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[31] **69 15656**

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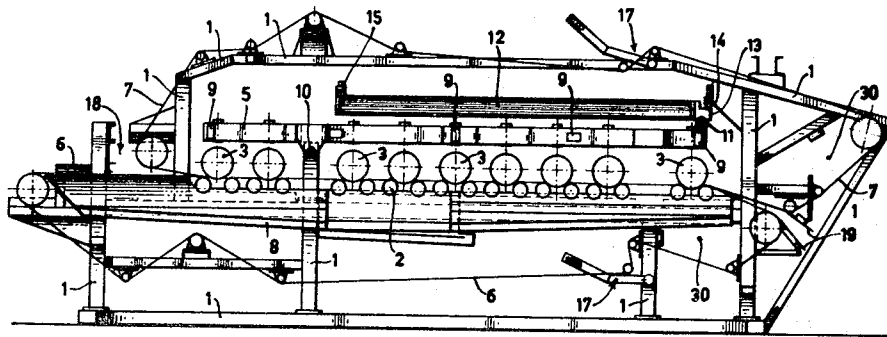
[54] **CONTINUOUS PRESS, ESPECIALLY FOR SQUEEZING FRUITS**
4 Claims, 2 Drawing Figs.

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100/151

[51] Int. Cl. **B30b 9/24**

[50] Field of Search. **100/118,**
119, 120, 151, 152, 153; 139/383; 162/DIG. 1

ABSTRACT: A continuous press, especially for squeezing fruits with two endless pressing belts and a plurality of rotatable pressing rollers, each cooperating with two supporting rollers thereunder on either side, arranged with a small number in a first train and a greater number in a main train on a supporting frame, said supporting frame being supported between the first and main train in such a way that it can pivot about a horizontal axis, with a pressing member being provided in order to exert (almost independently of the position of the supporting frame) a rather great force on the free end of the main train part of the supporting frame.



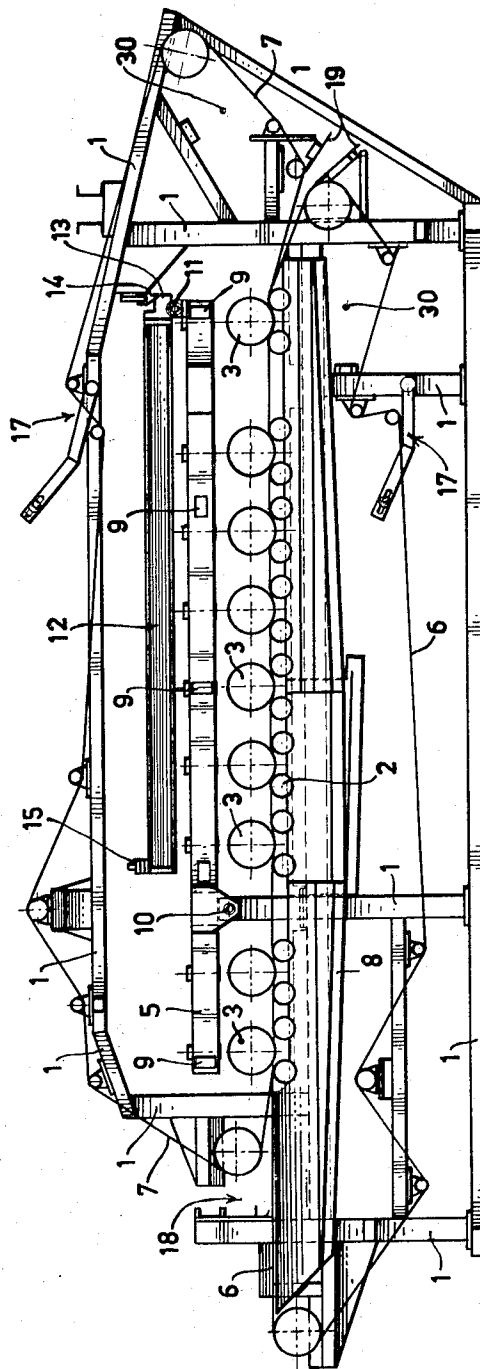


FIG. 2.

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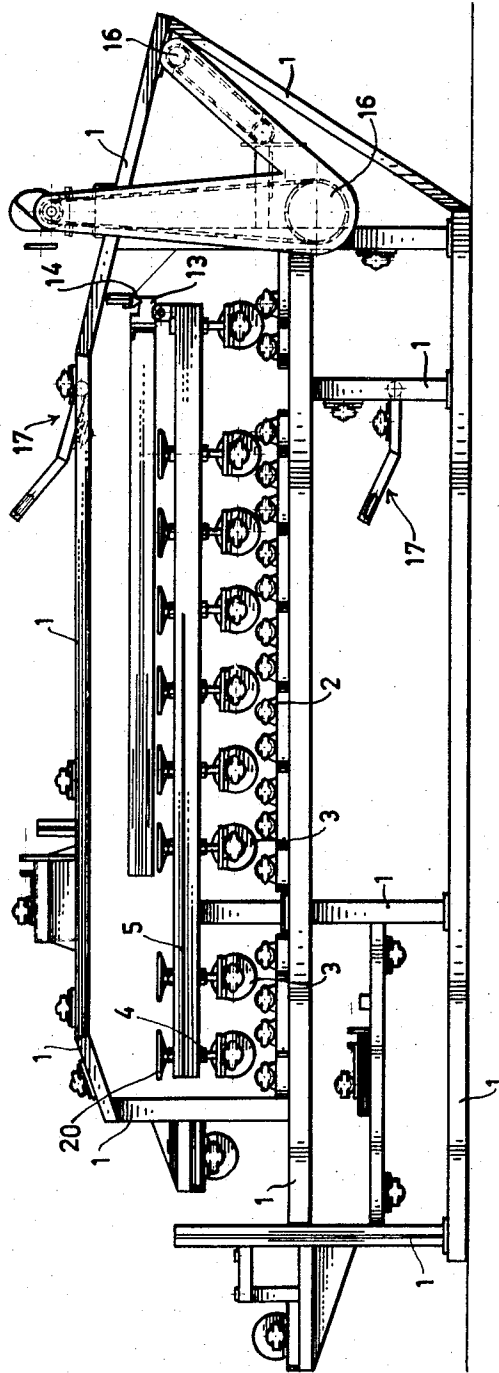


FIG. 2.

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CONTINUOUS PRESS, ESPECIALLY FOR SQUEEZING FRUITS

My invention relates to a continuous press, especially for squeezing fruits, comprising two endless pressing belts which in a pressing area can be driven in a longitudinal direction almost parallelly to one the other, at least one of the belts being permeable for liquids, and comprising in the pressing area, a plurality of pressing rollers each cooperating with two supporting rollers on either side thereof and thereunder which are at least stationary in a vertical direction and are rotatably mounted under the pressing belts.

Such devices are commonly known and have the drawback that, when a great pressure is exerted, as is required for squeezing e.g., apples, the slurry or pulp creeps out laterally between the pressing belts. This trouble is caused by the fact that at too high a press pressure, not only juice, but also fiber particles are pressed through the pressing belts and these are clogged up to such an extent that the resistance becomes intolerably high. An additional disadvantage is the fact that the obtained juice contains comparatively many fiber particles. The partially squeezed out slurry, in the shape of a cake, has by nature the tendency to extend under pressure in a cross direction. In order to overcome this trouble it has already been suggested to fold the lower pressing belt in such a way that the pulp is entirely surrounded thereby and cannot creep out laterally. A drawback of this solution is in that the pressing belt wears off fast. The device becomes also more complicated.

In general these belt presses are either of the type in which the pressure is obtained by the dead weight of the pressing rollers and of a vertically movable frame, secured to these rollers, or of the type in which the pressure is produced by pressing the belts with slurry between two or more stationary rollers, possible adjustable, with a fixed height of the cleft. With the first mentioned type the pressure is not adjustable; in with the second type it is adjustable. A disadvantage of the second type is in that when fluctuations in the thickness of layer of the slurry occur the pressure fluctuates too.

It is an object of the invention to provide a device of the above-mentioned type, which on the one hand has not the aforementioned drawbacks and wherein on the other hand the pressure exerted on the pressing belts by the pressing rollers has no fixed value, but adjusts itself continuously during operation in dependence, among other things, of the thickness of layer of the slurry to be squeezed.

For that purpose the invention provides a device of the aforementioned type in which a rather small number of the pressing rollers are provided in a first train and a rather great number of pressing rollers in a main train, arranged on a supporting frame in which the pressing rollers are supported in such a way that they are individually adjustable for height, while the supporting frame is supported between the first and main train in such a way that it can pivot about a horizontal axis, while a pressing member is provided in order to exert (almost independently of the position of the supporting frame) a relatively great force on the free end of the main train part of the supporting frame.

These measures are advantageous in that the supporting frame, acting as a yoke exerts at the location of the first train in the front part of the main train only a comparatively low pressure on the pressing belts, whereby an optimal preliminary pressing is achieved in order to squeeze the comparatively less bound quantity of juice. The yoke adjusts itself continuously during operation according to the changing circumstances; if suddenly a rather thick layer of slurry arrives at the first train or a slurry layer in which the moisture content is comparatively low, then the reaction force of the slurry on the pressing rollers will be greater than before and the main train part of the yoke will move downwards. When, in other words, it appears at a certain moment that the preliminary pressing by the first train has been excessively heavy then the already partially squeezed-out slurry exerts in the last part of the main train a rather small reaction force on the pressing rollers and the yoke

will rotate in such a way that the pressing rollers in the first train are pressed downwards to a comparatively lesser extent. Therefore the yoke ensures, if the layer in one of the two trains becomes comparatively thicker, that the pressing rollers in the other train are stronger pressed in order to remedy this. The yoke ensures also that the pressure in the slurry is adapted to the circumstances prevailing. This is of importance because in practice it has been found that, when the pressure exceeds a certain value less juice is pressed from the slurry, because fiber particles are pressed into the pores of the pressing belt and this will be a more or less degree become clogged up.

In order to be able to exert in an adjustable way and rather great pressure on the free end of the main train part of the supporting frame the pressing member comprises a two-armed lever which sets through a horizontal pivot shaft upon the main train part in the proximity of the free end thereof while the upper side of the short arm of this lever cooperates with a stationary knife profile and the long lever arm extends substantially parallelly to the supporting frame. The two-armed lever exerts a certain force, dependent on the weights and lengths of the arms, on the free end of the main train part of the supporting frame. This happens, however, in a nonstationary way, so that the yoke-shaped supporting frame can move freely. So the device can be easily adapted to the requirements of the moment independent of the moisture content and other properties of the slurry which is to be squeezed out.

Due to the aforementioned features it is prevented that locally a too great pressure occurs. As a result the slurry will not easily creep out in a cross direction. In order to ensure further that no slurry issues laterally the aforementioned measures are preferably combined with the measure that at least the lower pressing belt is built up from plastic and metal, the plastic wires extending in the longitudinal direction of the belt and the stainless steel wires extending in a transverse direction. Such a pressing belt is flexibly in the longitudinal direction and rigidly in the transverse direction and to a great extent it is due to these features that no slurry issues laterally.

The invention will be clarified hereinafter with reference to the drawing which shows a press according to the invention.

FIG. 1 is a side elevation of an embodiment of this press, the pressing belts, however, not being shown; and

FIG. 2 is a longitudinal section of this press.

As shown schematically in the drawings the press comprises in principle a frame 1 in which a row of supporting rollers 2 are rotatably supported. These supporting rollers are adjustable in a horizontal direction but not in a vertical direction. A pressing roller 3 is arranged between every two supporting rollers and thereabove; this pressing roller is with both ends rotatably supported on the ends of two rods 4 which are adjustable by hand. The rods 4 are provided in the longitudinal beams 5 of a supporting frame or yoke. The pressing belts 6, 7 respectively run in the pressing area of the device, parallel to each other, between the supporting rollers on the one hand and the pressing roller on the other hand. In the pressing area is a tank 8 for the fruit juice placed under the supporting rollers 2.

The longitudinal beams 5, one of which is visible in the drawing, are coupled to crossbeams 9, forming a supporting frame. The two longitudinal beams 5 of the supporting frame are via pivots 10 (only one shown) pivotally secured to the frame 1. The supporting frame can therefore pivot only vertically and behaves like a yoke. The part of the supporting frame with associated pressing rollers 3 at the left side of the pivotal point 10 is the first train, the other part the main train of the squeezing device. The free end of the longitudinal beams 5 on the side of the main train is pivoted at 11 to a two-armed lever 12, 13, of which the short lever arm 13 can cooperate with a knife profile 14 which is fixedly secured to the frame 1 of the device. The long lever arm 12 has a much larger length and is provided, at its free end, with weights 15. The two-armed lever 12, 13 and the supporting frame 5, 9 run almost parallel to each other.

The device is provided with driven rollers 16 for driving the two pressing belts, with tension devices 17 for tensioning the two pressing belts, with a trough 18 for feeding the slurry to be pressed and with means 19 for removing the cake. The device operates as follows:

The various pressing rollers 3 are manually adjusted for height by means of the handwheels 20. The correct number of weights 15 are provided on the beam 12 and the slurry is fed via the trough 18, while the two pressing belts 6 and 7 are positively driven and tensioned. In dependence of the thickness of the layer of the slurry to be pressed out the first train will exert to a lesser or greater extent a pressing force and suffer a reaction force. Under the influence of the dead weight of the rear part of the supporting frame 5, 9 and under the influence of the weight of the beam 12 and the weights 15 the last part of the main train will exert a relatively great pressing force on the slurry. The pressing force is also determined by the absolute and relative extent to which the pressing rollers 3 have been lowered with respect to the pivotal point 10 of the supporting frame 5 by means of the handwheels 20. When with a certain adjustment of the device the first train exerts an excessive press pressure, then the thickness of layer of the slurry in the main train will be comparatively small so that the reaction force which the slurry exerts on the pressing rollers will cause the yoke to rotate in a right-hand direction so that the first train will exert less pressure. If the opposite obtains, thus when the first train exerts too small a press pressure, then the thickness of layer in the main train is too great and the reaction force of the too thick layer in the main train becomes greater, so that the yoke rotates to the left and the press pressure in the first train increases. In this way a balance is set up which is at any moment a function of the initial thickness of layer and of the properties of the slurry. In practice the initial thickness of layer and the composition of the slurry will vary continuously.

It should be noted that the slurry after leaving the main train can be removed by the means 19. The slurry is in fact a press cake which is removed from the pressing belts 6 and 7, and these pressing belts are washed down by the aid of spraying means 30.

It is observed that the mutual distance between the associated supporting rollers for the pressing rollers can be decreased, going from the left to the right in the press as shown in the drawing, so that for this reason too the press pressure increases going from the left to the right. As appears from the figures the pressing rollers lie, going from the left to the right progressively nearer to the supporting rollers.

What I claim is:

1. A continuous press, especially for squeezing fruits, comprising two endless pressing belts which can be driven in a longitudinal direction and almost parallelly to each other in a pressing area, of which belts at least one being permeable for liquids, while the pressing area comprises a plurality of pressing rollers, each cooperating with two supporting rollers on either side thereof and thereunder and which are stationary in that vertical direction, but can rotate under the pressing belts comprising a rather small number of the pressing rollers arranged in a first train and a rather great number of pressing rollers, arranged in a main train on a supporting frame in which the pressing rollers are supported in such a way that they are individually adjustable for height, said supporting frame being supported between the first and main train in such a way that it can pivot about a horizontal axis and a pressing member being provided in order to exert a rather great force on the free end of the main train part of the supporting frame.

2. A device according to claim 1, wherein the pressing member comprises a two-armed lever which via a horizontal pivot shaft in the proximity of the free end of the main train part of the supporting frame acts thereon, while the upper side of the short arm of this lever cooperates with a stationary knife profile and the longer arm of the lever extends substantially parallel to the supporting frame.

3. A device according to claim 2, wherein means like weights are arranged in the vicinity of the end of the longer lever arm, which freely extends above the supporting frame, in order to exert pressure thereon.

4. A device according to claim 1, wherein at least the lower pressing belt is made of plastics and metal, the plastics wires extending in the longitudinal direction of the belt and the stainless steel wires extending in the transverse direction.

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