

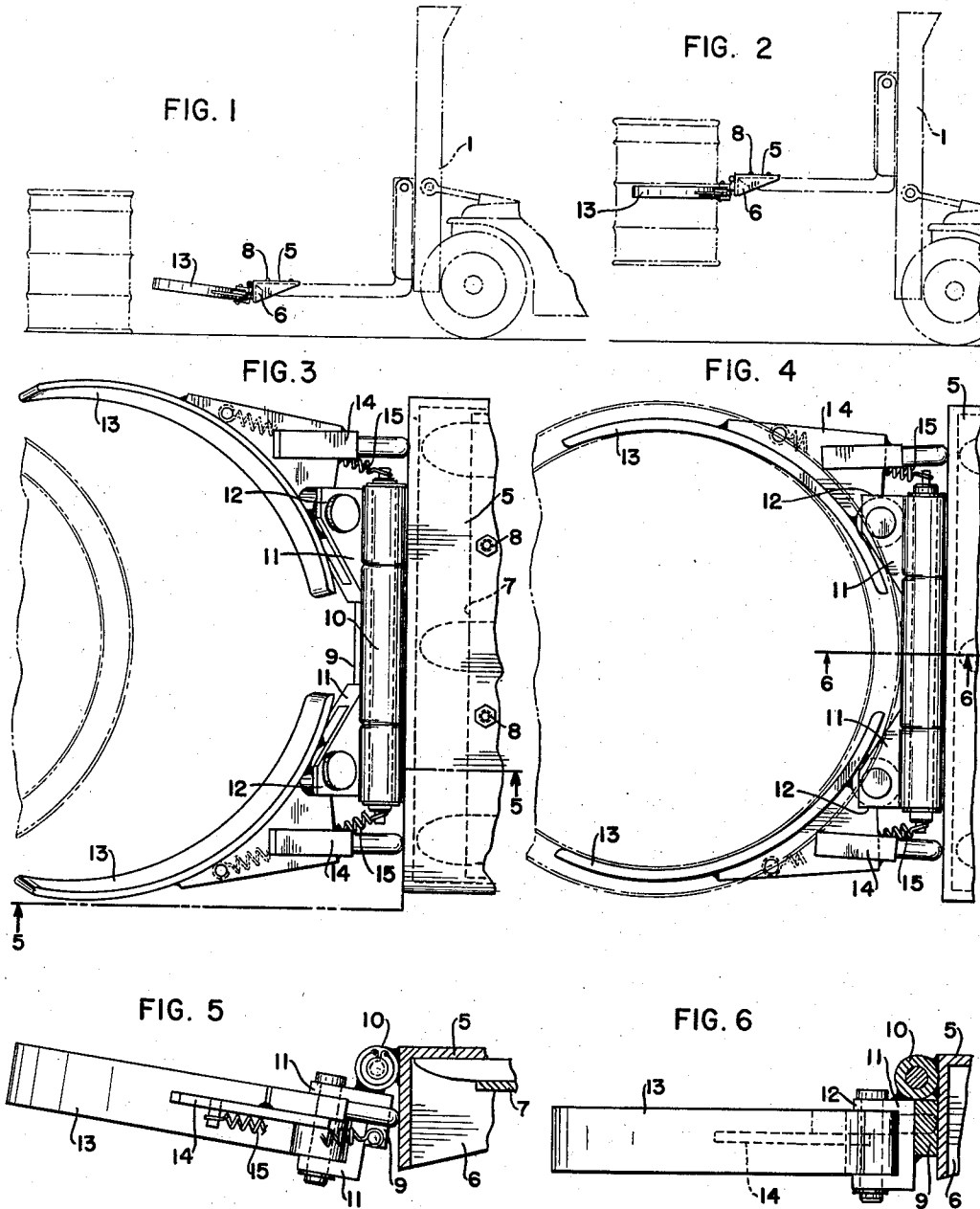
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E. R. KUGHLER
DRUM HANDLING APPARATUS

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2 Sheets-Sheet 1



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FIG. 7

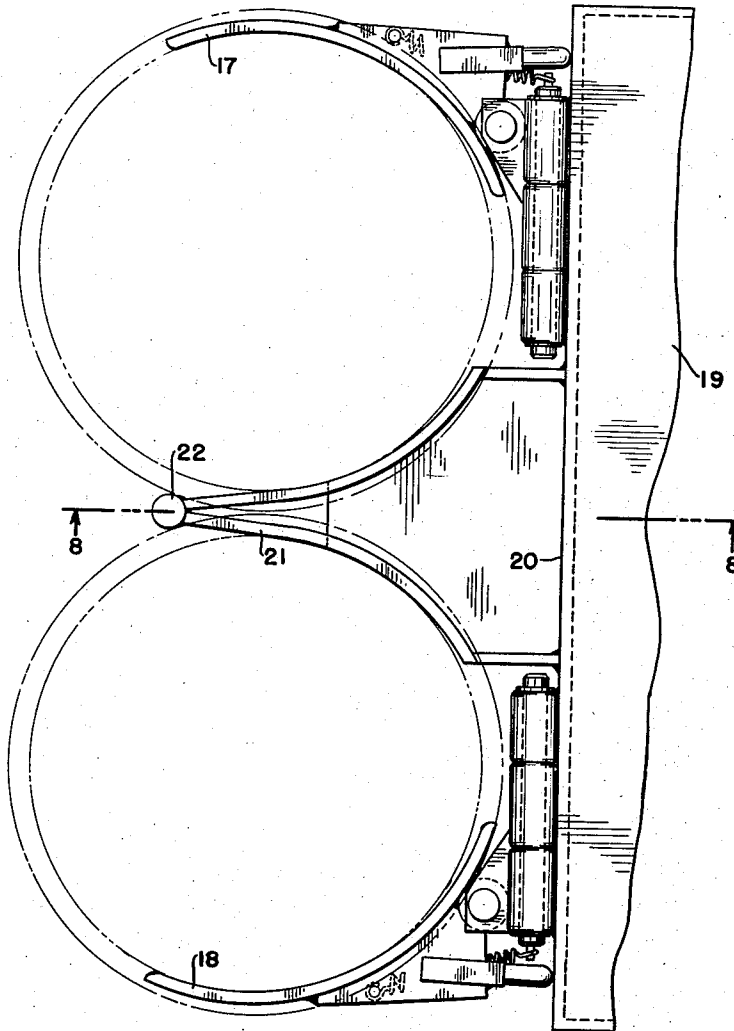


FIG. 9

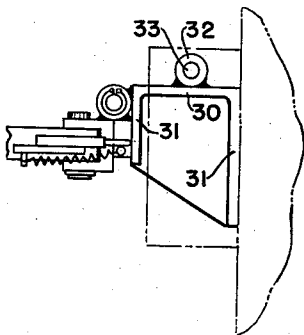
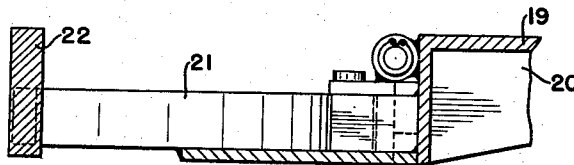


FIG. 8



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DRUM HANDLING APPARATUS

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6 Claims. (Cl. 214—653)

This invention relates to drum handling apparatus particularly of the type to be mounted on an ordinary lift truck. More particularly my present invention relates to apparatus of this kind for gripping and lifting oil drums and the like in a vertical position.

The principal object of my invention is to provide an apparatus which is completely automatic in operation and wherein the parts are so constructed that the forward movement of the truck against the drum to be lifted brings the gripping members into engagement with the drum surface and the upward vertical movement of the lift head of the truck, through the weight of the drum, causes the gripping arms to grip the drum with a pressure proportional to the weight of the drum so that the drums will be held firmly gripped no matter how rough the terrain over which the lift truck is moved nor how steep an angle it ascends or descends in shifting the drums from place to place.

My improved drum handling apparatus is further characterized by the fact that when the drums are deposited at their new location and the weight removed from the gripping arms, the arms open automatically to permit the truck to back away from the drums.

The drum hoisting device of my present application is an improvement on the hoisting apparatus for vertical drums shown in my co-pending application Ser. No. 230,858, filed June 11, 1951, for Hoisting Devices for Drums and the Like.

In the accompanying drawings I have shown my improved drum handling mechanism in the several forms in which it is now being manufactured and sold, and in the said drawings:

Fig. 1 is a side elevation of the conventional lift truck with my improved gripping device for single drums mounted thereon;

Fig. 2 is a similar view of the drum showing the parts in drum carrying position;

Fig. 3 is a plan view on an enlarged scale of the drum gripping device shown in Fig. 1;

Fig. 4 is a similar view with the parts in the position shown in Fig. 2;

Fig. 5 is a side view of the parts shown in Fig. 3;

Fig. 6 is a side view of the parts shown in Fig. 4;

Fig. 7 is a plan view of a drum hoisting apparatus for gripping two drums instead of one;

Fig. 8 is a detail view of a portion of the apparatus shown in Fig. 7; and

Fig. 9 is a detail view of the structure employed for attaching the drum handling apparatus to a lift truck with the forks removed.

Referring to the drawings, 1 indicates a conventional lift truck having forwardly projecting forks which in the ordinary use of the truck are thrust beneath the load, for example, a pallet on which the load to be carried is mounted. My improved drum gripping and lifting apparatus may be attached directly to the vertically moving head of the lift truck by removing the forks or the appa-

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ratus may be readily attached to the forks themselves, as shown in Fig. 1.

The drum lifting apparatus per se comprises a heavy sheet metal plate 5 which in the form shown in Fig. 3 is of a width to extend slightly beyond the outside forks of the lift truck. The plate 5 is provided with downwardly extending flanges 6 at its front and side edges and a clamping bar 7 underlying the forks of the lift truck is clamped against them by clamping bolts 8, to thereby firmly clamp the gripping and lifting apparatus to the forks of the truck.

The drum lifting and gripping device per se comprises a bar 9, see Fig. 6, of a length slightly less than the diameter of the drum to be lifted, which bar is connected along its upper edge by a hinge 10 to the front flange 6 of the plate 5. Attached to the face of the bar 9 at each end is a U-shaped bracket 11 having two forwardly extending parts 12 spaced apart a sufficient distance to receive between them the hub of a swinging drum gripping arm 13. The arms 13 are curved to the radius of the drums to be lifted and of a length to project beyond the transverse diameter of the drum when the gripping device is moved against the drum by the forward movement of the truck.

Projecting rearwardly from each of the gripping arms 13 is a bar 14. The bars 14 are of a length to engage the face of the front flange 6 of the plate 5 when the arms are in their open position, that is, moved away from each other by the springs 15 which are attached to the swinging and gripping arms and to the bottom edge of the hinged bar 9. In this position the bar 9 is swung away from the face of the flange 6 by the pull of the springs 15 so that the swinging grip arms 13, when no drum is being handled, extend upwardly at their front ends and away from each other a distance sufficient for the arms to pass on opposite sides of the drum when the lift truck is moved forward to grip the drum.

The bars 14 are rounded at their ends which engage the face of the flange 6 so as to move freely over the face of the plate when the arms move downwardly under the weight of the drum and inwardly by virtue of the engagement of the inner ends of the arms when upwardly tilted against the vertical wall of the drum.

The operation of the gripping and lifting drum will be obvious from a comparison of Figs. 5 and 6. Fig. 5 shows the arms in the position they are just before the drum contacts the faces of the arms 13 at the inner ends. Fig. 6 shows the relative positions of the drum and the arm after the truck is moved forwardly a sufficient distance to partially or completely close the swinging arms 13 against the sides of the drum beneath one of the reinforcing ribs. As will be noted, the forward movement of the arm against the drum has caused the plate 9 to swing backwardly on the horizontal hinge 10 at its upper edge and thereby through the bars 14 has caused the curved gripping arms to be swung toward each other about their vertical hinges to thereby firmly grip the drum beneath one of the horizontal reinforcing ribs. Now, when the lifting head of the drum is elevated the upper edges of the arms 14 will engage the reinforcing rib immediately above the gripping arms and lift the drum off the surface on which it is supported. As the weight comes onto the arms 14 the plate 9 is pressed hard against the flange 6 and there held until the drum is again deposited on its supporting surface. When supporting the weight of the drum the arms are held pressed toward each other to the full extent permitted by the diameter of the drum and the length of the rearwardly projecting bars 13 with the rounded ends which engage the face of flange 6.

In practice the dimensions of the drums used for oil

and other liquid commodities which are shipped in drums vary considerably among drums of the same rated capacity. Some of the drums used are as much as two inches greater in diameter, the capacity of the drum being made up by the greater axial dimension for the smaller diameter drums. My improved drum gripping and lifting mechanism as here disclosed will handle all drums within this two inch variation in diameter without adjustments of any kind. When handling a drum of a diameter near the maximum permitted the arms 13 will grip the drum before the plate 9 is swung to absolutely vertical position with its face in engagement with the front face of the flange 6, whereas with the drums of smaller diameter the arms may be swung inwardly to the full extent of their movement without engaging the cylindrical surface of the drum but in this position the distance between the arms is less than the diameter of the drum at the plane of the reinforcing ribs and consequently the drum will be lifted by the reinforced ribs and the arms will be held inwardly in position to so support the drum by the weight of the drum resting on the arms.

In Figs. 7 and 8 I have shown my drum gripping and lifting apparatus designed for lifting two drums at a time. The apparatus for this purpose as here shown comprises two separate swinging gripper arms 17, 18, each similar to the corresponding arm 13 of the single drum lifting device but spaced apart from each other a distance slightly greater than twice the diameter of the maximum size drum to be lifted. The plate 19 and flange 20 are similarly of a length substantially equal to double the diameter of the drums to be handled. At the mid point between the arms 17 and 18 is a forwardly projecting tongue 21 which is rigidly attached at its base to the face of the flange 20. The tongue 21 is curved on its opposite edges to substantially the same curvature as the arms 17, 18, and the forward end of the tongue projects forwardly from the plate 19 a distance somewhat greater than the radius of the drum to be handled so that when the truck is moved to bring the inner ends of the arms 17, 18 against the walls of the drums to be lifted the ends of the arms 17, 18 and the tongue 21 will be somewhat beyond the transverse diameter of the drums.

On the upper face of the tongue 21 at its end, there is provided an upstanding lug or finger 22 of a diameter equal to the horizontal dimension of the tongue at this point, so that when the apparatus is lifted by the vertical movement of the head of the lift truck the lug or finger 22 will project in front of the reinforcing ribs of the two drums being lifted to thereby prevent movement of the drums away from the plate 19 even though the lift truck is descending a steep incline.

The double drum apparatus of Figs. 7 and 8 will also handle drums of different dimensions varying as much as two inches, which is at present the maximum difference in drums of the same rated capacity.

In Fig. 9 I have shown a modification of my drum

gripping and lifting mechanism wherein the mechanism is attached directly to the lifting head instead of to the forks of the truck. As here shown the plate 30 is rectangular in shape and has downwardly extending marginal flanges 31 on all four edges. The end flanges 31 are spaced apart the same distance as the upstanding arms at the ends of the fork for which the lift truck is designed and upstanding eyes 32 are welded to the upper face of the plate for suspending the cross shaft 33 of the lift truck when the forks are removed. The cross bar 9 of the gripping and lifting mechanism is hinged to the front flange 31 of the plate 30. The mechanism and its operation are otherwise the same as above described.

I claim:

1. In an apparatus of the class described, a frame for attachment to a lift truck, a pair of gripping arms carried by said frame, each of said gripping arms being mounted for movement toward and from the other and also in a direction transverse to such movement, operative connections between said arm and said frame whereby relative movement of said arm with respect to said frame in one direction effects a relative movement of said arm in the transverse direction.
2. The apparatus of claim 1 wherein downward movement of said arms with respect to said frame causes said arms to move toward each other.
3. The apparatus of claim 1 wherein downward and backward movement of said arms with respect to said frame causes said arms to move toward each other.
4. In an apparatus of the class described, a frame for attachment to a lift truck, a pair of gripping arms mounted on said frame, one of said gripping arms being mounted for movement relatively to said frame in a direction toward and from the other arm and also in a direction transverse to said movement, operative connections between said arm and said frame whereby the last named relative movement of the frame and arm causes said arm to move toward or from the other arm.
5. The apparatus of claim 4 wherein the operative connection includes an intermediate member connected to the frame by a horizontal pivot and to which the arm is connected by a vertical pivot.
6. The apparatus of claim 5 wherein the movable arm is provided with a stop engaging the frame in position to cause the arm to move about its pivot when the intermediate member moves toward the frame.

References Cited in the file of this patent

UNITED STATES PATENTS

459,430	Zahrn	Sept. 15, 1891
875,078	Hoover	Dec. 31, 1907
1,018,260	Myrholm	Feb. 20, 1912
2,582,663	Weiss	Jan. 15, 1952
2,584,918	Puig Salsas	Feb. 5, 1952
2,689,663	Shramek	Sept. 21, 1954
2,704,167	Framhein	Mar. 15, 1955