March 30, 1965 E. C. HERNDON 3,175,719

DRUM-HANDLING APPARATUS

Filed April 30, 1962 3 Sheets-Sheet 1

FIG_1

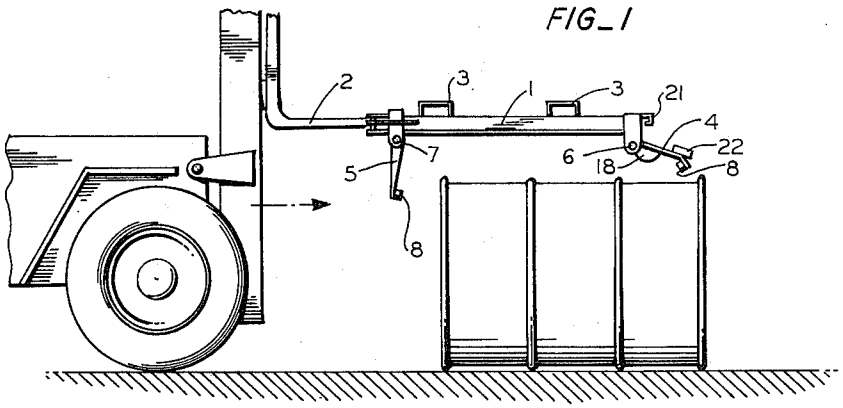


FIG_2

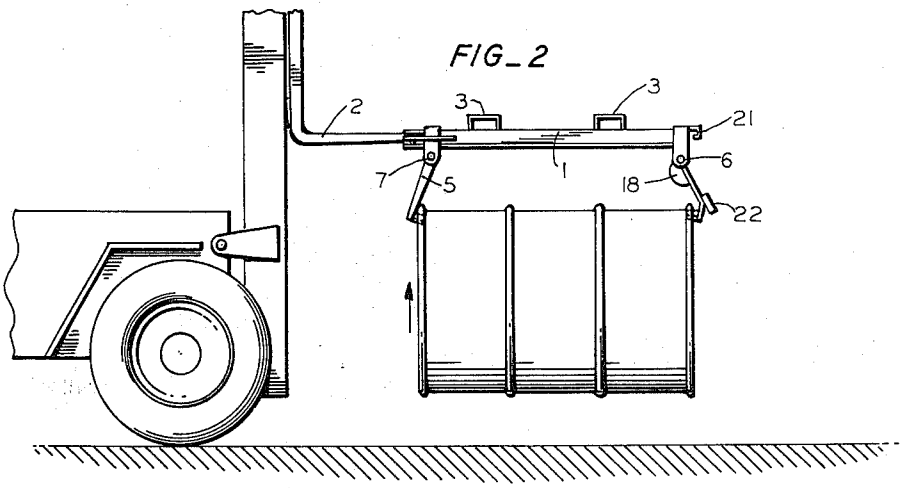
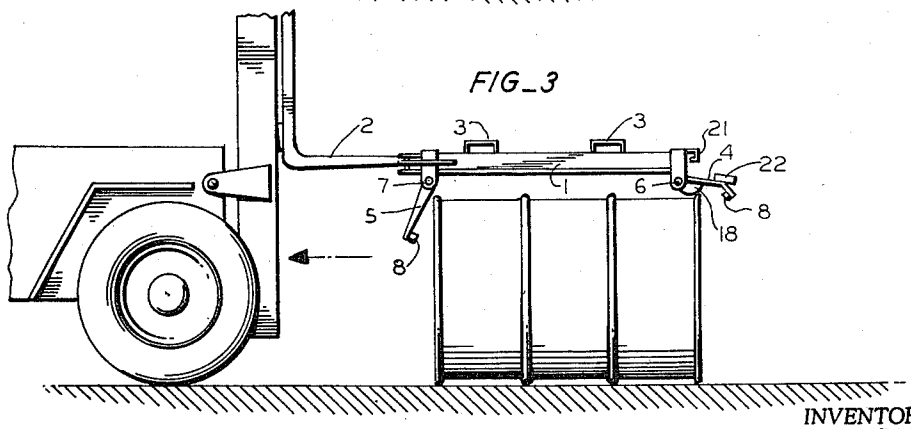


FIG_3



INVENTOR.
EDWARD C. HERNDON

BY Hoppe and Mitchell

ATTORNEYS

March 30, 1965 E. C. HERNDON 3,175,719

DRUM-HANDLING APPARATUS

Filed April 30, 1962 3 Sheets-Sheet 2

FIG_4

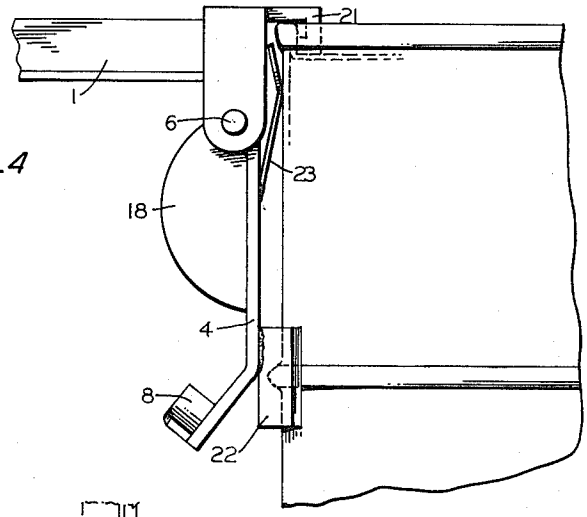
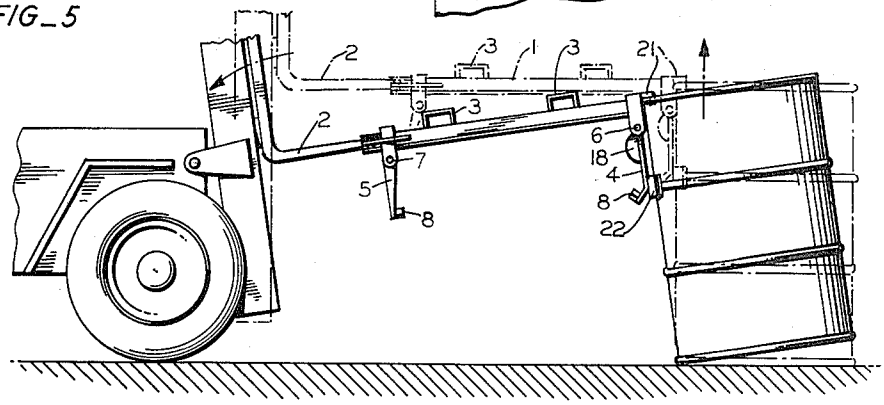


FIG_5



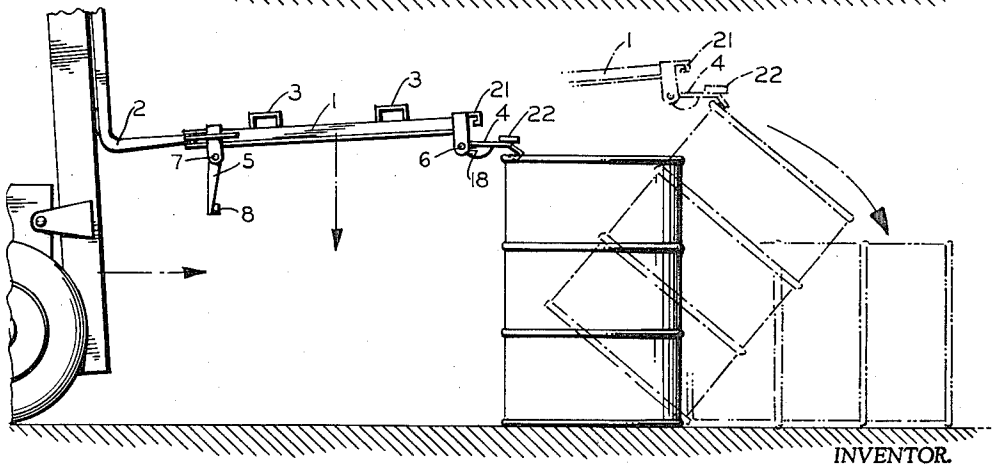


FIG_6

INVENTOR.
EDWARD C. HERNDON

BY Hoppe and Mitchell

ATTORNEYS

March 30, 1965 E. C. HERNDON 3,175,719

DRUM-HANDLING APPARATUS

Filed April 30, 1962 3 Sheets-Sheet 3

FIG_7

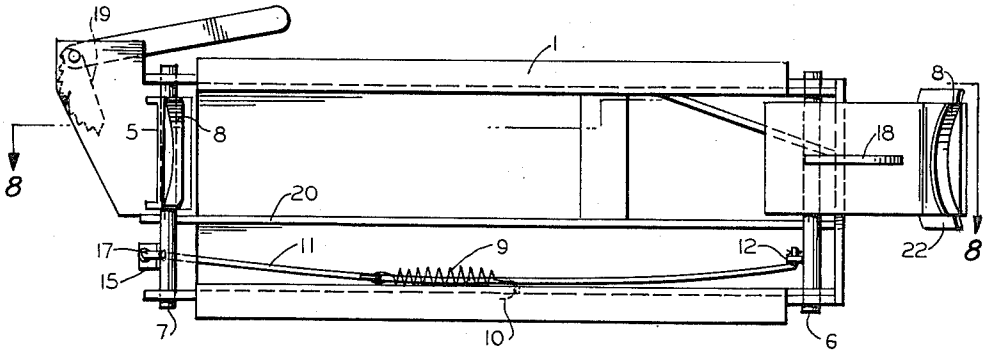


FIG_8

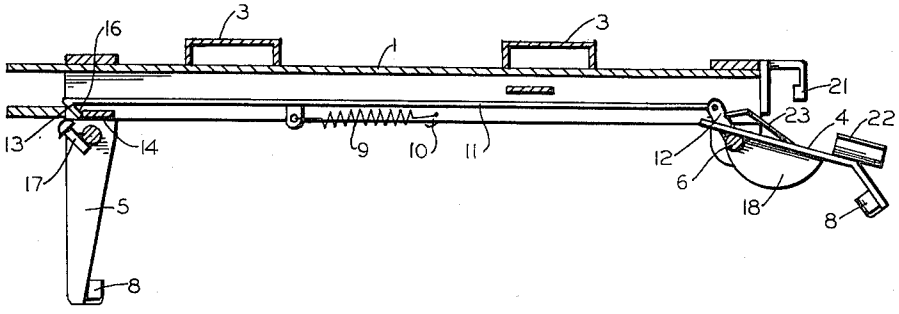
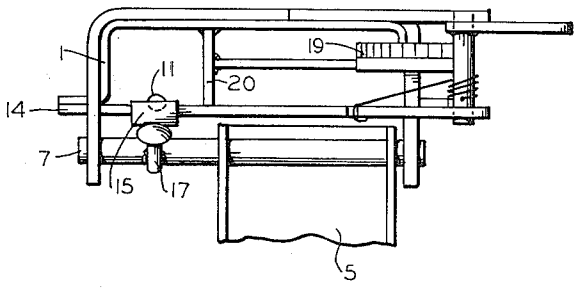


FIG_9



INVENTOR.
EDWARD C. HERNDON

BY Hoppe and Mitchell
ATTORNEYS

United States Patent Office

3,175,719

Patented Mar. 30, 1965

3,175,719

DRUM-HANDLING APPARATUS

Edward C. Herndon, San Francisco, Calif., assignor to Bulldog Engineered Products Company, Redwood City, Calif., a partnership

Filed Apr. 30, 1962, Ser. No. 190,997
4 Claims. (Cl. 214—620)

This invention relates generally to drum-handling apparatus and more particularly to an improved drum-handling attachment useful in combination with a fork-lift truck or other self-loading vehicle having a vertically shiftable and tiltable carriage. The apparatus is of the general type described in U.S. Patent No. 2,720,992 issued October 18, 1955 to W. W. Cushman; No. 2,653,725 issued September 29, 1953 to W. J. Dodge; and No. 2,613,823 issued October 14, 1952 to S. S. Johns.

One object of this invention is to provide a sturdy, light-weight drum-handling attachment for a fork-lift truck for handling drums stored in any position which is detachably mounted upon one or more of the tines of the truck.

Another object of the invention is to provide an improved spring loaded latching mechanism cooperating with pivoted depending grappling arms for tipping, uprighting and lifting drums and other lading units.

One other object of this invention is to provide an improved drum-handling attachment whereby a drum stored on end may be tipped upon its side and picked up in a horizontal position with a single unidirectional movement of the self-loading vehicle or a drum stored on its side may be uprighted or a vertically stored drum may be picked up in a vertical position.

Still another object of the present invention is to provide a drum-handling attachment for fork-lift trucks useful for lifting vertically stored drums and for lifting horizontally stored drums lying axially or transversely with respect to the path of self-loading vehicle movement.

Other objects and advantages of the invention will become apparent from the following description when considered in connection with the accompanying drawings wherein

FIG. 1 is a side elevational view of a drum-handling attachment embodying features of the present invention in its cocked position for handling a horizontally stored drum;

FIG. 2 is a side elevational view of the attachment of FIG. 1 shown lifting a horizontally stored drum;

FIG. 3 is a side elevational view of the apparatus of FIG. 1 illustrating the release of a horizontally stored drum;

FIG. 4 is an enlarged side elevational view of the apparatus engaging a vertically stored drum;

FIG. 5 is a side elevational view of the apparatus shown lifting a vertically stored drum;

FIG. 6 illustrates the use of the apparatus for tipping upended drums;

FIG. 7 is a bottom plan view of the attachment;

FIG. 8 is a longitudinal sectional view taken along line 8—8 of FIG. 7;

FIG. 9 is a view of the end of the device which is mounted on a fork-lift tine.

The present invention comprises a rigid channel-shaped beam 1 which fits upon a single tine 2 of a typical fork-lift truck. Installed in this manner the attachment is

useful for tipping, uprighting and lifting drums aligned axially with respect to a given path of fork-lift truck movement. The attachment also may be installed crosswise upon both tines of the fork-lift truck by means of the pair of spaced sleeves 3, fixed to the top of beam 1. With that orientation the attachment is useful for lifting drums or other cylindrical objects aligned transversely with respect to the path of vehicle movement. The sleeves 3 are shaped to accommodate the configuration of the tines on the self-loading vehicle to which the device is attached. With either of the described orientations the attachment is useful for lifting lading units other than drums, such as boxes and the like.

A pair of pivoted grappling arms 4, 5 each depend from the opposite ends of beam 1. Each grappling arm pivots about a separate axis lying transversely with respect to beam 1, as for example, on axles 6, 7 respectively, pivoted on beam 1. Each grappling arm carries a lip 8 along its lower extremity which engages the underside of the rim of a horizontally stored drum so that the drum is lifted by upward movement of the fork-lift carriage. For handling drums it is preferred that these lips define a radius approximately the same as that of the drums being handled. However, lips of various sizes and shapes may be utilized, particularly for handling objects other than drums.

The depending grappling arms are cooperatively joined by a spring-loaded latch means for cocking the forward grappling arm 4 substantially horizontally in the position illustrated in FIG. 1. The drum-handling attachment thus may be positioned over a horizontal drum by driving the self-loading vehicle forward along the drum axis. This latch means latches grappling arm 4 in the cocked position in opposition to the tension of a latch spring 9. As appears in FIGS. 7, 8 the latch means includes a spring 9 affixed at one end to a flange of beam 1 as at 10 and a rod 11 axially shiftable by spring 9. One end of rod 11 is pivotally connected to a crank arm 12 pivotable with axle 6 upon which grappling arm 4 pivots. The other end of rod 11 carries a latch 13 engageable with latch stop 14 attached across the lower edges of the flanges of beam 1 shown most clearly in FIG. 9. The latch has a cam surface 15 adjacent latching detent 16 which surface remains in contact with latch stop 14 for all positions of the latch.

The forward grappling arm 4 is cocked into the position illustrated in FIG. 1 by manually or otherwise pivoting the arm upwardly. Crank arm 12 shifts rod 11 axially toward grappling arm 5 and elongates spring 9 until the latch detent 16 engages latch stop 14. The fixed end of spring 9 is anchored to the flange of beam 1 a spaced distance below the axis of rod 11, as appears in FIG. 8, to securely hold the latch detent in engagement with latch stop 14.

Grappling arm 5 functions as a trigger to release the latch means permitting the forward grappling arm 4 to pivot into engagement with the rim of the horizontally stored drum assisted by the elongated spring 9 and its own weight. For this purpose a release dog 17 pivotable with axle 7 is provided adjacent latch 13. By pivoting rear grappling arm 5 to the rear by contact with a drum or other solid object, the release dog 17 engages cam surface 15 and drives the latch detent 16 out of engagement with latch stop 14. This permits rod 11 to shift forward under the urging of spring 9 and with the assist-

ance of the weight of the forward grappling arm 4. Grappling arm 4 becomes uncocked and both arms engage the drum rims as in FIG. 2.

To lift a horizontally stored drum with the present invention it is merely necessary first to cock the forward grappling arm into the position illustrated in FIG. 1. The device is latched in this cocked position while the fork-lift truck carrying the attachment is driven over the drum with the fork-lift carriage positioned at an appropriate height. The vehicle is driven toward the drum until the drum contacts the rear grappling arm 5, trips the latch means, and permits the forward grappling arm 4 to pivot into engagement with the front rim of the drum. Both grappling arms engage the drum rims and then the vehicle carriage is elevated to lift the load as in FIG. 2.

It will be observed in FIG. 2 that the distance between the axes about which the grappling arms pivot is less than the overall length of the lifted drum. This orientation utilizes the weight of the drum itself to secure the load upon grappling arms 4, 5 while the load is carried. The weight of the load exerts a turning moment on the grappling arms about their respective axes pivoting the lower extremities together into secure engagement with the load.

The load is released by lowering the fork-lift carriage until the drum rests upon the surface where it is to be placed. As shown in FIG. 3 further downward movement of the carriage engages the semi-circular plate cam 18, carried on the inside of grappling arm 5, with the drum rim and thereby pivots arm 4 upwardly against the tension of spring 9 until the arm 4 again is latched in its cocked position. The fork-lift carriage then may be raised and the vehicle moved to pick up its next load.

The plate cam 18 also is useful for tipping drums standing on end prior to picking them up with the described attachment as shown in FIG. 6. To tip an upended drum the forward grappling arm 4 is lowered over the near rim of the drum with the rim embraced between lip 8 and cam 18. Forward movement of the vehicle then engages the cam 18 with that rim and continued forward movement of the vehicle tips the drum with the rim finally sliding downwardly along grappling arm 4 until the rim becomes engaged with the lip 8. Further forward movement of the vehicle trips the latch means as described and brings both grappling arms into engagement with the drum rims. Hence, by a single forward movement of a self-loading vehicle fitted with this invention a drum resting on end may be tipped and picked up horizontally.

The described embodiment is rapidly attached to and detached from the tines of the fork-lift truck or other carrying vehicle by means of eccentric dog 19 pivoted about a vertical axis at the rear end of the beam 1. The dog urges the tine against the longitudinal retaining plate 20 and frictionally secures the attachment firmly to the tine.

A drum stored horizontally is upended by straddling the drum with beam 1 and engaging the lip 8 of forward grappling arm 4 with the forwardmost drum rim. Backward movement of the fork-lift vehicle with a simultaneous upward carriage movement pivots the drum about its rear rim into an upright position.

The described apparatus also is useful for picking up vertically stored drums as illustrated in FIGS. 4–5. The forward end of beam 1 carries fixed hook means 21 having a curved jaw which engages the inside of the top rim of the vertically stored drum as shown in enlarged FIG. 4. A chime rest 22 attached to the forward grapple arm 4 at its lower extremity embraces the uppermost chime of the drum. In addition the top end of grappling arm 4 extends above its pivot axle 6 and carries a rim rest 23 shaped to the drum curvature.

To pick up a vertically stored drum the forward grappling arm 4 is unlatched so that it depends downwardly under its own weight from axle 6. The carriage is lowered to embrace the drum rim between hook means 21 and rim rest 23. The carriage of the fork-lift truck then is tilted rearwardly, as illustrated in FIG. 5. In this manner the top chime of the drum is cradled in chime rest 22 and the rim securely embraced between hook means 21 and rim rest 23, the latter of which pivots toward hook means 21 by the weight of the drum on chime rest 22 exerting a turning moment about axle 6. The carriage then may be raised and the drum carried in normal manner. The drum is released merely by tilting the fork-lift carriage forward to the position illustrated in FIG. 4 whereupon rim rest pivots away from hook means 21 and release the rim.

Modifications of the described embodiment will become apparent to those familiar with this art such as other means of detachably securing the device to the fork-lift tines. It should be understood that the foregoing detailed description of an embodiment of the invention has been given for clearness of understanding only and no unnecessary limitation should be understood therefrom. The invention is defined by the following claims.

I claim:

1. An improved drum-handling attachment for a self-loading vehicle having a vertically movable carriage carrying horizontally extending fork tines including a rigid horizontal beam; means securing said beam to at least one of said fork tines; a first freely pivotable depending grappling arm pivoted on said beam about a fixed first horizontal axis near one end of said beam; a second freely pivotable depending grappling arm pivoted on said beam about a second horizontal axis parallel to and spaced from said first axis a distance less than the length of any handled drum, the depending end of each of said grappling arms being independently pivotable to either side of a vertical plane passing through the pivot axis of said grappling arm; latch means releasably latching said first grappling arm when the depending end of said arm pivots upwardly from its lowermost position and away from said second axis to a substantially horizontal cocked position; and means for releasing said latch means actuated by pivotal movement of said second grappling arm upwardly from its lowermost position and away from said first axis.

2. An improved drum-handling attachment according to claim 1 wherein said latch means comprises a rod shiftable axially along said beam; spring means for shifting said rod axially from said second axis toward said first axis; a crank mounted on and pivotable with said first grappling arm and pivotally connected to said rod for shifting said rod proximate said second axis in opposition to said spring means as said first grappling arm pivots to said cocked position; a latch stop on said beam; a latch on said rod releasably engageable with said latch stop only when said first grappling arm pivots into said cocked position.

3. An improved drum handling attachment according to claim 1 wherein said first grappling arm carries a cam surface engageable with a handled drum rim which upon the lowering of said carriage pivots said first grappling arm into said cocked position.

4. An improved attachment for lifting vertically stored drums with a self-loading vehicle having a vertically shiftable and tiltable carriage carrying normally horizontally extending fork tines, including a rigid beam; means securing said beam axially on one of said fork tines; a first depending grappling arm pivoted on said beam about a fixed horizontal axis near the end of said beam remote from said carriage; rigid hook means affixed to said end of said beam at a point above said horizontal axis; rim rest means mounted on said grappling arm and extending proximate said hook means for embracing between it and said hook means the rim of said drum nearest said carriage; and chime rest means carried on

said grappling arm below said pivot axis for engagement with the side of said drum when said carriage is tilted.

References Cited by the Examiner

UNITED STATES PATENTS

869,152	10/07	Alling	214—651 X
2,403,346	7/46	Deiters	294—110
2,429,193	10/47	Pool et al.	294—110
2,441,026	5/48	Long	294—110
2,609,954	9/52	Sutherland et al.	214—658
2,613,823	10/52	Johns	214—1
2,653,725	9/53	Dodge	214—651
2,655,278	10/53	Daniels	214—653

2,698,107	12/54	Ericson	214—653
2,720,992	10/55	Cushman	214—653
2,747,755	5/56	Kughler	214—653
2,757,812	8/56	Kughler	214—653
2,827,187	3/58	Mueller	214—620
2,828,155	3/58	Schwankl	294—16
3,042,241	7/62	Bauman	214—653
3,106,421	10/63	Wyrough	294—110 X

FOREIGN PATENTS

816,222	10/51	Germany.

HUGO O. SCHULZ, *Primary Examiner.*

MORRIS TEMIN, *Examiner.*