Feb. 3. 1925. 1,524,803

E. A. ADAM

INSTALLATION FOR EXPRESSING MATERIAL IN CAGE PRESSES

Filed Jan. 26, 1921

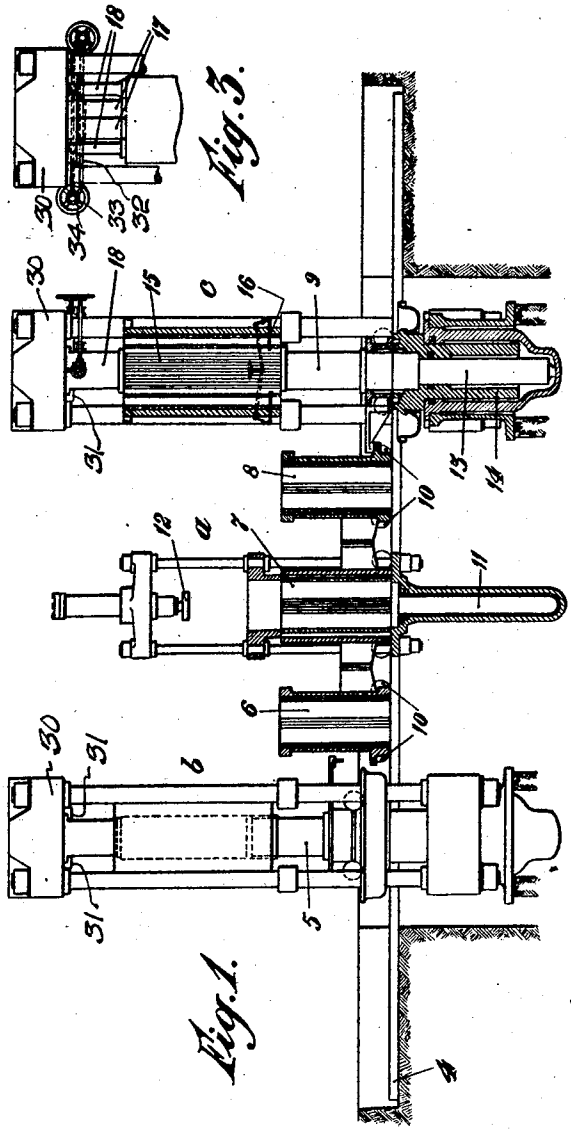

Fig. 1.

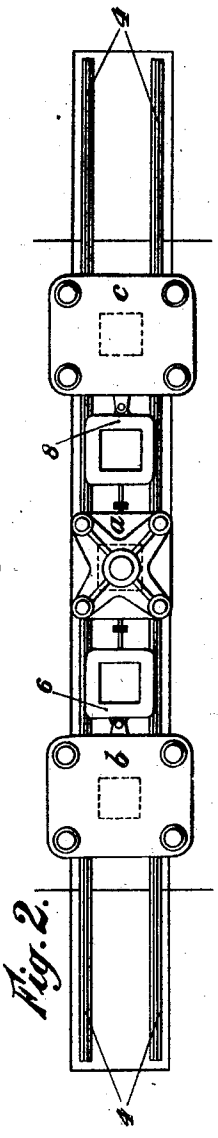

Fig. 2.

Fig. 3.

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Patented Feb. 3, 1925. 1,524,803

UNITED STATES PATENT OFFICE.

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INSTALLATION FOR EXPRESSING MATERIAL IN CAGE PRESSES.

Application filed January 26, 1921. Serial No. 440,228.

To all whom it may concern:

Be it known that I, EMIL ALOIS ADAM, a subject of the Queen of Holland, residing at Utrecht, Netherlands, have invented certain new and useful Improvements in Installation for Expressing Material in Cage Presses, of which the following is a specification.

The installation of a complete set of filling, prepressing and ejecting presses in addition to a battery of cage presses is extraordinarily expensive.

The present invention relates to the construction of cage presses proper, to a complete installation including an auxiliary press, and to a method of operation, whereby great advantages are realized in regard to the cost of installation and operation.

In the first place the invention consists of a cage press in which a tubular auxiliary container and an auxiliary pressing block are adapted to be alternately moved laterally into the space between the press piston and the press chamber. The press is preferably provided with a telescopic plunger the annular outer piston of which is adapted to transmit its pressure to the inner piston. The auxiliary pressing block (which is to be moved laterally into the press) and the head of the inner piston have a smaller cross sectional area than the inner space of the press chamber, and the auxiliary container fits into the space between the outer piston and the press chamber. The annular outer piston is by its length of stroke and the diameter of its head adapted to bear against the foot part of the press chamber.

The press chamber is preferably of the so-called floating type, and the press is provided, in addition to a displaceable counter pressure block, with one or more distance pieces fitting between the top edge of the press chamber and the head piece of the cage press.

A further important feature of the new press resides in that during the operation the press chamber is not removed from the press. The press chamber, therefore, forms an integral part of the press.

The particular method according to this invention is characterized by the fact that the material is fed into the tubular auxiliary container and with the latter moved laterally into the press. The material is then by the inner piston forced into the press chamber in which it remains suspended with the lower press plate resting upon retractable catches. The feeding of the press chamber with a charge from the auxiliary container and the preliminary compression is repeated as often as necessary. The material is then expressed by the aid of the laterally introduced auxiliary pressing block, and finally ejected.

This method renders a simple and economic operation possible. The travelling auxiliary containers are adapted to be charged in a comparatively small press. The charge of an auxiliary container can be rapidly conveyed to the heavy cage press and the press chamber can be completely filled under the comparatively high pressure of the inner piston. The press, therefore, is its own prepress.

The cooperating inner and outer pistons exert a high pressure which also suffices for the ejection of the material. On account of the telescopic arrangement of the piston the press may have a considerably reduced height and, moreover, it is almost permanently under a very favorable load. The process of filling one or more auxiliary containers can be made to be in timed relation with the operation of the press or of the battery of presses. The transportation of the comparatively light auxiliary containers requires far less power than that of the main perforated drums or press chambers. In a small factory a fairly economic operation can even be attained with one single filling press and one cage press according to this invention, because the total initial cost is so much below that of the usual installations. If later a second cage press is added and the total installation duplicated in order that the preheating and feeding apparatus may be more fully utilized, the installation will represent an absolutely economic plant having a greater capacity than one consisting of a heavy filling press, five cage presses and an ejecting press as at the present time extensively in use.

The auxiliary containers are preferably perforated because under certain conditions the filling press will have sufficient power to cause a partial expression of the liquid. In order to obtain a practically complete filling of the press chamber proper the last

charge to be pushed thereinto from the auxiliary container must be subjected to such a pressure that a considerable amount of liquid is expressed before the charge is forced into the press chamber. With the object to permit this expression the auxiliary container is made as a press chamber, but it is of lighter construction than the colander proper.

To further facilitate the operation of the plant it is advisable to provide a filling press centrally between two cage presses and to combine three auxiliary containers with two auxiliary pressing blocks to form a train. Furthermore, the centre distances between these auxiliary members should preferably be so that when one of the auxiliary containers is in alignment with the filling press one of the other auxiliary members automatically assumes a central position with respect to the cage press.

In order that the above may be more readily understood, reference is made to the accompanying illustrative drawing representing in a more or less diagrammatic manner a complete installation according to this invention. Said drawing also serves to explain the new working method.

Fig. 1 is a front elevation of a cage press, part of a vertical section of a filling press, a similar section of a second cage press, and a longitudinal section of the auxiliary containers and of the foundation.

Fig. 2 is a plan view of said installation, and

Fig. 3 a side elevation of the top portion of a cage press.

The conveyors, gangways, etc., are not shown because they do not form part of this invention.

The filling press *a* is mounted centrally between the main presses *b* and *c*. Mounted on the base structure are rails 4 for a train composed of a pressing block 5, a light filling drum 6, a heavy filling drum 7, a light filling drum 8 and a pressing block 9. The distances between the vertical axes of the several parts 6, 7, 8 and 9 are the same and are equal to one-half the centre distances between the presses *a* and *b* or *a* and *c*. The wheels of the carriages forming said train are indicated by 10.

The filling press *a* is provided with a piston 11 which is first allowed to rise and then to descend in stages according as the material, the press plates and the cloths are placed in the filling drum 7. The piston 12 pushes the material with some pressure into the filling drum.

The presses *b* and *c* are each provided with a piston 13 which is adapted to act either on the pressing block 9 or on the charge in the press chamber 15, and furthermore with an annular piston 14. The press chamber 15 is provided near its lower end with two catches which can be simultaneously displaced by means of a lever system. They form projections within said press chamber for temporarily supporting the charge.

Suspended from the press head piece 30 in channel guides 31 vertically above the press chamber are two pairs of displaceable blocks 17 and 18. When the blocks 17 are moved towards one another, as shown in Fig. 3, they form a counter pressure block for the charge and fit into the inner space of the press chamber. In the position as shown in the drawing, the blocks 18 serve as distance pieces which abut and prevent the press chamber 15 from being forced upward. Said pairs of blocks are adapted to be moved apart by means of screw spindles 32 with left and right hand thread connected by bevel gears 33 with hand wheels 34 as shown in the drawing.

The modus operandi of the described installation is as follows:

Assuming the press *c* in a position ready to be filled, i. e. the counter pressure blocks 17 are vertically above the mouth and the distance pieces 18 vertically above the wall of the press chamber (Fig. 3), while the filling drums 7 and 8 have received a charge. The portion of the train 6, 7, 8 and 9 (the annular outer piston 14 of press *b* has previously disconnected the pressing block 5) travels to the right until the filling drum 8 is centrally below the press chamber 15. The inner piston 13 rapidly pushes the charge from filling drum 8 into the press chamber 15 in which it is held by the projections 16. During this upward movement of the piston 13 the filling drum 8 obstructs the path of and prevents the annular outer piston 14 from rising while the press chamber 15 is kept in its position by the distance pieces 18. As soon as the filling drum has been emptied and the piston 13 descended (which movements are very rapid) the filling drum 7 is disconnected from the filling drum 6, moved into the press *c* (which is already filled with lightly compressed material) and likewise discharged into the press chamber 15. During this operation the carriages with the members 8 and 9 are on the track at the right hand side of press *c* where the dripping oil is collected. When the filling drum 7 has been discharged into the press chamber 15 (which operation requires a comparatively high pressure) the charge is again held by the projections 16. The pistons are allowed to descend, whereupon the train is returned into the position shown on the drawing, it being understood that filling drum 6 has been filled during the charging of the press *c*; the charge of the press *c* is now expressed by means of the large piston 14 after the distance pieces 18

have been moved to the left and to the right in order that the press chamber 15 may be free to float.

The filling drum 7 is now immediately refilled. When the pressing operation in press *b* is finished the cakes can be ejected. After the ejection the press *b* receives a charge from the filling drum 6 and subsequently from the filling drum 7 which has in the meantime been refilled, all as has been described with respect to press *c*.

The ejection of the cakes from press *c* is carried out by means of the pressing block 9 after the pressure has for a moment been interrupted whereby the floating press chamber 15 is allowed to descend and the blocks 17 can be moved apart so as to form distance pieces between the wall of the press chamber 15 and the head piece of the press. Initially the full pressing power is available for the ejection until the piston 14 abuts against the press chamber 15 whereupon the final ejection of the moving mass is effected by the piston 13 alone.

Claims:

1. In combination, a main press including a piston and a press chamber, an auxiliary tubular container and an auxiliary pressing block adapted to be alternately moved laterally into the space between the press piston and the press chamber of the main press.

2. A press comprising a press chamber, a press piston, and auxiliary tubular container and an auxiliary pressing block adapted to be alternately moved laterally into the space between the press piston and press chamber, a telescopic plunger including an annular outer piston and an inner piston, the outer piston being adapted to transmit its pressure on to the inner piston, the auxiliary pressing block and the head of the inner piston having a smaller cross sectional area than the inner space of the press chamber, the said auxiliary container fitting into the space between outer piston and press chamber and the diameter of the head of the outer piston being so as to permit said head to bear against the lower end of the auxiliary container.

3. A press as claimed in claim 2 having a floating press chamber, a head piece for the press chamber, a displaceable counter pressure block and associated with the press chamber and distance pieces fitting between the top edge of the press chamber and the head of the press.

4. In combination, two main presses, a filling press arranged centrally between the main presses, three auxiliary containers, two auxiliary pressing blocks, and means movably supporting the auxiliary container and pressing blocks whereby the latter may be moved as a train, said auxiliary blocks and auxiliary containers being so spaced in relation to the distance between the filling and main presses that when one of the auxiliary containers is in alinement with the filling press, one of the other auxiliary members automatically assumes a central position with respect to one of the main presses.

In testimony whereof I affix my signature.

EMIL ALOIS ADAM.