Sept. 25, 1956 E. C. SCHMIDT, JR 2,764,447

LIFTING DEVICE

Filed Dec. 13, 1952 2 Sheets-Sheet 1

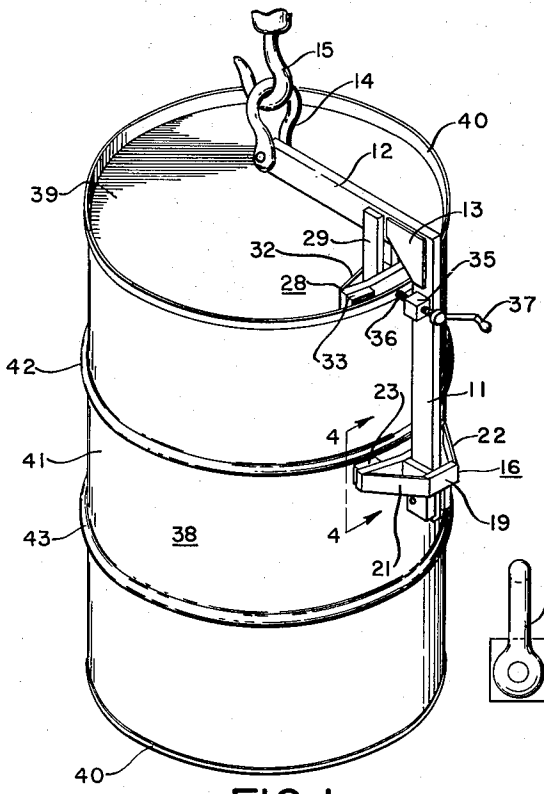


FIG. 1

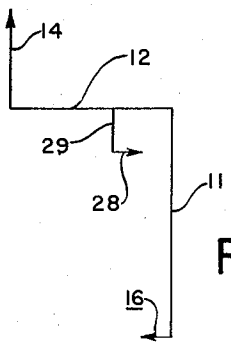


FIG. 2

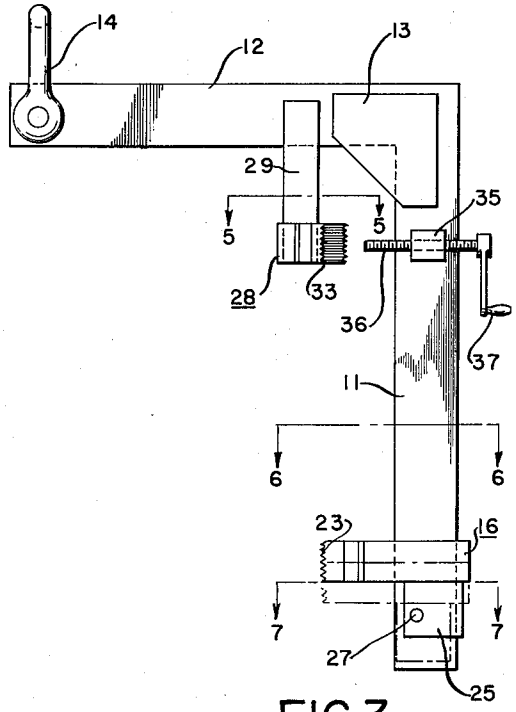


FIG. 3

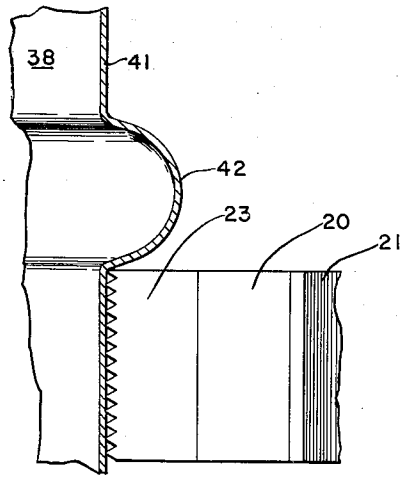


FIG. 4

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LIFTING DEVICE

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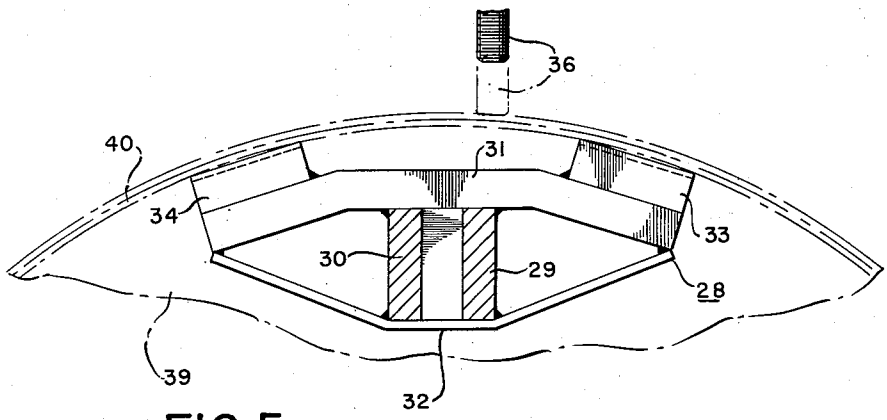


FIG.5

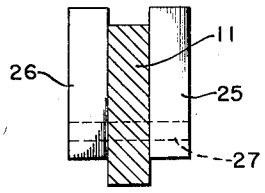


FIG.7

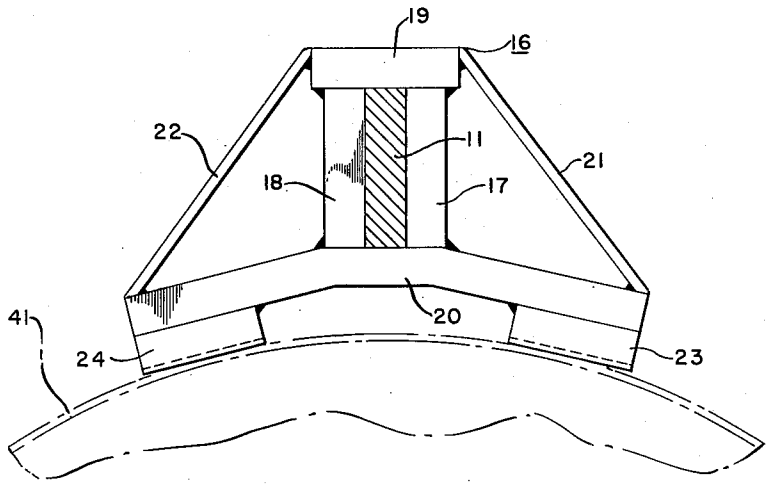


FIG.6

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LIFTING DEVICE

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Application December 13, 1952, Serial No. 325,800

6 Claims. (Cl. 294—92)

My invention relates to devices used for the lifting of objects, such as boxes, containers, barrels, drums, and the like. In the preferred embodiment of my device as illustrated and here described, the device is adapted particularly for use in the lifting of barrels or drums of cylindrical form and having a chime or upstanding lip around the upper edge thereof.

An object of my invention is to provide an improved device for lifting articles, such as barrels or drums, without the requirement for the use of slings and the like to embrace the article.

Another object is to obviate the use of tongs or grapples which seize an article, such as a barrel or drum, between opposed and compressing arms.

Another object is the provision of an improved lifting device which eliminates the disadvantage and limitations inherent in prior devices that have been utilized for the grasping of an article to lift the same.

Another object is the provision of an improved lifting device which is flexible in its use and adapted to handle and accommodate itself to various articles of varying sizes.

Another object is the provision of an improved lifting device arranged for the lifting of both full and closed barrels and open and empty barrels.

Another object is the provision of an improved device for lifting barrels and the like which accommodates itself to the varying structure of such barrels and the like.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a preferred form of my lifting device applied to and lifting a steel barrel;

Figure 2 is a diagrammatical view illustrating the disposition and direction of the forces set up in the use of my lifting device;

Figure 3 is a side elevational view of my improved lifting device somewhat enlarged from that shown in Figure 1;

Figure 4 is an enlarged sectional view of a portion of my lifting device applied to a steel barrel as seen looking in the direction of the arrows 4—4 of Figure 1;

Figure 5 is an enlarged sectional view of my device taken through the line 5—5 of Figure 3 with the addition of a portion of a barrel shown in broken lines;

Figure 6 is an enlarged sectional view of my device taken through the line 6—6 of Figure 3 with the addition of a portion of a barrel shown in broken lines; and

Figure 7 is an enlarged view of my device taken through the line 7—7 of Figure 3.

My lifting device includes a steel frame made of an upright beam member 11 and a horizontal beam member 12 welded together and disposed at a right angle to each other. A pair of bracing side plates 13 disposed at the corner of the frame and on opposite sides of the

beam members add strength and rigidity at the joinder of the two beam members. At the inner end of the horizontal beam member 12 and at the location of the axis, a clevis 14 is secured to the beam member 12. The clevis 14 is adapted to engage a hook 15 as shown, which hook 15 is secured to a chain or cable, not shown, utilized for raising the lifting device and its burden.

On the upright or first beam member 11 and adjacent its lower end, there is a lower engaging member denoted generally by the reference character 16. This lower engaging member 16 is in a sliding fit on the upright member 11 and is adapted to be raised and lowered to the desired elevation on the upright member.

The lower engaging member comprises side blocks 17 and 18 disposed in a sliding fit to the opposite sides of the upright beam 11. And end block 19 welded to the edges of the side blocks 17 and 18 enclose the upright member 11 on a third side in a sliding fit. There is an angularly formed bar 20 which is secured by welding to the other edges of the side blocks 17 and 18 and also engages the upright member 11 in a sliding fit. Thus, the upright member is surrounded by members 17, 18, 19 and 20, which may be moved as a unit up and down on the upright member 11. This unit is guided in its path by the upright member 11. As shown in detail in Figure 6, the angularly formed bar 20 is arranged to adapt itself somewhat to the cylindrical form of a barrel side. To provide strength and rigidity to the bar 20, bracing straps 21 and 22 are welded to the outer ends of the bar 20 and to the end block 19.

Carried by the bar 20 are a pair of spaced pads or jaws 23 and 24. These are disposed at an angle to each other to accommodate themselves to the curvature of a cylindrical barrel. Each of the pads 23 and 24 is made of a hard block of steel with serrations or teeth disposed in a horizontal direction. These serrations or teeth are disposed to project toward and engage the side of the barrel to be lifted. The projecting teeth are made particularly hard so as to be harder than the material of the barrel and thus to be able to "bite into" or frictionally engage without slippage the smooth exterior surface of the barrel.

To provide for changing the elevation of the lower engaging member 16 relative to the upright beam 11, that is, to change the distance of the lower engaging member 16 from the horizontal beam member 12, I provide means carried by the upright beam member 11 for supporting the slidable engaging member 16 at a predetermined position. This is provided by means of a pair of adjusting blocks 25 and 26, which are carried upon a steel pin or bolt 27 extending through a hole disposed in the lower end portion of the upright beam member 11. There is a turning fit of the steel pin 27 within the hole in the beam member 11, whereas the adjusting blocks 25 and 26 are non-rotatively engaged to the outer ends of the steel pin 27. By this means, the revolving of one of the adjusting blocks causes the pin 27 to rotate and the opposite adjusting block to revolve therewith. It is to be noted that the arrangement of the pin 27 and the adjusting blocks 25 and 26 is such that the axis of the pin 27 is at variable distances from the four sides of the square blocks 25 and 26. Thus there are four different distances between the axis of the pin 27 and the four sides of each block. Therefore, by turning the blocks 25 and 26 to any one of four possible arrangements, the elevation at which the lower engaging member 16 rests upon the top of the blocks 25 and 26 may be adjusted.

In Figure 3, the adjusting blocks are illustrated in one of four possible positions. If it is desired to lower the lower engaging member 16 to its lowermost position on the upright beam member 11, the adjusting blocks 25

and 26 would be turned on the pin 27 to the position where there is the shortest distance between the pin and the respective side of the adjusting blocks. During the revolving of the adjusting blocks to the desired position, the lower engaging member 16 is raised and after the adjusting blocks are in the position desired, the lower engaging member 16 is lowered with its weight resting upon the uppermost side or edge of the adjusting blocks. This holds the adjusting blocks in the predetermined position provided for by the turning of the blocks. By this arrangement, the lifting device may be adapted to barrels or other objects of varying structure and size.

There is an upper engaging member denoted generally by the reference character 28, which is carried by a pair of supporting bars 29 and 30, which in turn are carried by the second or horizontal beam member 12. The supporting bars 29 and 30 are welded to the horizontal beam member 12 on opposite sides thereof and are arranged to extend downwardly, as shown in Figures 1 and 3 of the drawings.

The upper engaging member 28 has welded to the edges of the supporting bars 29 and 30 an angularly formed bar 31 arranged as shown in Figure 5. To brace and add strength to the bar 31, a bracing steel strap 32 is welded to the ends of the bar 31 and to the edges of the supporting bars 29 and 30, as shown in Figure 5. The upper engaging member 28 is in a fixed position and does not move up and down, as is the case with the lower engaging member 16.

Carried by and secured by welding or other suitable means to the opposite ends of the bar 31 are a pair of pads or jaws 33 and 34. These pads 33 and 34 are blocks of hardened steel and each have horizontally disposed serrations or teeth which are directed outwardly and are disposed to adapt themselves to the curvature of the barrel. The teeth of the steel pads 33 and 34 are sufficiently hard that they bite into or frictionally engage the metal or softer material of the barrel.

As an added safety feature and convenience, there is provided a set screw arrangement which comprises a threaded block 35 secured by welding or other suitable means to the side of the upright beam member 11. A long threaded set screw or bolt 36 is threadably engaged in the block 35 and is arranged to extend in a horizontal direction substantially parallel to the horizontal beam member 12. The forward end of the set screw 36 is cupped and has a hardened edge adapted to bite into and frictionally engage the side of a barrel of steel or other material. As seen in Figures 1 and 3, the elevation of the set screw 36 is approximately that of the upper engaging member 28 so that the teeth of the pads 33 and 34 are opposed to the hardened end of the set screw 36, the set screw 36 being aligned intermediate of the two pads 33 and 34. A suitable handle 37 is provided on the opposite end of the set screw 36. By revolving the handle 37, the set screw is rotated to move its hardened end relative to the side of a steel barrel to which my lifting device may be applied.

To illustrate the use of my lifting device, I show in the drawings a steel barrel or drum denoted generally by the reference character 38. In the illustration given by way of example, the barrel 38 has a top 39 and a cylindrical side wall 41. At the ends of the barrel there are chimes or extending lips 40. The form and disposition of such chimes 40 on the ends of a barrel or drum is well known. Such chimes in effect extend the cylindrical side wall of the barrel beyond the top and bottom and the inner surface of a chime is accessible from the end of the barrel or drum. The barrel illustrated has an upper bead 42 and a lower bead 43 formed in the barrel side by rolling during the fabrication of the barrel. In barrels and drums there are various sizes and different structural details. The location and size of the beads formed in the sides of the barrels may vary. It is preferred in the use of my device that the toothed pads or jaws 23 and 24 of the lower engaging member 16 be placed under the bead 42 and against the cylindrical wall 41 of the barrel. While it is not essential in all uses that the lower engaging member be disposed just under a bead, this is useful and an advantage in many cases. The bead 42 prevents the lower holding member from sliding upwardly along the cylindrical wall 41, while the device is being applied to the barrel and before the teeth of the upper and lower engaging members have had an opportunity to bite into and firmly engage the barrel. After the lower engaging members have firmly bitten into and engaged the cylindrical side 41 of the barrel, then its disposition below the bead 42 is not as important as it was during the initial positioning and adjusting of the device to the barrel.

The upper engaging member 28 is so disposed that the toothed pads 33 and 34 may bite into and frictionally engage the inner wall of the upper chime 40. The depth of the chime 40 is sufficient to permit the upper engaging member 28 to fit within the cylindrical wall of the barrel above the top 39. It is not important whether there is a top 39 of the barrel or whether the barrel 38 has the top 39 removed. In either case, the upper engaging member 28 fits in the position shown in Figure 1 to bite into and frictionally engage the inner surface of the cylindrical wall at the top of the barrel.

In practice, my lifting device is placed upon an upstanding barrel as shown in Figure 1 with the lower engaging member 16 adjacent the outer surface of the wall of the barrel and with the upper engaging member 28 adjacent and directed toward the inner wall of the chime 40, that is, the inner surface of the cylindrical wall at the top of the barrel. Upon holding the lifting device in this position and raising the clevis 14, such as by a hook 15, a combination of forces is set up which forces the toothed pads of the lower engaging member 16 firmly into the side of the barrel and at the same time forces the toothed pads of the upper engaging member 28 firmly into the inner wall of the chime 40. The direction of the forces set up is illustrated by the diagrammatical view of Figure 2. Upon raising the end of the horizontal member 12 at its location at the axis of the barrel, the horizontal member 12 is tipped by a leverage action. The upward force indicated by the arrow on the clevis 14 sets up a force indicated by the arrow at the upper engaging member 28 and a force indicated by the arrow at the lower engaging member 16. Therefore, by the upward pull on the clevis 14, the upper engaging member 28 is forced radially outward of the barrel against the chime and the lower engaging member is forced radially inward against the cylindrical side of the barrel. These opposed forces cause the barrel to be firmly clamped and grasped by the upper and lower jaws or engaging members. After the upper and lower jaws or engaging members have firmly bitten into and frictionally engaged the barrel, there is sufficient grasp and hold upon the barrel to firmly hold a heavy loaded barrel and to lift the same by means of a hook 15 pulling up on the clevis 14.

Sometimes it may be necessary manually to hold the lifting device in position on the barrel until the clevis has been raised upwardly to initially cause the toothed pads of the engaging members to bite into and engage the barrel. To obviate such a manual holding of the device during this initial step, the set screw 36 may be turned so as to firmly hold the chime between the upper holding member 28 and the set screw 36. It is to be noted that the set screw 36 provides a steadying influence to hold or clamp the device firmly in position but the force of holding and lifting the loaded barrel is exerted by the opposed engaging members 16 and 28 rather than by the set screw 36. Also by having the set screw turned to engage the outside of the barrel at the chime, there is a safety measure added. Should the barrel suddenly be jarred, wiggled or swayed while it is being held up

by the lifting device, the set screw would help prevent the toothed pads of the upper engaging member from "working out" of or becoming disengaged from the inner surface of the chime. Therefore, the use of the set screw is a convenience and advantage in applying the lifting device to the barrel and also adds some safety against any possible disengagement of the lifting device from the barrel.

It is seen from the above description and from the disclosure of the drawings that I have provided a useful, practical and reliable tool used for the lifting of a barrel or other objects. A square container may be lifted as well and other objects may be similarly lifted by adapting the structure of my device to the objects to be lifted. The use of my device provides for speed and ease in the handling of such objects as containers, barrels and drums, either full or empty. Adaptations and variations of the device will be readily discernible by those versed in the art after having disclosed to them the herein described embodiment of my invention. This disclosure includes the description of structure contained in the appended claims as well as the above detailed description.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. A device for grasping an upright barrel and the like having a chime and a head, said device comprising in combination a frame having a first beam member and second beam member joined at substantially a right angle, a first jaw member and a second jaw member carried by the frame and positioned at a distance from each other along said first beam member to project in opposite directions relative to said first beam member and toward an upright plane disposed therebetween, said first jaw member being disposed at a first distance from said second beam member and said second jaw member being disposed at a second distance from said second beam member, said first distance being substantially greater than said second distance, adjusting means for adjusting and maintaining the position of said first jaw member to vary said first distance for accommodating the device to the location of the rib of a said barrel, said first jaw member being adapted to engage a side of a said barrel adjacent said rib and said second jaw member being adapted to engage the inner surface of said chime, hook-receiving means carried by the free end of said second beam member at substantially the axis of said barrel, and clamping means opposed to said second jaw member carried by said frame, said clamping means being adapted to hold said chime against said second jaw member, the vertically upward movement of the said hook-receiving means at the axis of the barrel away from the barrel moving said frame to press the second jaw member radially outward to frictionally engage said chime and to press the first jaw member radially inward to frictionally engage said side and thereby grasp said barrel and thereupon moving said barrel vertically upward.

2. A lifting device for grasping a barrel having a chime at an end and a bead on its side, said device having a frame, said frame having a first portion and a second portion disposed at substantially a right angle to each other, said first portion being adapted to be placed adjacent said barrel parallel to the axis thereof, said second portion being adapted to be placed over said barrel with its free end disposed adjacent the axis and the end of said barrel, a hook-engaging member carried by the said second portion at said free end, a first jaw member carried by said first portion and directed away from said first portion, said first jaw member being adapted to engage the side of said barrel, said first jaw member being movable relative to said first portion to variable positions therealong to accommodate said bead, holding means carried by said first portion for holding said first jaw member in a selected one of said variable positions to provide for the engagement by said first jaw member of said barrel side below and adjacent said bead, a second jaw member carried by said frame and directed toward said first portion and oppositely to the direction of said first jaw member, said second jaw member being positioned substantially closer to said second portion than said first jaw member and being adapted to engage the inner surface of said barrel chime, and auxiliary clamping means carried by said frame for pressing said barrel in firm engagement with said second jaw member, the arrangement of the frame and jaw members being such that vertical movement of said free end of the hook-engaging member at said second portion axially of, and away from, said barrel causes said jaw members to firmly grasp said barrel for lifting and to vertically lift said barrel along its axis.

3. In a device for grasping upright barrels to lift the same, each of said barrels having a chime at an end and a cylindrical side, comprising the combination of first jaw means to engage said barrel side, second jaw means to engage the interior of said barrel chime, said first and second jaw means being spaced apart and arranged to press in opposite directions toward a plane disposed therebetween and in parallel lines of force, spacing means for varying and fixing the maximum spacing of said first and second jaw means to accommodate barrels of varying structure, clamping means carried by the device for holding said barrel toward and against said second jaw means to assure engagement of said chime, and leverage means having a first portion interconnecting said first and second jaw means and a second portion disposed at an angle of substantially 90 degrees to said first portion, said second portion being arranged to extend substantially radially of said barrel toward the axis thereof, an engaging member carried by said second portion adjacent the free end thereof and adapted to non-rigidly connect, adjacent the top of said barrel, with a flexible supporting line at substantially the axis of said barrel, the vertically upward movement of said engaging member by a said line disposed substantially at the axis of the upright barrel tilting said leverage means to cause said first jaw means to press radially inward against and frictionally engage said barrel side and to cause said second jaw means to press radially outward and frictionally engage said chime whereby said barrel is grasped by said first and second jaw means and thereupon vertically raising the barrel in an upright position.

4. A device for raising a barrel in an upright position by an upward pull at substantially the axis of the barrel, said barrel having a chime at an end thereof, comprising leverage means including a pair of lever members connected at substantially right angles to each other, a first of said lever members being adapted to be disposed uprightly and adjacent a side of a barrel and the second of said lever members being adapted to be disposed laterally of the barrel and adjacent its top, a pair of jaw members carried by the leverage means and directed in opposite directions and toward an upright plane disposed therebetween, a first of said jaw members being adapted to engage the inner surface of the chime of a said barrel and the second of said jaw members being adapted to engage the side of said barrel below, and at a distance from, the top of the barrel, an engaging member connected to said first lever member at a lateral distance from said upright plane and adapted to be positioned substantially at the axis of said barrel and adjacent the top thereof, and pivot means having its pivot axis disposed laterally of said second lever member and interconnecting said engaging member and said second lever member to provide for tilting of said second lever member upon vertical raising of the engaging member, the

tilting of said second lever member also tilting said first lever member and causing said jaw members opposed by the weight of the barrel to exert a clamping force on said barrel, said jaw members both having biting teeth adapted to frictionally engage said chime and said barrel side, respectively, upon application of said clamping force, the continued vertical raising of the engaging member causing the clamped barrel to be vertically raised in an upright position along its axis.

5. A device for raising a barrel in an upright position by an upward pull at substantially the axis of the barrel, said barrel having a chime at an end thereof, comprising leverage means including a pair of lever members connected at substantially right angle to each other, a first of said lever members being adapted to be disposed uprightly and adjacent a side of a barrel and the second of said lever members being adapted to be disposed laterally of the barrel and adjacent its top, a pair of jaw members carried by the leverage means and directed in opposite directions and toward an upright plane disposed therebetween, a first of said jaw members being adapted to engage the inner surface of the chime of a said barrel and the second of said jaw members being adapted to engage the side of said barrel below, and at a distance from, the top of the barrel, an engaging member connected to said first lever member at a lateral distance from said upright plane and adapted to be positioned substantially at the axis of said barrel and adjacent the top thereof, pivot means having its pivot axis disposed laterally of said second lever member and interconnecting said engaging member and said second lever member to provide for tilting of said second lever member upon vertical raising of the engaging member, the tilting of said second lever member also tilting said first lever member and causing said jaw members opposed by the weight of the barrel to exert a clamping force on said barrel, said jaw members both having biting teeth adapted to frictionally engage said chime and said barrel side, respectively, upon application of said clamping force, and auxiliary clamping means for clamping the said first jaw member to said chime prior to the said application of clamping force by said lever members, the continued vertical raising of the engaging member causing the clamped barrel to be vertically raised in an upright position along its axis.

6. A lifting device for grasping an upright barrel having a chime at an end and a bead on its side, said device having a frame, said frame having a first portion and a second portion disposed at an angle to each other, said first portion being adapted to be placed adjacent said barrel parallel to the axis thereof, said second portion being adapted to be placed over said barrel with its free end disposed adjacent the axis of said barrel and spaced a first distance from the upper end of said barrel, a first jaw member carried by said first portion and directed away from said first portion, said first jaw member being adapted to engage the side of said barrel, said first jaw member being movable relative to said first portion to variable positions therealong to accommodate the location of said bead, holding means carried by said first portion for holding said first jaw member in a selected one of said variable positions to provide for the engagement by said first jaw member of said barrel side below and adjacent said bead, and a second jaw member carried by said frame and directed toward said first portion and toward an upright plane passing between said jaw members, said second jaw member being positioned substantially closer to said second portion than said first jaw member and being adapted to engage the inner surface of said barrel chime, said first jaw member being spaced a greater distance from the upper end of said barrel than the said first distance of said free end of the second portion from the upper end of said barrel, the arrangement of the frame and jaw members being such that vertical movement of said free end of said second portion axially of, and away from, said barrel causes said jaw members to firmly grasp said barrel for lifting and thereupon vertically lift said barrel.

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