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ADVANCING MECHANISM

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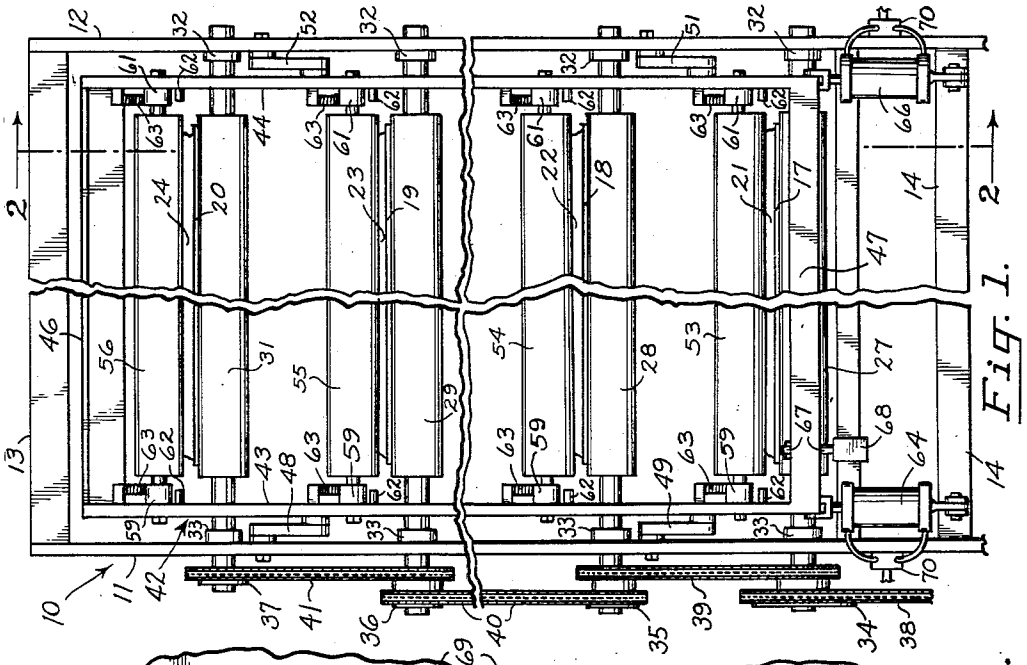


Fig. 1.

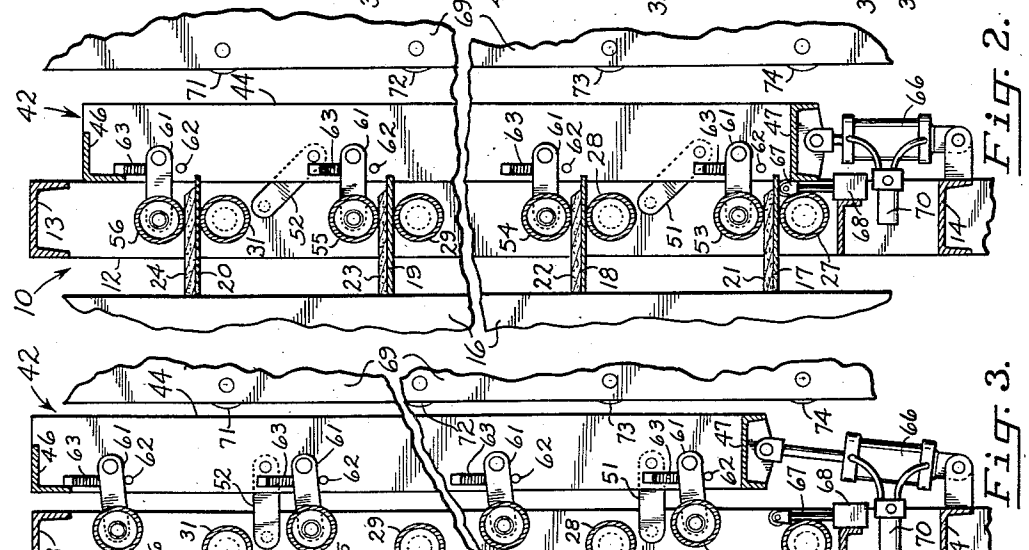


Fig. 2.

Fig. 3.

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ADVANCING MECHANISM

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This invention relates to a novel advancing mechanism, and more particularly, to an advancing mechanism for advancing sheet material out of a press.

In the manufacture of pressed products, such as hardboard sheets, the practice has been to distribute an even layer of the material making up the body of the sheet over a flat plate element, and to transport the plate element together with the material deposited thereon to a suitable press where the sheet is formed by the application of pressure, or heat and pressure.

In a plant operation where pressed products are continuously being manufactured, considerable difficulties have been experienced in vacating the press of the compressed product to accommodate the introduction of untreated material. When plate elements are used with material deposited thereon, the plates are usually relatively thin so that efforts to vacate the press by sliding the plate containing untreated material against the plate temporarily in the press, thereby shoving this last-mentioned plate from the press, have generally proved unsuccessful due to the tendency of the plates to override one another. Warping and buckling of the plates through the use of high temperatures accentuates the problem. Attempts have been made to fix attaching devices of various sorts to the plate elements employed, and to pull the plate elements from the press using these attaching devices. Arrangements such as these have had the obvious disadvantages of requiring specially constructed plates, and in most instances a rather intricate and combersome mechanism to accomplish the removal of the plate elements.

Generally, it is an object of this invention to provide a novel apparatus for advancing bodies of sheet material from a press which takes care of the hereinbefore outlined difficulties in a highly practical and satisfactory manner.

More specifically, it is an object of this invention to provide such an advancing apparatus which employs a pair of cooperating rolls adapted to engage opposite sides of a body of sheet material so as to positively grip the sheet body, rotation of the rolls serving to remove the sheet body from the press. Further, it is an object of this invention to provide such an advancing apparatus wherein the cooperating rolls are yieldingly held against the body of sheet material and wherein the rolls are moved towards one another when a body of sheet material is placed between the rolls in a manner that will readily accommodate variations in the thickness of the sheet body being handled.

Still another object of this invention is to provide for a multiple press which prepares a number of sheets simultaneously, an advancing mechanism having a pair of cooperating rolls for handling each of the sheets simultaneously, each of the co-operating pairs of rolls being adapted to conform to variations in sheet thickness.

These and other objects and advantages are attained by the present invention, various novel features of which will become more fully apparent as the following description is read in conjunction with the accompanying drawings, wherein:

Fig. 1 is an end view of an advancing mechanism embodying this invention;

Fig. 2 is a section view along the line 2—2 of Fig. 1, showing the mechanism in the position it occupies while advancing bodies of sheet material from a press; and

Fig. 3 is a section view similar to Fig. 2, but illustratting the mechanism in the position it occupies before sheet bodies are introduced into the mechanism.

An advancing mechanism embodying this invention comprises, in general, a support structure, indicated at 10, having vertical side members 11 and 12 and horizontal top and bottom members 13 and 14. Support structure 10 is suitably secured to the ground, or otherwise rigidly fixed in place, adjacent a press generally indicated at 16. Press 16 is of conventional construction, having clamping elements disposed at the top and bottom of the press adapted to be moved together so as to compress material lying therebetween. In the manufacture of hardboard, the press is operated by first loading the press with a stack of plate elements, known as "caul plates," each of the caul plates having deposited thereon a layer of wood fiber, and subsequently compressing the stack for a period of time and at an elevated temperature so as to form compressed sheets of hardboard. When the press is released, conventional mechanism associated with the press dislodges the caul plates within the press and moves the caul plates, together with the formed hardboard lying thereon, to a position wherein the ends of the hardboard sheets and caul plates project a limited distance beyond the forward side of the press. Thus in Fig. 2, which illustrates the condition of the parts after completion of the press cycle and before the removal of the hardboard and caul plates from the press, caul plates 17 through 20 together with hardboard sheets 21 through 24 are situated with their ends protruding a slight distance beyond forming press 16.

Extending between vertical side members 11 and 12, transversely of the path the caul plates follow in leaving forming press 16, are a series of horizontal rolls, or support roll members, 27, 28, 29 and 31. With reference to support roll member 28, each of the support roll members is rotatably supported at opposite ends in support structure 10 by suitable bearing assemblies such as bearing assemblies 32 and 33.

A drive means is provided for rotating these support roll members. Referring to Fig. 1, affixed to shaft extensions of the support roll members are double sprocket members 34, 35, 36 and single sprocket member 37. A series of chains 38, 39, 40, and 41 extend between and engage the various sprockets so that the support roll members rotate in a clockwise direction as viewed in Figs. 2 and 3, thereby tending to urge sheet bodies placed thereon to the right outwardly of press 16. Chain 38 is driven by a conventional electric motor (not shown).

Pivotally connected to support structure 10 is a frame structure 42, comprised of vertical members 43 and 44 and horizontal top and bottom members 46 and 47. Frame structure 42 is pivotally connected by means of four pivot links 48, 49, 51 and 52, each pivot link pivoting at one of its ends on support structure 10 and at the other of its ends on frame structure 42. Pivot links 48, 49, 51, 52 accommodate movement of the frame structure in a direction generally intersecting the paths of the bodies of sheet material advanced from press 16.

Radially spaced from and parallel to each of the support roll members is a complementary clamping roll member 53 through 56, respectively. Each of the clamping roll members is rotatably mounted at opposite ends in bearing assemblies disposed within the interior of the roll member. These bearing assemblies are supported on

one end of a pair of pivoted support levers 59 and 61. Support levers 59, 61 are pivotally connected at their outer ends to frame structure 42 and constitute mounting members or means in the apparatus. As can be seen in connection with support lever 61, each support lever is spring biased by a compression spring 63 to a lowered position determined by a pin 62 abutting the underside of the lever. Compression spring 63 has one of its ends seated on the upper side of the support lever, and the other of its ends seated on a suitable projection secured to frame section 42. While levers 59, 61 and spring 63 are shown positioned inside frame 42, they may as an alternative be secured to the outer side of frame 42.

Frame structure 42, and the support levers pivotally connected thereto, are so arranged that when the support structure is moved downwardly from the raised position it occupies in Fig. 3 to the lowered position it occupies in Fig. 2, each clamping roll member is moved adjacent its complementary support roll member. When bodies of sheet material, as for example the bodies comprised of the caul plates and sheets of hardboard shown in Fig. 2, are overlying the support roll members, movement of the frame structure downwardly is accompanied by pivotal movement of the clamping rolls upwardly relative to the frame structure so as to accommodate the bodies of sheet material lying on the support rolls. The pivotal movement of the clamping rolls is resisted by the compression spring, such as compression spring 63, so that regardless of the thickness of the body of sheet material handled by the rolls, the body of sheet material is firmly clamped between the rolls.

Mechanism is provided for pivoting the frame structure downwardly with respect to support structure 10. Pivotally connected at one of their ends to bottom member 14, on opposite sides of the advancing mechanism, are a pair of double acting fluid cylinders 64, 66, respectively. These fluid cylinders are pivotally connected at their other ends to bottom member 47 of the frame structure. Expansion of the fluid cylinders by suitable means, as air pressure, causes the frame structure to be pivoted upwardly to the position it occupies in Fig. 3, and contraction of the cylinders pulls the frame structure downwardly to the position it occupies in Fig. 2.

Passage of air to different sides of the fluid cylinders is controlled by mechanism actuated by a body of sheet material passing adjacent support roll member 27. As can best be seen in Figs. 2 and 3, to the outer side of roll member 27 is a finger member 67 slidably mounted for reciprocation in an electrical switch control indicated generally at 68. Suitable biasing means urges finger member 67 upwardly to the position it occupies in Fig. 3. When a body of sheet material passes over finger member 67, the finger member is depressed, thereby actuating switch control 67 which governs a valve 70 so as to direct air under pressure into the upper portions of the fluid cylinders and permit air to escape from the lower portions of the fluid cylinders. Depression of the finger member also closes the circuit to the motor driving drive chain 38. In this manner, rolls 27, 28, 29, 31 are caused to rotate, and at the same time the frame structure is pivoted downwardly with respect to support structure 10. This condition is maintained until the body of sheet material, represented by caul plate 17 and the hardboard sheet 21, passes over and beyond finger member 67. When this occurs, the finger member is urged upwardly by the biasing means associated therewith to the position the parts occupy in Fig. 3, movement of the finger member into this position opening the supply circuit to the motor driving drive chain 38, and directing air under pressure to the lower portions of the fluid cylinders and permitting the escape of air from the upper portions of the fluid cylinders. Frame structure 42 is then pivoted upwardly by the fluid cylinders where it is in condition to receive the next load of sheet material.

As illustrated in the drawings, the bodies of sheet material advanced by the advancing mechanism are passed forwardly into a suitable rack device, indicated generally at 69. Rack device 69 includes a number of rolls, such as rolls 71 through 74, these rolls supporting the underside of the sheet bodies passed upon the rack device.

From the foregoing it should be obvious that there has been disclosed a novel mechanism which is of comparatively simple construction, but which greatly facilitates the unloading of press mechanisms of the type described. The bodies of sheet material contained by the press are vacated from the press by means of cooperating roll members which grip opposite sides of the sheet bodies. By driving one of these rolls, preferably the lower one since this roll contributes the greatest amount of traction, the sheet bodies are moved outwardly from the press. The advancing mechanism is adapted to handle sheet bodies having various thicknesses, since clamping of the sheet bodies between the roll members is done after the sheet bodies have come to a position over the support roll members, the clamping roll members moving downwardly over the sheet bodies by pivoting frame structure 42. The biasing means provided with each of the clamping rolls, such as compression spring 63, performs the double function of permitting the clamping rolls to give in conformity with the size of the bodies of sheet material being handled, and yieldingly holding each sheet body against its complementing support member, thereby to insure positive traction.

It should be noted that by pivoting all of the clamping roll members on frame structure 42, the mechanism described may be used to remove all of the sheet bodies from a multiple press simultaneously, thereby greatly expediting the unloading of the press. The spacing between each set of support and clamping roll members is determined independently of the other roll members in the mechanism.

While I have described but one embodiment of this invention, it is desired not to be limited thereto, and it is intended to cover all the modifications of the invention which would be apparent to one skilled in the art and that come within the scope of the appended claims.

I claim:

1. In the manufacture of sheet material by compressing matter in a press, apparatus for advancing a body of sheet material along a path from the press comprising a first roll member extending transversely of said path adapted to engage one side of said body, means rotatably supporting the ends of said first roll member, a second roll member radially spaced from said first roll member adapted to engage the other side of said body, a frame movable in a direction generally intersecting said path, mounting means carried by said frame rotatably supporting the ends of said second roll member, means actuated when said body passes adjacent said first roll member whereby said frame is moved relative to said path so that said first and second roll members engage opposite sides of said body as it advances in said path, biasing means operatively interposed between said frame and mounting means for yieldingly holding said second roll member against said body when said second roll member engages said body, and drive means for rotating one of said roll members.

2. In the manufacture of sheets of material by compressing matter in a multiple press, apparatus for advancing bodies of sheet material along paths from the press comprising a plurality of support roll members extending transversely of said paths, each support roll member being adapted to engage one side of one of said bodies, means rotatably supporting the ends of said support roll members, a complementary clamping roll member radially spaced from each of said support roll members, said clamping roll members being adapted to engage the other side of said bodies, a frame movable in a direction generally intersecting said paths, mounting means carried by said frame for each of said clamping roll members ro-

tatably supporting their ends, means actuated when at least one of said bodies pass adjacent a support roll member whereby said frame is moved relative to said paths so that complementing support and clamping roll members engage opposite sides of said bodies as they advance in said paths, biasing means operatively interposed between said frame and each of said mounting means for yieldingly holding said clamping rolls against said bodies when said clamping rolls engage said bodies, and drive means for rotating said support roll members.

3. In the manufacture of sheet material by compressing matter in a press, apparatus for advancing a body of sheet material along a path from the press comprising a support; a support roll member extending transversely of said path and rotatably mounted at its ends in said support; a frame pivoted to said support for movement in a direction generally intersecting said path; a clamping roll member radially spaced from said support roll member; a pair of mounting members, one at each end of said clamping roll member, rotatably supporting each end of said clamping roll member and pivotally connected to said frame; biasing means operatively interposed between each of said mounting members and said frame resisting pivotal movement of said mounting members, power means actuated by the sheet body passing adjacent said support roll member operable to pivot said frame thereby to move said clamping roll member toward said support roll member so that said support and clamping roll members engage opposite sides of a sheet body as it advances in said path, and drive means for rotating one of said roll members.

4. The apparatus of claim 3 wherein said power means is operable to pivot said frame so as to move said clamping

roll member away from said support roll member after the sheet body moves past said support roll member.

5. In the manufacture of sheets of material by compressing matter in a multiple press, apparatus for advancing bodies of sheet material along paths from the press comprising a support, a plurality of support roll members extending transversely of said paths rotatably mounted at their ends in said support, each support roll member being adapted to engage one side of one of said bodies, a frame pivoted to said support for movement in a direction generally intersecting said paths, a complementary clamping roll member radially spaced from each of said support roll members, said clamping roll members being adapted to engage the other side of said bodies, mounting members at each end of each of said clamping roll members rotatably supporting the clamping roll members, each mounting member being pivotally connected to said frame, biasing means operatively interposed between each of said mounting members and said frame resisting pivotal movement of said mounting members, power means actuated by at least one of said sheet bodies passing adjacent a support roll member operable to pivot said frame thereby to move said clamping roll members toward said support roll members so that said support and clamping roll members engage opposite sides of sheet bodes as they advance in said paths, and drive means for rotating one set of roll members.

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