Sept. 13, 1966 C. R. COOLEY 3,272,546

PUSH-PULL DEVICE FOR CONTAINERS

Filed Dec. 3, 1964 3 Sheets-Sheet 1

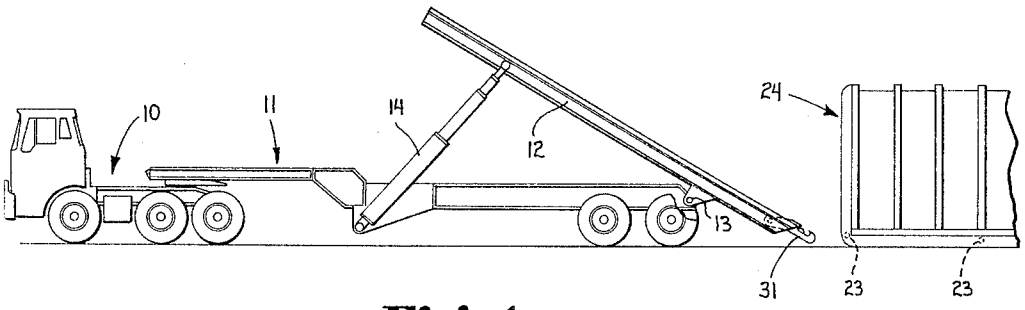


Fig. 1.

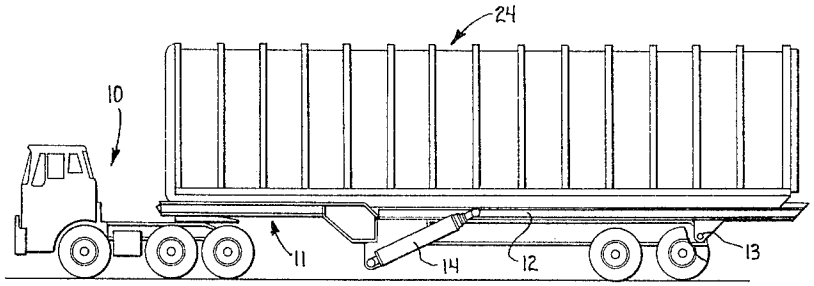


Fig. 2.

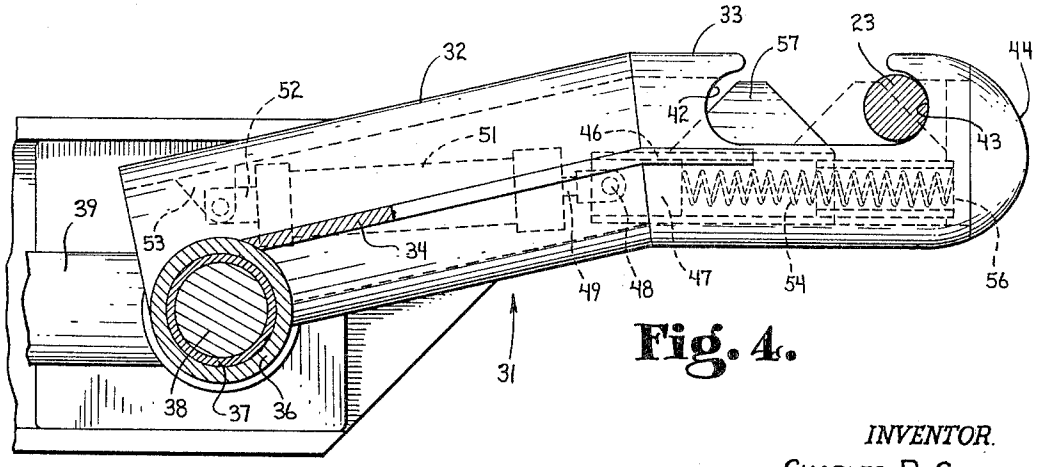


Fig. 4.

INVENTOR.
CHARLES R. COOLEY

BY Lakewood, Woodard, Smith & Wickart
Attorneys

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PUSH-PULL DEVICE FOR CONTAINERS

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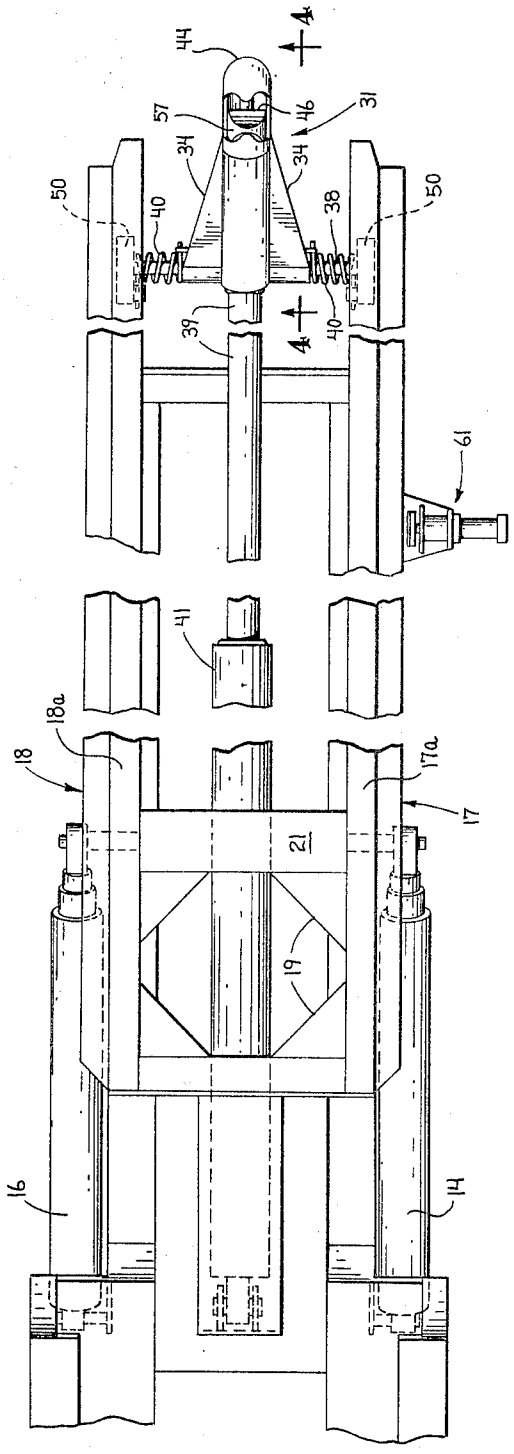


Fig. 3.

INVENTOR.
CHARLES R. COOLEY

BY Lockwood, Woodard, Smith & Wishart
Attorneys

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PUSH-PULL DEVICE FOR CONTAINERS

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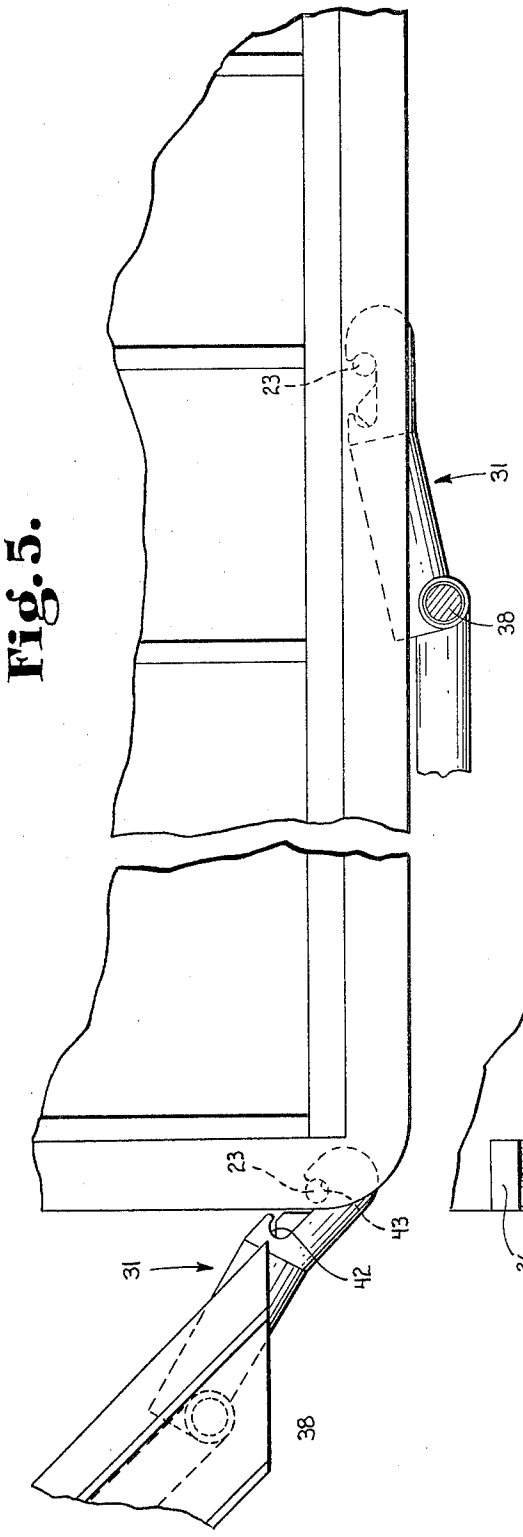


Fig. 5.

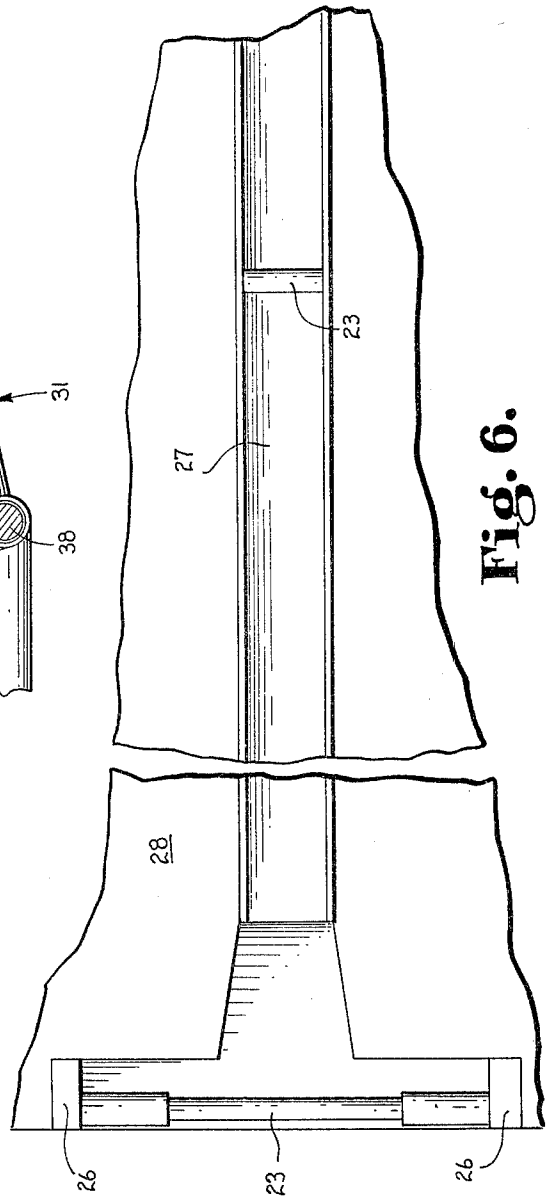


Fig. 6.

INVENTOR.
CHARLES R. COOLEY

BY Lockwood, Woodard, Smith & Weikart
Attorneys

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3,272,546

PUSH-PULL DEVICE FOR CONTAINERS

Charles R. Cooley, Louisville, Ky., assignor to Tri-City Industrial Service, Inc., Louisville, Ky., a corporation of Kentucky

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4 Claims. (Cl. 294—2)

This invention relates generally to material transfer devices and in particular to an assembly adapted to cooperate with a container for pulling or pushing the container with relation to a tilted loading platform.

In the prior art various means have been utilized to slide loaded containers along a track, or guides, with the track being tilted or horizontal. Such devices are disclosed in U.S. Patents 1,280,141 and 2,521,727. One of the problems involved in moving heavily loaded containers, as referred to above, is providing catch device, either on the container or on a thrust member cooperating with the container, which can be used to link the container to a source of motive power bidirectionally, that is, so that the container can be either pulled onto, or pushed off of, a loading frame or platform.

It is the primary object of the present invention to provide a catch device which can be selectively actuated to apply either push or pull motive power to a container and which cooperates with spaced abutments on a container so that such motive power can be applied in well defined steps or increments.

It is a further object of the present invention to provide a relatively simple, trouble-free catch assembly for selectively, moving loaded containers onto or off of tilted loading frames.

These and other objects will become apparent as the description proceeds with reference to the accompanying drawings in which:

FIG. 1 is a side view of a prime mover, tiltable platform and a portion of a container and illustrating the device of the present invention in its environment of use.

FIG. 2 is a view similar to FIG. 1 but showing the container loaded upon the platform by utilization of the device of the present invention.

FIG. 3 is a top plan view of the device of the present invention and illustrating a portion of the tiltable loading platform with which the device of the present invention coacts.

FIG. 4 is a side view taken generally along the line 4—4 of FIG. 3.

FIG. 5 is a fragmentary side view of a container and the motion of the device of the present invention during the application of a pushing or pulling force to the container.

FIG. 6 is a fragmentary, bottom plan view of a container having transverse bars thereon with which the device of the present invention is adapted to cooperate.

Referring initially to FIGS. 1 and 2, there is shown a prime mover taking the form of the tractor unit **10**, trailer platform **11** and tilting loading platform **12**. The platform **12** is pivoted at **13** and is raised and lowered by means of hydraulic power units **14** and **16** (FIG. 3), only one of the power units **14** being visable in FIG. 1. As will be evident from FIG. 3 the tilting platform **12** is composed of spaced structural channels **17** and **18** which are braced by suitable gusseting **19** and cross members **21**. The longitudinal members **17** and **18** are formed by back-to-back channels, the inwardly facing channels **17***a* and **18***a* providing tracks for the device of the present invention as will subsequently be described.

The push-pull attachment device of the present invention is shown generally at **31** in FIG. 1 and is adapted to be moved rectilinearly along the tilting platform **12**. The device **31** is adapted to engage spaced bars **23** mounted along the underside of the container **24**. FIG. 6 shows the arrangement of the bars along the length of the container, at the underside thereof. The leading or initial bar **23** on the container extends between two depending brackets **26**. The remaining, shorter bars **23** are spaced along the length of the underside of the container and extend between the side flanges of a channel-shaped structural member **27** which is rigidly secured to the underside of the container, the bottom panel of the container being indicated at **28** in FIG. 6.

The device **31** of the present invention is engaged sequentially by the bars **23** and a container is drawn by incremental movement up onto the tilting platform **12** and the tilting platform is lowered by means of the power means **14** and **16** until the platform and container have obtained the positions shown in FIG. 2. In the unloading of the container **24** from the trailer, the device of the present invention is utilized again to engage the bars **23** on the container base. However, the device **31** engages the bars so that the container may be pushed or controlled in its movement off of the tilting platform **12**.

Referring particularly to FIGS. 3 and 4, the structure of the device embodying the present invention will now be described. The push-pull attachment device comprises a tubular housing indicated generally at **31**, the housing being formed of two portions **32** and **33** whose central longitudinal axes are inclined with relation to each other. Extending sidewardly from the housing portion **32** are triangular shaped gusset members **34**. The end area of the housing portion **32** accommodates a transverse sleeve **36** which is inset into the housing portion and is welded thereto and also welded to the gusset members **34**. The sleeve **36** encircles an anti-friction bearing sleeve **37** and the sleeve **36** is thus free to pivotally move around a transverse shaft **38**. As may best be seen in FIG. 3, the shaft **38** extends sidewardly beyond the sleeve **36** and the ends of the shaft are attached to slide blocks **50** with are free to move along the longitudinal length of the inwardly facing channel frame members **17***a* and **18***a*. Each extending end of the shaft **38** carries a torsion spring **40** which serves to bias the free end of the housing **31** upwardly as viewed in FIG. 3 and counterclockwise as viewed in FIG. 4.

The housing **31** is moved rectilinearly along the frame members **17** and **18** by any suitable means which may take the form of a thrust rod **39** rigidly attached at one end to the sleeve **36**. The thrust rod **39** may be actuated by a hydraulic power element such as indicated at **41**, the power element **41** being mounted centrally between the members **17** and **18**. The housing portion **33** is cut away and undercut to provide two, spaced and opposed container bar-receiving throats **42** and **43**. The nose plug or closed end of the housing is smoothly curved as indicated at **44**.

Rigidly mounted within the housing and generally below the center of the housing portion **33** is a sleeve **46** (FIG. 4). Slidable longitudinally within the sleeve is a member **47** having a pivotal attachment, indicated at **48** to a thrust pin **49**. The thrust pin **49** is a component of a power element **51** taking the specific form of a single acting hydraulic cylinder pivotally mounted within the housing portion **32** by means of the pivotal attachment of the mounting post **52** to the spaced flanges **53** depending from the inner surface of the housing portion **32**. It will be understood that other forms of power elements for providing motion of the member **47** within the sleeve **46** could be utilized. A pressure liquid line to the hydraulic cylinder **51** is not shown in FIG. 4, however, it will be recognized that this might be a flexible line or might be a rigid fluid feed line which extends concentrically within the thrust rod **39** of the larger hydraulic cylinder **41**.

While the thrust pin **49** may be extended by the hydraulic cylinder **51**, a means is provided for retracting the thrust pin which takes the form of a compression spring **54** extending from a surface within the sleeve **46** and a surface **56** at the free end of the housing portion **33**. The member **46** carries an abutment member **57** which extends upwardly therefrom. The abutment **57**, as shown in solid lines in FIG. 4 cooperates with the throat **42** so as to obstruct it preventing entry of a container bar **23** into the throat **42**. Upon extension of the thrust pin **49**, the member **47**, and consequently the abutment **57**, move from their solid line position of FIG. 4 into their broken line position and in this position the abutment **57** obstructs the throat **43** preventing entry of a container bar **23** into the throat but permitting such entry in the now unobstructed throat **42**.

In operation, the trailer is moved into the positional relationship with a container **24** which is shown in FIG. 1. The device **31** is then moved rectilinearly toward the container by means of the power element **41** until the first container bar **23** is seated in the throat **43** of the device as shown in FIG. 5. The power element **41** is then actuated so as to retract the member **39**, drawing the container up the tilted platform **12** a distance equal to the length of the stroke of the power element **41**. A suitable arresting means, indicated at **61** in FIG. 3 is then actuated (by means of a solenoid or any other remotely controllable means) to move against the web portions of the longitudinal panel **27** underlying the container. With the container held by the arresting means, the power element **41** is again actuated to extend the member **39** and move the attachment device **22** so as to again engage the throat **43** with the next container bar **23**. It will be noted that, as shown in FIG. 5, in moving toward the second bar **23**, the arcuate end **44** of the housing functions to cam downwardly the leading end of the housing, pivoting the housing about the shaft **38**. As the bar **23** registers with the cut away portion of the housing, the housing returns to its upper limiting position aligning the bar **23** with the throat **43**. The arresting means **61** may now be deactuated and the thrust element **39** retracted so as to move the container and additional increment up the tilting platform **12**. This sequence continues until the container is moved completely onto the platform, the platform **12** being lowered as the container moves onto it, the final position of the container on the trailer being shown in FIG. 2.

When the container **24** is to be unloaded from the trailer, the power element **51** within the housing of the device **31** is actuated so as to move the abutment **57** to its broken line position of FIG. 4 wherein the throat **43** is obstructed and the throat **42** is cleared for entry of a container bar therein. The device **31** is then moved rectilinearly beneath the container by means of the power element **41** until one of the container bars **23** is seated in the throat **42** with the motion of the device **31** thereafter serving to push the container incrementally off the platform **12**, the platform being tilted as this removal of the container proceeds.

It will be understood that the device **31** is not limited in its use to the handling of containers or van bodies but also might be used to pick up and eject flat bed structures, machinery, portable field houses or other military equipment.

While the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative, and not restrictive in character, as other modifications may readily suggest themselves to persons skilled in this art and within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A push-pull attachment device adapted for cooperation with bars carried on a container spaced in the direction of intended motion of the container and extending transverse to the direction of container motion, said device comprising a tubular housing having a closed arcuate free end, said housing having a portion cut away adjacent said free end to provide two spaced and opposed bar-receiving throats which are spaced from each other along the longitudinal axis of said housing, said housing being adapted to underlie a container with said bar-receiving throats adjacent to the container bars, a rectilinearly movable pivotal mounting for said housing disposed below said bar-receiving throats and permitting pivotal movement of said housing and an axis transverse to its direction of rectilinear motion, resilient means biasing said housing about its pivotal axis to urge said throats into bar-receiving position, an abutment slidably mounted interiorly of said housing and movable between a first position blocking entry of a container bar into the one of said throats adjacent the closed end of said housing and a second position blocking entry of a container bar into the other throat, and a power element within said housing for moving said abutment between said positions, whereby as said housing is moved rectilinearly beneath a container the arcuate closed end of said housing engages the container bars pivoting said housing downwardly so as to initially clear said bars with said resilient means returning said housing to a position forcing the bars into one or the other of said throats depending upon whether said abutment is in its said first or second positions as said cut away portion of the housing registers with the bars.

2. A push-pull attachment device adapted for cooperation with members carried on a container spaced in the direction of intended motion of the container and extending transverse to the direction of container motion, said device comprising a tubular housing having a closed arcuate free end, said housing having a portion cut away adjacent said free end to provide two spaced and opposed throats which are spaced from each other along the longitudinal axis of said housing, said housing being adapted to underlie a container with said throats adjacent to the transverse container carried members, a rectilinearly movable pivotal mounting for said housing disposed below said throats and permitting pivotal movement of said housing on an axis transverse to its direction of rectilinear motion, resilient means biasing said housing about its pivotal axis to urge said throats into transverse member receiving position, an abutment slidably mounted interiorly of said housing and movable between a first position blocking entry of a transverse container member into the one of said throats adjacent the closed end of said housing and a second position blocking entry of a member into the other throat, and a power element within said housing for moving said abutment between said positions, whereby as said housing is moved rectilinearly beneath a container the arcuate closed end of said housing engages the transverse container members pivoting said housing downwardly so as to initially clear said members with said resilient means returning said housing to a position forcing the members into one or the other of said throats depending upon whether said abutment is in its said first or second positions as said cut away portion of the housing registers with the members.

3. A push-pull attachment device adapted for cooperation with members carried on a container spaced in the direction of intended motion of the container and extending transverse to the direction of container motion, said device comprising a tubular housing having a closed arcuate free end, said housing having a portion cut away adjacent said free end to provide two spaced and opposed throats which are spaced from each other along the longitudinal axis of said housing, said housing being adapted to underlie a container with said bar-receiving throats adjacent to the transverse container carried members, a rectilinearly movable pivotal mounting for said housing permitting pivotal movement of said housing on an axis transverse to its direction of rectilinear motion,

resilient means biasing said housing about its pivotal axis to urge said throats into transverse member receiving position, and abutment slidably mounted interiorly of said housing and movable between a first position blocking entry of a transverse container member into the one of said throats adjacent the closed end of said housing and a second position blocking entry of a member into the other throat, and a power element within said housing for moving said abutment between said positions, whereby as said housing is moved rectilinearly beneath a container the arcuate closed end of said housing engages the transverse container members pivoting said housing downwardly so as to initially clear said members with said resilient means returning said housing to a position forcing the members into one or the other of said throats depending upon whether said abutment is in its said first or second positions as said cut away portion of the housing registers with the members.

4. A push-pull attachment device adapted for cooperation with bars carried on a container spaced in the direction of intended motion of the container and extending transverse to the direction of container motion, said device comprising a tubular housing having a closed arcuate free end, said housing having a portion cut away adjacent said free end to provide two spaced and opposed bar-receiving throats which are spaced from each other along the longitudinal axis of said housing, said housing being adapted to underlie a container with said bar-receiving throats adjacent to the container bars, a rectilinearly

movable pivotal mounting for said housing disposed below said bar-receiving throats and permitting pivotal movement of said housing on an axis transverse to its direction of rectilinear motion, resilient means biasing said housing about its pivotal axis to urge said throats into bar-receiving position, an abutment slidably mounted interiorly of said housing and movable between a first position blocking entry of a container bar into the one of said throats adjacent the closed end of said housing and a second position blocking entry of a container bar into the other throat, means for moving said abutment between said positions, whereby as said housing is moved rectilinearly beneath a container the arcuate closed end of said housing engages the container bars pivoting said housing downwardly so as to initially clear said bars with said resilient means returning said housing to a position forcing the bars into one or the other of said throats depending upon whether said abutment is in its said first or second positions as said cut away portion of the housing registers with the bars.

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GERALD M. FORLENZA, *Primary Examiner.*

G. F. ABRAHAM, *Assistant Examiner.*