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(54) **Equipment for pressing incoherent humid material.**

(57) Equipment for pressing inchoerent humid material especially adapted to be used in agricolture to press squashed grapes, olive husks and the like, comprising: a closed compartment (20), that can be opened and has stationary walls (21, 24, 22), at least one of which (22) is provided with closely spaced openings (23); a bag (30), made from a resistant, resilient, flexible and waterproof material received within the compartment (20); and a source of a fluid under a certain pressure (ID, 45), outside the compartment (20) and adapted to be connected to the bag (30) inside the compartment (20), so that the bag (30) can be inflated by the fluid supplied by the source; in operation: once filled in the compartment (20) with the humid material (SU) to be pressed, with the bag (30) in the deflated condition, and closed the compartment (20), the bag (30) is inflated through the fluid under pressure, so that the increase of volume of the bag (30) reduces the space inside the compartment available for the humid material (SU), that is thus compressed between the bag (30) and the compartment walls (21, 22, 24).

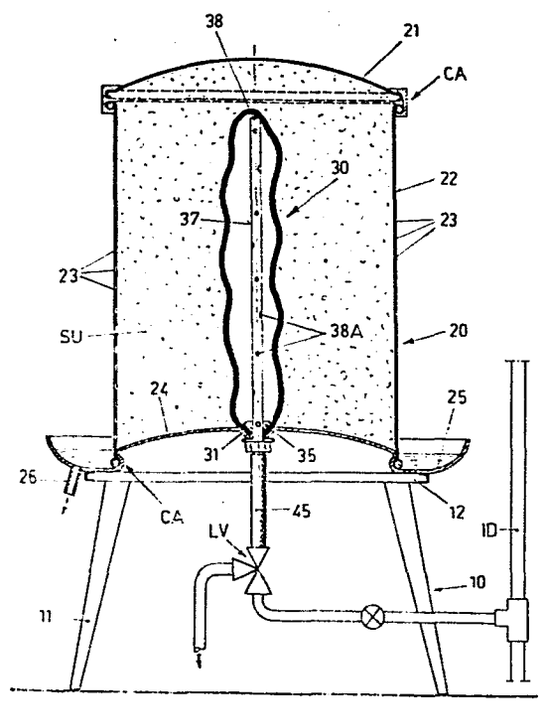

FIG.1

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EQUIPMENT FOR PRESSING INCHOERENT HUMID MATERIALS

in the name of Michelangelo SPINELLI

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The invention refers to presses of the type for pressing inchoerent humid materials in order to obtain the liquid contained therein as, for instance, it is required in agricolture to press squashed grapes, olive husks and the like.

More precisely the invention refers to an equipment intended to substitute presses, as screw or hydraulic presses at present in use.

Screw presses, which are at present the pressing equipments most widely used in agricolture, comprise a cylindrical compartment or "cage" adapted to receive the material to be pressed, having a stationary bottom and an open top through which the cage can be filled.

This cage has also an upper wall that can be vertically moved up and down inside the cage by means of a fixed screw and a mobile screw nut fitted thereon.
The screw nut is rotated by means of levers in one direction to lower the wall and to compress the material inside the cage and in the opposite direction to lift the wall.

Screw presses of this type has many drawbacks, the most serious of which is that the pressing operation

of the load cannot be performed continuosly but it must be performed through subsequent steps. Indeed, after loading of the material inside the cage, the upper wall is lowered through a certain length by rotating the screw in order to obtain a certain pressure on the material and, accordingly, a certain quantity of liquid. After this initial pressing it is necessary to wait at least about half an hour before lowering the upper wall by another length to further compress the material and so on.

This is a very serious drawback firstly because the pressing operation requires the constant presence of labour near the press and secondly because any operation lasts at least two hours.

Furthermore, these presses of the prior art are very heavy and costly. The same drawbacks affect the hydraulic presses with the aggravating circumstance that they are more costly and comprise very delicate hydraulic equipments.

Accordingly it is an object of the invention to provide a press, especially but not exclusively adapted to be used in agricolture, of completely new conception and construction that is completely free from the above mentioned drawbacks.

According to the invention, the vertically moving upper wall as well as the mechanical devices associated thereto are completely eliminated and they are substituted by a compartment or cage having stationary walls and containing a bag or "baloon" adapted to be inflated by a fluid supplied by a suitable source outside the compartment.

In operation, the cage, that can be opened, is filled with the material to be pressed, while the bag is in the deflated condition and, once the cage is closed again, the bag is inflated through the fluid supplied by the source connected thereto. The increase of the volume occupied by the bag inside the cage causes an identical decrease of the space available for the material and, consequently, the compression of the material betweeen the bag and the cage walls.

Another important feature of the invention is that the equipment can make partial use of the presses of the prior art, and more precisely of the cage, that is usually made of circumferentially spaced wood staves, and the support thereof, suitably modified.

The main features of the various parts of the equipment of the invention are as follows:

The cage must have strong walls adapted to withstand the pressure created by the inflation of the bag and at least one of the walls must be provided with closely spaced openings for allowing the liquid contained in the pressed material to come out of the cage;

The bag must be made from a strong, resilient, flexible and fluid-proof material adapted to be used in the production of food;

The fluid source must be able to supply fluid under a pressure between 2 and 8 kg/cm^2;

A three-way pressure limiting valve must be connected between the bag mouth and the fluid source in order to eliminate any danger of burst of the equipment.

The invention will be now described in detail with reference to the attached drawings which show a prefe-

red embodiment of the equipment in a first version wherein the equipment is completely new and a second version wherein the equipment makes use of the cage and support structure of a screw press of the prior art.

In the drawings:

Fig. 1 is an axial section of a preferred embodiment, wherein the cage and the bag are of a cylindrical shape and the bag is concentrical with the cage, the equipment being in a initial step with the bag in the deflated condition and the material interposed between the deflated and the walls of the cage that is closed.

Fig. 2 is a similar section but showing the bag in the inflated condition with the material pressed between the bag wall and the cage walls;

Fig. 3 is a similar section but showing the version of the equipment using the structure of an already existing screw press; and

Fig. 4 is a schematical view of the equipment in a "country" version to be used in places where the water network is practically non-existing or lacks the necessary pressure.

Referring now firstly to fig. 1, it can be seen that the equipment of the invention substantially comprises:

a supporting structure 10;

a cylindrical compartment or cage 20, supported by structure 10;

a bag (or ballon) 30 of generally cylindrical shape having an inlet or mouth 31;

a tube length 37 inside bag 30 for delivering thereto the fluid under pression; and

a fluid source delivering a fluid under pressure ex-

emplified by hose 45 which delivers, for instance, water from the water network.

Supporting structure 10 is very simple and comprises more legs 11 and a supporting ring 12 fixely attached thereto.

Cylindrical compartment 20 has an upper solid dome--shaped wall 21, a cylindrical wall 22 provided with closely spaced openings 23; a solid bottom wall 24, having a similar shape to top wall 24, a ring-shaped basin for the collection of the liquid obtained by the pressing operation, located below cylindrical wall 22; and a connecting pipe 26 for the discharge of the liquid.

Bag 30 is of a resistent, resilient, flexible and water-proof material as for instance rubber used in the food trade, and comprises (fig. 2) a mouth 31, a body having a conical portion 32, a cylindrical wall 33 and a bottom wall 34, the bag being arranged with mouth 31 in the lover part and bottom wall 34 in the upper part of cage 20.

Mouth 31 is tightly sealed, through a suitable sealing device 35 to the lower end of delivery tube 37, that passes through sealing device 35 and extends axially with respect to cage 20 inside bag 30, having its open end 38 at level with the connection CA between cylindrical wall 22 and upper wall 21.

Besides, tube 37 may present holes 38A spaced therealong.

Tube 45, exemplified as a source of fluid under pressure suited for use in the equipment of the invention, can be a flexible hose having one end connected to a tap of a water network for drinking or irrigation purposes

(having a minimum pressure of approximately 2 kg/cm^2) and the other end tightly connected to lower end 39 of tube 37 that protrudes below sealing device 35.

As can be seen from Figures 1 and 2, the delivery of water under pressure from the water network into bag 20 trough hose 45 and tube 37, obtained simply by opening the tap, will be sufficient to press the humid material SU which is compressed between the walls of bag 30 and the walls of cage 20.

In hose 45, a three-way limiting valve LV is connected for security reasons to limit the pressure inside bag 30 at a preselected maximum value in order to avoid the danger of excessive inflation of the bag and consequent "bursting" of the cage.

The equipment of the invention installed in a stave "cage" 20' of the type which is usually used in screw presses of the prior art can be seen in figure 3.

Since the base structure of said equipment and its operation are identical with the specification already given in connection with figures 1 and 2, they will not be repeated here.

It should be noted that cage 20 must be adequately resistent, or rendered still more resistent in case of compartments of already existing presses, particularly in correspondence with connection area CA between the lateral wall and the upper and bottom walls, since the pressure of pressing is uniformly distributed against the cage walls.

In figure 4, finally, an embodiment of the equipment is schematically shown to be used in places where the water distribution network is missing or does not

have sufficient pressure.

In this case the equipment is integrated by a pump DP and it is sufficient to arrange for a water tank, as exemplified by well WP, to draw water therefrom through pipe C1 and to supply this water to bag 30, (not shown in this figure, as it is inside cage 20) through limitation valve LV, of the three-way type, and hose 45; duct C2 returning the water to well WL in case of excessive pressure.

Naturally pump DP must have such a power to supply water with a sufficient pressure as indicated.

The embodiments which have been described and illustrated herein are preferred at present, while, however it is within the scope and concepts of the invention any equipments to press humid incoherent materials comprising a solid compartment of whatever shape, having at least one wall provided with closely spaced openings, suited to contain humid incoherent material to be pressed and a bag, also said bag of any suitable shape, arranged in any way inside the compartment and suitably connected with a source outside the compartment, but able to deliver any fluid under pressure as to inflate the bag inside the compartment and progressively to reduce the space available for the material to be pressed, which material therefore will be compressed and pressed, so that the liquid obtained in this way, can be collected outside the compartment.

C L A I M S

1. Equipment for pressing incoherent humid materials comprising in combination:

a strong compartment which can be opened, having stationary walls, at least one of which is provided with closely spaced openings, a bag element of a strong, resilient flexible and fluid-proof material contained inside said compartment; a source of fluid at a determined pressure, located outside said compartment and adapted to be connected with said bag so that said bag can be inflated by the fluid supplied thereby; said parts being so arranged that, once opened the compartment, filled the humid material therein, between the walls of the compartment and the bag, which is in a deflated state, and closed the compartment, the delivery of fluid at low pressure into the bag causes he volume occupied by said bag to increase and therefore an equal reduction of the volume available for the incoherent humid material is obtained which material is accordingly compressed between said mobile wall of the bag and said stationary walls of the compartment, and thus subjected to a pressing action.

2. Equipment according to claim 1, wherein a pressure limiting valve is connected to the delivery pipe of the fluid under pressure between said source and said bag.

3. Equipment according to claim 2, wherein said source of a fluid under pressure is a water supplying network.

4. Equipment according to claim 2, wherein said source of fluid under pressure is a pump able to draw water from a tank of sufficient capacity and to deliver the water at a sufficient pressure.

5. Equipment according to claim 1, wherein said compartment comprises a strong cylindrical cage with a vertical axis; solid upper and lower walls and an annular collecting basin below said cylindrical wall; said cylindrical wall being provided with closely spaced openings.

6. Equipment according to claim 1, wherein said compartment comprises a cylindrical cage of a conventional type press, formed by vertical staves closely spaced, provided with a solid upper and lower walls, and by a collection basin for collecting the liquid below said cylindrical wall.

7. Equipment according to claims 5 and 6, wherein said bag comprises a mouth; a body having a conical portion, adjacent to said mouth, and a cylindrical portion depending therefrom, and a bottom wall; said bag being arranged with said mouth in the lower part of said cage and said bottom in the upper part thereof, and wherein a delivery tube is arranged concentrically to said cage inside said bag, having an open upper end and an open lower end, the latter protruding to the exterior of said cage through a sealing device, adapted to be connected to said source of a fluid under pressure, so that said bag can be inflated thereby, said bag mouth being sealingly crimped onto said tube adjacent said lower end.

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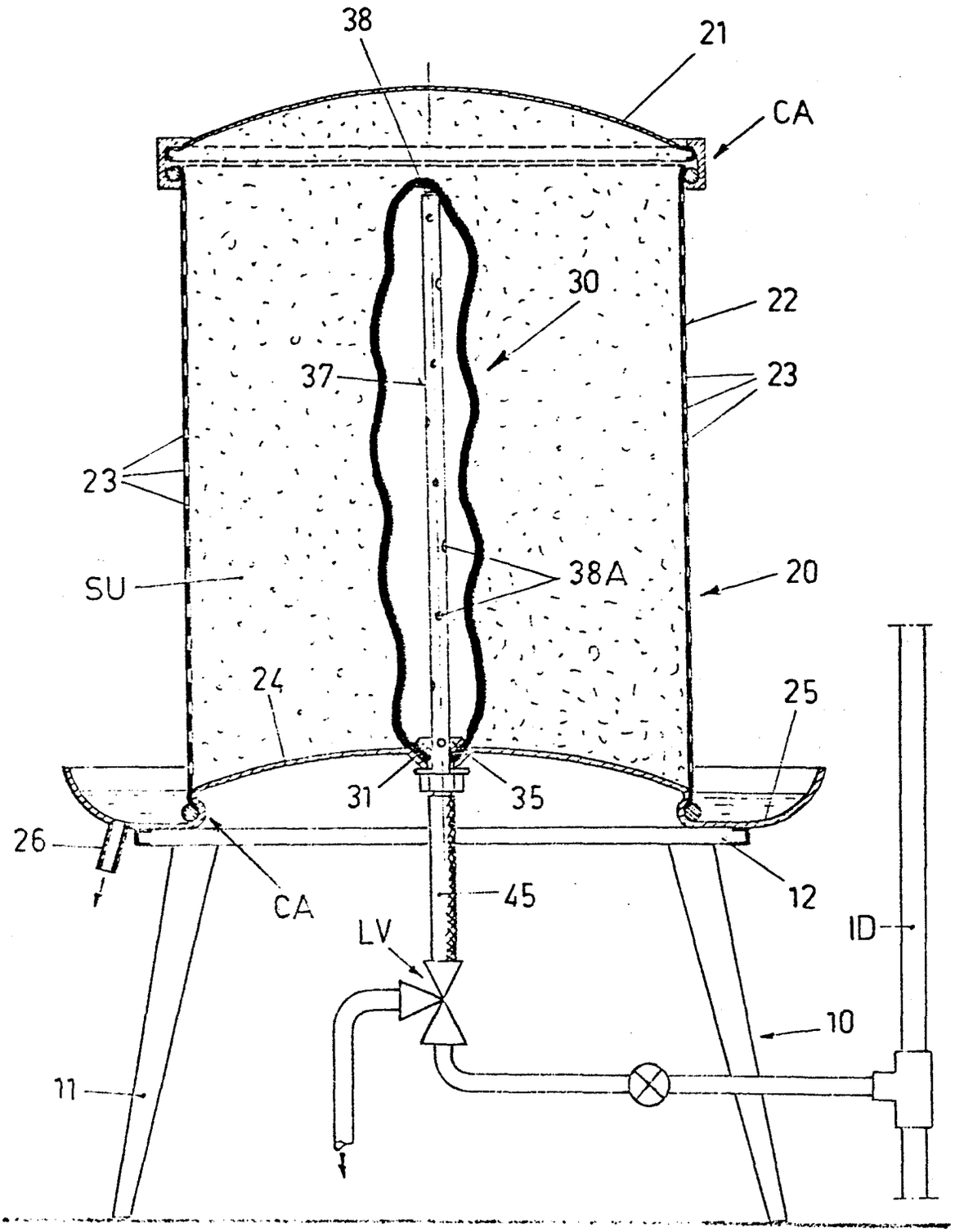

FIG.1

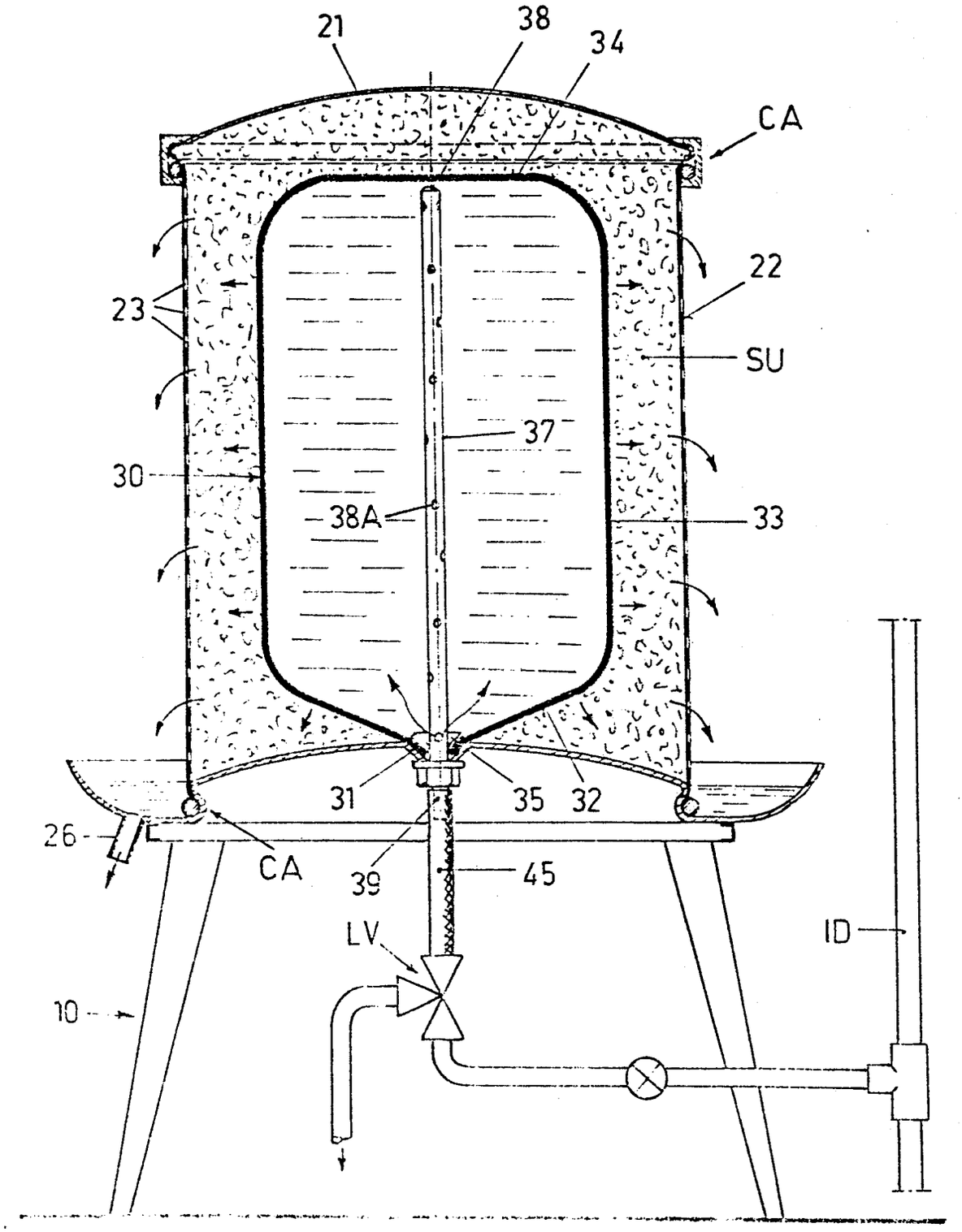

FIG.2

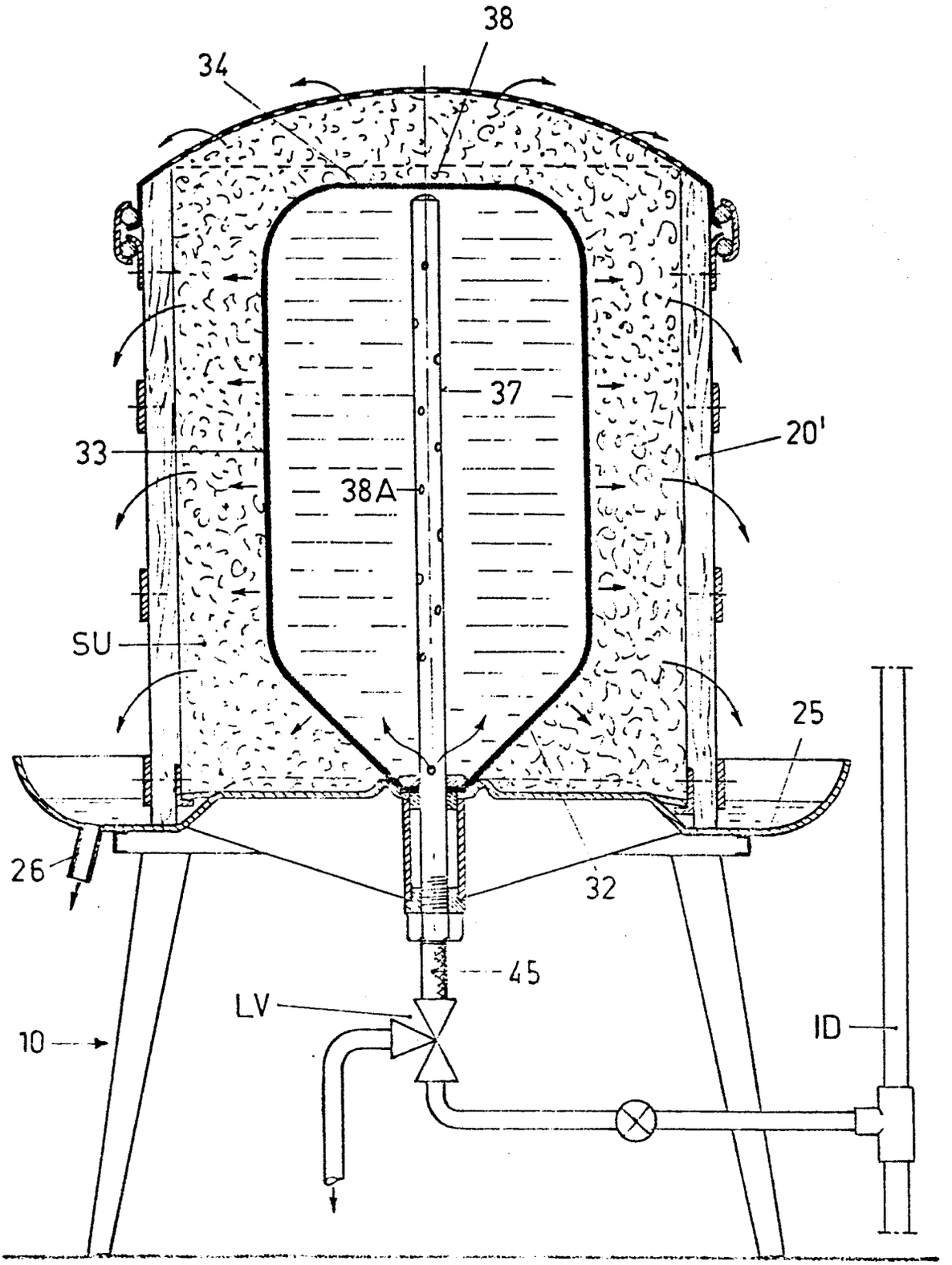

FIG.3

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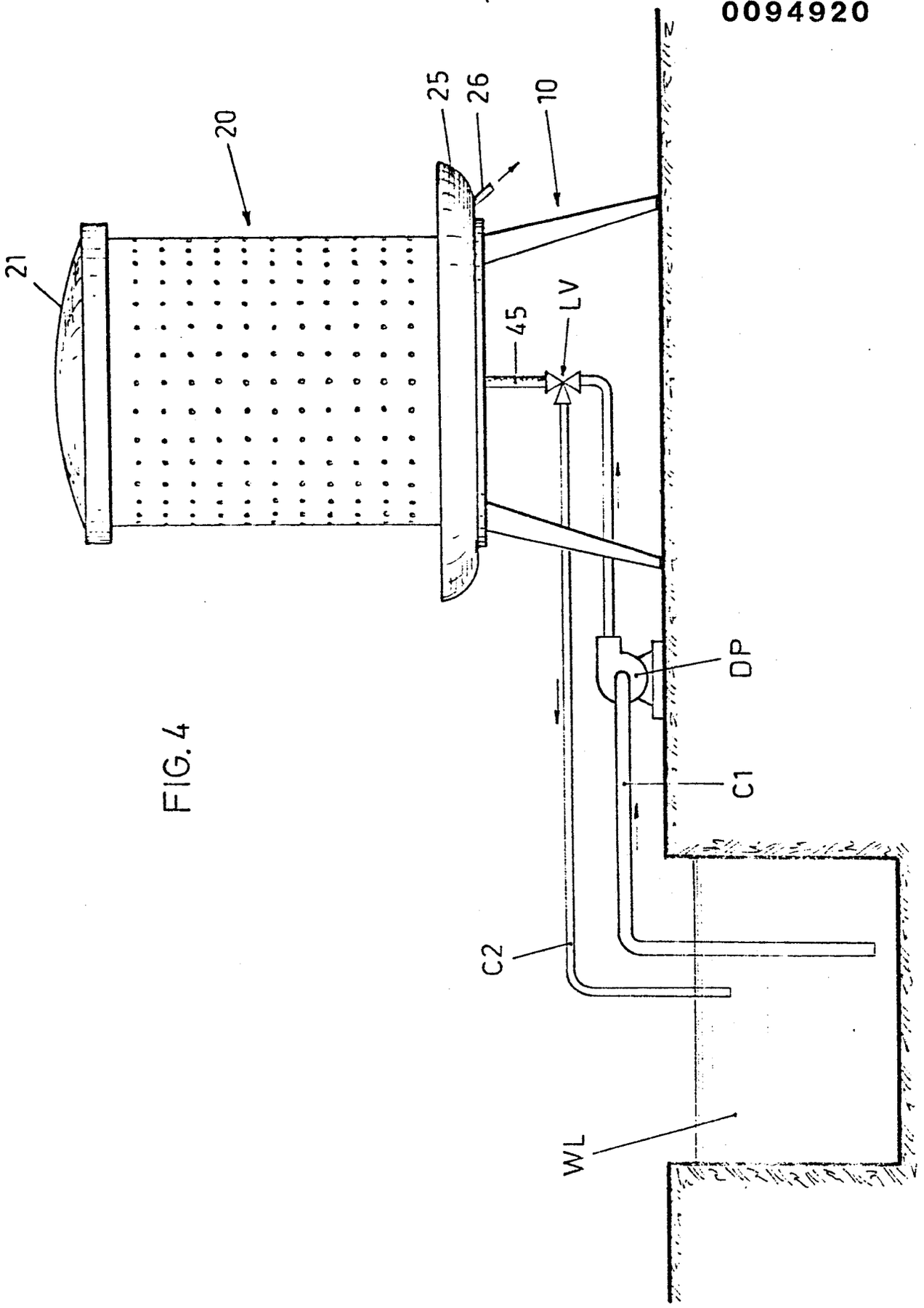

FIG. 4