United States Patent

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[54] **VEHICLE FOR HANDLING CONTAINERS OF VARYING LENGTHS**
8 Claims, 5 Drawing Figs.

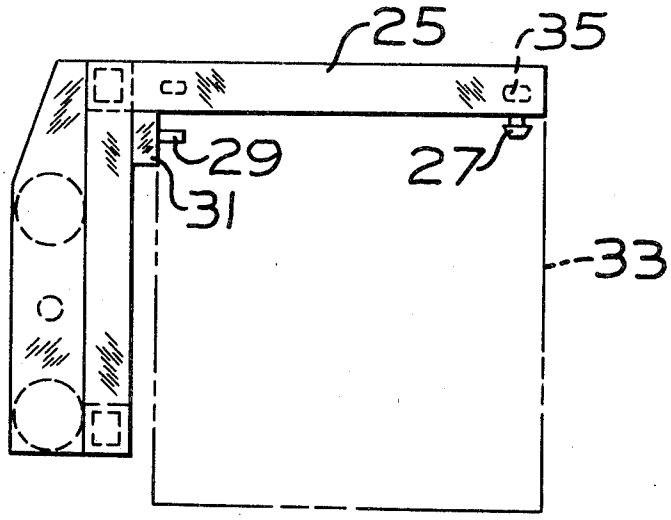
[52] **U.S. Cl.** **214/621,** 294/67
[51] **Int. Cl.** **B66f 9/18**
[50] **Field of Search** ..... 214/620, 621; 294/67.4 (A), 67.2 (B), 67.2 (C), 67.2, 67.4

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ABSTRACT: A container-handling device, which may be mounted on a suitable vehicle, comprising a pair of adjustable arms with locking devices on the lower and inside surfaces thereof for positively holding the containers to the device.



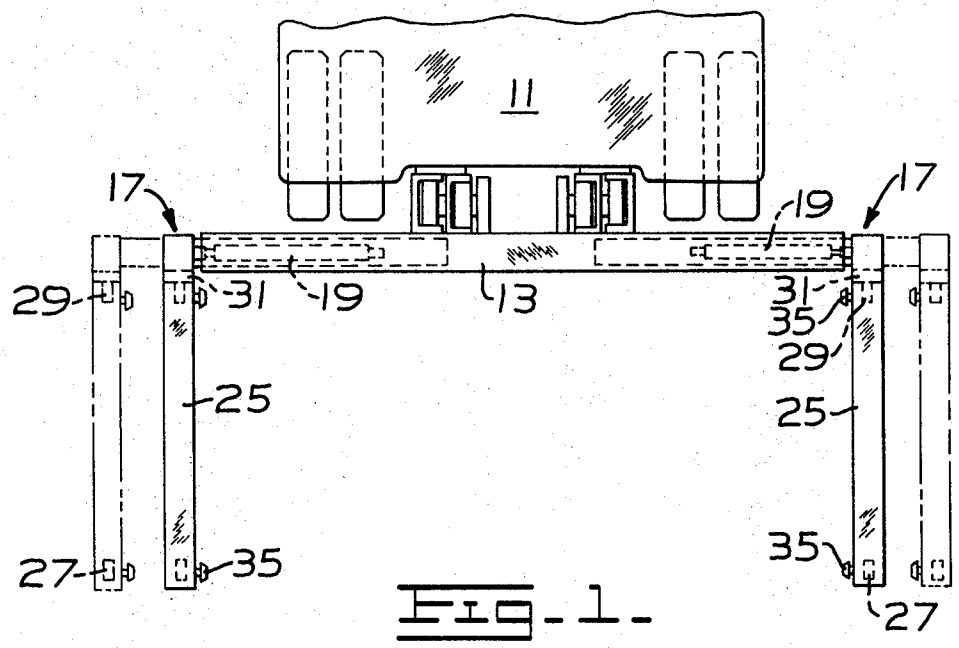


Fig-1-

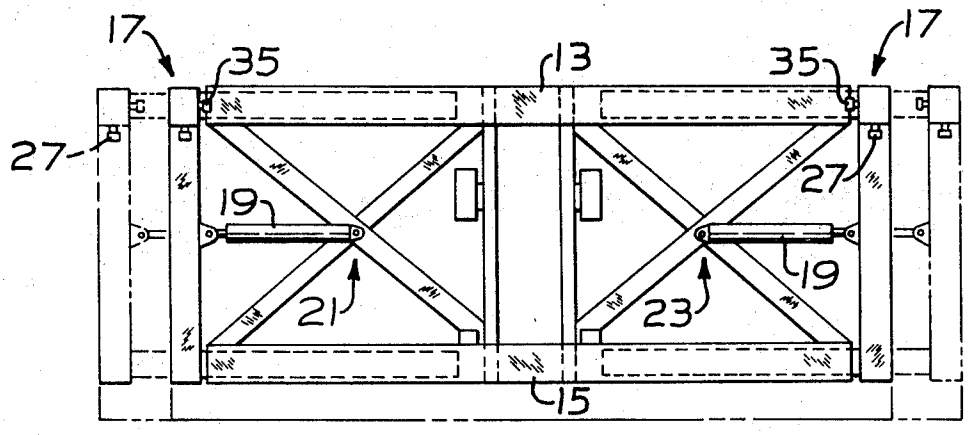


Fig-2-

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Fig. 3.

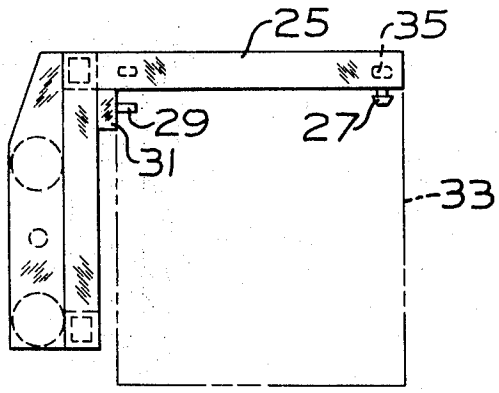


Fig. 4.

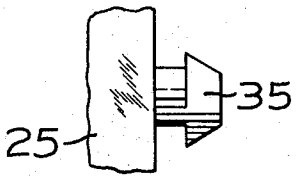
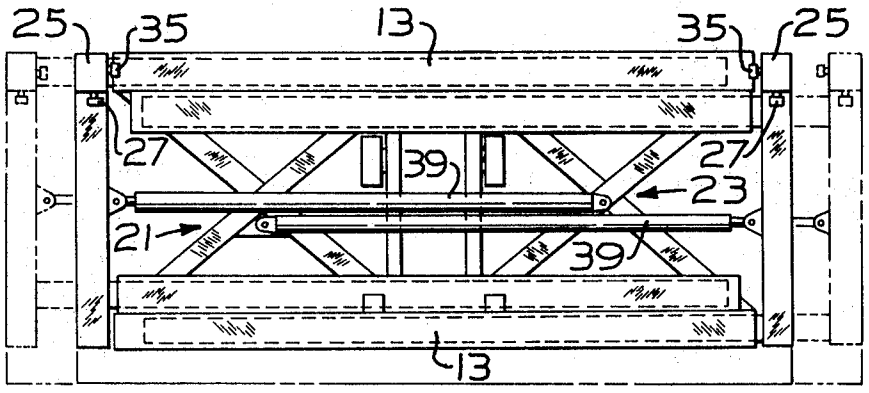


Fig. 5.



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VEHICLE FOR HANDLING CONTAINERS OF VARYING LENGTHS

BACKGROUND AND SUMMARY OF THE INVENTION

A relatively new concept in material shipping known as "containerization' has arisen within the last few years. Some of the problems facing the container-handling industry have been the lack of versatility in handling containers of different lengths and the utilization of available equipment without making numerous changes to the equipment.

Occasionally, attempts have been made by forklift operators to lift containers not having fork-pockets. In order to insert the forks under a container, either dunnage must be used beneath the container or the forks must be inserted under the container by force. The use of dunnage, of course, creates wasted space and the insertion of the forks by force often causes damage.

Although the International Organization for Standardization has recommended standard dimensions for containers, many of the containers utilized are not in accordance with those recommendations and it has proven to be difficult to handle all of the standard and nonstandard containers with a single piece of equipment while avoiding numerous parts changes.

At the present time, railroads and shipping companies desire to procure machinery and equipment which can handle the increasing number of containers having standard corner castings. Most companies will not wish to maintain an inventory of frames to support the various lengths of containers which they will have to handle.

For these reasons, the subject invention has been developed which relates to a variable length container-handling device suitable for picking up standard 8 ft. × 8 ft. cross section containers by their corner castings, even though the containers may have different lengths.

It is therefore an object of this invention to provide an improved container-handling vehicle.

It is also an object of this invention to provide a container-handling vehicle capable of maneuvering containers having a wide variety of lengths but having a standard cross section.

It is also an object hereof to provide a container-handling handling device capable of handling a number of empty or lightly loaded containers at one time.

Other objects and advantages of the present invention will become apparent from the following description and claims as illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and principles thereof and what is now considered to be the best modes contemplated for applying these principles. It is recognized that other embodiments of the invention utilizing the same or equivalent principles may be used, and structural changes may be made as desired by those skilled in the art, without departing from the present invention and purview of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a device according to the present invention, mounted on a suitable vehicle;

FIG. 2 is a front elevation of a preferred embodiment of the container-handling device;

FIG. 3 is an end view of the device according to the present invention;

FIG. 4 is an illustration of one of the means on the device for locking a container thereto; and

FIG. 5 is an elevation, similar to FIG. 2, of an alternate embodiment of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the embodiment of the invention shown in FIGS. 1—4, there is illustrated a lift truck 11 upon which are mounted horizontal box section members 13 and 15. The box section members movably support lifting assemblies 17 on either end thereof through telescopic interaction which is controlled by hydraulic cylinders 19 fastened between frame sections 21 and 23 and the lifting assemblies.

The lifting assemblies 17 have horizontal, forward extending arms 25 at the upper portions thereof. The arms contain twist locks 27 on the underside of the outer extremity thereof. Horizontal pins 29 are positioned near the inner extremities of the arms by means of blocks 31 which are mounted at the intersection of the box section members and the arms.

When a container, such as that shown in phantom at 33 in FIG. 3, is to be picked up by a vehicle utilizing the device, the arms 25 are positioned according to the length of the container by actuation of the cylinders 19 in a manner well-known in the art. With the mast of the lift truck tilted backward, the pins 29 are engaged in in the side holes of the casting at the near top corners of the container; the clearance provided by the blocks 31 permits this to be accomplished.

As the mast returned from the tilt position, the twist locks 27 may be inserted in the top holes of the castings in the far top corners of the container. The twist locks may then be rotated by hydraulic cylinders (not shown), in a well-known manner, to lock the arms 25 to the container.

The container may then be elevated and transported by the lift truck to its desired destination. The detachment of the container from the lift truck merely involves reversal of the above procedure.

When a number of empty or lightly loaded containers are to be handled, a set of relieved pins 35, on the inside edges of the front and rear extremities of the arms 25, can be inserted into the holes in the castings in the top outside corners of the bottom container in a stack to be handled. Of course, the number of containers which can be handled simultaneously in this manner is limited by the rated capacity of the unit and the stability of the stack of containers.

Referring now to the embodiment illustrated in FIG. 5, it can be seen that most of the parts of the device are identical to those already described and, as such, have been given identical labels. However, the machine illustrated may be utilized to handle containers of much greater length than those handled by the previously described embodiment.

In order to accomplish this increase in machine capability, the length of the telescoping members within the horizontal box section members 13 must be increased and the hydraulic cylinders 39 must be longer, as shown in the drawings.

In the first embodiment, the cylinders 19 could be less than one-half the length of the support member since only a relatively small adjustment of the distance between the arms would be required.

However, when it is desired to extend the arms a great distance apart so as to handle much longer containers, this result can be achieved by utilizing much longer cylinders—for example, at least one-half the length of the support member, or more, as shown.

In both of the embodiments described, the container handling device may be detachably applied to a fork-type carriage with the forks removed in a well-known manner.

The Applicant has thus described two embodiments of machinery utilizing the invention. Obvious alterations and modifications will quickly be visualized by those skilled in the art, without exceeding the purview of the following claims.

I claim:

1. In a container-handling device, means for mounting the device on a vehicle, support means fixed to the mounting means, a pair of forwardly extending, generally horizontally disposed, arms mounted on the upper portion of the support means, means on the arms for positively holding a container when inserted into corner apertures of the container, said holding means including twist lock means on the underside of the arms adjacent the forward end thereof, said holding means also including pin means mounted on said support means adjacent the intersection of the arms and the support means, and means mounting the pin means for maintenance of

clearance between a container and the support means, thereby allowing the support means and arms to be tilted relative to the container when the pin means are within their respective apertures while the twist lock means are not within their respective apertures.

2. The device of claim 1 including means mounted on the support means for adjusting the amount of separation between the arms.

3. The device of claim 2 wherein the adjustment means comprise at least one hydraulic cylinder means which, when retracted, is not longer than one-half the length of the support means.

4. The device of claim 2 wherein the adjustment means comprise at least one hydraulic cylinder means which, when retracted, is at least as long as one-half the length of the support means.

5. The device of claim 1 including means mounted on the support means for relatively moving the arms toward one another so that the pin means can positively grip a container when inserted into apertures on the upper side corners thereof.

6. The device of claim 1 wherein said support means comprises a generally vertically oriented member to which said horizontally disposed arms are attached.

7. The device of claim 6 wherein said pin means comprises a plurality of generally horizontally-oriented pins whereby said pins may be inserted in side holes of a container casting for holding a container.

8. The device of claim 7 wherein said twist lock means comprises a vertically, downwardly extending twist lock on the underside of each of said arms whereby said twist locks may be inserted in top holes of a container casting for holding a container.