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(12) # EUROPEAN PATENT APPLICATION

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(54) **A metering device.**

(57) A device for the delivery of metered quantities of a partially liquid product comprising a hopper (4), a metering cylinder (1) with a reciprocating plunger (2) and a connecting element (5) functioning as a shut-off valve with a cylindrical valve body (9) with recesses (6, 7, 8) for the liquid passage.

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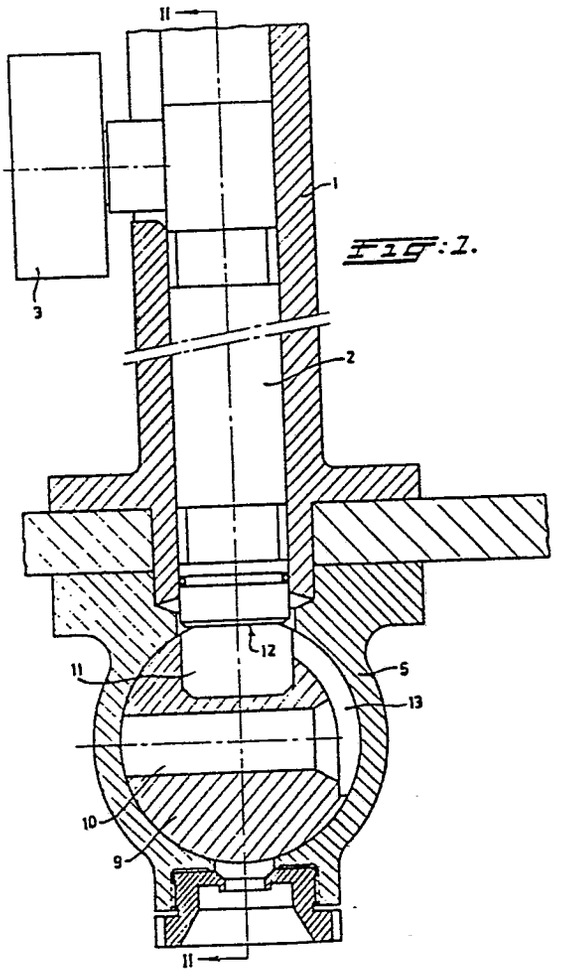


Fig:1.

A metering device.

This invention concerns a device for the delivery of metered quantities of a product being at least partially liquid, comprising a hopper, a metering cylinder, a plunger reciprocating within said cylinder and a connecting element with a shut off valve located in between the hopper and the cylinder, said element having the form of a housing, with a port towards the hopper, towards the cylinder and towards the location for the delivery of liquid products, the connections in between said ports being controlled by a valve which is displaceable into several positions within the chamber of the housing. Said valve mostly being rotatable between two positions spaced over an angle of 90° with respect to one another, serves for suitably selecting a port between the hopper and the metering cylinder, thus allowing a quantity of fresh liquid product to be supplied or for connecting the metering cylinder with the outlet, through which the metered product can be passed towards the predetermined location.

Various embodiments of a metering device or plunger filler of this type are known. In this respect reference is made to U.S. Patent Specification 2,666,564. When starting a

metering device of the type as disclosed in said Patent Specification an eventual quantity of gas (mostly being air) may get assembled below the head of the plunger. The presence of said gas or air may cause an incorrect metering to take place, so that a regular check and even a possible dismounting of the respective device is required.

The present invention aims to provide a construction such, that an occurrence of the abovementioned phenomenon is obviated.

This is attained according to the invention in that:

- the inner wall of the metering cylinder extends to within the valve housing;
- the head of the plunger extends to within the valve at the end of the metering stroke, and in that
- the valve is provided with an uninterrupted recess extending axially along its periphery, said recess providing a connection between the ports towards the hopper and the cylinder in the suction position of the valve.

In view of this combination of features a bubble of gas or air being present below the plunger during the lowermost position of the latter, can flow within the port to the hopper from which said bubble may then ascend towards the

surface of the liquid.

The present invention relates in particular to a metering device the valve of which is provided with a transverse bore in a manner known per se, said bore serving for obtaining a connection between the metering cylinder and the location of delivery of the product. In that case the valve is preferably provided with a circumferentially extending groove located between the axial recess and the transverse bore. This enables the valve to be rotated from one end position to another end position at the moment that the metering plunger is in its lowermost position.

An embodiment of the most important portion of the present metering device in accordance with the invention and some operational stages of same, will now be illustrated with respect to the accompanying drawings, wherein:

Figure 1 shows a vertical section of the metering device;
Figure 2 is a section according to line II-II of the lowermost part of the device in Figure 1;
Figures 3a-f diagrammatically show five operational stages of the device as shown in Figs. 1 and 2.

The drawings disclose a metering device which could be part of a complete device of the type as described in the aforementioned U.S. Patent Specification No. 2,666,564. A device of this type comprises a number of metering units all of them being of analogous construction, their operation

also being identical. The present Specification is therefore limited to a single unit being composed of a metering cylinder 1 and a plunger 2. Said plunger 2 is connected with a roll 3 protruding beyong the cylinder 1, said roll serving to reciprocate said plunger in between its lowermost invariable position (shown in Figure 1) and an adjustable uppermost position, depending upon the quantity of product to be metered, such as for instance soup, jams or suchlike partially liquid products. As can be seen in Figure 2 the cylinder 1 is positioned at short distance adjacent a hopper 4 for storing said products. A connecting element in the form of a valve housing 5 is located below the cylinder 1 and the hopper 4. The wall of said housing comprises three orifices constituting a port 6 towards the hopper 4, a port 7 towards the cylinder 1 and a port 8 towards the location for delivering the liquid or partially liquid product (see Fig. 3). The housing 5 comprises a cylindrical chamber in which a correspondingly shaped valve 9 is disposed. This valve 9 comprises a transverse bore 10 constituting a connection between the metering cylinder 1 and the location for the delivery of products, to wit in between the ports 7 and 8. The valve 9 is along its periphery further provided with an axially extending recess 11. Said recess 11 forms the connection between the ports 6 and 7 during the sucking stage of the relative device, when liquid product is fed to the cylinder 1 from the hopper 4.

As can be seen in Figures 1 and 2, the inner wall of the metering cylinder 1 extends to within the valve housing, whilst the surface of the head 12 of the plunger 2 extends within the valve 9 at the end of the metering stroke. From this it follows that the latter metering cylinder 1 will hardly exhibit any "dead" space during the lowermost position of the plunger 2. The recess 11 further maintains a connection with the hopper 4. The latter is favourable relative to the operation of the device, which will be described hereinafter with respect to Figures 3a-f.

The valve 9 further comprises a circumferentially extending cavity 13 in between the axial recess 11 and the transverse bore 10 (see Figure 1). This enables a rotation of the valve 9 in the lowermost position of the plunger 2. As can be seen in Figure 2 the left-hand end of the valve 9 is further provided with a collar 14 fitting in a groove 15 of the valve housing 5. In view of the latter the valve 9 may be simply retained by a cover 16. Due to the provision of a complementary recess at a suitable location along the circumference of the collar 14, the body of the valve 9 may be easily drawn out of the housing 5, when being in an inoperative position.

The operation of the metering device according to the invention substantially corresponds to that as, for example, described in U.S. Patent Specification No.

2,666,564 as mentioned hereinbefore, wherein a roll 3 cooperates with a cam path 17, as diagrammatically illustrated in Figures 3a-f. During stage A (Fig. 3a) the plunger is ascending and liquid product is sucked from the hopper 4, through the ports 6 and 7 and the recess 11. In stage B (Fig. 3b) the plunger 2 has achieved its uppermost position, so that the valve 9 can be displaced (that is to say be rotated) for closing off the connection between the hopper 4 and the cylinder 1 and for opening the connection between the cylinder 1 and the location of delivery, in this case a tin 18.

This stage C (Fig. 3c) merges into stage D (Fig. 3d) during which the plunger moves downwards whilst the desired quantity of product is pressed towards the location of delivery. Finally plunger 2 is in its lowermost position, to wit in operational stage E (Fig. 3e), whereby the surface of the head 12 of the plunger 2 penetrates to within the valve 9, said valve 9 being subsequently turned towards its initial position, see Figure 1. As a result of the location of the small "dead" space below the plunger 2 and in view of the fact that the head of the plunger in its lowermost position, will press the product and the eventual bubble of gas or air back to within the valve, said bubble assembling below the plunger 2, may escape in the direction of the hopper 4. This avoids the pressence of gas or air in a subsequent operational stage, which could hamper an

accurate filling of the aimed metered portion into the tin 18. The small dead space is further very useful in the situation of a so-called emergency-stop, i.e. a sudden disconnection of the machine. Due to this small space only a reduced quantity of product is contained in said space. This small quantity can easily be taken up in the container to be filled (tin or glass jar), without an overflow of the container. A pollution of the filling station will thus be prevented.

The device in accordance with the present invention is especially adapted to being employed in foodstuff-producing industries, for instance in factories for the preparation of tinned soups or for jams in jars. The plunger filler may be used for processing, for example, so-called "filled" soups, to wit soups consisting mostly of liquid substances, the remains of said soup (consisting for instance of pieces of vegetables or meat, minced meat balls and the like) being entrained in the flow.

Claims:

1. A device for the delivery of metered quantities of an, at least partially liquid, product, comprising a hopper, a metering cylinder, a plunger reciprocating within said cylinder and a connecting element with a shut off valve located in between the hopper and the cylinder, said element having the form of a housing, with a port towards the hopper, towards the cylinder and towards the location for product to be delivered, the connections in between said ports being controlled by a valve which is displaceable into several positions within the chamber of the housing, c h a r a c t e r i s e d in t h a t

- the inner wall of the metering cylinder (1) extends to within the valve housing;
- the head (12) of the plunger (2) extends to within the valve (9) at the end of the metering stroke;
- the valve is provided with an uninterrupted recess (11) extending axially along its periphery, said recess providing a connection between the ports (6, 7) towards the hopper (4) and the cylinder (1), in the suction position of the valve.

2. A metering device according to claim 1, in which the valve is provided with a transverse bore for establishing a connection between the metering cylinder and the location

for the delivery of product, in which the valve (9) is provided with a circumferentially extending groove (13) located between the axial recess (11) and the transverse bore.

3. A metering device according to claim 1 or 2, in which the valve (9) has a cylindrical shape, one end of said valve being provided with a collar (14) which cooperates with a local cover (16).

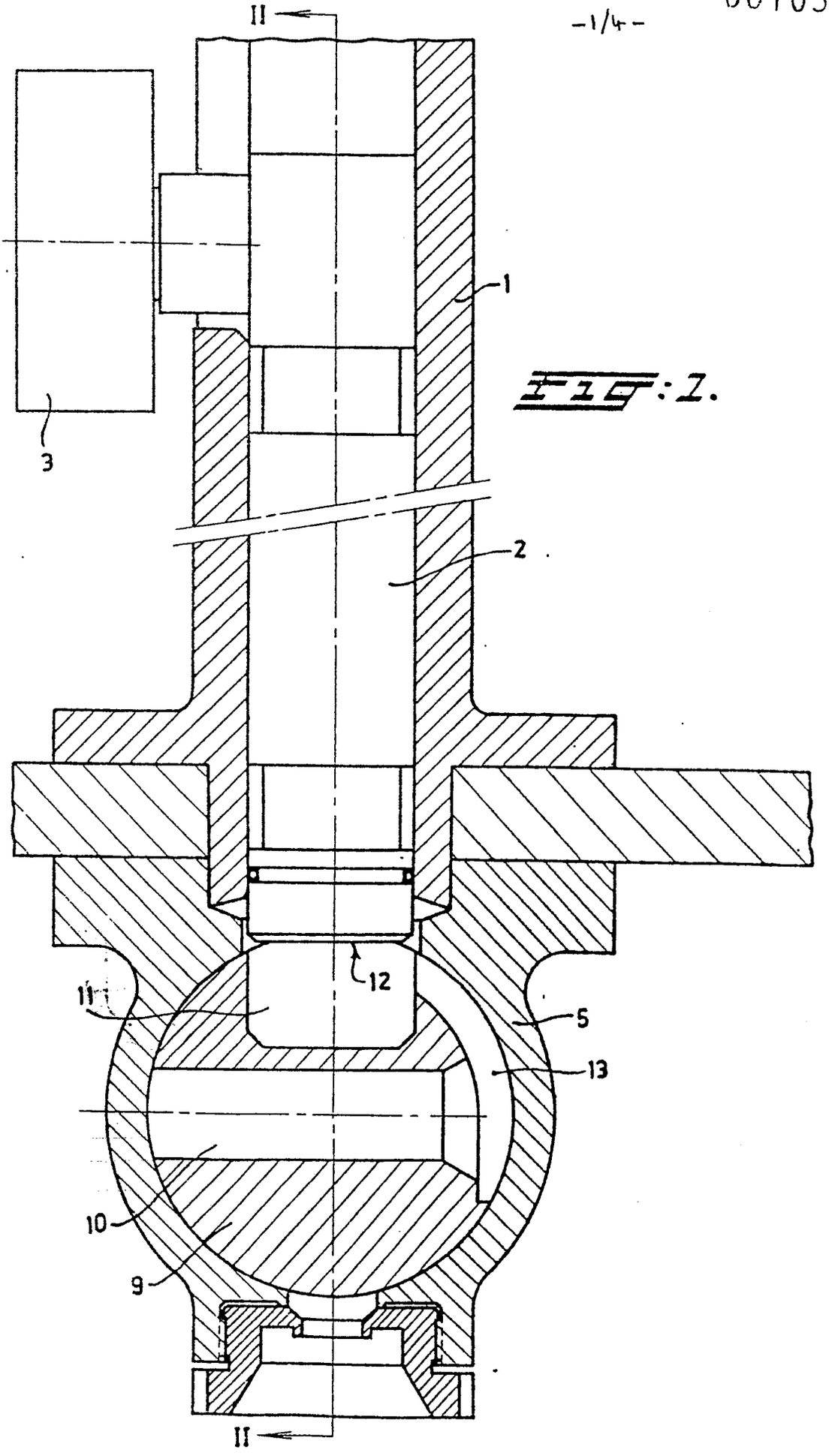


Fig:1.

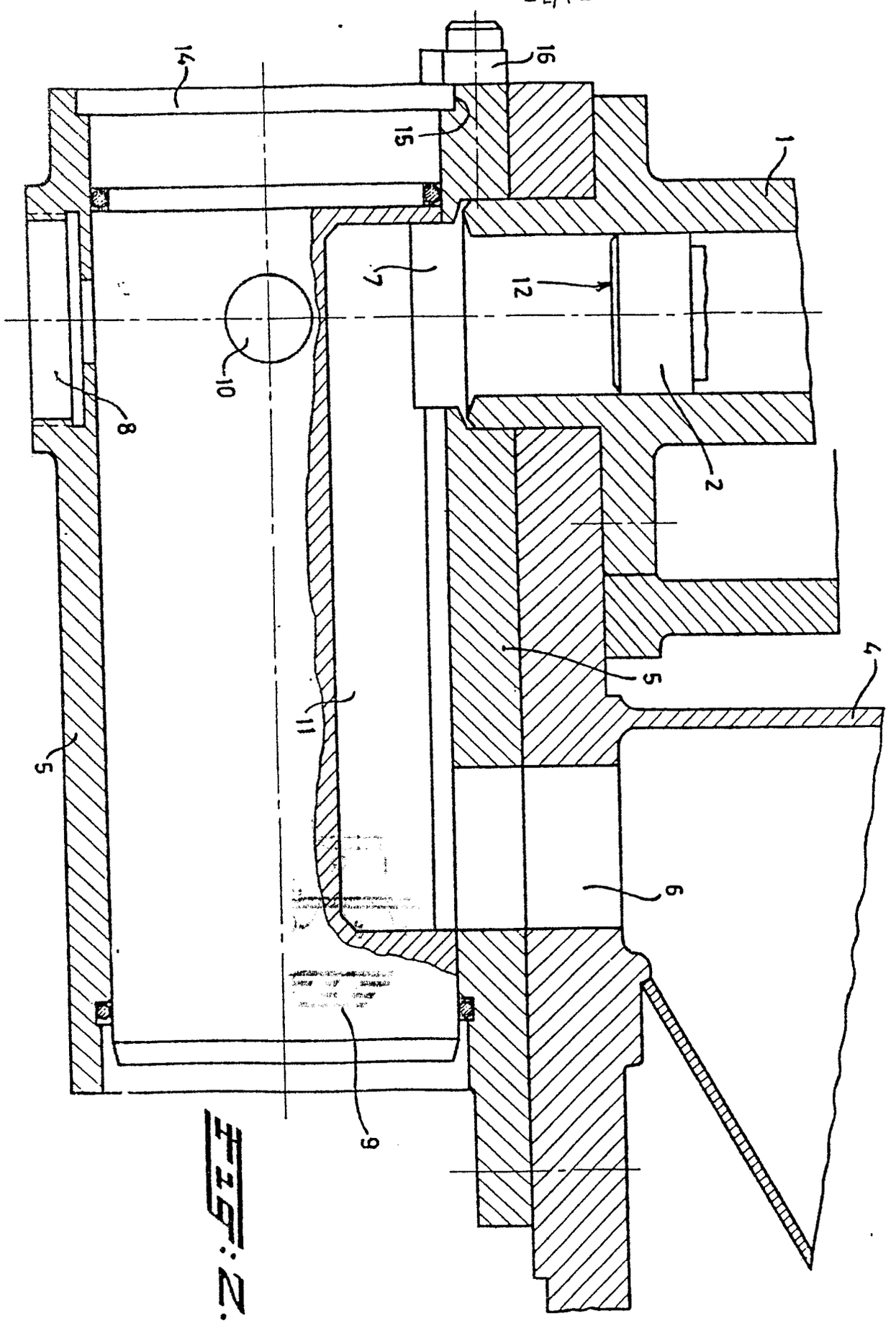


FIG. 2.

Fig: 3a.

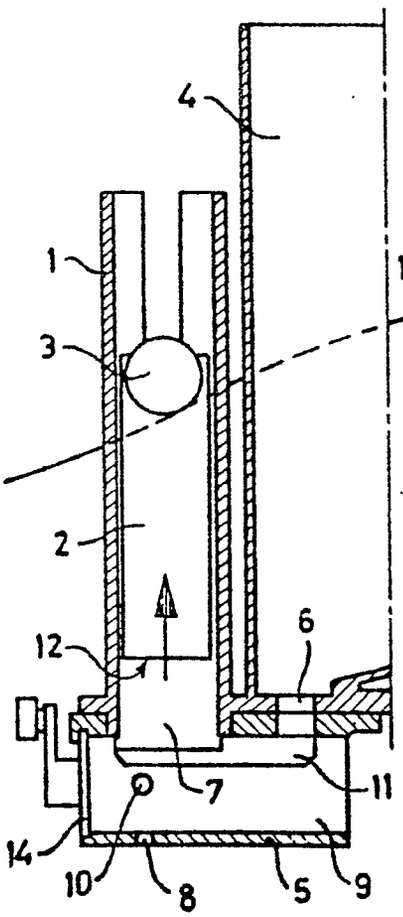


Fig: 3b.

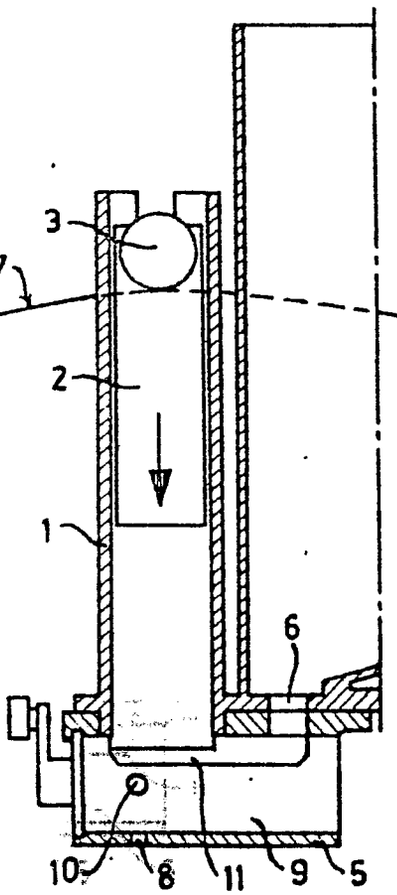


Fig: 3c.

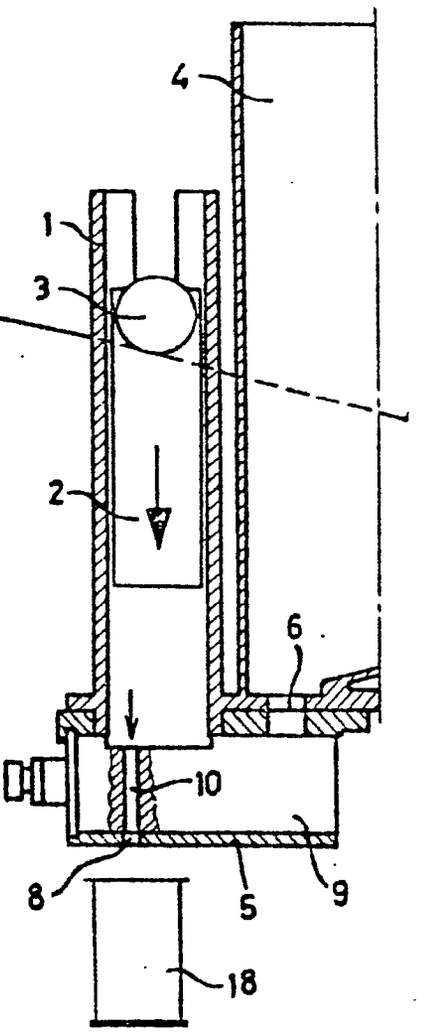


Fig: 3d.

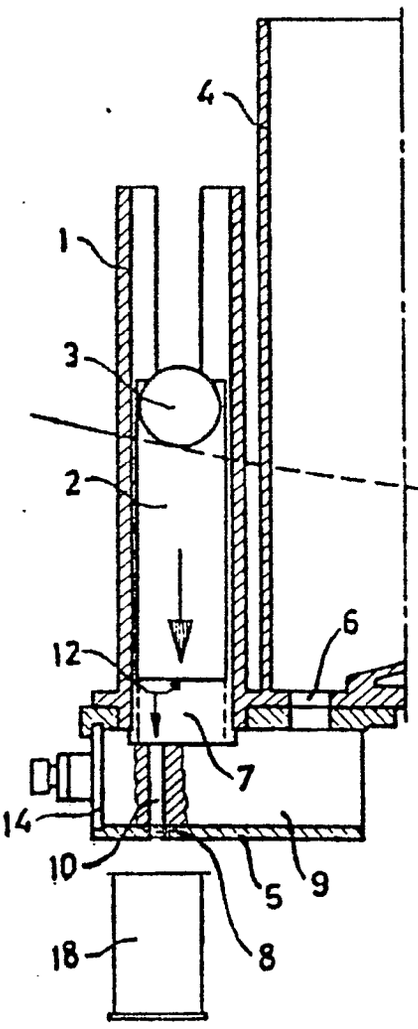


Fig: 3e.

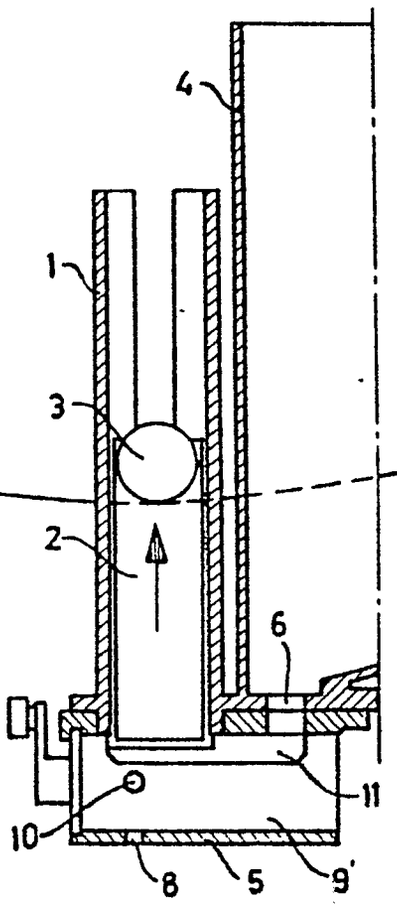
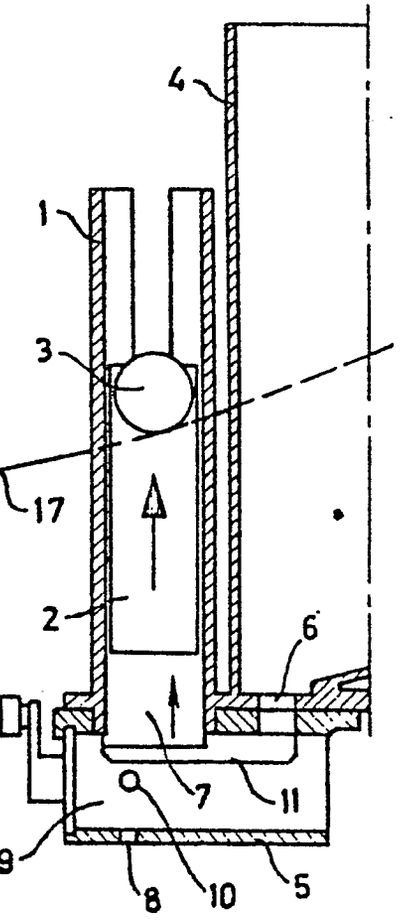


Fig: 3f.



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EUROPEAN SEARCH REPORT

Application number
EP 79 20 0555

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	NL - A - 69 08725 (MARCHADOUR) * In its entirety *	1
	FR - A - 892 883 (MARCHADOUR) * Page 2, lines 31-85; figure 1 *	3
A	US - A - 2 725 169 (STIGLER) * Column 3, lines 13-56; figure 2 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 65 B 43/60
3/32

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 65 B
B 65 C
G 01 F

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	03-01-1980	CLAEYS

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