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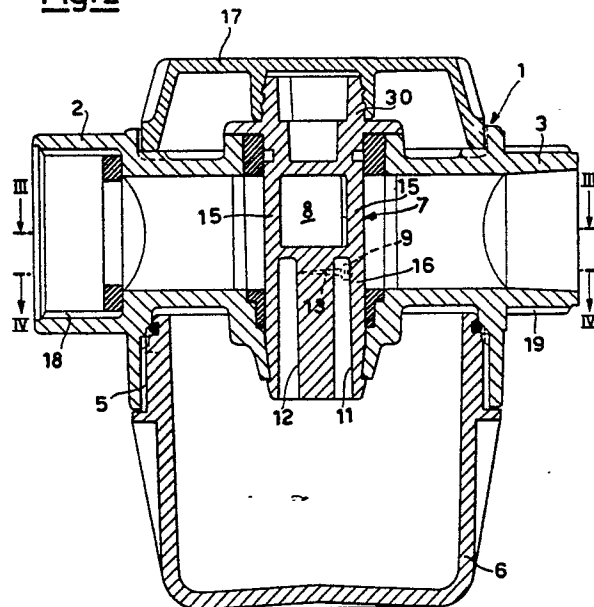
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(54) **Mixer of liquids.**

(57) The mixer comprises a housing (1) provided with an inlet opening (2) and an outlet opening (3) for a main liquid, to which there is connected in a removable manner a container (6) for an auxiliary substance to be mixed. Inside the housing (1) there is provided a valve element (7) rotatably arranged between said inlet opening (2) and said outlet opening (3). The conformation of valve element (7) is such that for different angular positions of the element itself there are defined different combinations of the passage of the main liquid both directly and through the auxiliary substance container (6). The possibility is also provided of completely interrupting all deliveries.

Fig.2



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Mixer of liquids

The present invention relates to a mixer of liquids, particularly for the distribution of detergents for washing motor vehicles or for the distribution of fertilizers, anticyptogamics, etc. for gardening purposes.

It is known that in washing operations, such as, say, the washing of a motor vehicle, it is necessary to alternate the delivery of water only with that of a mixture of water and detergent, particularly in liquid form.

In order to assist the operator, mixers have already been thought up which, inserted in a hydraulic circuit, are capable of ensuring the two deliveries, automatically performing the mixing operation, when requested.

It has, however, been shown to be necessary on occasion to have the detergent only available in order to execute an accurate initial soaping of the motor vehicle and then to continue the soaping operation with a lower concentration of detergent.

Moreover, it sometimes proves inconvenient to gain access to the hydraulic circuit's main cock each time any one delivery is to be interrupted completely.

On the basis of the above, the object of the present invention is to accomplish a mixer which, in addition to the normal delivery of water only and to the mixing of water and detergent, also allows the delivery of detergent only.

A further object is to provide this mixer with the possibility of varying the concentration of detergent from a maximum to a minimum, as well with a position in which the mixer itself behaves like a closed cock without having recourse to the main cock with its corresponding inconvenient access.

On the basis of the present invention such objects are attained with a mixer for liquids, particularly but not exclusively for detergents, comprising a housing provided with an inlet opening and with an outlet opening for a main liquid, said housing having means for fastening a container of an auxiliary substance to be mixed with said main liquid, and a valve element arranged between said inlet opening and said outlet opening, characterized in that said valve element has a first drilled portion such as to allow the direct communication between said inlet opening and said outlet opening for a first angular position of said valve element and the closing of said communication for a second angular position of said valve element, and a second axially displaced portion comprising at least two diametrically opposed holes communicating on one side in a constant manner with respective coaxial channels arranged in said valve element and in their turn communicating with said container and on the

other side with said inlet and outlet openings for a third angular position of said valve element wherein said first portion of the element itself accomplishes a reduced direct communication between said inlet opening and said outlet opening and a fourth angular position of said valve element wherein said first portion of the element itself accomplishes the closing of said communication.

It is evident that with the use of a mixer of this type it is possible to execute a plurality of operations, corresponding to the different angular positions of the valve element. In the latter's first angular position, indeed, the mixer behaves like a cock open for the main liquid only, in this case water, while in the second angular position it behaves like a closed cock preventing any delivery at all. In the third angular position, on the other hand, mixing is obtained of the main liquid with the auxiliary substance, such as, say, detergent, with the possibility of varying over a certain range the concentration of the substance itself, and lastly in the fourth angular position the delivery of the auxiliary substance only, in which case the main liquid is used merely as a conveyor means.

For a better understanding, there will now be described an embodiment of the invention, given as a non-limiting example, with reference to the enclosed drawings, wherein:

Fig. 1 is a plan view from above of a mixer accomplished according to the present invention;

Fig. 2 is a vertical cross-sectional view of said mixer in the all-closed position;

Figs 3 and 4 are cross-sectional views taken along lines III-III and IV-IV of Fig. 2;

Fig. 5 is a vertical cross-sectional view of the mixer in the position wherein it is open for the main liquid only;

Figs 6 and 7 are cross-sectional views taken along the lines VI-VI and VII-VII, respectively, of Fig. 5;

Fig. 8 is a vertical cross-sectional view of the mixer in the mixing position;

Figs 9 and 10 are cross-sectional views taken along the lines IX-IX and X-X, respectively, of Fig. 8;

Fig. 11 is a vertical cross-sectional view of the mixer in the position wherein it delivers only the auxiliary substance;

Figs 12 and 13 are cross-sectional views taken along the lines XII-XII and XIII-XIII, respectively, of Fig. 11;

Fig. 14 is a front view of a valve element included in the mixer of the previous figures;

Fig. 15 shows the same valve element of Fig. 14 rotated through 90°.

With reference to the figures, the mixer is constituted by a housing 1 provided with an inlet opening 2 and with an outlet opening 3 for a main liquid, say, water. To said housing 1 there is connected by means of fastening means 5, in a removable manner, a container 6 for an auxiliary substance, say, liquid detergent, to be mixed with the main liquid. Note that the term "detergent" means everything which is used to cleanse, and thus also shampoo, polisher and so on.

In said housing 1, between inlet opening 2 and outlet opening 3, there is a valve element 7 which may be moved by rotation. Said valve element 7 (Fig.s 14 and 15) comprises a first drilled portion 8 delimited by two walls having an annular sector 15 and a second axially displaced portion 16 comprising two holes 9 and 10, communicating with respective axial channels 11 and 12 and having a cross-section which decreases in the direction of the latter, which in turn communicate with said container 6.

From said holes 9 and 10, on the external face of portion 16 of said valve element 7, there extend for a certain arc of the circumference two notchings 13, 14, respectively, having a cross-section which diminishes as the distance from the holes themselves increases.

The valve element 7 has an upper appendix 30 which protrudes from housing 1 and with which there is integral a shaped roller 17 for the operation of the valve element itself.

The inlet opening 2 and the outlet opening 3 also have respective threads 18, 19 for the connection to a hydraulic circuit. For example, the mixer may be connected to a water mains by means of threads 18 of inlet opening 2, while a union for a rubber hose may be applied to outlet opening 3.

Once the water mains cock has been opened, the mixer is supplied with water which, according to the angular position of valve element 7, may follow different paths before arriving at the outlet opening 3.

For a first angular position of valve element 7 (Fig.s 2-4), which may be defined as for water only, the drilled portion 8 is aligned with inlet opening 2 and outlet opening 3 so as to allow direct communication between them, so that water flows through the mixer without affecting the substance contained in container 6.

For a second angular position of valve element 7 (Fig.s 5-7), which may be defined as the closed position, the mixer behaves like a closed cock, since in this angular position the annular walls 15 are arranged transversally to inlet opening 2 and to outlet opening 3.

There also exists a third angular position (Fig.s 8-10), which may be defined as the mixing position, wherein, supposing that the substance to be

mixed is detergent for washing motor vehicles and a water-detergent mixture is required, water not only flows through the drilled portion 8 but also flows into hole 9 and from here to the corresponding axial channel 11 and thence to container 6, from which after mixing with the detergent is exits through axial channel 12 and the corresponding hole 10 to arrive at outlet opening 3.

The particular conformation of notching 13 connected with hole 9 allows the variation of the quantity of water which may arrive at container 6. In actual fact, for the different angular positions assumed by valve element 7 in the mixing position, the cross-section of hole 9 offering a passage to the water is more or less important, so as to define a corresponding more or less important quantity of water which is allowed to reach the container 6 and, as a consequence, a variation of the concentration of the water-detergent mixture at the outlet of the mixer. The same goes for hole 10 and notching 14, which alter the outlet cross-section of the detergent.

In addition to the possibility of mixing water with detergent, and to vary the latter's concentration, the mixer illustrated in the drawings allows the delivery, in a fourth position of valve element 7 (Fig.s 11-13), which may be defined as a "shampoo" position, of detergent only. In actual fact, in this position the direct communication between inlet opening 2 and outlet opening 3 is prevented by the walls 15 as in the closed position, while water may enter hole 9 and from here flow to axial channel 11 exerting pressure on the detergent, which is forced to flow in axial channel 12 and from here into hole 10, from where it exits in the form of just detergent, diluted only to a very small extent. This could prove useful, say, in the case of a requirement of an initial abundant soaping with a high detergent concentration.

Naturally, instead of detergent, any other substance may be used which may be mixed with water or other liquid, such as fertilizers and/or anticryptogamics for gardening purposes.

The mixer accomplished according to the present invention will be able to operate at any of its positions; in actual fact, by using water pressure to convey the substance to be mixed, it shall be indifferent whether the mixer is in a direct position as represented in the drawings or in an upside down position or otherwise at an angle.

It is thus evident that with a mixer of this type it is possible to accomplish a variation of the concentration depending on the operator's requirements; it will also be possible to momentarily interrupt delivery by acting on the mixer directly and to go back again to having a delivery of the auxiliary substance only.

Claims

1. Mixer comprising a housing (1) provided with an inlet opening (2) and with an outlet opening (3) for a main liquid, said housing (1) having means for fastening (5) a container (6) of an auxiliary substance to be mixed with said main liquid, and a valve element (7) arranged between said inlet opening (2) and said outlet opening (3), characterized in that said valve element (7) has a first drilled portion (8) such as to allow the direct communication between said inlet opening (2) and said outlet opening (3) for a first angular position of said valve element (7) and the closing of said communication for a second angular position of said valve element (7), and a second axially displaced portion (16) comprising at least two diametrically opposed holes (9, 10) communicating on one side in a constant manner with respective coaxial channels (11, 12) arranged in said valve element (7) and in their turn communicating with said container (6) and on the other side with said inlet opening (2) and outlet (3) opening for a third angular position of said valve element (7) wherein said first portion (8) of the element itself accomplishes a reduced direct communication between said inlet opening (2) and said outlet opening (3) and a fourth angular position of said valve element (7) wherein said first portion of the element itself accomplishes the closing of said communication.

2. Mixer according to claim 1, characterized in that said holes (9, 10) in said second portion (16) of said valve element (7) have a cross-section which diminishes from the external face of said valve element until it gets to communicate with said respective axial channels (11, 12), and in addition, on the external face of said valve element (7), beginning with said holes (9, 10), there extend for a certain arc of a circumference respective notchings (13, 14) having a decreasing cross-section as the distance from the holes themselves increases.

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Fig.1

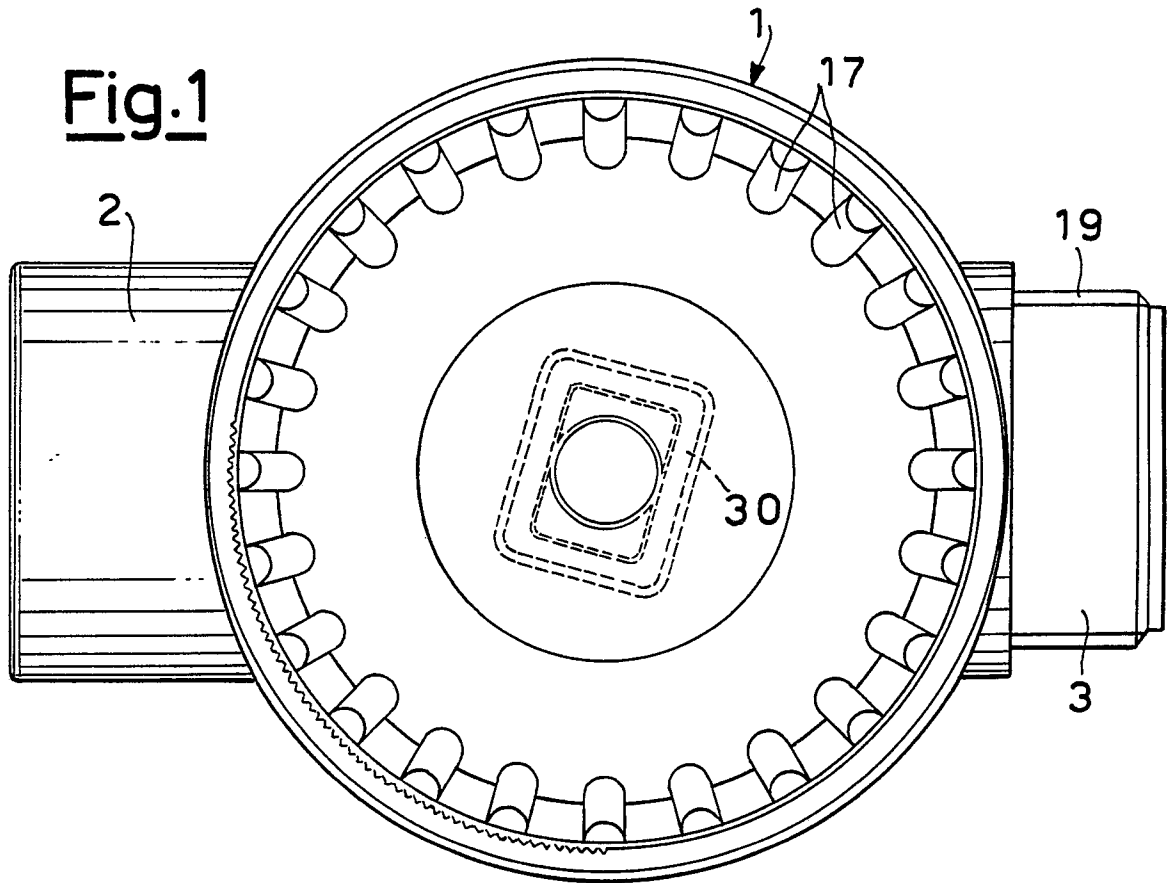


Fig.14

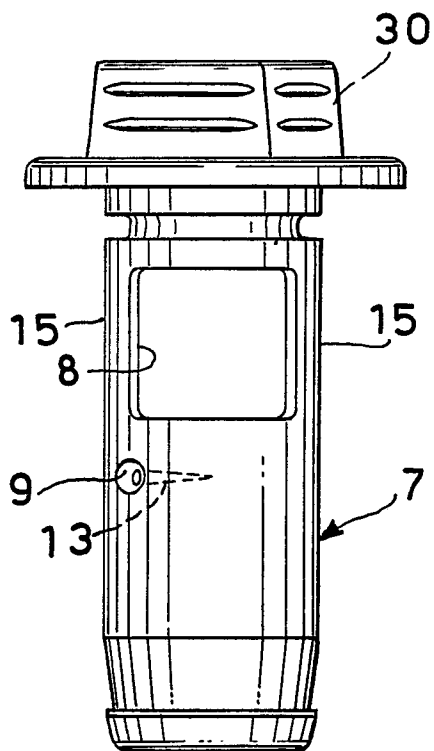


Fig.15

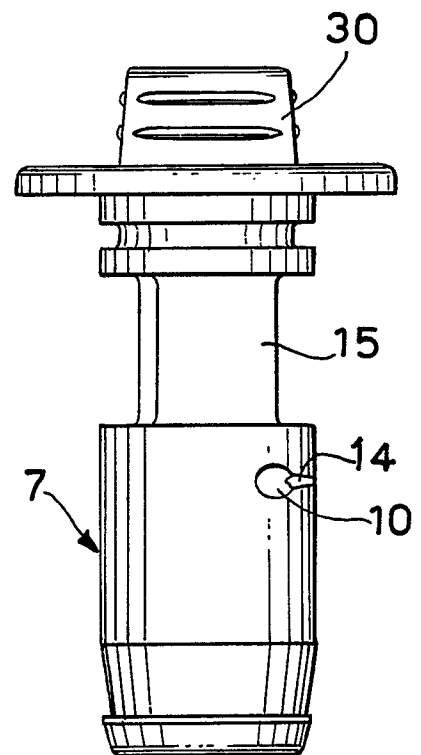


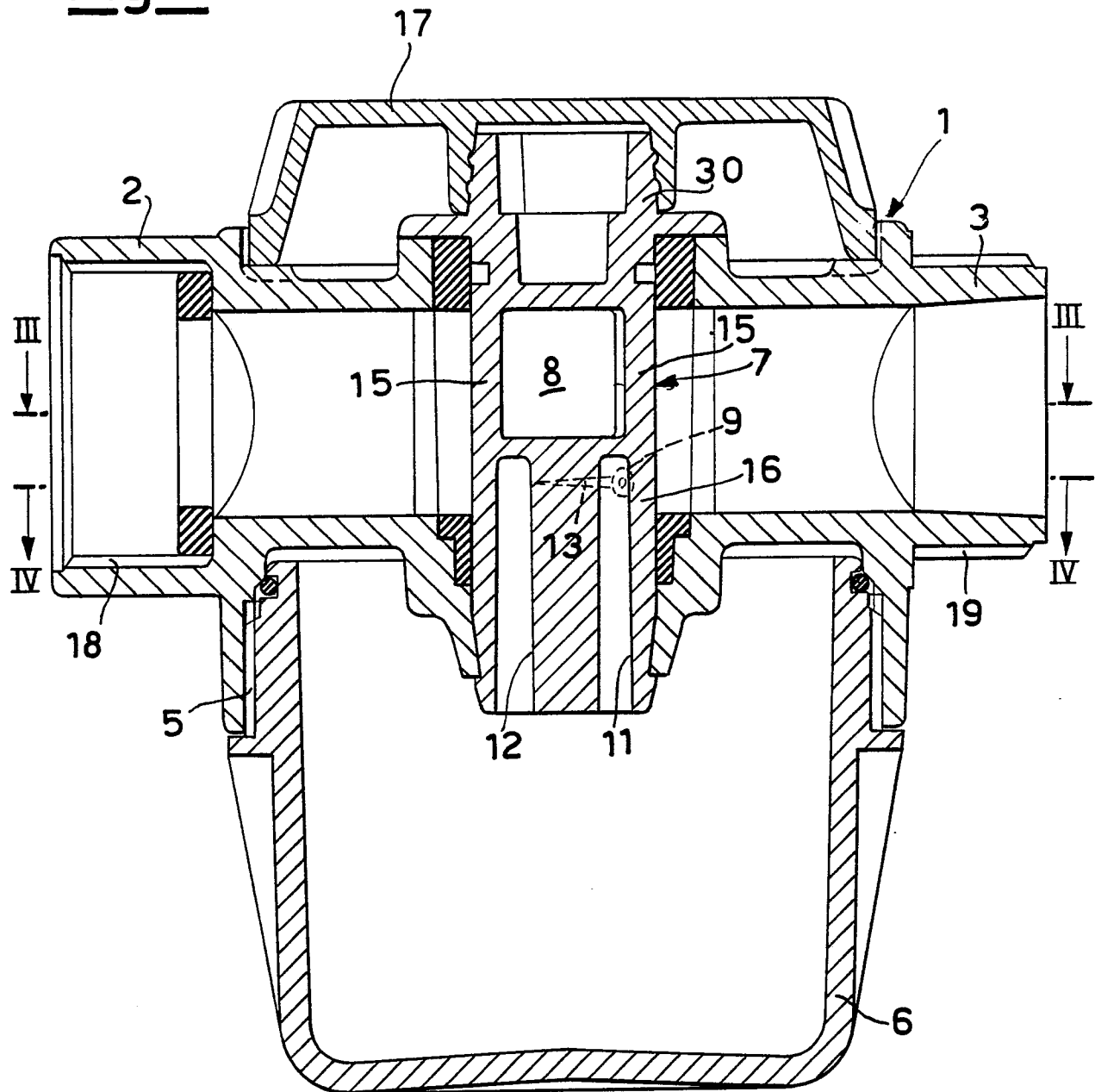
Fig.2

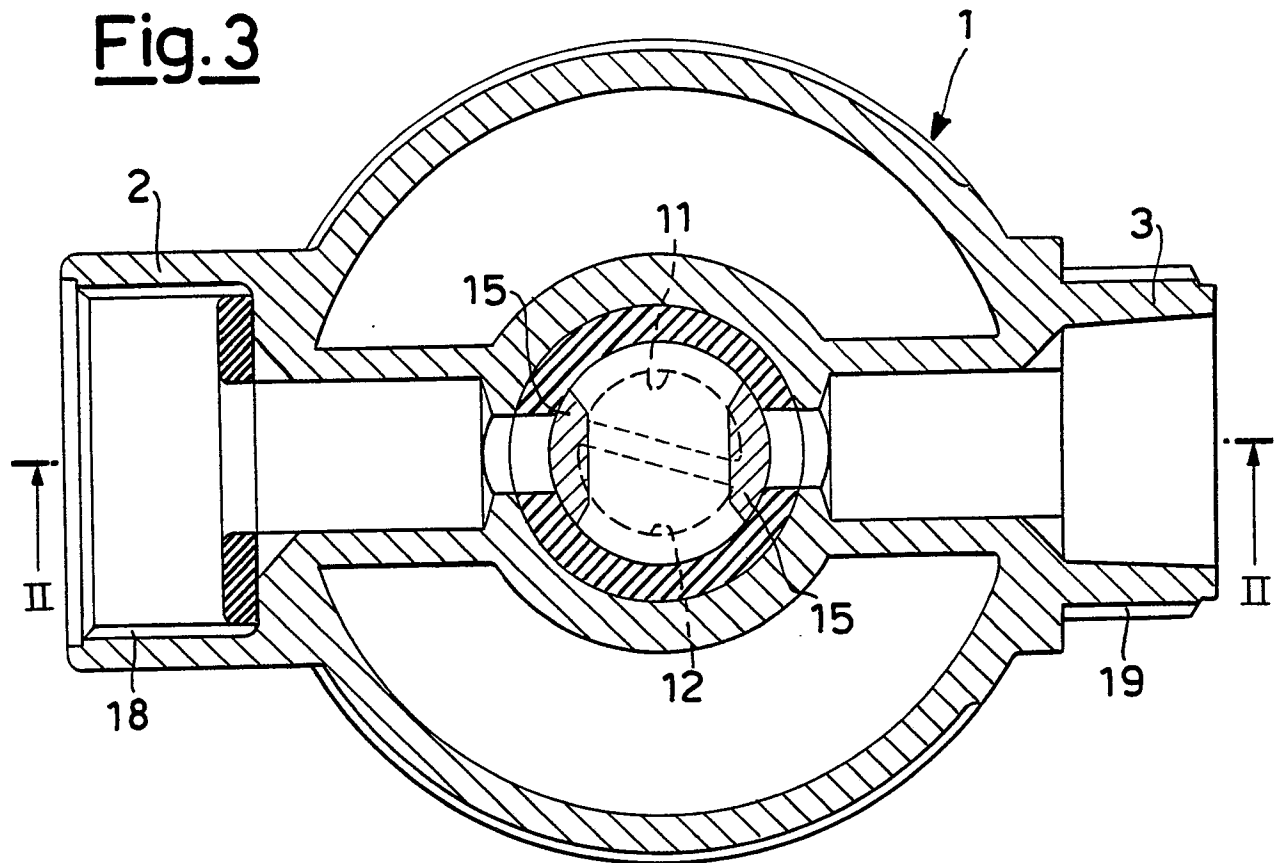
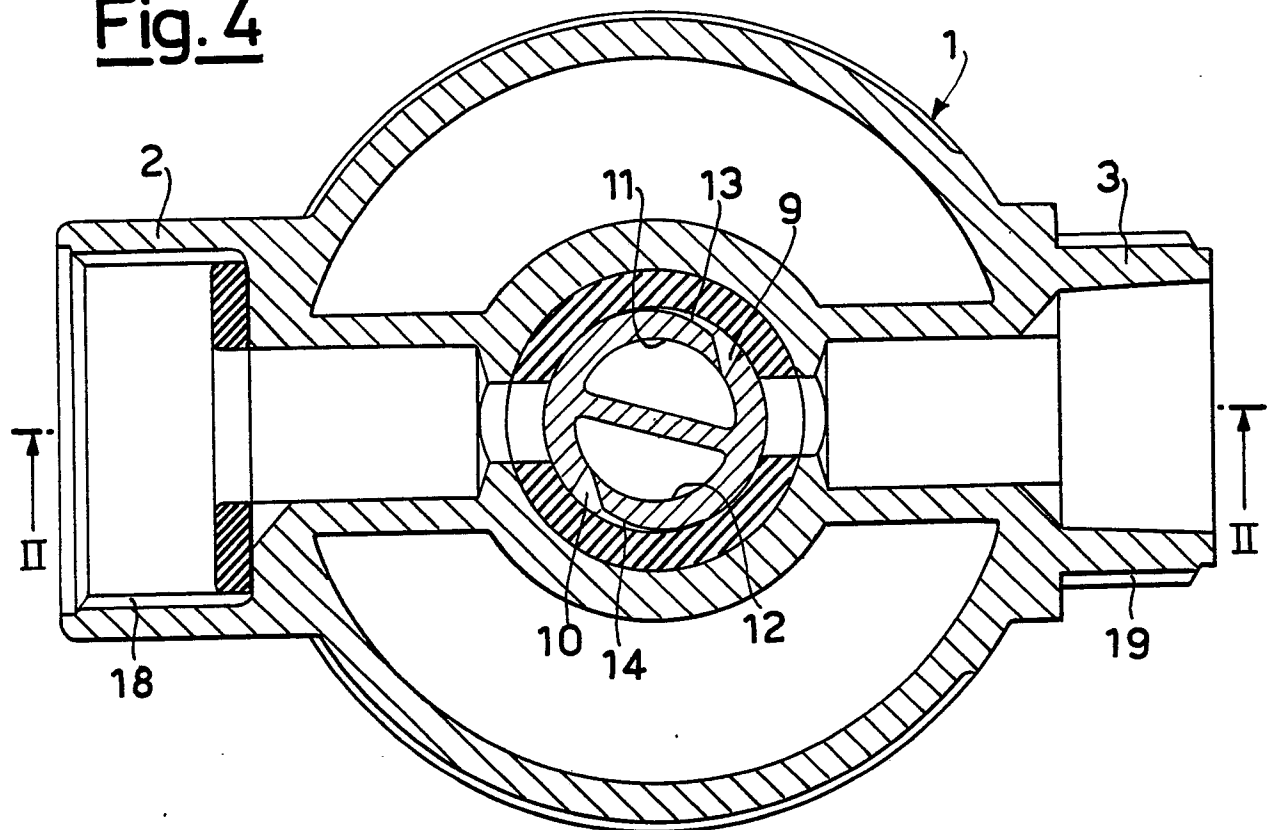
Fig. 3**Fig. 4**

Fig. 5

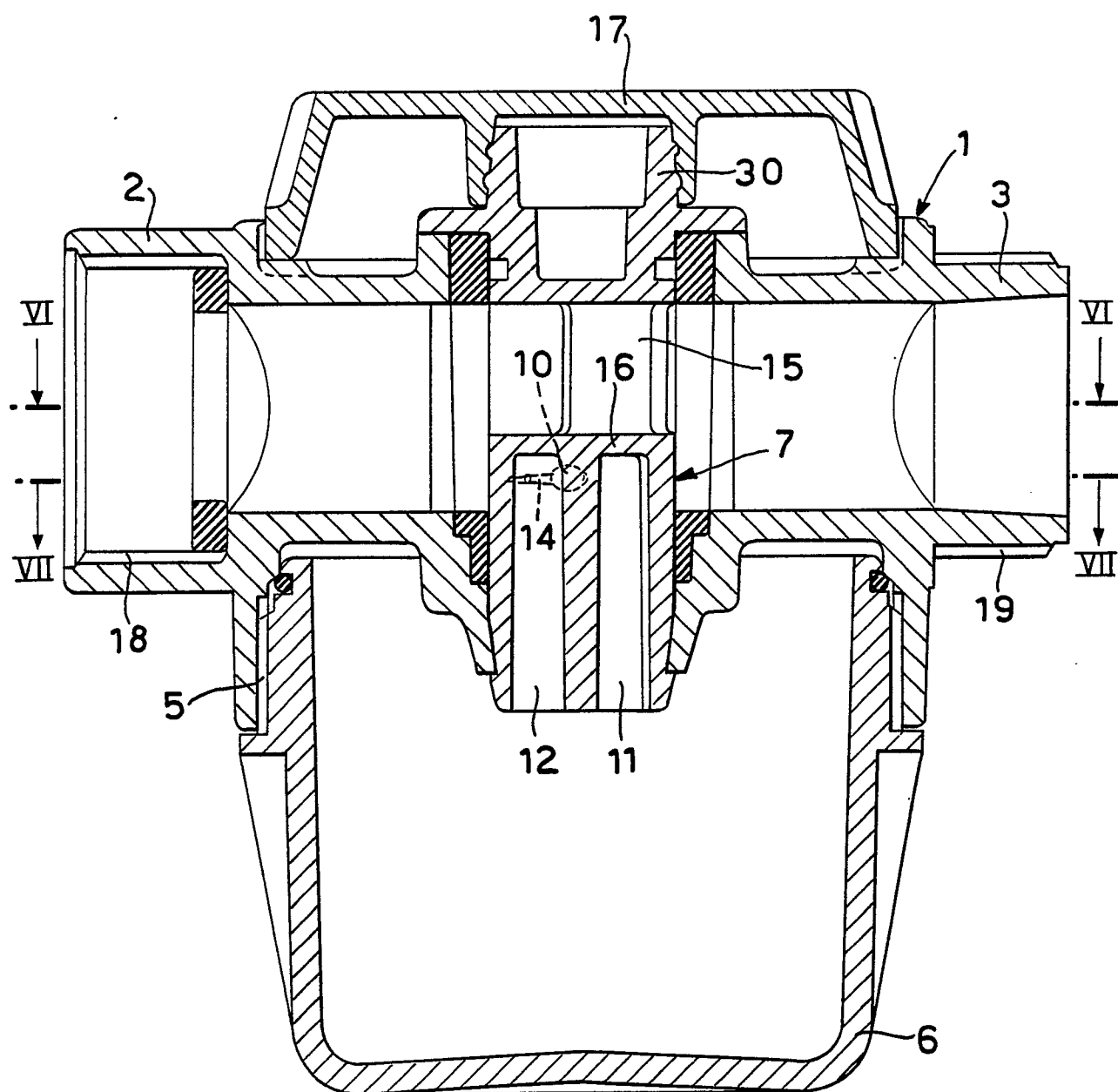


Fig.6

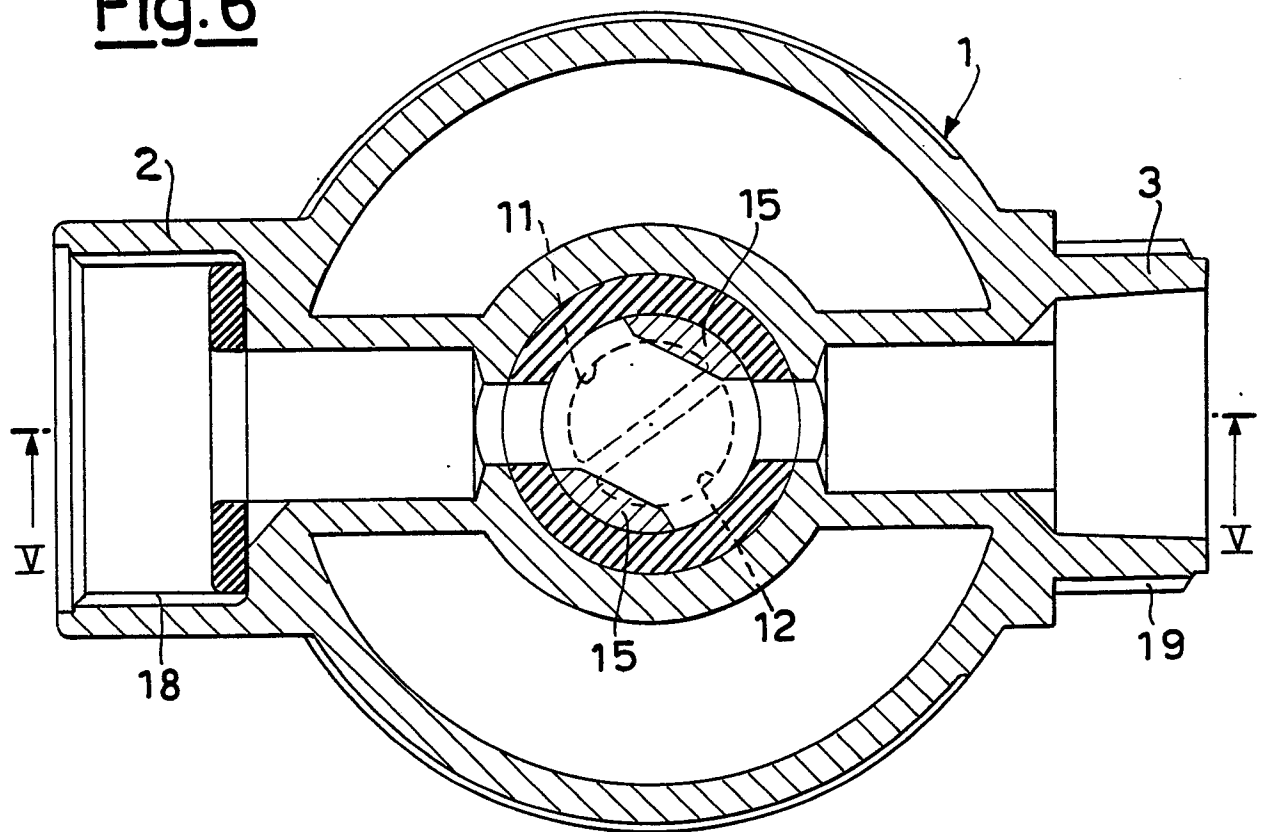


Fig.7

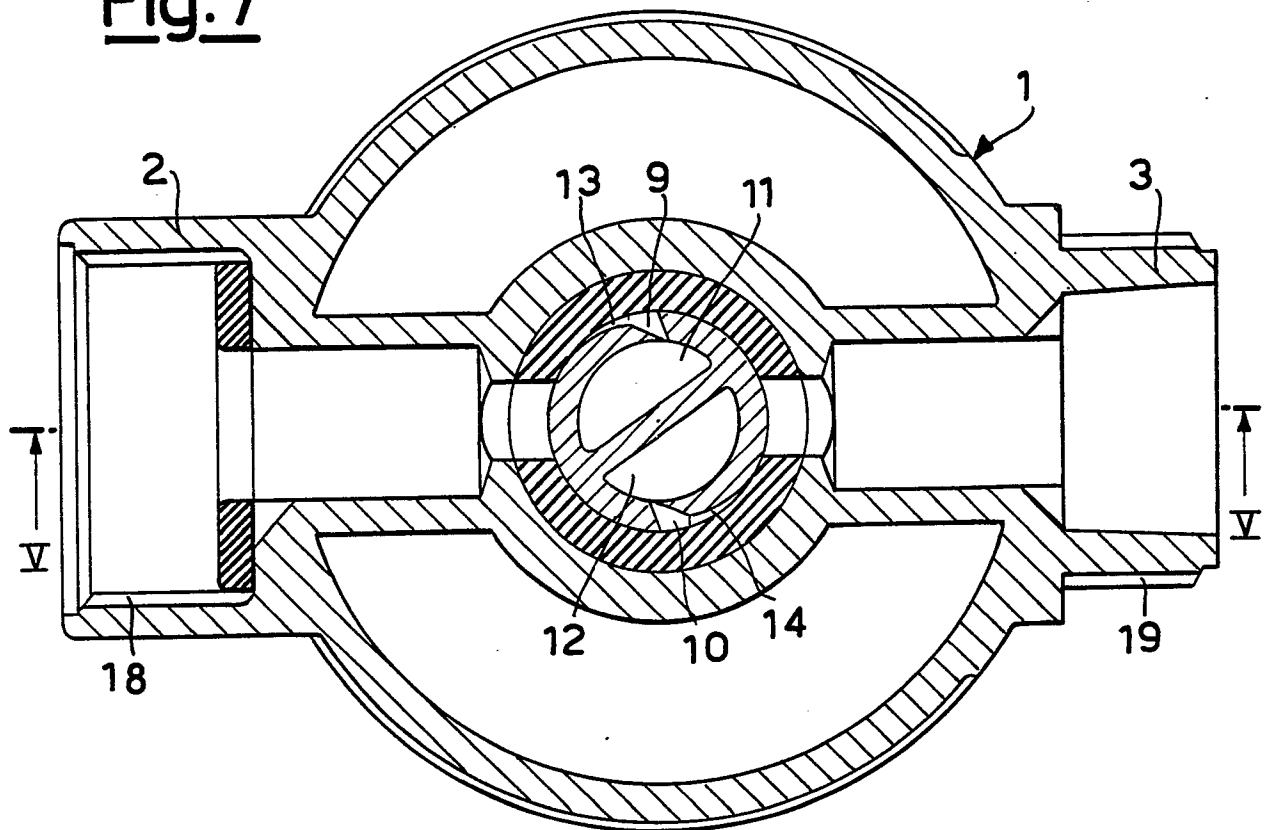


Fig. 8

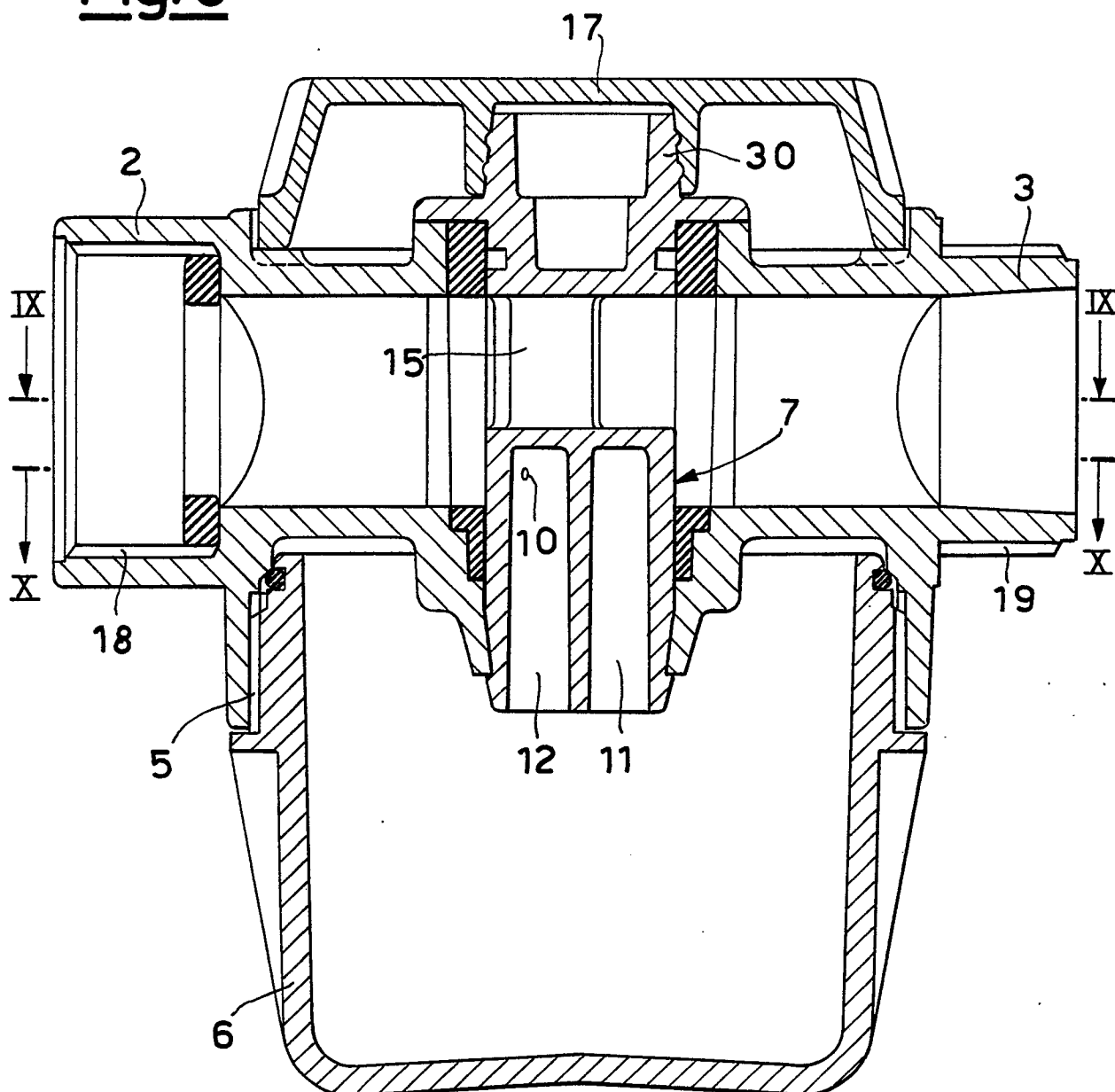


Fig.9

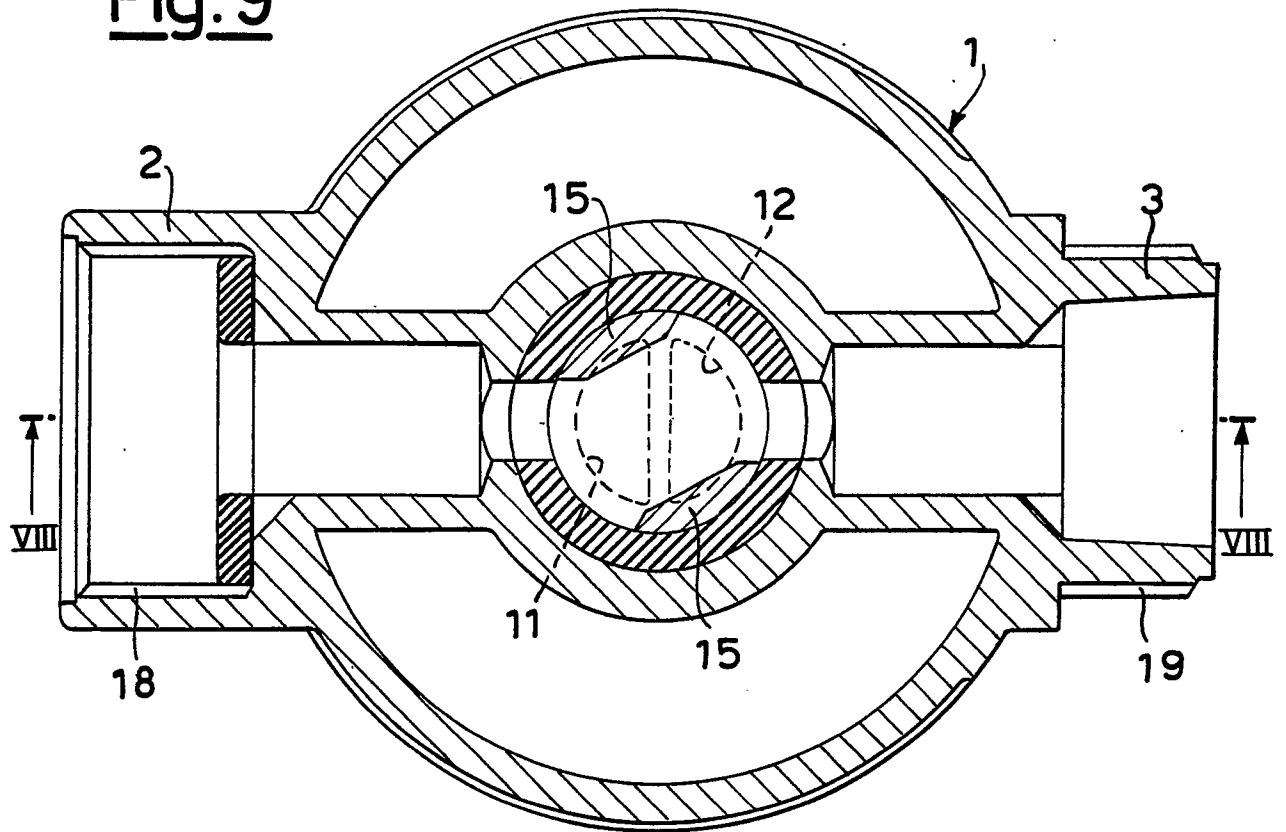


Fig.10

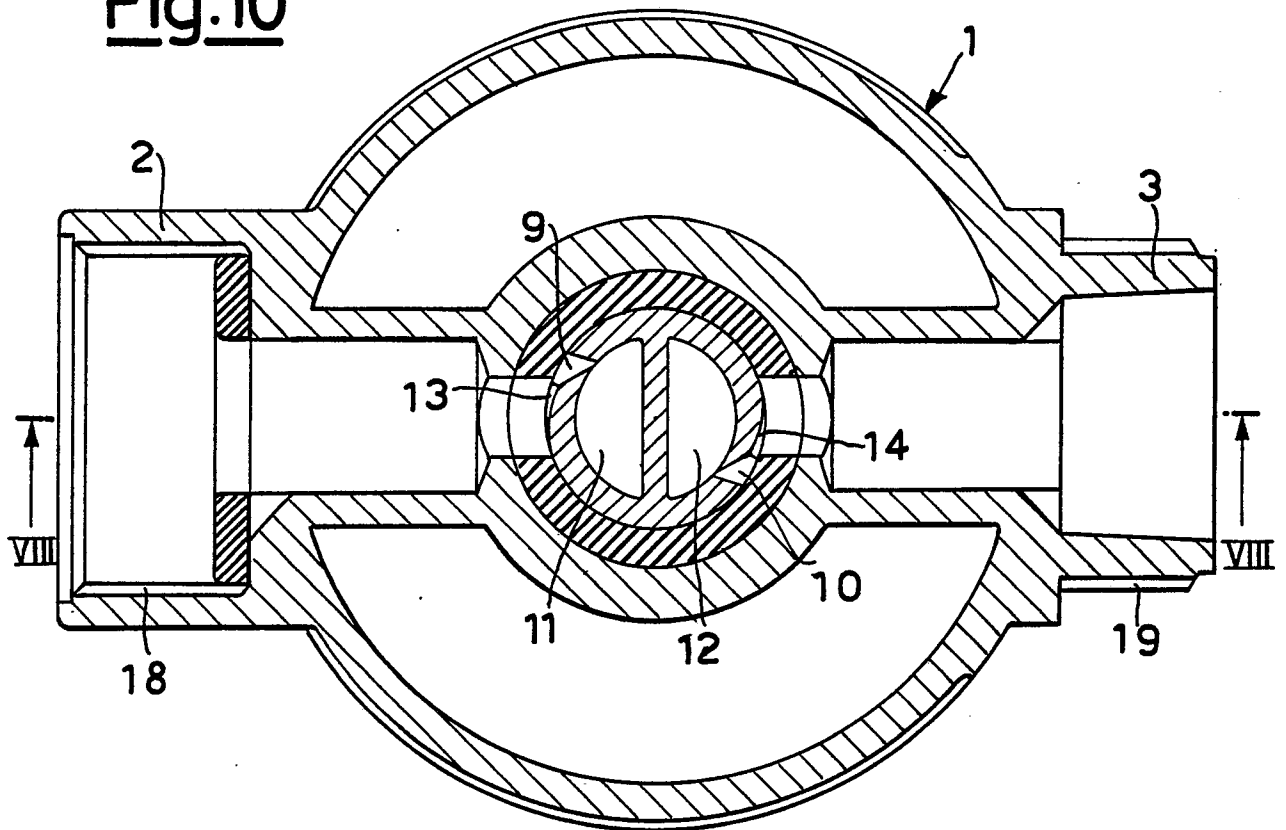


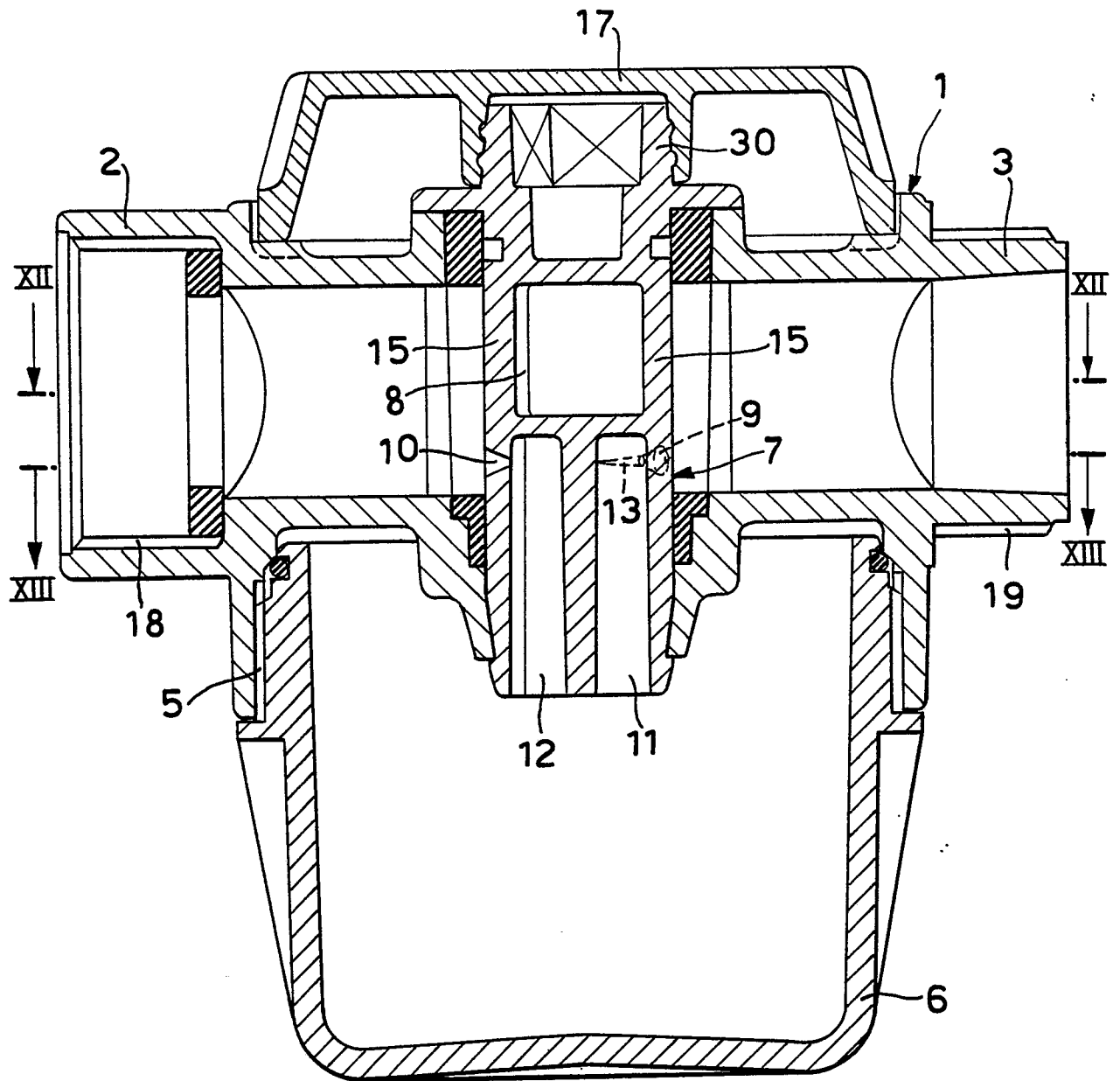
Fig.11

Fig.12

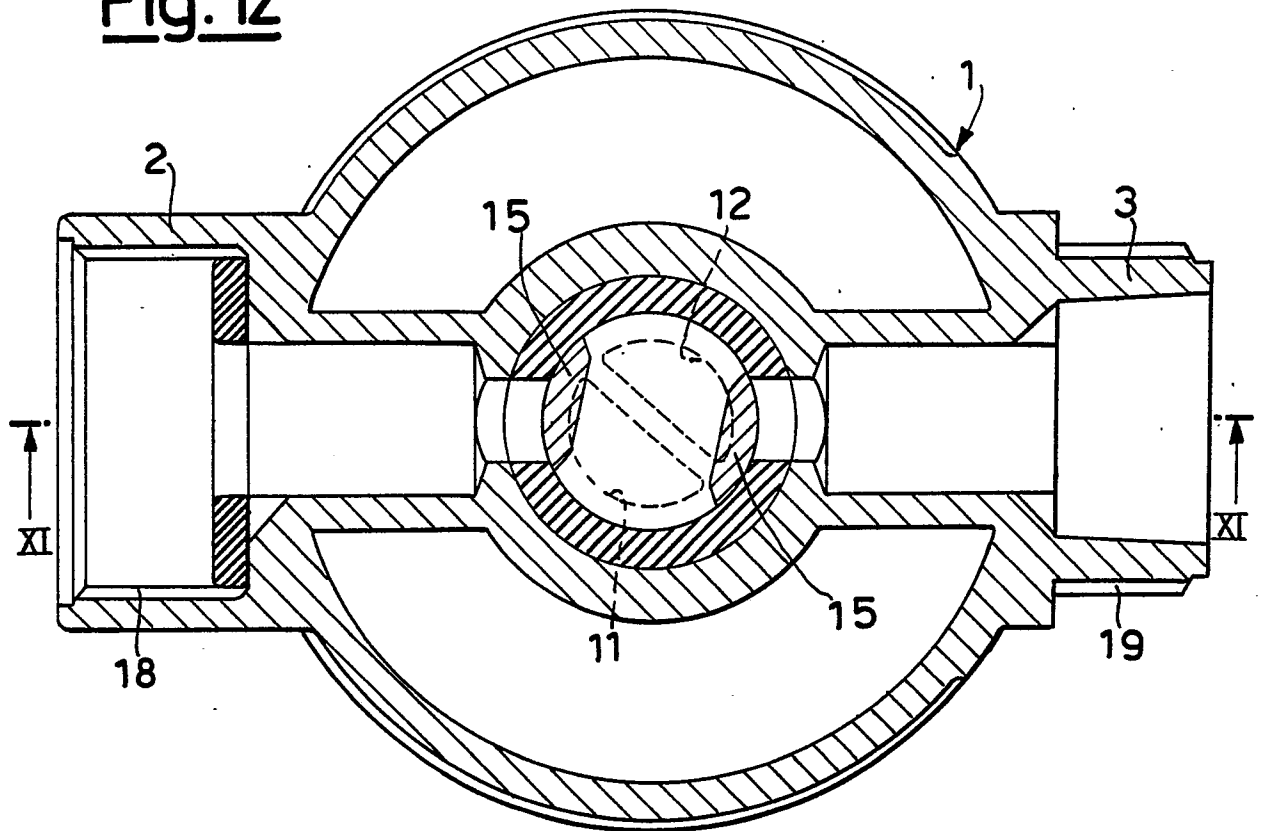


Fig.13

