Nov. 17, 1953 R. M. BOTLEY 2,659,496

CAN STACKER AND UNSTACKER

Filed Aug. 16, 1950

4 Sheets-Sheet 1

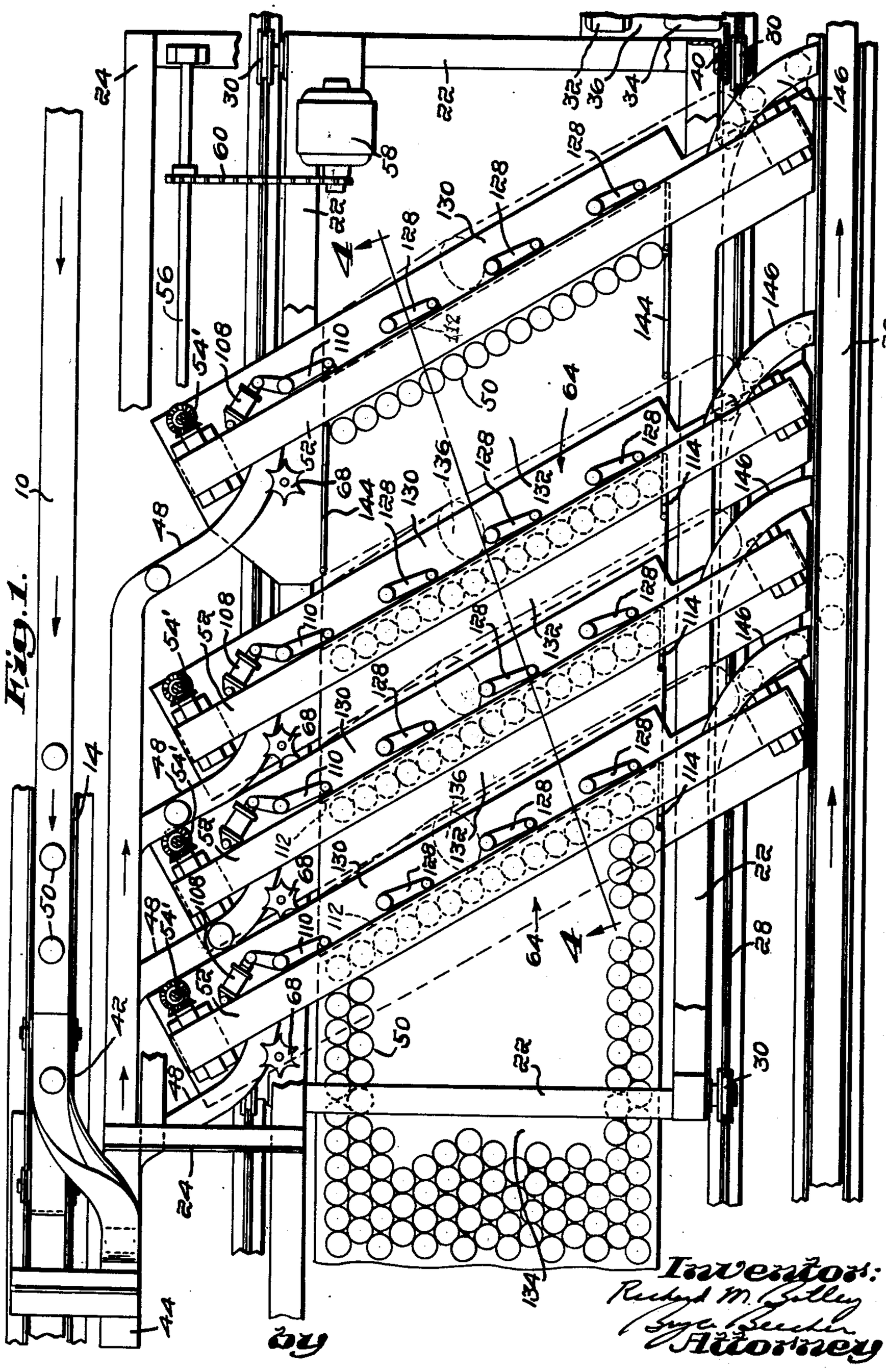


Fig. 1.

Inventor:
Richard M. Botley
by Bruce Bendix
Attorney

Nov. 17, 1953

R. M. BOTLEY

2,659,496

CAN STACKER AND UNSTACKER

Filed Aug. 16, 1950

4 Sheets-Sheet 2

Fig. 2A.

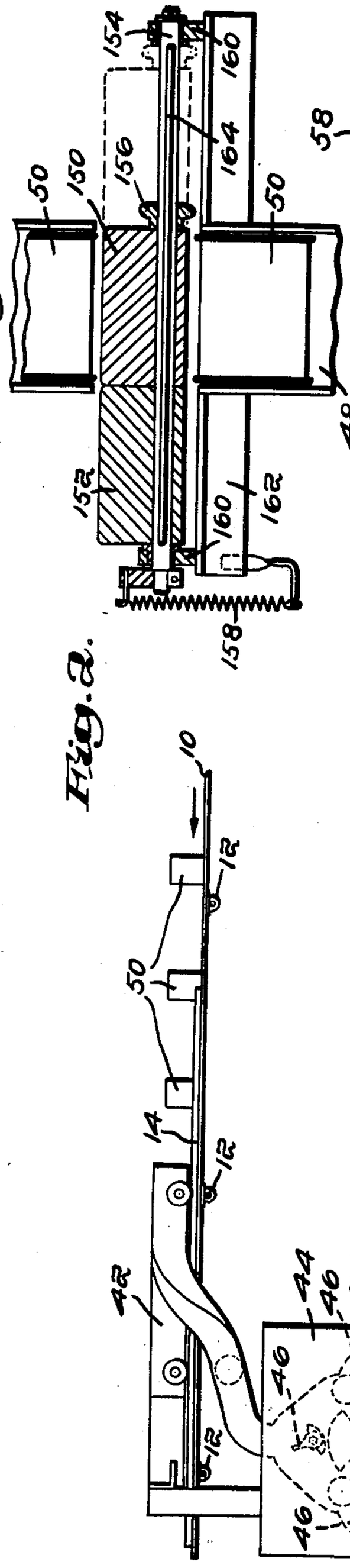
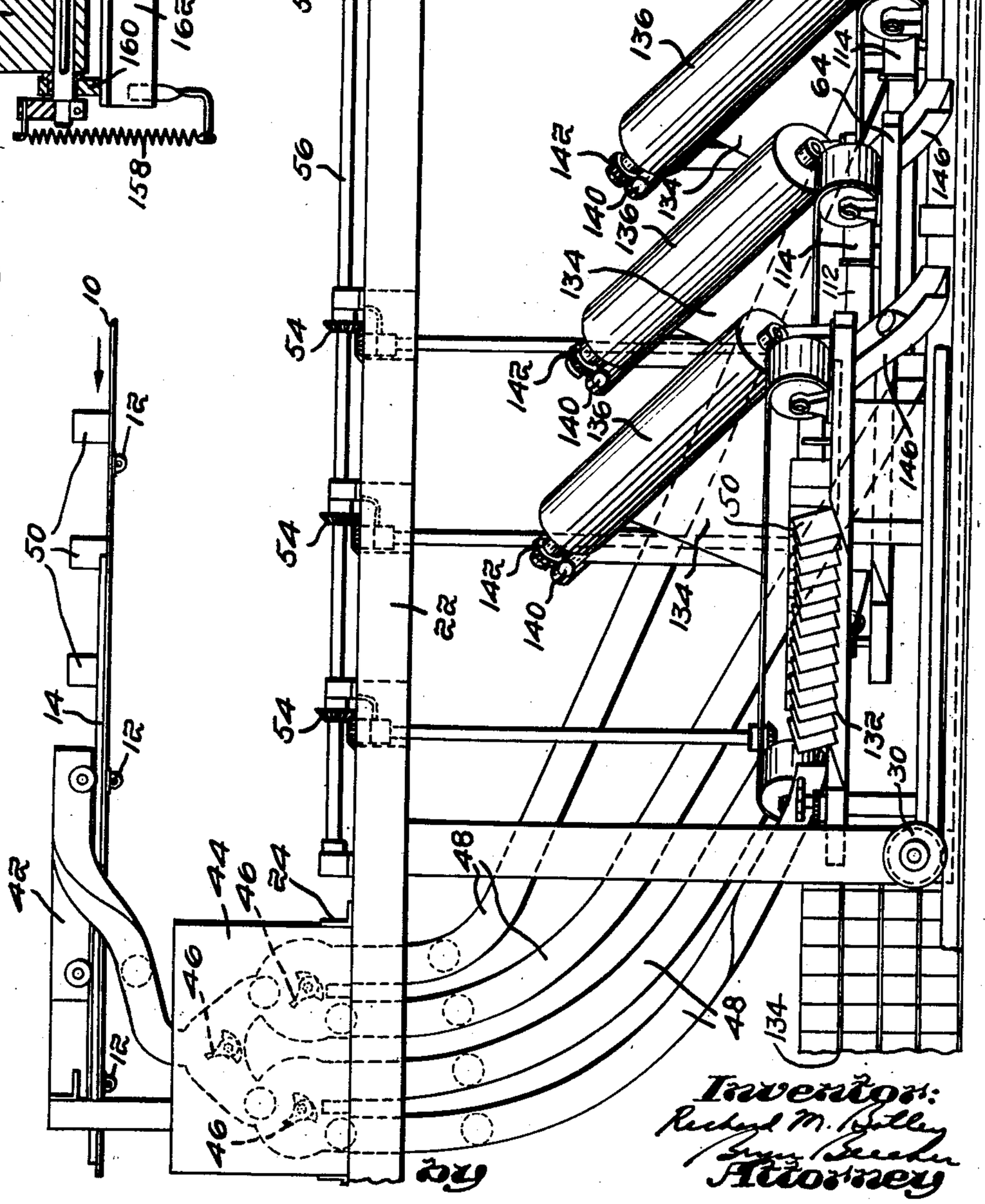


Fig. 2.



Inventor:
Richard M. Botley
by Lyon Lyon
Attorney

Nov. 17, 1953 R. M. BOTLEY 2,659,496

CAN STACKER AND UNSTACKER

Filed Aug. 16, 1950 4 Sheets-Sheet 3

Fig. 2B.

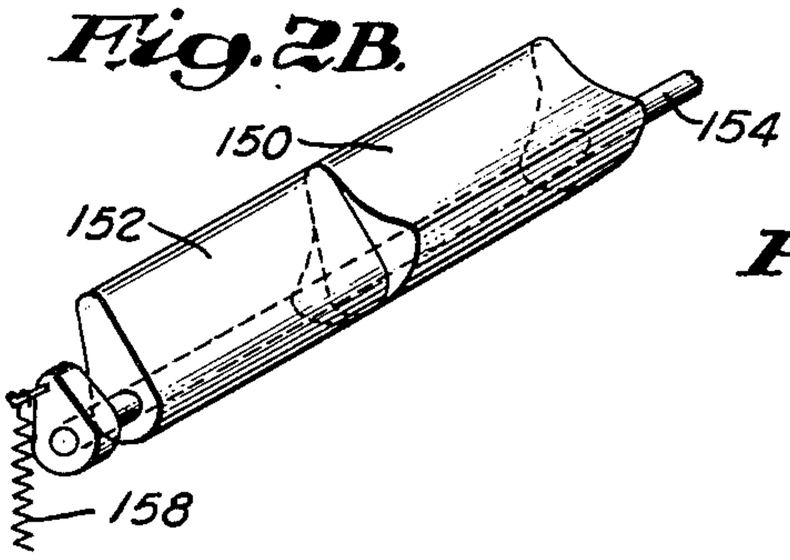
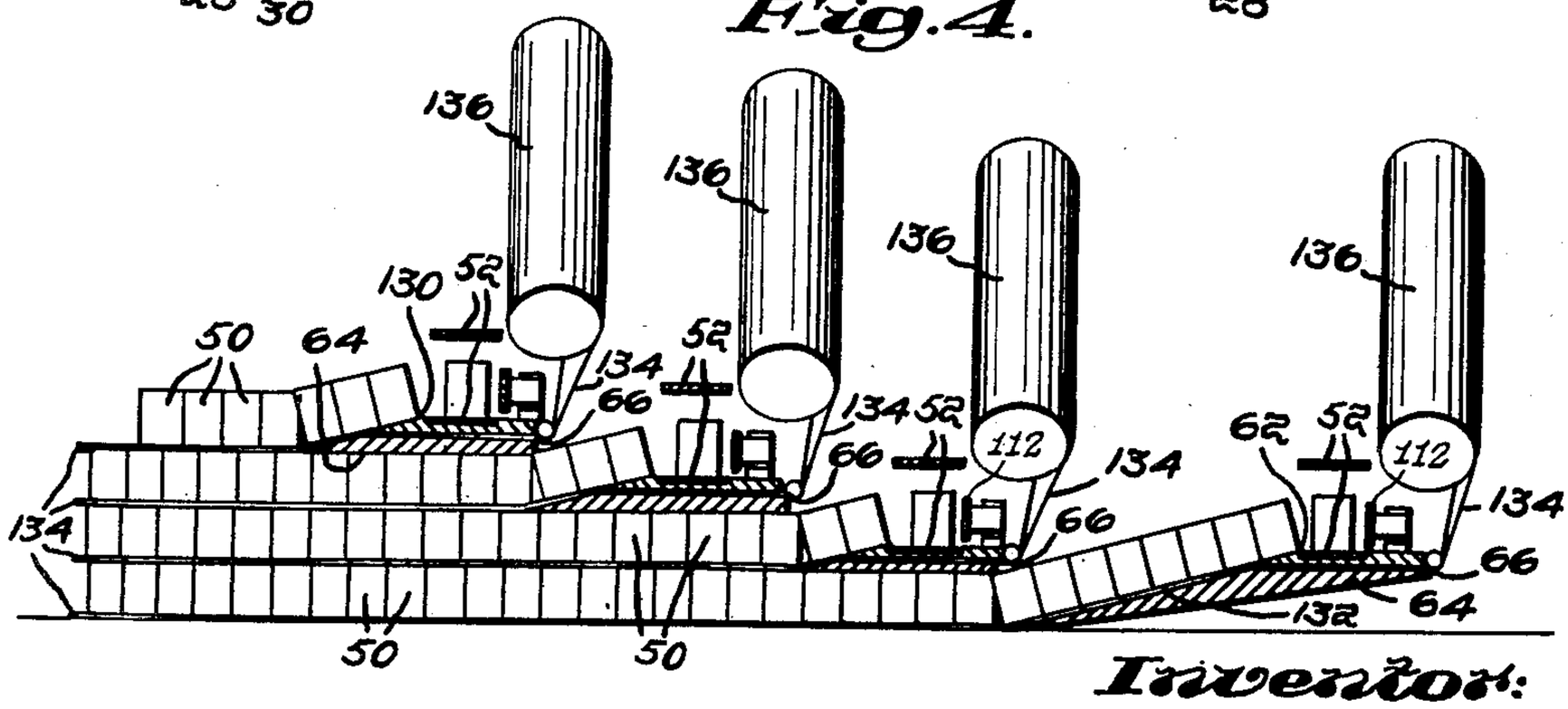


Fig. 3.

Fig. 4.



Inventor:
Richard M. Botley
By Ryan Russell
Attorney

Nov. 17, 1953

R. M. BOTLEY

2,659,496

CAN STACKER AND UNSTACKER

Filed Aug. 16, 1950

4 Sheets-Sheet 4

Fig. 5.

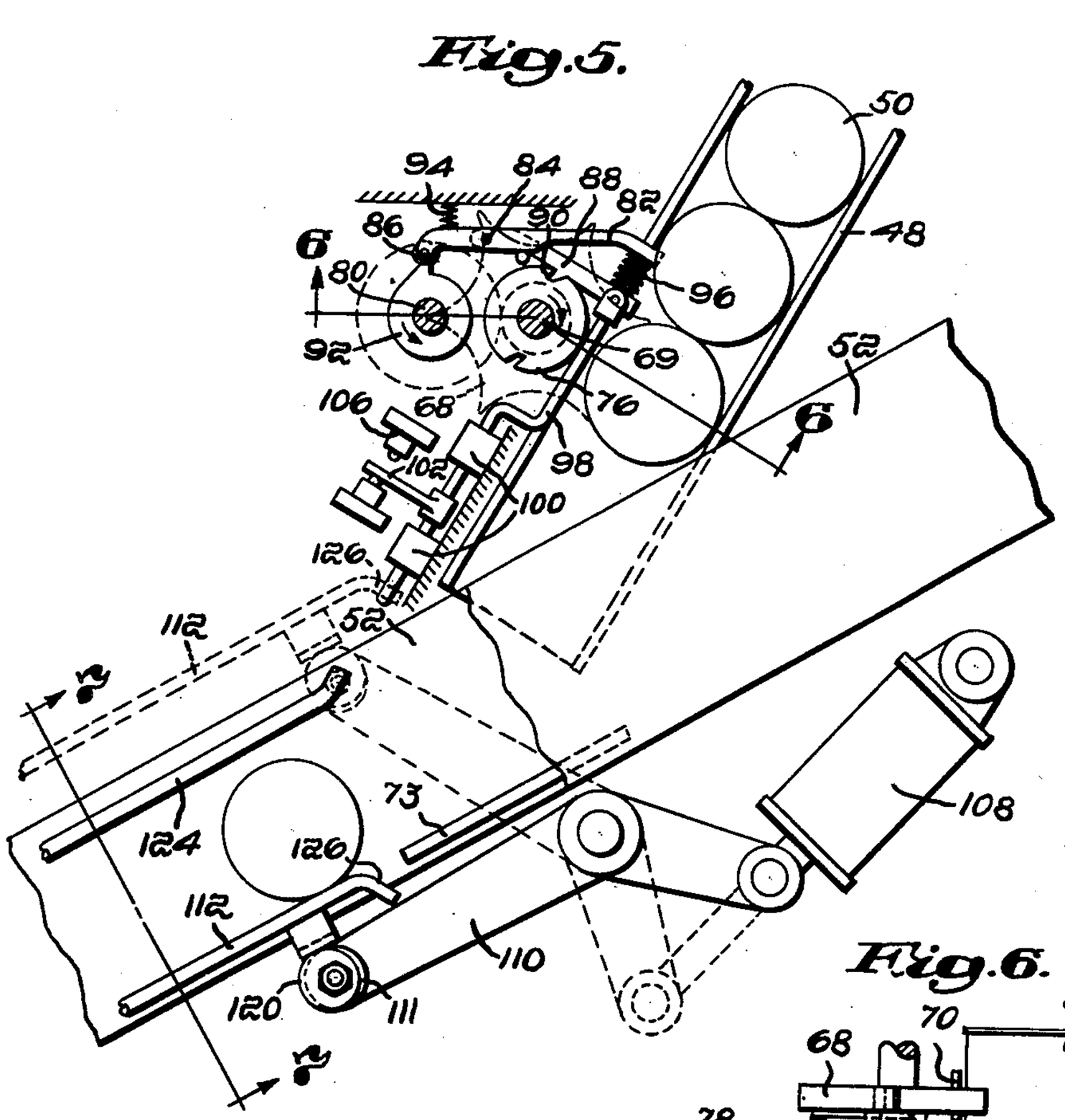


Fig. 6.

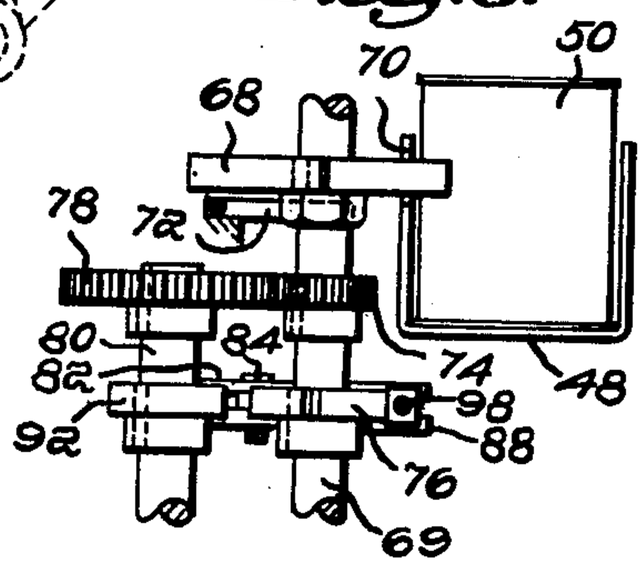
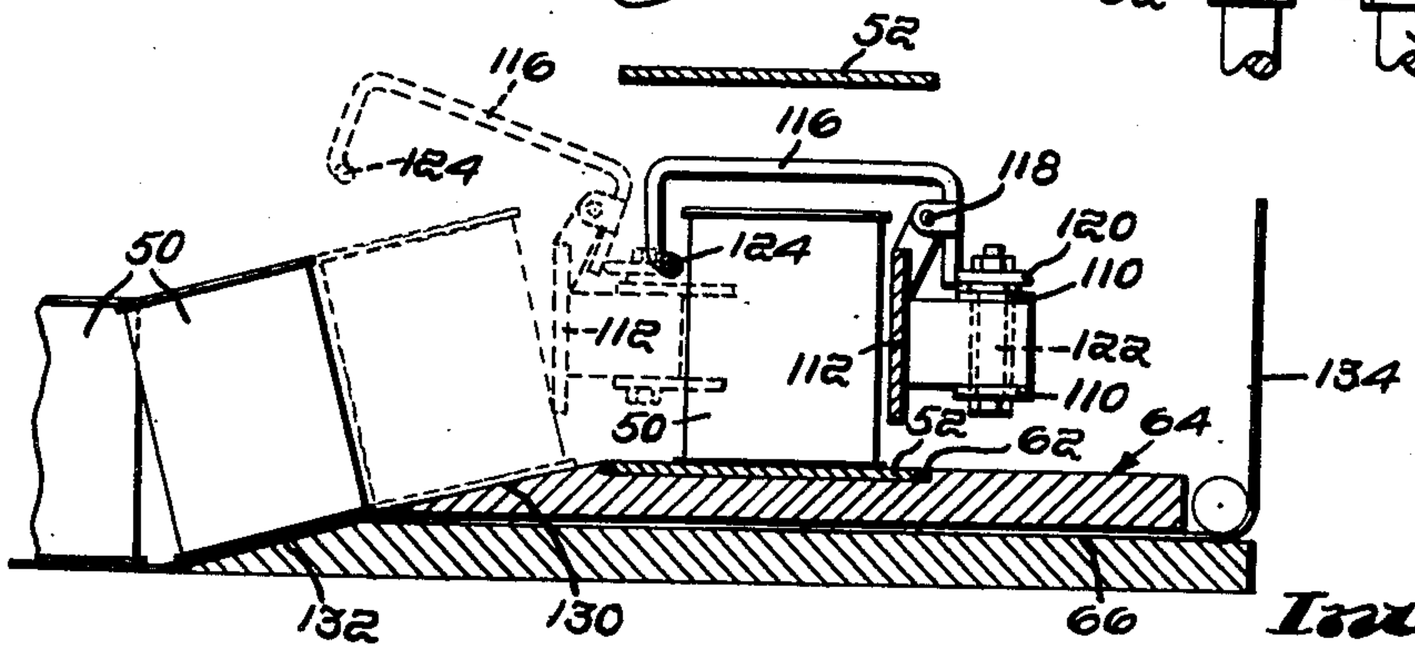


Fig. 7.



Inventor:
Richard M. Botley
By Lyon Lyon
Attorney

Patented Nov. 17, 1953

2,659,496

UNITED STATES PATENT OFFICE

2,659,496

CAN STACKER AND UNSTACKER

Richard M. Botley, Honolulu, Territory of Hawaii, assignor to Hawaiian Pineapple Company, Limited, Honolulu, Territory of Hawaii, a corporation of Hawaii

Application August 16, 1950, Serial No. 179,682

17 Claims. (Cl. 214—6)

1

My invention concerns a machine for stacking and unstacking objects, particularly sealed cans, stackable in superposed tiers and more especially concerns such a machine which is adapted to stack and unstack a plurality of tiers simultaneously.

To the extent that it utilizes an anchored carrier belt for each of the tiers of cans, which belt is left in the stack on completion of the stacking operation, and to the extent that it is moved away from the anchored end of the belt on stacking and toward such end on unstacking, the machine herein is similar to the machine described in my copending application Serial No. 169,930, filed June 23, 1950. Otherwise, it is substantially different, a principal advantage thereof residing in the fact that it may be operated at a relatively low speed to stack or unstack a greater number of cans per unit time.

I shall describe my present invention in its preferred embodiment with the aid of the accompanying drawings, in which:

Fig. 1 is a plan, with certain parts omitted or shown broken away or in broken lines for sake of clarity;

Fig. 2 is a side elevation;

Fig. 2A and 2B are detail views of the means used to control the flow of cans received for stacking by the machine, Fig. 2A showing the principal parts in section, Fig. 2B being a perspective view omitting certain minor parts;

Fig. 3 is an end elevation;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a detail in plan of certain parts to be hereinafter identified;

Fig. 6 is a section on the line 6—6 in Fig. 5; and

Fig. 7 is a section on the line 7—7 of Fig. 5.

Referring first particularly to Figs. 1 and 2, the machine is supplied with cans to be stacked by a belt 10 traveling toward the left, over idlers 12, the idlers being supported from rail members 14 which serve to retain the cans 50 on the belt. These members in turn are supported through brackets 16 (see Fig. 3) fixed as to building columns 18.

In the unstacking function of the machine, the unstacked cans are delivered to a second belt 20, traveling toward the right in Figs. 1 and 2, this belt being positioned just slightly above the level of the warehouse floor at the side of the machine opposite the side above which the belt 10 travels. Neither belt forms a part of the machine proper.

The machine includes a frame 22, having an

2

extension 24 and is adapted to be driven horizontally in either direction over a trackway 28 on wheels 30 by a reversible motor 32, mounted with suitable reduction gearing 34 on a platform 36 fixed to the frame. Chain 38 (Fig. 2) links a sprocket wheel 40 fixed to rotate with one of the wheels 30 and a sprocket keyed to the output shaft of the reduction gear unit.

In the stacking operation of the machine, the cans 50 are removed from the belt 10 as the machine is advanced along the belt by a plow attachment 42 such as is described and claimed in my copending application above identified. The cans are diverted to a four-lane can divider 44 carried by the extension 24 of the frame 22, the divider, as shown, including three divider-deflector members 46. The divider portion 150 of each member 46 is shaped as a conventional can divider (Fig. 2B) and functions in the same manner. Such portion is mounted with the deflector portion 152 on a rock shaft 154 journaled in supports 160 (Fig. 2A) fixed to a frame piece 162 extending between the side walls of the can divider. A tension spring 158 connects a bracket fixed to the frame piece and an arm fixed to the shaft, the axis of the spring when the latter is in neutral position being normal to that of the shaft.

The shaft 154 carries a key 164 (Fig. 2A) received in a key way cut in the portions 150 and 152 which are fixed together and manually slidable on the shaft, such movement being facilitated by the knob 156. As shown in Fig. 2 the cans 50 are alternately directed into adjacent chutes 48 by the two lower divider-deflector members. When it is desired that cans be directed to only one of the chutes it is only necessary to slide the portions 150 and 152 on the shaft so that the portion 152 is brought directly under the descending cans (to the right in Fig. 2A) and to turn the shaft, if necessary, in a direction away from the selected chute. The distance through which the shaft may be turned is limited as by suitably placed stops, not shown.

Each of chutes 48 feeds the lower run of an endless belt 52 extending diagonally across the width of the frame 22. Belts 52 are driven by means of suitable bevel gearing 54, 54' through a shaft 56 by a motor 58 mounted on the main frame 22. Motor 58 and shaft 56 are connected by a chain 60 passing around a sprocket keyed to the shaft of the motor and a sprocket of wider diameter fixed to the shaft 56 near one end thereof.

Each belt 52 travels in its lower pass or run

in a recess 62 (Fig. 7) in the top of a wedge plate 64. These plates, which are suitably fixed to the frame 22, are slotted at 66 over the greater portion of their length for a reason which will subsequently appear.

A star can counter 68 keyed to a shaft 69 rotatably held by bearings, not shown, supported from the frame 22, extends through a slot 70 in one side of the chute 48 (Figs. 5 and 6). This counter, as shown, being a six-pocket counter, each can descending onto the lower pass of the belt 52 rotates the shaft 69 one-sixth of a revolution. A spring detent 72 assures proper positioning of the counter with relation to the oncoming cans, while a deflector plate 73 prevents any of the cans from over-carrying the belt.

In addition to the counter, shaft 69 carries a pinion 74 (Fig. 6) and a ratchet wheel 76. Pinion 74 meshes with a gear 78 on a shaft 80 supported, as shaft 69 from the frame 22. A bifurcated lever 82 pivoted or fulcrumed at 84 carries a cam follower 86 and a pawl 88 hingedly connected to the lever at its pivot point 84. Detent 90 is cut complementarily with relation to the notches in the ratchet wheel 76. Cam follower 86 is maintained in engagement with a cam 92, fixed to the shaft 80, by a compression spring 94. A tension spring 96 connects the lever and pawl at their right-hand ends, the pawl also being linked at its right-hand end to a rod 98 reciprocal in guides 100. Rod 98 carries an arm 102 adapted to actuate a switch 104 controlling a solenoid, not shown, governing a valve, not shown, comprised in the hydraulic system including the cylinder 108.

The gear ratio in the case of pinion gear 74 and driven gear 78 is 1:2.5. Accordingly, shaft 80 makes only one complete revolution for each 2½ revolutions of shaft 69, i. e., for each 15 cans deposited on the lower run of belt 52. As the fifteenth can reaches the conveyer, detent 90 snaps into one of the notches in the ratchet wheel 76 to momentarily lock the shaft 69 and the counter 68. This action is accompanied by movement of the rod 98 in the direction of the belt 52, closing of the switch 104 by the arm 102, and the admission of fluid to the hydraulic cylinder 108.

The piston in cylinder 108 is hingedly connected to one end of a bell crank 110, which is pivotally connected at its other end 111 to a pusher plate 112 coextensive with the length of the row of cans on the belt 52. As the pusher moves the cans off the belt, more accurately the lower pass thereof, loss of cans from the end of the still moving belt opposite the cylinder is avoided by the gates 114 (Fig. 2) suitably removably secured to the frame of the machine. Guard 116 (Fig. 7) which assures proper alignment of the cans on the belt 52 is hingedly connected to the pusher plate 112 at 118. A cam 120 fitted to the pin 122 and keyed to the bell crank at 111 turns in correspondence with changes in the angularity of the bell crank to elevate and lower this guard. Portion 124 of the latter has a length substantially conforming with that of the pusher plate.

The distance through which the pusher plate moves is indicated by both Figs. 5 and 7 wherein the most forward position of the plate is shown in broken lines. As the plate nears this position the curved end thereof 126 (Fig. 5) engages the end of the rod 98 to move the same to the extent required to bring about the opening of the switch

104 and unlocking of the star counter 68 through removal of the detent 90 from the notch in the ratchet wheel 76. On the opening of the switch, the bell crank and the associated linkages 128 (Fig. 1) are returned by the hydraulic cylinder 108 to their positions as indicated by the full line representation of the bell crank in Fig. 5. A dead contact 106 acts to limit movement of the rod 98.

Wedge plates 64 each include an upper wedge portion 130 and a lower wedge portion 132 (Fig. 7), these being separated by the previously mentioned slot 66. As the row or line of cans is pushed off the upper wedge portion by the pusher plate, the force of which is transmitted through the succeeding row of cans, it is received on a paper belt or strip 134 threaded through the slot 66. This belt is fed from a drum or roll 136 (Fig. 4) and is anchored as to the wall of the warehouse or to special anchoring means, not shown. Drums 136 are driven by hydraulic motors 140 through gearing 142 (Fig. 2). Their peculiar angular disposition, necessary in view of the diagonality of the transverse belts 52, assures substantially uniform tension across the width of the belts 134 and avoids misalignment of the belts in winding and unwinding.

With the transverse belts arranged as shown, the cans are deposited on the belts 134 in a staggered pattern with the axes of the staggered rows such that the rows paralleling the longitudinal edges of the belts are unbroken. This provides a firmer stack than would obtain should the side rows be broken, a condition which would be prone to result if the belts 52 were disposed at right angles with relation to the belts 134. The rate at which the latter belts are unwound from the drums in stacking operation corresponds, of course, with the rate of advancement of the machine as a whole against the cans approaching on the feed belt 10.

From Fig. 4 it is to be observed that in the case of the right hand wedge plate the lower wedge portion 132 is elongated, the elongation being demanded by the positioning of the plate at a level corresponding with that of the adjacent wedge plate.

To begin the stacking operation the machine is driven as closely as possible to the warehouse wall or to the special anchoring means, if such are used, and anchoring of the belts 134 effected. Then, after these belts have been properly tensioned either through operation of the drums 136 or by slightly retracting the machine, cans are first admitted only to the chute 48 serving the transverse belt 52 farthest removed from the can divider 44. With the machine held stationary the corresponding belt 134 coacting with such transverse belt is loaded with cans by the corresponding pusher plate 112 until the belt is filled to substantially the capacity of the unwound portion thereof. At this stage cans are admitted to the chute 48 serving the second transverse belt 52 (counting from the right in Fig. 4). Once the belt 134 coacting with the second transverse belt has been loaded to substantially the capacity of the unwound portion thereof, cans are fed to the third transverse belt and so on until further loading of the longitudinal belts requires movement of the machine along the feed belt 10.

The procedure as just above described is, of course, subject to some variation. Thus, the belts 134 may be anchored sequentially rather than all at the same time; indeed, this practice is preferred where any substantial amount of hand work is found necessary. If desired, auxiliary

side pieces may be used in the initial loading of the belts 134 to increase the effective length of the guards 144, one pair of which will be seen in Figs. 1 and 2.

Following completion of the stack, the paper belts 134 are cut or otherwise severed from the feed rolls 136, preferably on lines forward of the wedge plates so as to avoid the necessity for subsequent re-threading of the belts through the slots in these plates. The sheets thus left in the stack have been found to contribute markedly to the stability of the stack.

It is not essential that the belts 134 be made of paper, since canvas belts, for example, formed of readily disconnectable sections of a size determined by the dimensions of the tiers, can be employed with substantially equivalent results.

In the use of the described machine to unstack cans, the machine, with the gates 114 removed or open and with the guard 116 held in its raised position, is driven toward the stack to a point where the belt sections or sheets underlying the tiers can be conveniently reconnected for winding in on the drums 136. In the case of a paper belt, a fast-drying glue may be used to effect the reconnection. With the reconnection made and with the belts properly tensioned through operation of the drums 136, the machine is moved into the stack, while the drums are rotated in a reverse direction at a rate corresponding with the rate of movement of the machine. As the machine advances toward the anchored ends of the belts 134, cans are continuously transferred from these belts to the transverse belts 52 which operate to deliver them to the chutes 146 serving the belt 20. One wall of each of chutes 146 extends across the lower reach of corresponding belt 52, as shown by the dotted lines in Fig. 1, and serves to deflect the cans from the advancing belt 52, gates 114 being in the open position. The action of wedge plates 64 on unstacking will be made apparent by reference to Fig. 4.

When the machine has reached the limit of its leftward movement, the uppermost belt section is unanchored and, with the machine now stationary, wound in to the extent necessary to enable transfer of the last row of cans thereon to the upper wedge portion of the corresponding wedge plate and thence to the corresponding transverse belt. Subsequently, the next uppermost belt section is unanchored and wound in and so on until the unstacking is completed by the transfer of the last row of cans on the lowermost belt section from the upper wedge portion of the corresponding wedge plate to the transverse belt farthest removed from the can divider. Some hand work, of course, is necessary during the phase of the unstacking when the machine is stationary.

It will be readily apparent that the machine as shown in the drawings is susceptible to substantial modification without departure from the spirit and scope of the invention. Thus, those skilled in the art will immediately recognize that there is nothing critical in the illustrated quadruple construction, since the machine obviously may be constructed to simultaneously stack or unstack a greater or lesser number of tiers.

What I claim is:

1. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out and drawing in a plurality of belts under tension, a plurality of wedge elements associated with said frame member in

fixed relation at a plurality of levels spaced apart by a distance equal to the spacing between said tiers or layers, said wedge elements underlying said belts as they are paid out and drawn in, and conveyor means through which each said belt is supplied with a layer of the objects in stacking operation of the machine, said conveyor means receiving the objects from said belts in unstacking operation of the machine.

2. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out and drawing in a plurality of belts under tension, a plurality of wedge members associated with said frame member in fixed relation at a plurality of levels spaced apart by a distance equal to the spacing between said tiers or layers, said wedge members underlying said belts as they are paid out and drawn in, and a plurality of second belts, disposed transversely to the direction of travel of said first-mentioned belts through which each of said first-mentioned belts is supplied with a layer of the objects in stacking operation of the machine, said transverse belt receiving the objects from said first-mentioned belts in unstacking operation of the machine.

3. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out and drawing in a plurality of belts in superposed relation under tension as the frame member is moved in stacking and unstacking operation of the machine along a path away from and toward the free end of the belts at a rate corresponding to the rate at which the belts are paid out and drawn in, each of said belts being anchored at its end remote from said machine, a plurality of wedge elements, equal in number and complementary to said belts, fixedly associated with said frame member, each in position to underlie the corresponding belt as paid out and drawn in and to be entered into the stack under the corresponding belt on unstacking movement of said frame member, and a plurality of endless belts, equal in number to said first-mentioned belts and disposed in transverse angular relation to the direction of travel of said first-mentioned belts through which said first-mentioned belts are supplied with the objects in stacking operation of the machine and on which the objects are deposited from said first-mentioned belts in unstacking operation of the machine.

4. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out and drawing in a belt under tension as said frame member is moved in stacking and unstacking operation of the machine in a direction away from and toward the free end of the belt, a wedge plate associated with said frame member so as to stand in angular transverse relation to the direction of travel of said belt, said plate having an elongated slot therein through which said belt passes and comprising a portion entering the stack under said belt on unstacking movement of said frame member, and conveyor means through which said belt is supplied with a layer of the objects in stacking operation of the machine, said conveyor means receiving the objects from said belt in unstacking operation of the machine.

5. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out and drawing in a belt under tension as said frame member is moved in stacking and unstacking operation of the machine in a path away from and toward the free end of the belt at a rate corresponding to the rate at which the belt is payed out and drawn in, said belt being anchored at its free end remote from said machine, a wedge plate associated with said frame member so as to stand in angular transverse relation to the path of travel of said belt, said plate having an elongated slot therein through which said belt passes and comprising a portion entering the stack under said belt on unstacking movement of said frame member, and conveyor means disposed in overriding relation to said wedge plate through which said belt is supplied with a layer of the objects in stacking operation of the machine, said conveyor means receiving the layer of objects from said belt in the unstacking operation of the machine.

6. A machine as defined by claim 5 in which the conveyor means is a conveyor belt.

7. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out and drawing in a plurality of belts under tension in superposed relation as the frame member is moved in stacking and unstacking operation of the machine in a path away from and toward the free end of the belts at a rate corresponding to the rate at which the belts are payed out and drawn in, each of said belts being anchored extraneously of the machine, a plurality of wedge plates, equal in number and complementary to said belts, supported by said frame member in transverse angular relation to the path of said belts, each of said wedge plates having a recessed upper surface and an elongated slot through which the corresponding belt passes and further comprising a portion adapted to enter the stack under the corresponding belt on unstacking movement of said frame member, and a plurality of endless belts, equal in number to said first-mentioned belts, through which said first-mentioned belts are supplied with the objects in stacking operation of the machine and on which the objects are deposited in unstacking operation of the machine, the working passes of said endless belts coursing the recesses in said wedge plates.

8. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means including an obliquely mounted drum in association with said frame member and extending diagonally thereacross for paying out and drawing in a belt under tension as said frame member is moved in stacking and unstacking operation of the machine in a path away from and toward the free end of the belt at a rate corresponding to the rate at which the belt is payed out, said belt being anchored at its free end remote from said machine, a wedge plate associated with said frame member, and extending diagonally thereacross below said drum, having an elongated slot therein through which said belt passes and further comprising a portion adapted to enter the stack under said belt on unstacking movement of said frame member, and conveyor means through which said belt is supplied with a layer of the objects in stacking operation, said conveyor means receiving the objects from said belt in unstacking operation.

9. In a machine for stacking and unstacking objects stackable in superimposed tiers or layers, a frame member linearly movable horizontally, means including a plurality of obliquely mounted drums in association with said frame member and extending diagonally thereacross for paying out and drawing in an equal number of belts in superposed relation under tension as the frame member is moved in stacking and unstacking operation of the machine in a path away from and toward the free end of the belts at a rate corresponding to the rate at which the belts are payed out and drawn in, each of the belts being anchored extraneously of the machine, a plurality of wedge plates, equal in number and complementary to said belts, supported by said frame member and extending angularly thereacross, each having an elongated slot therein through which the corresponding belt passes and a portion adapted to enter the stack under the corresponding belt on unstacking movement of said frame member, and a plurality of conveyor belts, equal in number to said wedge plates and similarly disposed with relation to said frame member, said conveyor belts delivering the objects for deposition onto said first-mentioned belts in stacking operation and receiving the objects from said first-mentioned belts in unstacking operation.

10. In a machine for stacking and unstacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means including a plurality of obliquely mounted drums in association with said frame member and extending diagonally thereacross for paying out and drawing in an equal number of belts in superposed relation under tension as the frame member is moved in stacking and unstacking operation of the machine in a path away from and toward the free end of the belts at a rate corresponding to the rate at which the belts are paid out and drawn in, each of said belts being anchored extraneously of the machine, a plurality of wedge plates, equal in number and complementary to said belts, supported by said frame member and extending diagonally thereacross, each having a recessed upper surface and an elongated slot through which the corresponding belt passes and further comprising a portion adapted to enter the stack under the corresponding belt on unstacking movement of said frame member, a plurality of endless belts equal in number and complementary to said wedge plates and disposed with relation to said frame member as said wedge plates, the lower pass of each of said endless belts riding in the recess in the corresponding wedge plate, means for feeding said lower passes with the objects in stacking operation of the machine and means for transferring the objects from said lower passes to said first-mentioned belts on such operation, said lower passes receiving the objects from said first-mentioned belts in unstacking operation.

11. In a machine for stacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out a plurality of belts under tension as said frame member is moved in a direction away from the free end of the belts, said belts being anchored at their free ends remote from the machine, a plurality of wedge elements associated

with said frame member in fixed relation at levels corresponding to the level of each of the tiers, and conveyor means through which each said belt is supplied with a layer of the objects as the belt is paid out over said wedge element.

12. In a machine for stacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out a plurality of belts under tension as said frame member is moved in a direction away from the free end of the belts at a rate corresponding to the rate at which the belts are paid out, said belts being anchored at their free ends extraneously of the machine, a plurality of wedge elements associated with said frame member in fixed relation at levels corresponding to the level of each of the tiers, and endless belt means through which each of the first said belts is supplied with a layer of the objects as the the first said belts are paid out over said wedge element, said endless belt means being disposed in transverse relation to the path of said first-mentioned belts as paid out.

13. In a machine for stacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means in association with said frame member for paying out a belt under tension as said frame member is moved in a direction away from the free end of the belt at a rate corresponding to the rate at which the belt is paid out, said belt being anchored at its free end extraneously of the machine, a wedge plate fixedly supported by said frame member in transverse angular relation thereto, said plate having a recessed upper surface and an elongated slot through which said belt passes, and an endless belt through which said first-mentioned belt is supplied with a layer of the objects as it is paid out, the working pass of said endless belt coursing the recess in said wedge plate.

14. In a machine for stacking objects stackable in superposed tiers or layers, a frame member linearly movable horizontally, means including an obliquely mounted drum supported by said frame member and extending diagonally thereacross for paying out a belt under tension as said frame member is moved in a direction away from the free end of the belt at a rate corresponding to the rate at which the belt is paid out, said belt being anchored at its free end remote from said machine, a wedge plate fixedly associated with said frame member, and extending diagonally thereacross below said drum, having a recessed upper surface and an elongated slot through which said belt passes, a conveyor belt through which said first-mentioned belt is supplied with a layer of the objects as it is paid out, said conveyor belt coursing the recess in said plate, and pusher means for transferring the objects from said conveyor belt to said first-mentioned belt.

15. In a machine for unstacking objects stacked

in superposed layers, the layers being separated by intervening leaves of sheet material anchored at the back of the stack, a frame member, linearly movable horizontally, having associated therewith means for maintaining said leaves taut as the frame member is moved toward the anchored ends of the leaves, a plurality of wedge elements, equal in number to and spaced apart as the leaves, fixedly supported by said frame member in position to enter the stack under the leaves, and conveyor means receiving the objects from said leaves for transport to a point of discharge.

16. In a machine for unstacking objects stacked in superposed layers, the layers being separated by intervening leaves of sheet material anchored at the back of the stack, a frame member linearly movable horizontally, individual belt means associated with said frame member for maintaining said leaves taut as the frame member is moved toward the anchored ends of the leaves, a plurality of wedge members, equal in number to and spaced apart as said leaves, supported by said frame member in position to enter the stack under the leaves, each said wedge member having an elongated slot therein through which the corresponding leaf passes in operation of the machine, and a plurality of conveyor belts equal in number to said wedge members and disposed with relation to said frame member as said wedge members, said conveyor belts receiving the objects from said leaves for transport to a point of discharge.

17. In a machine for unstacking objects stacked in superposed layers, the layers being separated by intervening leaves of sheet material anchored at the back of the stack, a frame member linearly movable horizontally, powered belt means associated with said frame member for maintaining said leaves taut as the frame member is moved toward the anchored ends of the leaves, a plurality of superposed wedge members supported by said frame member and extending diagonally thereacross in position to enter the stack under said leaves, each having a recessed upper surface and an elongated slot through which the corresponding leaf passes in operation of the machine, and a plurality of endless conveyor belts equal in number and complementary to said wedge members and disposed with relation to said frame member as said wedge members, said conveyor belts receiving the objects from said leaves for transport to a point of discharge, the working passes thereof coursing the recesses in the wedge members.

RICHARD M. BOTLEY.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
488,404	Robertson	Dec. 20, 1892
1,582,411	Lesser et al.	Apr. 27, 1926
2,237,345	Frentzel, Jr. et al.	Apr. 8, 1941
2,442,250	Spain	May 25, 1948