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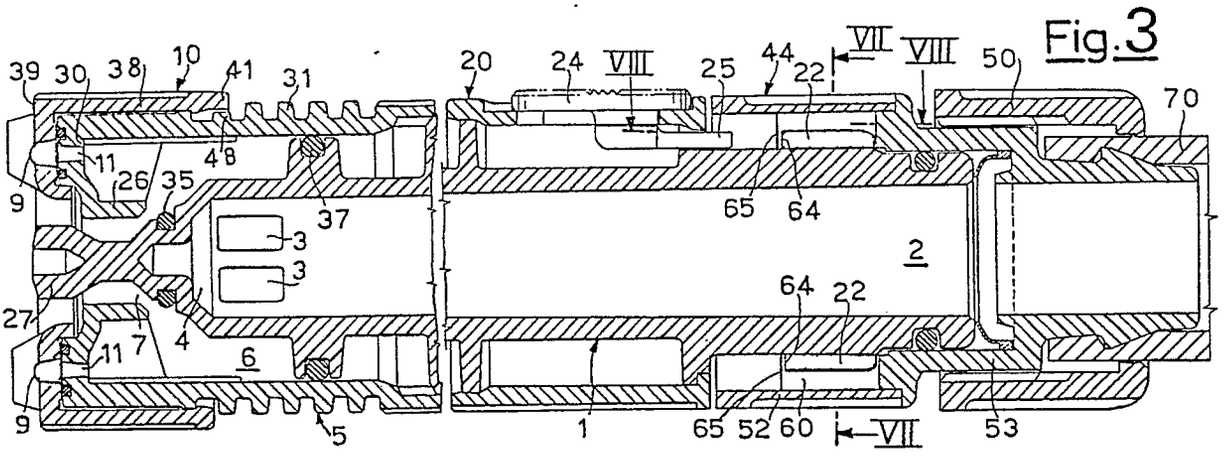
(54) Irrigation nozzle, particularly for large-diameter pipes.

(57) The nozzle comprises first means (1-7) for the creation of a main jet having variable length and conformation and second means (9, 10, 11, 30) for the creation of a plurality of secondary jets, at reduced pressure, which surround the main jet. The first means (1-7) comprise an internal tubular casing (1) which can be supplied with a delivery liquid at one extremity and provided with radial openings (3) for the outflow of the liquid at the other extremity and an external sleeve (5) which can be screwed on and unscrewed from the internal casing (1) to open and close a central passage (7) for the outflow of the liquid. The second means (9, 10, 11, 30) comprise a terminal wall (30) of the sleeve (5) provided with a plurality of circumferentially spaced holes (11) over which there is rotatably superimposed a cap (10) provided with a similar plurality of circumferentially spaced holes (9), which can be aligned or otherwise with the holes (11) of the terminal wall of the sleeve (5) for their opening or closing in relation to the angular position of the cap (10).

Fig.3



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Irrigation nozzle, particularly for large-diameter pipes.

The present invention relates to a nozzle, particularly for large-diameter pipes and thus a large water delivery.

The use is known of irrigation nozzles for normal pipes having a diameter of half an inch up to a diameter equal to three quarters of an inch.

Such nozzles are married at one extremity with a union which is in turn connected to the pipe at the other extremity. Such coupling between the nozzle and the union is generally made with a quick-action coupling of a female part, in particular the union, with a male part, the nozzle.

Nozzles of the known type include an inner tubular casing which can be supplied with an irrigation liquid at one extremity and provided with radial openings for the outflow of the liquid at the other extremity, an external sleeve defining with said internal casing a delivery chamber of the liquid communicating with said openings and which can be screwed on and unscrewed from the same in order to close and open in an adjustable way a central outflow passage.

Such known solutions are not, however, suitable to be associated with large-diameter feed pipes and thus of large water delivery. In such cases, indeed, according to the position of the adjustment sleeve, either a very long water jet is produced with which it is possible to water only a far point on which the jet falls or a circular short-range fan-shaped jet is generated which is characterized by a high outlet pressure which cannot but damage any plants or flowers to be irrigated.

The object of the present invention is that of accomplishing an irrigation nozzle which is particularly suitable for use with large-diameter pipes without giving rise to the above mentioned drawbacks.

According to the invention such object is attained by means of an irrigation nozzle, particularly for large-diameter pipes, comprising first means for the creation of a main jet having variable length and conformation, said first means comprising an internal tubular casing which can be supplied with an irrigation liquid at one extremity and provided with radial openings for the outflow of the liquid at the other extremity and an external sleeve defining with said internal casing a delivery chamber of the liquid communicating with said openings and which can be screwed on and unscrewed from the same to close and open in an adjustable way a central outflow passage, characterized in that it also comprises second means for the creation of a plurality of secondary jets at reduced pressure round the circumference of said main jet said second means comprising a terminal wall of said sleeve provided with a plurality of circumferentially spaced holes and a cap rotatably superimposed over said terminal wall of the sleeve and in turn provided with a similar plurality of circumferentially spaced holes which can be aligned or otherwise with said holes of the terminal wall of the sleeve for their opening or closing, respectively, in relation to the angular position of the cap.

It appears evident that in this way the nozzle adds to the possibility of having a long low-pressure main jet or, as an alternative, a circular high-pressure jet in the shape of a fan as for the traditional nozzles, also that of producing in combination with or as alternative to said main jet a plurality of secondary low-pressure jets, even if the delivery is high, which in the case of large-diameter pipes form an irrigation pattern having a comparatively limited force so as to avoid damage to plants and flowers to be irrigated. It is thus possible to irrigate at a distance while, at the same time, also watering areas which are nearer to the point of outflow of the main jet or it is possible to provide for the possibility of watering without any damage extremely near areas such as flower-beds, etc..

The features of the present invention shall be made more evident by the following detailed description of a preferred embodiment, illustrated as a non-limiting example in the enclosed drawings, wherein:

Fig. 1 is a longitudinal cross-sectional view of the nozzle in the closed position;

Fig. 2 shows the connection of the nozzle of Fig. 1 with a suitable quick-action union;

Fig. 3 shows a longitudinal cross-sectional view of the nozzle applied to the union and adjusted to the open position;

Fig. 4 is a view of the nozzle from the left hand side in the position of Fig. 3;

Fig 5 shows a detail in cross-section taken along the line V-V of Fig. 4;

Fig. 6 is a transversal cross-sectional view of the nozzle taken along the line VI-VI of Fig. 1;

Fig. 7 is a transversal cross-sectional view of the connection area of the nozzle to the union taken along the line VII-VII of Fig. 3;

Fig. 8 shows a detail of the connection area seen in a cross-sectional view taken along the line VIII-VIII of Fig. 3.

With reference to the drawings, and in particular to Fig.s 1 and 3, the irrigation nozzle indicated as a whole with 20 comprises an internal tubular casing 1 which can be supplied with an irrigation liquid at one extremity 2 and provided with radial openings 3 for the outflow of the liquid at the other extremity 4.

The nozzle 20 also comprises an external

sleeve 5 which has a terminal wall 30 traversed by circumferentially spaced holes 11, an internal annular part 26 and an external lateral wall 31 which can be screwed on and unscrewed from said internal casing 1. The sleeve 5 defines with said internal casing 1 a delivery chamber 6 of the liquid communicating with said radial openings 3. By screwing and unscrewing the sleeve 5 closing and opening is effected of a central passage 7 for the outflow of the liquid which is defined between said internal annular wall 26 of the sleeve and a terminal appendix 27, substantially in the shape of a mushroom, of the internal casing 1. The closed position is defined by the engagement of said internal annular wall 26 of the sleeve 5 with an annular gasket 35 applied to the base of the terminal appendix 27 of the internal casing 1. Between the internal casing 1 and the external lateral wall 31 of the sleeve there is accomplished a further hydraulic seal by means of an annular gasket 37.

On the terminal wall 30 of the sleeve 5 there is placed a cap 10 formed by a lateral annular wall 39 rotatably coupled to the external lateral wall 31 of the sleeve 5 and a front annular wall 39 traversed by a plurality of circumferentially spaced holes 9 which can be aligned or otherwise with said holes 11 of the front annular wall 30 of the sleeve 5 for their opening or closing in relation to the angular position of the cap 10. As can be seen in Fig.s 1, 3 and 6, the rotation of the cap 10 is allowed between two extreme angular positions defined by the engagement of an axial protuberance 41 of the lateral wall 38 of the cap 10 with a lateral protuberance 48 of the external lateral wall 31 of the sleeve 5.

As shown in Fig.s 4, 5, the holes 9 on the annular wall 39 of the cap 10 are surrounded by divergent walls 42 which define a V-shaped channel for the direction of the individual jets issuing from the holes.

Fig.s 2, 3, 7, 8, show the system for connecting the nozzle 20 to a quick-action union 44 for a large-diameter flexible pipe accomplished according to the patent application No. 19494 A/89 filed on 20 February 1989 in the name of the same Applicant.

Said union 44 comprises a tubular casing 52, which can be fastened to a flexible pipe 70 by means of a ring nut 50 which is screwed onto a threaded part 53 to hold the flexible pipe, fitted over an extremity, not shown, of said tubular casing 52.

Said union 44 is endowed with an internal lateral wall 37 in which there is obtained a plurality of axial grooves 23, circumferentially spaced, each of which has at its side a respective seat 60 for receiving, by an axial sliding action and subsequent rotation, a rib 22 forming part of a plurality of circumferentially spaced ribs, protruding in a radial direction opposite the extremity 2 of the internal casing 1.

In particular each of the ribs 22 is held inside its respective seat 60 by the engagement of one extremity 64 of the respective rib 22 against a shoulder 65 of the respective lateral wall 60.

To lock the ribs 22 inside seats 60 the nozzle 20 is provided with a slidable tang 25 to which is attached a control cursor 24 and which can be inserted into the ribs 23 of union 44 to lock the nozzle 20 in the rotated position.

In order to use the nozzle 20 it is first of all necessary to connect the nozzle 20 to the respective union 44. Such operation occurs in a way known in itself of the above patent application No. 19494 A/89.

For the creation of the main delivery jet it is necessary to rotate the external sleeve 5 round the internal tubular casing 1 so as to cause, following the movement of the internal tubular wall 26 of the sleeve 5 away from the terminal appendix 27 of the internal casing 1, the opening of the central delivery passage 7; in relation to said opening the length and the conformation of the main outflow delivery jet is adjusted.

It is also possible to create a plurality of secondary reduced-pressure jets surrounding said main jet. For this purpose it is necessary to rotate the cap 10 in order to align the holes 9 on the front annular wall 39 with the corresponding holes 11 of the front annular wall 30 of the sleeve 5.

If desired, the secondary jets can replace the main jet by executing the closing of the central passage 7 by rotation of sleeve 5.

Claims

1. Irrigation nozzle, particularly for large-diameter pipes, comprising first means (1-7) for the creation of a main jet having variable length and conformation, said first means (1-7) comprising an internal tubular casing (1) which can be supplied with an irrigation liquid at one extremity (2) and provided with radial openings (3) for the outflow of the liquid at the other extremity (4) and an external sleeve (5) defining with said internal casing (1) a delivery chamber (6) of the liquid communicating with said openings (3) and which can be screwed on and unscrewed from the same to close and open in an adjustable way a central outflow passage (7), characterized in that it also comprises second means (9, 10, 11, 30) for the creation of a plurality of secondary jets at reduced pressure round the circumference of said main jet, said second means (9, 10, 11, 30) comprising a terminal wall (30) of said sleeve provided with a plurality of circumferentially spaced holes (11) and a cap (10)

rotatably superimposed over said terminal wall (30) of the sleeve and in turn provided with a similar plurality of circumferentially spaced holes (9) which can be aligned or otherwise with said holes (11) of the terminal wall (30) of the sleeve for their opening or closing, respectively, in relation to the angular position of the cap.

2. Irrigation nozzle according to claim 1, characterized in that said sleeve (5) has an external lateral wall (31) which can be screwed on and unscrewed from said internal casing (1), there being provided hydraulic sealing means (37) situated between said external lateral wall (31) and said internal casing (1).

3. Irrigation nozzle according to claim 2, characterized in that said sleeve (5) also has an internal tubular wall (26) which co-operates with a mushroom-shaped terminal appendix (27) of the internal casing (1) to define said central passage (7) for the outflow of the liquid.

4. Irrigation nozzle according to claim 2, characterized in that said cap (10) has an annular lateral wall (38) with an axially-protruding sector (41) suitable for co-operating with a radially-protruding sector (48) of the external lateral wall (31) of the sleeve (5) to define two extreme angular positions of said cap (10) for the opening or closing of the holes (11) on the terminal wall (30) of the sleeve (5).

5. Irrigation nozzle according to claim 1, characterized in that said extremity (2) of the internal casing (1) is provided with ribs (22), circumferentially spaced, protruding in a radial direction, which can be coupled, respectively, with corresponding axial grooves (23), circumferentially spaced, obtained in the internal lateral wall (37) of a union (44), each of which has at its side a respective seat (60) for receiving, by an axial sliding action and subsequent rotation, a respective rib (22), said nozzle (20) being provided with a slidable tang (25) which cam be inserted in one of the grooves (23) of the union (44) to lock the nozzle (20) in the rotated position.

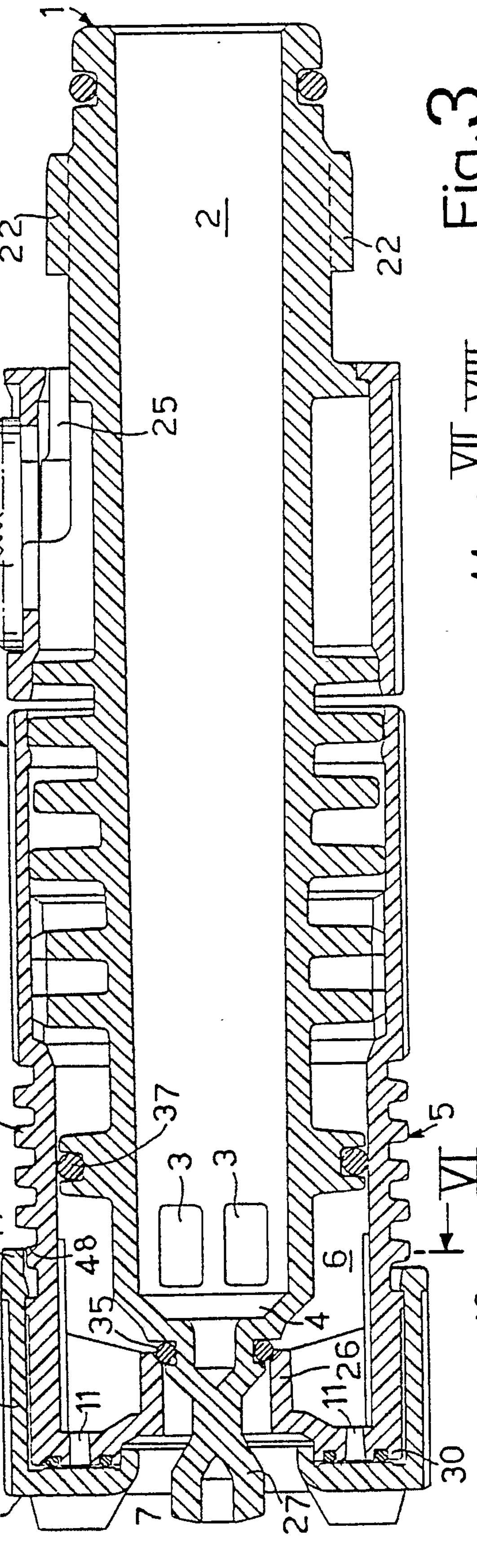
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Fig.1

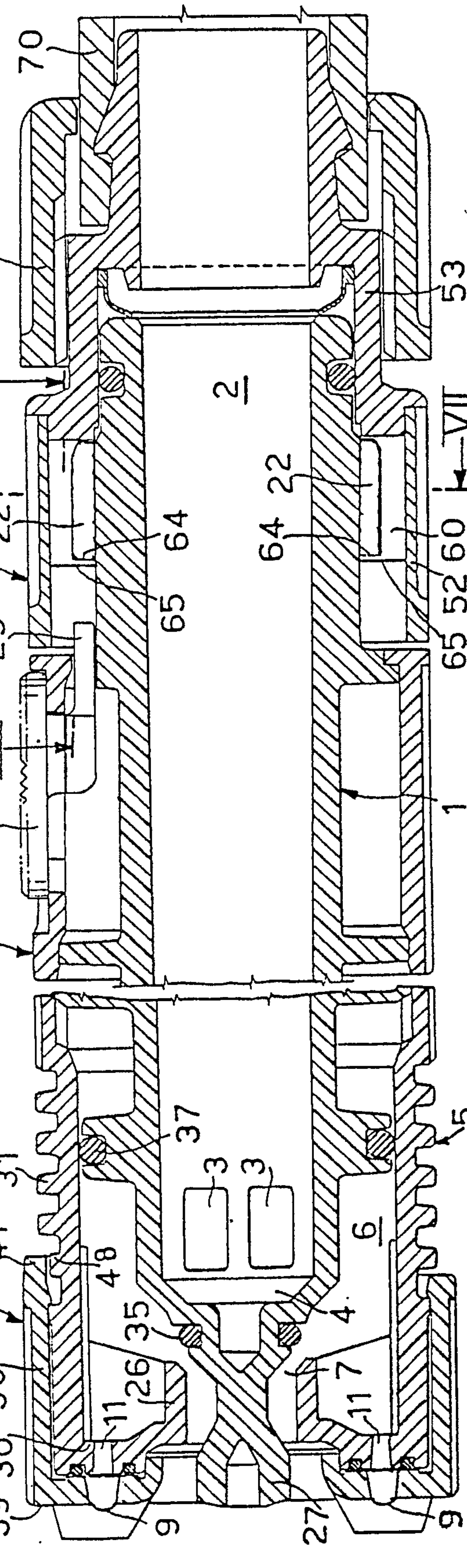
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Fig.3

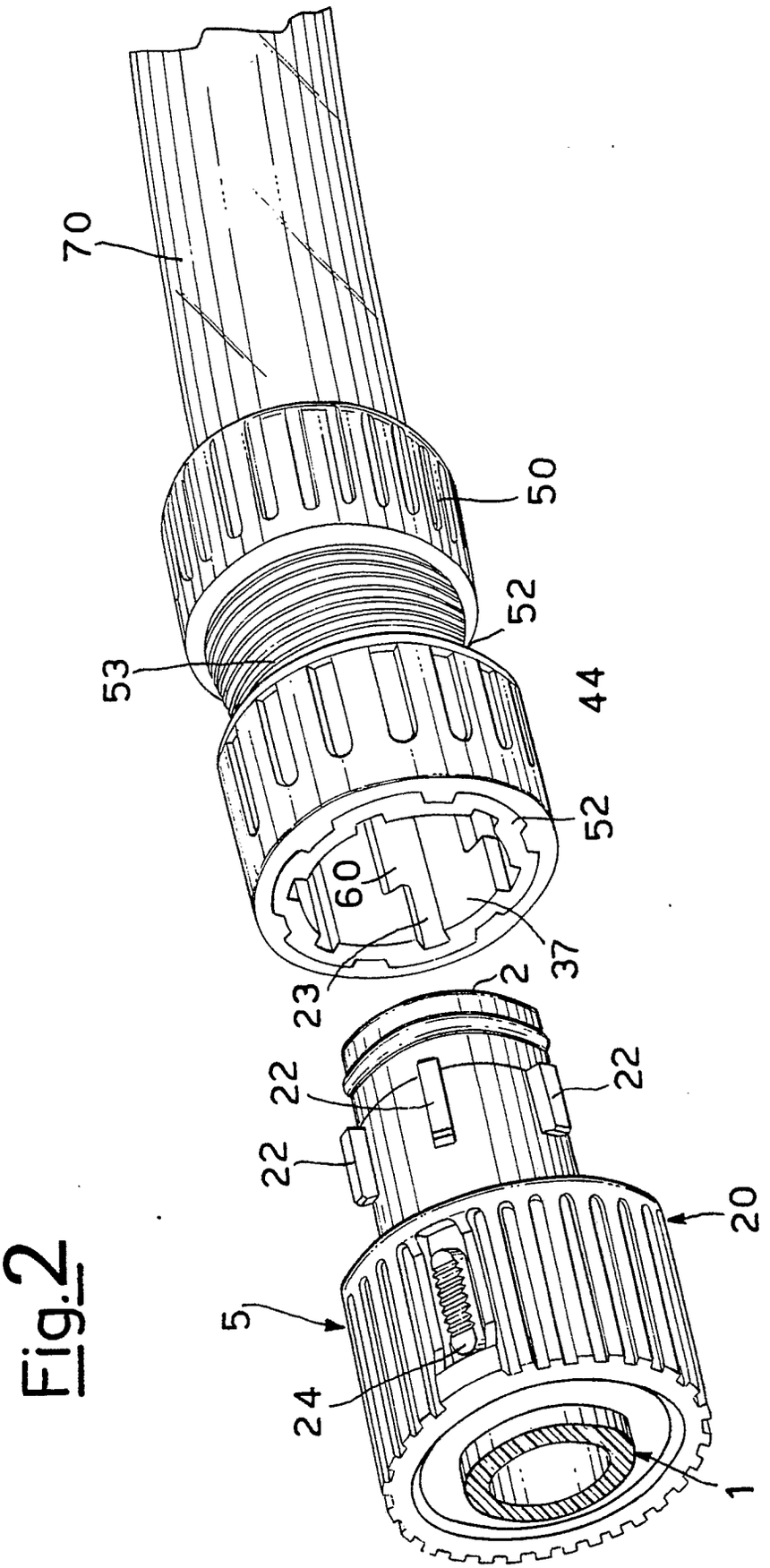


Fig.2

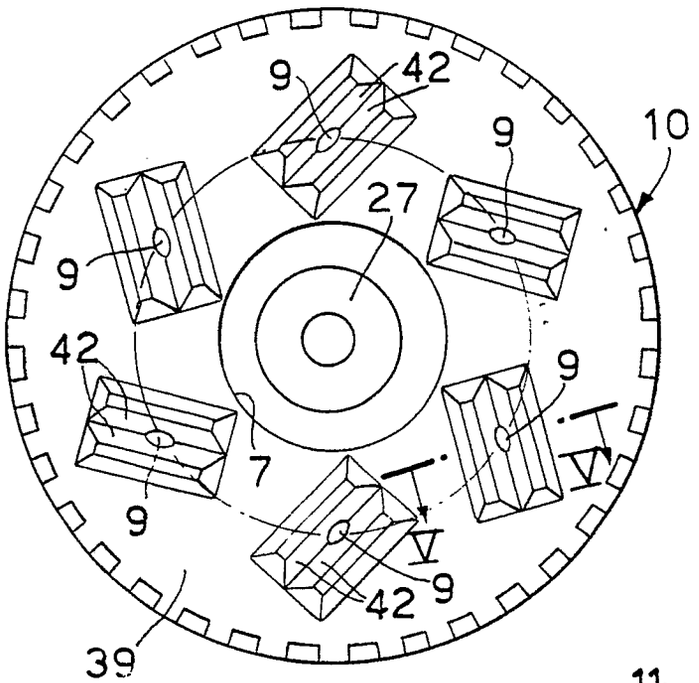


Fig.4

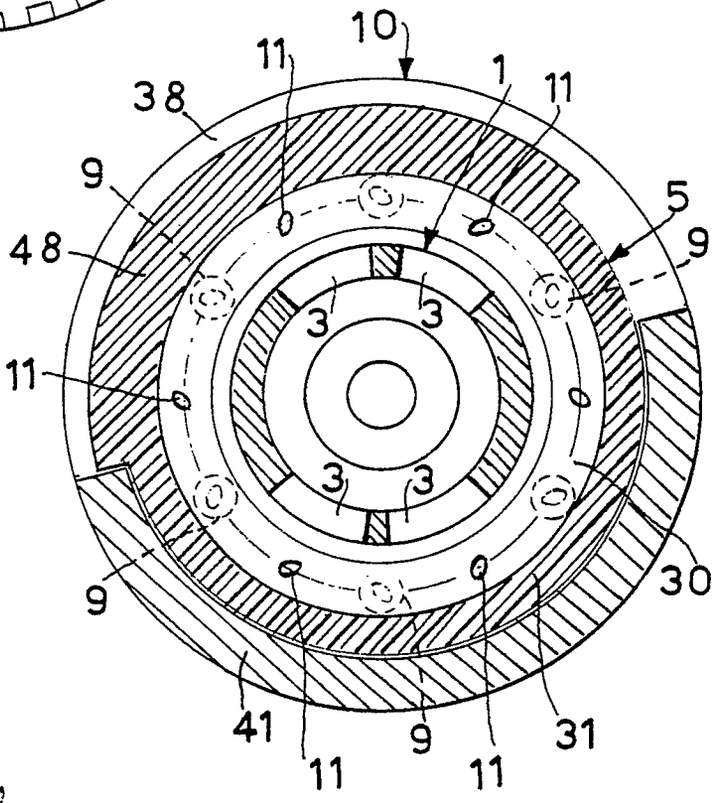


Fig.6

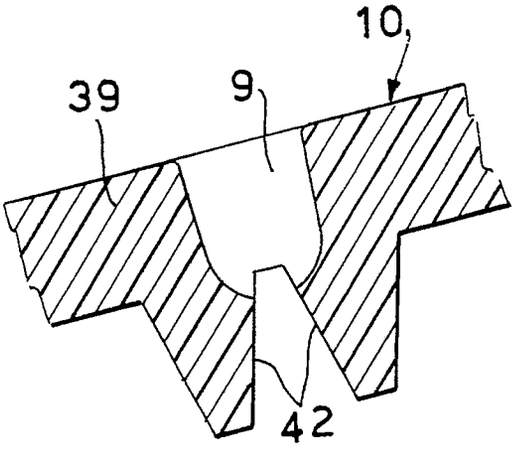


Fig.5

Fig.7

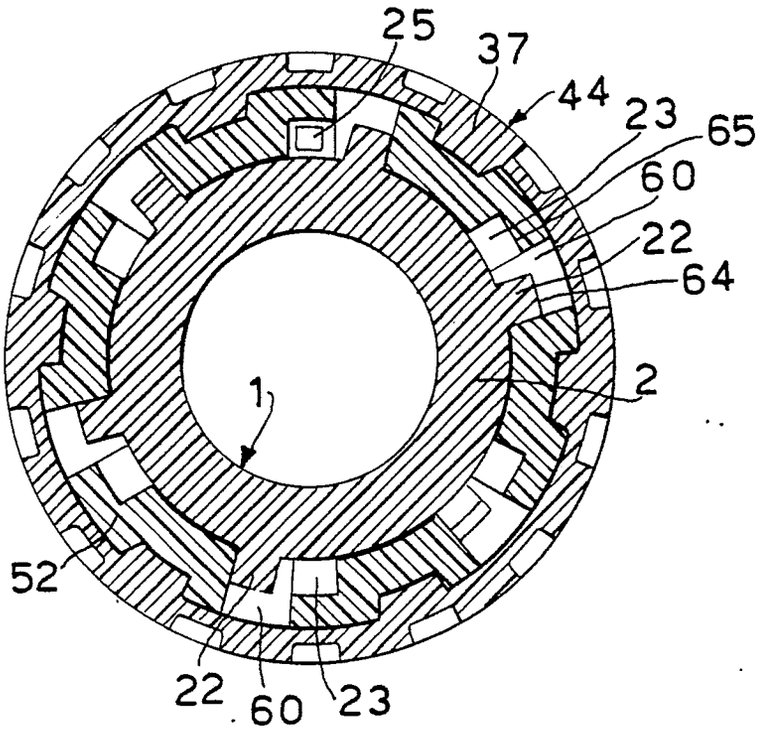
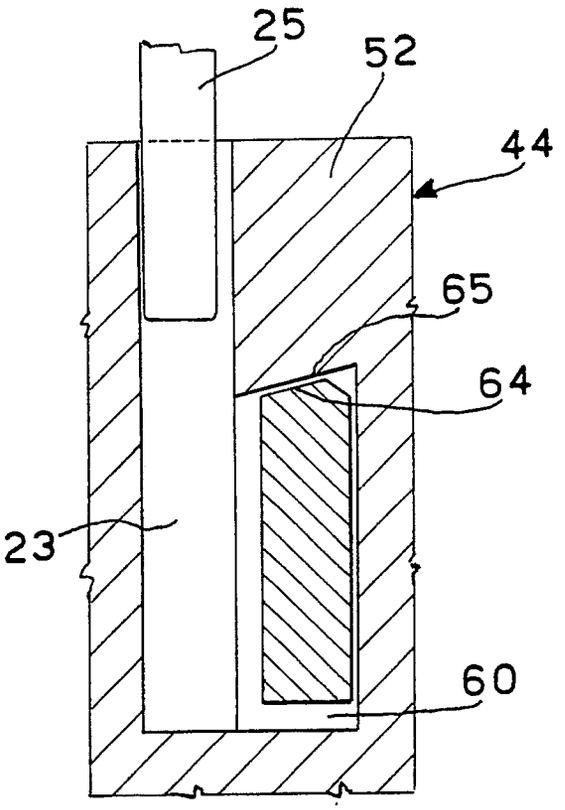


Fig.8



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EUROPEAN SEARCH REPORT

Application number

EP 90201267.3

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 5)
A	US - A - 4 785 998 (TAKAGI) * Column 5, line 58 - column 7, line 59; fig. 2-7 *	1-3	B 05 B 1/12

TECHNICAL FIELDS SEARCHED (Int Cl 5)

B 05 B
A 01 M 7/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	08-08-1990	KUTZELNIGG

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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