



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 884 804 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.12.1998 Bulletin 1998/51

(51) Int Cl.⁶: **H01R 13/42**

(21) Application number: **98201605.7**

(22) Date of filing: **14.05.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **13.06.1997 GB 9712225**

(71) Applicant: **Delphi Automotive Systems
Deutschland GmbH
D-42369 Wuppertal (DE)**

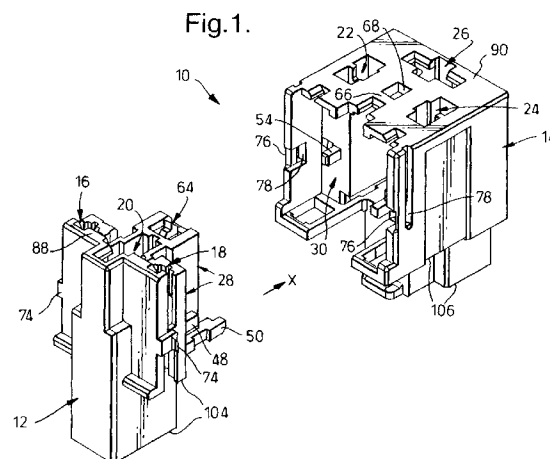
(72) Inventors:
• **Koburg, Dirk
42897 Remscheid (DE)**
• **Winkler, Mark
42287 Wuppertal (DE)**

(74) Representative: **Denton, Michael John
Delphi Automotive Systems
Centre Technique Paris
117 avenue des Nations
B.P. 60059
95972 Roissy Charles de Gaulle Cedex (FR)**

(54) Electrical connector housing

(57) An electrical connector housing (10) comprising a first part (12) and a second part (14), the first part having an axially extending through bore (16-20) and the second part having an axially extending through bore (22-26), the first part and the second part moving together in a direction (X) which is substantially perpendicular to the axial direction of the through bores; first snap-fitting means (60-68) on the first part and on the second part for holding the first part and the second part together in a first position; second snap-fitting means (70-78) on the first part and on the second part for locking the first part and the second part together in a second position; a wall portion (28) of the first part positioned adjacent a wall portion (30) of the second part in the second position; an aperture (32-36) in the wall portion of the first part opening into the through bore of the first part; an aperture (38-44) in the wall portion of the second part opening into the through bore of the second part; a peg (46-52) on the first part extending away from the wall portion of the first part, into but not through the aperture in the wall portion of the second part in the first position, and through the aperture in the wall portion of the second part and into the through bore in the second part in the second position; a peg (54-58) on the second part extending away from the wall portion of the second part, into but not through the aperture in the wall portion of the first part in the first position, and through the aperture in the wall portion of the first part and into the through bore in the first part in the second position; and an inwardly facing lip (92-102) in each through bore, the inwardly facing lip of each through bore having a predetermined axial separation from the peg extending into

the respective through bore in the second position. Removes need for an additional terminal retaining part.



Description

Technical Field

The present invention relates to an electrical connector housing for an electrical connector.

Background of the Invention

It is known to provide electrical connector housing which are moulded from plastics material. These known housing have through bores within which electrical terminals are positioned. An additional plastics part is used to secure the terminals in the through bores. Such known arrangements inevitably lead to complex moulding operations, and restrict the minimum size of the housing.

Summary of the Invention

It is an object of the present invention to overcome the above mentioned disadvantages.

An electrical connector housing in accordance with the present invention comprises a first part and a second part, the first part having an axially extending through bore and the second part having an axially extending through bore, the first part and the second part moving together in a direction which is substantially perpendicular to the axial direction of the through bores; first snap-fitting means on the first part and on the second part for holding the first part and the second part together in a first position; second snap-fitting means on the first part and on the second part for locking the first part and the second part together in a second position; a wall portion of the first part positioned adjacent a wall portion of the second part in the second position; an aperture in the wall portion of the first part opening into the through bore of the first part; an aperture in the wall portion of the second part opening into the through bore of the second part; a peg on the first part extending away from the wall portion of the first part, into but not through the aperture in the wall portion of the second part in the first position, and through the aperture in the wall portion of the second part and into the through bore in the second part in the second position; a peg on the second part extending away from the wall portion of the second part, into but not through the aperture in the wall portion of the first part in the first position, and through the aperture in the wall portion of the first part and into the through bore in the first part in the second position; and an inwardly facing lip in each through bore, the inwardly facing lip of each through bore having a predetermined axial separation from the peg extending into the respective through bore in the second position.

In the present invention, a terminal receiving through bore is provided in each part of the connector housing, and each part of the connector housing provides a part of the means for securing a terminal in the

through bore in the other part of the connector housing. Such an arrangement reduces the complexity of moulding, and allows a more compact connector housing to be produced. The first and second positions of the parts of the connector housing also allow easier assembly of an electrical connector having a connector housing in accordance with the present invention, and provide a positive (audible) indication of each position.

Brief Description of the Drawings

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is an exploded view of an electrical connector housing in accordance with the present invention prior to interengagement of the first and second parts of the connector housing;

Figure 2 is an end view of the first part of the connector housing of Figure 1;

Figure 3 is a cross-sectional view on the line III-III of Figure 2;

Figure 4 is a cross-sectional view on the line IV-IV of Figure 3;

Figure 5 is a cross-sectional view of the second part of the connector housing of Figure 1 on the line V-V of Figure 7;

Figure 6 is a cross-sectional view on the line VI-VI of Figure 5; and

Figure 7 is a cross-sectional view on the line VII-VII of Figure 5.

Description of the Preferred Embodiment

Referring to the drawings, the electrical connector housing 10 in accordance with the present invention comprises a first part 12 and a second part 14 each made (preferably by moulding) from an electrically insulating material (for example, a plastics material such as PBT or PA). The first and second parts 12, 14 of the connector housing 10 are capable of being secured together in a first position in which the first and second parts are held together and in a second position in which the first and second parts are locked together. The first part 12 comprises first, second and third axially extending through bores 16, 18, 20, respectively, and the second part 14 comprises first, second and third axially extending through bores 22, 24, 26, respectively. The through bores may vary in shaped and size. In the present embodiment, through bores 16 and 18 are substantially identical, and through bore 22 and 24 are substantially identical, although these through bores may also be different.

The first and second parts 12, 14 of the connector housing 10 slide and lock together in a direction X which is substantially perpendicular to the axial direction of the through bores 16-26. The first part 12 of the connector

housing 10 has a wall portion 28 which is directed towards a corresponding wall portion 30 of the second part 14. The wall portions 28,30 are substantially adjacent one another when the first and second parts 12,14 are fully locked together (the second position defined above). The first part 12 has three apertures 32,34,36 extending through the wall portion 28. The aperture 32 opens into the first through bore 16 of the first part 12; the aperture 34 opens into the second through bore 18; and the aperture 36 opens into the third through bore 20. The second part 14 has four apertures 38,40,42,44 extending through the wall portion 30. The aperture 38 opens into the first through bore 22 of the second part 14; the aperture 40 opens into the second through bore 24; and the apertures 42,44 open into the third through bore 26. The positioning of the apertures 32-44 relative to their respective through bore 16-26 is predetermined, as described below.

Extending away from the wall portion 28 of the first part 12, in a direction towards the wall portion 30 of the second part 14, are four pegs 46,48,50,52. The peg 46 is positioned adjacent the aperture 32 in the wall portion 28 of the first part 12; the peg 48 is positioned adjacent the aperture 34; and the pegs 50,52 are positioned either side of the aperture 38. Extending away from the wall portion 30 of the second part 14, in a direction towards the wall portion 28 of the first part 12, are three pegs 54,56,58. The peg 54 is positioned adjacent the aperture 38 in the wall portion 30 of the second part 14; the peg 56 is positioned adjacent the aperture 40; and the peg 58 is positioned between the apertures 42,44. The apertures 32-44 and pegs 46-58 are shaped and sized such that the peg 46 can make a sliding fit in the aperture 38; the peg 48 can make a sliding fit in the aperture 40; the peg 50 can make a sliding fit in the aperture 42; the peg 52 can make a sliding fit in the aperture 44; the peg 54 can make a sliding fit in the aperture 32; the peg 56 can make a sliding fit in the aperture 34; and the peg 58 can make a sliding fit in the aperture 36. The free ends of the pegs 46-58 and/or the openings to the apertures 32-44 in the wall portions 28,30 preferably have chamfered edges 108,110, respectively, for easier insertion of the pegs in the apertures.

The first part 12 has a first shoulder 60 and the second part 14 has a corresponding first shoulder 62. The first shoulder 60 on the first part 12 is formed on a resilient tab 64. The first shoulder 62 on the second part 14 is formed by a substantially rigid bar 66 which defines an edge of a first opening 68 in the second part. The first part 12 of the connector housing 10 has a pair of second shoulders 70 and the second part 14 has a corresponding pair of second shoulders 72. The second shoulders 70 on the first part 12 are formed on substantially rigid tabs 74. The second shoulders 72 on the second part 14 are formed by resiliently bars 76 which each define an edge of second openings 78 in the second part.

Movement of the first part 12 of the connector housing 10 relative to the second part 14 in the direction X

moves the pegs 46-58 into their corresponding apertures 32-44. Also, such movement causes the resilient tab 64 on the first part 12 of the connector housing 10 to flex and move across the rigid bar 66 on the second part 14 until the resilient tab 64 makes a snap fit in the first opening 68. In this position, the first position mentioned above, the first shoulders 60,62 are aligned adjacent one another to substantially prevent movement of the first part 12 relative to the second part 14 in a direction opposite to direction X. Also, in this first position, the pegs 46-58 extend into, but not through, their corresponding apertures 32-44; and the rigid tabs 74 engage the resilient bars 76. The engagement of the rigid tabs 74 with the resilient bars 76, and the alignment of the first shoulders 60,62, hold the first part 12 of the connector housing 10 in the first position relative to the second part 14.

Further movement of the first part 12 of the connector housing 10 relative to the second part 14 in the direction X (the opening 68 is large enough so as not to restrict movement of the resilient tab 64 in the direction X) causes the rigid tabs 74 to flex the resilient bars 76 until the rigid tabs 74 make a snap fit in the second openings 78. In this position, the second position mentioned above, the second shoulders 70,72 are aligned adjacent one another to substantially prevent movement of the first part 12 relative to the second part 14 in a direction opposite to direction X. Also, in this second position, the pegs 46-58 extend through their corresponding apertures 32-44 into the associated through bore 16-26, and the wall portions 28,30 of the first and second parts 12,14, respectively, are positioned adjacent one another. The relative positioning of the wall portions 28,30, and the alignment of the second shoulders 70,72, lock the first part 12 of the connector housing 10 in the second position relative to the second part 14.

The faces 80,82 of the resilient tab 64 and the rigid tabs 74, respectively, which initially engage the bars 66,76, respectively, are preferably chamfered. Alternatively, or additionally, the faces 84,86 of the rigid bar 66 and the resilient bars 76, respectively, which initially engage the tabs 64,66, respectively, are preferably chamfered.

The first part 12 of the connector housing 10 has an end face 88 which is substantially planar. The second part 14 of the connector housing 10 has an end face 90 which is substantially planar. When the first and second parts 12,14 are secured together in the first and second positions, the end faces 88,90 are substantially aligned in a common plane. Each through bore 16-26 has an inwardly facing lip or lips formed in the through bore adjacent the end faces 88,90. For through bores 22,24,26, the inwardly facing lip or lips 92,94,96, respectively, are integrally formed with the second part 14 of the connector housing. For through bores 16,18,20, the inwardly facing lip or lips 98,100,102, respectively, are integrally formed with the first part 12 of the connector housing 10, and are also defined by lips formed on the second

part 14 of the connector housing which are only fully positioned in the through bores 16, 18, 20 when the first and second parts are locked in the second position.

The above mentioned predetermined position of the apertures 32-44, and hence the predetermined position of the pegs 46-58 is determined to provide a required predetermined axial separation between the inwardly directed lip or lips 92-102 in each through bore and the pegs 46-58, when the first and second parts 12, 14 of the connector housing are locked in the second position and the pegs extend into their respective through bore.

Each through bore 16-26 is capable of receiving a male or a female electrical terminal (not shown). With the first and second parts 12, 14 of the connector housing 10 held in the first position, each terminal is inserted into its respective through bore 16-26 from the opposite end 104, 106 of the first and second parts 12, 14, respectively, to the end faces 88, 90 until each terminal engages the inwardly directed lip or lips 92-102 in the respective through bore. The first and second parts 12, 14 of the connector housing 10 are then moved to, and locked in, the second position. In this second position, the pegs 46-58 extend into their associated through bore 16-26 to trap the inserted terminal between the inwardly directed lip or lips 92-102 and the pegs in each through bore. The above mentioned predetermined axial separation of the inwardly directed lips 92-102 and the pegs 46-58 in each through bore 16-26 is determined on the basis of the shape and size of the terminal to be inserted in the through bore.

The present invention provides a two-part connector housing in which the two parts make a snap fit together in a first position to allow terminal insertion, and then makes a snap fit together in a second position to trap the terminals in position. The need for additional housing parts to secure the terminals is not required.

The present invention is not restricted to the above described embodiment. For example, the number of through bores in each of the first and second parts 12, 14 of the connector housing may be greater than, or less than, three. However, associated with each through bore is an aperture and corresponding peg. Other suitable arrangements may be provided for the snap fit of the first and second parts 12, 14 in the first position, and/or the snap fit in the second position, and the positioning of each snap fitting means may be other than that shown in the drawings.

Claims

1. An electrical connector housing (10) comprising a first part (12) and a second part (14), the first part having an axially extending through bore (16-20) and the second part having an axially extending through bore (22-26), the first part and the second part moving together in a direction (X) which is substantially perpendicular to the axial direction of the

through bores; first snap-fitting means (66-68) on the first part and on the second part for holding the first part and the second part together in a first position; second snap-fitting means (70-78) on the first part and on the second part for locking the first part and the second part together in a second position; a wall portion (28) of the first part positioned adjacent a wall portion (30) of the second part in the second position; an aperture (32-36) in the wall portion of the first part opening into the through bore of the first part; an aperture (38-44) in the wall portion of the second part opening into the through bore of the second part; a peg (46-52) on the first part extending away from the wall portion of the first part, into but not through the aperture in the wall portion of the second part in the first position, and through the aperture in the wall portion of the second part and into the through bore in the second part in the second position; a peg (54-58) on the second part extending away from the wall portion of the second part, into but not through the aperture in the wall portion of the first part in the first position, and through the aperture in the wall portion of the first part and into the through bore in the first part in the second position; and an inwardly facing lip (92-102) in each through bore, the inwardly facing lip of each through bore having a predetermined axial separation from the peg extending into the respective through bore in the second position.

2. An electrical connector housing as claimed in Claim 1, wherein the first snap fitting means comprises a resilient tab (64) on the first part (12), and a substantially rigid bar (66) defining an edge of an opening (68) on the second part (14), the resilient tab making a snap fit in the opening in the first position with a shoulder (60) on the resilient tab being positioned adjacent a shoulder (62) on the rigid bar.
3. An electrical connector housing as claimed in Claim 1 or Claim 2, wherein the second snap fitting means comprises a substantially rigid tab (74) on the first part (12), and a resilient bar (76) defining an edge of an opening (78) on the second part (14), the rigid tab making a snap fit in the opening in the second position with a shoulder (70) on the rigid tab being positioned adjacent a shoulder (72) on the resilient bar.
4. An electrical connector housing as claimed in any one of Claim 1 to 3, wherein the first part (12) has more than one axially extending through bore (16-20) and at least a corresponding number of apertures (32-36) formed in the wall portion (28) thereof, each through bore having at least one aperture opening therein; and wherein the wall portion (30) of the second part (14) has at least the same number of pegs (54-58) thereon as the number of

through bores in the first part.

5. An electrical connector housing as claimed in any one of Claim 1 to 4, wherein the second part (14) has more than one axially extending through bore (22-26) and at least a corresponding number of apertures (38-44) formed in the wall portion (30) thereof, each through bore having at least one aperture opening thereinto; and wherein the wall portion (28) of the first part (12) has at least the same number of pegs (46-52) thereon as the number of through bores in the second part. 5 10
6. An electrical connector housing as claimed in any one of Claims 1 to 5, wherein at least one of the through bores (16-26) has at least two inwardly facing lips (92-102), one of the inwardly facing lips being formed on one of the first or second parts (12,14), and the other inwardly facing lip being formed on the other of the first or second parts, with the other inwardly facing lip only being fully positioned in the through bore when the first and second parts are in the second position. 15 20
7. An electrical connector housing as claimed in any one of Claims 1 to 6, wherein the first and second parts (12,14) are moulded from plastics electrically insulating material. 25

30

35

40

45

50

55

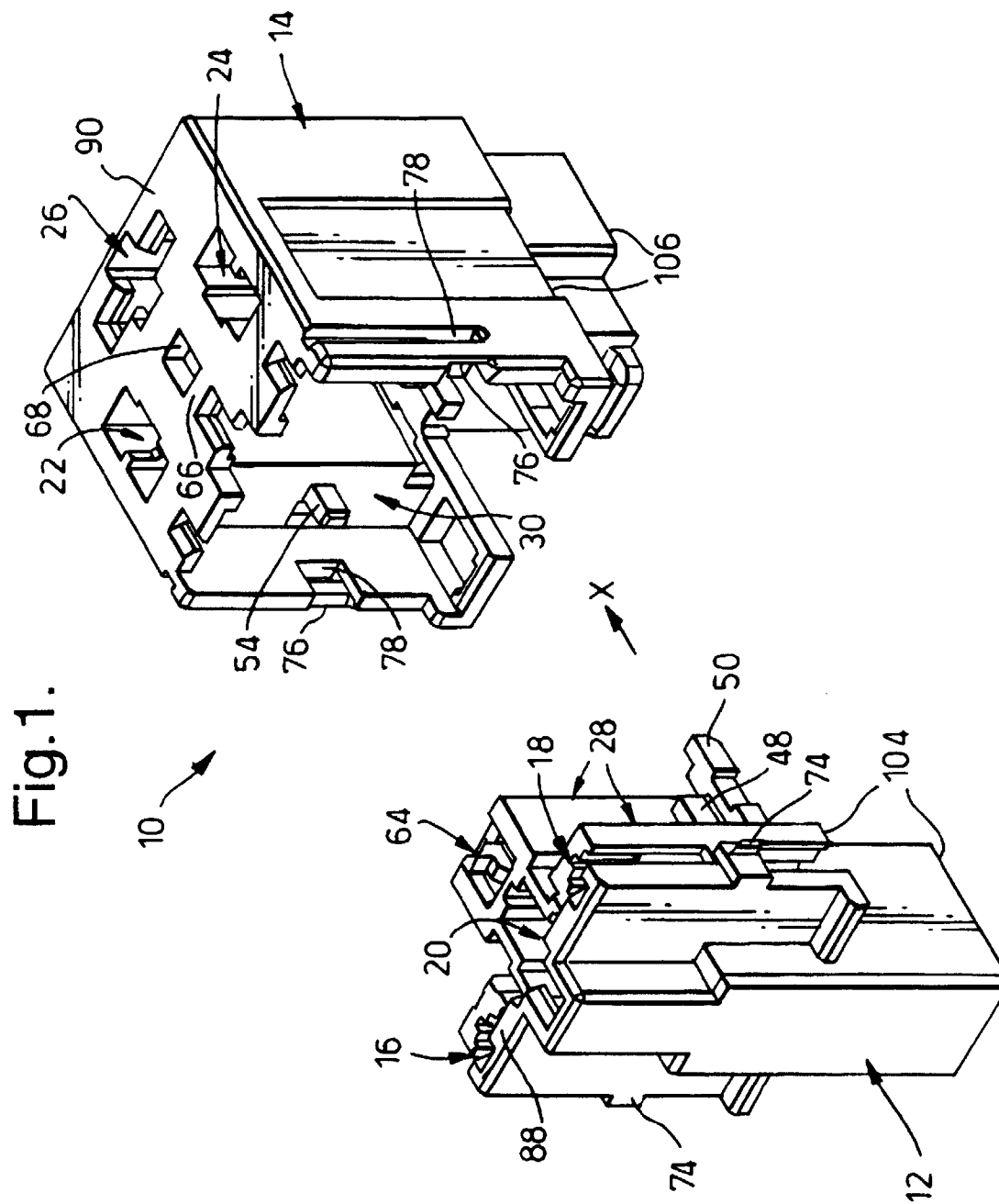


Fig.2.

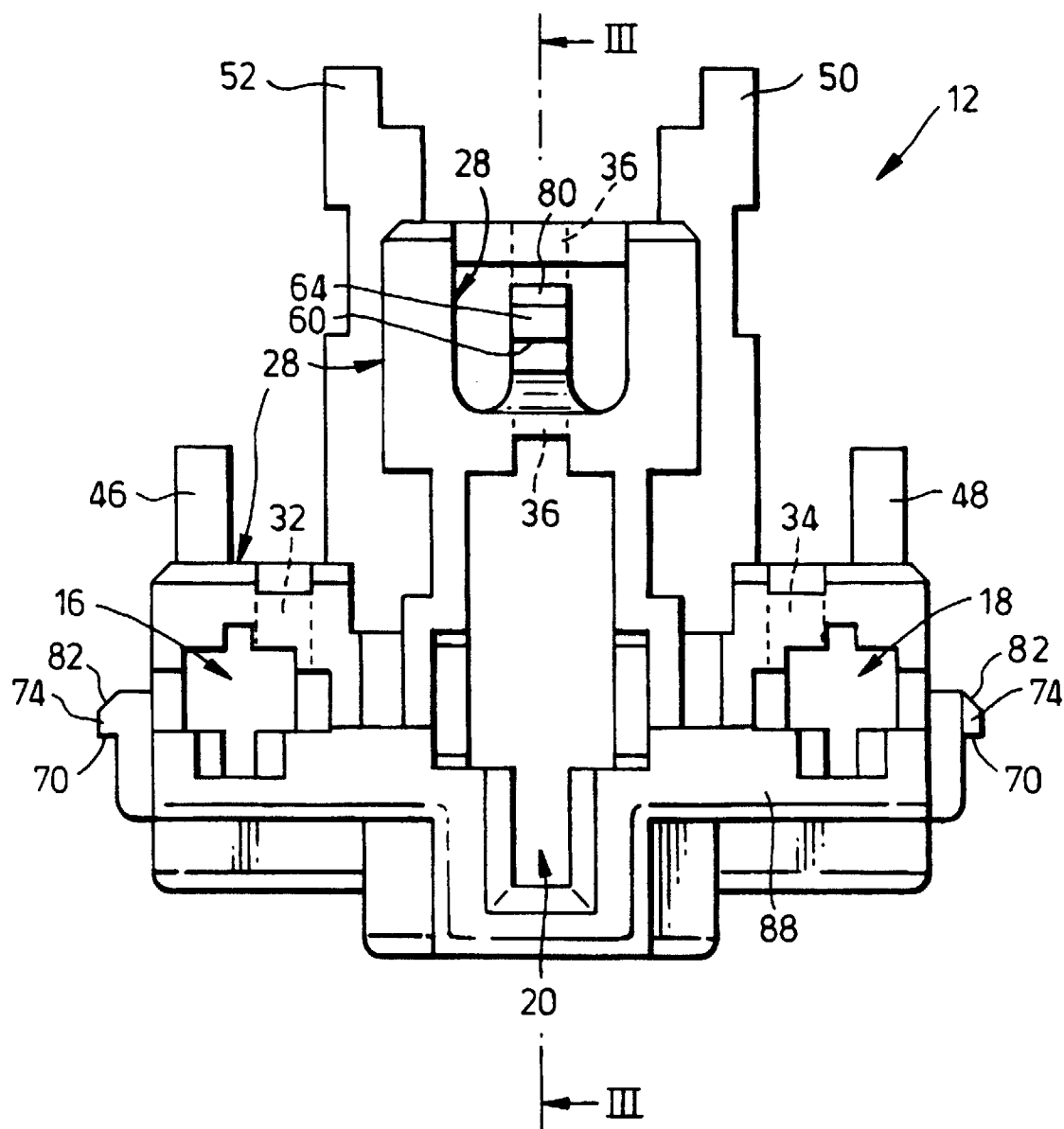


Fig.3.

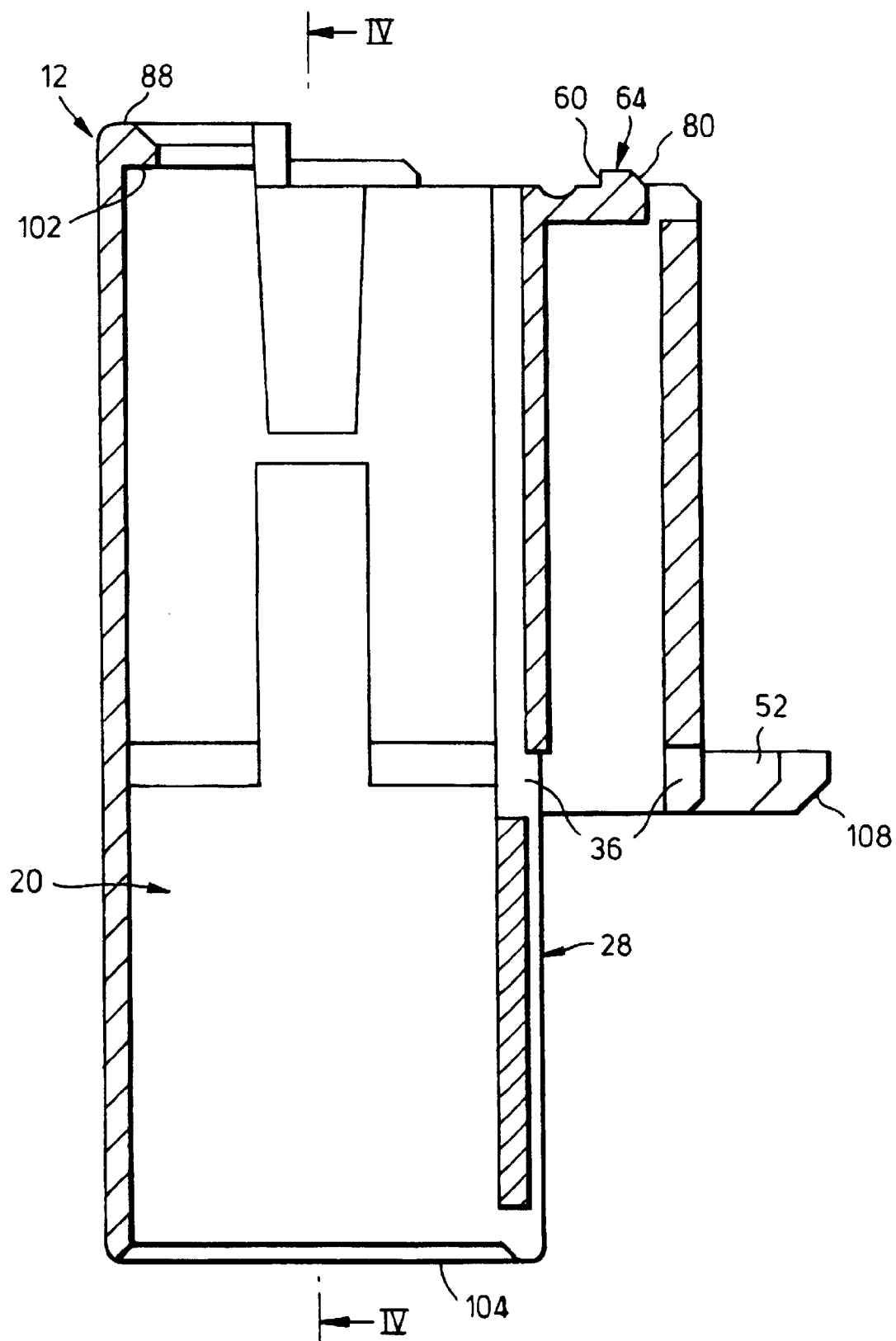


Fig.4.

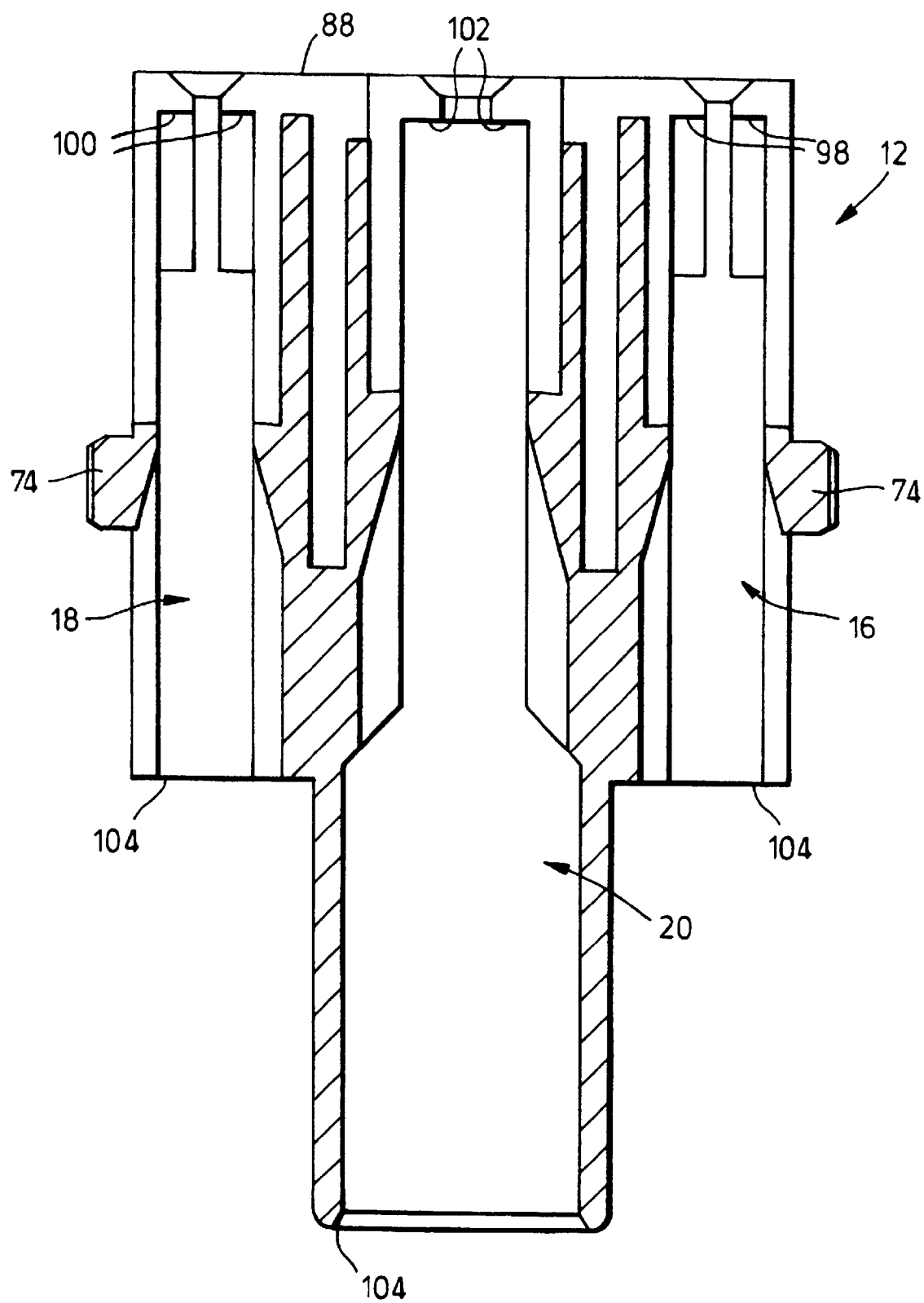


Fig.5.

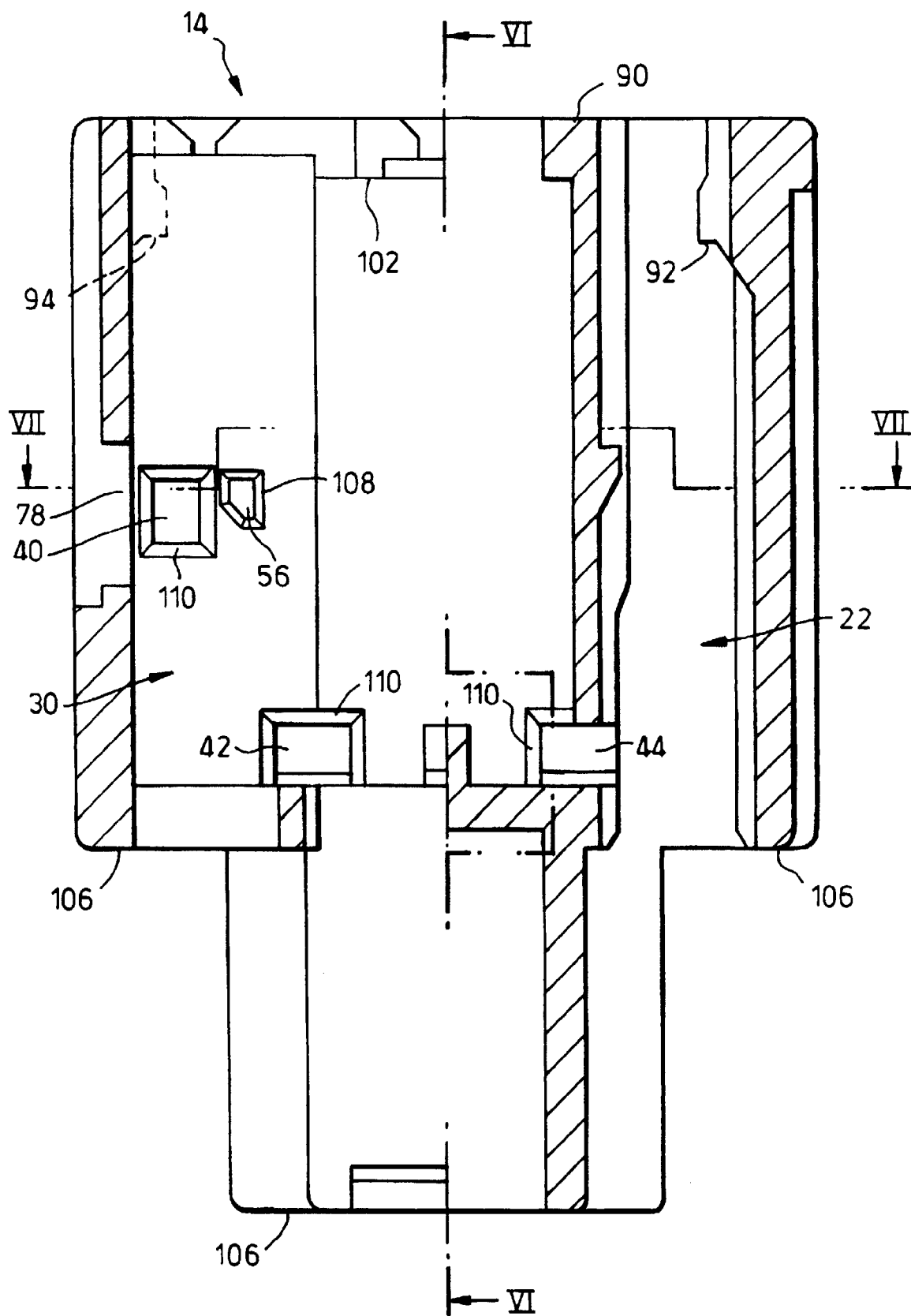


Fig.6.

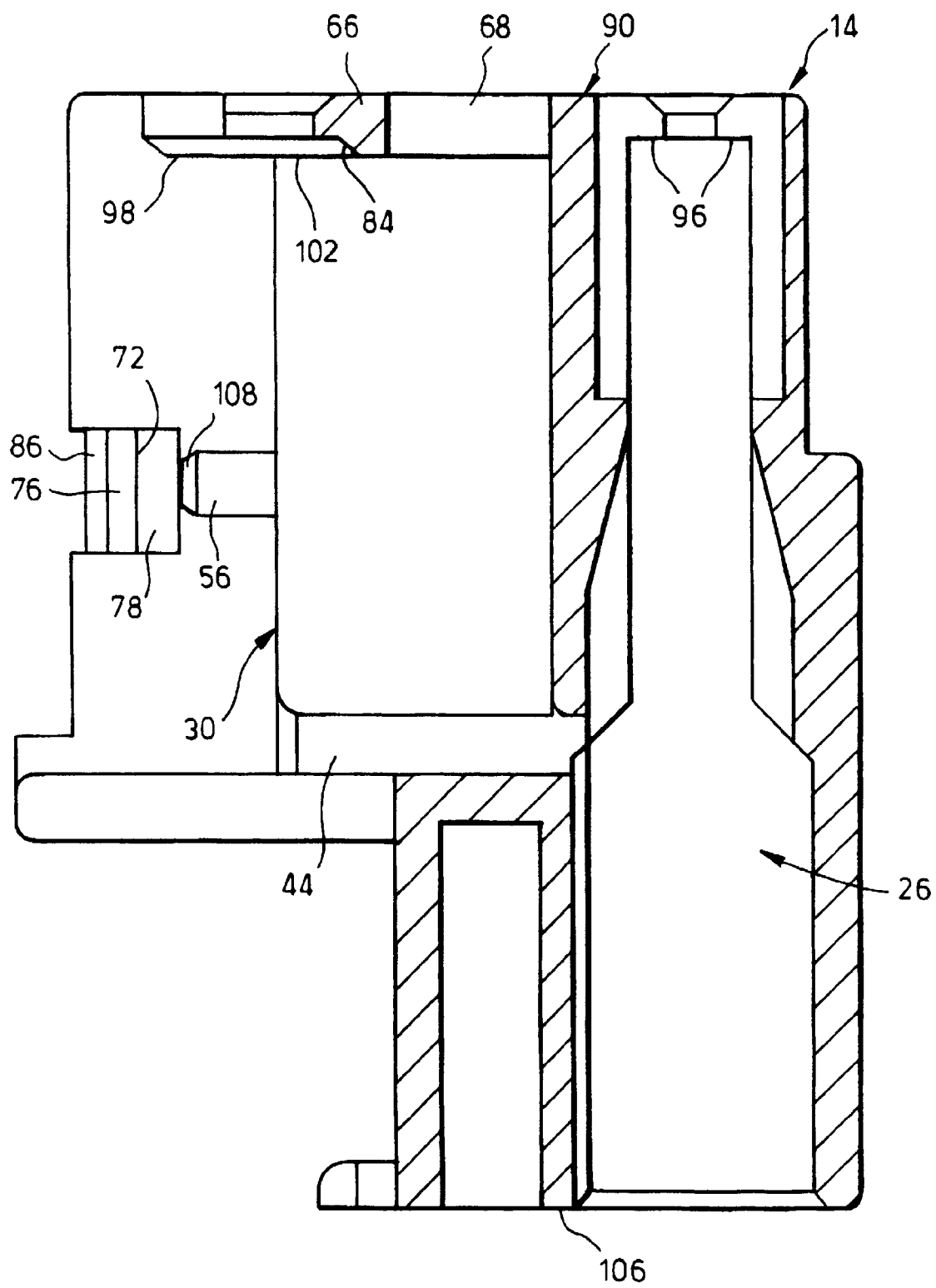


Fig.7.

