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54 **Diaphragm press with internal wash system.**

57 A diaphragm press comprises a cylindrical vessel (7) rotating about its longitudinal axis and divided into two diametrically opposing parts by a flexible diaphragm, (8), a series of perforated longitudinal channels (10) being fixed to a part of the inner surface of the vessel and connected at one end to an external manifold (12) for collecting the juice. At their other end the channels (10) are connected to at least one further manifold (15) which is connected to means (99) for feeding water under pressure by way of valve means (16). The flexible diaphragm (8) is of such dimensions as to perfectly mate with the wall to which the channels (10) are connected and with the channels themselves so as to perfectly close the holes (100) of these latter when the diaphragm is thrust from its rear by the pressurised fluid.

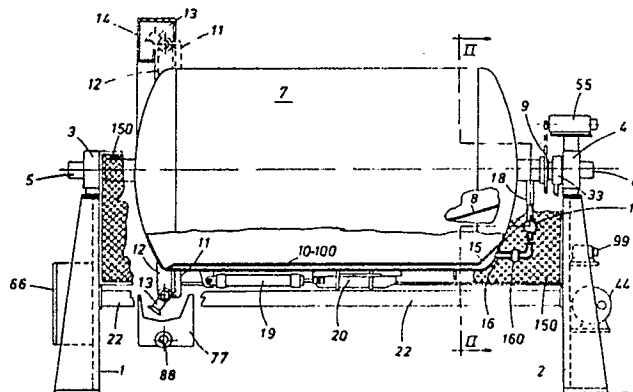


FIG.1

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DIAPHRAGM PRESS WITH INTERNAL WASH SYSTEM

In the enological field so-called diaphragm presses are known consisting of a cylindrical vessel rotating about its longitudinal axis and divided into two parts by a deformable diaphragm disposed in proximity to the vessel axis and substantially parallel thereto.

One part of the vessel is intended to receive a pressurised fluid and its other part is intended to receive the product to be pressed.

Presses of this type are also known in which the juice pressed from the product is collected through perforated channels in the inner wall of the vessel which feed the juice either to a common external manifold or to a closed false bottom located at one end of the vessel.

One of the main problems encountered in the use of diaphragm presses of the aforesaid type is the need to wash said collection channels to prevent stagnant juice lying therein undergoing undesirable fermentation while the press is inactive, and harming the product obtained when the press is again operated.

Any solution to this problem is aggravated by the fact that said channels are inaccessible from the outside.

The object of the present invention is to provide a diaphragm press comprising simple means operable in accordance with an automatic cycle to ensure perfect washing of the juice collection channels.

This object is attained by the means which form the subject of the main claim.

The merits and the operational and constructional characteristics of the invention will be apparent from the detailed description given hereinafter with reference to the figures of the accompanying drawings which show a preferred embodiment thereof by way of non-limiting example.

Figure 1 is a side view of the invention with parts shown in section.

Figure 2 is a section on the line II-II of Figure 1 to an enlarged scale.

Figure 3 is a cross-section through a drainage channel during the final wash stage, to an enlarged scale.

Said figures, and in particular Figure 2 show two opposing pairs of side-by-side uprights 1, 2 connected lowerly together by a strong horizontal frame 22.

At the top of said two pairs of uprights 1, 2 there are disposed respective supports 3 and 4 in which two hollow coaxial journals, 5 and 6 respectively, are rotatably mounted. These latter are fixed to the centre of the ends of a cylindrical vessel 7 in which a longitudinally extending flexible diaphragm

8 is disposed. The flexible diaphragm 8 is formed of a convenient impermeable material suitable for food use and is fixed in a sealed manner at its periphery to the inner surface of the vessel 7 by known means.

In this manner the diaphragm 8 divides the vessel 7 into two diametrically opposite parts, of which one (the lower one in Figures 1 and 2) is intended to contain the product to be pressed, whereas the other (the higher one in said figures) is intended to be connected to a compressor/vacuum unit. This latter, indicated schematically at 44 in Figure 1, is intended to put the region behind the diaphragm 8 under vacuum and also to put the same region under pressure in the manner well known to experts of the art and therefore not described as it does not form part of the invention.

The compressor/vacuum unit 44 is connected to the vessel 7 by a sealed rotary coupling 33 associated with the hollow journal 6 (see Figure 1), the product to be pressed being loaded, again by way of a rotary sealed coupling (not shown), through the hollow journal 5. This latter is intended to be connected to a convenient feed pump, not shown, there also being associated in known manner with the hollow journal 5 a pressure switch arranged to feed a signal for halting said pump when the chosen working pressure is reached in the vessel 7, and a bag valve which seals the journal 5 after stoppage of the feed pump. In addition, to the side of the support 4 there is a self-braking geared motor unit with two or more speeds able to operate both continuously and intermittently to drive a chain which passes about a sprocket 9 fixed to the journal 6 (Figure 1).

With the pair of uprights 1 there is associated a central control unit 66 which can be of electrical or electronic type and by which the pressing cycles can be selected on the basis of the characteristics of the product to be pressed. The control unit 66 also automates the wash stage described hereinafter.

With reference to Figures 1 to 3, to evacuate the juice there is fixed on the inner surface of the vessel 7 a plurality of longitudinal drainage channels 10 each provided with a multiplicity of small slots 100 or holes (see Figure 3) through which the juice passes. In the case shown there are fourteen drainage channels (10) (see Figure 2) but their number can obviously vary.

At one end, each individual channel 10 communicates by way of a corresponding external elbow 11 with a manifold 12 in the form of an open ring and comprising a series of discharge ports 13. These latter are directed towards an annular collec-

tion element 14 supported by a guard 150 secured to the frame 22, and is arranged to convey the juice to an underlying tray 77 provided with a discharge outlet 88. At their opposite end the four lateral groups of three channels 10 and the central pair of adjacent channels 10 (see Figure 2) communicate with respective secondary manifolds 15 for collecting the wash water, these being connected to a main manifold 17 by an external elbow 16. Said elbows 16 are valved by corresponding solenoid valves 160 controlled by the central control unit 66, from the main manifold 17 there branching a feed pipe 18 connected to the hollow journal 6. Finally, said journal 6 is connected by way of a rotary sealed coupling (not shown) to a pumping unit 99 (Figure 1) controlled by the central control unit 66 and connected to a convenient source of water.

On termination of the pressing cycle, the vessel 7 is as shown in Figure 1, a vacuum then being created behind the diaphragm 8 (Figure 2) and the pneumatic piston-cylinder unit 19 receiving the enabling signal to withdraw the cover 20 (see Figure 1) to uncover a lateral mouth provided on the vessel 7 through which the grape cake is discharged.

With reference to Figure 2 it should be noted that said discharge mouth for the grape cake lies between the central channels 10 of said series of channels.

No further constructional details of the cover 20 will be given as these are known.

After discharging the grape cake the cover 20 is closed again and air is fed behind the diaphragm 8. At the same time the pumping unit 99 receives the enabling signal to start, and the valves 160 are opened in succession for a predetermined period, of such a length as to enable all the valves to open and then close before a convenient pressure, such as of the order of 0.3-0.4 bar, has built up behind the diaphragm.

This enables the air thrust by the diaphragm 8 to mix with the water, leading to a more effective and/or careful cleaning/washing action for the channels 10. When said pressure has built up behind the diaphragm the valves 160 are again made to open in succession for a predetermined period which can be selected at will through the central control unit 66, after which, when the last valve 160 of the series has closed, the pumping unit 99 stops.

The diaphragm 8 is of such a size as to exactly mate with the outer profile of the channels 10 and the corresponding connection wall so that during the final wash stage the slots or holes 100 are closed. This can be seen in Figure 3.

The objects and advantages of the invention are clear from the foregoing and from an examina-

tion of the accompanying figures.

The invention is not limited to the single illustrated and described embodiment, and can comprise all technical equivalents to the aforesaid means and their combinations if implemented within the context of the following claims.

Claims

1. A diaphragm press of the type comprising a cylindrical vessel (7) rotating about its longitudinal axis and divided into two parts by a deformable diaphragm (8), perforated longitudinal channels (10) being provided in a part of the vessel and associated with the inner wall thereof and being connected to an external manifold (12) for collecting the juice, characterised in that at least one further manifold (15) is provided connected to that end of the channels distant from the juice collection manifold and connected to means (99) for feeding water under pressure by way of valve means, the deformable diaphragm (8) being of such dimensions as to perfectly mate with the wall carrying the channels (10) and with the channels themselves so as to perfectly close their holes (100) when it is maintained in position by the pressurised fluid acting on its rear.

2. A press as claimed in claim 1, characterised in that said at least one further manifold comprises a series of secondary manifolds (15) which on their delivery side are connected to at least one of said channels (10) and on the inlet side are connected to a main manifold (17) which is connected to said means (99) for feeding water under pressure, in the pipes (16) which connect said secondary manifolds (15) to the main manifold (17) there being interposed corresponding valves (160) arranged to open in succession for a predetermined adjustable period.

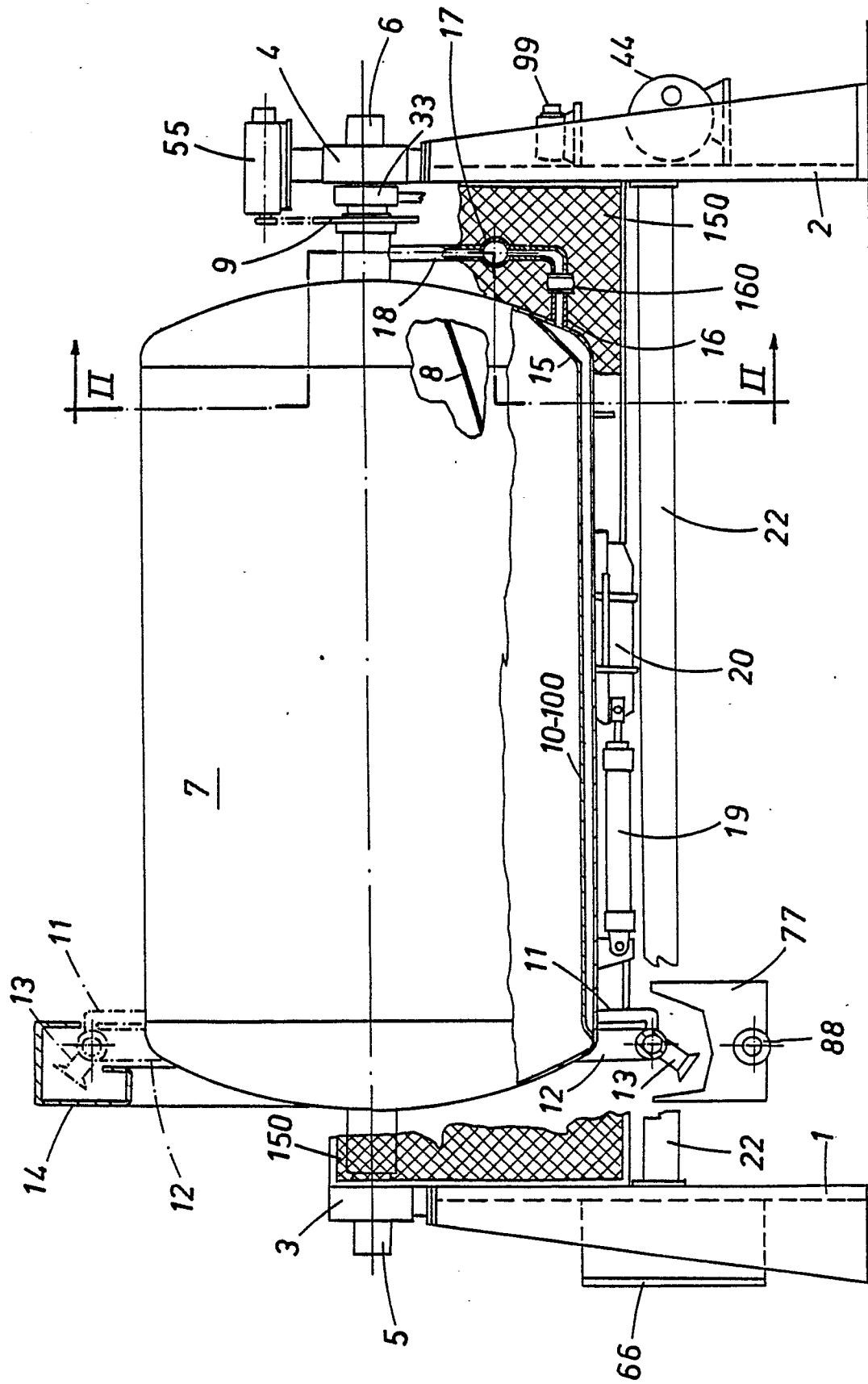


FIG.1

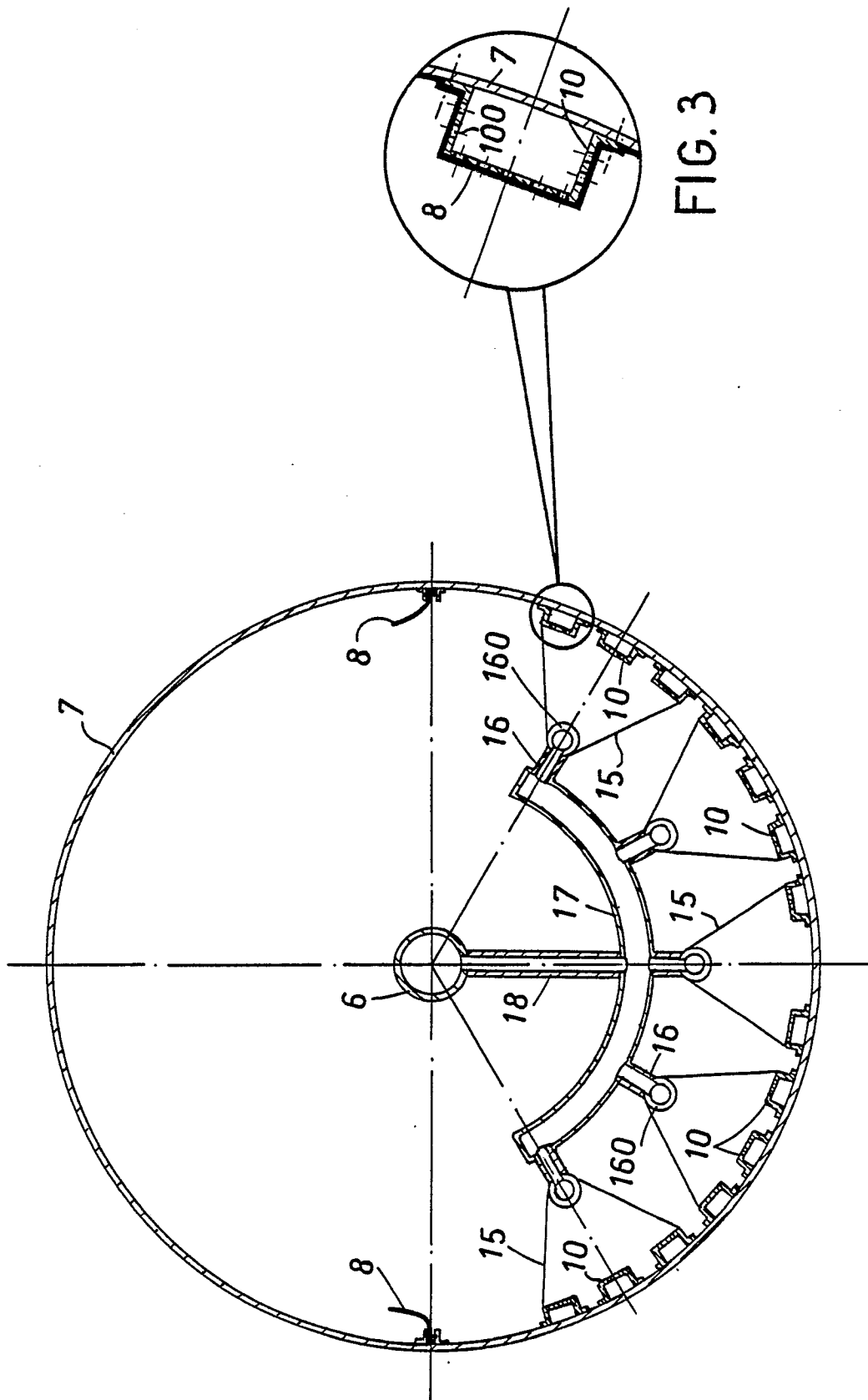


FIG.2

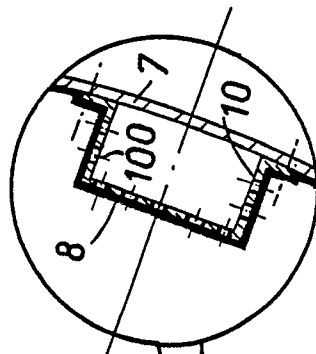


FIG.3