

June 9, 1931.

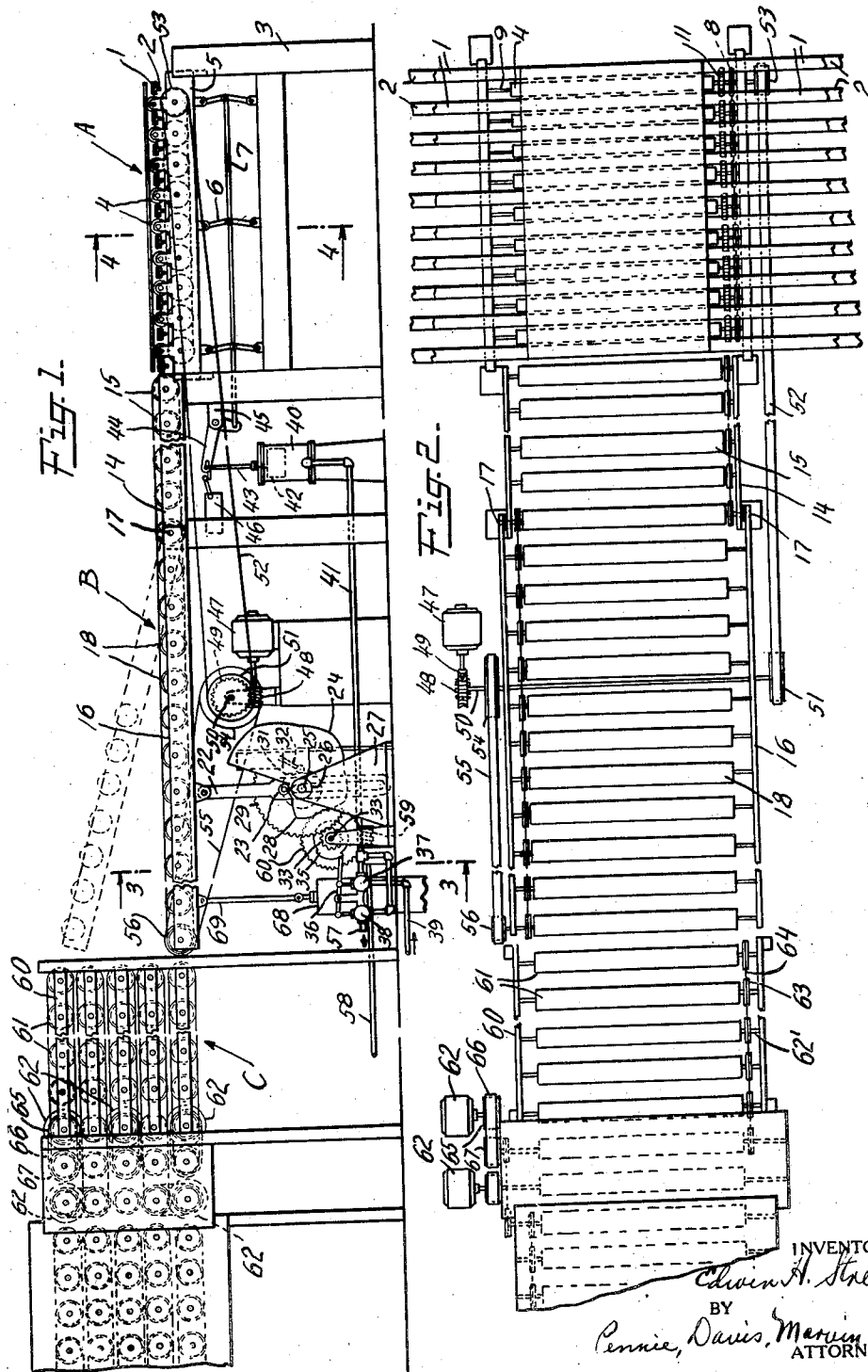
E. H. STREETER

1,809,456

TRANSFER DEVICE

Filed March 21, 1928

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

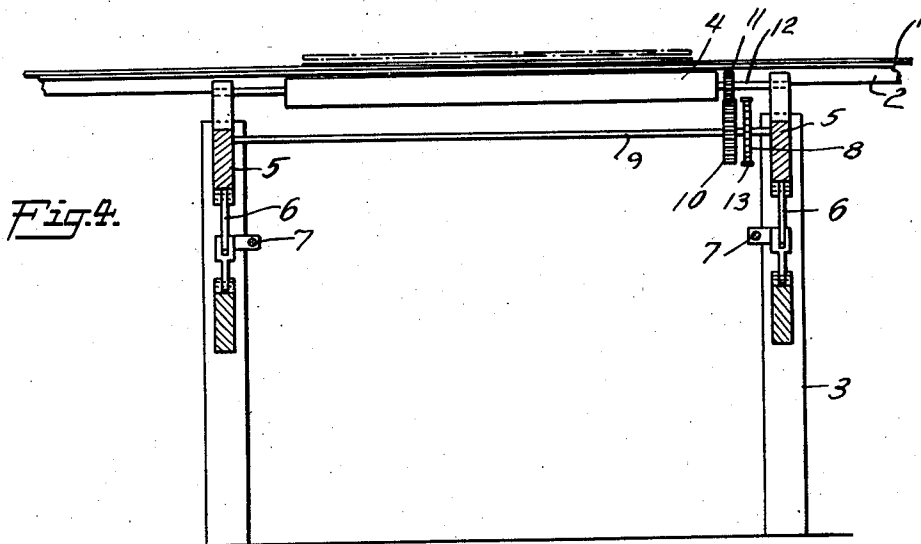
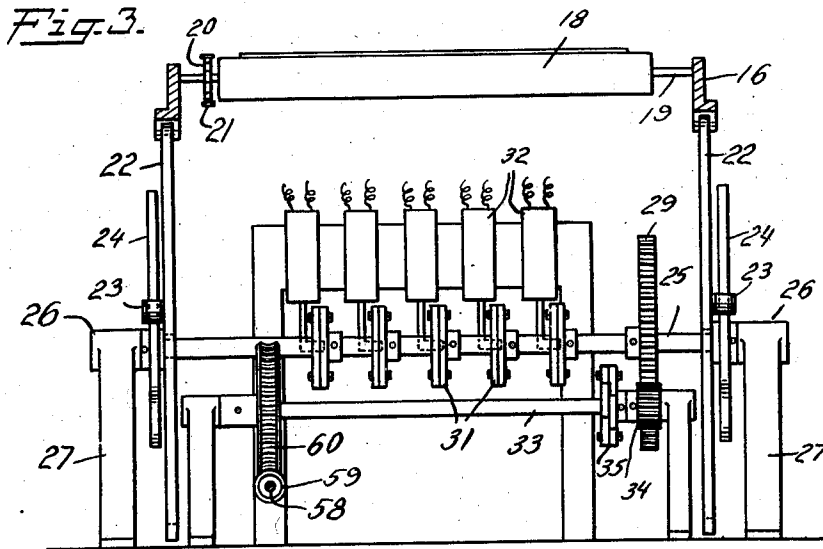
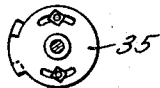


Fig. 5.



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TRANSFER DEVICE

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This invention relates to transfer mechanism and more particularly to apparatus for delivering sheets or the like from a press or other apparatus to the various decks of a multiple deck dryer.

In the manufacture of certain products, a final drying operation is necessary and it is frequently impossible to stack the articles being dried. A multiple deck drier may therefore be used with a resulting economy in the heat necessary to effect the drying operation.

For instance, in the manufacture of a certain type of wall board, wood is reduced to a structureless gelatinous mass by mechanical hydration, with or without the use of an alkali, and this material is used as a binder, mixed with a suitable filler, such as sawdust. The stock is formed into a slurry containing about 95% of water by weight, and flowed on to a screen to produce a uniform layer which is adapted to be pressed and dried to form a sheet. During the pressing operation, a large portion of the water is removed and the damp sheets leaving the press contain from 56 to 60% water. These sheets are dried by heat to reduce the moisture content to about 8% which is the desired moisture content to prevent warping in the final product.

As the sheets of wall board contain considerable moisture when they enter the drier, it is impossible to stack them, and to permit operation of the press at maximum capacity, a drier is used having a plurality of flights arranged in vertical alignment.

An object of the present invention is to provide means for successively feeding sheets of wall board, or other material, to the different flights of a drier as they leave the press. More specifically, I provide a transfer mechanism, intermittently operated to receive the boards as they leave the press and having automatic means for elevating its delivery end to bring it into alignment with the different flights of the drier.

The transfer mechanism may also be provided with means for controlling the feed motors of the various flights of the drier whereby the proper flight will be actuated when a board or sheet is fed thereto.

In the accompanying drawings I have shown one form of my invention. In the drawings,

Fig. 1 is a side elevation;

Fig. 2 is a plan view;

Fig. 3 is a vertical, sectional view on line 3—3 of Fig. 1;

Fig. 4 is a similar view on line 4—4 of Fig. 1, and

Fig. 5 is a detail view of one of the cams.

The apparatus consists of three units, A, B and C. Unit A receives the boards as they are delivered by the press or other apparatus and changes their direction of travel 90° on to unit B which is pivotally mounted so that the rear end can be raised or lowered to align with any one of the various levels of unit C. Unit C consists of a plurality of levels, in this instance, five corresponding to the number of decks of a multiple dryer. Suitable automatic control mechanism is provided for driving the conveying mechanism of unit A intermittently to receive the boards or other articles from an intermittent delivering press or other apparatus. The raising and lowering of unit A is automatically accomplished and the drive mechanism of the various tiers of unit C is also automatically controlled so as to operate in unison with unit B.

In unit A there is provided a plurality of belts 1 extending transversely of the transfer mechanism and supported on stationary T-shaped bars 2 built into the frame 3 of the apparatus. These belts form the conveying mechanism which delivers the boards or other articles from the press or other apparatus at one side of the transfer mechanism. The belts are spaced from each other a sufficient distance to allow room between each pair of belts for a transfer roll 4. The transfer rolls are mounted on a sub-frame 5 which is supported by toggle links 6 connected to an arm or link 7 so that the actuation of this arm will move the transfer rolls upwardly between the belts to an operative position. The rolls may be driven by means of sprockets 8 mounted on shafts 9 carried by the sub-frame 5 and these shafts may be provided with gears 10 meshing with pinions 11 carried by shafts 12

on which the rolls are mounted. A chain 13 extends over the sprockets 8 and is driven from a suitable source. The belts 1 may be driven by suitable mechanism (not shown) on the press or other apparatus with which the transfer mechanism is used.

Unit B may consist of a stationary frame section 14 in alignment with unit A and provided with a plurality of rolls 15 similar to the rolls 4, but stationarily mounted in the frame. Rearwardly of the stationary frame 14 there is provided a pivoted frame 16 which is pivotally mounted on the rear end of the stationary portion of the frame as indicated at 17. This portion of the frame is also provided with rollers 18. The rolls 15 and 18 are mounted on shafts 19 having sprockets 20 adapted to receive a chain 21 to drive them. Links 22 are connected to the pivoted portion 16 of the frame and these links are provided with rollers 23 adapted to engage cams 24 which are mounted on a shaft 25 supported in suitable bearings 26 carried by standards 27. Cams 24 are of irregular form and are provided with a plurality of transfer points 28 corresponding to the number of positions to be assumed by the rear end of the pivoted frame. These transfer points are each a true radius of a circle for a sufficient period to allow the pivoted frame to remain in a stationary position while the board is being transferred to unit C. The shaft 25 carries a spur gear 29 and is also provided with a plurality of cam contact members 31 which control contact switches 32 corresponding in number to the number of tiers in unit C. Shaft 25 is driven from a shaft 33 by means of a pinion 34 meshing with gear 29, the ratio of the gear and pinion in the machine shown being five to one. The shaft 33 also carries a cam 35 adapted to engage a pivoted arm 36. The arm 36 controls an air inlet valve 37 and an air exhaust valve 38. The inlet valve is connected to a source of air or other fluid under pressure by pipe 39 and to an air cylinder 40 by a pipe 41. A plunger 42 is mounted in this cylinder and provided with a plunger rod 43 which is connected to a bell crank lever 44 pivoted on an arm or bracket 45 carried by the frame 3 and connected to the arm or link 7 to operate the toggle links and raise and lower the rolls 4 and sub-frame 5. The plunger rod 43 also actuates a contact switch 46 connected to a motor 47. Motor 47 drives worm 48 mounted on the motor shaft and meshing with a gear 49 on a shaft 50. The shaft 50 drives the rolls 4 of unit A through a pulley 51, belt 52 and pulley 53 mounted on one of the shafts 9. The rolls 60 of unit B are also driven from this shaft by means of a pulley 54 adapted to receive a belt 55 passing over a pulley 56 carried by one of the shafts 19. When the arm 36 opens exhaust valve 38, air is exhausted from the cylinders 40 to the atmosphere through pipe

57, plunger 42 is lowered, switch 46 opened to stop the motor 47 and bell crank lever 44 is swung on its pivot to lower the sub-frame 5 and rolls 4 of unit A.

The shaft 33 may be driven from the dryer through suitable reduction gearing and a shaft 58 extending longitudinally of the transfer mechanism. This shaft is provided with a worm 59 meshing with a worm gear 60 on the shaft 33. The press (not shown) may be controlled from shaft 25 and may be stopped at the end of each operation by suitable means. Shafts 25, 33 and 58 operate continuously, and shaft 50 operates only at such times as sheets are being transferred to the dryer.

Unit C consists of a plurality of decks, each of which is provided with a frame 60 in which is mounted a plurality of rolls 61. A motor 62 is provided for each of these sets of rolls and these motors are controlled by contact switches 32 on shaft 25 so that the proper motor may be actuated to drive the proper tier of unit C when a board is being delivered from unit B to unit C. The rolls 61 are mounted on shafts 62' provided with sprockets 63 adapted to receive a chain 64. The motor 62 may be provided with pulleys 65 adapted to receive belts 66 passing over pulleys 67 on one of the shafts 62'.

In operation the boards or other articles to be transferred from the press or other apparatus to the dryer are carried into position over the rolls 4 by belts 1. Cam 35 then engages arm 36 to open inlet valve 37 and deliver air to cylinder 40. The upward movement of the plunger 42 in cylinder 40 swings the bell crank lever 44 on its pivot, and through the arm or link 7, actuates the toggle links 6 to raise the rolls 4 between the belts to lift the fiber sheet off the belt. At the same time switch 46 is closed starting the motor 57 and causing the rolls 4, 15 and 18 to be rotated. The sheet is then fed over units A and B until it reaches the rear end of unit B and is delivered to unit C. At this time contact switch 32 connected to motor 62 of the lower tier of unit C is closed and the rolls 61 of the lower tier are rotated at the same speed as rolls 18 of unit B until such time as the board is delivered to the lower deck of unit C. Cam 35 then moves to a position to cause lever 36 to close the intake valve 37 and open exhaust valve 38. The air from cylinder 40 is then exhausted causing the piston 42 to move downwardly opening the switch 46 and stopping the motor 47. At the same time bell crank lever 44 is moved in a reverse direction causing the toggle links 6 to recede and lowering the rolls 4 of unit A to their initial position. The contact switch 32 of the motor of the lower tier of unit C is then opened by its cam 31. This operation is repeated as each sheet is received from the press or other apparatus and the en-

gagement of cams 24 and rollers 23 causes the rear end of unit B to be consecutively placed in alignment with each tier of unit C until a sheet has been transferred to each tier or deck when the cam permits the rear end of unit B to lower from the dotted line position to the full line position shown in Fig. 1 of the drawings. If desired, dash pots 68 may be arranged under the rear end of unit B and pistons or plungers in the dash pot cylinders may be connected to the frame 16 by suitable plunger rods 69.

I claim:

1. Transfer mechanism comprising a unit adapted to receive an article from a conveyor, a second unit adapted to receive an article from said first unit, means for automatically elevating the discharge end of said second unit, a conveyor having a plurality of tiers communicating with the discharge end of said second unit, and means controlled by said second unit for actuating a selected tier of said conveyor.

2. Transfer mechanism comprising a plurality of belts, a plurality of rollers arranged to convey an article at an angle to the direction of travel of said belts, a movable frame on which said rollers are mounted whereby said rollers may be moved from a position beneath the plane of said belts to a position above the plane of said belts to remove an article therefrom, drive mechanism for said rollers, toggle links connected to said frame, a link connected to said toggle links, a motor for driving said rollers, an air cylinder, and a plunger in said cylinder controlling said motor and actuating said link.

3. Transfer mechanism comprising a series of movable belts, conveying rollers arranged to convey an article at an angle to the direction of travel of said belts, a movable frame for said rollers to permit said rollers to be positioned beneath said belts or raised above said belts to transfer an article therefrom, a pivoted frame arranged in alignment with said rollers, a plurality of conveying rollers carried by said frame, a cam for raising and lowering the free end of said frame, intermittent drive mechanism for each of said sets of rollers, and means coordinated with said drive mechanism for raising the frame of said first mentioned rollers.

4. Transfer mechanism comprising a series of movable belts, conveying rollers arranged to convey an article at an angle to the direction of travel of said belts, a movable frame for said rollers to permit said rollers to be positioned beneath said belts or raised above said belts to transfer an article therefrom, a pivoted frame arranged in alignment with said rollers, a plurality of conveying rollers carried by said frame, a cam for raising and lowering the free end of said frame, intermittent drive mechanism for each of said sets of rollers, means coordinated

with said drive mechanism for raising the frame of said first mentioned rollers and a conveyor comprising a plurality of tiers communicating with a discharge end of said pivoted frame.

5. Transfer mechanism comprising a unit adapted to receive an article from a conveyor, a second unit comprising a pivoted frame and a plurality of rollers communicating with said first unit, a rotating shaft, a cam mounted on said shaft and adapted to position the discharge end of said pivoted frame, a third unit comprising a plurality of tiers of rollers, a motor for the rollers of each tier, and contact switches carried by said shaft to control said motors.

6. Transfer mechanism comprising a unit adapted to receive an article from a conveyor, a second unit comprising a pivoted frame and a plurality of rollers communicating with said first unit, a rotating shaft, a cam mounted on said shaft and adapted to position the discharge end of said pivoted frame, a third unit comprising a plurality of tiers of rollers, and means for actuating the rollers of each tier when the free end of the pivoted unit is aligned therewith.

In testimony whereof I affix my signature.
EDWIN HENRY STREETER.