

July 23, 1957

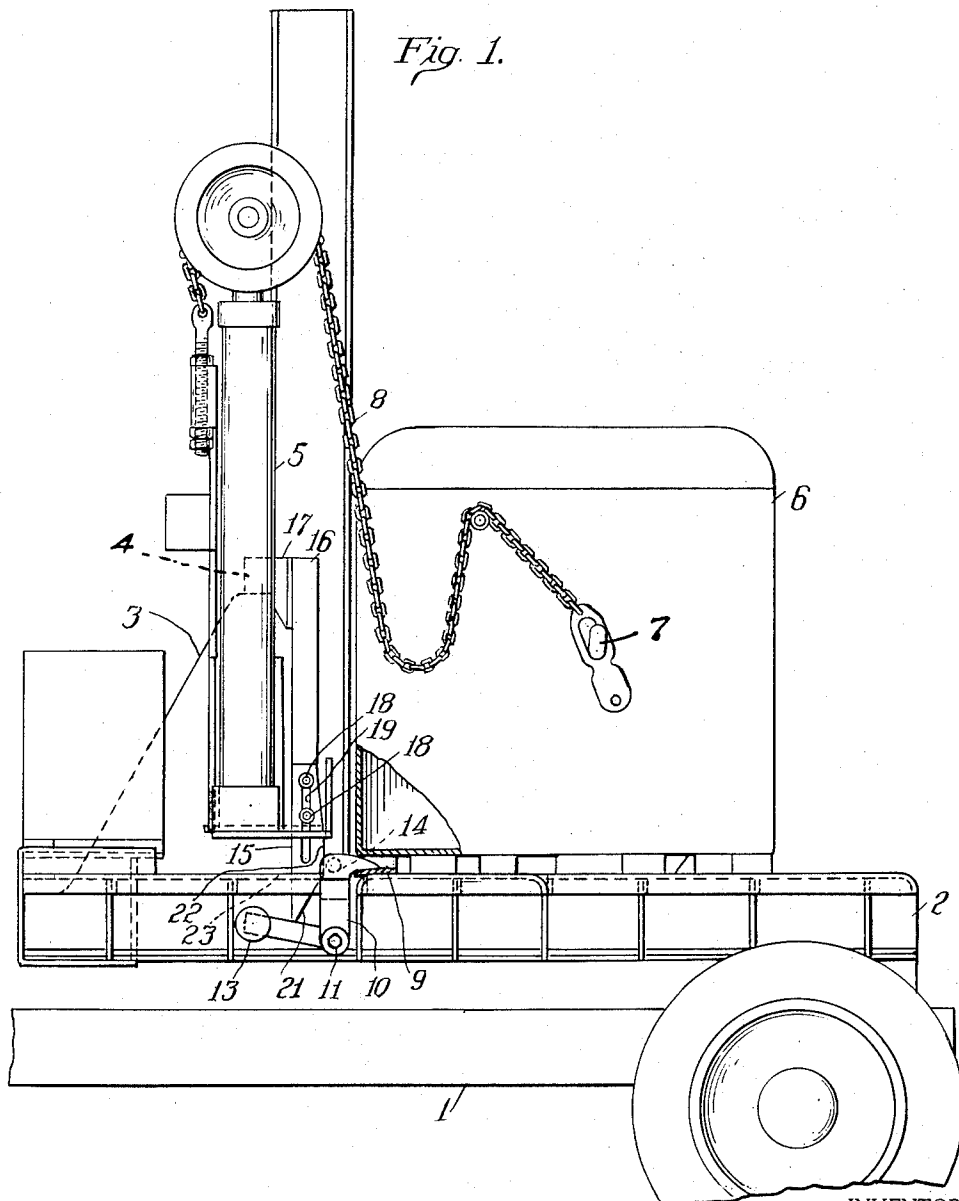
H. W. JONES

2,800,233

LOCKING DEVICES FOR TRANSPORTING EQUIPMENT

Filed Sept. 3, 1953

3 Sheets-Sheet 1



INVENTOR

Harry W. Jones

BY *Cyrus Kehn & Smith*

ATTORNEYS

July 23, 1957

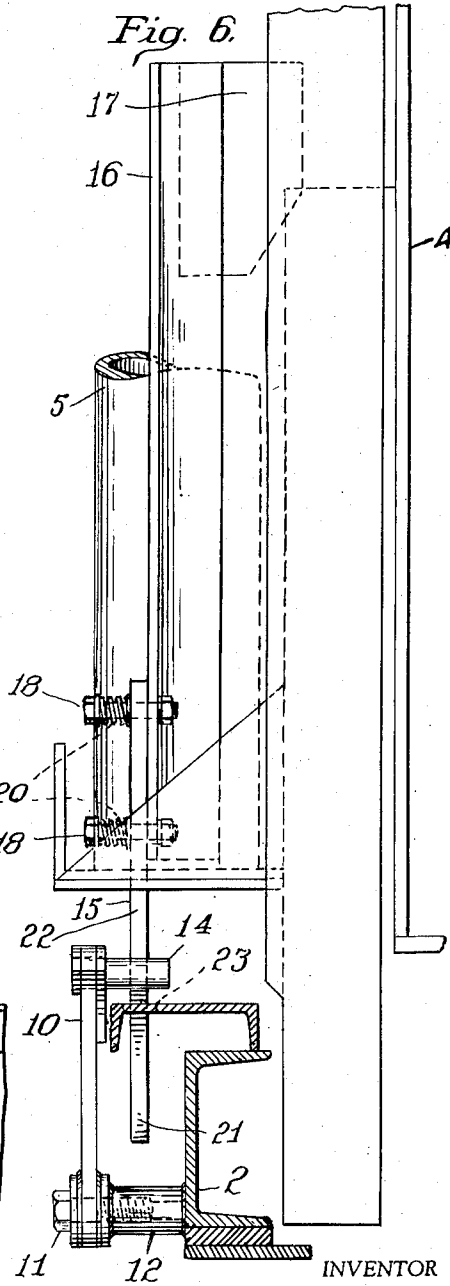
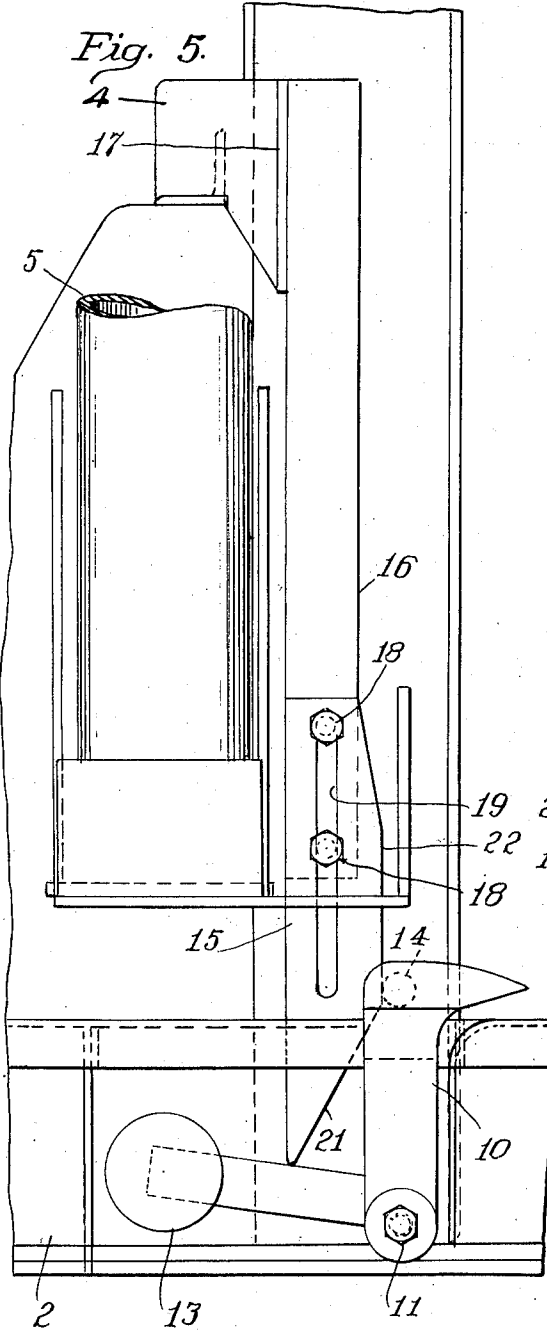
H. W. JONES

2,800,233

LOCKING DEVICES FOR TRANSPORTING EQUIPMENT

Filed Sept. 3, 1953

3 Sheets-Sheet 3



INVENTOR

Harry W. Jones

BY *Cyrus K. & S. S. S. S.*

ATTORNEYS

1

2,800,233

LOCKING DEVICES FOR TRANSPORTING EQUIPMENT

Harry W. Jones, Knoxville, Tenn., assignor to Dempster Brothers, Inc., Knoxville, Tenn., a corporation of Tennessee

Application September 3, 1953, Serial No. 378,315

14 Claims. (Cl. 214—75)

This invention relates to improvements in Locking Devices for Transporting Equipment of the character set forth in the Dempster patent, No. Re. 23,546, granted September 9, 1952.

As set forth in the aforesaid patent, it has been the practice heretofore to provide a vehicle with mechanism for lifting a container from a position on the ground by upward movement of an elevator on a carriage to an elevated position and thereafter shifting the carriage and the container forwardly of the vehicle, after which the container may be lowered by the elevator to a seated position upon the vehicle at a forward portion thereof. The container remains in the seated position on the vehicle during transportation, and while the container may be filled with material, the movement of the vehicle during transportation may result in a shifting of the container thereon.

It has also been proposed, according to the Bamberg patent, No. 2,424,429, granted July 22, 1947, to lock the container securely in its lowered position on the vehicle during transportation by means of one or more hooks which are shifted into engaged connection with the container when the carriage is lowered, to set the container down on the vehicle. The mechanism provided therein has not been entirely satisfactory in service under different conditions, and is not readily applicable to many types of containers now in use.

One object of this invention is to improve the construction of the locking device for such containers, to overcome the objections heretofore encountered in service, and to ensure of securely locking the container in place upon the vehicle and to hold it during transportation.

A further object of the invention is to simplify the construction of the locking device for such containers to provide for the use of a locking hook and the secure holding of the hook in locked engagement with the container so long as the carriage remains in its transport position, while releasing the hook automatically upon movement of the elevator to raise the container from its transport position.

A still further object of the invention is to provide for connection of the operating means for the locking device with the elevator on the carriage itself so as to ensure that the locking means will be engaged continuously so long as the carriage is in its transport position and at the same time to prevent the destruction of any part of the mechanism upon lowering of the elevator in any but the proper relation of the carriage and container in their transport positions.

These objects may be accomplished according to one embodiment of the invention by the provision of one or more lock hooks mounted on the vehicle in position to engage a portion of the container such as a loop bracket attached to the bottom thereof, one for each hook. The lock hook will be held in secure engagement with the loop bracket when the carriage and container are in their proper transport positions by a locking member attached

2

to the carriage in position for cooperative engagement with the locking hook to hold the latter securely in engagement with the loop bracket on the container.

Since it is possible for the elevator to be lowered in some other position than the transport position of the container on the vehicle, provision should be made to avoid danger to the locking member, or the portion of the vehicle that may be engaged thereby, in the event of such lowering of the elevator out of its normal transport position. In the preferred embodiment of the invention, this means includes a lost motion connection between the locking member and the elevator on the carriage which will hold the locking member in its extended or operative relation to the carriage, but is capable of shifting its position relative thereto in the event of lowering of the elevator in some other than its operative position. This lost motion connection preferably is in the form of a pin and slot connection, with yieldable means normally holding the locking member extended and capable of sliding in the event that it is moved into engagement with a portion of the vehicle.

This embodiment of the invention is illustrated in the accompanying drawings in which:

Fig. 1 is a side elevation of the transporting equipment, showing the invention applied thereto, with the container in its loaded position on the chassis;

Fig. 2 is a similar view, with the container unloaded and sitting on the ground;

Fig. 3 is a perspective view of the hook detached;

Fig. 4 is a cross-section through the mounting means for the hook;

Fig. 5 is a detailed side elevation of the locking device; and

Fig. 6 is a similar view, at right angles thereto, partly in section.

The invention is illustrated as described in connection with transporting equipment of the character set forth more in detail in the aforesaid patents, No. Re. 23,546 and No. 2,424,429, comprising a motor vehicle or truck chassis, power operated in the usual manner, to which the invention may be applied. The motor vehicle chassis is generally designated by the numeral 1.

Mounted upon the chassis 1 is a subframe, generally designated by the numeral 2. The subframe 2 also forms a trackway for supporting a carriage, generally designated at 3, which is capable of movement horizontally forward and backward relative to the subframe 2, to different positions thereon. This movement is power operated by any suitable means such as that set forth more in detail in the aforesaid Patent No. Re. 23,546.

Mounted on the carriage 3 is an elevator, generally designated by the numeral 4, which is supported thereby upon one or more hydraulic hoists, generally designated at 5. One end of the hoist 5 is mounted on the carriage 3, while the other end thereof extends upwardly to the upper end of the elevator 4 and supports the latter for raising and lowering movement relative to the carriage. The elevator 4 is mounted for movement either slidably or on rollers, substantially in a vertical plane, and may be raised and lowered in the different positions of the carriage relative to the subframe 2. In this way, the elevator may lift a container from its supported position on the ground into bearing relation with the carriage and hold it in this position while the carriage is moved forward on the subframe 2 of the chassis, after which the container may be set down in its transport position on the subframe.

The container is designated generally at 6. The invention may be applied to any suitable or desired form of container, whether of drop bottom, tip-over, skip, tank, or other types, which may be handled by such transporting equipment. The container 6 is usually pro-

3

vided with lifting pins 7 on opposite ends thereof for detachable engagement by flexible devices, such as chains, generally designated at 8, that extend upward to the top of the elevator. As set forth in the aforesaid patent, No. Re. 23,546, the flexible devices 8 may extend either to anchor points on the elevator 4, or extend over guide sheaves thereon to anchor points on the carriage, whereby double travel of the container is obtained with respect to a predetermined movement of the elevator.

The construction in operation of the transport equipment as described above is set forth more in detail in the above-mentioned patents, without requiring repetition herein.

Provision is made for locking the container in its transport position on the subframe 2, to ensure that it will be retained securely in such position relative thereto. To accomplish this result, the container is preferably provided adjacent its forward edge with a hook bracket 9 formed as a loop, substantially U-shaped in the example illustrated, and adjacent each opposite end of the container where a locking hook is to be provided at each end thereof. The hook bracket may be welded or otherwise secured to the bottom of the container, or to a part of the frame thereof, and should be open at, or adjacent, the forward wall of the container, for engagement by the locking hook.

The locking hook is designated generally by the numeral 10 and is shown in the form of an upstanding hook having a rearwardly projecting portion in position to engage in the hook bracket 9 so as to hold the container down securely in its transport position on the subframe 2.

The hook 10 is pivotally supported at 11 on the subframe 2 and extends upwardly above the bottom thereof sufficiently to engage over the closed side of the hook bracket 9 when the container is in its proper transport position on the subframe. The hook should be mounted in a laterally spaced relation, out away from the side of the subframe, the pivot pin 11 extending through a spacer sleeve 12 welded to a side of the subframe, so as to hold the hook in proper relation thereto.

Suitable means may be provided for normally maintaining the hook in one position, such as a counterweight 13 in the embodiment illustrated, which is connected rigidly with the hook 10 and acts normally to hold the hook in its disengaged position. The hook 10 is also provided with a pin 14 extending inwardly therefrom and fixed thereto to be engaged by actuating and locking means.

In the preferred embodiment illustrated in the drawings, the hook actuating and locking means is shown as comprising a cam member 15, which is suspended by an upright bar 16 that is secured to a crossbar 17 on the elevator 4. The bar 16 may be in the form of an angle-bar or other suitable means that will hold the cam member 15 in place. The bar 16 will raise and lower the cam member 15 upon upward and lowering movements of the elevator.

Provision is made for a lost motion yieldable connection between the bar 16 and the cam member 15. This lost motion connection may be provided, in the illustrated embodiment of the invention, by a pair of bolts 18, secured to the bar 16 and extending laterally therefrom through a slot 19 in the cam member 15. Springs 20 are telescoped over the bolts 18, bearing at opposite ends between the heads of the bolts and suitable washers abutting against the adjacent side of the cam member 15, providing spring tension, yieldably and frictionally holding the cam member in a set position relative to the bar 16. However, this connection will yield to an excessive pressure applied lengthwise to the cam member 15 as hereinafter described, permitting a shifting movement of said cam member relative to the bar 16, upon the application of substantial pressure thereto, such as may re-

4

sult from a lowering of the elevator in other than the transport position of the container.

The cam member 15 has a bevelled edge 21, in position to engage the pin 14 during the lowering movement of the elevator 4, and a locking face 22 at the upper end of said bevelled edge in position to engage the pin 14 after the hook has been moved into engagement with the hook bracket 9, to lock the hook securely therein during transportation. In this position, the bevelled edge does not bear against the pin 14 on the hook but the latter is held by the vertical edge 22. Thus, any upward force on the hook or container would not have the tendency to release the cam member 15 from engagement with the hook. The hook is held securely in place against disengagement from the container even though the latter may be displaced appreciably from its transport position.

A locking hook may be provided at each opposite end of the container if desired, on the bottom thereof, or at any intermediate point. A hook bracket 9 is provided for each locking hook, as well as a cam member 15.

The raising and lowering of the container onto the subframe 2 of the chassis will be apparent from the above-mentioned patents and need not be repeated herein.

When the elevator 4 is lowered in the transport position of the container, the latter is seated upon the subframe 2. The lowering movement of the elevator 4 also lowers the cam member 15 for each hook 10, causing the bevelled edge 21 of the locking member to engage the pin 14 thereof and to swing the hook into locking engagement with the hook bracket 9 on the container. The continued downward movement of the locking member will cause the latter to move sufficiently relative to the pin 14 so that the bevelled edge 21 will be moved entirely below the pin 14, and the latter will be engaged by the vertical locking surface 22 of the cam member when the hook is in its locked position relative to the hook bracket 9. Thus, the container will be held by the hook 10 securely in place on the subframe 2 during transportation, continuously until the elevator 4 is raised to lift the container off the subframe. In that event, the raising of the elevator will also lift the locking member 15 out of engagement with the pin 14, permitting the counterweight 13 to swing the hook to its disengaged position.

Inasmuch as the cam member 15 must be lowered to a point below the top surface of the subframe 2, a slot 23 may be provided in the top surface of the subframe to permit the downward movement of the cam member therethrough in the transport position. If the elevator 4 should be lowered to its extreme lower position in any other horizontal position of the carriage relative to the subframe except its transport position, which is usually required in setting the container on the ground, as in Fig. 2, the cam member 15 would otherwise engage the top surface of the subframe with such force as may tend to cause a destructive action to the mechanism. This is prevented by the lost motion connection provided at 18-20, whereby the locking member may slide lengthwise relative to the supporting bar 16 to permit such downward movement of the elevator without danger. Thereafter, upon raising of the elevator, the operator can restore the locking member to its normal position by a manual shifting thereof.

In this way the container can be locked securely in place on the subframe during transporting by very simple mechanism which is controlled and operated by the elevator, the locking cam being secured to the latter and thus ensuring of effective locking of the device during transportation without danger of disconnection if the elevator should be lowered to an extreme position in any other than its transport position.

While the invention has been illustrated and described in one embodiment, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

5

I claim:

1. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into engagement with the container, a cam member connected with the elevating mechanism for actuation thereby, and a lost motion connection between the cam member and the elevating mechanism providing for movement of the elevating mechanism relative to the cam member.

2. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into engagement with the container, a lost motion connection between the cam member and the elevating mechanism providing for movement of the elevating mechanism relative to the cam member, said lost motion connection including pin and slot means, and means yieldably holding the cam member in a fixed relation to the elevating mechanism.

3. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member for holding the container in place on the vehicle, means mounting the hook member for swinging movement relative to the vehicle into and out of engagement with the container, a support carried by the elevating mechanism, a cam member secured to the support in position to engage the hook member to move said hook member into engagement with the container, and means forming a yieldable connection between the support and the cam member providing for downward movement of the elevating mechanism relative to the cam member in an extreme lowered position thereof.

4. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member for holding the container in place on the vehicle, means pivotally mounting the hook member for swinging movement relative to the vehicle, a support carried by the elevating mechanism, a cam member in position to engage the hook member and move the latter into engagement with the container, and means forming a pin and slot connection between the cam member and the support providing for downward movement of the support relative to the cam member in an extreme lowered position.

5. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member for holding the container in place on the vehicle, a support carried by the elevating mechanism, a cam member arranged for operative engagement with the hook member to move the latter into engagement with the container, and means forming a pin and slot connection between the support and the cam member providing for lowering movement of the elevating mechanism relative thereto in an extreme lowered position.

6. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member for holding the container in place on the vehicle, a support carried by the elevating mechanism, a cam member arranged for operative engagement with the hook member to move

6

the latter into engagement with the container, means forming a pin and slot connection between the support and the cam member providing for lowering movement of the elevating mechanism relative thereto in an extreme lowered position, and means yieldably holding the cam member in fixed relation to said support normally tending to prevent relative movement with respect thereto.

7. In transporting equipment, the combination with a subframe adapted to be mounted on a vehicle, elevating mechanism mounted on the subframe for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into and out of engagement with the container, means forming a pivotal support for the hook member and projecting laterally from the subframe in spaced relation thereto, said hook member having an inwardly extending pin fixed thereto, a support secured to the elevating mechanism and depending therefrom, a cam member in position to engage said pin on the hook member for moving the hook member into engagement with the container, bolts connecting the support and the cam member together and having lost motion connection with one of said members, coiled springs sleeved over the bolts yieldably retaining the cam member in position relative to the support and permitting movement of the support relative to the cam member in an extreme lowered position of the elevating mechanism relative to the subframe.

8. In transporting equipment, the combination with a subframe adapted to be mounted on a vehicle, elevating mechanism mounted on the subframe for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into and out of engagement with the container, means forming a pivotal support for the hook member, said hook member having a pin fixed thereto, a support secured to the elevating mechanism and depending therefrom, a cam member in position to engage said pin on the hook member for moving the hook member into engagement with the container, a bolt connecting the support and the cam member together and having lost motion connection with one of said members, a coiled spring sleeved over the bolt yieldably retaining the cam member in position relative to the support and permitting movement of the support relative to the cam member in an extreme lowered position of the elevating mechanism relative to the subframe.

9. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into engagement with the container, a cam member carried by the elevating mechanism for raising and lowering movement thereby, said cam member being in position for actuating the hook member upon lowering movement of the elevating mechanism, and means forming a movable connection between the cam member and the elevating mechanism.

10. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into engagement with the container, a cam member, means forming a movable connection between the cam member and the elevating mechanism and supporting the cam member on the elevating mechanism for raising and lowering movement therewith and for movement relative thereto in the lowered position of the elevating mechanism, said cam member being in position for actuating the hook member to move the latter into engagement with the container.

7

11. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising a hook member adapted to be moved into engagement with the container, a cam member, means forming a movable connection between the cam member and the elevating mechanism and supporting the cam member on the elevating mechanism for raising and lowering movement therewith and for movement relative thereto in the lowered position of the elevating mechanism, said cam member being in position for actuating the hook member to move the latter into engagement with the container, and yieldable means connected with the cam member for retaining said member normally in fixed relation to the elevating mechanism and permitting lost motion therebetween and movement of the elevating mechanism relative thereto.

12. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising an upstanding hook member, means pivotally supporting the hook member at the lower end portion thereof, said hook member having a hook on the upper end portion thereof turned in the opposite direction away from the elevating mechanism in position to be moved into engagement with the container, and means carried by the elevating mechanism in position to actuate the hook member when the elevating mechanism is moved to a lowered position for causing the hook member to move into engagement with the container.

13. In transporting equipment, the combination with elevating mechanism adapted to be mounted on a vehicle for raising and lowering a container into and out of transport position thereon, of a locking device for the container comprising an upstanding hook member, means

8

pivotally supporting the hook member at the lower end portion thereof, said hook member having a hook on the upper end portion thereof turned in the opposite direction away from the elevating mechanism in position to be moved into engagement with the container, and a cam member connected with the elevating mechanism in position to engage and actuate the hook member upon lowering movement of the elevating mechanism, causing the hook member to engage the container.

14. In transporting mechanism, the combination with a container having a loop bracket at the bottom thereof, of a rest receiving the container thereon in supported position, elevating mechanism for raising and lowering the container to and from the supported position on the rest, a locking device for the container comprising a member having a hook thereon in position to engage over the loop bracket on the container to hold the container in place on the rest, said hook having an upwardly inclined engaging face on the underside thereof which extends continuously to the end of the hook to be withdrawn from the loop bracket in a direction extending lengthwise of the hook, and means on the elevating mechanism for locking the hook member in engagement with the loop bracket.

References Cited in the file of this patent

UNITED STATES PATENTS

1,477,723	Smith	Dec. 18, 1923
1,883,538	Bywater	Oct. 18, 1932
2,132,612	Faries	Oct. 11, 1938
2,424,429	Bamberg	July 22, 1947
2,426,498	Franklin	Aug. 26, 1947
2,482,708	Gordinier	Sept. 20, 1949
2,538,531	Likens	Jan. 16, 1951
2,606,675	Jones	Aug. 12, 1952