This invention relates to new and useful improvements in apparatus for making composition board or sheets of the kind adapted for use in the construction of buildings and for various other purposes.

An object of the invention is to provide such an apparatus, comprising a pair of perforated cylinders having close proximity and partially submerged in a fibrous pulp stock and between which the pulp stock, adhering to the peripheries, is adapted to be fed and then compressed into a sheet, wherein the cylinder 14 is provided for applying and controlling the pressure applied to the sheet formed by the two perforated cylinders, which in part determines the amount of water removed from the sheet and the density and the bevel.

The particular object of the invention is to provide an improved apparatus for making composition boards or sheets having means provided for controlling and applying pressure to the board or sheet being formed upon the peripheries of the cylinders.

Other and further objects of the invention and the advantages of the same will be pointed out hereinafter and illustrated in the accompanying drawings in which like reference numerals indicate like portions of the claimed invention. It will be obvious to those skilled in the art upon reading the present disclosure.

For the purpose of this application, it has been elected to set forth one particular structure, but it is to be understood that it is here presented for illustrative purposes only and is not to be accorded any interpretation such as might have the effect of limiting what is claimed for the invention short of its true and comprehensive scope in the art.

In the accompanying drawings there has been disclosed and illustrated in the several views an apparatus for making composition boards or sheets wherein there is shown:

- A side elevation view, partly in section and partly broken away, showing one pressure applying and controlling means.
- A top plane view of the apparatus shown in Figure 2.
- Figure 4 is a schematic diagram showing the hydraulic system used in connection with the pressure applying means.
- In the selective embodiment of the invention shown in the drawings, the purpose of this disclosure, there is illustrated a machine or apparatus for making composition boards or sheets comprising a pair of perforated cylinders 14 and 18 geared together for simultaneous rotation by suitable gears (not shown). These cylinders 14 and 18 are mounted respectively over vats 22 and 24, to which fibrous pulp stock is delivered through a passage 26 as shown in Figure 1. The said passage 26 communicates with a head box 29 having a pulp feeding means (not shown) from which pulp material is delivered to the head box 29.

In operation a quantity of stock and water is delivered to the head box 29 and in such quantities preferably as to cause the stock or a portion thereof to be returned through an overflow (not shown), thus retaining a constant head in the head box 29 and, therefore, tending to maintain a constant static pressure on the pulp against the perforated cylinders in the vats 22 and 24. In the head box 29 is provided section 30 which leads to passage 26 and the pulp from this passage is fed into the vats 22 and 24. In order to prevent leakage at the ends of the cylinders, there is provided seals 21, which are adapted to engage the annular frame or end rings 12 and 16 respectively of rolls 14 and 18. The pulp from the vats 22 and 24 is formed into a suitable board or sheet of the desired thickness, particularly in the manner shown in Patent No. 1,672,429. In Figure 2 is shown the preferred method of applying and controlling the pressure upon the board or sheet being formed by the cylinders 14 and 18. To the machine frame 32 is secured upright member 36. Suitably connected to the shaft 10 of the cylinder 14 is member 35, which is pivotally connected to the machine frame 32 at 38. The member 35 is removably secured to the shaft by suitable member 36 and has extension 34 which is provided with an aperture through which rod 42 passes. Mounted on member 34 is spring retaining means 40. The arms 55 are pivotally mounted at 44 and the arms 55 extending from the pivot point to member 60 which pivotally supports cylinder 41 and encircling the member 42 is spring member 46 having a top spring retaining member 48 mounted upon the member 50. This extension of member 50 is suitably connected to piston 49. The cylinder 51 is provided with heads 52 and 53, which are secured in place by bolts 66. Extending to opening in the cylinder 51 is fluid conduit 54 and member 56 is operatively connected to cross member 58 from which extends arms 54. These arms are connected to support member 60, which supports the cylinder 51 in the proper position. In dotted lines in Figure 2 is shown the extent of maximum travel of rod member 42.

A suitable hydraulic material such as oil is maintained in reservoir 70, in which is positioned suitable strainers 71 for removing any foreign matter that may be contained in the oil and preventing it from being passed through the hydraulic system. Mounted upon the reservoir 70 are two hydraulic motor units 71 and operatively connected to the motor units are pumps to pressure conduits to hand-controlled pressure relief valves 73, 74, 76 and 77. The relief valves are provided with dial gauges 75 so that the pressure can be regulated and controlled on either or both ends of the cylinder through the shaft 10. The oil passes from the relief valve at the selected pressure through suitable conduits to check valves 78 and 80. The check valve 78 eliminates the possibility of a globe-type valve and prevent back flow of the oil when it is necessary or desirable to use the alternate or spare pumping unit. The check valve is important as it permits automatically working of either pump and motor or relief valve without the necessity of closing off a globe valve, which in turn would have to be opened later. In this connection it might be mentioned that the use of shut-off valves would do great harm in the event the valves were closed at the time the pump was started as there would be no protection for the pump and/or motor. The hydraulic fluid, after passing through the check valve, is conducted through control valves 82, which are provided with directional control of the oil flow into the cylinders 51 and these flow control valves 82 are provided with a push or pull motion. These valves are spring-set for oil flow to the thrust end of the cylinders 51 and will automatically reset themselves to the thrust position if intentional or accidental movement to the neutral or reverse position occurs. When the valves 82 are held in reverse position to lift the top cylinder, the oil or hydraulic fluid is then fed back through the check valves 84, which valves are equipped with soft plugs and drilled orifices for limiting the return flow of the hydraulic fluid.

The purpose of this is to prevent a sudden back flow of oil when operating with the control valves open to thrust. The valve, however, will permit the slow passage of oil back through it when the direction control valve is open to pull direction while lifting the top forming cylinder 10. In operation the fluid from tank 70 passes through strainer 69 under influence of one of the pumps 72 and then through conduit 86 to control relief valves 73 and 74, connected to relief valves 73 and 74 and return conduit 88. The hydraulic fluid then flows through conduits 90 and 92 to flow-control valves 82, from the flow-control
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valves 82 through conduits 94 and 96, through check valves 84, conduits 64, to cylinders 51.

Should the hydraulic fluid being supplied from pump 72 through conduit 86 cease or the pressure fall below a predetermined limit for any reason, the fluid will then automatically be furnished by the other pump 72 through conduits 98. This may be accomplished by pressure operated controls (not shown) placed in a T on line 86 and 98 and suitably connected to the motive power for the pump being brought into operation upon failure of the pressure from the other pump. It is to be understood any of the known pressure-control switching means may be utilized. It is also to be understood that manually operated switch means may be utilized to bring the idle pump into operation upon the falling of fluid pressure in the line furnishing hydraulic fluid to the cylinders 51.

I claim:

1. An apparatus for making fiberboard from water suspension of fibers including a frame, shafts mounted in the frame and carrying perforated surface cylinders which are arranged in close proximity and having one cylinder in a plane higher than the plane of the other cylinder, members attached to the frame and extending upwardly to a plane above the shafts, a substantially U-shaped yoke carried by the members, a hydraulic cylinder means pivotally carried by the yokes and operatively connected to the shafts of the cylinder in a plane higher than the plane of the other cylinder, arms pivotally mounted on the frame and operatively connected to the shafts, a piston mounted in the hydraulic cylinder, a rod operatively connected to each piston, said rod passing through an opening in the arms and the spring means mounted on said rods.

2. A device of the class described, including a receptacle comprising two vats, a pulp feeding passage between the vats for delivering pulp thereto, a frame, a perforated cylinder mounted in said frame and over each vat and having their peripheries partially submerged in the pulp stock, and arranged with one of the cylinders in a plane higher than the plane of the other cylinder, said cylinders offset one from the other in a horizontal plane and the cylinders in close proximity and adapted to feed the fibrous material therebetween, and hydraulically operated cylinders operatively connected to the perforated cylinder in the higher plane for controlling the pressure applied to said perforated cylinder said means for connecting the hydraulic operated cylinder to the perforated cylinder including a rod, a spring mounted around the rod and an arm against which the spring presses and through which the rod passes.

3. A device of the class described, including shafts supporting perforated cylinders arranged in close proximity and having one cylinder in a plane higher than the plane of the other cylinder and the cylinders offset from each other, said cylinder adapted to feed fibrous material therebetween, and means attached to the perforated cylinder in the higher plane and extending therefrom, spring means operatively connected to the extension of the means attached to the perforated cylinder-shaft, and fluid operating means for applying pressure on the spring and the extension of the means attached to the perforated cylinder for controlling the pressure applied to fibrous pulp stock.

4. An apparatus for making fiber composition board from a water suspension of fibers, including a frame, shafts carried by the said frame, perforated surfaced cylinders carried by each of said shafts, the said cylinder surfaces arranged in close proximity with one cylinder in a plane higher than the other cylinder and said cylinders offset from each other in a horizontal plane, means mounted on the frame and extending upwardly therefrom to a plane above the shafts, hydraulic means pivotally carried by said means mounted on the frame, arm means pivotally connected to the frame and operatively connected to the piston, said rod connecting through an opening in the arm pivotally connected to the arm and spring means mounted around said shaft.

5. An apparatus for making fiber composition board including a frame, shafts mounted in the frame and carrying perforated surfaced cylinders which are arranged in close proximity and having one cylinder in the plane higher than the plane of the other cylinder, means mounted on the frame and extending upwardly therefrom to a plane above the shafts and pivotally supporting a hydraulic cylinder, a hydraulic cylinder, means pivotally connected to the frame and operatively connected to the shafts, a piston mounted in the hydraulic cylinder, a rod operatively connected to the piston, said rod passing through an opening in the arm extending from the pivotally mounted means on the frame, a spring means mounted around said rod, and arms pivotally connected to the frame and to the hydraulic cylinder.

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