A press for extracting water from wet washing in which a ram carries a bellows adapted to be pressed against the washing, the bellows being expandible under the action of a pressure medium.

7 Claims, 4 Drawing Figures
PRESSES FOR WASHING

This invention relates to an automated press for removing water from wet washing by a ram which is pressed against the washing.

Known automated presses are ram-type the ram being lowered into a cylindrical washing container, in the form of a bucket, during the pressing operation. The ram is mounted in a gantry support which is in turn secured to a foundation in which the washing container is located.

These presses have a relatively large overall height and thus require a large foundation which must have a depth corresponding to the size of the washing container. There is also the drawback that the washing surface of the ram cannot adapt itself to the shape of the heap of washing during pressing. This is because the washing introduced into the relatively tall washing containers is not uniformly distributed but forms a heap, the height difference between the lower and upper points off the heap being relatively large.

It is the object of the present invention to provide an automated press of relatively low overall height, not requiring a foundation and whose ram may be adapted to the shape of the heap of washing.

According to the present invention there is provided an automated press for removing water from wet washing comprising a ram adapted to be pressed against the washing and supporting the bellows, the cavity of which is acted upon by a pressure medium.

Preferably the bellows have a shape corresponding to that of a washing container located in the lower part of the press.

Preferably the bellows are constructed to act as the sealing diaphragm of a bell-shaped bellows support. In this case, a conveyor may be provided for conveying the heap of washing from the unloading end of a washing machine to a position under the ram of the press.

The invention will now be further described by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a diagrammatic longitudinal section through an automated press with a washing container in the lower part of the press;

FIG. 2 is a cross-section of the press of FIG. 1 in the pressing position;

FIG. 3 shows part of FIG. 2 to an enlarged scale;

FIG. 4 shows another embodiment of the press with the lower part of the press having a flat working surface.

Located in a housing 1 of an automated press is a support 2 carrying bellows 3, the cavity 4 of the bellows having within it a channel 5 with a socket 6 for connection to a pressure source. A hydraulic pressure source using water as the pressure medium is preferred in order that the washing will not be dirtied if the bellows 3 burst. The lower part 7 of the press contains a washing container 8 which comprises a relatively flat trough tapering towards the ground. A loading basket 9 filled with wet washing 10 is insertable into the trough 8. The bellows support 2 (FIGS. 2 and 3) has lateral bars 11 engageable by their ends in corresponding recesses in the lower part 7 of the press. The ends of these bars 11 and the corresponding parts of the lower part 7 of the press are designed to be locked together by appropriate locking members (not shown) engageable in holes 12.

The washing container 8 (see FIG. 3) has grooves 13 on the inside walls and grooves 14 on the top of the base, a bore 15 being provided at the end of each groove 14 in the base, through which bore 15 the excess water passes at the time of pressing.

The loading basket 9 has perforations 16 and is provided at two diametrically opposed edges with guide members in the form of roller 17, which run on rails 18 so that the basket 9 can be inserted and removed easily.

Further guide members may be located outside the press in order that the baskets 9 may be conveyed to the unloading station of a washing machine having a batch type operation or to a subsequent drying drum. Thus the press may be incorporated in an automated washing line.

In addition to devices (not shown) for the guidance and vertical displacement of the bellows support 2, the press also has a pneumatic drive for the aforementioned hydraulic pressure source, outlet pipes for the water removed from the washing and mechanisms for the manual or automatic control of the individual operations.

The embodiment according to FIG. 4 differs from that according to FIGS. 1 to 3 in that in place of the washing container 8, the lower part 7 of the press has a flat working surface extending beyond the press and covered by a perforated plate 19. Thus instead of a loading basket 9 a conveyor frame 20 is used for the washing 10 removed from a washing machine 21.

The conveyor frame 20 has a flap 22. Outlets 23 are provided for the discharge of the excess water and a pump 24 is provided for returning the water to the washing machine. The conveyor frame 20 may be moved by a cable 26 and drive 25. The conveyor frame 20 also preshears the heap of washing so that the latter corresponds approximately to the shape of the sealing diaphragm of the bellows 3.

In this case also the bellows support 2 is connected to the ram 27 of a power cylinder 28.

The hydraulic system which acts upon the bellows 3 comprises a water tank 29 with a feed pipe 30 and a float valve 31. The water tank is connected by pipes 32 and 33 to pumps 34 and 35, the pump 34 being connected by way of a valve 36 to a pipe 37 leading to the socket 6. One branch of the pipe 37 is connected by way of a valve 38 to the pipe 39 coming from the pump 35 and by way of a further valve 40 located behind this connecting point to the pipe 41 leading to the tank 29. Located between the pump 34 and valve 36 is a branch pipe 42 leading to a pressure switch 43 and a control pressure gauge 44. A further control pressure gauge 45 is connected in the pipe 37. The pump 35 is connected by way of corresponding pipes and the valves 45 and 46 to the pressure chambers of the cylinder 26, as well as to the water tank 29 by way of a return pipe 47. The press also has an unloading conveyor belt 48.

The automated press according to FIGS. 1 to 3 operates as follows: The wet washing taken from a washing machine having a batch type operation and placed in a basket 9, is conveyed to the press in the basket and introduced into the washing container 8 of the lower part 7 of the press. The bellows support 2 with the bellows 3 is lowered towards the lower part 7 of the press and locked to the latter. At this time, the cavity 4 of the bellows 3 is not under pressure. Then the pressure medium, for example water, is introduced into this cavity so that the bellows inflate and exert pressure on the washing.
It is desirable to introduce the washing into the loading basket with sufficient water to enable the washing to be uniformly distributed in the basket. Due to this and the relatively flat construction of the loading basket and of the washing container, the bellows 3 only need to adapt themselves solely to the slight differences in height of the washing. Furthermore, the bellows are constructed to correspond to the shape of the loading basket 9.

The embodiment according to FIG. 4 works in a similar manner, with the difference that the washing is unloaded into the conveyor frame 20 and brought under the bellows 3 by the cable line 26. The further operation takes place like that of the automated press according to FIGS. 1 to 3, and then, the flap 22 is opened and the frame 20 is brought to its point of departure.

The water for acting upon the bellows 3 is taken from the tank 29 with the assistance of the pump 34. After pressing, it is returned by way of the pipe 41. The pump 35 acts upon the pressure chambers of the cylinder 28, which in this case is constructed as a hydraulic cylinder.

The pressure applied varies from 10 to 20 atmospheres according to the type of washing. In order to remove water from the wet washing in a satisfactory manner, the pressure must be maintained for approximately 30 seconds to 2 minutes. Since, with the construction described, the bellows support has to be raised only approximately 30 to 50 cm, a relatively low overall height of the press results.

After pressing, the cavity 4 of the bellows 3 is depressurized, the bellows support raised and the washing conveyed to a drying drum. In the embodiment according to FIG. 4, the washing is pushed onto the conveyor belt 48 by the conveyor frame 20 conveying the next batch.

What is claimed is:

1. A press for removing water from wet washing comprising:
   A. A perforated plate for receiving the wet washing,
   B. A fluid actuated ram reciprocally with respect to the perforated plate, the ram having a bell-shaped bellows support attached thereto on the end adjacent to the perforated plate, and a diaphragm forming a bellows and sealing the bell-shaped bellows support said bellows diaphragm and said bell-shaped bellows support being separated by a cavity for receiving a pressure medium, and
   C. A conveyor frame for receiving said wet washing and being, reciprocally moveable at right angles with respect to the ram for introducing and discharging said washing from said plate, said conveyor frame being substantially shaped to correspond to the shape of said diaphragm of said bellows, for pre-shaping the wet washing into a batch and conveying the batch of wet washing between the perforated plate and the bellows diaphragm such that upon inflation of said bellows by said pressure medium water is forced from said washing through said perforated plate.

2. The press of claim 1 wherein the conveyor frame further comprises a pivotable flap forming one side of the conveyor frame and the conveyor frame is reciprocally moved by means of a cable drive.

3. The press of claim 1 further comprising a power cylinder for reciprocably moving the ram with respect to the perforated plate in response to controllably developed hydraulic pressure.

4. The press of claim 1 wherein the pressure medium is water.

5. The press of claim 1 wherein said pressure is maintained for 30 seconds to 2 minutes.

6. The press of claim 1 wherein the pressure medium is water.

7. The press of claim 1 wherein the pressure applied to the wet washing is between 10 and 20 atmospheres.
UNIVERS STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,924,425
DATED : December 9, 1975
INVENTOR(S) : Hans F. Arendt

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

<table>
<thead>
<tr>
<th>COLUMN</th>
<th>LINE</th>
<th>ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>54</td>
<td>&quot;cahmbers&quot; should read --- chambers ---.</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>&quot;diaphgram&quot; should read --- diaphragm ---.</td>
</tr>
</tbody>
</table>

Signed and Sealed this sixteenth Day of March 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks