

[54] **BARREL LIFTING DEVICE**

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[51] **Int. Cl.²**..... **B66C 1/42**

[58] **Field of Search**..... 294/4, 16, 31, 62, 67 BC,
294/67 DA, 81 R, 90, 91, 95, 97, 103, 104,
106, 115; 214/380, 381

[56] **References Cited**

UNITED STATES PATENTS

673,263	4/1901	Hitchings et al.	294/106
870,450	11/1907	Mayer	294/62
1,788,087	1/1931	Dunbeck	294/104
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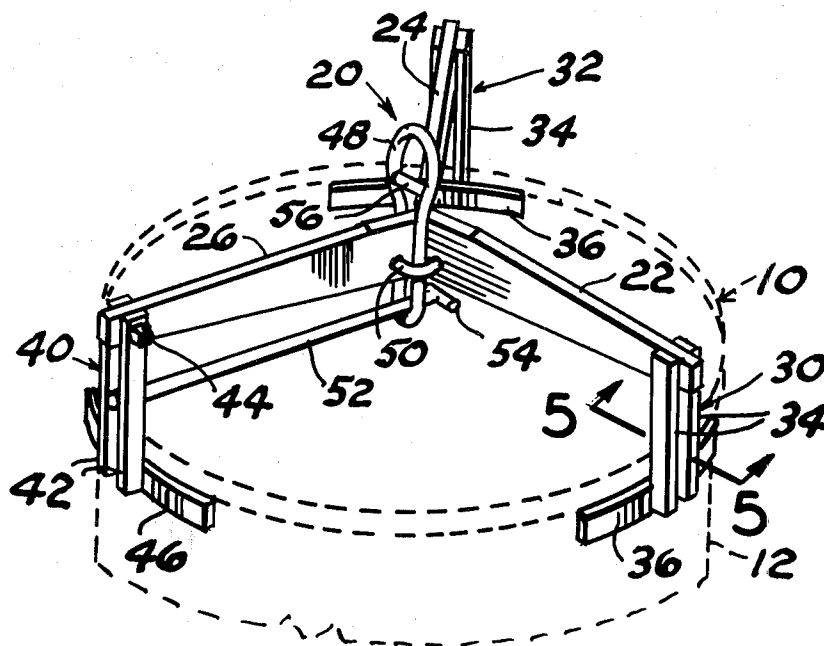
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[57]

ABSTRACT

A three-arm beam member horizontally overlies and spans the upwardly disposed end of a cylindrical drum and is provided with clamp jaws secured to its respective arm end portions in depending relation. One of the clamp jaws is movable toward and away from an arc of a circle described by the clamp jaws for gripping intermediate circumferential wall portions of a drum being lifted. Lever means connected, at one end, to the movable jaw is also connected at its other end to a lifting loop vertically and slidably supported centrally by the beam for pivoting the movable jaw to a drum gripping and releasing position in response to vertical movement of the lifting loop.

1 Claim, 5 Drawing Figures



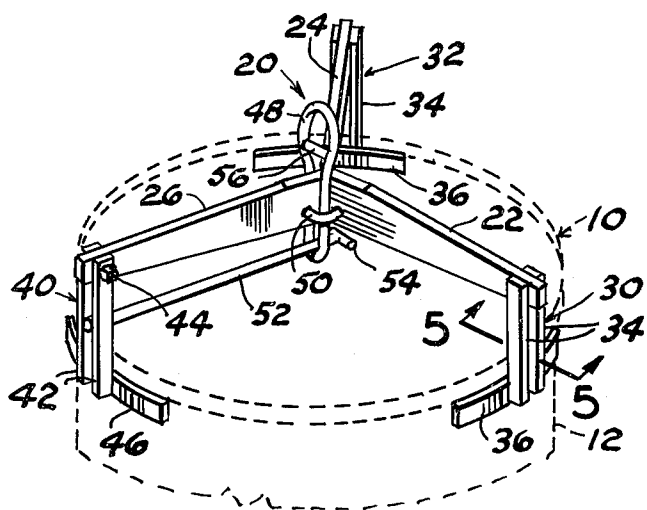


FIG. 1

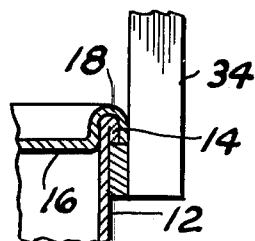


FIG. 5

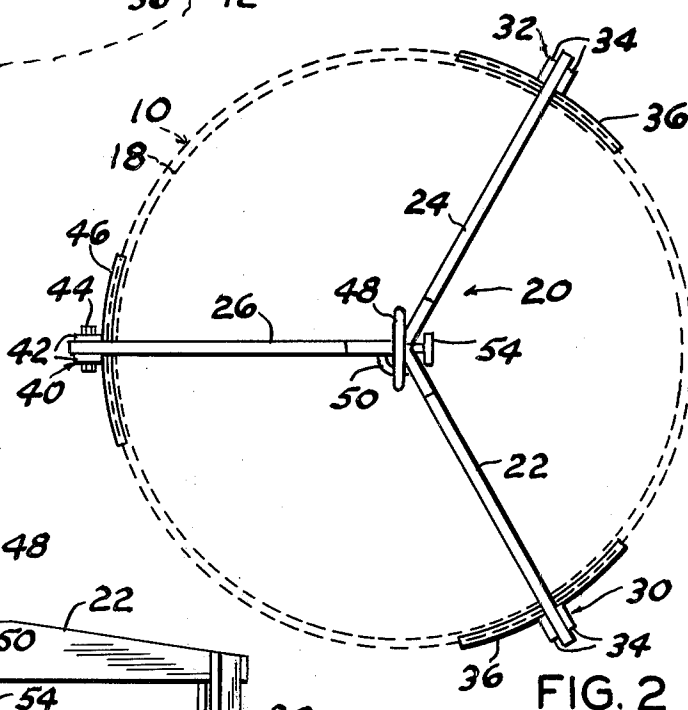


FIG. 2

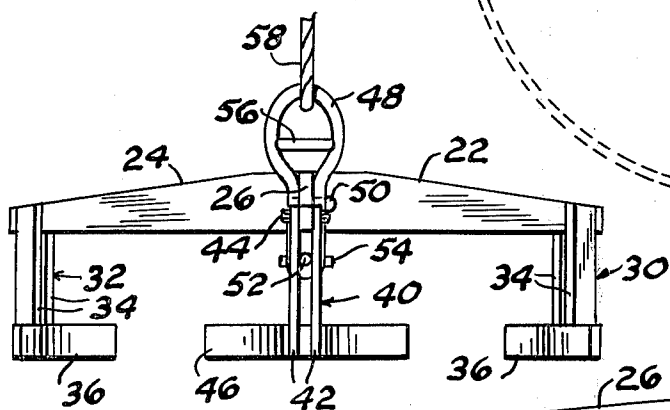


FIG. 4

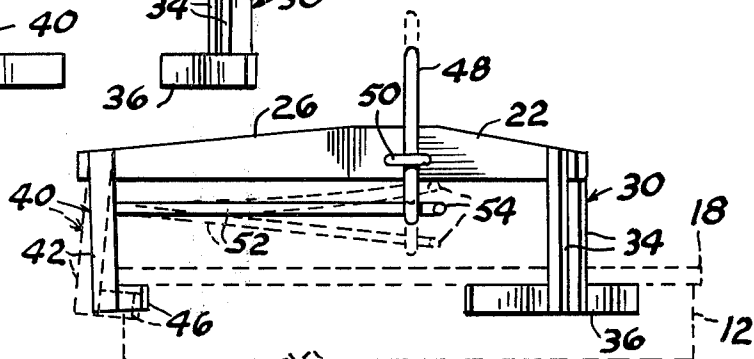


FIG. 3

BARREL LIFTING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to clamping devices and more particularly to a barrel lifting device.

Storage drums are commonly used for storing and transporting various commodities in both liquid and dry form. Such storage drums are formed of steel in cylindrical form and are usually arranged with the longitudinal axis disposed vertically. Since these drums are usually 55 gallon liquid capacity their size and mass, when filled, is such that it is difficult for a single workman to move or load such drums.

This invention is intended for lifting and moving such drums from location to another in combination with a power operated hoist, or the like.

2. Description of the Prior Art

The prior art discloses various mechanisms for lifting and transporting barrels, or the like, some of which are relatively specialized for particular barrel or container and generally comprising a plurality of interacting components thus increasing the initial cost as well as maintenance of the barrel lifting or clamping device. For use with cylindrical drums the prior art patents have generally disclosed devices which form clamp members engaging the surrounding bead and gripping the outstanding flange at the upwardly disposed end of the drum, such as is disclosed by U.S. Pat. No. 2,500,055. Other patents, such as U.S. Pat. Nos. 1,788,087 and 2,349,591 disclose clamp means for gripping diametrically opposite sides of containers.

This invention is distinctive over the art by its simplicity of its construction comprising a three-arm beam member horizontally overlying the upper end of a cylindrical drum and having an arcuate jaw secured to the respective outer end of each arm of the beam member in depending relation with one jaw being movable in response to a lifting force applied to the beam cooperating with the other jaws to generate a drum clamping and lifting action.

SUMMARY OF THE INVENTION

A normally horizontally disposed beam member comprising three equally spaced radial arms, each having a length slightly greater than the radius of the drum to be lifted, is provided with a pair of jaws rigidly connected in depending relation with respect to the end portion of two of the support arms. A third jaw is pivotally connected to the free end portion of the other support arm for pivoting movement toward and away from the arc of the outer surface of a cylindrical drum end portion underlying the beam member for cooperating with the pair of jaws and gripping the surface of a drum below an annular bead defining its upper end. A lifting loop surrounds the beam member at the juncture of the arms for lifting the latter and is slidably engaged with one end of a lever connected at its other end to the pivoting jaw for generating a drum clamping action in response to a lifting force applied to the loop.

The principal object of this invention is to provide a force distributing drum clamping and lifting means with the gripping action formed by and proportional to the lifting force to prevent accidental release of the drum or a collapsing action on its wall while suspended which is simple in construction and operation and will not easily get out of order.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the barrel lifting device in operative position on the upper end portion of a cylindrical drum, the latter being shown by dotted lines;

FIG. 2 is a top view, to a larger scale, of FIG. 1;

FIG. 3 is a side elevational view of FIG. 2;

FIG. 4 is a left side elevational view of FIG. 2; and,

FIG. 5 is a fragmentary vertical cross sectional view, to a different scale, taken substantially along the line 5—5 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 10 indicates a conventional cylindrical drum having a side wall 12. The side wall 12, at the respective ends of the drum, usually has its end portion doubled back upon itself to form an outwardly projecting annular bead 14, only one being shown. The respective ends of the drum are closed by end walls 16, only one being shown, with one end wall forming the top or removable cover for the drum with the outer peripheral portion of the end wall 16 being arcuately curved to form an inverted U-shape 18 contiguously contacting the inner and outer surfaces of the bead 14, thus disposing the plane of the end wall 16 in or near a horizontal plane defined by the depending limit of the bead 14. It is with such a drum that this invention is intended to be used.

The device, indicated generally at 20, comprises a support member or beam formed by three elongated arms 22, 24 and 26 rigidly interconnected at one end to form a common center or axis for the device 20 with the arms projecting radially outward at their other ends in equally spaced relation. The length of each arm is preferably slightly greater than the radius of the drum 10 to be lifted. First and second rigid clamp jaw members 30 and 32 are rigidly connected, respectively, to the outer free end portion of the beam arms 22 and 24. Each of the rigid clamp jaw members 30 and 32 comprises a pair of legs 34 secured to opposite sides of the outer end portion of the respective arm in depending parallel relation and an elongated clamp member or jaw 36 having a length substantially greater than the distance across the legs 34 and a transverse width and thickness of selected dimensions and being arcuately curved longitudinally complemental with an arc of the circumference described by the outer surface of the drum 10. The thickness of the clamp member 36 is at least equal to the combined thickness of the drum bead 14 and drum end wall 16.

A third or movable clamp jaw 40 includes a pair of similar legs 42 pivotally connected at their upper ends to opposite side surfaces of the support arm 26 adjacent its free end by bolt and nut means 44. The movable jaw 40 similarly includes a substantially identical clamp member or jaw 46 rigidly connected to the depending end portion of the legs 42 for movement there-with toward and away from the adjacent surface of the drum 10.

A lifting member, comprising an endless rod or loop 48, surrounds the support arm 26 adjacent its juncture with the other support arms 22 and 24 and is vertically

movable with respect to the arm 26 and is maintained in a vertical slidable position by a guide 50 extending horizontally between and connected to adjacent surfaces of the arms 22 and 26.

A lifting bar or lever 52 is horizontally connected at one end between the jaw legs 42 intermediate their length and is at least coextensive with the support arm 26. The lever 52 projects at its other end through a depending portion of the lifting loop 48 projecting below the horizontal plane defined by the support arms 22, 24 and 26 for pivoting the movable jaw 40 toward the drum 10 by vertically upward movement of the endless loop 48. The lever is maintained within the endless loop 48 to prevent release of the lever relative to the loop 48 by a stop 54 transversely secured to the end of the lever 52 opposite its connection with the legs 42. vertical downward movement of the lifting loop 48 and outward pivoting movement of the movable jaw away from the drum side wall 12 is limited by a cross bar 56 extending horizontally across the opening defined by the loop above the upper limit of the support arms.

OPERATION

In operation the support beam is placed in spanning relation over the upwardly disposed end of the drum 10 to be lifted wherein the mass of the lever 52, by gravitational attraction therefor, counterbalances and pivots the movable clamp jaw 40 outwardly away from the drum wall 12, as shown by dotted lines (FIG. 3). A hook or hoist line 58, engaged with the loop 48, moves the loop surrounded end portion of the lever 52 upwardly, as shown by dotted lines (FIG. 3), forcing the movable clamping jaw 40 toward the drum wall 12 in a cooperating clamping action with the rigid clamp jaws 30 and 32 on the drum side wall 12 below the bead 14 and adjacent the plane of the end member 16, thus distributing the clamp force and avoiding a collapsing action against the drum wall 12 by the gripping force applied thereto by the clamping jaws when a lifting force applied to the lifting loop 48 is great enough to lift the drum and its contents. The bead 14 thus forms an annular shoulder engaged by the respective jaws.

After the drum is placed in a new location, a release of the lifting force applied to the lifting loop 48 permits the movable clamping jaw 40 to pivot outwardly away from the drum side wall 12 for removal of the lifting device.

Obviously the invention is susceptible to changes or

alterations without defeating its practicability, therefore, I do not wish to be confined to the preferred embodiment shown in the drawings and described herein.

I claim:

1. A lifting device for an upright drum having a cylindrical wall and having its upwardly facing end surface surrounded by an annular bead with the depending limit of the bead disposed below the upper end surface of the drum wall, comprising:
 - beam means horizontally overlying said drum and including at least three equally spaced arms interconnected at one end portion and projecting outward at their other end portion and intersecting a cylindrical plane generated by the wall of said drum;
 - first and second drum engaging jaws rigidly connected respectively with the outer end portion of two of said arms;
 - a third drum engaging jaw pivotally connected with the outer end portion of the other said arm for movement toward and away from said drum, each of said jaws being elongated and arcuately curved longitudinally on a radius complementary with the radius of the drum to be lifted;
 - a lever connected at one end portion with said third jaw in depending coextensive horizontal spaced relation with respect to said other arm;
 - at least one leg extending between and connecting each said jaw to the respective outer end portion of each said arm in depending spaced relation with respect to the horizontal position of said lever a distance at least as great as the spacing between the depending limit of the drum bead and the upper end surface of said drum wall; and,
 - lifting means including an endless loop surrounding an intermediate portion of said lever and said other arm adjacent the juncture of said arms,
 - a guide secured to at least one said arm and horizontally partially surrounding an intermediate portion of said endless loop for maintaining said endless loop adjacent the juncture of said arms,
 - a stop secured to said other end portion of said lever for preventing relative separating movement of said lever and said endless loop, and,
 - a cross bar extending horizontally across said endless loop above the upper limit of the juncture of said arms.

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