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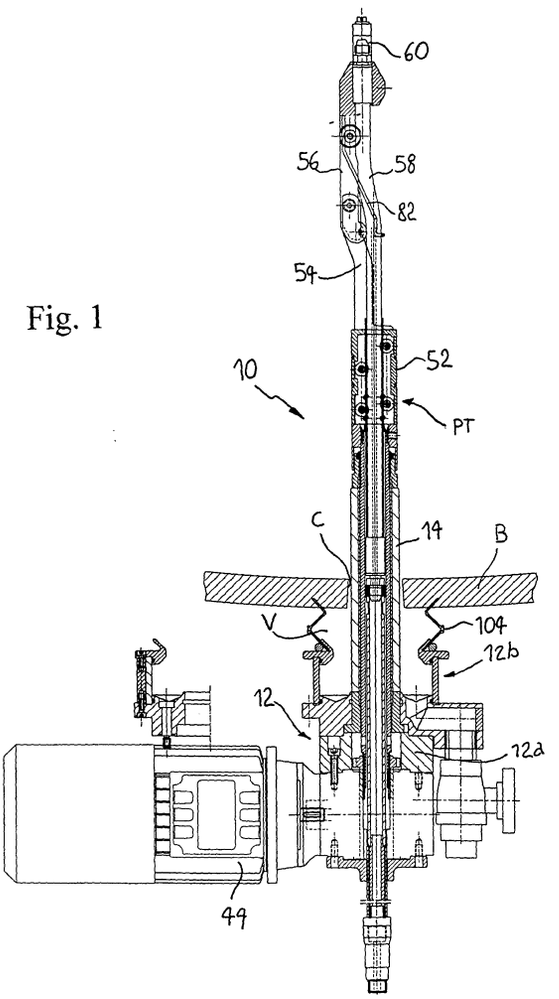
(54) Barrel-scouring device

(57) A device for internally scouring a barrel having a bung-hole (C) in a wall comprises an elongated support (14, 52, 54) for arrangement in a stationary position with respect to the barrel, with an end portion (52, 54) inserted into the barrel through the bung-hole (C), and a boom (56) having an end pivoted to said end portion (52, 54) about an axis (P) lying transversely to the elongated support, and a free operating end. A flexible tube (58) has a delivery end (58b) attached to the operating end of said boom (56) and an inlet end (58a) connected to liquid supply means through a union pipe (64) and is integral with a slide (58, 74) that is slidably supported in a longitudinal direction in said elongated support (14, 52, 54) under control of displacement driving means (44, 66, 70) to transmit to the boom (56) a rotary motion about said transversal axis (P) via the flexible tube (58). Constraint means (80, 82) guide the flexible tube (58) to bend in dependence from the axial motion of said slide (74) to cause the boom (56) to become inclined.

Fig. 1



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Description

[0001] This invention is concerned with a device for scouring the insides of barrels, particularly caskets, barriques, and the like.

[0002] It is known to improve the taste and flavor of wine by refining it in wooden caskets or barriques of variable capacity, typically a few hundred liters. After emptying a barrel at the end of a cycle, and before a fresh filling, the inside wall of the barrel should be accurately scoured in order to remove the lees that have been deposited during the previous cycle, which would affect the quality of the wine to be treated in the new cycle.

[0003] Such scouring step is difficult to carry out, because access to the inside of the barrel can only be made through a bung-hole of 4 to 5 cm gage.

[0004] According to a widespread current practice for scouring barriques, the barrel is laid horizontally, with its bung-hole facing downwards, on a supporting structure that is rotatable around a vertical axis through the bung-hole, and a perforated head inserted into the bung-hole is connected to a tube feeding the scouring water to the head. While the barrique is rotated, water is pumped to the head, so that a number of jets may issue from the perforations to hit the inside wall of the barrel.

[0005] The above known method is not only awkward to be carried out, but is also unsatisfactory in that the barrique is only summarily scoured, several blind spots being left which are not directly showered by the jets.

[0006] Another considerable drawback of this method is that the pressure of the jets, which has been reduced from the pump delivery pressure proportionally to the number of output holes in the head, is then further drastically reduced at the point of hitting the wall, because of the considerable distance from the head's output holes, substantially at the center of the barrique, to the wall.

[0007] Consequently, the scouring action is bland and does not remove all lees with certainty, particularly the less that are nested in the most critical points, e.g. the corners between the bottoms and the side walls of the barrel.

[0008] Therefore, the main object of the invention is to provide a device for scouring the insides of barrels, particularly caskets, barriques, and the like, which is capable of scouring the inside wall of a barrel more energetically than conventional devices, without leaving blind spots and allowing the scouring action to be concentrated on the most critical spots.

[0009] The above and other objects and advantages, such as will better appear in the following disclosure, are achieved by a barrel-scouring device having the features recited in claim 1, while the subordinate claims recite other advantageous, though unessential, features.

[0010] The invention will now be described in more detail with reference to a preferred embodiment, shown by way of non-limiting example in the attached drawings, wherein:

Fig. 1 is a view in longitudinal cross-section of a device according to the invention, when inserted in a generic barrel;

Fig. 2 is an enlarged view of a detail of Fig. 1;

Fig. 3 is an enlarged view of another detail of Fig. 1;

Fig. 4 is a view of the device in transverse cross-section made along line IV-IV of Fig. 3;

Fig. 5 is an enlarged view of another detail of Fig. 1;

Fig. 6 shows the detail of Fig. 5 in an intermediate operating configuration of the device.

[0011] With reference to the above Figures, the scouring device 10 according to the invention comprises an elongated support 14 which can be placed in a stationary position with respect to a generic barrique B, with an end portion PT insertable through a bung-hole C and rotatable about its axis.

[0012] The elongated support is a bushing 14 comprising a cylindrical tube 16 rising from a base 12, and reinforced by four posts 18 that are longitudinally welded to the external surface of the tube and spaced at equal angles about its axis.

[0013] Base 12 comprises a block 12a provided with a bore 20 coaxially to tube 14, and carrying a draining tank 12b, described in more detail below, which surrounds bushing 14 with its concavity facing toward the barrique, and having a cylindrical cavity 22, coaxially with bore 20. Bushing 14 is attached to base 12 by means of a collar 24 connected to the corresponding end of tube 16 and engaging the cylindrical cavity 22 of tank 13, and having an annular expansion 24a that is axially retained between an annular ledge 26 projecting from block 12a and an associated undercut 28 made in cylindrical cavity 22.

[0014] Within tube 16 of bushing 14 a hollow shaft 38 is journaled which has a threaded end 38a passing through bore 20 of block 12a and screwed into the hollow driving shaft 42 of a gearmotor 44 attached at base 40 of the block by means of screws 46. Gearmotor 44 is controlled by a control unit (non shown) which does not belong to the invention. A ring nut 48 screwed on the threaded end of the hollow shaft can be locked against driving shaft 42 to secure the hollow shaft.

[0015] The opposite end 38b of hollow shaft 38 rises from tube 16 and carries a threaded, cylindrical connector 50, onto which is attached the above- mentioned, rotatable end portion PT. The latter comprises a hollow box 52, from which a fork 54 projects parallelly to hollow shaft 38. A boom 56 is swiveled around a transversal axis P on fork 54. Within hollow shaft 38 is slidable a flexible tube 58, having its delivery end provided with a nozzle 60 and hooked to the free end of boom 56, in an offset position when the boom lies longitudinally to shaft

38. A coupling 62 axially connects the inlet end 58a of flexible tube 58 to a union pipe 64, which is also axially slidable within hollow shaft 38. Union pipe 64 has a threaded tail 66 engaging the threaded bore 68 of a flange 70 attached to the housing of gearmotor 44. The free end 66a of threaded tail 66 is connectible to a detergent-feeding pipe (not shown) through a swivel joint 72.

[0016] Flexible tube 58 is partly sheathed in a rigid lining 74, extending from coupling 62 for a length L, and slidable between two opposite pairs of rollers 76a, 76b and 78a, 78b, which are journaled within hollow box 52 and are shaped with concave profiles.

[0017] Flexible tube 58 is guided by constraint means to take desired, progressively bent attitudes, corresponding to respective inclinations of boom 56, which depend on the axial displacement of the slide. The constraint means comprise a projection 56a obliquely extending from boom 56 beyond its transversal axis P, and having a saddle-shaped seat 80 at its end, where flexible tube 58 is slidably received. Flexible tube 58 is elastically retained to engage seat 80 by a U-shaped elastic member 82, which is arranged obliquely astride flexible tube 58 and is attached to boom 56 by its ends such as 82a.

[0018] The end 16b of tube 16 integrally carries a coaxial cylindrical ferrule 84, within which is received a lip gasket 86 in sealing engagement with the outside surface of hollow shaft 38, as well as a guiding bush 87. Moreover, the outside mantle of cylindrical ferrule 84 has an annular region 84a with a reduced diameter, which is closely surrounded by a cylindrical apron 88 extending from cylindrical connector 50 in a longitudinal direction to build a labyrinth seal.

[0019] The bottom F of tank 12a is shaped with a circumferential hollow 90 surrounding the bushing and has a draining channel 92 leading to an exhaust port 94 to which a cock 96 is connected. Moreover, a transparent cylindrical window 98 surrounds tank 12a, and supports a connection ring 100 having a conical seat 102 receiving the rim of a bellow-shaped gasket 104, whose opposite rim engages the external wall of barrique B around bung-hole C. An elastic ring 106 clamps the rim of the bellow-shaped gasket engaging the conical seat, so that a seal is provided. Other annular gaskets 108, 110 seal the transparent window with respect to block 12b and to connection ring 100. Thus, block 12b, cylindrical window 98, connection ring 100, bellow-shaped gasket 104 and the side wall of the barrique together define a draining chamber V surrounding bushing 14.

[0020] In operation, the barrique B is supported with horizontal axis on a fixed support structure, with its bung-hole C facing downwards, while device 10 is preferably mounted on a bench placed beneath the barrique. While the boom is extended longitudinally, the nozzle-carrying end of device 10 is radially inserted through the bung-hole, until the bellow-shaped gasket 104 is pressed against the outside surface of the barrique. Preferably, an auxiliary centering tool (not shown) may be attached to support 12, which is provided with four brackets in abutment with the outside surface of the barrique B, in order to provide further resting points and to aid in centering the device.

[0021] Washing water is then supplied to the device by connecting a pump (not shown) to coupling 72. The liquid goes through union pipe 64 and flexible tube 58 to be ejected from nozzle 60 as a high-pressure jet. When gearmotor 44 is operated, boom 56 is driven to turn around driving shaft 42, by the intermediary of hollow shaft 38, cylindrical connector 50, hollow box 52 and fork 54. The boom's rotation is transmitted, via flexible tube 58 and union pipe 64 (which are integral with boom 56), to the threaded extension 66 of the union pipe. Threaded extension 66 cooperates with stationary flange 70 to be displaced axially, and both its rotation and its linear displacement are applied to the length of flexible tube that is stiffened by rigid lining 74, which will slide within the hollow box 52 between rollers 76, 78, which act a guiding means for the slide made by the rigid lining surrounding the flexible tube.

[0022] As shown in Fig. 6, the length of flexible tube free from lining 74, which is attached to boom 56 near its end, is progressively bent by the action of the lever due to the offset between the length of flexible tube inserted in the rigid lining 74 and the end 58b of the flexible tube attached to boom 56, thereby driving the boom to swivel around pivot P. Seat 80 and elastic member 82 cooperate to guide the proper bending of flexible tube 58, which will progressively and continuously increase the inclination of boom 56 around axis P as the union pipe is displaced, up to an angle ? of substantially 180°. Such rotation of boom 56 about axis P, together with the rotation about the axis of hollow shaft 36, will sweep the nozzle through a spherical path, so that the jet will impact the entire internal surface of barrique B. It should be noted that the distance from nozzle 60 to the internal wall of the barrique is reduced to only a few centimeters, whereby the jet intensity and pressure at impact are high.

[0023] It will be apparent of a person skilled in the art that the inclination of boom 56 is univocally defined by the angular position of the driving shaft, so that the direction of the jet can be determined at any given moment from the number of turns performed by the motor. It is therefore possible to stop the motor at the most critical areas, such as corners between the ends of the barrique and its lateral wall.

[0024] The scouring liquid flows into draining chamber V through the gap between bung-hole C and tube 14, and from there to the circumferential hollow 90 and to the drain channel 92, so that it is eventually exhausted from the exhaust port through the cock. The above-described exhaust arrangement, due to the seal between the drain tank and the wall of the barrique surrounding the bung-hole, allows the scouring to be carried out while maintaining a clean working environment. Moreo-

ver, by shutting the cock and sustaining the supply of scouring liquid, the draining chamber V fills up progressively with exhaust liquid, and it is then possible to visually check the degree of cleanliness of the exhausted liquid and determine whether an additional scouring step should be carried out.

[0025] A preferred embodiment of the invention has been described, but a person skilled in the art can make a number of modifications to it, depending on needs, which all belong to the spirit of the same inventive concept. For instance, the displacement of rigid lining 74 which causes boom 56 to swivel about transversal axis P, and the rotation of the end portion PT about the axis of the bung-hole might be effected by separate, independent driving means for displacement and for rotation, rather than being interlocked to a single gearmotor as described above with reference to the preferred embodiment.

Claims

1. A device for internally scouring a barrel having a bung-hole (C) in a wall, **characterized in that** it comprises:

   - an elongated support (14, 52, 54) for arrangement in a stationary position with respect to the barrel, with an end portion (52, 54) inserted into the barrel through the bung-hole (C),
   - a boom (56) having an end pivoted to said end portion (52, 54) about an axis (P) lying transversely to the elongated support, and a free operating end,
   - a flexible tube (58) having a delivery end (58b) attached to the operating end of said boom (56) and an inlet end (58a) that is connected to liquid supply means through a union pipe (64) and is integral with a slide (58, 74) that is slidably supported in a longitudinal direction in said elongated support (14, 52, 54) under control of displacement driving means (44, 66, 70) to transmit to the boom (56) a corresponding rotary motion about said transversal axis (P) via the flexible tube (58), and
   - constraint means (80, 82) for guiding the flexible tube (58) to bend in dependence from the axial motion of said slide (74) to cause the boom (56) to become inclined.

2. The device of claim 1, **characterized in that** said end portion (52, 54) is rotatable about the axis of the bung-hole (C) under control of rotation driving means (38, 42, 44).

3. The device of claim 2, **characterized in that** said rotation driving means comprise a hollow shaft (38) that is coaxially attached to said end portion (52, 54), is journaled in said elongated support (14, 52, 54), receives coaxially said union pipe (64) and is rotationally driven by a motor (44).

4. The device of claim 3, **characterized in that** said displacement driving means comprise a threaded tail (66) of said union pipe, which engages a corresponding threading in a stationary housing (70) integral with said elongated support (14, 52, 54) to drive said slide in roto-displacement.

5. The device of any of claims 1 to 4, **characterized in that** said slide comprises a rigid lining (74) surrounding the flexible tube (58) for a length (L) extending from its inlet end (58a) and axially slidable within guide means (76), 78) integral with said end portion (52, 54).

6. The device of claim 5, **characterized in that** said guide means comprise at least a pair of opposed rollers (76, 78) journaled in said end portion (52, 54) of the elongated support, between which said rigid lining (74) is slidably received.

7. The device of any of claims 1 to 6, **characterized in that** said constraint means comprise a projection (56a) obliquely extending from boom 56 beyond its transversal axis(P), and having a saddle-shaped seat (80) at its end, where said flexible tube (58) is slidably received.

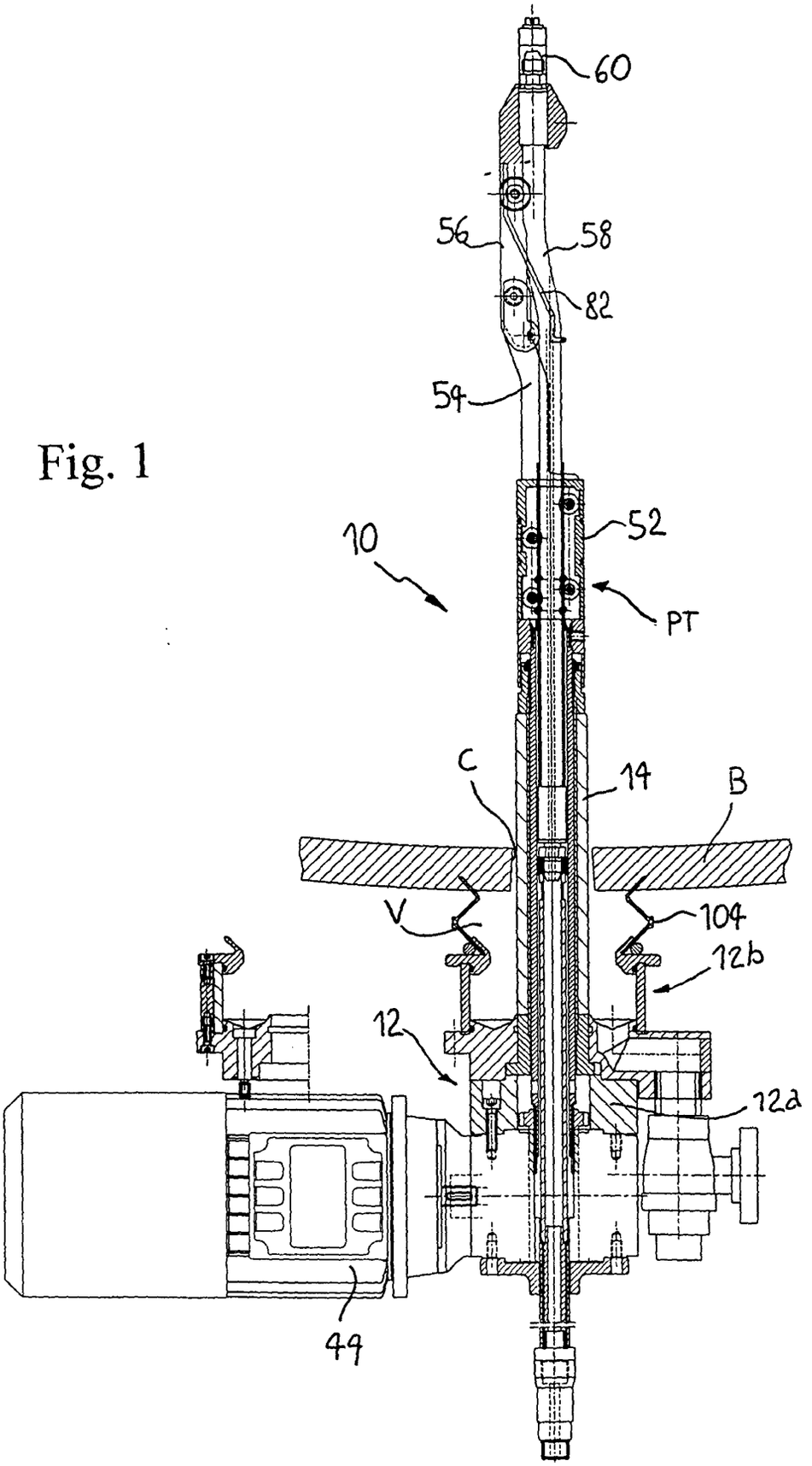
8. The device of claim 7, **characterized in that** said constraint means further include a U-shaped elastic member (82) having its opposite ends (82a, 82b) attached to said boom (56) and arranged obliquely astride said flexible tube (58) to bias the flexible tube (58) to engage the seat (80).

9. The device of any of claims 1 to 6, **characterized in that characterized in that** it comprises a drain collection tank (12b, 98) surrounding said elongated support, having a concave area facing the barrel when said end portion is inserted in the barrel, and having a bottom (12b) with a draining channel (92) opening to the outside through an exhaust port (94).

10. The device of claim 9, **characterized in that** said concave area of the tank (12b, 98) is bounded by a border (100) carrying a sealingly connected tubular gasket (104) capable of sealingly abutting against the outside wall of the barrel.

11. The device of any of claims 9 or 10, **characterized in that** at least one surface (98) of the wall of said tank (12b, 98) is of a transparent material.

Fig. 1



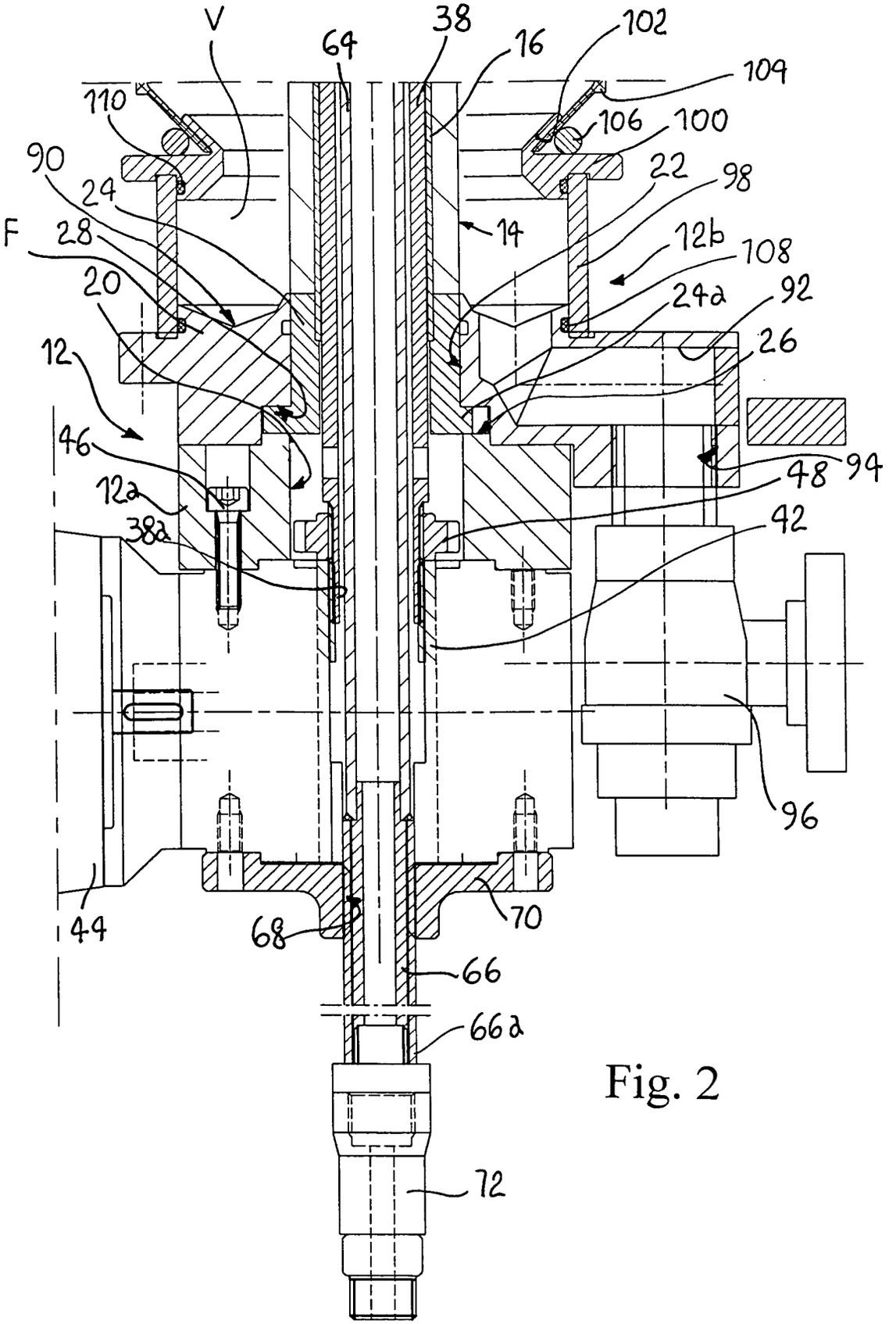

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Fig. 2

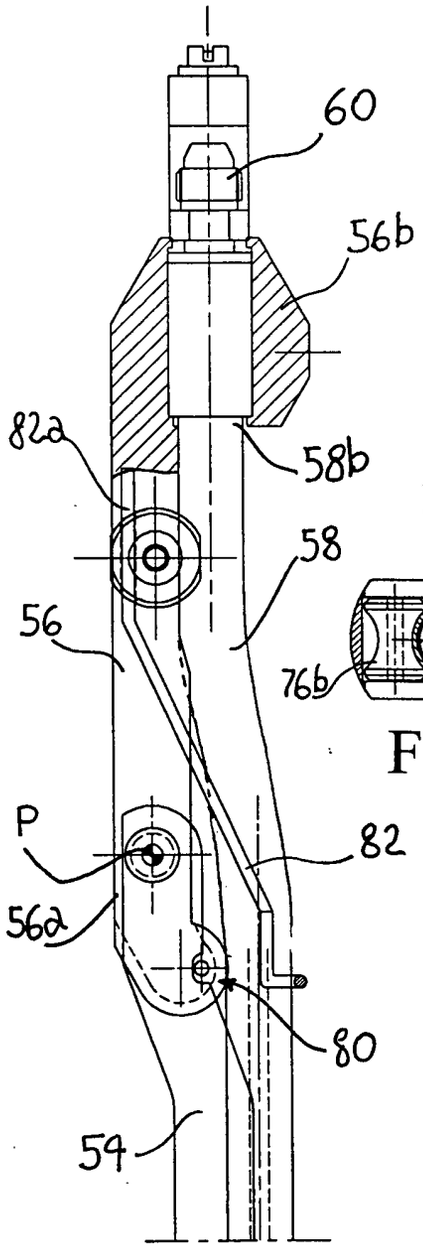

Fig. 5

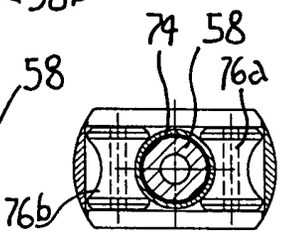

Fig. 4

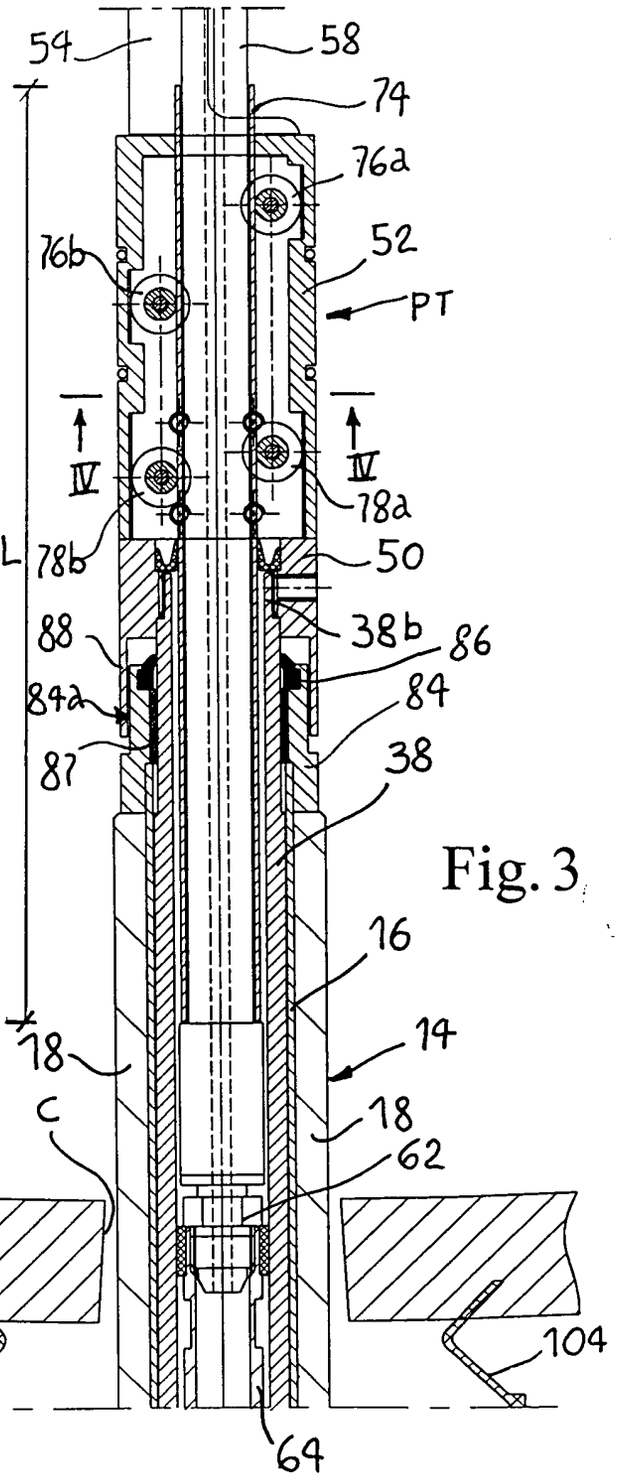

Fig. 3

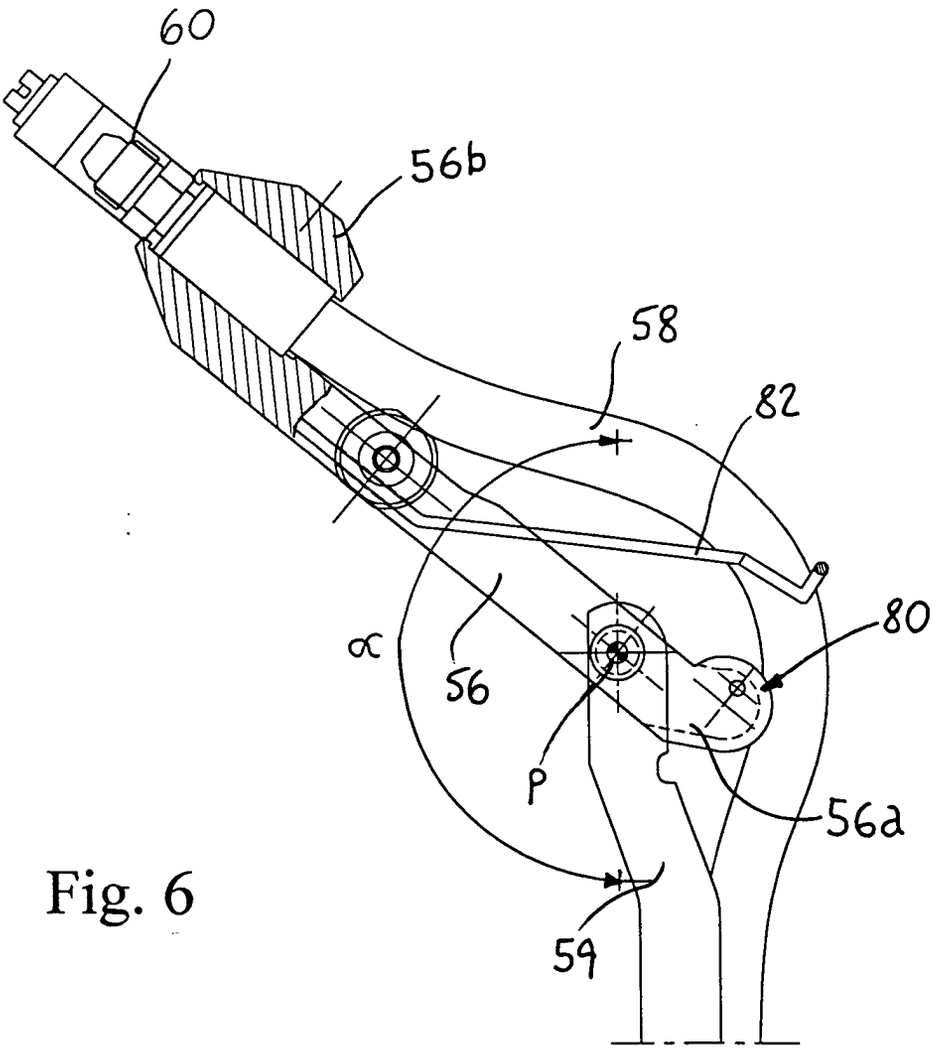

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5730

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.7)
X	DE 16 07 362 A (CASOTTI) 9 July 1970 (1970-07-09) * page 1, line 1 - page 4, line 16; figure 1 *	1-3	B05B15/06 B08B9/093 B08B9/08
A	US 6 021 793 A (MOULDER) 8 February 2000 (2000-02-08) * abstract * * column 1, line 11 - line 25 * * column 2, line 6 - line 20 * * column 3, line 2 - line 63 * * column 5, line 34 - column 6, line 37 * * column 7, line 6 - line 27 * * column 12, line 52 - column 14, line 31; figures 1,8-10 *	1-4,7,8	
A	EP 1 029 599 A (SANKYO RYOKKA COMPANY LIMITED TOKYO) 23 August 2000 (2000-08-23) * abstract * * paragraph [0001] * * paragraph [0008] * * paragraph [0024] * * paragraph [0033] - paragraph [0034]; figures 8-14 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)
B05B
B08B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 May 2004	van der Zee, W

CATEGORY OF CITED DOCUMENTS

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04-05-2004

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