Oct. 21, 1958 W. S. CAMPBELL 2,857,040

AUTOMATIC CASE STACKER

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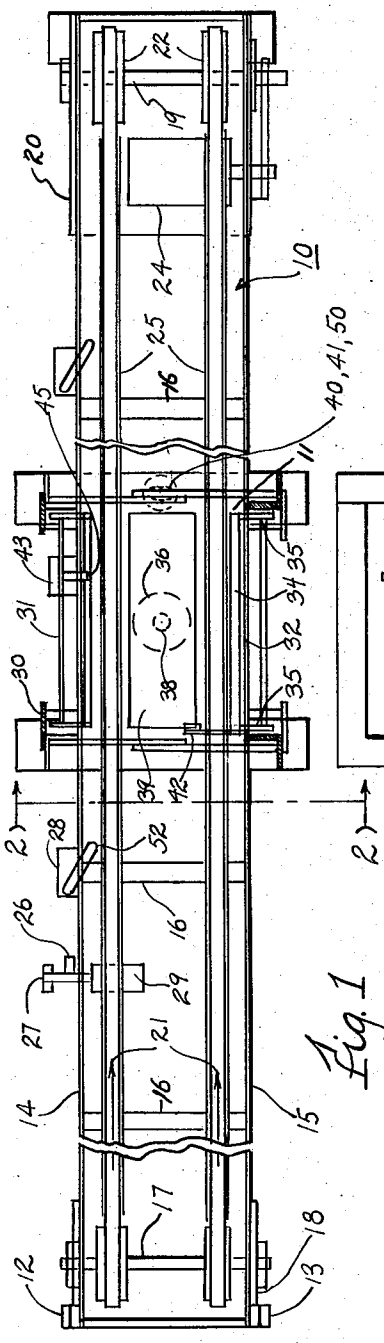


Fig. 1

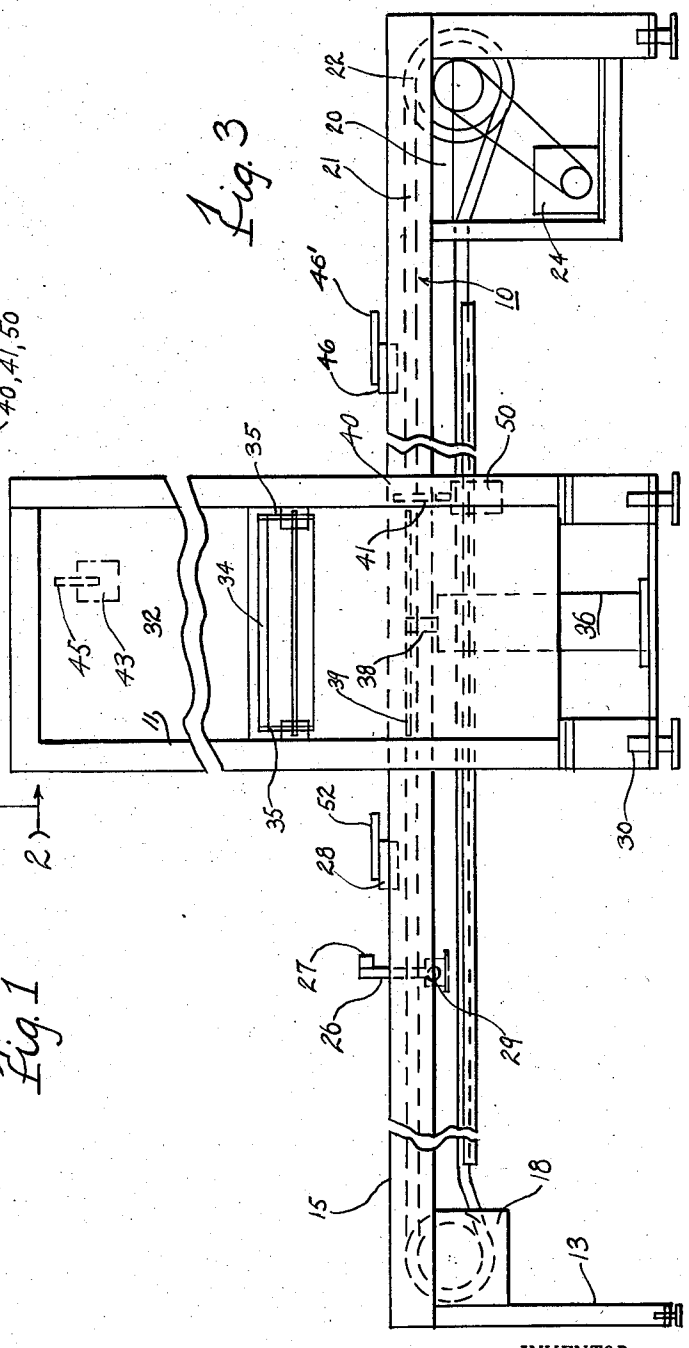


Fig. 3

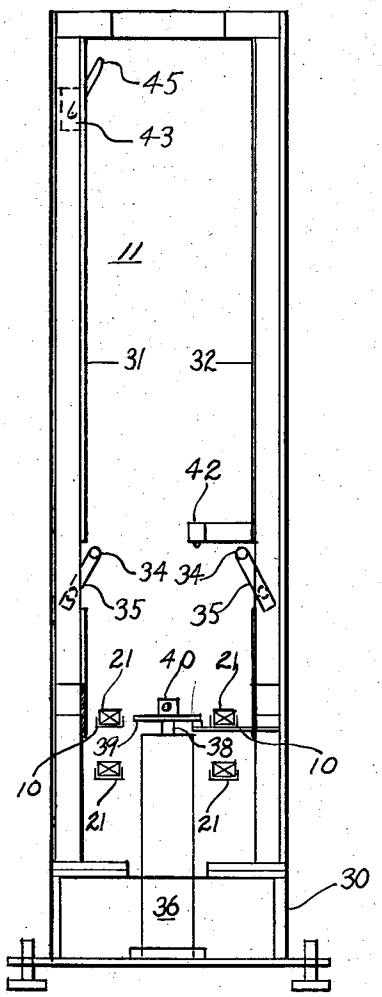
INVENTOR.
Willard S. Campbell,
BY
James R. McKnight
Attorney.

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Fig. 2



INVENTOR.
Willard S. Campbell
BY James R. McKnight
Attorney.

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Fig. 6.

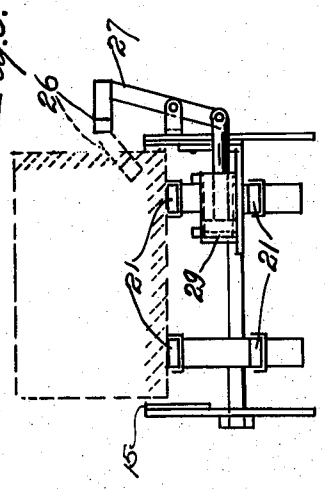


Fig. 4.

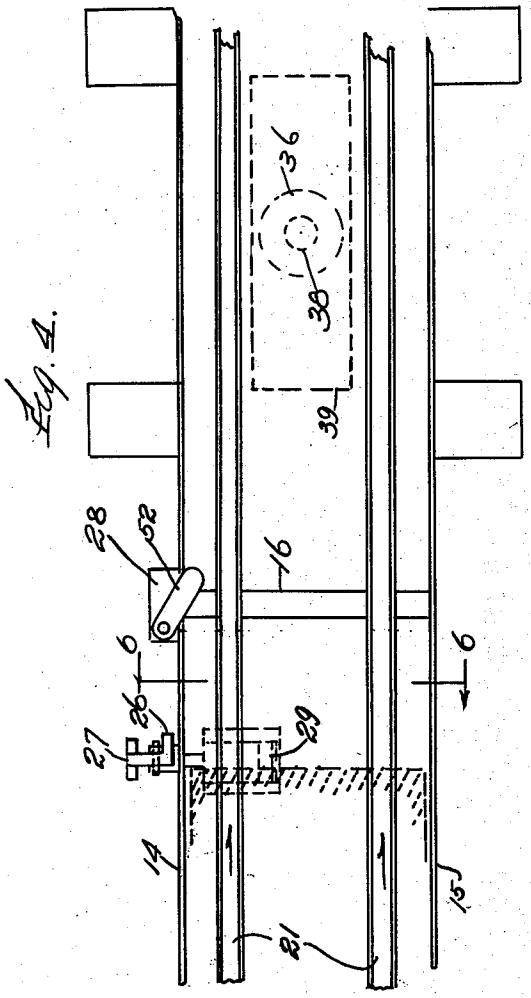
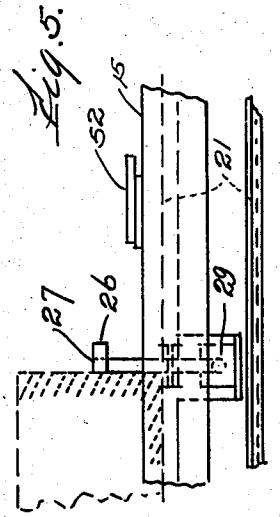


Fig. 5.



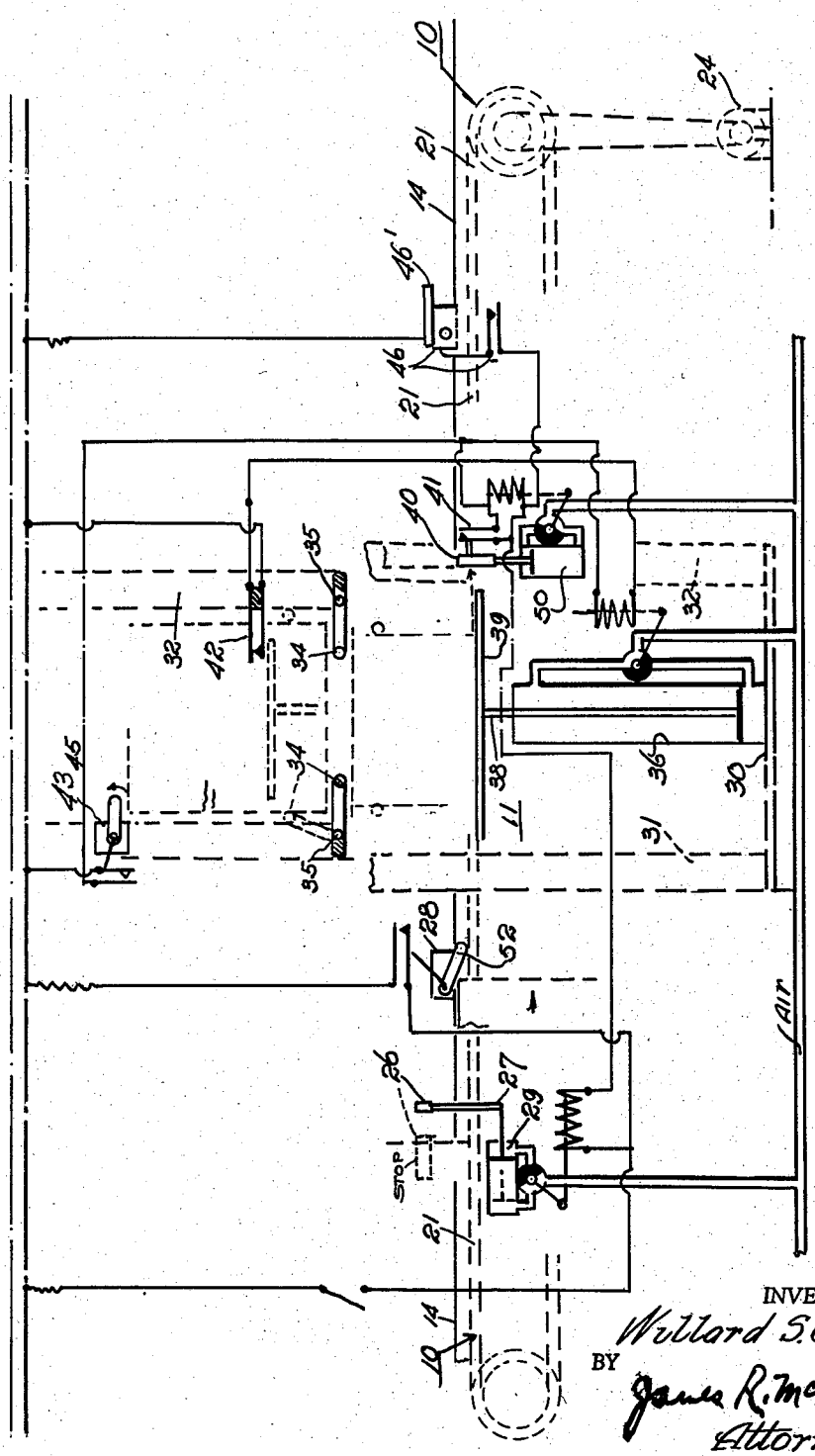
INVENTOR.
Willard S. Campbell.
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James R. McKnight
Attorney.

Oct. 21, 1958 W. S. CAMPBELL 2,857,040

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Fig. 7.



INVENTOR.
Willard S. Campbell
BY
James R. McKnight
Attorney

United States Patent Office

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AUTOMATIC CASE STACKER

Willard S. Campbell, Chicago, Ill., assignor to M. & C. Conveyors, Inc., Chicago, Ill., a corporation of Illinois

Application April 5, 1956, Serial No. 576,493

2 Claims. (Cl. 198—35)

My invention relates to an automatic case stacker adapted to stack milk bottle cases, or the like.

In dairies and other plants where milk or other fluids are bottled and placed in cases, it is necessary to move these cases from place to place. In such situations it is a great saving of time, and labor to move the cases in stacks, rather than one at a time. For instance, let us say that the cases have been loaded with filled bottles and it is necessary to move them to a storage room, or to a cooler, or to a truck upon which they are to be loaded for shipment. If the cases are stacked one on top of another to a stack of let us say five cases, it is much quicker to pull the stack than to pull five separate cases. Ordinarily a worker operating with the usual hook can pull a stack of five cases with less back breaking effort than a single case. This is because the stick attached to the hook can be raised so that the worker can pull the stack in upright position. The amount of time, and labor saved in moving stacked cases is substantial. However, the lifting of the cases, to stack them, particularly when loaded with filled bottles, presents a problem.

Among the objects of my invention is to solve the foregoing problem, and to provide a stacker for automatically stacking cases and moving them to desired position.

My invention also contemplates such other objects, advantages, and capabilities as will later more fully appear and which are inherently possessed by my invention.

While I have shown in the accompanying drawings, a preferred form of my invention, yet it is to be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

Referring to the drawings, Fig. 1 is a top plan view of my automatic case stacker; Fig. 2 is an end elevational view in section, on line 2—2 of Fig. 1, Fig. 3 is a side elevational view; Figs. 4 and 5 are enlarged views of the case stop; Fig. 6 is a detailed view on line 6—6 of Fig. 4; and Fig. 7 is a schematic, diagrammatic view showing the system operation.

The embodiment selected to illustrate my invention comprises a case conveyor 10 and case stacker 11. My case conveyor 10 has at one end, preferably the entrance end, a pair of spaced supports 12 and 13 adapted to contact the floor.

Attached to said supports are spaced guide rails 14 and 15 having cross members 16 extending therebetween.

An idler shaft 17 is rotatably mounted on extension 18 attached to side rails 14 and 15 adjacent one end. Another or driving shaft 19 is rotatably mounted on conveyor drive unit frame 20 adjacent the other end of case conveyor 10. A double chain 21 in the form of two carrying chains extend between shafts 17 and 19. Chain 21 is connected to and moved by a driving sprocket 22 attached to driving shaft 19 turned by the motor reducer 24 supported on frame 20, said motor being connected to a suitable source of electrical or other power.

A pair of spaced tracks 25 mounted on cross members 16 guide the two carrying chains 21.

On guide rail 14 is attached a case stop 26 having a pivotally mounted arm 27 for stopping and holding cases on the conveyor while chains 21 continue to move under cases. This case stop is normally in the open non-stop position when no cases are on the conveyor or in the stacker.

When the above condition exists and a case is then placed on the conveyor, the following action takes place: The case being conveyed along the conveyor by chains 21 moves along the conveyor until it contacts and moves switch arm 52 which operates switch 28, which in turn energizes air cylinder 29 causing arm 27 to move to stop position, where it stops the next case to come along the conveyor. The original case passes the stop before the stop is acuated and moves on into the stacker. Switch 28 is connected to an electric source of power and air cylinder 29 is connected to a compressed air supply.

My case stacker 11 has a base 30 on which is mounted a pair of uprights 31 and 32 extending above the conveyor 10. A stacking dog having a bar 34 with arms 35 on each end is pivotally mounted for limited movement on each of the uprights 31 and 32. The doges normally are in downward and inward position slightly above a case entering stacker 11.

Elevator air cylinder 36 is mounted on base 30 and has a piston shaft 38. Mounted on the upper end of piston shaft 38 is an elevator frame 39 which extends between the two conveyor chains 21. The air cylinder is connected to an electric supply source and a compressed air supply.

A case stop member 40 is mounted on the case stacker base 10 and has an electric switch 41, which is operated by contact with a case, when the stop is in upper stop position, which is the normal position. This contact with a case energizes said electric air cylinder 36 and also energizes air cylinder 29 to open position, allowing one case to move through case stop 26. Air cylinder 36 having been energized when switch 41 was operated by case contact, moves the elevator frame 39 slightly above stacking dog bars 34. At this point the frame 39 contacts electric switch 42 positioned on upright 32, energizing elevator air cylinder 36 and changing its direction of travel from up to down. As the elevator frame 39 moves the case upwardly, the case pivots the stacking dog bars 34 upwardly and outwardly until it is slightly above them. Then the stacking dog bars 34 fall by gravity downwardly and inwardly, so that as the elevator is lowered, the case moves downwardly against the stacking dog bars 34, where it is held until moved upwardly by the next case therebelow.

The foregoing cycle is repeated until the top case in the stacker 11 contacts switch arm 45 which in turn operates switch 43 on the upper portion of one of the uprights 31. Switch 43 reverses the operation of air cylinder 36 so that elevator frame 39 is moved downwardly to chains 21. Switch 43 activates air cylinder 50 releasing stop member 40 from stop position to a lowered position below tracks 21 so that the stack of cases is moved by the chains outwardly to the exit of the conveyor 10.

Another switch 46 on guide rail 14 beyond stacker 11 has a switch arm 46'. When case stack hits this arm, it through switch 46 moves stop 40 to raised position to stop the next case in line.

My automatic case stacker is electrically operated. Switch 28 which is operated by switch arm 52 is connected to an electric supply source. Electric switch 41 is connected to an electric supply source, and is electrically connected to switch 28. Electric switch 42 is con-

nected to an electric supply source. Switch 43 is connected to an electric supply source, to air cylinder 36 for downward operation of elevator 39, and to air cylinder 50 for moving stop member 40 to non-stop position. Switch 46 is connected to an electric supply source and to stop member 40 for raising the same to stop position. Switch 43 is also connected with cylinder 29 and also energizes said cylinder from closed to open position to start cycle over again.

The electrical system operation is as follows: The conveyor chain 21 which moves the cases placed thereon is moved by a driving sprocket 22 attached to a driving shaft 19 turned by a motor reducer 24 supported on frame 20 and connected to a suitable source of electrical power.

When the first case is moving on conveyor chain 21, pivotally mounted entrance stop arm 26 of stop member 27 is in open non-stop position and permits the case to pass on until it contacts switch arm 52 which operates entrance switch 28 which in turn energizes entrance air cylinder 29 causing entrance stop arm 26 to move to stop position. Entrance switch 28 is connected to an electrical source of power and to entrance air cylinder 29 which is connected to a compressed air supply.

The case then travels until it moves onto elevator 39 and contacts exit stop member 40 and exit switch 41. Exit switch 41 is connected to an electrical source of supply and to entrance air cylinder 29 which is connected to a compressed air supply and upon contact with the case energizes entrance air cylinder 29 to move entrance stop arm 26 to open position to permit another case to pass through. On the same contact with this case exit switch 41 connected to elevator air cylinder 36 which is in turn connected to a compressed air supply energizes said air cylinder 36 to move elevator 39 with its case upwardly.

When the case is moved slightly above the stacking dogs, it contacts an upper electrical switch 42 connected to an electrical source of supply and to elevator air cylinder 36. This contact energizes elevator air cylinder 36 to travel with elevator 39 downwardly.

This cycle is repeated until a top case in stacker 11 contacts switch arm 45 which operates top switch 43. This switch 43 is connected to an electrical source of supply and to elevator air cylinder 36 and moves it and elevator 39 downwardly to chain 21. Top switch 43 is also connected to exit air cylinder 50 connected to a compressed air supply and to exit stop member 40 moving it to non-stop position and permitting the stacked cases to pass outwardly on chain 21.

As the stacked cases pass near the exit end of the conveyor, they contact an end electrical switch arm 46', which through switch 46 is connected to an electrical source of supply and to said exit stop member 40 and energizes said exit air cylinder 50 to move said exit stop member 40 to closed position.

Having thus described my invention, I claim:

1. An automatic case stacker comprising a frame, a case conveyor movably mounted on said frame and adapted to move cases thereon, said frame having an entrance and an exit, means engaging said conveyor and connected to an electrical source of supply for moving said conveyor, an entrance stop member pivotally mounted on said frame adjacent its entrance and in normal non-stop position to permit the first case to pass therebeyond on the conveyor, an entrance air cylinder mounted on said frame and connected to a compressed air supply and to said entrance stop member, an entrance electrical switch mounted on said frame slightly beyond said entrance stop member and connected to an electrical source of supply and to said entrance air cylinder for moving said entrance stop member to stop position when contacted by a case, a stacker positioned intermediate the entrance and the exit of said frame, said stacker having a pair of uprights, a stacking dog pivotally mounted on each of said uprights slightly above the height of a single case, an elevator air cylinder mounted on said stacker and connected to a compressed air supply, an elevator movably mounted on said elevator air cylinder, an exit electrical switch, an exit stop member and an exit air cylinder connected to a compressed air supply mounted on said stacker at the portion nearest the exit of said frame, said exit stop member normally in closed position to prevent a case from leaving the stacker, said exit electrical switch in contact with said elevator air cylinder with said entrance stop member and with an electrical source of supply so that when a case contacts said exit electrical switch, said entrance stop member is moved to open position to permit entry of another case, and said elevator air cylinder is energized to move said elevator upwardly with its case slightly above said stacking dogs, an upper electrical switch mounted on one of said uprights slightly above said stacking dogs, connected to an electrical source of power and said elevator air cylinder and adapted upon being contacted by a case to energize the elevator air cylinder and change the travel of said elevator to move downwardly to the conveyor level, said dogs upon being released from contact with the case, moving downwardly and inwardly to support the case moving downwardly thereagainst, the cycle being repeated until the cases are stacked high enough for the top case to contact a top electrical switch mounted high on said stacker, said top electrical switch connected to an electrical source of supply, to said upper electrical switch for moving the elevator downwardly to the conveyor level, and to said exit stop switch to energize said stop air cylinder to move exit stop member to open position and permit the stacked cases to pass from the stacker toward the exit end of the frame, and an end electrical switch mounted on said frame adjacent the exit connected to an electrical source of supply and to said exit stop switch and said exit air cylinder upon being contacted by said stacked cases to energize the exit air cylinder to move said exit stop member to closed position.

2. In an automatic case stacker, a case conveyor having an entrance and an exit, a stacker positioned intermediate the entrance and the exit of said conveyor, said conveyor having means for conveying cases from said entrance to said stacker and from said stacker to said exit, an entrance stop member pivotally mounted on said conveyor adjacent its entrance and adapted to be in non stop position to permit the first case to pass thereby, an entrance air cylinder mounted on said conveyor and connected to a compressed air supply and said entrance stop member, an electrical switch mounted on said conveyor beyond said stop member and adapted upon being contacted by a case to move said entrance stop member to closed position, said stacker having a pair of uprights, a stacking dog pivotally mounted on each of said uprights, an exit stop member pivotally mounted on said stacker and electrically connected with said entrance stop member, an exit air cylinder mounted on said stacker and connected to a compressed air supply and to said exit stop member, an elevator air cylinder mounted on said stacker and connected to a compressed air supply, an elevator movable by said air cylinder within said uprights and electrically connected to said exit stop member, said exit stop member upon being contacted by first case adapted to energize said elevator air cylinder to move said elevator upwardly with said first case until above said dogs, an upper electric switch electrically connected to said elevator and positioned on one of said uprights slightly above said dogs and adapted upon being contacted by said first case to energize the elevator air cylinder to move the elevator downwardly for the second case, said first case being held above by said dogs, said upper switch also connected to and adapted to energize said entrance air cylinder to move said entrance stop member to open position to permit a second case to pass thereby, the cycle being repeated until enough cases are stacked to contact a top electrical switch positioned ad-

jacent the top of said upright structure, said top switch connected to and adapted to energize said elevator air cylinder to move the elevator with its stack of cases downwardly to said conveyor and connected to and adapted to energize said exit air cylinder to move said exit stop member to non stop position to permit said conveyor to move the stack of cases to the exit.

References Cited in the file of this patent

UNITED STATES PATENTS

2,376,176	Neja	May 15, 1945
2,687,813	Verrinder et al.	Aug. 31, 1954
2,770,373	Verrinder et al.	Nov. 13, 1956