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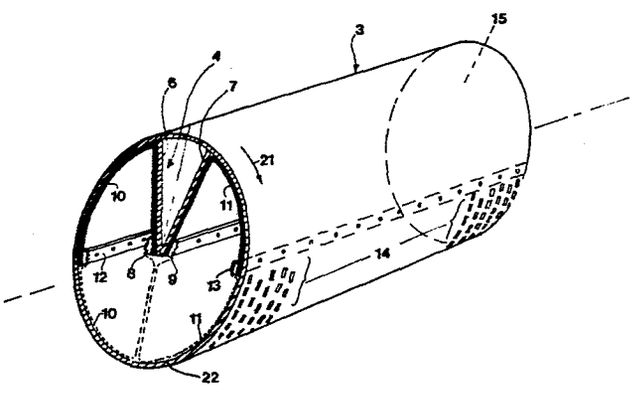
(54) Pneumatically-operated press.

(57) A pneumatically-operated press is particularly for extracting juice from grapes and other fruit.

The press includes a rotatable horizontal drum 3 sub-divided by membranes 10, 11 into a pressing space and two air spaces. The pressing space is defined by the two membranes and a slotted wall 22 of the drum.

The membranes 10, 11 are each secured along their longitudinal edges to the circumferential wall of the drum at one edge 12, 13 and to a support 4 spaced radially inwardly of the drum wall at the other edge.

The support 4 is triangular in cross-section with the edges of the membranes 10, 11 secured at the apex of the triangle by connecting strips 8, 9.



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Pneumatically-Operated Press

This invention relates to pneumatically-operated presses and in particular to wine presses including a cylindrical drum the interior of which is sub-divided into a pressing space accepting material to be pressed and an air space defining a space into which air under pressure is introduced to cause a membrane between the spaces to move towards the pressing space.

German patent specification 29 45 254 describes a pneumatically-operated wine press in which two such air spaces are provided. However with the arrangement described high stresses are induced in the drum of the wine press particularly when the pressed residue is loosened after a pressing operation since the residue falls on the membrane and on the drum and the drum may become distorted.

An object of the invention is to provide an improved pneumatically-operated press which is structurally sound and which achieves this structure without significant cost penalties.

According to the invention a pneumatically-operated press comprises a rotatable cylindrical drum having its axis of rotation disposed horizontally and having end walls, flexible membrane means subdividing the interior of the drum into a pressing space and two air spaces, the pressing space extending parallel to the axis of rotation of the drum and accepting material to be pressed, and the air spaces extending parallel to the axis of rotation of the drum and defining spaces into which air under pressure is introduced to cause the membrane means to move towards the pressing space, and connecting means for connecting

the longitudinal edges of the membrane means with respect to the drum, the connecting means including connecting elements disposed inwardly of the cylindrical wall of the drum and extending between the end walls of the drum, the membrane means including two membranes each having one longitudinal edge supported by one of said connecting elements radially inwardly of the wall of the drum and another longitudinal edge supported by the connecting means on a side wall of the drum, whereby the air spaces are located to each side of the connecting elements.

Preferably the connecting elements are supported on inwardly-directed supporting walls presenting smooth internal walls for the air spaces.

Conveniently the connecting means for connecting the longitudinal edges of the membranes to the side walls of the drum are in the form of connecting strips fixed to said side walls.

In one arrangement the supporting walls present a generally triangular shape in cross section, the connecting elements being located towards the apex of the triangle and the connecting elements are located in the region of the axis of rotation of the drum.

The longitudinal edges of the membranes supported on the side walls of the drum may lie in a plane passing through the axis of rotation of the drum.

Further features of the invention will appear from the following description of embodiments of the invention given by way of example only and with reference to the drawings, in which,

Fig. 1 is a perspective view, partly in cross section, of one form of press, and

Fig. 2 is a perspective view corresponding to Fig. 1 of another form of press.

Referring to the drawings and firstly to Fig. 1 a pneumatically-operated wine press includes a cylindrical drum 3 which is rotatable about its central longitudinal, horizontal axis. The drum 3 has end walls 15 at opposite ends of the drum and over one half of its surface 22 (the lower half, as shown) the drum is formed with a plurality of circumferentially extending rows of slots 14 through which juices from the contents of the drum, for example grapes or other fruit, drain during a pressing operation. The drum also includes an opening (not shown) through the slotted wall 22 of the drum for receiving a charge of material to be pressed, in known manner. As can be seen in the Fig. 1 embodiment the slotted wall 22 of the drum constitutes substantially one half of the total circumferential area of the drum.

Internally of the drum 3 is located connecting means for two longitudinally arranged membranes 10 and 11 disposed symmetrically in the drum and comprising flexible but substantially non-elastic sheet material. Each membrane 10 and 11 includes longitudinal edges extending parallel to the axis of rotation of the drum and in each case one longitudinal edge is fixed to the wall of the drum by a connecting strip 12 or 13 which locates said edge between the strip 12 or 13 and said wall so that the edges lie in a plane containing said axis. The other edges are fixed towards the axis of rotation of the drum, that is, the edges are

located radially inwardly of the wall of the drum, by connecting strips 8 and 9.

The connecting strips 8 and 9 are secured to generally radially extending walls 6 and 7 whose radially outer edges are fixed to the wall of the drum, the walls 6 and 7 presenting a generally triangular cross-section, and the strips 8 and 9 lying at the apex of the triangle. Longitudinal edges of the membranes 10 and 11 are fixed between the strips 8 and 9 and the radially inner ends of the walls 6 and 7 and the walls present a smooth inner surface against which the membranes engage before and after a pressing operation (as shown). The walls 6 and 7 and the strips 8 and 9 together define a triangular support 4 for a longitudinal edge of each membrane 10 and 11.

The walls 6 and 7 extend between the end walls 15 of the drum 3 and interconnect said walls 15 and this serves to make the drum more rigid. Further connecting strips (not shown) connect the membranes 10 and 11 to the inner sides of the end walls 15 of the drum.

The membranes 10 and 11 by their sealed connection to the cylindrical wall of the drum, to the end walls 15 and to the support 4 define two air spaces between the membranes and the associated walls 6 and 7 and the associated portion of the drum wall. The other part of the drum, defined by the slotted wall 22 of the drum 3 and the membranes 10 and 11, constitutes a pressing space.

As shown in Fig. 1 the air spaces are of their minimum size. By introducing air under pressure into the

spaces from a source of compressed air (not shown), the membranes are moved towards the slotted wall 22 of the drum until they take up the position shown in chain lines in Fig. 1, in which position the membranes engage the slotted wall 22. In effecting such movement the material in the pressing space, from which juice is to be extracted, is put under pressure and the juice passes out of the drum through the slots 14. In practice the membranes 10 and 11 will not press against the slotted wall 22 at least over their whole area because of the presence of material in the drum, but the positioning of the strips 8 and 9 and 12 and 13 and the sizes of the membranes 10 and 11 is selected to ensure that, in each position, the membranes are free from folds and free from tension.

In Fig. 2 is shown a similar press to that of Fig. 1 but in this case the support 4 is of a different form. In this embodiment similar parts to those of Fig. 1 are given the same reference numbers.

The support 4 is still of generally triangular form in cross-section but the apex of the triangle carrying the strips 8 and 9 lies at less distance from the circumferential wall of the drum 33, compared with the Fig. 1 embodiment. As a result of the different arrangement the strips 12 and 13 connecting the longitudinal edges of the membranes to the walls of the drum 3 are displaced from their Fig. 1 position and the slotted wall 22 of the drum is correspondingly reduced in area.

In both embodiments the two air spaces are interconnected to equalise the air pressure in the air spaces and such interconnection is conveniently by connection of the air spaces through the support 4.

The press described is of particularly rigid construction and this is achieved without introducing significant extra production or material costs. Moreover the membranes are subjected to reduced stresses during operation due to the location of the support with the edges of the membranes fixed thereto, particularly in the Fig. 1 embodiment. Moreover portions of the wall of the drum which are particularly subjected to the free fall of material after a pressing operation are not covered by the membranes. For example note arrow 20 denoting fall of such material during rotation of the drum in the direction of arrow 21. This factor, together with the arrangement of smooth walls against which the membranes contact during operation, assists in ensuring long life of the membranes even under high loadings and robust use of the press.

It will be appreciated that the area of the slotted wall can be varied according to the different requirements of different products to be pressed. The connecting strips 12, 13 can be repositioned to give such different areas and the support 4 can be of different size to accommodate such repositioning.

Claims

1. A pneumatically-operated press comprises,

a rotatable cylindrical drum (3) having its axis of rotation disposed horixontally and having end walls (15),

flexible membrane means (10, 11) subdividing the interior of the drum into a pressing space and two air spaces, the pressing space extending parallel to the axis of rotation of the drum and accepting material to be pressed, and the air spaces extending parallel to the axis of rotation of the drum and defining spaces into which air under pressure is introduced to cause the membrane means (10, 11) to move towards the pressing space, and

connecting means (4, 6, 7, 8, 9, 12, 13) for connecting the longitudinal edges of the membrane means with respect to the drum,

characterised in that the connecting means includes connecting elements (8, 9) disposed inwardly of the cylindrical wall of the drum (3) and extending between the end walls (15) of the drum,

the membrane means including two membranes (10, 11) each having one longitudinal edge supported by one of said connecting elements (8, 9) radially inwardly of the wall of the drum and another longitudinal edge supported by the connecting means (12, 13) on a side wall of the drum, whereby the air spaces are located to each side of the connecting elements (8, 9).

2. A wine press according to claim 1 wherein the connecting elements (8, 9) are supported on

inwardly-directed supporting walls (6, 7) presenting smooth internal walls for the air spaces.

3. A wine press according to claim 1 or 2 wherein the connecting means (12, 13) for connecting the longitudinal edges of the membranes (10, 11) to the side walls of the drum are in the form of connecting strips fixed to said side walls.

4. A wine press according to claim 2 wherein the supporting walls (6, 7) present a generally triangular shape in cross-section, the connecting elements (8, 9) being located towards the apex of the triangle.

5. A wine press according to any one of the preceding claims wherein the connecting elements (8, 9) are located in the region of the axis of rotation of the drum (3).

6. A wine press according to any one of the preceding claims wherein the longitudinal edges of the membranes (10, 11) supported on the side walls of the drum lie in a plane passing through the axis of rotation of the drum (3).

7. A wine press according to any one of the preceding claims wherein the two air spaces are interconnected to equalise the air pressure in said spaces.

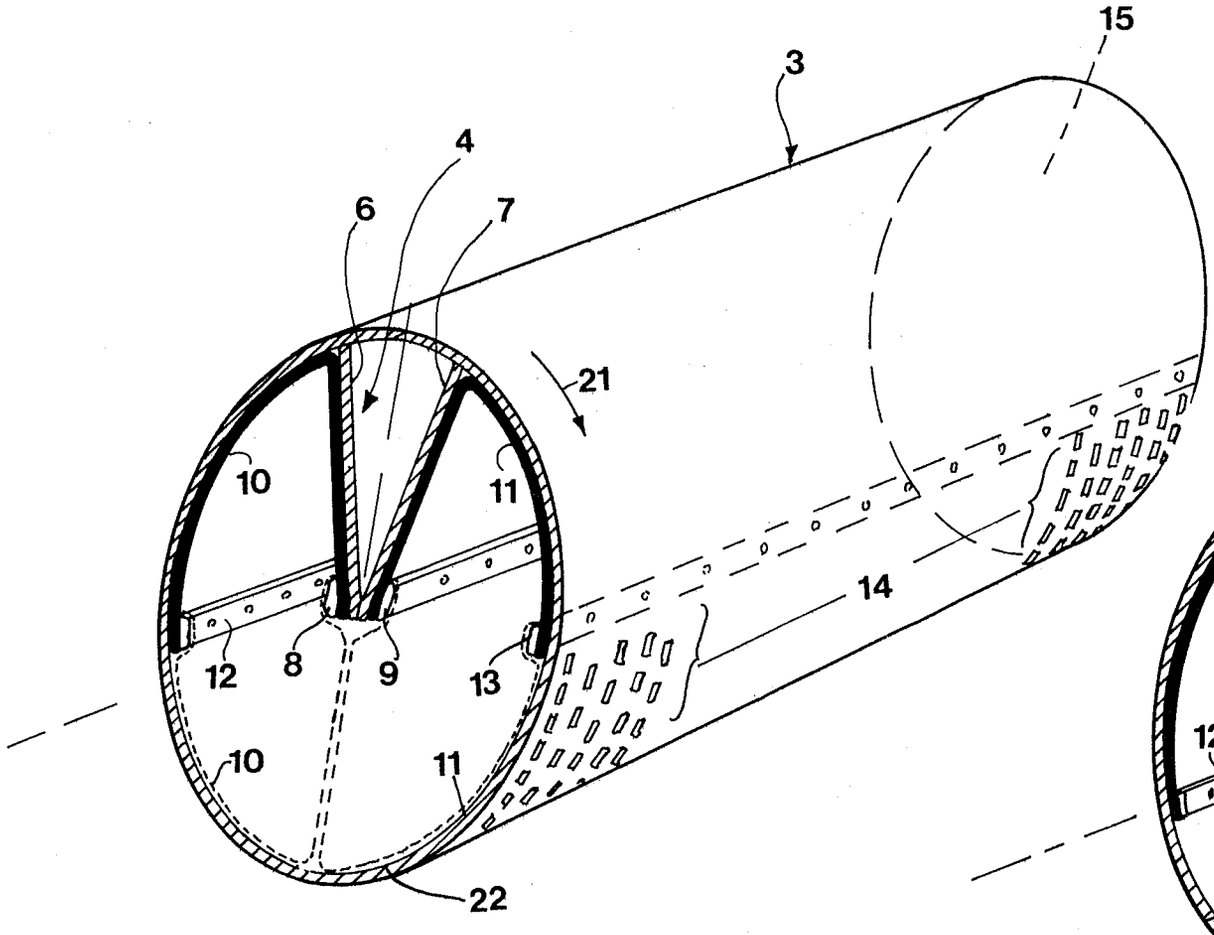

FIG.1

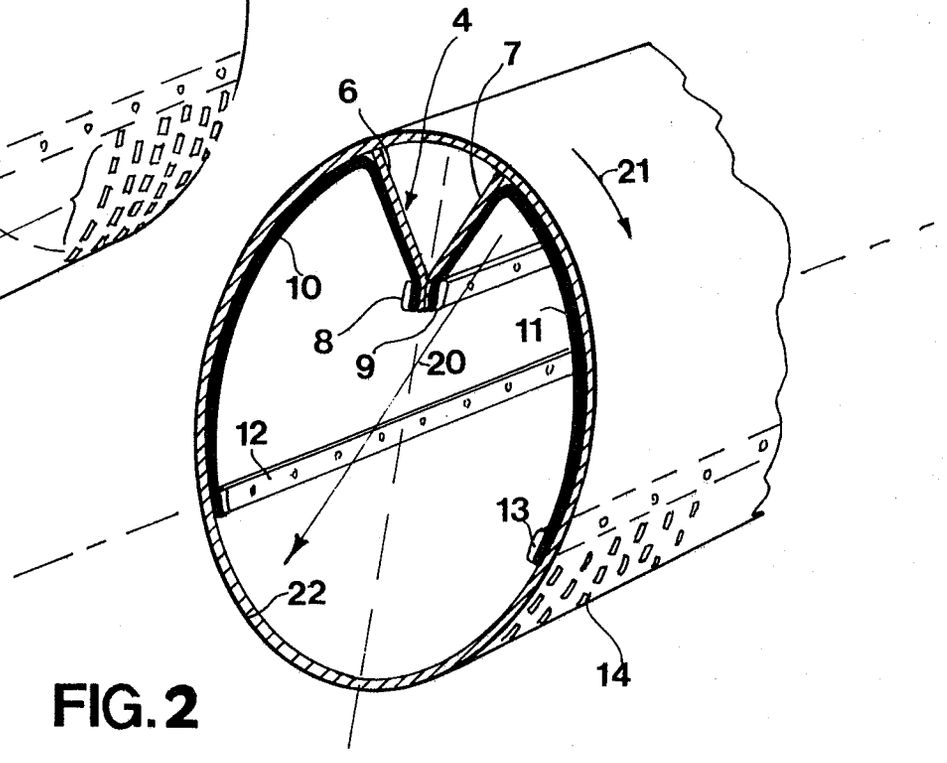

FIG.2

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