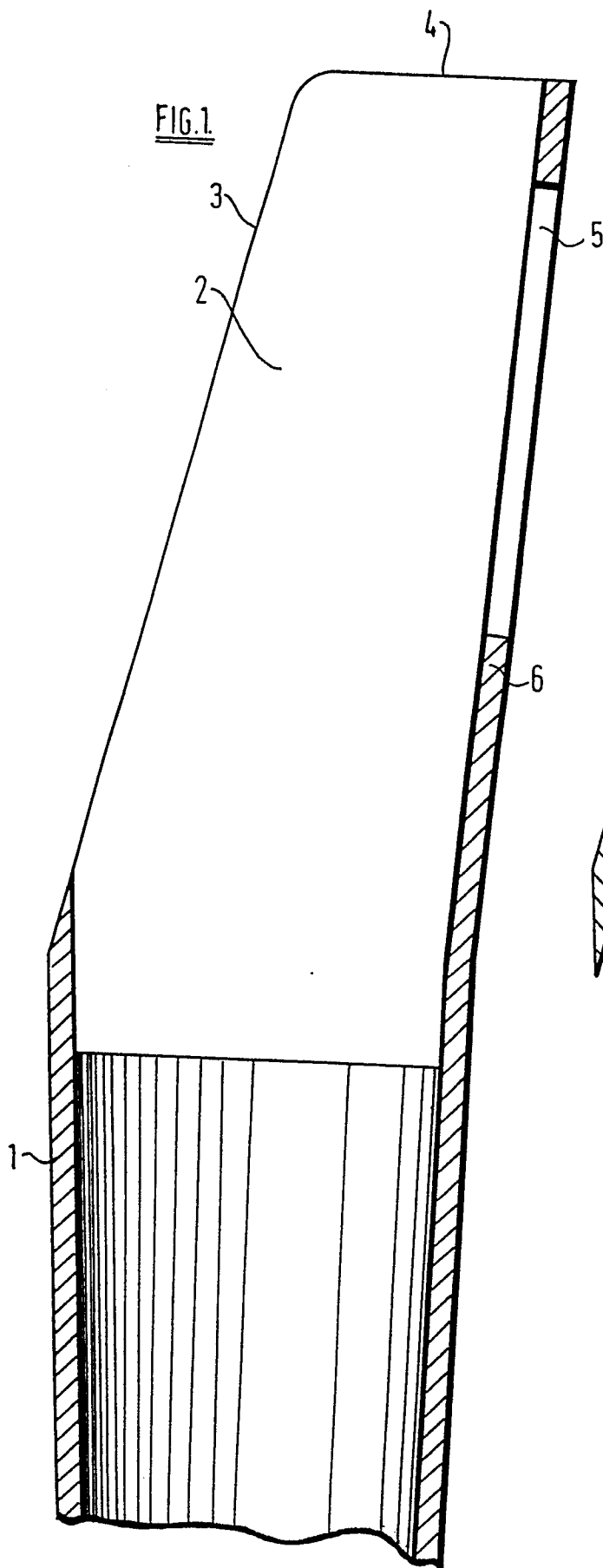
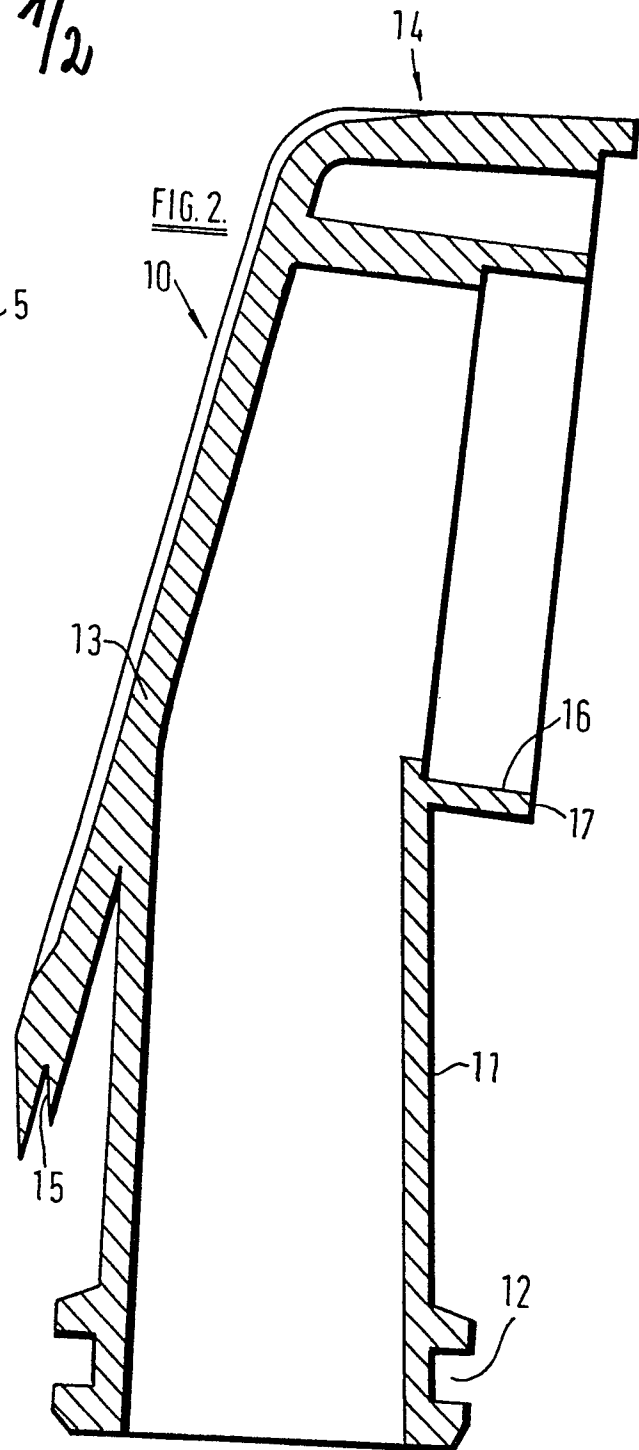
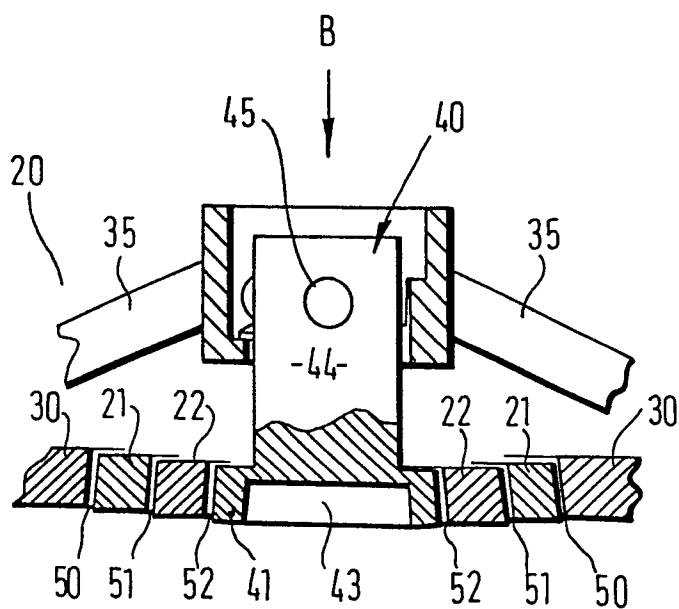
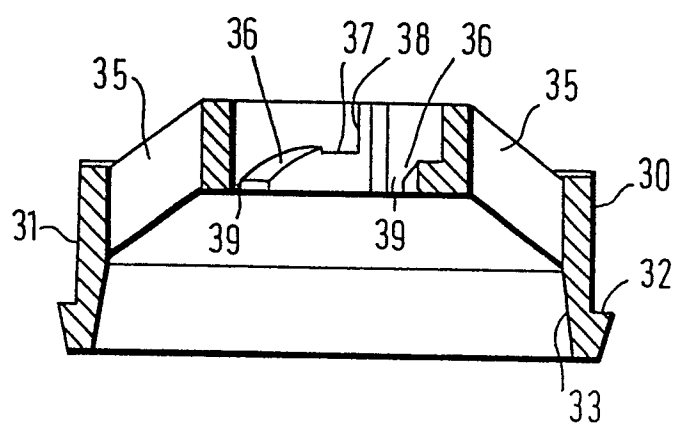
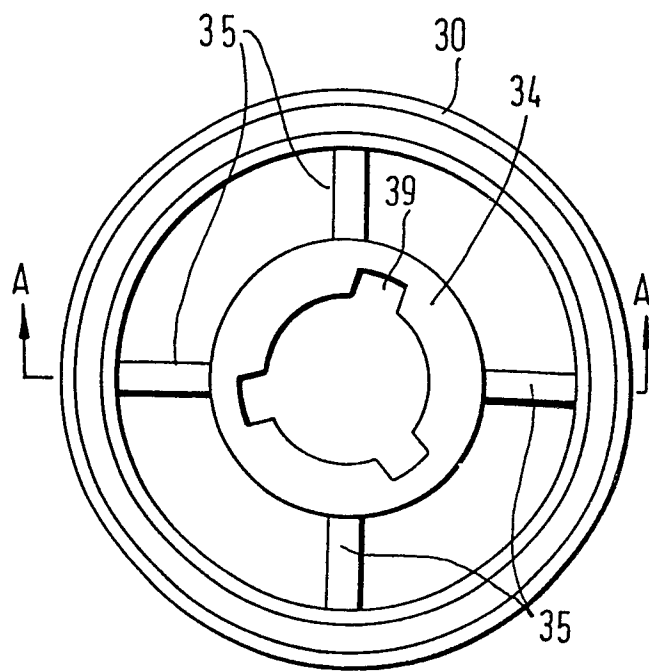
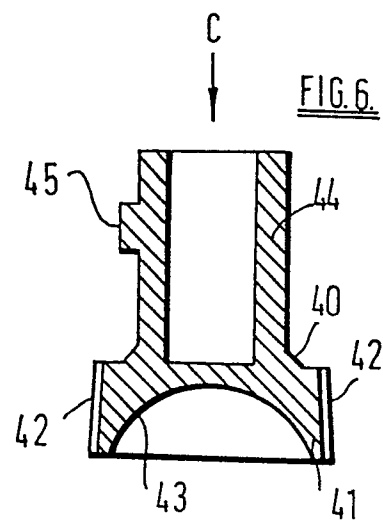


FIG. 2



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FIG. 3.FIG. 4.FIG. 5.FIG. 6.FIG. 7.