March 13, 1934. J. M. HUTCHINSON 1,950,943

TRANSFERRING AND STACKING MECHANISM

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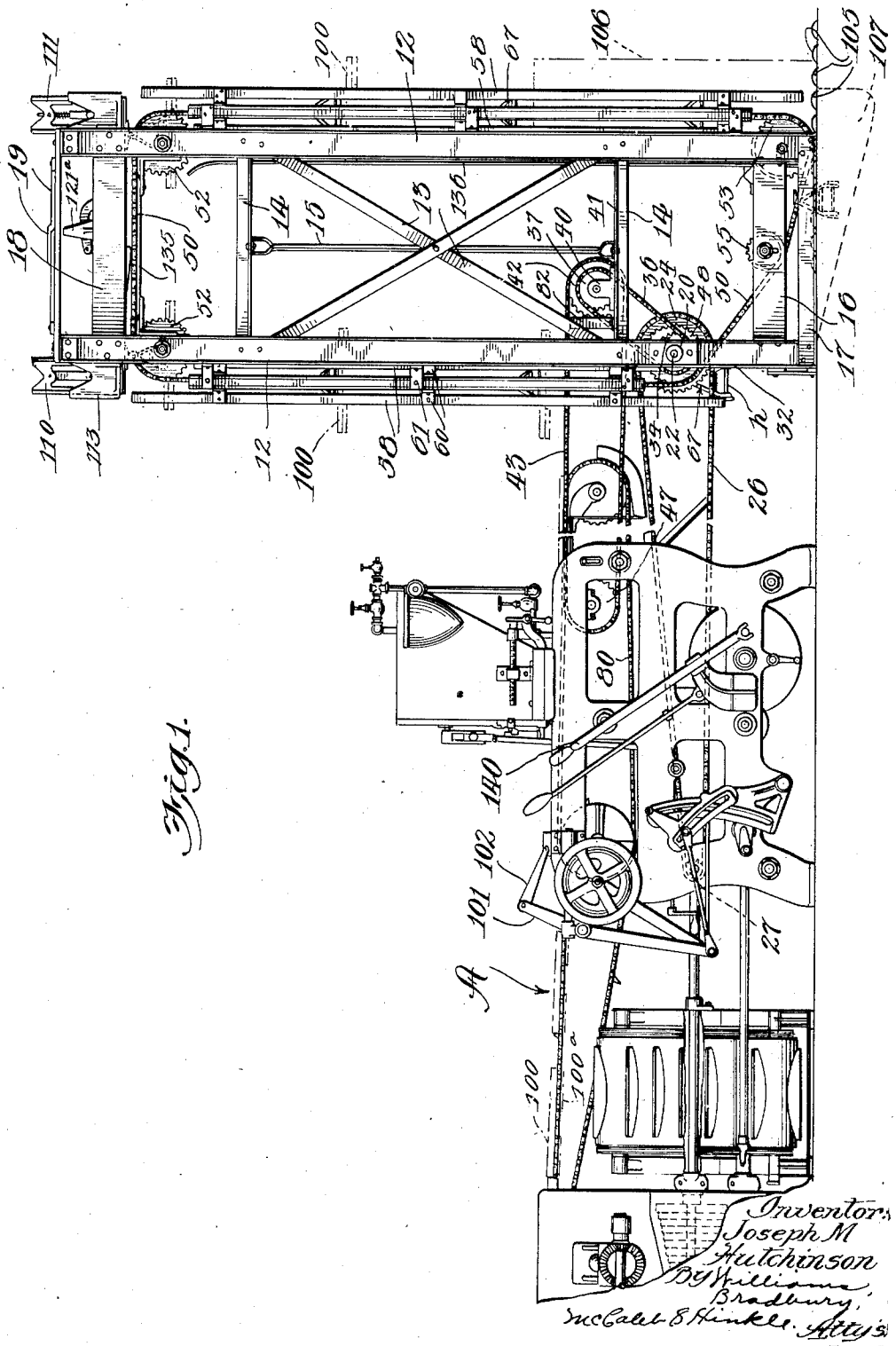


Fig. 1.

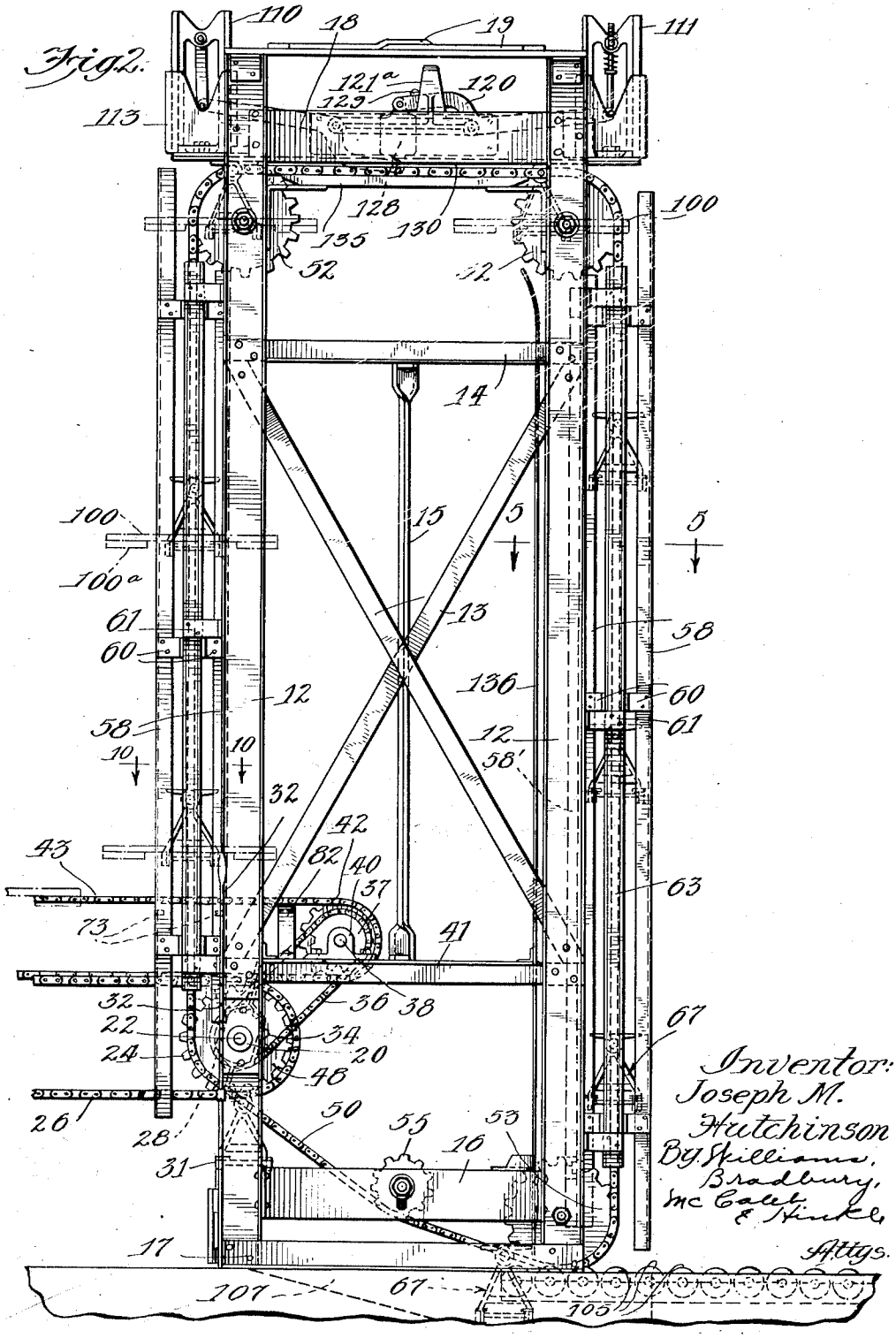
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TRANSFERRING AND STACKING MECHANISM

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Fig. 2.



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TRANSFERRING AND STACKING MECHANISM

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Fig. 3.

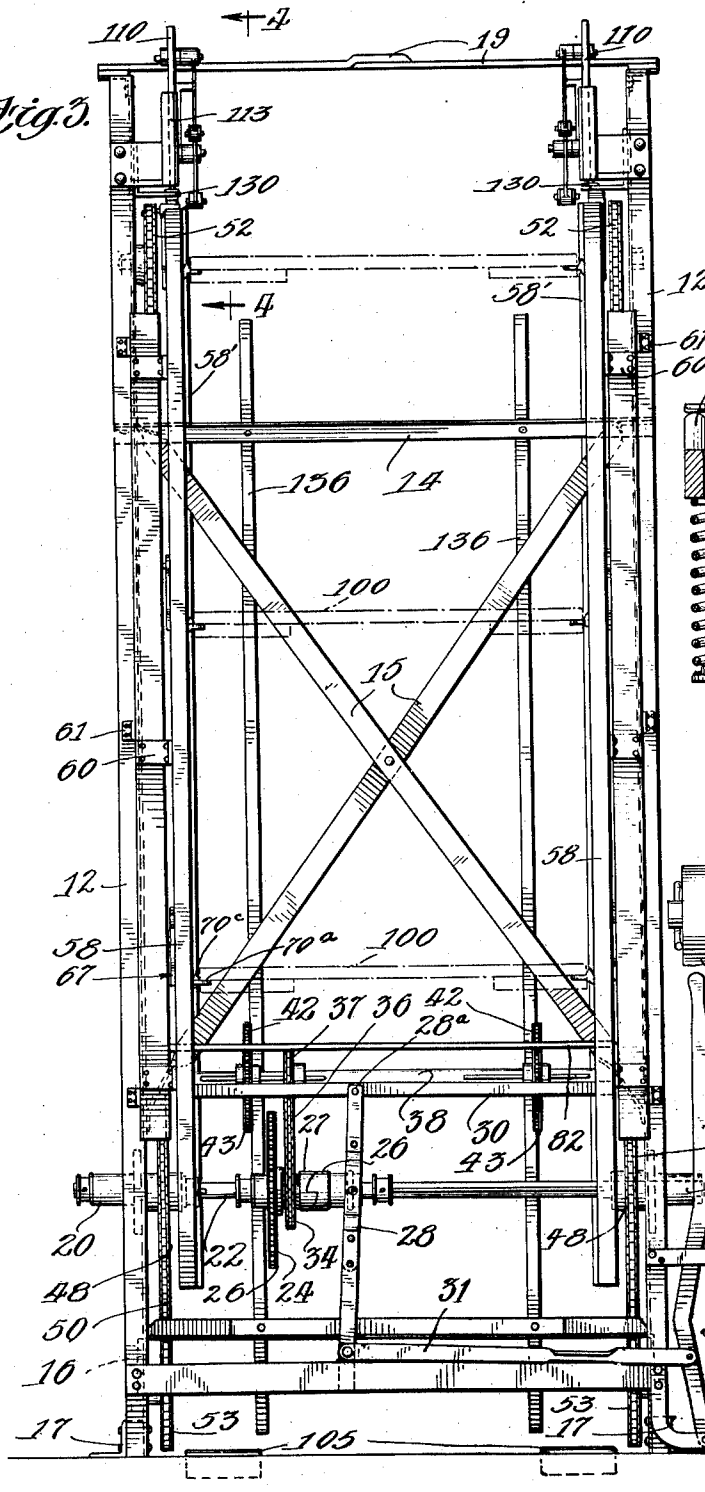
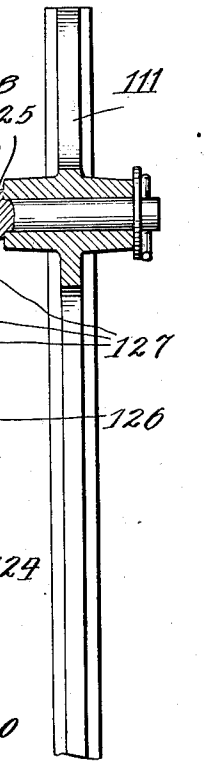


Fig. 9.



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TRANSFERRING AND STACKING MECHANISM

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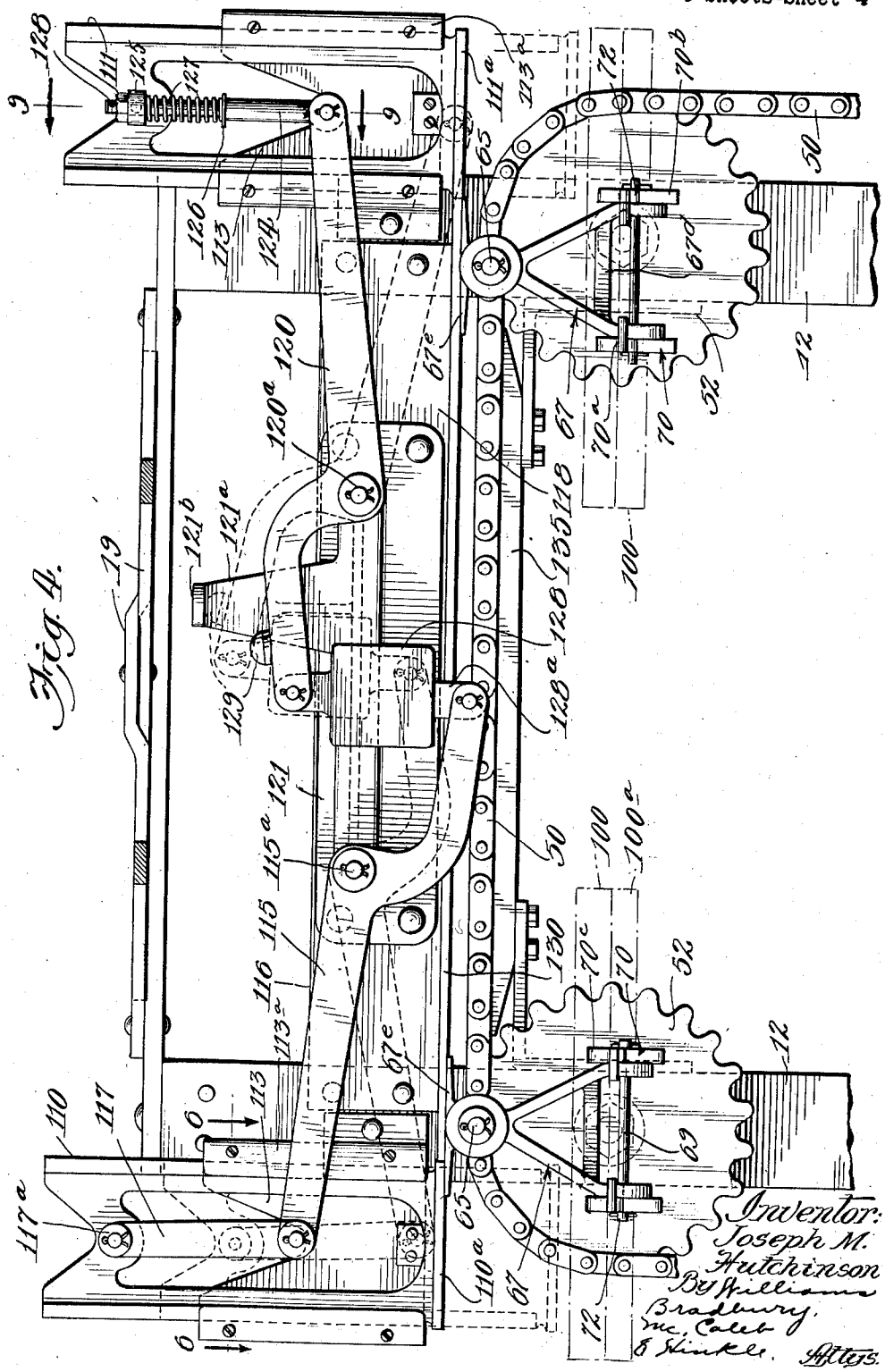


Fig. 4.

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TRANSFERRING AND STACKING MECHANISM

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Fig. 5.

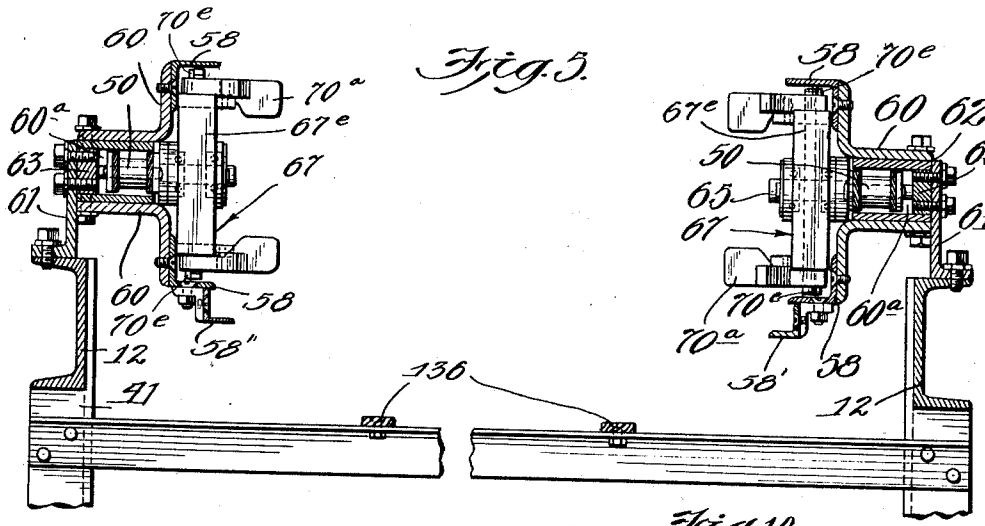


Fig. 6.

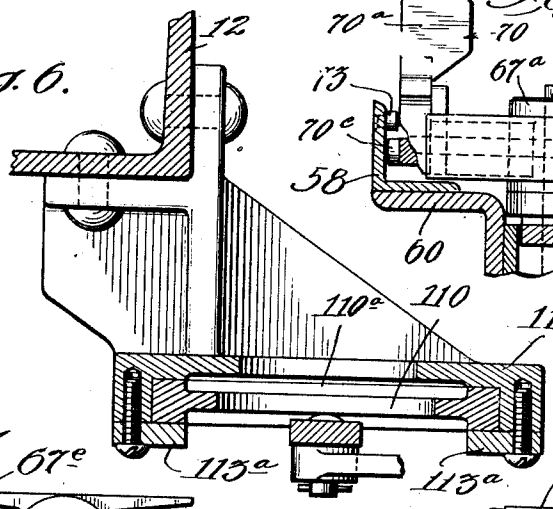


Fig. 10.

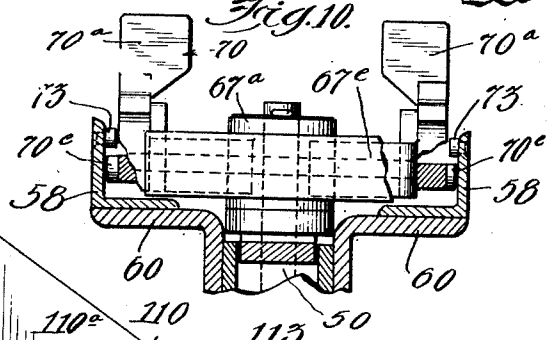


Fig. 7.

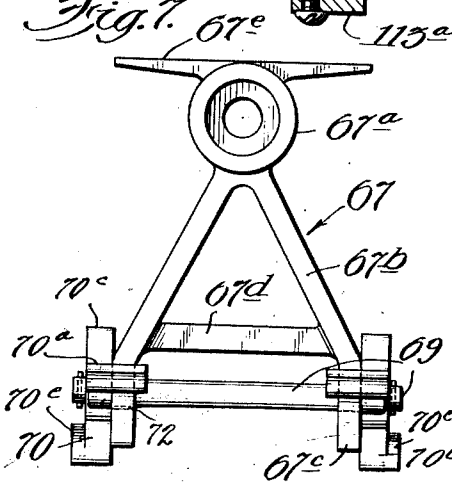
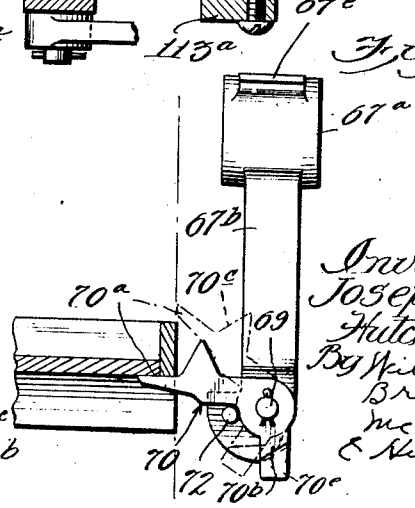


Fig. 8.



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UNITED STATES PATENT OFFICE

1,950,943

TRANSFERRING AND STACKING MECHANISM

Joseph M. Hutchinson, Chicago, Ill., assignor to E. J. Brach & Sons, Chicago, Ill., a corporation of Illinois

Application October 6, 1930, Serial No. 486,629

23 Claims. (Cl. 214—6)

This invention relates to improvements in transferring and stacking mechanisms and has for an object to provide a mechanism of that character in which trays or pallets may be successively picked up from a feeding or preliminary conveying means or place of collection and thereafter conveyed and transferred to a desired place of deposit where they may be deposited singly or in stacks as desired.

Another object consists in the provision of means to maintain the trays in proper position during their transfer to the place of deposit.

Other objects reside in the novel details and arrangements of construction which contribute to the general objects as stated above.

In the accompanying drawings I have illustrated an embodiment of my invention, in which

Fig. 1 is a side elevation thereof shown in association with a preliminary handling and treating mechanism which ultimately conveys or feeds the trays to a position wherein they are picked up by the transferring and stacking mechanism.

Fig. 2 is a side elevation of the transferring and stacking mechanism drawn to enlarged scale.

Fig. 3 is an end elevation of the structure illustrated in Fig. 2.

Fig. 4 is a side elevation of what I term the stabilizing mechanism drawn to an enlarged scale.

Fig. 5 is a horizontal section along the line 5—5 of Fig. 2.

Fig. 6 is a horizontal section along the line 6—6 of Fig. 4.

Fig. 7 is a side elevation of one of the carrier members.

Fig. 8 is a side elevation of the same showing a portion of a suspended tray in section.

Fig. 9 is a vertical section along the line 9—9 of Fig. 4.

Fig. 10 is a horizontal section along the line 10—10 of Fig. 2, a portion of the fingers being broken away.

Like numerals refer to like elements throughout the drawings.

The transferring and stacking mechanism comprises a frame of generally rectangular construction which includes vertical frame members or beams 12 secured by suitable cross ties and braces 13, 14, 15, 16, 17, 18, 19, for example, to form a rigid skeleton-like structure.

Suitably journaled in bearing members 20 carried by a pair of opposed main frame members 12 and extending therebetween is a driven shaft 22 upon which is mounted for free rotation a sprocket 24 with which coacts a driving chain 26 driven by sprocket 27. Rotation is imparted to the sprocket 27 by driving mechanism not illustrated which forms a part of the pretreating and charging mechanism generally indicated by A. This arrangement insures the actuation of the transferring and stacking mechanism in synchronism with the operations of this machine A, as will be more fully explained below. Mounted upon the shaft 22 is the sliding clutch comprising the engaging portion 26 and the engageable portion 27, the latter being integral or fixedly associated with the sprocket 24. The engaging portion 26 is supplied upon the shaft 22 to rotate therewith and to permit longitudinal sliding movement for engagement or disengagement with its complementary member 27. A shifting lever 28 engages a reduced portion of the member 26 being pivoted at its upper end at 28—*a* to a cross bar 30 and pivotally connected adjacent its lower end to the link 31 which is in turn pivoted to the operating or shifting handle 32. This arrangement permits the clutch members to be readily engaged or disengaged to transmit or terminate the rotation of the sprocket 24 to shaft 22. Associated with sprocket 24 to rotate therewith is a driving sprocket 34 with which coacts chain 36 leading to a driven sprocket 37 keyed to countershaft 38 journaled in suitable bearings 40 mounted upon supporting angles or strips 41 (see Figs. 2 and 3). Carried by this countershaft 38 are spaced sprockets 42 around which run conveyor chains 43 to the discharge end of the machine A, suitable spaced sprockets 47 being provided on the machine A for the chains 43.

Adjacent each side of the transferring and stacking mechanism and mounted upon and to rotate with shaft 22 is a sprocket 48 with which is engaged a conveyor chain 50, these conveyor chains 50 being actuated by engagement with the sprockets 48. Suitable idler sprockets 52 are provided for the conveyor chains 50 at the upper corners of the mechanism (see Fig. 2) and a pair of sprockets 53 is provided at the lower forward corners of the mechanism. In addition there are provided take-up or adjustable idler sprockets 55, adjustable to maintain the desired tension in the conveyor chains 50. It will be noted that with the arrangement illustrated the conveyor chains are provided with spaced vertical runs or portions, top connecting substantially horizontal runs, and inclined lower runs extending upwardly from

sprockets 53 to the driving sprockets 48. By the chain members adjacent the corners are the vertically extending angle bars 58, the same being arranged in pairs to form guide ways (see Figs. 2 and 5, for example). These angle bars have their inwardly directed flanges secured to reversely arranged larger angle bars 60 suitably secured to the main frame by angles 61 and spaced to provide channels or guide ways 60—*a* for the conveyor chains 50, there being also utilized wear strips 62 at the sides of channel 60—*a* and filler strips or blocks 63 at the back thereof as illustrated in Fig. 5. Secured to and located inwardly of the inner pair of angles 58 are guide angles 58′ which prevent lateral shifting of the trays as they are being stacked.

At suitable intervals along the conveyor chains 50 are provided pins or trunnions 65 on which are pivotally mounted the carrier members 67. These carrier members are provided each with an apertured boss 67—*a* at the vertex for mounting upon the pin 65 and from the bosses 67—*a* lead the downwardly and outwardly inclined side arms 67—*b* terminating in the downwardly inclined portions 67—*c* through which extend supporting pins 69. A cross brace or web 67—*d* extends between ends formed integral with each pair of arms 67—*b* (see Fig. 7). Rotatably mounted upon the pins 69 are the fingers 70, each having the flat tray supporting portion 70—*a* and the downwardly extending stop lug 70—*b*. Projecting upwardly from the portions 70—*a* are the inverted conical lugs 70—*c*. Stop pins 72 project outwardly from each of the portions 67—*c* between the tray engaging portions 70—*a* and the lugs 70—*b* to limit the pivotal movement of these fingers 70. The inclined inner walls of the lugs 70—*c* serve to guide and properly locate trays as they are picked up or deposited upon the fingers 70. To insure return of the fingers 70 to tray supporting position before reaching the plane of the upper run of conveyor chains 43, I provide pins 73 projecting inwardly from angles 58 at the charging end of the machine. I also provide lugs 70—*e* projecting outwardly from the stop lugs 70—*b*. When the fingers are tilted to dotted line position, as illustrated in Fig. 8 for example, in depositing a tray upon the stack accumulated starch, syrup or other foreign substance may prevent the fingers from again dropping down to tray supporting position under the influence of gravity. When in this upper position, however, the lugs 70—*e* lie in a position where they will strike the pins 73 and be kicked or forced down to tray supporting position preliminary to picking up a tray.

The construction of the carriers and their associated parts is such as to enable them to slide freely in the guide ways formed by hangers 58 (see Fig. 5) without substantial friction or binding but in such wise as to prevent substantially rocking movement of the hangers and their loads. The chains 50 at the same time ride in the channels or guide ways 60—*a* to prevent substantial sag, sway, or movement out of their proper orbits.

The chains 43 extend well into the interior of the transferring and stacking mechanism as illustrated in Fig. 1. The machine A is provided with intermittently operated conveying chains 80 which serve to convey trays or pallets to the discharge end of the machine where they are gradually picked up by the chains 43, these end chains 80 being so arranged that the latter drop slightly as the discharge zone is reached so that the trays are deposited upon the chains 43 and thereafter conveyed until they strike stop members 82 forming a part of the transferring and stacking mechanism. I have found it desirable to drive the chains 43 at a speed greater than that of chains 80 so that successive trays are separated from those following and may be picked up by the carrier 67 without interference from a succeeding tray. Since the trays or pallets, which for convenience I have numbered 100, are driven only through their frictional contact with the chains 80 and 43, the latter will slip in respect to the trays after they have abutted against the stop members 82. The transfer of trays from chains 80 to 43 is expedited and assisted by the rocking lever 101 and its associated engaging arm 102 which functions to engage the rear end of each tray as it is reached and to impart thereto an accelerated or jump movement which is likewise transmitted to precede trays which are in continuous formation. This jump device is primarily intended for a function found necessary in the charging of the trays but is also utilized in the functioning of my machine to positively drive the foremost tray being discharged well upon the chains 43.

All of the driving and conveying mechanism described, including the jump mechanism, chains 80, chains 43 and conveyor chains 50, are driven by the common driving mechanism of the machine A, and the arrangement of the sprockets, chains, etc., is such that the travel of chains 50 with the hangers 67 is in synchronism with the feed of the trays to the transferring and stacking mechanism. The hangers 67 are likewise spaced at proper intervals to contribute to this synchronous operation. When it is desired to properly time the pick-up of the carriers it is only necessary to operate the clutch 26—27 to suspend actuation of the conveying chains 50 until a tray is properly positioned on the stop member for pick-up when the clutch 26—27 may be again engaged and the mechanism will thereafter function in synchronism with the feeding mechanism.

The trays 100, as illustrated, are provided with corner lugs 100—*a* to insure proper spacing when stacked and these lugs 100—*a* are so arranged as to permit engagement of the fingers 70 with the bottom of each tray and to permit release and desposit of such tray at the conclusion of the transferring operation. At the deposit end of the transferring and stacking mechanism I have illustrated a plurality of rollers 105 upon which a stack of trays, indicated in outline at 106, may be built up and thereafter transferred to a truck or the like although it is within the purview of my invention that deposit may be made directly upon trucks if so desired. As each tray is deposited upon the rollers 105 or upon the stack which is being formed, the fingers 70 will ride downwardly into contact with the next lower tray and will ride over the sides of the lower trays due to their pivotal mounting.

A recess 107 is provided beneath the lowermost sprockets 53 to accommodate the carriers in their travel upwardly toward the place of pick-up of additional trays. The stop pins 72 function to limit the pivotal movement of the fingers 70 out of supporting position, as will be obvious.

To prevent rocking of the trays during the

movement of the hangers around sprockets 52 and with the upper horizontal runs of the chains 50, I provide what I term stabilizing means or mechanism. This mechanism comprises a pair of spaced slidable shoes 110 and a generally similar pair of spaced slidable shoes 111. Each of these shoes slides in a suitable guide member 113 (see Fig. 6) having the removable slide forming strips 113—*a* (see Fig. 6). Each of the hangers 67 is provided at its upper end with a table portion 67—*e* horizontally disposed in the normal portion of the hanger. The shoes 110 are located at the upper end of the path of upward travel of the hangers while shoes 111 are located at the upper end of the downward path of travel of the hangers. Each of the shoes is provided with an horizontal lower contact portion 110—*a* or 111—*a*. For each of the shoes 110 is provided a pivoted lever 115 pivoted at 115—*a* to a fixed cross member 116 forming a part of the frame of the mechanism. At its outer end each of the arms 115 is pivotally attached to a link 117 which in turn is pivoted at its other end at 117—*a* to the upper end of shoe 110 (see Fig. 4). Similarly, inverted arms 120 are provided generally similar in construction to arms 115 and similarly pivoted at 120—*a* to the bearing plate 121 which is secured to frame member 118. The arms 120 are each pivotally attached at an outer end to a connecting rod 124 which at its upper end is slidably inserted through an eye member 125 pivotally attached to the upper end of shoe 111. A washer 126 abuts against a shoulder on the pin 124 intermediate its extremities and forms a base for a coil spring 127 located on the rod 124 and extending upwardly to contact with the eye 125. A nut 128 threadedly engages the upper end of the rod 124 above the eye 125. This construction provides an interposed cushioning means to cushion the driving effect of the lever 120 and the connecting rod 124. In other respects shoes 111 are substantially identical with shoes 110. Interposed between the inner ends of the lever arms 115 and 120 is a counterweight 128 having extended lugs 128—*a* for pivotal engagement with the lever arms. Projecting upwardly from the bearing plate 121 is a stop arm 121—*a* having the overlying stop portion 121—*b* in the path of travel of the inner end of lever arm 120. A cushioning button 129 is carried by this lever 120, the purpose being to limit the downward movement of the shoes, as will be apparent. The shoes, counterweight and levers are so constructed and arranged that a desired unbalanced weight is provided for each shoe in order to impose a suitable load upon the carriers as they enter into and leave contact with the shoes.

At the upper part of the frame and extending between the shoes is a guide plate 130, there being a pair of these plates provided, as will be apparent. Their location is such that the table portions 67—*e* of the hangers will contact or lie closely adjacent during the transverse travel with the upper horizontal runs of the chains as illustrated in Figs. 2 and 4, for example.

When in normal position the shoes 110 and 111 are as indicated in dotted lines in Fig. 4, lying below the upper portions of sprockets 52. As each carrier rises to the sprocket 52 before the corresponding chain link starts around the sprocket the table portion 67—*e* of the carrier will contact the bottom 110—*a* of the corresponding shoe 110 and will operate to lift the same to the position shown in full lines in Fig. 4. During this lifting movement full contact is had between the carrier and the shoe and the dimensions of the contacting surfaces are such as to preclude rocking or tilting of the carrier as it rounds the sprocket 52. At the same time through the interposed levers 115 and 120 and the counterweight 128 the shoes 111 rise in unison with shoes 110. As the chains move the carriers horizontally beneath the guide plates 130 the preceding hangers will move from beneath the plates 130 to a position beneath the shoes 111, the latter having been raised as described to the illustrated full line position wherein clearance is made for the oncoming carriers. The arrangement and spacing is such that one pair of carriers 67 will properly actuate the shoes 110 to position shoes 111 to permit this clearance for the preceding pair of hangers which as they leave the guide plate 130 are contacted with the portions 111—*a* of shoes 111 which follow them down and impose a weight upon them again to prevent rocking or tilting until they enter the upper ends of their guide ways for their downward travel.

By the mechanism and arrangement described it will thus be seen that the carriers are guided and held against rocking movement during vertical movement upwardly and downwardly in the mechanism and also while rounding the sprockets 52 and traversing the upper end of the frame horizontally.

As an example of desirable dimension and size of parts I have selected the sprockets 48, 52 and 53 with twenty teeth and have arranged the carriers 67 at intervals of twenty links of the conveyor chains, so that one complete revolution of the drive shaft occurs for each pick-up of a tray. This arrangement is not necessary, but I have found it convenient for the timing and accurate function of the mechanism.

Underlying the horizontal runs of the chains 50 are supporting strips or plates 135 which serve to prevent sagging of these portions of the chains and thus insure that the carriers will be maintained close to or in contact with the plates 130.

To insure accurate positioning of the trays for the formation of true stacks I provide positioning strips 136, which contact with the rear sides of the trays in their downward movement to the place of deposit. Should they be slightly out of proper position these strips will operate to slide them into the proper position.

The machine A is provided with a main control clutch having a handle 140 to throw into or out of operation the main driving means. This permits the entire set-up, including both the machine A and the transferring and stacking mechanism, to be simultaneously thrown into and out of operation without affecting the synchronous operative relationship between the two mechanisms.

Assuming that this synchronous relation has been effected and the machine is functioning, a tray for example loaded with starch and deposited confections will be successively advanced to and against the stops 82, each of such trays being picked up by the next pair of upwardly travelling carriers 67 which will then convey such tray up and across the frame, then downwardly for deposit upon the rollers 105 or upon the partially formed stack of trays previously deposited thereon. As previously explained the

hangers are guided in their vertical movements up and down to prevent tilting or rocking with subsequent displacement of the carried trays while the stabilizing mechanism and the guide plates 130 and 135 maintain the carriers and their trays in the proper horizontal position during horizontal movement thereof. The pivoted fingers 70 automatically function to release each tray after deposit and to ride over the ends or sides of previously deposited trays. The operation of the transferring and stacking mechanism may be discontinued by means of the clutch 26—27 as described and the proper timing of the pick-up action of this mechanism may be effected by means of such clutch, as also previously described.

It will be apparent that my invention is susceptible of modification and departure from the illustrated and described embodiment and I do not wish to be restricted thereto except as proper interpretation of the appended claims makes such restriction necessary.

What I claim is:

1. In a mechanism of the class described conveyor chains having substantially vertical and non-vertical runs, tray engaging and supporting members carried thereby, means forming guides for said carrier members during the vertical portion of their travel and means engageable and moved by said members to stabilize the same during their movement with the non-vertical runs of said chain, said last named means comprising a pair of interconnected slidable members.

2. In a mechanism of the class described a frame, means carried thereby forming upwardly directed guideways, conveyor chains, tray engaging members carried thereby and movable in said guideways, said chains being provided with transversely extending portions and means engageable by and coacting with said carrier members during the movement of said members into and out of said upwardly directed guideways to maintain the same against pivotal movement, said last named means comprising slidable members located in alignment with said guideways.

3. In a mechanism of the class described a frame, means carried thereby forming upwardly directed guideways, conveyor chains, tray engaging members carried thereby and movable in said guideways, said chains being provided with transversely extending portions and means engageable by and coacting with said carrier members during the movement of said members into and out of said upwardly directed guideways to maintain the same against pivotal movement, said last named means comprising slidable members located in alignment with said guideways, said members being interconnected for simultaneous movement.

4. In a mechanism of the class described conveying means including carriers, stabilizing means coacting with said carriers and including a slidably mounted member, said member being engaged and moved by said carriers successively.

5. In a mechanism of the class described conveying means including carriers, stabilizing means coacting with said carriers and comprising a pair of interconnected slidable members, one of said members being engaged and actuated by successive carriers.

6. In a mechanism of the class described conveying means including carriers, stabilizing means coacting with said carriers and comprising a pair of spaced slidable members, means interconnecting said members for simultaneous movement thereof and a counterweight associated with said members to partially counter-balance the same.

7. In a mechanism of the class described conveying means including carriers, stabilizing means coacting with said carriers and comprising a pair of slidable members, pivoted lever arms operatively attached thereto, and a counterweight pivotally attached to and interposed between said lever arms.

8. In a mechanism of the class described conveying means including carriers, stabilizing means coacting with said carriers and comprising a pair of spaced slidable members, means interconnecting said members for simultaneous movement thereof and a counterweight associated with said members to partially counterbalance the same, and means to limit the movement in one direction of said slidable members.

9. In a mechanism of the class described conveyor chains having upwardly and downwardly directed runs or portions with transversely arranged portions extending therebetween, carriers associated and movable with said chains, sprocket means at the junctures of said first named portions and said transversely arranged portions, a slidable member overlying each of said sprockets coacting with said carriers during transverse movement thereof and means interconnecting said slidable members for simultaneous movement.

10. In a mechanism of the class described conveyor chains having upwardly and downwardly directed portions, sprockets at the upper ends thereof, said chains being arranged with transversely travelling portions between said sprockets, carrier members pivotally mounted on said chains and provided with a table portion, a slidable member overlying each of said sprockets in the path of travel of said table portions for contact therewith during travel around said sprockets.

11. In a mechanism of the class described conveyor chains having upwardly and downwardly directed portions, sprockets at the upper ends thereof, said chains being arranged with transversely travelling portions between said sprockets, carrier members pivotally mounted on said chains and provided with a table portion, a slidable member overlying each of said sprockets in the path of travel of said table portions for contact therewith during travel around said sprockets, said slidable members being interconnected for simultaneous movement.

12. In a mechanism of the class described conveyor chains having upwardly and downwardly directed portions, sprockets at the upper ends thereof, said chains being arranged with transversely travelling portions between said sprockets, carrier members pivotally mounted on said chains and provided with a table portion, a slidable member overlying each of said sprockets in the path of travel of said table portions for contact therewith during travel around said sprocket, said slidable members being interconnected for simultaneous movement, said carrier members being so located on said chains that as one set thereof contacts and actuates corresponding slidable members the other slidable members will be simultaneously actuated to permit clearance of preceding carrier members.

13. In a mechanism of the class described

conveying means, carrier members carried by said conveying means, said carrier members being provided with pivoted tray supporting members and means to positively move said tray supporting members from nonsupporting position into supporting position.

14. In a mechanism of the class described conveying means, carrier members carried by said conveying means, said carrier members being provided with pivoted tray supporting members and means to positively move said tray supporting members from nonsupporting position into supporting position, said last named means comprising pins and lugs, said lugs being associated with said tray supporting members.

15. In a mechanism of the class described conveying means, carriers carried thereby, pivoted tray supporting members carried by said carrier members, said machine being provided with guide ways for said carrier members, said tray supporting members being provided with contactable portions, pins projecting into said guide ways and operable to strike said contactable portions when said tray supporting members are out of tray supporting position to move them there into.

16. In a mechanism of the class described, a frame, said frame being provided with vertical carrier channels and with chain channels extending therefrom, conveyor means comprising endless chains, sprockets associated with said chains, carrier members carried thereby, said carrier members riding in said first named channels and said chains riding in and being guided by said second named channels, said carrier members being provided with table portions, movable stabilizing means in alignment with said channels and contactable by said table portions to stabilize said carriers during movement around said sprockets.

17. In a mechanism of the class described, a frame, said frame being provided with vertical carrier channels and with chain channels extending therefrom, conveyor means comprising endless chains, sprockets associated with said chains, carrier members carried thereby, said carrier members riding in said first named channels and said chains riding in and being guided by said second named channels, said carrier members being provided with table portions, movable stabilizing means in alignment with said channels and contactable by said table portions to stabilize said carriers during movement around said sprockets, a fixed guide means extending between said stabilizing means and also contactable with said table portions during their movement with said stabilizing members.

18. In a mechanism of the class described spaced conveyor chains, means carried thereby to engage and support trays, additional conveyor chains extending between and past said first named chains and arranged to convey said trays into position for pick-up by said engaging and supporting means, means to actuate all of said chains continuously and in timed relation, means associated with said conveyor chains to stop trays conveyed thereby in said pick-up position.

19. In mechanism of the class described, conveying means and carrier members associated therewith, said carrier members being arranged at opposite sides of said mechanism in opposed pairs, said carrier members being provided with tray supporting fingers projecting inwardly of said mechanism and pivotally attached to said carriers, said fingers being provided with inclined portions for guidance of trays into proper position upon said fingers and for maintenance of said trays against displacement therefrom.

20. In mechanism of the class described, conveyor chains having substantially vertical and non-vertical runs, tray engaging and supporting members carried thereby, means forming guides for said supporting members during the vertical portion of their travel and a stabilizing member vertically movable and engaged and moved by said carrier members in movement out of said guides.

21. In mechanism of the class described, conveyor chains having substantially vertical and non-vertical runs, tray engaging and supporting members carried thereby and provided with table portions, means forming guides for said supporting members during the vertical portion of their travel, and a stabilizing member vertically movable and engageable by the table portions of said successive carrier members and movable therewith during the movement of said supporting members out of said guides.

22. In mechanism of the class described, conveying means comprising a substantially upwardly moving vertical portion and a substantially vertically moving downward portion, said portions being spaced, and a substantially horizontal portion extending inbetween, carrier members carried by said conveying means, a stabilizing member engageable by and movable with each of said carrier members successively during its transition from vertical upward movement to horizontal movement, and a second stabilizing member engageable with said carrier members successively in the transition from horizontal movement to downward vertical movement.

23. In mechanism of the class described, conveying means comprising a substantially upwardly moving vertical portion and a substantially vertically moving downward portion, said portions being spaced, and a substantially horizontal portion extending inbetween, carrier members carried by said conveying means, a stabilizing member engageable by and movable with each of said carrier members successively during its transition from vertical upward movement to horizontal movement, and a second stabilizing member engageable with said carrier members successively in the transition from horizontal movement to downward vertical movement, said stabilizing members being interconnected whereby actuation of the first named will move the second named stabilizing member into position for engagement with one of said carrier members.

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