Sept. 3, 1940. F. JAEGER 2,213,815

HORIZONTAL PRESS

Filed March 30, 1936 2 Sheets-Sheet 1

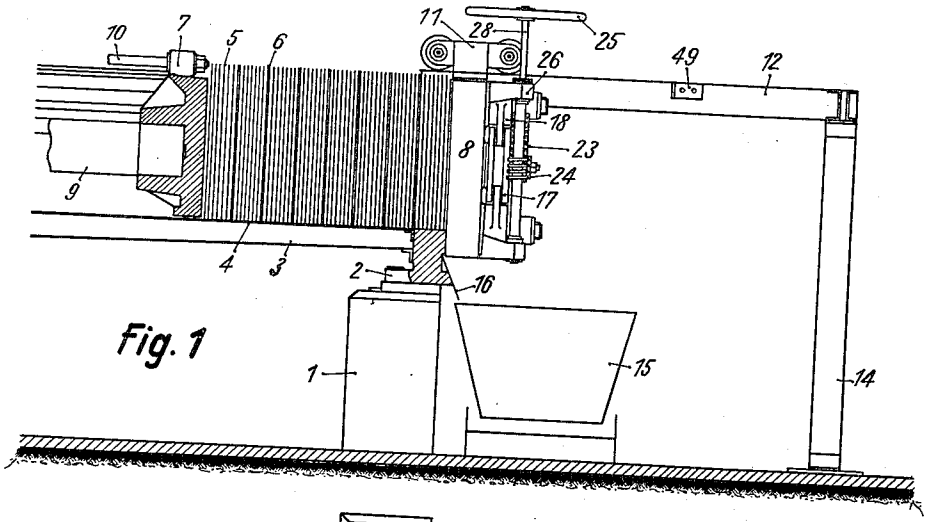


Fig. 1

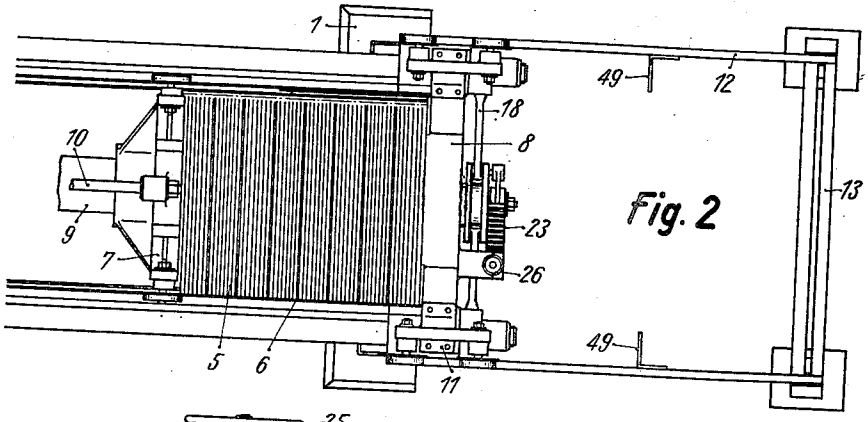


Fig. 2

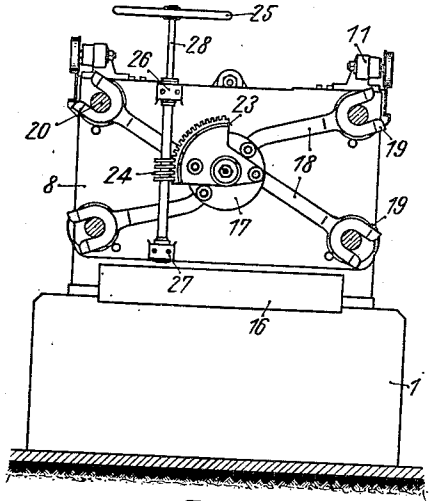


Fig. 3

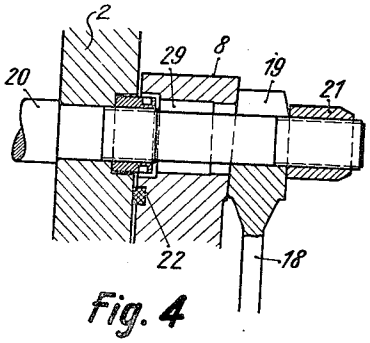


Fig. 4

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Fig. 5

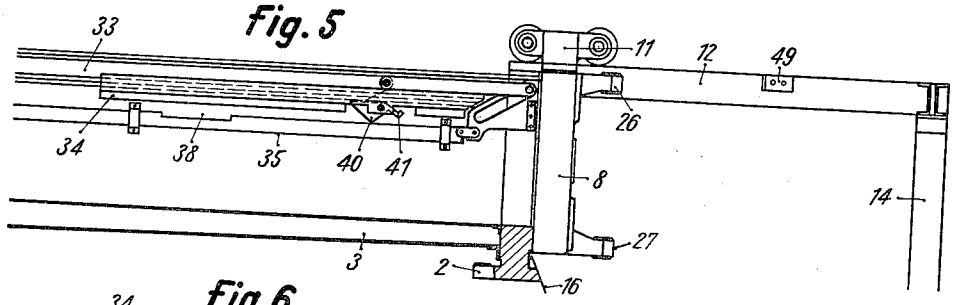
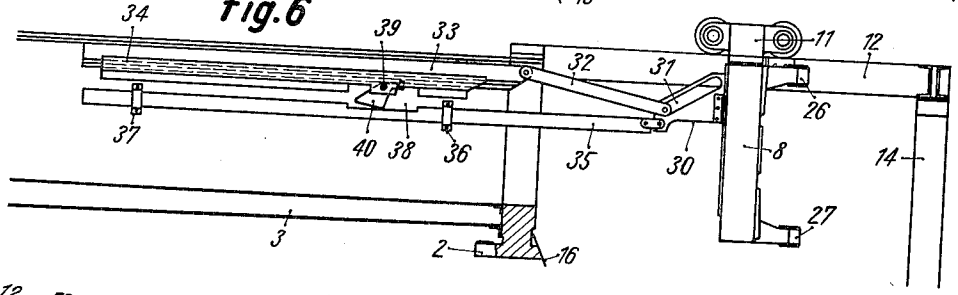


Fig. 6



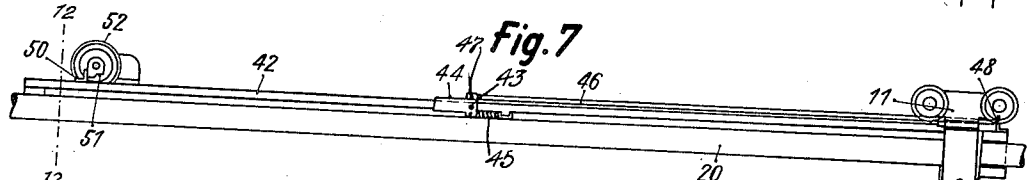


Fig. 7

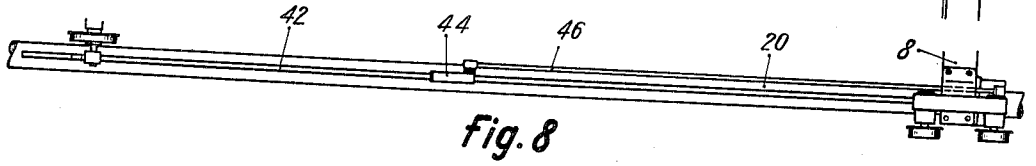


Fig. 8

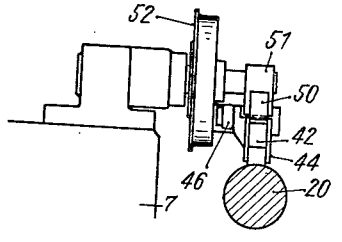


Fig. 12

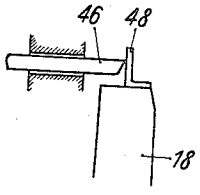


Fig. 10

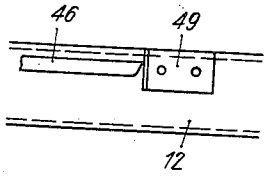


Fig. 11

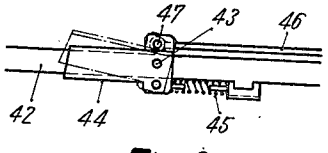


Fig. 9

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2,213,815

UNITED STATES PATENT OFFICE

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HORIZONTAL PRESS

Fritz Jaeger, Halle, Saale, Germany

Application March 30, 1936, Serial No. 71,696
In Germany April 11, 1935

2 Claims. (Cl. 100—50)

This invention relates to a horizontal press for the treatment of cellulose sheets with alkaline lye, in which in one and the same container the said sheets are soaked with the lye, the excess of lye is thereupon pressed-out, and the treated sheets are discharged from the container for further treatment. It is known for this purpose to move the sheets together with the corresponding press plates in an upward or a downward direction out of the container; it is likewise known to tilt the container. In the first case a suitable lifting device must be employed, necessitating a suitable height of the building, while in the second case there must be provided a sufficient space underneath the press, and in the third case a special tilting mechanism must be used.

The discharge of the sheets and plates from the container is made possible by providing the wall of the container which acts as an abutment or counter plate during the pressing operation as a removable wall the movement of which is effected in the direction in which pressure is applied during the pressing operation. Thus, after the release of a bolt or locking mechanism which tightly presses the said wall against the container, the wall may be moved in the direction in which the pressing of the sheets is effected.

The press plates and the sheets of cellulose, subsequent to the displacement of the said movable wall or counter plate, are discharged from the container by movement in the pressing direction.

The displacement of the movable wall or counter plate, and furthermore the movement of the press plates and the sheets of cellulose from the container, can be effected by the head or pressure member that is connected to the pressing plunger and moved by the latter. This head or pressure member is moved during the operation of pressing in the forward direction, is then arrested, and then returned into its initial position. It may, however, also be forwarded stepwise in the event that the cellulose sheets require to be taken out in several steps. The pressing plunger may be operated forwardly and rearwardly by any suitable conventional hydraulic system.

Upon completion of the operation of pressing the treated sheets are at first maintained between the press plates. In order to remove the sheets from the press, according to the invention the press plates are caused to travel on an inclined discharge track, down which the said plates automatically slide. During this downward movement the plates are sufficiently spaced apart to allow the sheets to fall from between the plates. The sheets thus fall out automatically in succession, and can then be conveyed in any direction by means of suitable conveyor members arranged below the container. In this connection a conveyor belt may be provided upon which the sheets are suitably distributed and fed to the site of any further treatment.

According to the invention the said inclined discharge track is automatically formed upon the withdrawal of the movable wall or counter plate, for which purpose the said plate is equipped with inwardly directed inclined slide-ways, upon which, during the inward movement of the plate, the end of the inclined track moves upwardly. The inclined track is brought into alignment with the horizontal track upon which the press plates travel in the interior of the container.

It is of particular importance, in order to secure efficient operation of such a press, properly to construct the locking means for the movable wall or counter plate. For this purpose there are provided locking means which comprise, for instance, four bolts or locking arms arranged to be inwardly and outwardly displaceable in the direction from the middle of the plate, to effect locking and release. These arms are preferably connected to a rotatable middle member in such a manner that in accordance with the direction of rotation of the middle member the arms lock the end or counter plate on the container or unlock it to permit withdrawal. The bolts or locking arms serve to secure the pressure for maintaining a tight joint by wedge action in their outward movement.

The movement of the wall can be effected by any operating agent. In order to secure very simple conditions the movement may be produced by the head or pressure member which may conveniently serve for moving the wall in both directions. It is furthermore important for operating the press to set the press plates, after the treated sheets of cellulose have been discharged, in a manner to permit immediate reception of a new charge. For this purpose thin press plates are arranged in groups, and separaed by thicker press plates, the latter intervening between the said groups of thin plates. The press plates of greater thickness are moved by the movable head or pressure member with the aid of a flexible tractive member, preferably in the form of a sprocket chain, in such manner that they follow the head or pressure member, the tractive member at the same time serving to maintain the thicker plates suitably spaced apart, and at a required distance from the head or pressure

member. Within the groups themselves there are further provided spacing members in the form of links acting likewise in the manner of a chain, but of a form to prevent entanglement.

It is further essential, in order properly to operate the press, to dispose as quickly as possible of the lye pressed out from the plates. For this purpose each press plate may be composed, according to the invention, of three layers united together the outer layers consisting of solid perforated plates, and the inner layer of metal network, the said middle layer thus permitting convenient lateral discharge of the expressed lye through the passages formed therein.

A press according to the invention is diagrammatically illustrated, by way of example, in the accompanying drawings.

Figure 1 is a longitudinal section through the discharge end of the press.

Figure 2 is a plan corresponding to Figure 1.

Figure 3 is an end elevation of the discharge end of the press.

Figure 4 is a detail sectional view of the locking means for securing the end plate or abutment of the press in position.

Figure 5 is a longitudinal section of the discharge end of the press with the end plate or abutment disposed in the closed position.

Figure 6 is a longitudinal section similar to Figure 5, but showing the end plate or abutment outwardly disposed for the removal of the cellulose sheets.

Figure 7 is a longitudinal exterior view of the means whereby the end or counter plate or abutment is coupled with the head or pressure member.

Figure 8 is a plan view corresponding to Figure 7.

Figures 9 to 12 are detail views of parts of the device illustrated in Figures 7 and 8, Figure 12 being a section along the line 12—12 of Figure 7.

The press is provided with a container 3 having a perforated false bottom 4 and fixedly supported by means of feet on a plurality of base-members or pedestals 1, of which only the one at the discharge end of the press is illustrated. At the discharge end the supporting feet are formed on a frame 2 which is of an open rectangular form or of a U-shape. The press-plates together with the cellulose sheets placed between them in known manner are arranged in the container above the bottom 4 so that they may be moved in the horizontal direction. According to the invention the press plates 5 are arranged in groups, each comprising six plates, and between the groups there are interposed thicker plates 6. The plates are positioned between a movable head or pressure member 7 and the end plate or abutment 8 forming the movable wall at the discharge end of the container 3, the said end plate or abutment being in the present case pressed tightly against the frame 2.

The head or pressure member 7 is moved in the usual way on the one hand by the plunger 9 against the end plate or abutment 8 and on the other hand away from the latter by means of the tension rod 10 operated by a retracting cylinder not illustrated.

The end plate or abutment 8 is provided with two crabs 11 disposed one at each side and mounted to travel on rails 12 which are connected together at the outer ends by a transverse member 13 and supported upon pillars 14 to form a track on which the end plate or abutment 8 can thus move in the horizontal direction.

Adjacent the base member 1 means are provided for the reception of the cellulose sheets, such as a carrier 15 which may be moved in a transverse direction and into which the cellulose sheets discharged from the container 3 may fall. In order to ensure a suitable falling path a sheet metal chute 16 is secured to the foot 2.

The end plate or abutment 8 is detachably secured to the container 3 or the frame 2 thereof by means of a locking mechanism. For this purpose a rotatable disc 17 is mounted on the outside of the end plate or abutment 8, and four arms 18 are pivotally connected to the disc 17, each of the said arms terminating in prongs 19. In the locking position as shown in Figures 1–4, these prongs 19 are received, in the case of each arm 18, in the space formed between the end plate or abutment 8 on the one hand and a nut 21 on the other hand, which nut is screwed on to the outer end of a longitudinally disposed spindle 20, having the end portion formed as a screw bolt. As may be seen especially from Figure 4 the parts of the end plate or abutment 8 destined to be engaged by the forked prongs 19 of the arms 18 are provided with inclined or wedge surfaces so that on the outward movement of the prongs 19, which also have inclined surfaces in contact with the inclined surfaces of the end plate or abutment 8, an increasing pressure is exerted on to the end plate 8 with the result that the packing 22 in the inner face of the end plate 8 is accordingly pressed firmly against the frame 2. Adjustment of the pressure applied to this packing may be effected by adjustment of the nut 21.

Fixedly mounted on the rotatable disc 17 is a toothed segment 23 engaging with a worm 24 mounted on a spindle 28 carried by bearings 26 and 27 secured to the end plate or abutment 8; the spindle 28 may be rotated by means of a hand-wheel 25 in one or the other direction, thus transmitting rotation to the toothed segment 23 and thereby to the disc 17 to engage or disengage the forked prongs 19 on each of the arms 18 in relation to the aforesaid spaces. If the arms 18 are drawn out of engagement to the extent to clear the nuts 21, the end plate or abutment 8 may be moved in the outward direction from the frame 2 by means of the crabs 11, as the end plate or abutment 8 is provided with bores 29 of a size permitting the outward movement over the nuts 21.

Fixed to the inner side of the end plate 8 are two flat brackets 30 (Figures 5 and 6) each of the said brackets being provided with an obliquely directed guide-slot 31. Each guide-slot is engaged by a rail 32 in such a manner that the outwardly directed end of the rail may move along the slot 31 in either direction. The other end of each rail 32 is pivoted to a rail 33 slidable horizontally on the adjacent side-wall of the container 3, the rail 33 moving on a guide rail 34 secured to the wall of the container.

Underneath the oblique guide slot 31 there is pivotally connected to each bracket 30 a rod 35 which is likewise mounted slidably upon the side wall of the container 3 in guides at 36 and 37. A shallow recess 38 is formed in the upper edge of the rod 35 and serves, in the outward movement of the rod, to engage with one arm of a double-armed pawl 40 pivotally connected to the guide-rail 34, when the rod 35 reaches the position shown in Figure 6. The other arm of the pawl is of the form of a locking nose 41 which in the position shown in Figure 6 may engage with a corresponding recess in the rail 33 to maintain the latter in fixed position. If, on the other hand, by

position the press is ready for the reception of a new charge.

I claim:

1. A horizontal press for the treatment of cellulose sheets with alkaline lye, said press comprising a stationary container for the reception of said sheets, a movable press-plunger, a pressure-member associated therewith, an end plate, a releasable locking mechanism for detachably securing said end plate to said container, and guide means for said end plate permitting motion of the latter in direction of the pressure applied to said sheets subsequent to releasing said locking mechanism, members attached to said end plate at the inner side thereof, said members forming a sliding track for the press plates and the cellulose sheets as said plate is moved outwardly from said container, said members being adapted to return into their initial position as said end plate is returned to the closing position.

2. A press according to claim 1, characterized in that the sliding track members are arranged between the end plate and pressure member and the inner surface of the walls of the container normal to the end plate.

FRITZ JAEGER.

inward movement of the end plate 8 the rod 35 is displaced to assume the position shown in Figure 5, the pawl 40 during the course of this displacement is lifted so that the rail 33 can also move.

The arrangement of the rails 32 and 33 is such that when the end plate 8 is in the position to close the container they extend in alignment along the side walls of the container and afford support to the press plates 5 and 6 which are suspended thereon by lateral projections (not shown). During the movement of the end plate to the position represented in Figure 6, the rails 32 and 33 lag behind so that the outer end of the rail 32 sinks in the slot 31 and when the position represented is finally taken the pawl 40 is caused to lock the rails in position so that the rail 32 now forms a rigid inclined track for the press plates when they are pressed out of the container to discharge the cellulose sheets.

To the end plate 8 there is further fixed above each of the upper longitudinal spindles 20 extending along the sides of the container 3 a rod 42 resting on the said upper spindle 20, a pawl 44 being pivotally mounted on the rod at the point 43, the said pawl 44 being adapted to assume the operative or locking position under the action of a spring 45 suitably applied to the heel of the pawl. The pawl 44 is brought into the inoperative or unlocked position by means of a thrust-rod 46 pivoted to the pawl 44 at 47, the thrustrod 46 passing through the end plate or abutment 8 and being guided so as to lie parallel to the rod 42.

The free ends of the thrust-rod 46 may come in contact, either with a stop 48 on the upper locking arm 18 or with a stop 49, which is mounted on one of the rails 12 serving for the travel of the counter plate 8.

A stop 50 is provided near to the inner end of each rod 42 to serve as an abutment to be engaged by a nose 51 which is mounted in a fixed position in relation to the axle of the rollers 52 by which the movable head or pressure member 7 is supoprted in its movement. The engagement of the nose 51 with the stop 50 is effective on the movement of the head or pressure member 7 away from the discharge end of the container to move the end plate 8 into the closed position.

The pawl 44 is of the conformation of a shoe or open cuff fitting round the rod 42 in a manner, when in the inoperative position, to permit movement of the head or pressure member 7 past it.

The operation of the device is as follows:

The press is filled with cellulose sheets to be treated, and then, the container is closed by shifting the movable wall or counter plate 8 into the position shown in Figures 1, 2 and 5. The movable head or pressure member 7 is placed at the inner end of the container, while the press plates 5 and 6 are arranged therein in open assembly. The movable wall or end plate 8 is locked by the operation of the arms 18 by means of the handwheel 25, so that these parts assume the position shown in Figures 1–4.

The thrust-rod 46 engages the corresponding upper locking arm 18, i. e. one of the prongs 19, and the locking pawl 44 is in its lower or inoperative position.

The container is thereupon filled with lye in the usual manner and subsequent to the soaking the lye is drawn off and then the pressing begins. For this purpose, the control piston is actuated to cause the pressure medium to enter the press cylinder. The plunger of the press cylinder and the movable head or pressure member 7 are pushed forward. During the forward motion of the head or pressure member, the latter moves past the locking pawls 44, which, as already stated, are in their lower or inoperative positions.

The forward movement of the plunger is continued until it is brought to an end by any suitable means.

After the pressing operation, there follows the operation of discharging the impregnated and compressed cellulose sheets. For this purpose, the pressure medium is conducted into the retracting cylinder, which will thus come into action. The movable head or pressure member 7 is now moved back again. The pile of press plates is thereby relieved of pressure, so that the movable end plate 8 can be unlocked. After the release of the locking arms 18 for the unlocking of the end-plate 8, the thrust-rods 46 are also released by the withdrawal of the corresponding locking arms 18, and the pawls 44 may assume their operative positions, as shown in dot-and-dash lines in Figure 9. If, now, the movable head or pressure member is again moved forward, the noses 51 thereon will abut against the pawls 44, thus establishing a coupling between the movable head or pressure member and the movable end plate through the intermediary of the rods 42. Upon further forward movement of the head or pressure member the end plate 8 will thus participate in this motion and gradually assume the position shown in Figure 6. The rods 42 likewise participate in this motion and, in addition, the rails 32 and 33 will move outwardly so that the rails 32 may form the required inclined track for the press plates on the completion of the outward movement of the end plate 8. When the end plate has arrived at this position, the thrust-rods 46 will abut against the stops 49. By these means, the pawls 44 are again moved into their inoperative positions to release the coupling between the movable end plate 8 and the movable head or pressure member 7. The latter may thus now continue to move forward alone, thereby moving outwardly the assembly of press plates in the direction of the inclined rails 32. To clear the container of the press plates, the movable head or pressure member now moves as far as the end of the container and is there again arrested automatically by any suitable means.

Subsequent to the removal of the cellulose sheets, from the container the press plates must again be moved back into the container. For this purpose, the head or pressure member is again moved back along the container, thereby carrying with it the press plates by means of chain and links (not shown) and moving these plates upwardly on the inclined rails 32. The end plate 8 is at first still retained in its outer position, while the head or pressure member 7 will travel past the pawls 44 and finally strike against the stops 50 on the rods 42. By these means, a coupling is again established between the head or pressure member and the end plate by means of the rods 42 so that upon further motion of the head or pressure member the end plate will be drawn forward towards the container. The inclined rails 32 are again moved into the interior of the container into alignment with the rails 33 and the end plate is carried along with the head or pressure member until it has again assumed its initial or closing position. After the end plate has again been locked in