

April 9, 1963

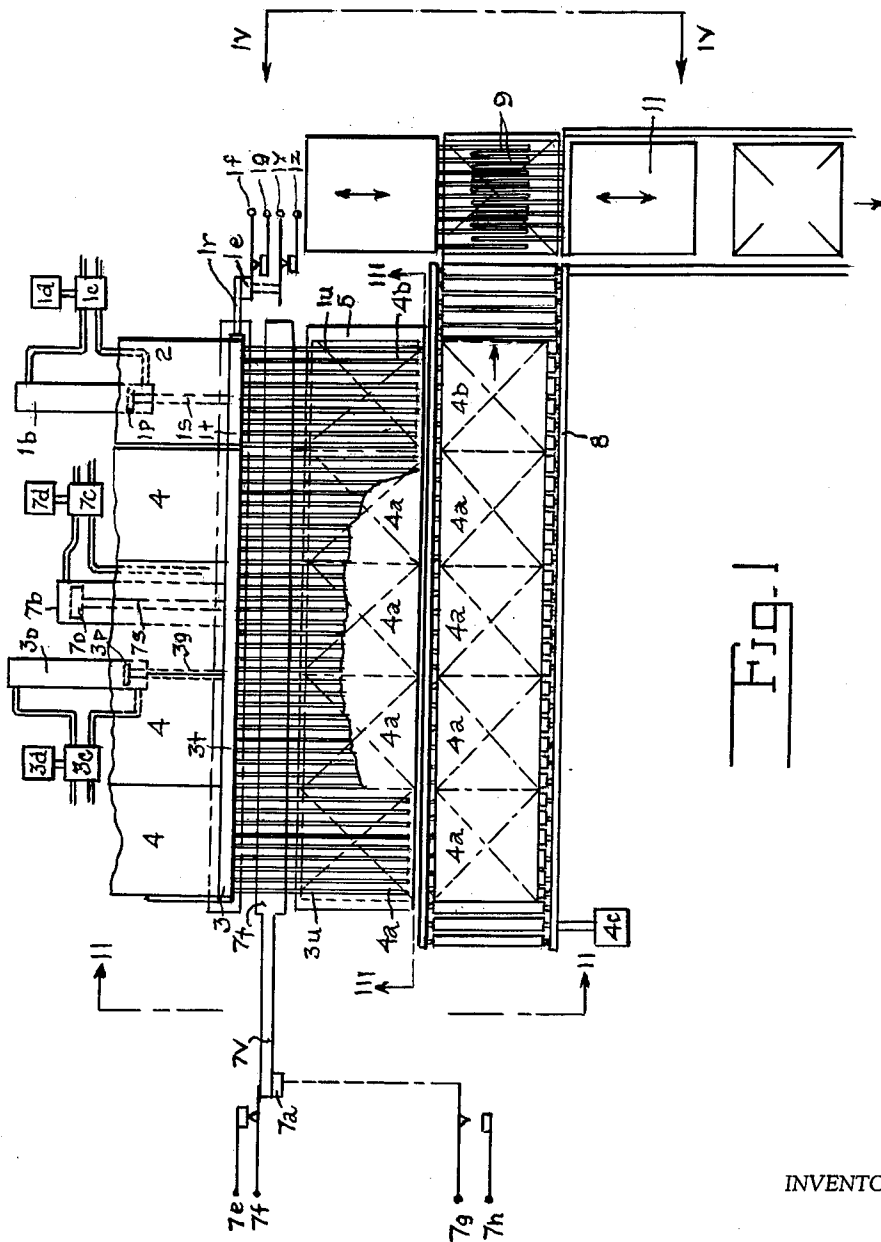
B. G. E. JOHANSSON

3,084,812

MEANS FOR STACKING OF SHEETS

Filed Oct. 27, 1959

4 Sheets-Sheet 1



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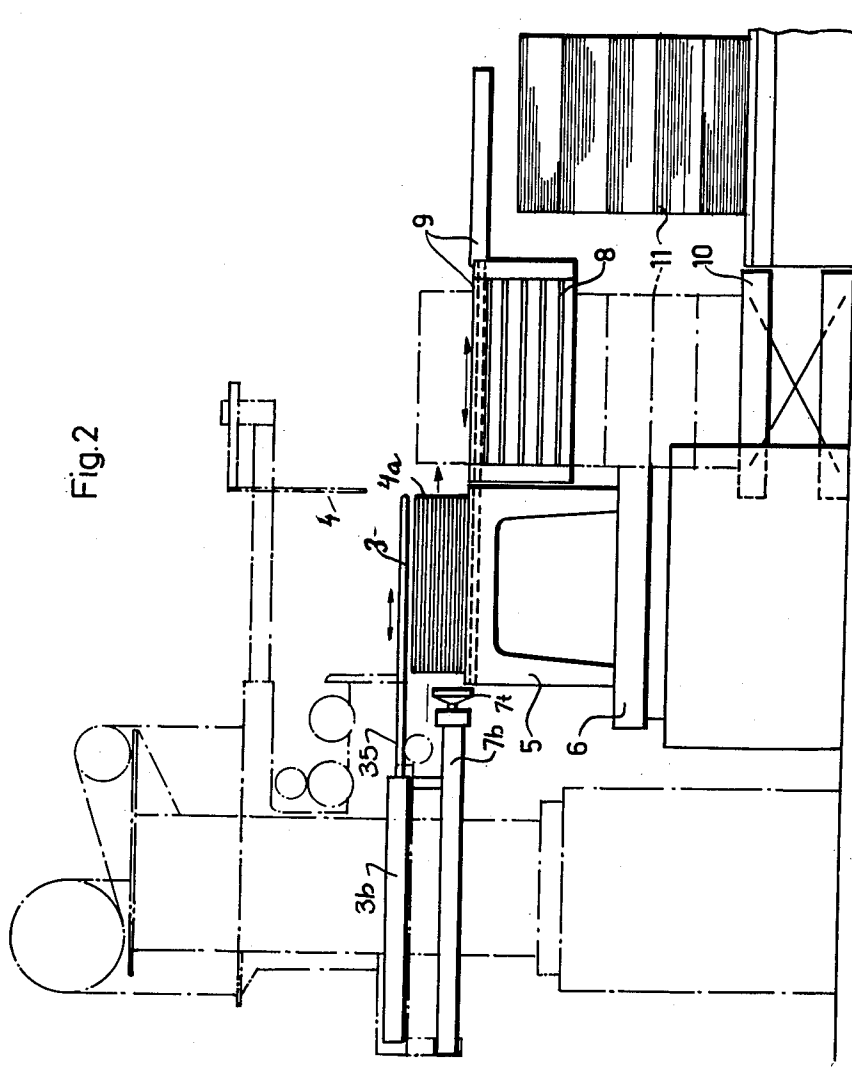
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MEANS FOR STACKING OF SHEETS

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4 Sheets-Sheet 2



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MEANS FOR STACKING OF SHEETS

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4 Sheets-Sheet 3

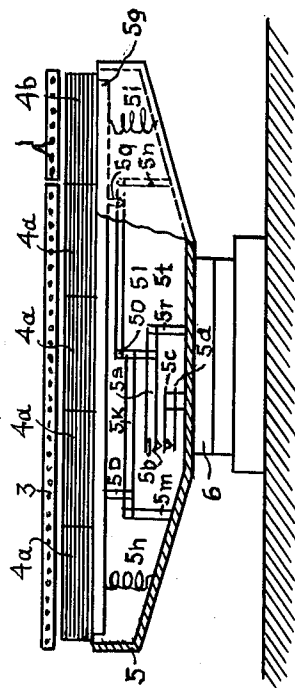


Fig. 3

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4 Sheets-Sheet 4

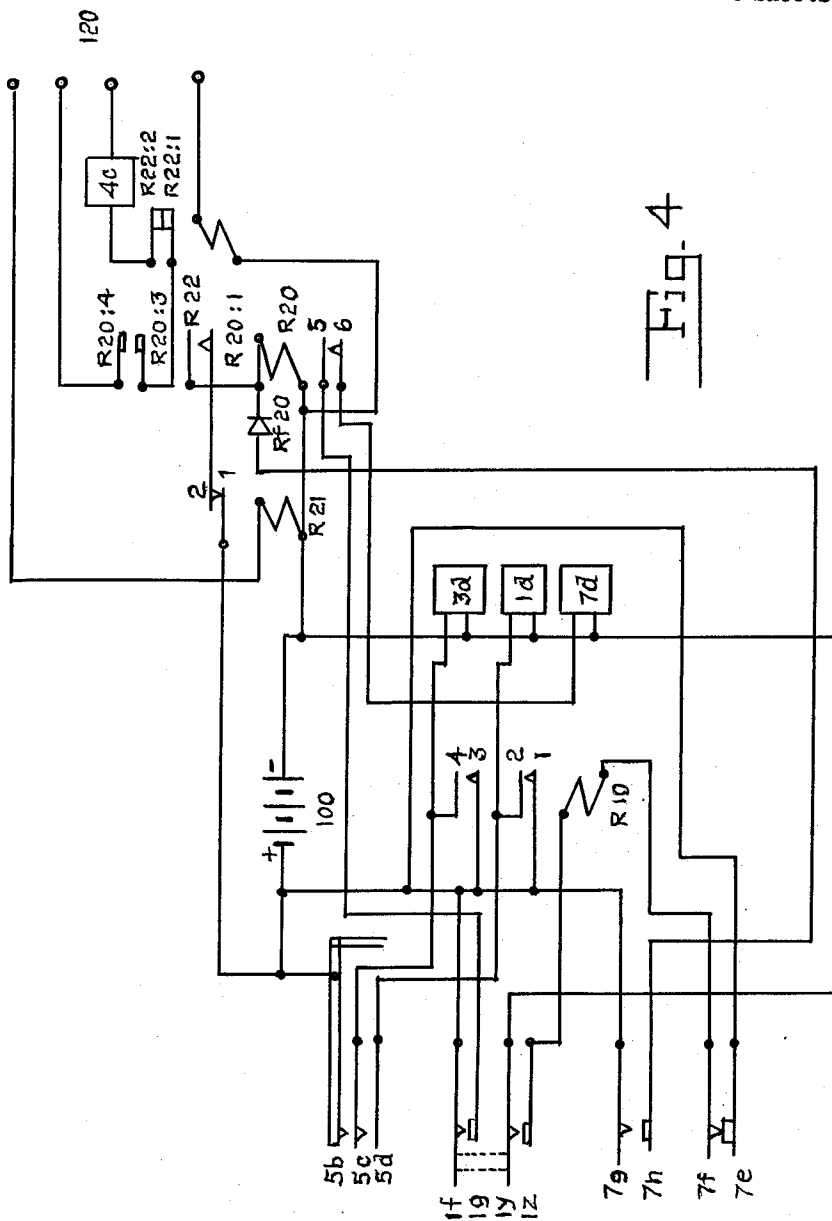


Fig. 4

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1

3,084,812

MEANS FOR STACKING OF SHEETS

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1 Claim. (Cl. 214-2)

In drying machines for cellulose pulp, as is well known, slitters are used to subdivide the pulp web longitudinally into a number of webs, usually four or five. These webs are then cut perpendicularly to the longitudinal direction by means of knife carrying rollers so that sheets of a certain shape and size are formed. The sheets are usually collected in sheet boxes or stacked on a conveyor. When the sheets are stacked on a conveyor, the height of the pile or the number of sheets will usually determine when the pile of sheets is finished. The continuously fed sheets are then laid down on a so-called gate or some other supporting member which extends over the finished piles of sheets.

The present invention relates to an improved method and simplified means for rendering it possible to stack the sheets which are continuously supplied from a machine in a plurality of partial webs and are stacked in a plurality of primary piles to be collected in a combined pile, the weight of which is adjusted by sheets being supplied from one of the partial webs to one of the primary piles.

The invention has for its main object to enable the series of primary piles to obtain an accurately predetermined weight, and to effect the pile formation and the carrying away of the piles without the continuous feed of the sheets being interrupted.

A further object of the invention is to render it possible to mix sheets from the several partial webs in the combined pile so as to equalize any differences in humidity of the partial webs. A still further object of the invention is to permit changes of the size of the sheets without having to make any complicated changes of the piling or weighing machine.

According to the invention, these advantages are attained by the primary piles of sheets first being weighed jointly and then, having attained the total predetermined weight, brought together into the combined pile. According to one embodiment of the invention a portion of said supporting member or gate is introduced across some of the primary piles of sheets stacked on a weighing machine, when their total weight is slightly below the predetermined total weight by a predetermined value, this portion of the supporting member or gate then receiving the sheets continuously supplied on top of the sheets thus covered, while the remaining, uncovered primary pile or piles of sheets still receive sheets from their partial webs until said predetermined total weight is attained. Then a second portion of the supporting member or gate is introduced across the remaining primary piles of sheets also, after which all primary piles are removed from the weighing machine and collected in the combined pile. Thus, by the sheets at the final stage of the stacking only being delivered to one primary pile of sheets, or to a number of primary piles which is small in relation to the total number of primary piles, the desired weight may be maintained considerably more accurately than if all primary piles are being supplied with sheets at the final stage also.

The invention also relates to a machine for carrying this method into effect. The device comprises means for feeding sheets to a plurality of primary piles arranged side by side from a number of partial webs of a common

2

web, said number corresponding to the number of primary piles. The machine is chiefly characterized in that it includes a receiving table, common to all primary piles of sheets and disposed on a weighing machine, for simultaneously weighing all of these primary piles of sheets. According to one embodiment a support or gate member which is movable to and away from an operating position above the primary piles of sheets and which is divided into at least two movable portions, one of which being larger than the other and adopted to receive, in its said operating position, the sheets intended for all but one, or a small minority, of the primary piles, while the other, smaller portion is movable independently of the first portion to an operating position, for receiving the sheets intended for this or these remaining primary piles. A conveyor is arranged to remove at the same time from the receiving table all such simultaneously weighed primary piles of sheets for collecting them to the combined pile.

In the annexed drawings there is shown an embodiment of a machine in accordance with the invention.

FIG. 1 shows a plan view of the machine,

FIG. 2 is a side elevation on line II—II in FIG. 1,

FIG. 3 is a front elevational view on line III—III in FIG. 1 with parts broken away and in section and showing the receiving table and weighing mechanism, and

FIG. 4 is a schematic wiring diagram of the electrical control circuit for the apparatus of this invention.

The sheets 4, being cut longitudinally and transversely in known manner are fed continuously in a plurality of adjacent webs 4, 2, and drop onto piles 4a, located side by side on a common receiving table 5g, which forms part of a weighing machine. The weighing machine comprises a casing 5, containing two helical springs 5h and 5i which support the table 5g.

Two levers 5k and 5l have one end pivoted to a bracket 5m and 5n respectively, projecting upwards from the bottom of the casing 5 and rigidly secured thereto. The other ends of levers 5k and 5l are connected to a vertical rod 5o. At intermediate points between the ends of each lever 5k and 5l connections are made to brackets 5p and 5q which project downwards from the table 5g and are rigidly secured thereto.

A further bracket 5r is secured to the bottom of the casing 5 and projects upwards therefrom. To the top end of this bracket a horizontal lever 5s is pivotally mounted. At an intermediate point between the ends of said lever a connection is made by means of a vertical rod 5t to the lower end of the rod 5o. The free end of the lever 5s is provided with a contact member 5b adapted to cooperate with a contact spring 5c which, in turn, is adapted to cooperate with another contact spring 5d, said springs being fastened to but electrically isolated from the bottom of the casing 5.

The table 5g is pressed in downward direction by the weight of the piles of sheets resting thereon and when said weight has reached a value slightly below the predetermined value the contact 5b will engage the spring 5c. As will be apparent from FIG. 4, a current path from the positive pole of the battery 100 is closed through a solenoid 3d and back to the negative pole of the battery 100.

The solenoid 3d is adapted to actuate a valve 3c controlling the pressure fluid supply to a hydraulic cylinder 3b in which a piston 3p is inserted.

The piston rod 3s carries a gate 3, comprising an elongated bar 3t and a great number of shorter bars 3u, projecting from one side of the elongated bar 3t. When the piston 3p is pushed forward the gate 3 is introduced across the piles of sheets, covering all piles 4a except one, 4b. The gate member 3 now collects the sheets, which are still being continuously supplied from the webs 4, so that these sheets are prevented from reaching the piles 4a

of sheets under the gate member 3. Only on the last, still uncovered pile 4b, the sheets from the web 2 continue to collect until the desired total weight of all piles has been attained.

By the sheets being stacked one by one on the last pile 4b it is possible to gain accurately the correct total weight of the whole series of piles. When this predetermined weight is reached the table 5g has descended to a level, where the contact of the spring 5c engages the contact spring 5d. Thereby a current path is closed from the positive pole of battery 100 (FIG. 7) through the closed contacts 5b, 5c, 5d, and an actuating solenoid 1d, to the minus pole of battery 100. The solenoid 1d actuates a valve 1c, which controls the supply of pressure fluid to a hydraulic cylinder 1b, having a piston 1p, attached to a piston rod 1s.

Therefore, when the actuating solenoid 1d is connected to the current supply source 100 as described, the piston 1p will move forwardly. At its free end the piston rod 1s carries a gate 1, comprising a bar 1r, from one side of which a number of bars 1u project.

The gate member 1 now extends so as to cover the pile 4b of sheets, so that no sheets may arrive upon any of the piles 4a, 4b. (This position is shown in the drawing.)

A bar 1r is attached to the gate 1. At its outer end this bar is provided with a projection 1e which, when the gate 1 arrives at its extended position, strikes a contact spring 1f and moves the latter into engagement with another contact spring 1g. The contact spring 1f is mechanically connected to but electrically isolated from a contact spring 1y, which is moved into contact with a fourth contact spring 1z.

Referring now to FIG. 4, it is seen that when the contact between the contact springs 1f and 1g is closed, a current path is closed from the positive pole of battery 100 through contact 1f, 1g, relay contacts R20:5, 6 belonging to relay R20, actuating solenoid 7d, back to the negative pole of battery 100.

The actuating solenoid 7d is adapted to actuate a pressure fluid valve 7c (FIG. 1), which in turn is arranged to control the stream of pressure fluid to a hydraulic cylinder 7b. The hydraulic cylinder 7b has a piston 7p and a piston rod 7s, the latter carrying at its outer end a pusher 7t (FIG. 2).

When the valve 7c is actuated by the solenoid 7d the piston 7p is forced to its outer position. Thereby the pusher 7t pushes all the piles of sheets 4a and 4b off the table 5g onto a conveyor 8 located in front of the table 5g.

On closing the contact springs 1y, 1z a relay R10, FIG. 4, will be actuated through the following current path: Positive pole of battery 100, contact springs 55g and 55h, relay coil R10, contact springs 1z, 1y, negative pole of battery 100. The relay contact R10:1, 2 and R10:3, 4 are now closed and it is apparent from the FIG. 4 that the solenoids 3d and 1d now will be supplied with current through these relay contacts, also on separation of contacts 5b, 5c, 5d, as will be the case when the piles of sheets are removed from the receiving table 5g.

When the pusher 7t reaches its outmost position a

projection 7u at the end of a bar 7b (FIG. 1) cooperates with a contact spring 7g and moves the latter into contact with contact spring 7h. Now a current path is closed from the battery 100 (FIG. 4) through the contact springs 7g, 7h, a rectifier Rf20, a relay coil R20 and back to the battery 100. The relay R20 is actuated and its contacts R20:1, 2, R20:3, 4 and R20:5, 6 are closed.

The relay contacts R20:1, 2 close a self-holding current path for the relay R20, this path also including relay contacts R21:1, 2 of a relay R21.

The relay contacts R20:3, 4 connect a motor 4c to an A.C. current supply source 120.

This current supply path also includes a break contact R22:1, 2 of a relay R22.

The motor 4c is adapted to drive the conveyor 8 (FIG. 1) and now the conveyor carries the piles 4a and 4b to a receiving device 9.

On opening the relay contacts R10:1, 2 and R10:3, 4 the current paths through the solenoids 3d and 1d will be interrupted. The gates 3 and 1 are now retracted, whereby the sheets, which have been supplied onto these gates from the webs 4 and 2, fall down onto the receiving table 5g.

From the receiving device 9, the piles 4a and 4b are transferred to a table 10 to provide a single pile 11 of the desired weight and the pile 11 is subsequently removed from the table 10 in any desired manner.

The embodiment described above and illustrated in the drawings is only to be considered as an example, which may be varied in many ways within the scope of the invention. Thus, for instance, any number of webs may be used.

What I claim is:

A machine for stacking similarly dimensioned sheets of wood pulp, including delivery means discharging sheets of wood pulp in adjacent rows, a weighing machine with a receiving table positioned transversely of the discharge end of said delivery means for receiving said sheets in adjacent piles, first and second gate members mounted in the same horizontal plane beneath said delivery means and to the rear of said receiving table, means controlled by said weighing machine for disposing said first gate member above some but not all of the piles of sheets formed on said receiving table when the weight of all piles collected on said receiving table reaches a predetermined value below a predetermined total weight to interrupt the delivery of sheets to said some piles, means for disposing said second gate member over the other of said piles when the weight of all piles has reached said predetermined total value to interrupt the delivery of sheets to said other piles and means for subsequently piling all of said piles one upon the other to provide a single pile of said predetermined weight.

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