

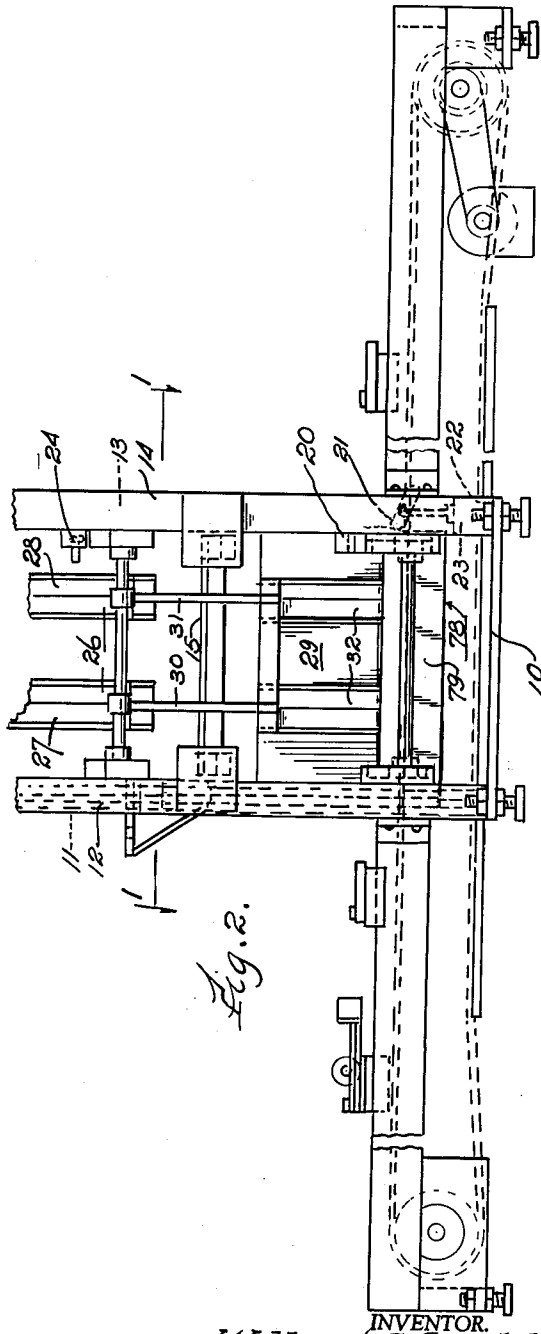
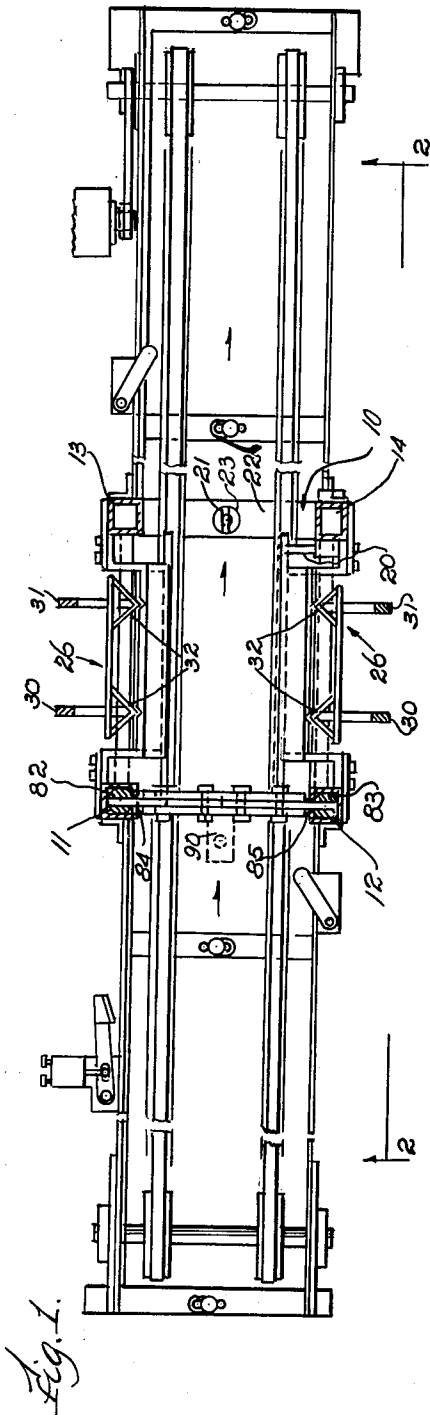
June 19, 1962

W. S. CAMPBELL
ADJUSTABLE CASE STACKER

3,039,624

Filed April 1, 1958

3 Sheets-Sheet 1



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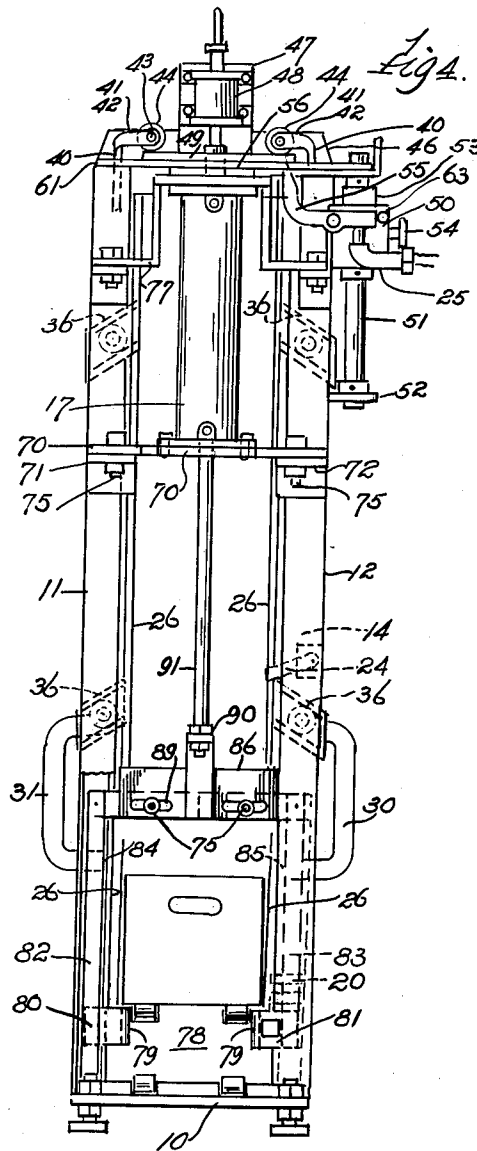
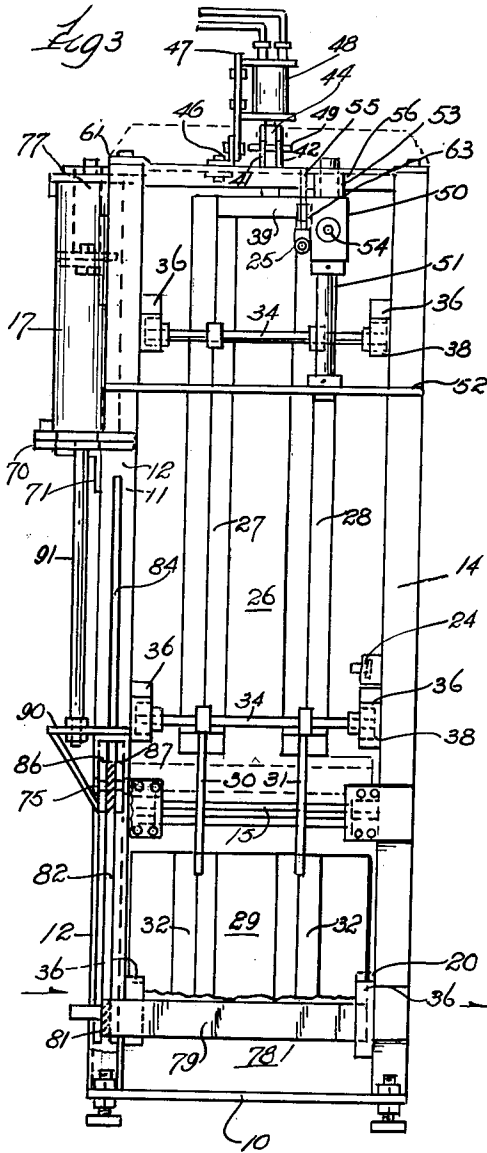
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3 Sheets-Sheet 2



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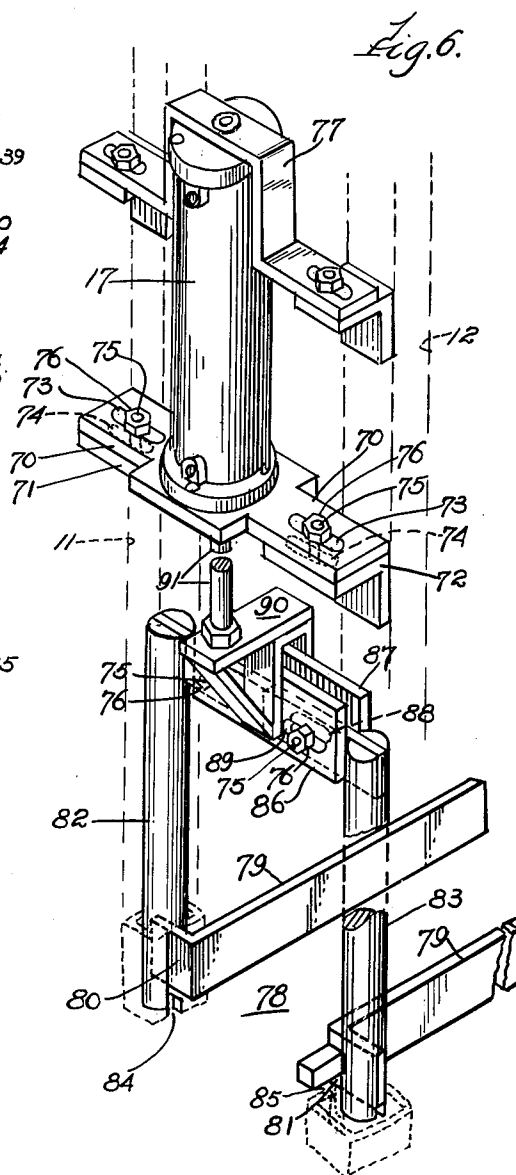
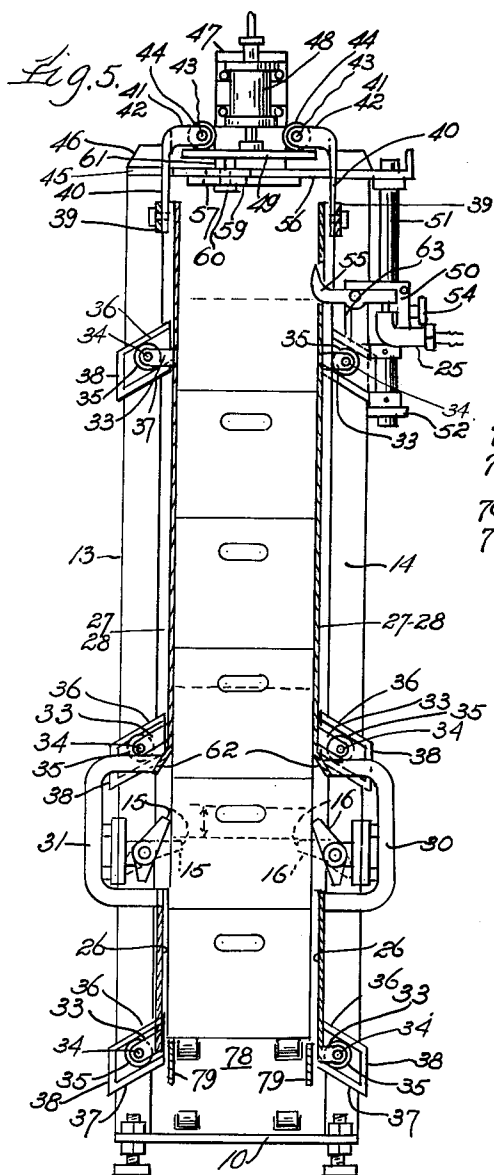
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ADJUSTABLE CASE STACKER

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3 Sheets-Sheet 3



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3,039,624

ADJUSTABLE CASE STACKER

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

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1 Claim. (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. This is a continuation in part application, on an application for Adjustable Case Stacker, Serial Number 667,579, filed in the United States Patent Office on June 24, 1957, now Patent No. 2,857,058. In my improved device, the air cylinder for lifting and lowering my elevator for the cases is so positioned that the elevator may reach a lower level and it is not necessary to dig a pit for accommodation of the height of the air cylinder.

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. In my application, Serial Number 667,579, the air cylinder 17 is shown on a base 10. In order to position the bottom level of the platform 19 low enough to communicate with the conveyor, it has been necessary in some instances to dig a pit for base 10 because of the height of air cylinder 17. My improvement herein positions air cylinder 17 away from the base so that it is no longer necessary to build a pit to accommodate its height. Often such pits are costly, inconvenient or fill with water. In some instances, a pit cannot be provided. With my present improvement, no pit is necessary.

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 detailed elevational view; FIG. 5 is a vertical sectional elevational view showing stacked cases ready for removal; and FIG. 6 is an enlarged perspective view of my cradle broken to show the parts.

My adjustable case stacker is ordinarily used in connection with a conveyor for moving milk bottle cases as shown in my co-pending application Number 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 shelf 70 resting on brackets 71, and 72 attached to entrance uprights 11 and 12. Openings 73 in shelf 70 and openings 74 in brackets 71 and 72 are adapted to receive bolts 75 and nuts 76 for holding shelf 70 on brackets 71 in desired

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adjusted position. An upper bracket 77 attaches the upper part of the air cylinder 17 to said uprights 11 and 12.

Cradle 78 has a pair of spaced arms 79, on the inner ends of which are attached outwardly extending right angle members 80 and 81, to which are attached spaced bars 82 and 83 travelling in slots 84 and 85 formed in entrance uprights 11 and 12. The upper ends of bars 82 and 83 extend at right angles between cross members 86 and 87. The upper ends of bars 82 and 83 have openings 88 and cross members 86 and 87 also have openings 89 to receive bolts 75 and nuts 76 for holding the parts in desired adjusted position.

Centrally positioned on the tops of cross members 86 and 87 is an upper member 90 to which is attached rod 91 of air cylinder 17, which rod extends through shelf 70.

It is to be noted that cradle 78 may extend substantially nearer the floor than the platform actuated by the air cylinder in the parent application. Air cylinder 17 is connected to a source of electrical power and to a compressed air supply, for operating cradle 78.

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 cradle 78 slightly upwardly above stacking dogs 15 and 16. At this point the case on cradle 78 contacts electric switch 24 on upright 14.

This switch 24 connected to air cylinder 17 energizes it and reverses the direction of travel of cradle 78 from up to down, to move it downwardly to its position on a level with another case entering the stacker. However, while cradle 78 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 cradle 78 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 cradle 78 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 cradle 78 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

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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 member 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 cradle 78 so that the stack may be removed as heretofore 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.

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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.

Instead of using air cylinders as the power means, hydraulic means or a motor may be used to operate my adjustable case stacker.

Having thus described my invention, I claim:

1. In a case stacker for milk bottle cases, a base adjacent the floor, a pair of spaced entrance uprights and a pair of spaced exit uprights mounted on said base, a single pair of nonelectrically operated and nonretractable stacking dogs comprising a stacking dog pivotally mounted for limited movement on and extending between an entrance upright and the exit upright directly in line therebehind, another stacking dog pivotally mounted for limited movement on and extending between the other entrance upright and the exit upright directly in line therebehind, said dogs positioned slightly above the height of a case entering the stacker, said dogs normally in inward position, a cradle elevator movably mounted to and between said uprights, an air cylinder connected to a compressed air supply, and to said cradle elevator, a pair of brackets attached to said entrance uprights at their upper portions, a shelf mounted on said brackets, an upper bracket attached to a higher portion of said uprights, said air cylinder mounted on said shelf and attached at its upper portion to said upper bracket, said air cylinder being supported above said base so as to require no vertical space at the base for said air cylinder, thereby permitting the cradle elevator to reach a lower level adjacent said base and the floor, a lower and an upper electric switch each connected to an electrical source of power and to said air cylinder, said lower electric switch positioned on one of said exit uprights on the level of a case entering the stacker on said cradle elevator, said upper electric switch positioned on one of said uprights slightly above said stacking dogs, said lower electric switch upon being contacted by a case to actuate said air cylinder to move said cradle elevator upwardly with the case physically contacting and pivoting said stacking dogs inwardly until slightly above them, said dogs then being released and falling downwardly and inwardly by gravity, so that when the case contacts said upper electric switch thereby energizing said air cylinder to move said cradle elevator downwardly, the case falls by gravity onto and is supported by said stacking dogs, said cycle being repeated until a desired stack of cases is formed, with the lowest case contacting any case above it, and with the single pair of stacking dogs contacting the lowest case and supporting it and any case above it in the stack, said entrance uprights and said exit uprights adapted to be moved to or from each other and to be held in desired position by adjustable connecting members to permit the stacker to accommodate cases of varying widths, said brackets supporting said shelf and said air cylinder and said upper bracket attached to said air cylinder adapted when said uprights are moved to or from each other to be adjusted for support of and attachment to said air cylinder.

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