April 25, 1967 R. C. TAIT 3,316,009

COUPLING ADAPTOR

Filed Feb. 18, 1966

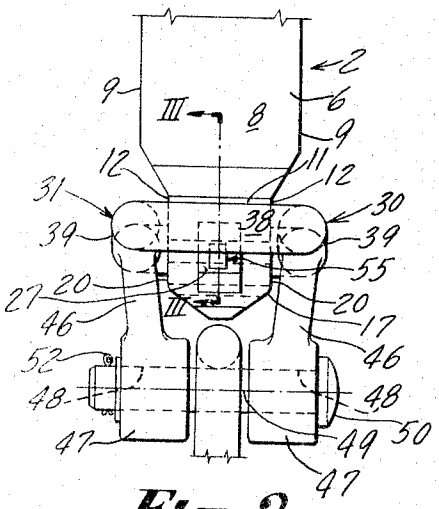

Fig. 2

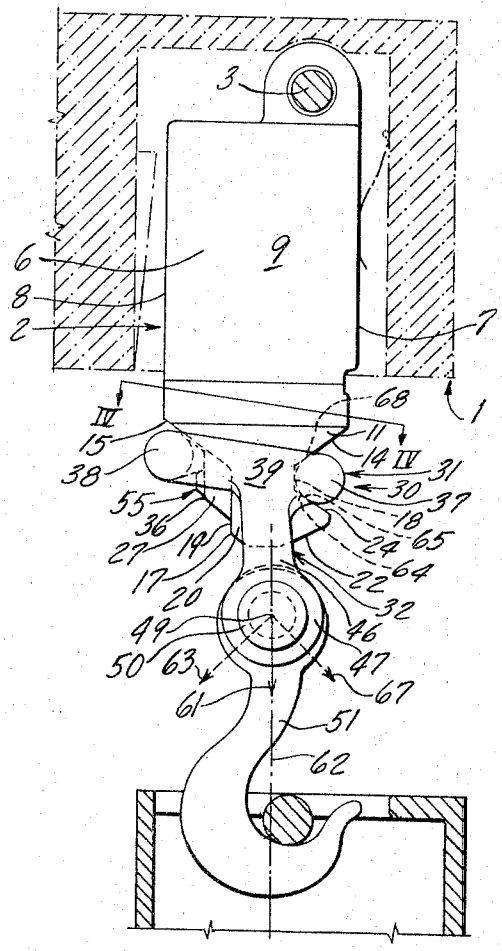

Fig. 1

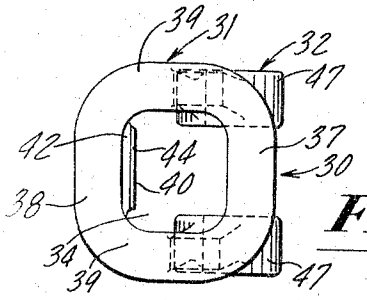

Fig. 4

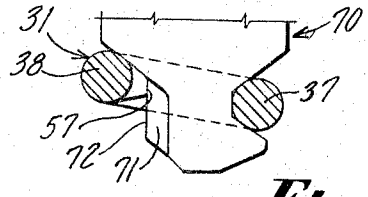

Fig. 5

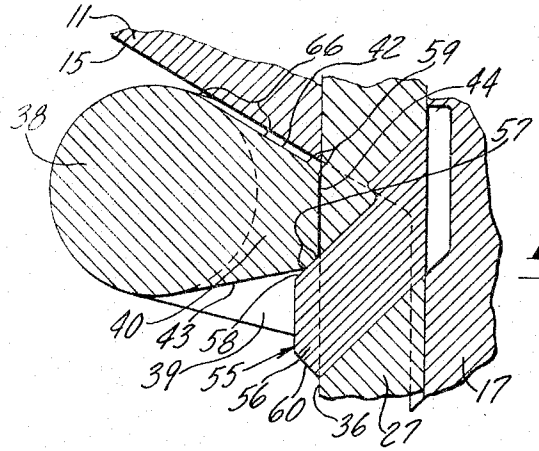

Fig. 3

INVENTOR
RAYMOND C. TAIT
BY
Henry Kozak
ATTORNEY

United States Patent Office 3,316,009 Patented Apr. 25, 1967

3,316,009

COUPLING ADAPTOR

Raymond C. Tait, Cleveland Heights, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio, a corporation of Ohio

Filed Feb. 18, 1966, Ser. No. 528,562
7 Claims. (Cl. 294—82)

This invention relates to cargo-container handling systems, and particularly, to a known type of container lifting implement and an adaptor therefor enabling the implement to handle types of containers and loads other than those for which the implement was designed.

In the transportation industry, there are several types of lifting systems capable of handling freight packed in large crane-portable containers. Some of the containers in use have a plurality of pockets extending inwardly from their top surface at each corner. The lifting implement for this type of container has a like-plurality of coupling devices spaced in the same horizontal pattern as the pockets of the containers. Other containers in use have a hook or ring-shaped member disposed at each top corner to enable rope slings or chains to be connected therewith.

It is the primary object of this invention to provide an adaptor for an L-shaped lifting device that is attached to a lifting implement to thereby permit the implement to handle various types of containers having connecting means of a different coupling system.

A further object is to provide an adaptor for an L-shaped lifting device which, when coupled thereto, will remain positively connected therewith until manually removed therefrom.

In the drawing in respect to which this invention is described:

FIG. 1 is a fragmentary side elevation illustrating an L-shaped lifting device having coupled thereto an adaptor connecting the device with a load.

FIG. 2 is an elevation of the device and adaptor illustrated in FIG. 1 and as viewed from the left.

FIG. 3 is a fragmentary side elevation in cross-section taken along line III—III of FIG. 2.

FIG. 4 is a top view of the adaptor, with the device removed, taken along line IV—IV of FIG. 1.

FIG. 5 is a fragmentary side elevation of another embodiment of an L-shaped lifting device to which the adaptor may be coupled.

FIG. 1 illustrates as a part of the lifting implement **1**, a lifting device **2** pivotally attached thereto by means of a pin **3**.

Briefly, each lifting device **2** comprises a body portion **6** having front, rear, and lateral sides **7**, **8** and **9—9**, respectively. The bottom of the body **6** is defined by a frustum **11** of a tetrahedron having vertical lateral sides **12—12** and downwardly facing inclined surfaces **14** and **15**. A stem **17** depends from the base of the frustum **11**. The stem is a quadrangular prism having front and rear vertical surfaces **18** and **19** and lateral sides **20—20** which are coplanar to the sides **12—12** of the frustum **11**, respectively. A tapered foot **22** projects frontwardly from the free end of the stem to define an upwardly facing inclined surface **24** in spaced relation to the downwardly inclined surface **14**. A vertically reciprocal lock **27** is supported by the body rearwardly of the stem and in slidable relation with the rear surface **19** thereof. The lifting device described herein is used in the material handling system as set forth in United States Patent No. 3,034,659.

The present invention encompasses an adaptor **30** to be used in combination with the aforesaid lifting device **2**. The adaptor **30** comprises a rigid collar **31** and a load-supporting means **32**.

The collar **31** is a ring-shaped member having an opening **34** therein adapted to receive the stem **17** and lock **27** of the device **2**. As is obvious from the drawings, the inner peripheral portions of the collar **31** are in closely spaced relationship with the front vertical surface **18** of the stem and the rearwardly facing surface **36** of the lock **27**. Such a relationship prohibits the disengagement of the collar from the stem **17** when the adaptor is connected to the device **2**.

The collar **31** comprises front and rear sections **37** and **38**, respectively. Sections **37** and **38** are interconnected by stem-flanking lateral sections **39—39**. Each section **37**, **38** and **39—39** is preferably circular in vertical cross-section. A tapered rib **40** projects into the opening **34** a predetermined amount from the inner peripheral portion of the rear section **38**. The rib **40** is contained in the general plane of the collar and is defined by a pair of converging outwardly facing side surfaces **42** and **43**. Each side surface tangentially merges with the rear section **38**. A flat end surface **44**, parallel to the lengthwise direction of the rear section **38**, connects the two side surfaces.

In the embodiment shown, the load-supporting means **32** comprises a pair of spaced legs **46—46** which converge in a direction away from the collar **31**. Each leg extends a distance greater than the length of the stem downwardly and forwardly from its associated stem-flanking section **39**. The upper terminus of each leg joins with its respective lateral section **39** at a location spaced nearer to the front section **37** than the rear section **38**. As a result, the load distribution is such that the front section **37** carries the greatest load when the adaptor is connected to the lifting device **2** and the article to be transported. The free end of each leg terminates in a lug **47** having a hole **48** therein. The holes **48—48** are in alignment and have a common axis **49** that is parallel to the lengthwise direction of the front and rear sections **37** and **38**. In the embodiment now described, a connecting link pin **50** is attached to the adaptor **30** to thereby function as the means for interconnecting the adaptor to a load through a chain, rope, or hook **51** such as is shown in FIG. 1. Fastening means **52**, such as a cotter pin connection, is used to secure the link pin **50** to the adaptor **30**.

Referring to FIGS. 1 and 3, there is shown a rearwardly facing detent means **55** which protrudes, in its normal position of rest, in an inclined downward direction from the rear surface **36** of the lock **27**. The detent means comprises a bolt **56** which is longer than the dimension of the lock normal to its path of travel. For a further description of the detent means, reference is made to United States Patent No. 3,043,411.

In the operation of the mechanism above, the detent means functions as a holding latch; that is, it serves to maintain the adaptor **30** in a connected position with the device **2**. In this unloaded condition, a bottom portion **57** of the rib **40** rest against an upwardly facing surface **58** of the bolt **56**.

To connect the adaptor **30** to the lifting device **2**, the front section **37** of the collar **31** is positioned between, and in abutting relation with, the front inclined surfaces **14** and **24** of the device with the section **38** positioned below the stem. The adaptor is then rotated about section **37** as an axis so that the rear section **38** of the collar advances upwardly toward the device. As the rear section **38** traverses its arcuate path, a forward upper portion **59** of the rib **40** engages a bottom portion **60** of the bolt **56**. Continuous upward movement of the rear section **38** urges the bolt **56** into its chamber in the lock. As the bottom portion **57** of the rib **40** passes over the end of the bolt thus retracted, the bolt **56** readily returns to its normal position of rest. The bolt then acts as a stop

to the reverse arcuate movement of the collar. To disengage the collar from the device, finger pressure upon the bolt urges it upwardly into its chamber to thereby permit the reverse movement of the adaptor.

When the adaptor **30** is attached, through the link pin **50**, and hook **51** to a load having its line of action, as indicated by arrow **61**, contained in vertical plane **62** passing through the axis of **49** of the lugs **47—47**, or its line of action extending from the axis **49** downwardly and rearwardly as indicated by a dot-dash arrow **63**, the adaptor pivots about a bearing contact line created between a bottom area **64** on the front collar section **37** and a supporting area **65** of the inclined surface **24**. Under the latter loading condition, a portion **66** of the upwardly facing surface **42** of the rib **40** and rear section **38** will engage the inclined surface **15** of the body **6** to define a positive connection. However, when the line of action of the load increasingly deviates from the vertical plane **62** in the downwardly and forwardly direction, as indicated by a dot-dash arrow **67**, the upwardly facing surface **58** of the bolt **56** will increasingly support the main load. Under this type of a loading condition, the upper inner peripheral portion **68** of the front section **37** will engage the inclined surface **14** of the body **6**.

Advancing now to FIG. 5, there is shown another embodiment of the lifting device. The essential differences between device **2** and device **70** are that (1) the length of the lock **71** is greater than the length of the lock **27** and (2) the detent means **55** has been eliminated. Such lock structure in essence accomplishes the same result as the short lock **27** with the bolt **56**. That is, the bottom portion **57** of the rib **40** would be permitted to engage a portion **72** of the lock **71** to thereby restrain the movement of the adaptor towards an unconnected position.

To connect and disconnect the adaptor **30**, finger pressure is applied to the bottom of the lock **71**. Such pressure will raise the lock to a position whereby the rear section **38** of the collar **31** may be moved through an arcuate path to disconnect the adaptor **30**.

The terms and expressions which have been employed are used as terms of description and not of limitation and there is no intention of excluding such equivalents of the invention described or portion thereof as fall within the scope of the claims.

What is claimed is:

1. In combination with an L-shaped lifting device having front, rear and lateral sides and comprising an upper body, a stem projecting downwardly therefrom, a foot projecting frontwardly from the stem in spaced relation with the body, and a locking means disposed rearward of the stem and retractable from a normal downward position of rest;

an adaptor for connecting said device with a load and comprising:

(A) a rigid collar providing an opening for receiving the stem and the locking means in back-to-back relationship with a front section of the collar resting on an upper surface of the foot and a rear section of the collar resting against said lock means, said rear and front collar sections being connected by stem-flanking lateral section; and

(B) load -supporting means having upper termini fixed to said lateral collar sections and including means for connecting with a load spaced downwardly with respect to the collar as to dispose the connecting means underneath the device during use.

2. The combination of claim **1** in which said lock means comprises:

(A) a lock in vertically slidable relation with the back side of the stem; and

(B) a rearwardly facing detent means retractable from a position wherein it protrudes from the back of said lock.

3. The combination of claim **1** wherein:

(A) said load-supporting means and connecting means are contained in a plane transverse to the general plane of the collar, said transverse plane extending downwardly from said upper termini as to dispose said connectings means in frontwardly spaced relation to said upper termini.

4. The combination of claim **1** in which said load-supporting means comprises.

(A) a pair of spaced legs that converge in a direction away from said collar.

5. The combination of claim **1** wherein:

(A) said rear section includes a rib contained in the general plane of said collar which projects therefrom into said opening a predetermined distance.

6. The combination of claim **5** wherein:

(A) said rib is defined by a pair of spaced oppositely facing side surfaces and a flat end surface connecting said side surfaces, said side surfaces converging towards the center of the opening and said end surface extending in a direction parallel to said rear section.

7. The combination of claim **6** wherein:

(A) said side surface facing said body tangentially merges with said rear section of the collar.

References Cited by the Examiner

UNITED STATES PATENTS

3,086,807	4/1963	Russell	294—67
3,264,026	8/1966	Hansen	294—82 X

GERALD M. FORLENZA, *Primary Examiner*.

G. F. ABRAHAM, *Assistant Examiner*.