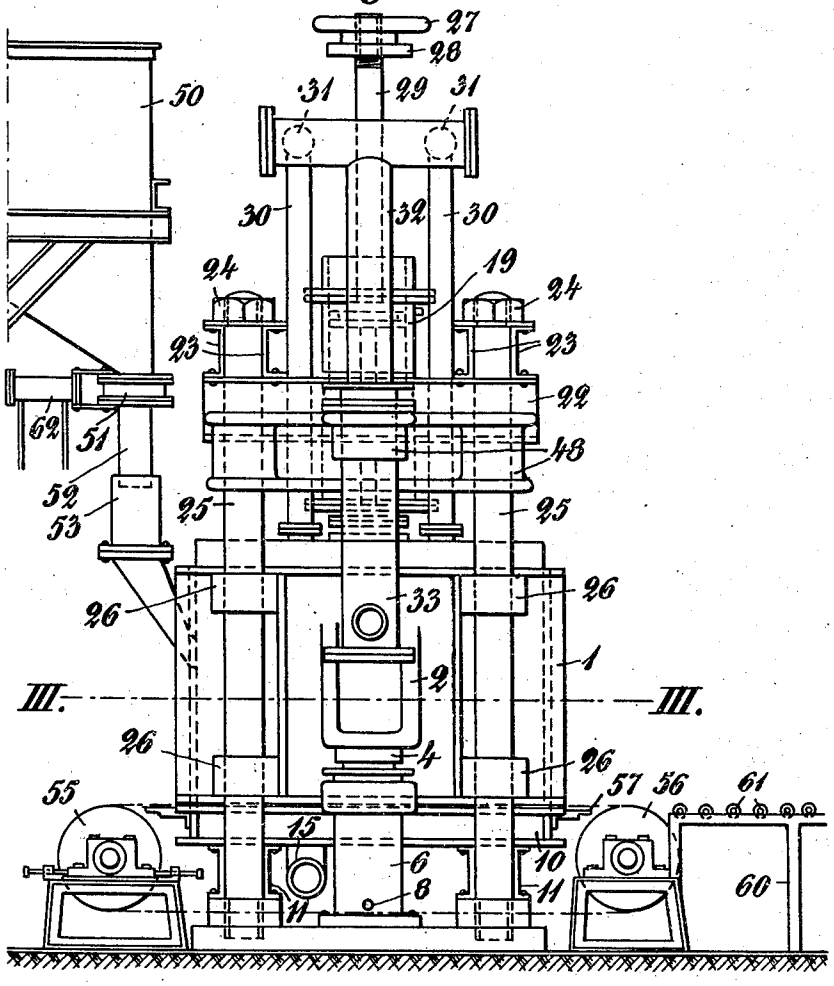
Feb. 4, 1947. T. O. HILLBOM 2,415,244

PRESS FOR THE MANUFACTURE OF FIBER BOARDS

Filed July 23, 1943 4 Sheets-Sheet 1

Fig. 1.



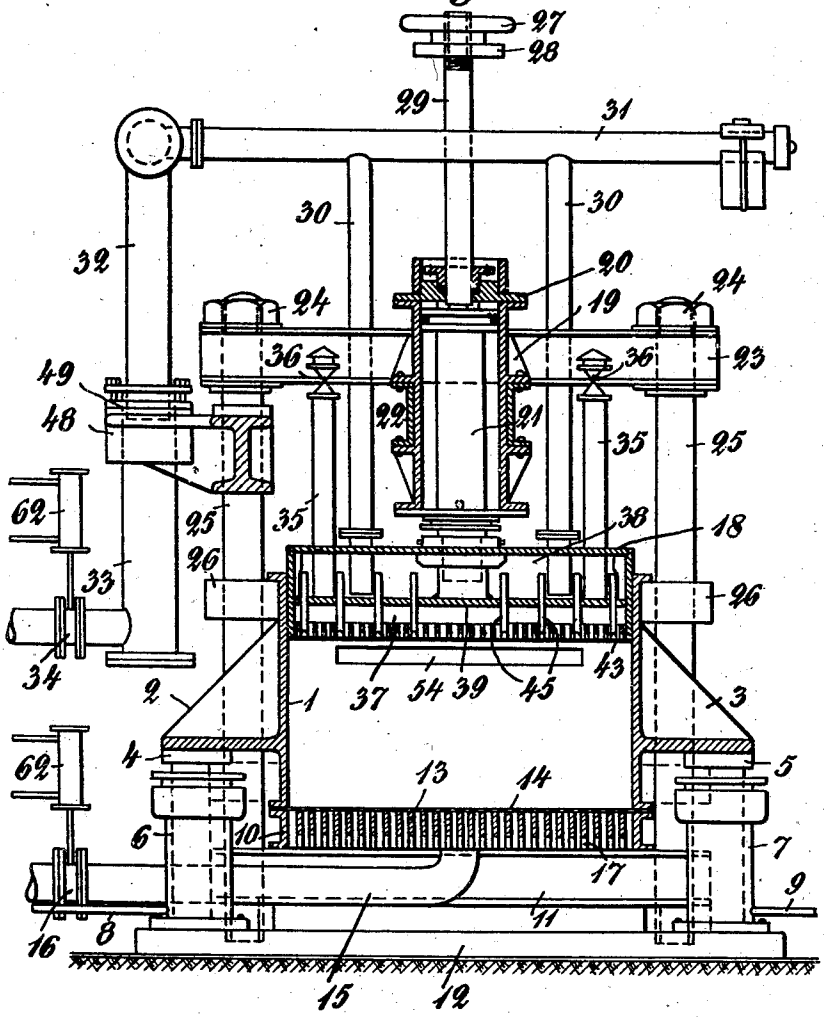
Inventor
T. O. Hillbom
By Glascock Downing & Seibold
Attys

Feb. 4, 1947. T. O. HILLBOM 2,415,244

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Filed July 23, 1943 4 Sheets-Sheet 2

Fig. 2.



Inventor
T. O. Hillbom
By Glascock Downing & Seebold
Atty's

Feb. 4, 1947. T. O. HILLBOM 2,415,244

PRESS FOR THE MANUFACTURE OF FIBER BOARDS

Filed July 23, 1943 4 Sheets-Sheet 3

Fig. 5.

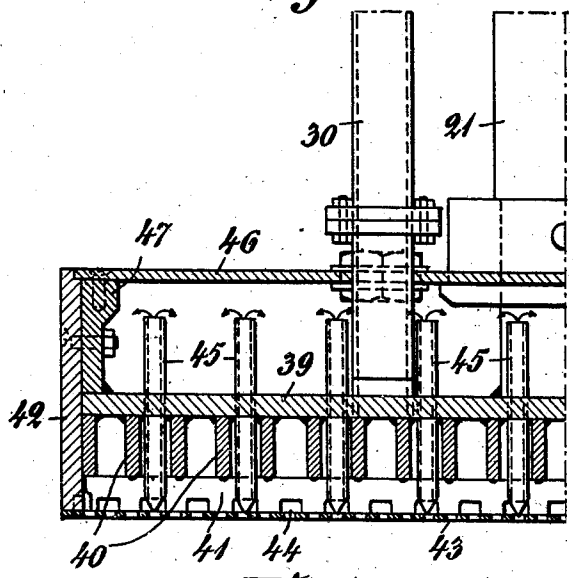
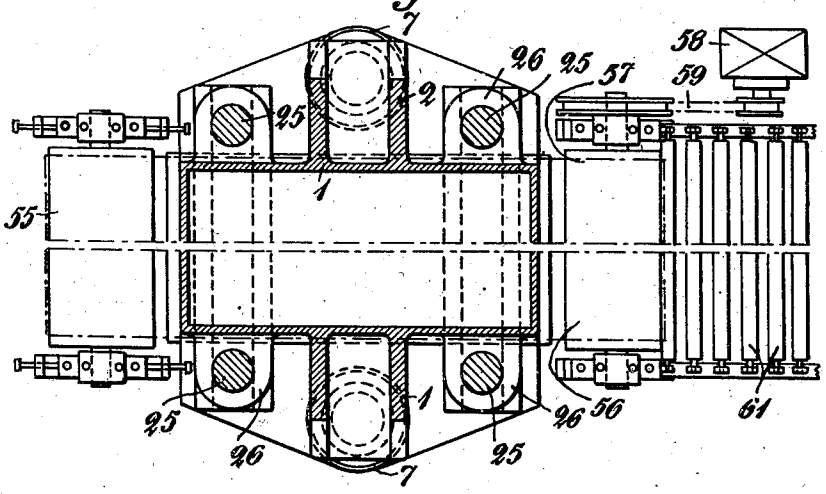


Fig. 3.



Inventor
T. O. Hillbom
By Glascock Downing & Seibold
Attys

Feb. 4, 1947. T. O. HILLBOM 2,415,244

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Filed July 23, 1943 4 Sheets-Sheet 4

Fig. 4.

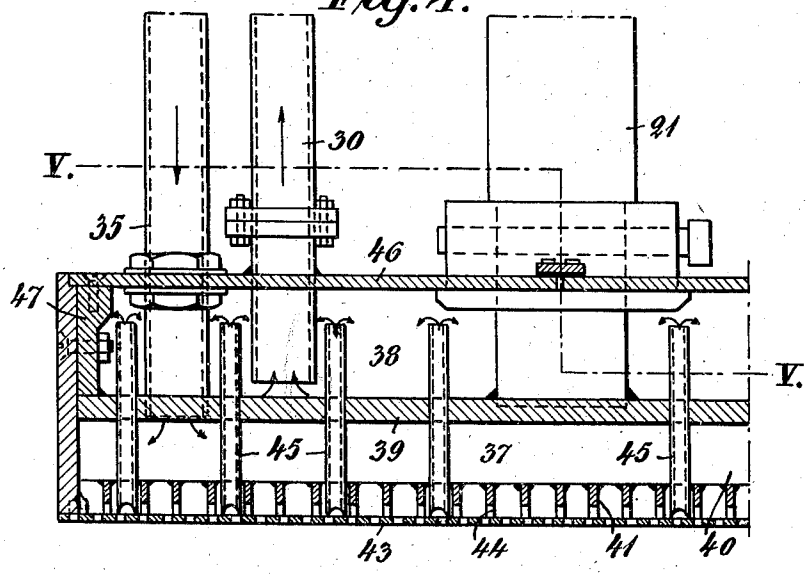
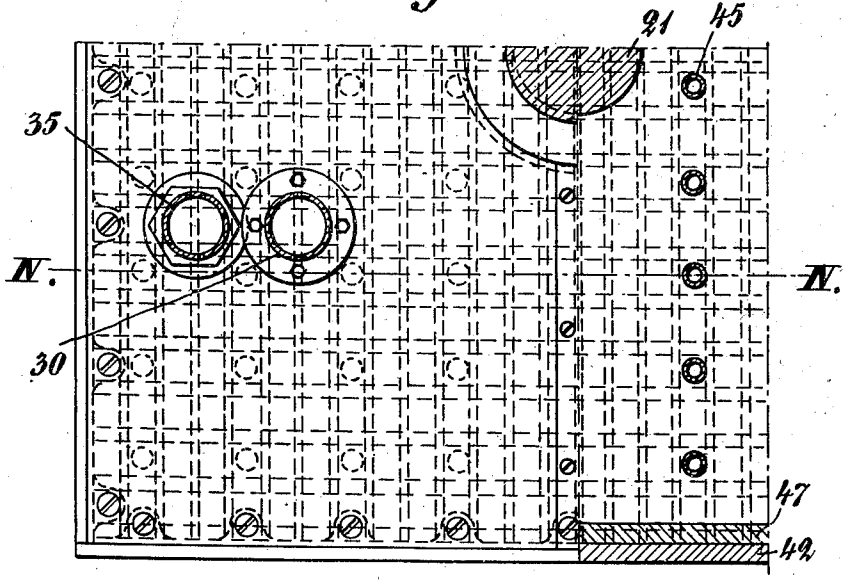


Fig. 6.



Inventor
T. O. Hillbom
By Glascock Downing & Seebold
Attys.

Patented Feb. 4, 1947

2,415,244

UNITED STATES PATENT OFFICE

2,415,244

PRESS FOR THE MANUFACTURE OF FIBERBOARDS

Tor Ove Hillbom, Karlshall, Lulea, Sweden

Application July 23, 1943, Serial No. 495,945
In Sweden July 8, 1942

2 Claims. (Cl. 92—61)

1

The present invention refers to such presses for the manufacture of boards, particularly fiber boards, briquets or other moulded bodies from a pulp suspended in liquid, which are provided with means in the form of a suction box or the like for the dehydration of the fiber board in the press proper. The object of the invention is to provide for effective dehydration of the fiber board, particularly in the manufacture of comparatively thick boards. It is known for this purpose to arrange a suction box not only in the bottom of the press-mould, but also in the press-plate proper. The constructions of press-plates with a suction box as hitherto known have the disadvantage, however, that the water which is sucked in cannot be removed completely from the press-plate by the suction of air, the consequence of this being that any residue of water remaining in the press-plate is emptied over the ready pressed fiber board when the press-plate is raised, whereby the ready pressed product may be damaged. The present invention aims at obviating this drawback, and principally consists in that the water is sucked out from the press-plate by means of a large number of suction pipes connected to a suction conduit and opening near at the perforated bottom plate of the suction box, said pipes being distributed over the surface of the bottom plate. Hereby the suction power will have an opportunity to act over the whole surface of the bottom plate, so that every residue of water is removed. Said suction pipes are preferably connected to a vacuum chamber arranged in the upper portion of the suction box and separated by a partition from a chamber adapted to receive the water pressed out from the fiber board, the latter chamber being arranged immediately inside the perforated bottom plate. This arrangement primarily aims at reducing the length of the vertical pipe portions in which the liquid may be retained by adhesion, and thus at preventing any liquid particles remaining in the pipes upon the ceasing of the sucking effect and at the raising of the press-plate from flowing down onto and damaging the ready pressed product. In addition, said arrangement provides for a constructive simplification of the connection of the pipes to the suction box, while good facilities are obtained for the cleaning of the interior of the suction box.

The invention will be described more closely with reference to the accompanying drawings, which illustrate a form of embodiment of a press constructed in accordance with the invention. Figure 1 is a vertical view of the press. Figure 2 is another vertical view partly sectioned on a

2

plane perpendicular to the projection plane in Figure 1. Figure 3 is a horizontal section on line III—III in Figure 1. Figure 4 shows a vertical section through the press-plate, and Figure 5 shows a vertical section in a plane perpendicular thereto through the one half of the press-plate. Figure 6 shows the one half of the press-plate viewed from above and partly sectioned on line IV—IV in Figure 4.

The press is provided with a moulding box 1 consisting of four walls, said box resting by means of brackets 2, 3 on the ends of plungers 4, 5, which are vertically movable in cylinders 6, 7 and arranged to be vertically adjusted by means of hydraulic power. The driving medium is supplied to the cylinders 6, 7 through pipes 8, 9. In its lowermost position the moulding box 1 rests on a bottom 10 formed as a suction box, said bottom being carried by girders 11 resting on a base 12. The suction box consists of a grid composed of vertical rods or laminae 13, said grid being covered by a sheet-metal plate 14. The interior of the suction box is connected through a pipe 15 to a suction conduit provided with a hydraulically controlled valve 16. The laminae are at their lower edges provided with recesses 17 permitting the escape of the water to the conduit 15.

Arranged within the moulding box 1 is a press-plate 18 fitting tightly therein, said plate being adjustable in a vertical direction by means of a hydraulic driving means consisting of a cylinder 19 and a piston 20 movable therein, said piston being rigidly connected to the press-plate by means of a piston rod 21. The cylinder 19 is carried by girders 22 which, in turn, are rigidly connected with girders 23 extending at right angles thereto, the girders 23 being secured by means of nuts 24 to the upper ends of four posts 25 rigidly arranged in the base 12. The posts 25 form at the same time guides for the moulding box 1, which is for this purpose provided with guide sleeves 26 displaceable along the posts. In the position shown in Figures 1 and 2, the press-plate 18 takes its uppermost position. The movement of the press-plate in a vertical direction is limited downwardly by a nut 28 on the end of a rod 29 rigidly connected with the piston 20, said nut 28 being adjustable by means of a hand-wheel 27. The nut is thus caused to bear on the upper end of the cylinder 19. The nut 28 may be adjusted with the aid of a scale, so that accurate stop positions are obtained corresponding to the desired thickness of the fiber board.

The press-plate 18 is, like the bottom 10, formed into a suction box to suck off water from the up-

per side of the fiber pulp. To this end, the press-plate is connected to a vertical pipe **33** by means of pipes **30**, **31**, **32**, said pipe **33** permitting of being brought into communication with a suction conduit by means of a hydraulically controlled valve **34**. The pipes **30**, **31**, **32** form a pipe system rigidly arranged on the press-plate, said pipe system partaking in the movement of the press-plate, and the pipe **32** being telescopically displaceable within the pipe **33** which, in turn, is rigidly arranged and carried by the posts **25** by means of a bracket **48**, Figure 2. The pipe **32** is connected tightly to the pipe **33** through a packing-box **49**. Furthermore, the lower space of the press-plate communicates with the external atmosphere through two pipes **35** rigidly arranged at the plate. Inserted into the upper end of these pipes are valves **36** to cut off the air supply.

The construction of the press-plate will be best seen from Figures 4–6, which illustrate the press-plate to a larger scale. The press-plate comprises two superimposed chambers **37**, **38**, which are separated from each other in an air-tight fashion by means of a horizontal partition **39**. Arranged on the lower side of this partition is a supporting grid consisting of two series of rods **40**, **41** extending at right angles to each other, the upper rods **40** being welded to the partition **39** and the lower rods being secured to the rods **40**. The lower side of the press-plate is constituted by a perforated bottom **43** secured in the lower edge of the vertical walls **42**, said bottom plate bearing on the inside against the edges of the rods **41**. To make it possible through the pipes **45** to suck out the water which is pressed or sucked in through the bottom plate **43**, the rods **41** are provided with edge recesses **44**. The removal of the pressed-in or sucked-in water is effected with the aid of a number of vertical pipes extending through the partition **39**, said pipes bearing with their lower bevelled ends on the perforated bottom plate **43** and opening with their upper ends into the upper portion of the upper chamber **38** which thus forms a water-seal.

On the upper side, the press-plate is closed by means of a cover **46** which is screwed fast to a frame **47** arranged on the inside of the walls **42**, said frame having the partition **39** welded thereto. The air supply pipes **35** secured in the cover **46** are fitted with their ends into apertures in the partition **39** and open into the lower chamber **37**. The suction pipes **30**, which are likewise inserted onto the cover **46**, open into the upper chamber **38** at some distance from the partition **39**. The piston rod **21** is secured with its lower end to the partition **39**.

The fiber suspension is supplied to the moulding box **1** from a doling-out container **50** through a hydraulically controlled valve **51** and two pipes **52**, **53** telescopically displaceable within one another, the pipe **53** being connected to a slit-like opening **54** in one wall of the moulding box.

To facilitate the removal of the ready pressed fiber board, the press is provided with a conveying means consisting of a belt **57** from wire cloth running about two rollers **55**, **56**, the upper side of said belt or wire being arranged to run between the perforated plate **14** in the suction box **10** and the lower edges of the vertical walls of the moulding box **1**. The conveying belt is arranged to be driven by a motor **58** by means of a belt gearing **59** coupled to the roller **56**. Arranged beside the roller **56** is a take-up table **60**, the upper side of which consists of a number of rollers **61**.

Whilst the press is in the position shown in Figures 1 and 2, a quantity of fiber suspension corresponding to the desired thickness of the fiber board is supplied from the doling-out container **50**. The valve **51** having been closed, the suction box **10** is brought under vacuum, the major portion of the water of the fiber suspension then escaping through the conduit **15**. After that, the press-plate **18** is driven downwardly, and the interior of the suction box is brought into communication with the suction conduit by the opening of the valve **34**. The water penetrating into the lower chamber **37** through the perforated bottom of the press-plate is then sucked up through the pipes **45** and emptied into the upper chamber **38**. When the level of the liquid reaches the mouth of the suction pipes **30**, the water is caused to escape through these pipes.

The pressing operation and the dehydration having been carried so far that only a small quantity of water enters the press-plate, the air stream flowing through the pipes **45** will entrain water particles from the upper side of the perforated bottom **43**, so that the lower chamber **37** will become entirely relieved of water at the termination of the pressing operation. This will prevent remaining residues of water from falling down on the upper side of the ready pressed fiber board when the press-plate is raised. At the same time a rapid and effective dehydration of the fiber board will be obtained thereby. On account of the double-sided dehydration, the water contents of the board will be about the same in layers on different levels of the board, which is of importance in preventing deformation of the board in the subsequent drying, particularly in the manufacture of highly porous boards, when the pressing pressure is small.

After the pressing of the fiber board has been finished and the last residues of water have been removed from the press-plate, the valve **34** is cut off, so that the sucking effect in the upper side of the fiber board ceases. After that the press-plate is first raised and then the moulding box, whereupon the lower suction box is disconnected from the suction conduit by means of the valve **16**. The fiber board is now conveyed with the aid of the wire **57** to the take-up table **60** in order then to be conveyed further to a drying plant in which the remaining quantity of water is removed by evaporation.

By the use of hydraulic control the cycle of operation of the press may be rendered entirely automatic, in that the valves may be controlled in accordance with a predetermined scheme by means of a suitable guiding means, the valves being then actuated hydraulically with the aid of hydraulic shifting members **62**, Figures 1 and 2. Similar shifting members are obviously provided for the control of the moving parts of the press.

I claim:

1. In a press for the manufacture of boards, especially fiber boards, briquets and other moulded bodies from pulp suspended in a liquid, the combination of a moulding box, an upper movable press plate arranged in the moulding box and provided with a perforated bottom, a suction box for the dehydration of the fiber board formed in the moulding box, a plurality of the narrow suction pipes opening closely to the perforated bottom of the press plate and uniformly distributed over the surface thereof, a horizontal partition in the suction box dividing the suction box into a lower water chamber adapted to

receive water entering through the perforated bottom of the press plate and into an upper vacuum chamber, said narrow suction pipes passing through the partition and opening into the vacuum chamber above the partition and thus collecting at the bottom of the vacuum chamber the water penetrating into the water chamber and sucked up through the suction pipes, a suction pipe system cooperating with said narrow suction pipes which system is rigidly arranged on the upper movable press plate and comprises conduits opening at a level below the upper ends of said narrow suction pipes.

2. In a press as claimed in claim 1 pipes connecting the water chamber with the external atmosphere and provided with valves adapted to cut off the air supply to the water chamber.

TOR OVE HILLBOM.

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