

May 23, 1950

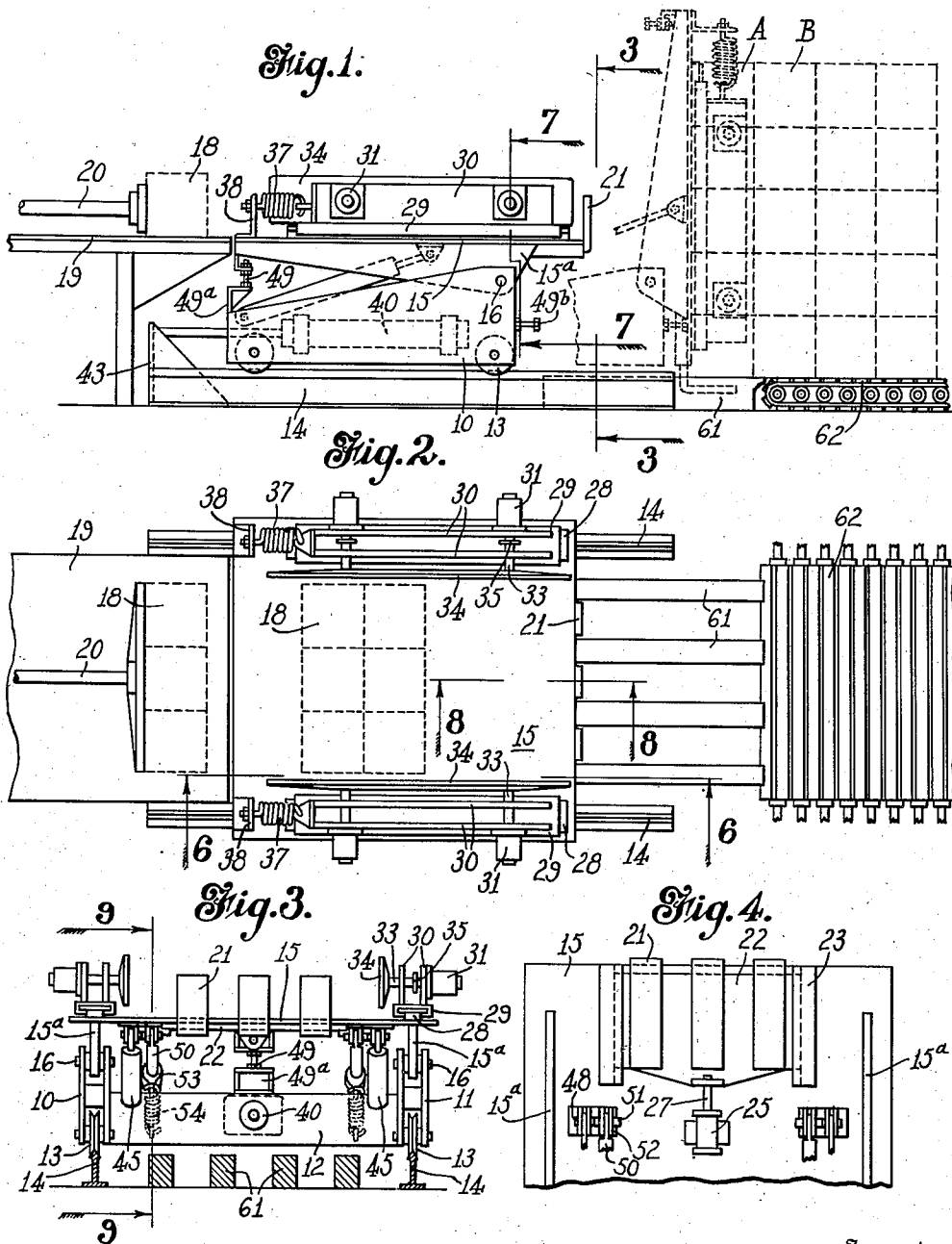
R. D. VON BEREN

2,508,698

STACKING OR TIERING MACHINE

Filed April 24, 1946

3 Sheets-Sheet 1



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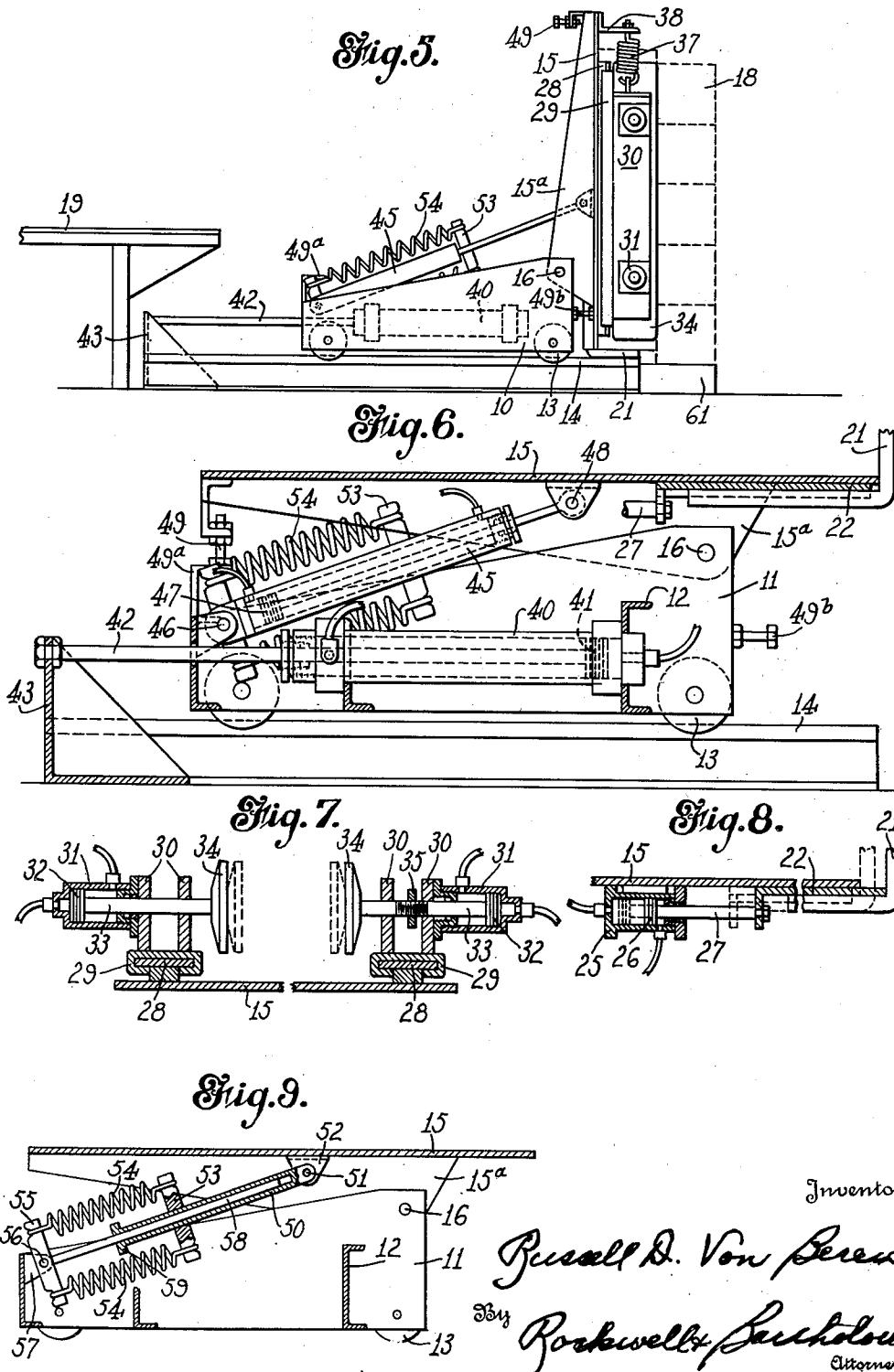
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3 Sheets-Sheet 2



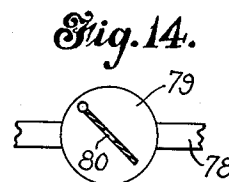
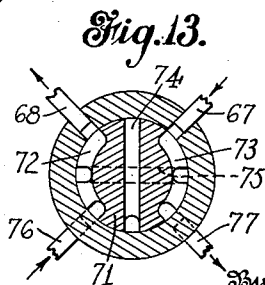
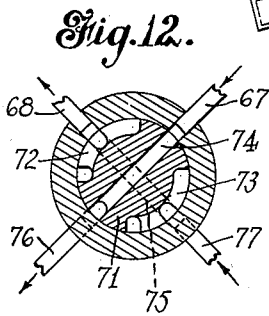
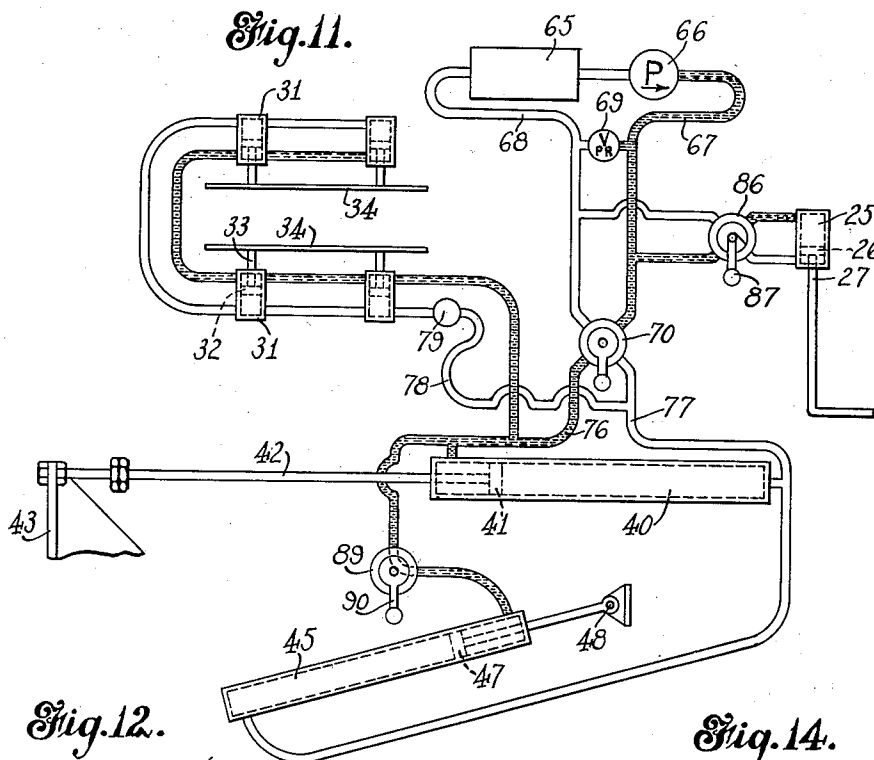
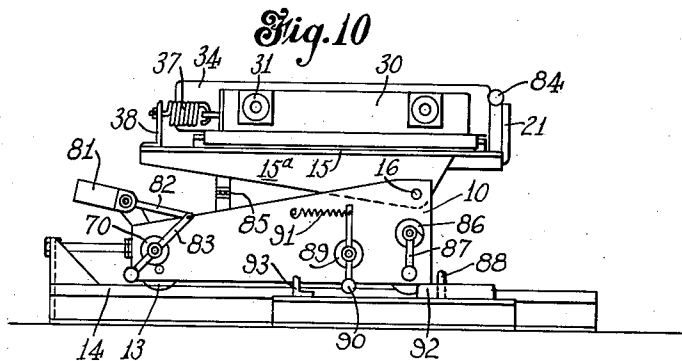
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,508,698

STACKING OR TIERING MACHINE

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Application April 24, 1946, Serial No. 664,653

16 Claims. (Cl. 214—6)

1

This invention relates to stacking or tiering machines, and more particularly to a device adapted to receive a plurality of articles and stack or tier them in a plurality of rows, one upon the other. The device may be used for handling cartons, cases, boxes, or even loose articles such as bricks or concrete building blocks or the like.

In many manufacturing plants the articles may be placed in cases, boxes, or cartons which are usually of a standard size, and these cases or boxes are usually handled individually, either for storing purposes or when placed upon a truck for transportation from the factory. The same is true with some articles such as building blocks, for example, which are not crated, and this individual handling of the items adds considerable expense to the cost of transportation.

I contemplate by the present invention to provide a device which may receive a plurality of separate articles, cases, or boxes, as the case may be, and stack them in a plurality of rows such that they may be moved readily to a stored position, or loaded upon a truck or the like for transportation to a distant point.

Generally speaking, the device consists of a movable carriage upon which a table is tiltably mounted, the table being adapted to receive the separate packages from a conveyor or other delivery means, and after a sufficient quantity of the articles or packages have been received upon the table, the latter may be tilted to place the articles or cases in a vertical stack and also move them forward, so that a plurality of these vertical stacks may be placed upon a suitable support, one rearwardly of the other, the forward movement of the carriage serving also to move forwardly the stacks deposited upon the support at a previous operation.

Thus the cases or articles may be handled mechanically instead of manually, and a considerable saving effected. Moreover, the device may be power-operated, and automatic means provided for actuating the various parts of the device in order that the labor necessary to operate it is reduced to a minimum.

One object of the present invention is to provide a device to automatically stack articles, cases, or boxes by a mechanical operation.

A further object of the invention is to provide a stacking device which will up-end a plurality of cases or articles to arrange them in a plurality of tiers and to move each stack forwardly so that a plurality of stacks, each of which comprises a number of tiers of cases, may be arranged compactly together upon a support or carrier in an economical and expeditious manner.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

2

In the accompanying drawings:

Fig. 1 is a side elevational view of a stacking machine embodying my invention;

Fig. 2 is a top plan view thereof;

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

Fig. 4 is a bottom plan view of the forward end portion of the tilting table;

Fig. 5 is a view similar to Fig. 1, but showing the parts in another position;

Fig. 6 is a sectional view on line 6—6 of Fig. 2;

Fig. 7 is a partial sectional view on line 7—7 of Fig. 1;

Fig. 8 is a fragmentary sectional view on line 8—8 of Fig. 2;

Fig. 9 is a sectional view on line 9—9 of Fig. 3;

Fig. 10 is a view similar to Fig. 1, showing certain control mechanism;

Fig. 11 is a diagrammatic view of the automatic control mechanism for my device;

Fig. 12 is a diagrammatic sectional view of one of the valves employed in the control mechanism;

Fig. 13 is a view similar to Fig. 12, showing the valve in another position; and

Fig. 14 is a diagrammatic sectional view of a variable control valve employed in the control system.

To illustrate a preferred embodiment of my invention, I have shown in Fig. 1 of the drawings a carriage consisting of side members 10 and 11, and one or more transverse members 12, mounted upon flanged, guiding wheels or rollers 13, the rollers being supported upon rails 14 comprising a track upon which the carriage may move.

Tiltably mounted upon the carriage is a table 15 supported from standard 15^a which are pivotally connected at 16 to the side members 10 and 11, so that the table may tilt from the horizontal position, shown in full lines in Fig. 1, to a vertical position, shown in dotted lines in this figure and in full lines in Fig. 5.

The table 15 is adapted to receive cases or other articles 18 from any desired means, such as a platform 19, shown in Figs. 1 and 2. As illustrated, a plunger or pusher 20 is provided to transfer the cases or articles 18 from the platform to the supporting table, although it will be understood that they may be moved upon the latter by any appropriate means.

Mounted at the forward end of the table 15 are end gate members 21, these members as shown being L-shaped in form and being secured to a carrier plate or slide 22 slidably mounted at the under surface of the table in lateral guides 23, so that the end gate may have a limited sliding movement relatively to the table. To move this end gate to its extended or retracted position, I have shown a fluid cylinder 25 within which operates a piston 26 (Fig. 8) connected by a piston rod 27 to the slide 22.

At each side of the table 15 is provided a guide member 28 upon which is slidably mounted a support 29 carrying a pair of spaced standards 30. Secured to one of these standards is a pair of cylinders 31 within which operate pistons 32 connected by piston rods 33 to a condenser plate 34, the arrangement being such that, as shown in Fig. 7, the two compressor plates, one at each side of the table, may be moved toward each other to grip or squeeze the articles or cases between them so that they will be held securely during movements of the carriage and table. A stop 35 may be provided on the piston rods 33 at one side of the table so as to limit the inner position of the compressor plate 34 at that side, and thus align all of the articles or packages at that side of the device, so that when they are deposited upon a support, as will be hereinafter explained, they will be in evenly aligned rows or stacks.

The supports 29 are, as stated, slidably mounted upon the members 28, so that the compressor plates 34 may move longitudinally of the table as well as transversely thereof, the members 29 being normally held, however, in a rearward position by springs 37 (Fig. 2) secured to the standards 30 and to brackets 38 mounted upon the table 15. The carriage may be moved forwardly and rearwardly by means of a fluid-pressure cylinder 40 mounted on the carriage, a plunger 41 operating within the cylinder and being connected by the piston rod 42 to a bracket 43 fixedly secured in place. It will be obvious that when fluid pressure is admitted to the cylinder 40, the latter will be driven forwardly or rearwardly, depending upon the end of the cylinder to which the fluid pressure is admitted, and thus will move the carriage forwardly or rearwardly upon the fixed track 14, as the case may be.

As shown in Fig. 6, a fluid pressure cylinder 45 is pivoted to the carriage at 46, at each side thereof, and the plungers 47 operating in these cylinders are pivoted at 48 to the table 15, so that operation of the plungers 47 will serve to tilt the table from the full-line to the dotted-line position in Fig. 1, and also draw it back to its original position, arrangements being made for admitting fluid pressure at either end of the cylinders 45, as desired. Also secured to the lower side of the table is an adjustable stop member 49 adapted to engage a bracket 49^a on the carriage to support the table in its horizontal position. A similar adjustable stop 49^b is provided on the front portion of the carriage to engage the table when the latter reaches a vertical position.

It will be appreciated that as the table is tipped from its horizontal position it will, when the center of gravity passes over the pivot point 16, tend to swing to a vertical position by its own weight, and likewise upon its return movement it will tend to assume a horizontal position by reason of its own weight after the center of gravity has passed to the left of the pivot 16. In order to assist the return movement of the supporting table at the beginning of such movement, and also cushion the latter portion of the tilting movement of the table, I have provided the mechanism shown more particularly in Figs. 6 and 9, one of these devices being provided at each side of the table. As shown in Figs. 6 and 9, a tubular member 50 is pivoted at 51 to a bracket 52 at the under side of the table 15, and slidably mounted upon this tube is a crosshead 53 connected by springs 54 to a second crosshead 55

pivoted at 56 to a bracket 57 on the carriage. Also pivoted to the bracket 57 at the point 56 is a guide rod 58 slidably received in the tube 50. The latter is provided with a limiting flange or head 59 on its free end, so that it will have a lost-motion slidable connection with the crosshead 53.

It will be apparent from inspection of Fig. 9 that, as the table is tilted forwardly by action of the plunger 47, the tubular member 50 will slide through the crosshead 53 until the limiting flange 59 comes into engagement with the crosshead, and thereafter the latter will be carried with the member 50, thus tensioning the springs 54. It may be assumed that engagement of the flange 59 with the crosshead 53 will take place approximately as the center of gravity of the load passes to the right of the supporting pivots 16, so that as the table 15 continues its tilting movement the force of gravity acting thereon will be counter-balanced by the springs 54. Likewise, upon the return movement of the table 15, the springs 54 will assist in raising the table about its pivots until the center of gravity of the table has passed to the left of the pivots 16, at which time the limiting flange 59 will move out of engagement with the crosshead 53 and the springs will no longer be under tension.

As shown more particularly in Figs. 1 to 3, a plurality of spaced supporting rails or skids 61 are provided between the track rails 14. These skids 61 will preferably be so spaced as to permit the end gate members 21 to pass between them upon the tilting of the table 15. Forwardly of the skids 61, some means such as a slat conveyor 62 may be provided to receive the tiered or stacked cases, and, if desired, convey them to a distant point. If desired, instead of providing the conveyor 62, the cases or articles may be deposited upon a pallet located forwardly of the skids 61.

The operation of my device may be briefly described as follows: The cases or articles 18 may be delivered to the platform 19 by any suitable means, and a row of these articles, such as the three shown in Fig. 2, moved forwardly upon the supporting table 15. Successive rows will then be moved onto the table 15 until the latter is full, each row pushing before it rows already on the table, the forward row presumably being lodged against, or substantially against, the end gate members 21. As soon as the table 15 is filled, the fluid pressure may be admitted to the cylinders 31 to move the compressor plates toward the sides of the cases 18 so as to align these cases against the right-hand compressor plate, as shown in Fig. 7. Substantially simultaneously, fluid pressure will be admitted to the cylinders 40 and 45, so that, at the same time that the compressor plates are moved toward each other to grip the load, the tilting of the table and the forward movement of the carriage will be initiated. The tilting movement will be completed promptly, and, as the end gate members 21 will pass between the members 61, the load will be up-ended to a vertical position and held a short distance above the skids. At this time, of course, the compressor plates will have gripped the load tightly so that it will be properly held at its side edges.

At this time pressure fluid is admitted into the cylinder 25 to permit the end gate members to move from the dotted-line position shown in Fig. 8 to the full-line position shown in that figure, thus moving these members away from the

5

bottom cases 18, and permitting the entire stack of cases to be deposited upon the skids 61.

The continued forward movement of the carriage will then move the entire stack of articles forwardly, the stack still being gripped by the compressor plates 34, over the skids 61 to the forward end of these skids, or in the position of the stack designated by the letter A in Fig. 1. It may here be stated that upon a succeeding operation the next stack will, at the end of the forward movement of the carriage, move this stack A into the position occupied by the stack B on the conveyor 62, and that, as each succeeding stack is moved up to the ends of the skids, the previously deposited stacks will be moved one step forwardly, provided, of course, they have not been carried away by the conveyor. Thus a plurality of stacks of the articles or cases may be deposited upon the conveyor or upon a pallet or other conveying means, these stacks being properly aligned, and the articles or cases being held compactly together by the compressor plates 34 during the movement of the machine.

It will be understood that, when the end gate or abutment members 21 are lowered, the articles or cases A are still gripped between the compressor plates 34, and that the weight of the articles will cause these compressor plates to move downwardly against the action of the springs 37 to permit the articles themselves to move downwardly and be deposited upon the skids 61, the compressor plates and the supports 29 sliding upon the guide members 28 during this movement.

After the carriage has been moved to its extreme forward position, as shown in Fig. 5 and in dotted lines in Fig. 1, it is withdrawn from the stack of articles which it has carried by a reversing of the movements heretofore described. In the first instance, fluid pressure is admitted to the cylinders 31 forwardly of the pistons 32, to retract or move outwardly the compressor plates 34 to release the load. Then, or substantially simultaneously therewith, fluid pressure is introduced into the rear end of the cylinder 40 to initiate the rearward movement of the carriage. As soon as the end gate or abutment members 21 move from beneath the stack A, fluid pressure may be introduced to the forward end of the cylinders 45 to return the table 15 to a horizontal position, and also to the forward end of the cylinder 25 to retract the end gate members to their original positions, namely, the positions shown in dotted lines in Fig. 8. As soon as the compressor members are moved to disengage the load, they will be drawn upwardly by the springs 37. Thus the parts will be restored to their original positions, shown in full lines in Fig. 1, in readiness for a successive operation.

If desired, the introduction of fluid pressure into the various operating fluid motors may be effected automatically, as indicated in Figs. 10 to 14, inclusive. Referring particularly to Fig. 11, I have shown diagrammatically an arrangement for effecting the introduction of fluid pressure into the various operating cylinders which lends itself to automatic control. A storage tank for a fluid such as oil, for example, is shown at 65, and a circulating pump at 66, the pump delivering through the pipe 67, and a pipe 68 permits return of the fluid to the tank. The outlet and return pipes may be connected by a pressure relief valve 69, so that when the devices are at rest, fluid pressure may by-pass from the outlet to the return pipes, and again to the tank, so as

6

to permit continuous operation of the pump. A valve device 70 is mounted in the line between the pump and the cylinders 31, 40 and 45, so that by operation of this valve fluid pressure may be introduced into either end of these cylinders at the proper time, and when the pressure is introduced into one end the opposite end will be connected to the return pipe 68.

The structure of the valve 70 is shown in Figs. 12 and 13, and it will be noted that the valve is provided with a rotatable part 71 having recesses 72 and 73, and offset through passages 74 and 75 at right angles to each other. In the position shown in Fig. 12 the pipe 67 will be connected with the pipe 76, while the return pipe 68 will be connected with the pipe 77. When the valve is rotated a slight amount, the position of the parts is shown in Fig. 13, where the pipes 68 and 76 will be placed in communication, and the pipe 67 will be placed in communication with the pipe 77, thus reversing the flow of pressure through the pipes 76 and 77 in a manner which will be well understood.

It will usually be desired to have the compressor plates 34 approach each other gradually, while the release of these pressure plates from the load should take place rapidly. Therefore, in the line 78 leading to the cylinders 31 may be placed a check valve 79, shown in Fig. 14, this check valve being provided with an opening 80 so as to permit passage of pressure fluid slowly therethrough, even though the valve is closed. This will allow the pressure fluid to pass through the pipe 78 slowly, in the direction in which it moves to close the compressor plates 34, while in the opposite direction the check valve will open and will permit normal or rapid flow through this pipe.

To operate the valve 70 a solenoid 81 (Fig. 10) may be provided, the movable plunger 82 of which is pivoted to a lever 83 connected to the valve. This solenoid may be conveniently energized by an electric eye 84 positioned upon the table 15 at the forward end of the table, so that it will be actuated when the first row of articles or cases have reached the forward end of the table, the position in which they would be when the table is full and ready to be unloaded.

A switch 85 may be placed between the table and the carriage, so that, when the table begins its tilting movement from a horizontal position, the circuit between the electric eye 84 and the solenoid 81 will be interrupted.

The introduction of pressure fluid to the cylinder 25, which controls the end gate members 21, is controlled by a valve 86, the movable part of which is actuated by a lever 87 having a lost-motion connection with the movable part of the valve. As shown in Fig. 10, this lever 87 is adapted to be engaged by a trip 88 upon a stationary part adjacent the rails or track. It will be understood that the lever 87 normally stands in the vertical position shown in Figs. 10 and 11, due to gravity, so that after it has been moved by the trip 88 in either direction it will return to this position without changing the valve 86.

Also that part of the line 76 leading to the forward end of the tilting cylinders 45 is controlled by a valve 89 having a lever 90 connected thereto, this lever 90 being normally maintained in the vertical position shown in Figs. 10 and 11 by a spring 91.

When the electric eye 84 energizes the solenoid 81, the lever 83 is moved in a counterclockwise direction, as viewed in Fig. 10, to rotate the valve

70 and permit pressure fluid to enter the forward end of the cylinder 40, the outer ends of the cylinders 31, and the rear end of the cylinders 45. It will be understood that at this time fluid pressure exists in the forward end, or, as shown in Fig. 11, the lower end of cylinder 25, to hold the end gate members in retracted position.

Thus the compressor members are moved inwardly, the carriage moved forwardly, and the table tilted forwardly, substantially simultaneously. The tilting of the table will break the connection between the electric eye and the solenoid, which will not, however, affect the position of the valve 70.

At the proper time the arm 87 will strike the trip 88 to reverse the direction of pressure fluid in the cylinder 25 and permit the end gate members to lower to drop the load upon the skids 61. Upon continued forward movement of the carriage, the lever 90 will strike the trip block 92 upon a fixed part of the device, and rotate the valve 89 so as to cut off the connection between the pipe 76 and the cylinders 45, in order that the return tipping movement will not begin until the carriage has moved rearwardly a sufficient distance to permit the end gate members to clear the load which has been deposited.

Upon continued forward movement of the carriage, the lower end of the lever 83 will strike the tripping member 93, thus reversing the valve 70 and initiating a return movement of the mechanism. Reversing of the valve 70 will admit pressure fluid to the rear end of cylinder 40 and to the inner ends of cylinders 31, to withdraw the compressor plates from engagement with the load and to effect the return movement of the carriage. The return tilting movement of the table will not begin, however, until the lower end of the lever 90 has been released by the tripping block 92 so as to permit the spring 91 to move the valve to the position shown in Fig. 11, at which time the return tilting of the table will begin. Also, the lever 87 will be moved in a reverse direction by the trip 88, as it passes the latter, thus reversing the valve 86 and introducing fluid pressure into the upper end of the cylinder 25 (as viewed in Fig. 11) to draw the end gate members to their retracted positions.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and the scope of the claims.

What I claim is:

1. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement, end abutment means associated with the table adjacent the forward edge thereof to hold material thereon during the tilting thereof, said abutment means including an end gate movably connected to the table for sliding movement longitudinally thereof toward and away from the forward edge of the table.

2. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement, end abutment means associated with the forward edge of the table to hold material thereon during the tilting thereof, said abutment means including an end

gate movably connected to the table for movement longitudinally thereof toward and away from the forward edge of the table, and releasable means below the upper surface of the table to hold said end gate against movement when the table is tilted.

3. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement from a substantially horizontal receiving position to a substantially vertical depositing position, end abutment means associated with the forward edge of the table to hold material thereon during the tilting thereof, said abutment means including an end gate movably connected to the table for movement longitudinally thereof, and adapted to be moved downwardly with respect to the table to lower the load after the table is tilted.

4. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement, end abutment means associated with the table to hold material thereon during the tilting thereof, said abutment means including an end gate movably connected to the table for movement longitudinally thereof and adapted to be moved downwardly with respect to the table to lower the load after the table is tilted, and means to return said end gate to its original position after the load is cleared therefrom.

5. In a stacking or tiering machine, a table to receive a plurality of articles thereupon, means for mounting said table for tilting movements, abutment means adjacent the side edges of the table to grip the articles therebetween, one of said abutment means being movable relatively to the other transversely of the table, the other of said abutment means serving to align the articles, end abutment means at the forward edge of the table, and means mounting said abutment means for sliding movement toward and away from the forward edge of the table.

6. In a stacking or tiering machine, a table to receive a plurality of articles thereupon, means for mounting said table for tilting movements, an abutment member adjacent each side edge of the table, means mounting said abutment means for approaching and separating movements to grip a load on the table, means mounted on said table for effecting relative approaching movements of the abutment means, said abutment means being movable toward the forward edge of the table, and spring means resisting said latter movement.

7. In a stacking or tiering machine, a table to receive a plurality of articles thereupon, means for mounting said table for tilting movements, abutment means adjacent the side edges of the table to grip the articles therebetween, one of said abutment means being movable relatively to the other transversely of the table, said abutment means also being movable longitudinally of the table, and spring means resisting movement of said abutment means in the latter direction.

8. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement, end abutment means associated with the table to hold material thereon during the tilting thereof, load-gripping

means associated with the table, said end abutment means supporting the load when the table is tilted and being movable downwardly away from the table to deposit the load, means for moving the carriage forwardly, and means for actuating said load-gripping means to grip and release the load.

9. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement, end abutment means associated with the table to hold material thereon during the tilting thereof, load-gripping means associated with the table, said end abutment means supporting the load when the table is tilted and being movable downwardly away from the table to deposit the load, means for moving the carriage forwardly, means for actuating said load-gripping means to grip and release the load, and said gripping means being mounted to move downwardly relatively to the table upon downward movement of said abutment means.

10. In a stacking or tiering machine, a carriage, means mounting said carriage for forward and rearward movements, a supporting table pivoted to the carriage adjacent the forward portion thereof for tilting movement, end abutment means associated with the table to hold material thereon during the tilting thereof, load-gripping means associated with the table, said end abutment means supporting the load when the table is tilted and being movable downwardly away from the table to deposit the load, means for moving the carriage forwardly, means for actuating said load-gripping means to grip and release the load, said gripping means being mounted to move downwardly relatively to the table upon downward movement of said abutment means, and a spring to return said gripping means to their initial positions.

11. In a stacking or tiering machine, a carriage, a table tiltably mounted thereon, and gate means at the forward end of the table and slidably mounted thereon to move longitudinally thereof, gripping members movably mounted adjacent the side edges of the table to move toward each other and grip the load therebetween, means to move said members to grip the load, means to move the carriage forwardly and tilt the table forwardly whereby the load bears upon said end gate means, and means to hold said end gate members against downward movement, all of said means being mounted on the carriage.

12. In a stacking or tiering machine, a carriage, a table tiltably mounted thereon, end gate means at the forward end of the table and slidably mounted thereon to move longitudinally thereof, gripping members movably mounted adjacent the side edges of the table to move toward each other and grip the load therebetween, means to move said members to grip the load, means to move the carriage forwardly and tilt the table forwardly whereby the load bears upon said end gate means, and means to hold said end gate members against downward movement, all of said means being power operated and mounted on the carriage.

13. In a stacking or tiering machine, a carriage, a table tiltably mounted thereon, end gate means at the forward end of the table and slidably mounted thereon to move longitudinally thereof, gripping members movably mounted adjacent the side edges of the table to move to-

ward each other and grip the load therebetween, means to move said members to grip the load, means to move the carriage forwardly and tilt the table forwardly whereby the load bears upon said end gate means, means to hold said end gate members against downward movement, all of said means being mounted on the carriage, and means actuated by the forward movement of the carriage to release said holding means substantially upon completion of the tilting movement.

14. In a stacking or tiering machine, a carriage, a table tiltably mounted thereon, end gate means at the forward end of the table and slidably mounted thereon to move longitudinally thereof, gripping members movably mounted adjacent the side edges of the table to move toward each other and grip the load therebetween, means to move said members to grip the load, means to move the carriage forwardly and tilt the table forwardly whereby the load bears upon said end gate means, means to hold said end gate members against downward movement, all of said means being mounted on the carriage, and automatically acting means to reverse said moving means to release the gripping members, move the carriage rearwardly, and effect return tilting movement of the table.

15. In a stacking or tiering machine, a carriage, a table tiltably mounted thereon, end gate means at the forward end of the table and slidably mounted thereon to move longitudinally thereof, gripping members movably mounted adjacent the side edges of the table to move toward each other and grip the load therebetween, means to move said members to grip the load, means to move the carriage forwardly and tilt the table forwardly whereby the load bears upon said end gate means, means to hold said end gate members against downward movement, all of said means being mounted on the carriage, automatically acting means to reverse said moving means to release the gripping member, move the carriage rearwardly, and effect return tilting movement of the table, and said automatically acting means being actuated by the forward movement of the carriage.

16. In a stacking or tiering machine, a carriage, a table tiltably mounted thereon, end gate means at the forward end of the table and slidably mounted thereon to move longitudinally thereof, gripping members movably mounted adjacent the side edges of the table to move toward each other and grip the load therebetween, means to move said members to grip the load, means to move the carriage forwardly and tilt the table forwardly whereby the load bears upon said end gate means, and means to hold said end gate members against downward movement, all of said means being pressure fluid actuated.

RUSSELL D. VON BEREN.

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