Oct. 17, 1939. W. L. COLEMAN ET AL 2,176,246

CLAMP TRUCK

Original Filed June 1, 1936 2 Sheets-Sheet 1

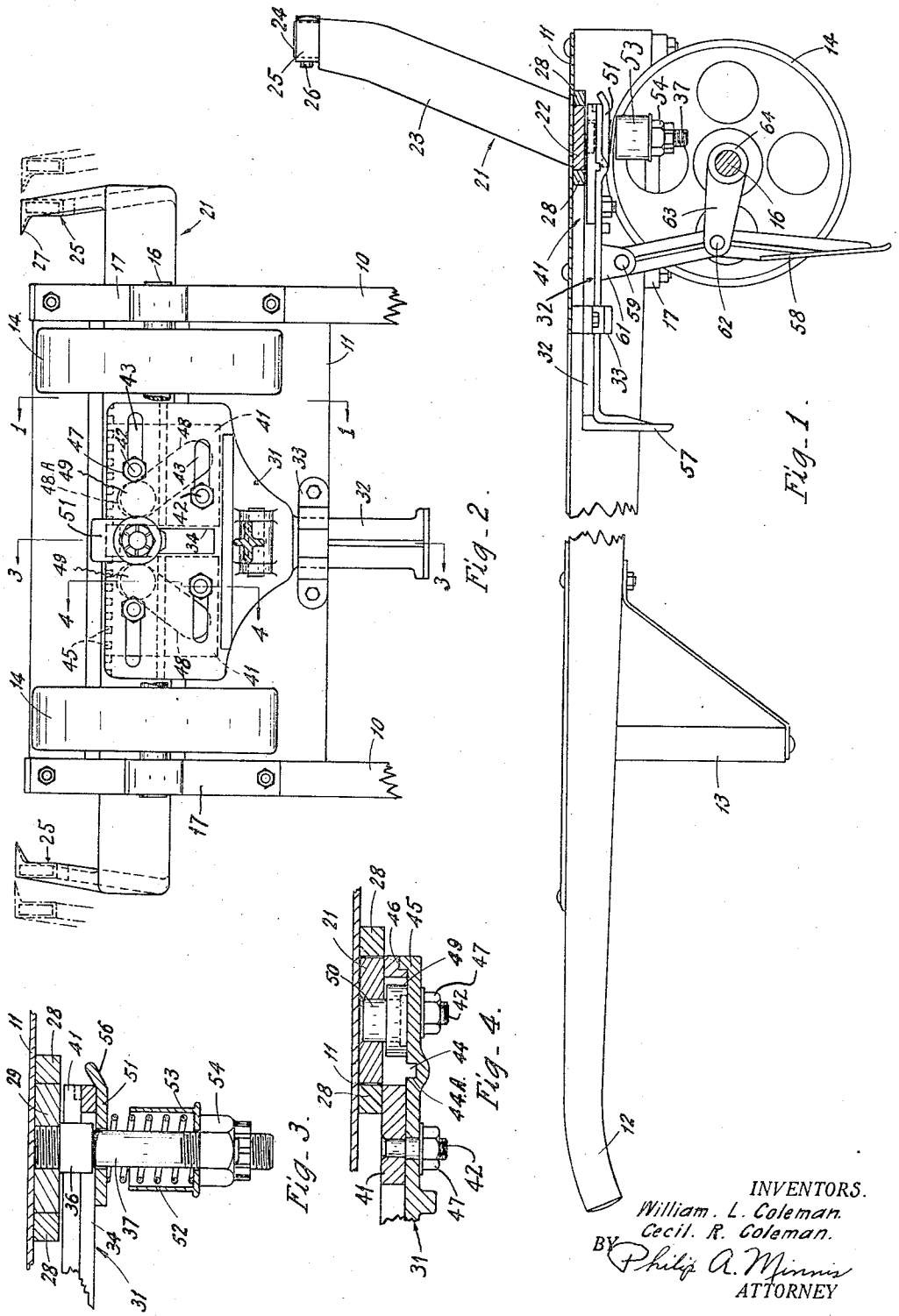


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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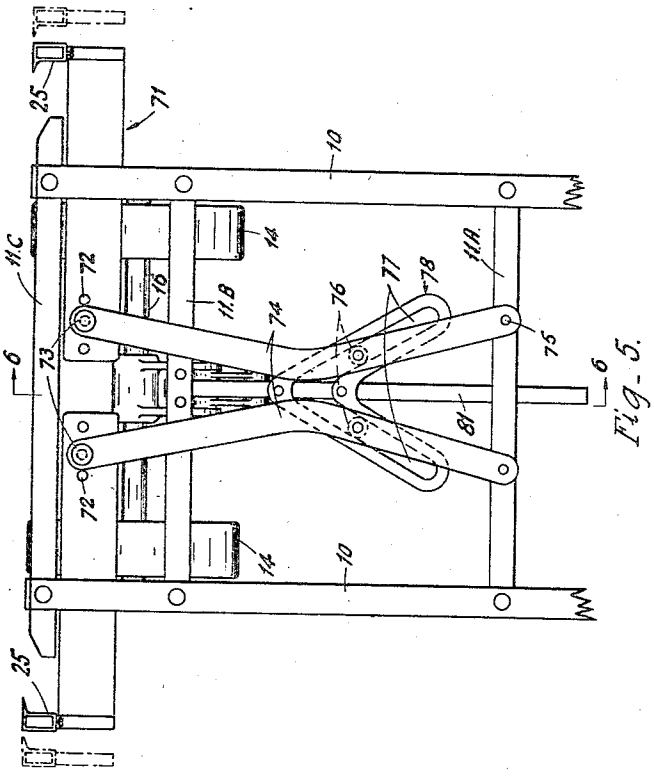
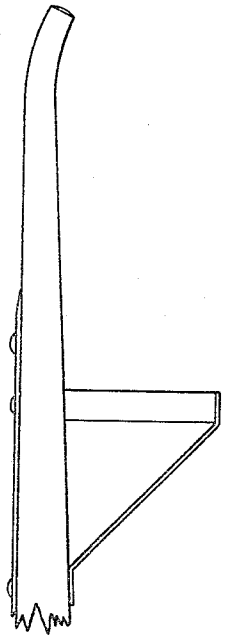


Fig. 5.



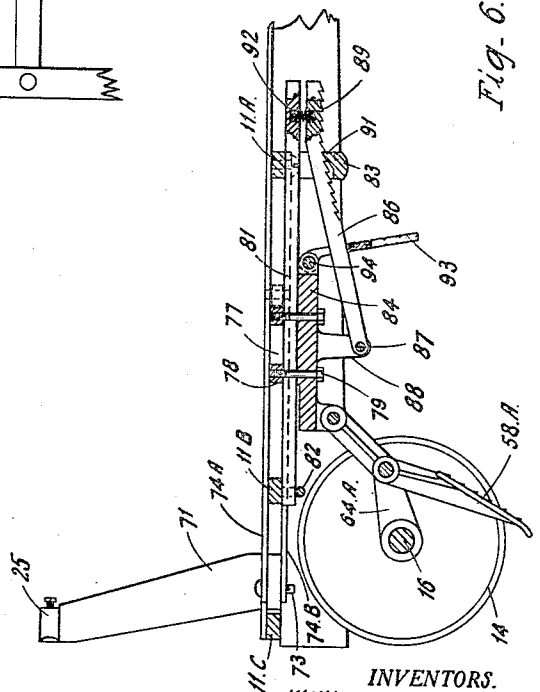


Fig. 6.

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CLAMP TRUCK

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Renewed November 25, 1938

16 Claims. (Cl. 214—65.5)

The present invention relates to clamp trucks for picking up and transporting boxes and the like and more particularly to a truck of this character which includes opposed clamp members adjustable to and from clamping position and which is constructed to facilitate easy use with boxes or the like of varying sizes.

It is an object of the invention, therefore, to provide an improved clamp truck.

Another object of the invention is to provide a truck of the character described having improved means for operating the clamping members.

Another object of the invention is to provide a truck of the character described in which the clamp members of the truck are operated to and from clamping position by cam devices.

Another object of the invention is to provide a truck of the character described in which the clamp members of the truck are operated to and from clamping position by cam devices which can be adjusted to operate the clamping members throughout various ranges of movement.

Another object of the invention is to provide improved clamping members for trucks of the character described having removable gripping devices at the ends thereof to facilitate handling of the boxes.

Another object of the invention is to provide an improved truck of the character described which possesses the above noted advantages and which is constructed to enable economical manufacture and assembly.

Other objects of the invention will appear with the foregoing as the description progresses with respect to preferred embodiments of the invention as illustrated in the accompanying drawings.

In the drawings:

Figs. 1 through 4 illustrate one form of the invention.

Fig. 1 is a side elevational view with certain parts shown in section as illustrated by the line 1—1 in Fig. 2.

Fig. 2 is a rear elevational view of the lower end of the truck.

Fig. 3 is a fragmentary section taken in a plane indicated by the line 3—3 in Fig. 2.

Fig. 4 is a fragmentary section taken in planes indicated by the line 4—4 in Fig. 2.

Figs. 5 and 6 illustrate a second form of the invention.

Fig. 5 is a front elevational view of the lower end of the truck.

Fig. 6 is a longitudinal section taken in the plane of the line 6—6 in Fig. 5, with the upper end of the truck shown in elevation.

The invention is illustrated as embodied in a clamp truck of the type having a longitudinally extending frame with a pair of supporting wheels at one end and handles at the other end to be gripped by the operator. At the lower or wheel supported end of the truck, opposed clamping members are provided which are movable toward and from each other, i. e., to and from clamping position, so that an article, such as a box, can be clamped between the members with the frame in substantially vertical position and thereafter carried to any other desired location. The present invention contemplates the provision of operating means for the clamp members in the form of cam devices which enable the secure clamping of a box with a minimum of exertion on the part of the operator. In order to provide for handling boxes of varying sizes, adjusting means is provided whereby the range of movement of the clamp members can be varied in accordance with the size of the boxes to be handled.

Referring to the form of the invention illustrated in Figs. 1 through 4, the frame comprises spaced apart side members 10 which are interconnected by various cross members including plate 11 secured to the lower ends of side members 10. At their upper ends, members 10 are formed to provide handle portions 12 and intermediate their ends have secured thereto a supporting bracket 13 so that the frame can be supported in horizontal position on the ground or floor. At the lower end of the frame, a pair of supporting wheels 14 are secured on axle 16 having its ends journalled in brackets 17 secured to the lower ends of side members 10 opposite plate 11. The above described structure is conventional and forms no part of the present invention except insofar as it cooperates with the mechanism about to be described.

Opposed clamp members are mounted adjacent the lower end of the frame for movement transversely thereof into and out of clamping relation with respect to a box to be carried by the truck. Clamp members 21 are similar and symmetrical with respect to each other so that only one need be described. Each clamp member 21 includes transverse portion 22 for connection with the frame of the truck and end portion 23 bent at slightly less than a right angle with respect to transverse portion 22 and also extending downwardly into line with the ends of frame members 10 for cooperation with the side or end of the box to be carried. End portion 23 terminates in re-

duced end 24, on which end bit 25 is removably secured by set screw 26. Each end bit 25 is provided with a wedge shaped flange 27 which extends inwardly of the truck and is parallel to the ground or floor when the truck is in vertical loading position so that flanges 28 of respective end bits 24 are in opposed relation to each other to slide under and support a box or the like positioned therebetween by movement of clamp members 21. Because end bits 25 are detachable, they can be replaced easily when worn out or broken. Transverse portion 22 of each clamp member 21 extends through a cut away portion of the adjacent side member 10 beneath plate 11 between spaced apart guides 28 (Fig. 1) suitably secured on plate 11. In their innermost position, portions 22 of clamp members 21 have their inner ends in abutting relation with stop plate 29 (Fig. 3) suitably secured between guides 28 and to plate 11.

The operating means for clamp members 21 include cam devices which are adjustably secured on a supporting and operating member mounted for movement longitudinally of the truck frame and having operating members associated therewith for manipulation by the truck operator. The longitudinal movement of the operating member and the cam devices serve to adjust the clamp members to and from clamping position, while the adjustable mounting of the cam devices on the member provides for varying the range of movement of the clamp members. The operating means includes operating member or plate 31 having upper extension 32 guided in bracket 33 secured to frame plate 11, and having central slot 34 extending longitudinally of the truck frame and engaging square guide portion 36 of stud 37 which is threaded in frame plate 29 centrally of the truck frame. Thus, plate 31 is mounted for movement longitudinally of the truck frame, i. e., to the right from the position illustrated in Fig. 1. Such movement is utilized to operate the cam devices for controlling movement of clamp members 21. Each cam device comprises cam plate 41 having studs 42 threaded therein and engaging in transverse slots 43 in plate 31 so that cam plates 41 can be adjusted transversely of operating plate 31. In addition, each plate 41 has transverse rib 44 engaged in transverse groove 44A of plate 31. To maintain positively the transversely adjusted position of each plate 41, spaced apart lugs 45 (Figs. 2 and 4) are provided on plate 31 for engagement with corresponding notches 46 in cam plate 41, the engagement of lugs 45 and notches 46 being maintained by nuts 47 threaded on studs 42. Each cam plate 41 (Fig. 2) is provided with a diagonal cam slot 48 which may extend inwardly and downwardly of the truck frame at an angle of approximately 45° with respect to the direction of movement of cam plate 41. Cam slot 48 is engaged by roller 49 journalled on stud 50 (Fig. 4) secured adjacent the inner end of the associated clamp member 21. Thus, movement of cam plate 41 longitudinally of the truck frame causes transverse movement of the associated clamp member 21 into and out of clamping position with respect to a box to be carried. It will be noted that the adjacent converging ends of cam slots 48 are formed with sockets 48A which are offset from slots 48 to receive rollers 49 in the inner or clamping position of clamp members 21. Sockets 48A are preferably formed with side walls at right angles to the path of travel of rollers 49 so that clamp members 21 are held positively in clamping position.

The parts are illustrated with clamp members 21 in clamping position and means is provided for yieldably resisting movement of the clamp members from such position, such means also tending to maintain clamp members 21 in any other adjusted position, as for example, the dotted line or open position illustrated in Fig. 2. For this purpose, plate 51 (Fig. 3) is apertured to receive stud 37 and is urged into engagement with plate 41 by spring 52 compressed between plate 51 and cup shaped spacer 53 fitting over stud 37 and held against nut 54 threaded on stud 37. Lower bent end 56 of plate 51 is positioned below plate 31 in the upper position thereof which it occupies when clamp members 21 are in clamping position. Thus, plate 51 in effect forms resilient latch means, which under the urgency of spring 52 yieldably resists movement of plate 31 and clamp members 21 from their active or clamping position, and prevents withdrawal of rollers 49 from sockets 48A because of vibration or the like. In addition, the frictional engagement of plates 31 and 51 resists movement of the parts from any adjusted position thereof.

To release clamp members 21 from clamping engagement with a box, extension 32 of plate 31 is provided with pedal end 57 for manipulation by the foot of an operator to move plate 31 downwardly. To move clamp members 21 to clamping position from their open position, operating pedal 58 (Fig. 1) is pivotally connected at 59 between spaced ears 61 of plate 31 and is pivotally supported at 62 intermediate its ends between spaced arms 63 of bracket 64 pivoted on axle 16. By depressing pedal 58, plate 31 is moved upwardly to the position shown in the drawings where rollers 49 are positioned in the adjacent converging ends of cam slots 48 and clamp members 21 are in clamping position.

From the above description, it is seen that the clamp members of the truck are moved to and from clamping position by means of cam devices, which are adjustable to vary the range of movement of the clamping members, by moving the points of connection between the cam devices and the clamp members laterally of the truck frame. In addition, the clamp members are provided with detachable end bits which can be replaced quickly and easily if broken or worn out.

The form of the invention illustrated in Figs. 5 and 6 is generally similar to that described above and the description thereof will be limited to the differences in construction. The frame includes side members 10, 10 connected by various cross members 11A, 11B, 11C and is supported at its lower end by wheels 14 secured on axle 16. Opposed clamp members 71 are generally similar to clamp members 21 described above and have similar end bits 25 detachably secured at their outer ends.

Clamp members 71 are mounted by suitable guide means for movement transversely of the frame to and from clamping position, which position can be adjusted in accordance with the size of box to be handled. At their inner adjacent ends, clamp members 71 are each provided with a plurality of apertures 72 for adjustable connection by means of pivot pins 73 with the lower ends of operating levers 74. Each lever 74 comprises a pair of spaced apart similar straps 74A, 74B (Fig. 6) pivoted at 75 to cross member 11A at their upper ends and carrying roller 76 journalled therein intermediate their ends. Rollers 76 of

respective levers 74 are engaged with respective forks of V-shaped cam slot 77 formed in cam member 78. Thus, clamp members 71 can be moved to and from clamping position, by the cooperation of rollers 76 and cam slot 77, while the range of movement of clamp members 71 can be varied by connecting levers 74 with different apertures 72.

Cam member 78 is mounted for movement longitudinally of the truck frame and releasable latch means is provided for maintaining the adjusted position thereof and of clamp members 71 as effected by movement of levers 74. Cam member 78 is secured by studs 79 (Fig. 6) to longitudinally extending bar 81 which is mounted for sliding movement longitudinally of the truck frame by bracket 82 on cross member 11B and by bracket 83 on cross member 11A. Bracket 84 is also secured to bar 81 by studs 79 to provide a connection for the various operating parts for the clamping devices.

To maintain cam member 78 and clamp members 71 in selected adjusted positions thereof, latch member 86 (Fig. 6) is pivoted at 87 between ears 88 on bracket 84 and at its opposite end is provided with ratchet teeth 89 for engagement with tooth 91 of bracket 83, such engagement being maintained by spring 92 compressed between and seated in suitable recesses in bar 81 and latch member 86. To move latch member 86 out of engagement with tooth 91, latch control member 93 has its forked end engaged over latch member 86 and pivoted at 94 to bracket 84. As seen in Fig. 6, depression of control member 93 serves first to move latch member 86 to delatching position and thereafter serves to move cam member 78 downwardly to determine movement of clamp members 71 to the open, dotted line position thereof illustrated in Fig. 5. To move clamp members 71 to clamping position, pedal 58A has an end pivoted to bracket 84 and is pivotally connected intermediate its ends to bracket 64A pivoted on axle 16.

From the above description, it is seen that the second form of the invention, also includes cam devices for moving the clamp members to and from clamping position, and that provision is made for varying the range of movement of the clamp members.

While we have disclosed our invention as embodied in preferred forms thereof, it is to be understood that the invention may lend itself to other variations and modifications. We desire it to be understood, therefore, that we consider ourselves entitled to such other variations and modifications as may be included by the scope of the claims appended hereto.

We claim:

1. A clamp truck comprising a frame, opposed clamp members mounted for movement transversely of said frame, an operating member mounted for movement longitudinally of said frame, cam members mounted on said operating member having converging cam slots, rollers on said clamp members engaging said slots, and sockets at the adjacent ends of said slots to receive said rollers in the clamping position of said clamp members.

2. A clamp truck comprising a frame, opposed clamp members mounted for movement transversely of said frame, an operating member mounted for movement longitudinally of said frame, cam means mounted on said operating member for adjustment transversely thereof and having converging cam slots, rollers on said clamp members engaging said slots, and sockets at the adjacent ends of said slots to receive said rollers in the clamping position of said clamp members.

3. A clamp truck comprising a frame, opposed clamp members mounted for movement transversely of said frame, an operating member mounted for movement longitudinally of said frame, cam means mounted on said operating member having converging cam slots, rollers operatively connected with said clamp members and engaging said slots, latch means for maintaining said operating member in adjusted position, and a latch control operable to first disable said latch means and thereafter to move said operating member to effect movement of said clamping members to open position.

4. A clamp truck comprising a frame, clamp means mounted for movement transversely of said frame to clamp a box, operating means mounted for movement longitudinally of said frame, and a pair of clamp operating cam adjustably mounted on one of said means for relative transverse adjustment operatively associated with the other of said means to effect transverse movement of said clamp means upon longitudinal movement of said operating means.

5. A clamp truck comprising a frame, opposed clamps mounted for movement transversely of said frame, an operating slide mounted for movement longitudinally of said frame, and a pair of cams operatively related to said clamps and mounted for transverse adjustment on said slide to vary the operative range of said clamps.

6. A clamp truck comprising a frame, opposed clamps mounted for movement transversely of said frame, an operating slide mounted for movement longitudinally of said frame, and a pair of cams operatively related to said clamps and mounted for transverse adjustment on said slide to vary the operative range of said clamps, said cams and said slide having interlocking portions normally preventing relative transverse movement therebetween.

7. A clamp truck comprising a frame, opposed clamps mounted for movement transversely of said frame, an operating slide mounted for movement longitudinally of said frame, and a pair of slotted cam plates operatively related to said clamps and mounted for transverse adjustment on said slide to vary the operative range of said clamps.

8. A clamp truck comprising a frame, opposed clamps mounted for movement transversely of said frame, an operating slide mounted for movement longitudinally of said frame, and a pair of slotted cam plates operatively related to said clamps and mounted for transverse adjustment on said slide to vary the operative range of said clamps, said plate and said slide having interlocking portions normally preventing relative transverse movement therebetween.

9. A clamp truck comprising a frame, opposed clamps mounted for movement transversely of said frame, an operating slide mounted for movement longitudinally of said frame, and a pair of slotted cam plates operatively related to said clamps and mounted for transverse adjustment on said slide to vary the operative range of said clamps, said plates and said slide having interlocking portions normally preventing relative transverse movement therebetween, and also having interlocking portions preventing relative

movement therebetween longitudinally of said frame.

10. A clamp truck comprising a frame, opposed article clamping members mounted on said frame for movement to and from clamping position, means for operating said members, and spring-urged pressure means associated with said operating means for yieldably resisting movement of said clamping members from clamping position.

11. In a warehouse truck of the character described, the combination of a pair of opposing box-clamping members supported for movement transversely of the truck whereby to expand and contract the members, a pair of foot-actuated devices having operative connection with the clamping members and actuated independently to contract and expand the clamping members, and means for locking the clamping members in selected contracted positions against box-influenced expansion movement only, said foot-actuated device for expanding the clamping members being provided with means for releasing the locking means simultaneously with foot-actuation expansion movement.

12. In a warehouse truck, in combination with a wheeled vehicle of the character described, a pair of opposing box-clamping arms provided with extensions therefrom supported by the vehicle for transverse sliding movement, power-transmitting means connected with said extensions for actuating the same inwardly and outwardly as respects the vehicle, power-applying means therefor comprising a pair of foot-actuated pedals operated independently to respectively effect said outward and inward movement, means operating to lock said sliding extensions of the clamping arms against box-influenced outward movement only, following the actuation of the arms to a selected clamping position, and means operating automatically under the influence of pedal-actuated outward movement of the sliding extensions for releasing said locking means.

13. In a warehouse truck, in combination with a truck frame, and a pair of opposing clamping jaws slidably supported for movement toward and from one another, a member slidably supported for movement longitudinally of the frame and a power-transmitting member common to each of the jaws and operated by said slide member for regulating the span of the jaws, and means by which said slide member is actuated longitudinally of the frame comprising a pedal-operated toggle structure, said toggle structure consisting in companion upper and lower arms the upper of which is coupled to the slide member and provided at its opposite end with an integral pedal and the lower of which is fulcrumed at its lower end about a fixed pivot and at its upper end pivotally connected to the pedal-forming arm at the approximate mid-length of the latter.

14. In a warehouse truck, the combination of: a pair of opposing box clamping members supported for movement transversely of the truck, whereby these members may be expanded or contracted in relation to each other; foot-actuated means operable to contract said clamping members to grip a load and also to expand said clamping members to release said load; and locking means associated with said foot-actuated means for automatically locking said clamping members in said gripping relation upon said clamping members being moved into said relation and irrespective of substantial variations in the widths of loads handled by said truck; said locking means being associated with said foot-operated means for actuation conjointly with said foot actuated means to be released by the same foot movement which expands said clamping members.

15. In a warehouse truck, the combination of: a pair of opposing box clamping members supported for movement transversely of the truck, whereby these members may be expanded or contracted in relation to each other; foot-actuated means operable to contract said clamping members to cause the latter to grip a load; locking means associated with said foot actuated means for automatically locking said clamping members in said gripping relation upon said clamping members being moved into said relation irrespective of substantial variations in the widths of loads handled by said truck; and unitary control means for releasing said locking means and expanding said clamping members to cause the latter to release said load.

16. In a warehouse truck, the combination of: a pair of opposing box clamping members supported for movement transversely of the truck, whereby these members may be expanded or contracted in relation to each other; foot-actuated means operable to contract said clamping members to cause the latter to grip a load; locking means associated with said foot actuated means for automatically locking said clamping members in said gripping relation upon said clamping members being moved into said relation irrespective of substantial variations in the widths of loads handled by said truck; and control means operable by a single movement to release said locking means and to expand said clamping members to cause the latter to release said load.

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