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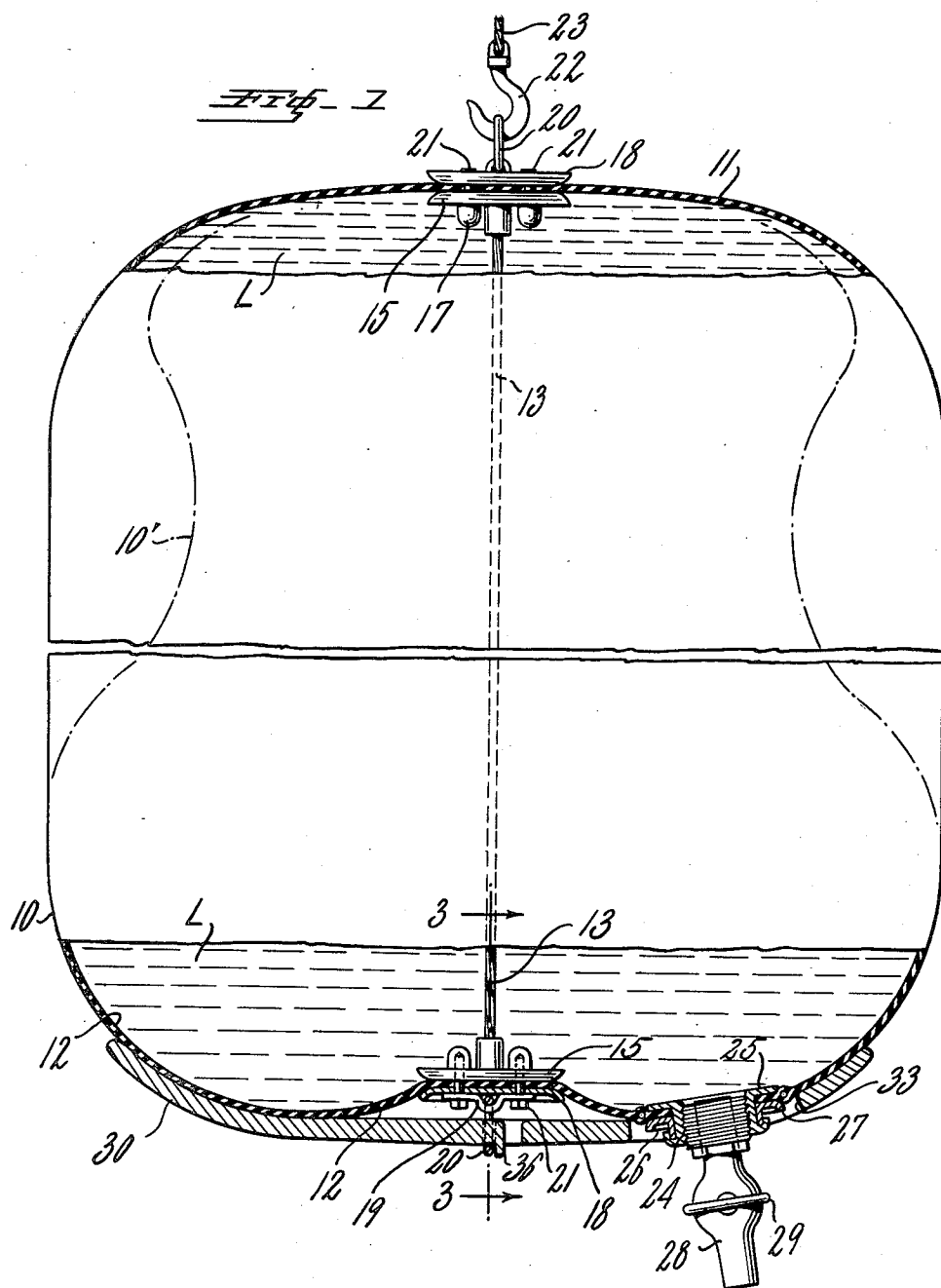
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2,677,406

REMOVABLE PLATE FOR SUPPORTING ENDS OF COLLAPSIBLE DRUMS

Filed Sept. 18, 1951

2 Sheets-Sheet 1



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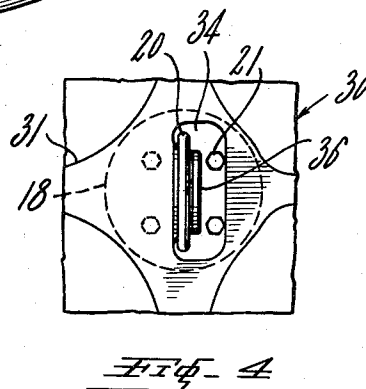
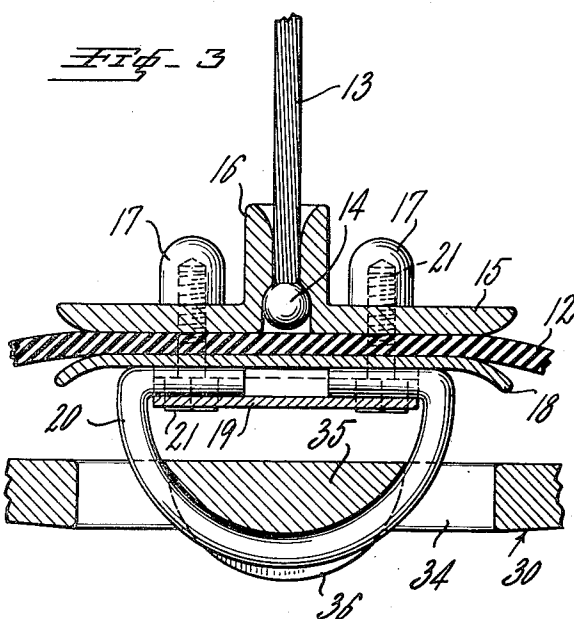
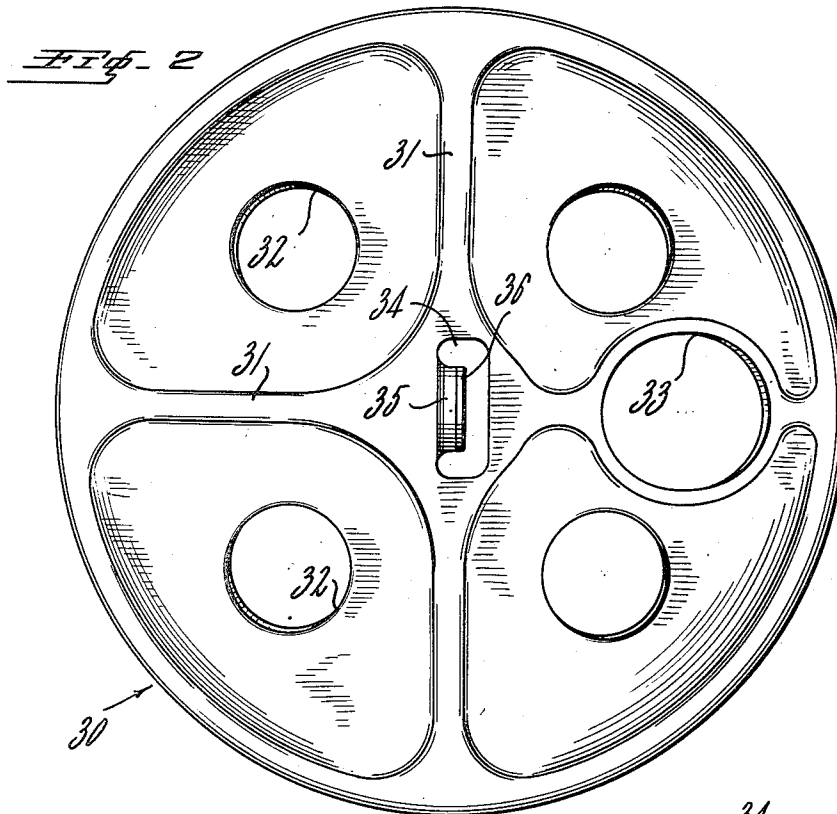
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UNITED STATES PATENT OFFICE

2,677,406

REMOVABLE PLATE FOR SUPPORTING ENDS
OF COLLAPSIBLE DRUMS

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3 Claims. (Cl. 150—1)

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This invention relates to collapsible shipping drums formed of reinforced plastic material such as reinforced rubber, and more particularly to a removable plate adapted to support the lower end of such drum when the drum is suspended in a vertical position so that the contents of the drum can be drained therefrom through a bung hole at the lower end of the drum.

In my application Serial No. 131,407, filed December 6, 1949, for Collapsible Container (now Patent 2,612,924), there is shown, described and claimed a collapsible drum or barrel formed of reinforced rubber. Such barrel has a lifting ring at one end thereof and a central cable connecting the flexible opposite ends of the barrel so as to limit the distance therebetween. The barrel of said application is strong and durable and may be made in various sizes, and it is well adapted for use in shipping and storing various materials such as gasoline, oil, corrosive liquids, paints, dyes and the like. This collapsible drum is well adapted for use in place of the well known 55 gallon steel drum now in extensive commercial use, as it is made of strong durable non-corroding material, and when empty can be collapsed into a small space to facilitate its return for reuse.

The present application relates to a supporting plate constructed to be associated with a collapsible shipping drum of the general type just referred to, and adapted to support the lower end of the collapsible drum to prevent it from sagging down out of shape when the drum is supported in a vertical suspended condition by a lifting ring at its upper end and by a central cable that connects the lower end of the drum with such lifting ring. The use of this supporting plate is particularly desirable when the flexible shipping drum is suspended as just mentioned with its bung hole at the lower end of the drum so that the contents of the drum will flow by gravity out of the bung hole.

It is found that the collapsible shipping drum herein contemplated will retain well the cylindrical shape of its side walls when it is full of liquid that is confined therein by closing the bung hole, but as the liquid is removed from the drum it tends to sag and distort from the desired cylindrical shape, particularly when the weight of the drum and content is supported by suspending the drum from its upper lifting ring.

Having in mind the foregoing, the present invention contemplates a disc-like supporting plate adapted to be removably secured to the lower end of a collapsible shipping drum of the type above

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described, so that when such drum is suspended in a vertical position so that liquid may be drained from the bung hole at the lower end of the drum, this plate will support the lower flexible end of such drum and prevent it from sagging out of shape.

The above and other features of the present invention will be further understood from the following description when read in connection with the accompanying drawings, wherein,

Fig. 1 is a side elevation, with parts in section, of a collapsible shipping drum suspended in a vertical position, and having a supporting plate attached to its lower end in accordance with the present invention.

Fig. 2 is a bottom view of the disk-like supporting plate shown in Fig. 1.

Fig. 3 on a larger scale is a sectional view taken on the line 3—3 of Fig. 1; and

Fig. 4 is a bottom view of parts shown in Fig. 3. The collapsible shipping drum or barrel shown in Fig. 1 of the drawing and designated by the numeral 10 is formed primarily of reinforced plastic material and is preferably formed of two or more plies of rubber coated cord fabric molded and vulcanized in the shape shown to provide a strong durable shipping drum or barrel, which when empty can be collapsed into a small space to facilitate the shipping of the same to a return point for reuse. Such drum or barrel may be of a size to contain anywhere from a few gallons to many gallons of liquid and is preferably built substantially as shown and described in the above cited application.

The drum 10 when full of liquid or when pressurized by introducing air or gas therein will take the approximate shape shown in full lines in Fig. 1 of the drawing where it will be seen that it has well shaped cylindrical sidewalls secured to the upper end 11 and lower end 12. This drum or barrel 10 is preferably closed throughout except for a bung hole provided at one end thereof in the metal flange fitting to be described.

In order to prevent the ends 11 and 12 of the drum from projecting outwardly under pressure somewhat like the ends of an egg, it is found desirable to provide within the drum a central cable 13, adapted to anchor one end to the other and thereby limit the distance between these ends. This cable is preferably secured in place inside the drum by employing the construction best shown in Fig. 3 wherein the means for securing the lower end of the cable 13 to the low drum wall 12 is shown in cross-section. The same

type of means is employed for securing the upper end of the cable 13 to the upper drum wall 11. Now referring more particularly to Fig. 3, it will be seen that the lower end of the cable 13 has soldered or otherwise secured thereto the ball shape metal head 14 which seats within a pocket formed in a face of the annular metal plate 15 provided with the boss 16 in which there is formed a central hole to receive the cable 13. This plate 15 is preferably provided with four lugs 17 each of which is internally threaded to receive the threaded end portion of a clamping bolt. The plate 15 is disposed inside of the drum 10 and it is fastened in place therein by providing at the outer face of the wall 12 a disk-like metal plate 18 having four bolt holes formed there-through, and seated against the outer face of this plate 18 is the ring attaching yoke 19 adapted to secure a lifting ring 20 to the end 12 of the drum. The parts 15, 18 and 19 are firmly secured together with the wall 12 squeezed there-between by tightening up the four clamping bolts 21.

When liquid is removed from the interior of the drum, without permitting air to enter the drum, it will collapse inwardly substantially as indicated by the dot and dash lines 10'. This makes it possible to fill or empty the drum without permitting air to contact the liquid being forced into or out of the drum. This is highly desirable in many cases, such for example as when a corrosive liquid is being shipped and any spillage of the same would prove serious, or when a highly volatile liquid or one that oxidizes in contact with air is being shipped.

The bung hole above mentioned and shown in Fig. 1 as at the lower end of the container 10 that is suspended in an upright position by the hoisting hook 22, is preferably formed by providing a fitting having an internally threaded metal sleeve 24 and an outwardly flaring flange 25 that seats firmly against the inner face of the lower drum wall 12. This fitting is secured in place by placing outside of the sleeve 24 a ring 26 having the outwardly flaring flange 27 that seats against the outer wall of the drum. An opening is cut in the wall 12 to receive the sleeve 24, and the marginal portions of this wall are tightly clamped between the flanges 25 and 27 by rolling the outer end portion of the sleeve 24 outwardly over the edge of the ring 26 to clamp this ring in place. The bung hole or opening within the internally threaded sleeve 24 is normally closed by a threaded closure plug, not shown. This bung hole is shown as closed in Fig. 1 by the threaded inner end of the faucet or spigot 28 which is screwed into such bung hole, and this spigot has the usual valve which may be rotated by the thumb piece 29.

If the flexible drum or barrel 10 is filled with a liquid, such as indicated by L, and the drum is suspended in a vertical position by the upper ring 20, as shown in Fig. 1, the drum will retain to a relatively high degree its symmetrical shape so long as the drum is completely full of liquid or is pressurized by forcing a gas into the drum in addition to the liquid. This is because when the drum is full all walls are held pressed outwardly into shape. But if the drum 10 is suspended as shown in Fig. 1 and the faucet 28 is open to drain the liquid therefrom, the drum will sag inwardly as indicated by 10' and its lower end will sag downwardly as the liquid is removed, unless additional means is provided to support the lower end of the drum. Such addi-

tional supporting means is provided, in accordance with the present invention, by forming a disk-like supporting plate 30 preferably in the form of a metal casting having the shape best shown in Fig. 2. This plate may have the reinforcing ribs 31 and may be cut away as indicated at 32 to reduce its weight. The plate 30 also has the relatively large hole 33 adapted to clear the bung hole structure above described. An important feature of the supporting plate 30 resides in means for removably securing it to the lower lifting ring 20. This attaching means, as shown, comprises the cut away portion 34 formed at approximately the center of the plate 30 to clear the lifting ring 20, and the plate 30 has the projection 35 adapted to project into a ring 20 and is provided with a curved recess to receive the curved inner face of the ring 20 as shown in Fig. 3. The projection 35 is also preferably provided with a lip 36 which serves as locking means that prevents the supporting plate from becoming accidentally disengaged from the ring 20. As a result of this construction the supporting plate 30 may be easily secured to the ring 20, and when in the position shown in Fig. 1 it will serve to support the lower end of the drum to prevent such end from sagging downwardly under the weight of the confined liquid. It will be seen that the load resting upon this plate 30 is supported by the ring 20 and that it is transmitted from this ring by the cable 13 to the upper lifting ring 20 and hook 22.

In using the disk-like supporting plate 30 contemplated by the present invention, the drum is preferably positioned so that the bung hole will be at the upper end thereof, to facilitate the screwing of the faucet 28 into the bung hole and the attachment of the supporting plate 30 to the ring 20. As soon as this is done, the drum may be turned upside down by suspending it as shown in Fig. 1 of the drawing so that the bung hole is now at the lower end of the drum, and the lower drum wall 12 is supported by the disk-like plate 30 to prevent this lower wall from distorting and sagging downwardly under the weight of the liquid confined in the drum.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. In combination, a collapsible shipping drum having flexible walls formed of reinforced plastic material and provided with a central cable within the drum that anchors one drum end to the other and has a lifting ring outside the drum and attached to each cable end, a disk-like supporting plate removably secured to the lower lifting ring outside of the drum and in position to support the flexible lower end of the drum through said cable when the drum is supported in a suspended condition by its upper lifting ring and liquid is removed from the drum.

2. In combination, a collapsible shipping drum having a bung hole in one end and formed of reinforced plastic material, said drum having a central cable within the drum that anchors one drum end to the other and a lifting ring outside the drum and attached to each end of the cable, a disk-like supporting plate removably secured to the lower lifting ring outside the drum and in position to support the lower end of the drum through the cable when the drum is supported in a suspended condition with its bung hole down by the upper lifting ring, whereby said plate will support the lower end of the drum as liquid is drained out of the bung hole.

3. In combination, a flexible and collapsible

shipping drum formed of reinforced plastic material and provided with a lifting ring at each end outside the drum and a central cable inside the drum connecting the rings, a disk-like supporting plate that can be attached to and removed from the full drum and having a projection shaped such that it may be inserted in one of said rings, means on said projection to engage the ring with a locking action to removably secure the plate to such ring in position to support the flexible lower end of the drum through said cable when the drum is supported by its upper lifting ring in a suspended condition.

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