Oct. 21, 1958 W. S. CAMPBELL 2,857,058

ADJUSTABLE CASE STACKER

Filed June 24, 1957 3 Sheets-Sheet 1

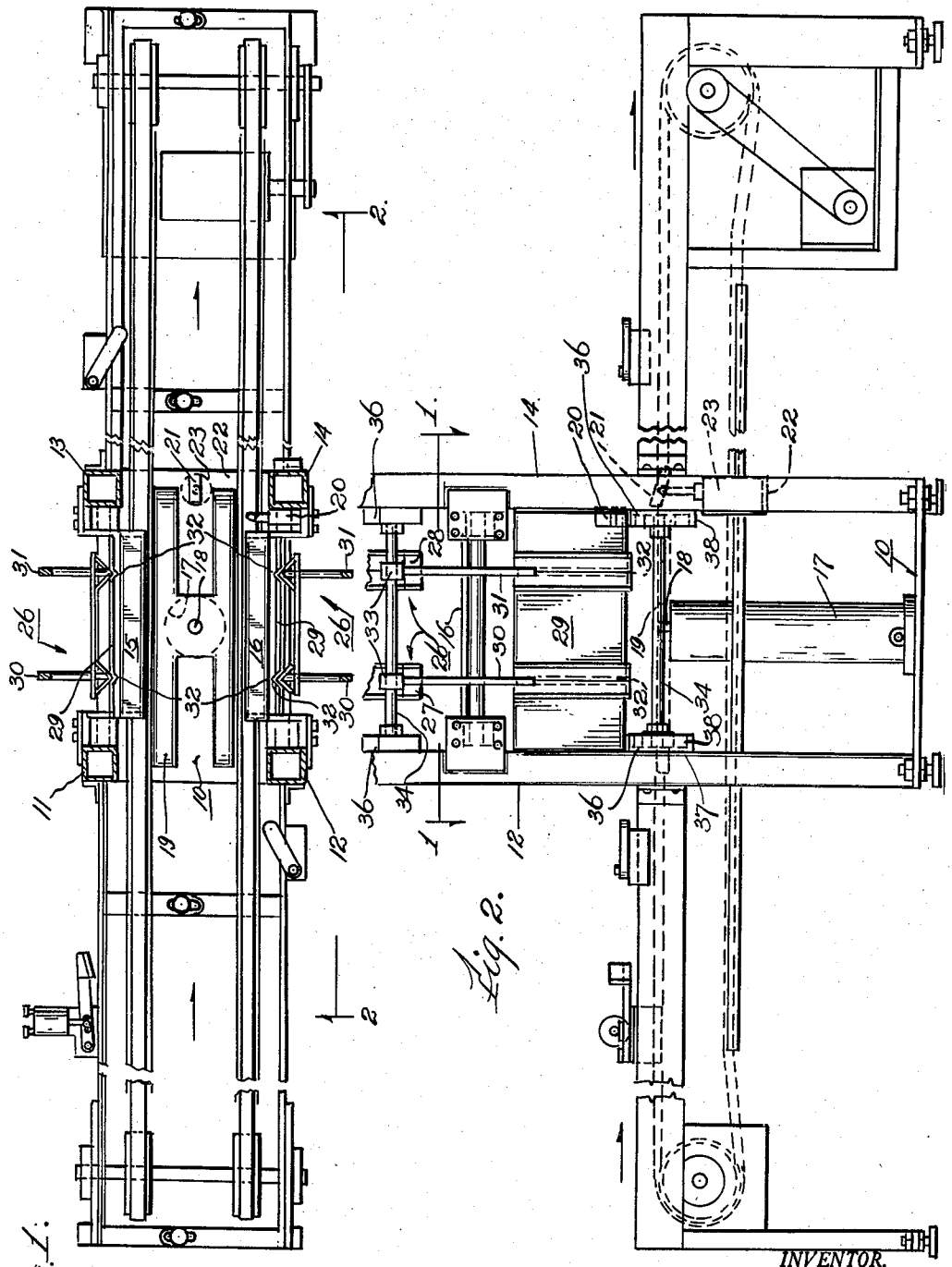


Fig. 1.

Fig. 2.

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

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Fig. 3.

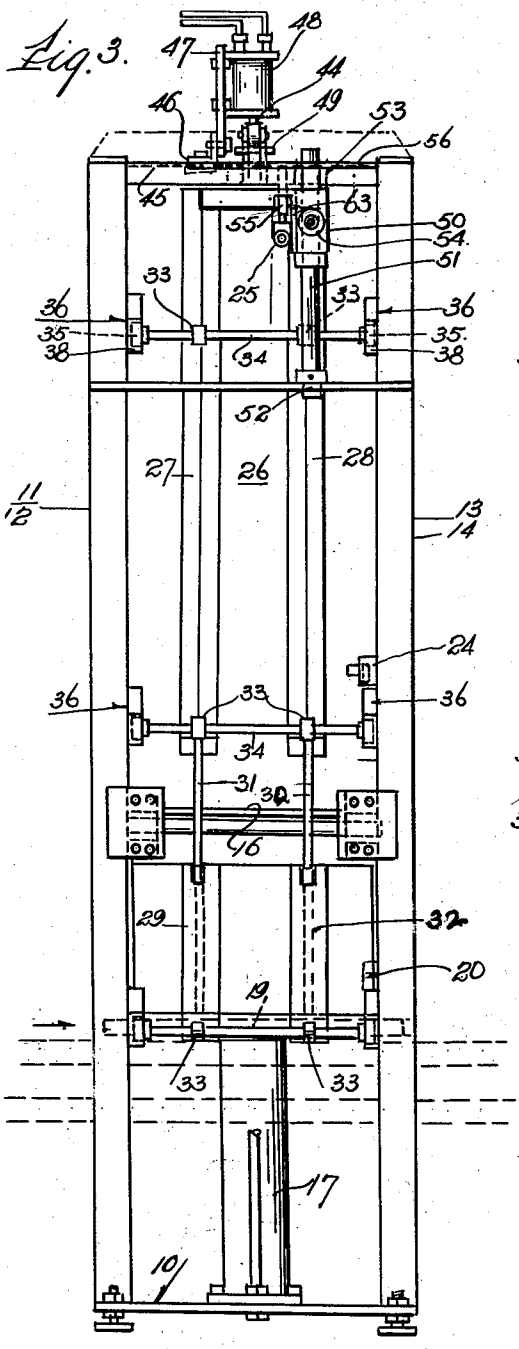
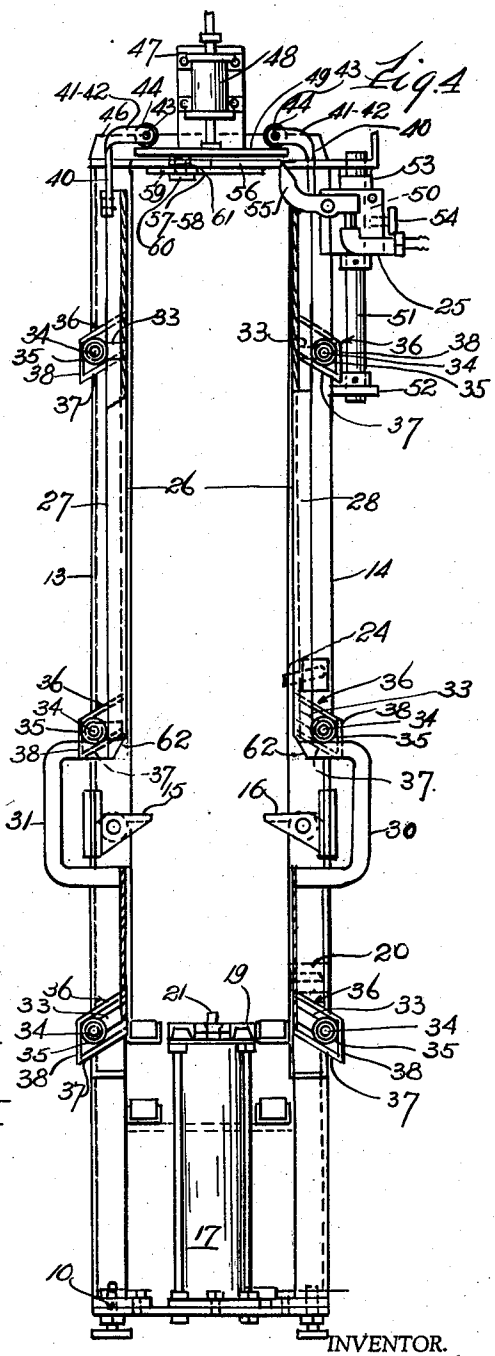


Fig. 4



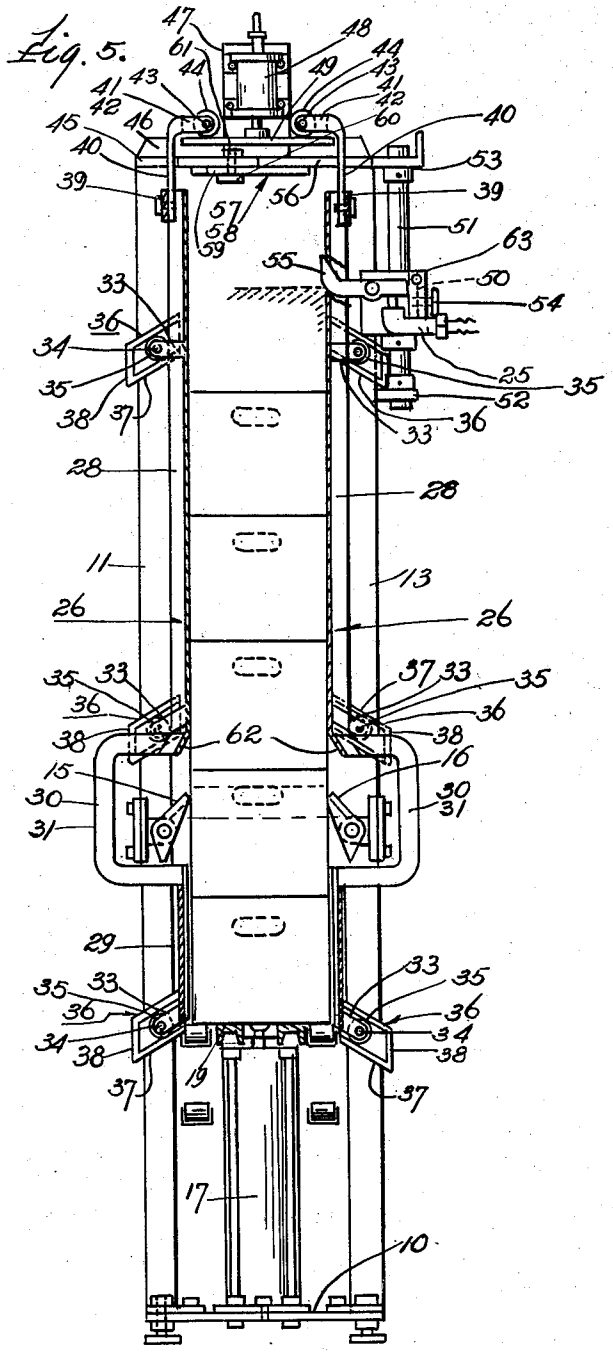
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Willard S. Campbell
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James R. McKnight
Attorney.

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Fig. 5.



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

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ADJUSTABLE CASE STACKER

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

Application June 24, 1957, Serial No. 667,579

3 Claims. (Cl. 214—6)

My invention relates to a device for centering cases of milk bottles or the like, in which the stacker is adjustable to centering cases of different widths.

In dairies and other bottling plants in which many cases filled with bottles are used, it is desirable to have a case stacker for stacking the cases vertically for their handling in stack form to expedite the operation of the plant. It is necessary that the cases be centered in the stack to be properly in line. In some instances, cases will vary in width. With my stacker all the cases of one width may be run through and properly centered and stacked. Then cases of a different width may be run through and my device will properly center and stack these cases. It is among the objects of my invention to solve the problems of centering and stacking such cases. My invention 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 embodiment of my invention, yet the same is susceptible to modification and change without departing from the spirit of my invention.

Referring to the drawings, Fig. 1 is a top plan view of my adjustable case stacker taken on line 1—1 of Fig. 2; Fig. 2 is a side elevational view on line 2—2 of Fig. 1; Fig. 3 is a vertical elevational view; Fig. 4 is a vertical sectional elevational view; and Fig. 5 is a vertical sectional elevational view showing stacked cases ready for removal.

My adjustable case stacker is ordinarily used in connection with a conveyor for moving milk bottle cases as shown in my co-pending application No. 576,493 filed on April 5, 1956.

My adjustable case stacker has a base 10 on which are mounted a pair of spaced entrance uprights 11 and 12, and a pair of spaced exit uprights 13 and 14. A stacking dog 15 is pivotally mounted for limited movement on and between uprights 11 and 13. Another stacking dog 16 is pivotally mounted for limited movement on and between uprights 12 and 14. The dogs normally are in inward position, slightly above a case entering the stacker.

An elevator air cylinder 17 is mounted on base 10 and has a piston shaft 18 on the upper end of which is an elevator frame or platform 19. Air cylinder 17 is connected to a source of electrical power and to a compressed air supply.

An electric switch 20 is mounted on exit upright 14 on the level of a case entering the stacker, and is connected to a source of electrical power and to a case stop member 21 mounted on cross member 22 between exit uprights 13 and 14 and to air cylinder 23 connected to a compressed air supply.

When a case enters the stacker and contacts electric switch 20 this operates air cylinder 23 to move case stop member 21 and moves it to stop position between the exit uprights 13 and 14 to prevent the case from leaving

the stacker. Electric switch 20 is also connected with air cylinder 17 and when contacted by the case entering the stacker energizes air cylinder 17 to move platform 19 slightly above stacking dogs 15 and 16. At this point the case on platform 19 contacts electric switch 24 on upright 14.

This switch 24 connected to air cylinder 17 energizes it and reverses the direction of travel of platform 19 from up to down, to its position on a level with another case entering the stacker. However, while platform 19 is moving upwardly the case pivots the dogs 15 and 16 inwardly until it is slightly above them. The dogs then being released from contact with the case pivot by gravity to downward and inward position, so that as the platform 19 is lowered the case falls a slight distance by gravity against the dogs where it is held until moved upwardly by the next case therebelow.

The foregoing cycle is repeated until the top case in the stacker contacts high electric switch 25 described hereafter in detail. This switch 25 is connected to air cylinder 17 so that upon contact of the case with switch 25, platform 19 is moved downwardly.

Switch 25 is also connected with air cylinder 23 and energizes it to move stop member 21 to lowered position to permit the stacked cases to leave the stacker.

Mounted on each side of the stacker on and between uprights 11 and 13 and on and between uprights 12 and 14, is a case centerer 26. Each case centerer 26 comprises a pair of spaced upper arms 27 and 28 formed preferably of angle irons with the corner edge facing inwardly. These upper arms extend from adjacent the top of the uprights to a point just above the dogs 15 and 16. The upper arms 27 and 28 are joined to lower centering portion 29 by outwardly curved connecting portions 30 and 31. Each lower centering portion 29 has a substantially flat plate portion with a pair of spaced inwardly extending V's 32 and extends downwardly from a point below dogs 15 and 16 substantially to platform 19 when it is on a level to receive an entering case.

Attached to the rear of each of upper arms 27 and 28 adjacent both the upper and lower portions and to the rear of each of the lower centering members 29 adjacent the lower portion is a rod or post 33 to the other end of which is attached a bearing 34 to which is rotatably attached a roller bearing 35, on each end.

To each of the uprights is attached a plurality of spaced tracks 36, each of which is upwardly and inwardly inclined. Tracks 36 are positioned to receive roller bearings 35 which roll thereon. Each track 36 has side walls 37 and a closed outer end 38.

Upper arms 27 and 28 are each connected at their upper ends by cross member 39 which is attached thereto. Attached to said cross member 39 and extending above it is vertical member 40 to which is attached a pair of spaced horizontal members 41 and 42, rotatably supporting between them, a shaft 43 which carries wheel 44.

Top connectors 45 extend between and are attached to the tops of entrance and exit members 11 and 13, and 12 and 14.

A cross connector 46 extends between top connectors 45 at substantially their central portions. Cross connector 46 supports a vertical bracket 47 to which is attached air cylinder 48, and lifting plate 49 attached to the shaft of said air cylinder. On said plate 49 wheels 44 of the centering members roll. Air cylinder 48 is connected to an electrical source of power and to a compressed air supply.

High electric switch 25 is attached to plate 63, which is attached to a collar 50 which is slidably mounted on rod 51. Rod 51 is mounted on lower bearing 52 at its

bottom and to upper bearing 53 at its top. When the collar 50 is moved to the desired position on rod 51 it is held there by tightening clamp screw 54. Clamp screw 54 may be loosened to permit further movement of collar 50 on rod 51. This permits vertical adjustment of trip member 55 which is pivotally mounted on plate 63. This vertical adjustment permits trip member 55 to be moved higher or lower to accommodate different desired heights of cases. This variation may permit the use of four, five or six cases to be stacked before the top one contacts trip member 55 to actuate switch 25.

Cross connectors 56 are attached to the tops of and extend between entrance uprights 11 and 12, and exit uprights 13 and 14. Each of the cross connectors 56 and also cross connector 46, has a pair of overlapping plate portions 57 and 58 with a slot 59 therethrough adapted to permit the entrance uprights 11 and 12 and the exit uprights 13 and 14 to be moved to or from each other and in the position desired to permit bolts 60 to be placed through slots 59 and held there by nuts 61. This adjustment permits the stacker to accommodate cases of greatly varying widths.

The lower ends 62 of upper centering members 27 and 28 are beveled outwardly and downwardly to aid in centering the cases.

When the first case enters the stacker and contacts electric switch 20, which is electrically connected with air cylinder 48, it energizes said air cylinder and lifts lifting plate 49. This moves wheels 44 toward each other and moves the opposite centering members toward each other with the roller bearings 35 moving upwardly and inwardly on tracks 36. The opposite centering members move toward each other the same distance with the same speed and center the case between them. As the next cases enter the stacker the centering members remain in inward position until the cases are piled on top of each other to reach and contact trip member 55 and actuate switch 25. This switch actuates air cylinder 48 to release the opposite centering members to fall by gravity on the inclined tracks to outward position. Switch 25 also operates through connections to lower platform 19 so that the stack may be removed as heretofor set forth from the stacker.

As a new case then enters the stacker, the cycle begins over again.

Ordinarily 5 cases form a stack to complete a cycle, but this may be adjusted because of the height of the cases to accommodate a different number for a cycle stack.

I prefer that the opposite lower centering members be spaced apart at their inward portions about a quarter of an inch wider than the space between opposite upper centering arms at their inward portions.

The travel of the roller bearings of the centering members on the tracks is limited by the force applied, so that the roller bearings do not go off the tracks. A closed end at the inner extents of the tracks could be provided to act as stop members.

Having thus described my invention, I claim:

1. A case stacker comprising a base, a pair of spaced entrance uprights and a pair of spaced exit uprights mounted on said base, an elevator between said uprights, a stacking dog pivotally mounted on and between each of the entrance and exit uprights slightly above the height of a single case, an air cylinder connected to a compressed air supply in operating connection with said elevator, a lower electric switch attached to one of said exit uprights and connected to an electrical source of power and to said air cylinder and adapted upon being contacted by a case on said elevator to move the elevator upwardly with its case slightly above said stacking dogs, a middle 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 to form a stack of cases, a pair of oppositely disposed centering members, each centering member located between an entrance and an exit upright, each of said centering members having inner case contacting portions, and outer rollers, a plurality of inclined tracks attached to said uprights, a top cross member supported on the tops of said uprights, an upper air cylinder mounted on said top cross member, and connected to said lower switch, a lifting plate mounted on said upper air cylinder, said centering members having wheels at their tops riding on said lifting plate, said upper air cylinder connected to a compressed air supply and actuated on a case contacting said lower switch to lift said lifting plate thereby moving said wheels thereon and the rollers of said centering members on said tracks toward each other to contact each case from the side and center the same, and a high switch mounted on one of said uprights and connected to an electrical source of power and upon being contacted by the top case in the stack to actuate said upper air cylinder to move said lifting plate downwardly, permitting the wheels thereon to travel outwardly and the rollers of the centering members to drop downwardly by gravity on said tracks away from contact with the stacked cases, and means for removing the stacked cases from the stacker.

2. An adjustable case stacker comprising a base, a pair of spaced entrance uprights and a pair of spaced exit uprights mounted on said base, an elevator between said uprights, a stacking dog pivotally mounted on and between each of the entrance and exit uprights slightly above the height of a single case, an air cylinder connected to a compressed air supply in operating connection with said elevator, a lower electric switch attached to one of said exit uprights and connected to an electrical source of power and to said air cylinder and adapted upon being contacted by a case on said elevator to move the elevator upwardly with its case slightly above said stacking dogs, a middle 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 to form a stack of cases, a pair of oppositely disposed centering members, each centering member located between an entrance and an exit upright, each of said centering members having inner case contacting portions, and outer rollers, a plurality of inclined tracks attached to said uprights, overlapping top cross members supported on the tops of said uprights, said top cross members adjustable to permit the distances between the uprights to be varied, an upper air cylinder mounted on said top cross member, and connected to said lower switch, a lifting plate mounted on said upper air cylinder, said centering members having wheels at their tops riding on said lifting plate, said upper air cylinder connected to a compressed air supply and actuated on a case contacting said lower switch to lift said lifting plate thereby moving said wheels thereon and the rollers of said centering members on said tracks toward each other to contact each case from the side and center the same, and a high switch mounted on one of said uprights and connected to an electrical source of power and upon being contacted by the top case in the stack to actuate said upper air cylinder to move said lifting plate downwardly, permitting the wheels thereon to travel outwardly and the

rollers of the centering members to drop downwardly by gravity on said tracks away from contact with the stacked cases, and means for removing the stacked cases from the stacker.

3. An adjustable case stacker comprising a base, a pair of spaced entrance uprights and a pair of spaced exit uprights mounted on said base, an elevator between said uprights, a stacking dog pivotally mounted on and between each of the entrance and exit uprights slightly above the height of a single case, an air cylinder connected to a compressed air supply in operating connection with said elevator, a lower electric switch attached to one of said exit uprights and connected to an electrical source of power and to said air cylinder and adapted upon being contacted by a case on said elevator to move the elevator upwardly with its case slightly above said stacking dogs, a middle 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 to form a stack of cases, a pair of oppositely disposed centering members, each centering member located between an entrance and an exit upright, each of said centering members having inner case contacting portions, and outer rollers, a plurality of inclined tracks attached to said uprights, a top cross member supported on the tops of said uprights, an upper air cylinder mounted on said top cross member, and connected to said lower switch, a lifting plate mounted on said upper air cylinder, said centering members having wheels at their tops riding on said lifting plate, said upper air cylinder connected to a compressed air supply and actuated on a case contacting said lower switch to lift said lifting plate thereby moving said wheels thereon and the rollers of said centering members on said tracks toward each other to contact each case from the side and center the same, and a high switch slidably mounted on one of said uprights so that it may be raised or lowered thereon to accommodate a larger or smaller stack of cases, connected to an electrical source of power and upon being contacted by the top case in the stack to actuate said upper air cylinder to move said lifting plate downwardly, permitting the wheels thereon to travel outwardly and the rollers of the centering members to drop downwardly by gravity on said tracks away from contact with the stacked cases, and means for removing the stacked cases from the stacker.

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