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NONCREEPING BARREL

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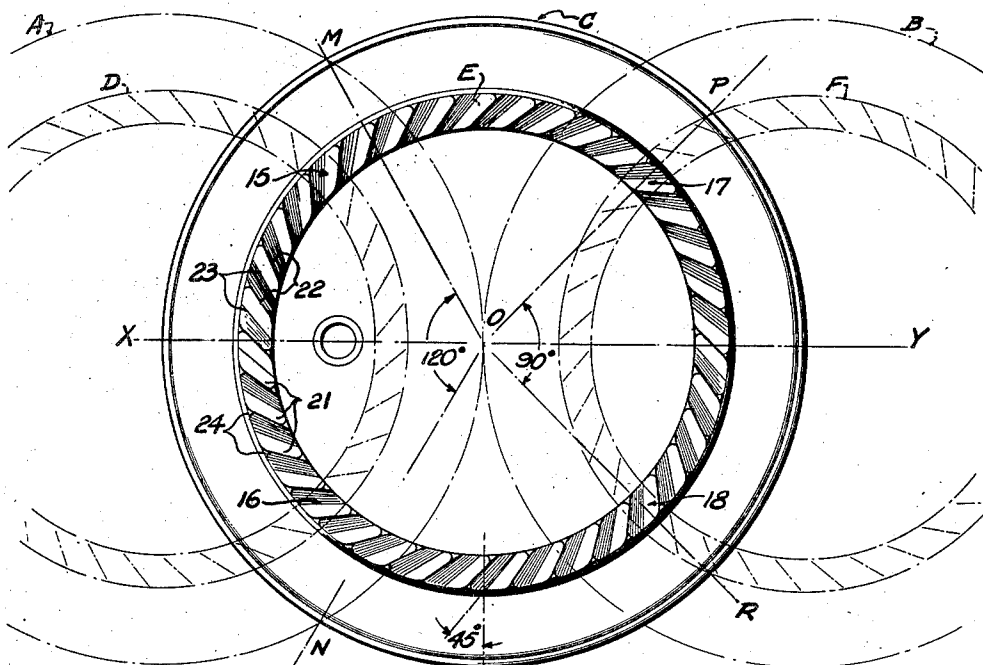


Fig. 1

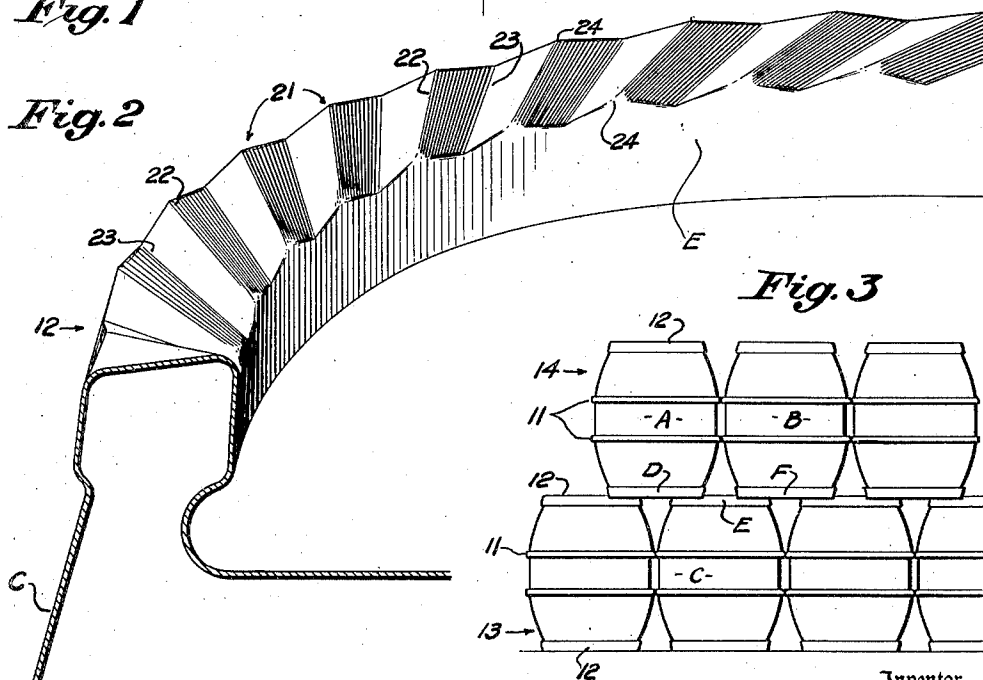
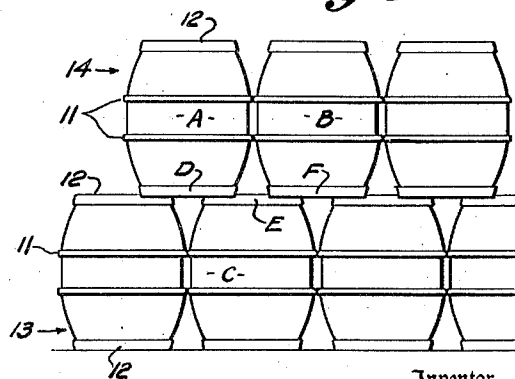


Fig. 2

Fig. 3



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NONCREEPING BARREL

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1 Claim. (Cl. 220—97)

This invention relates to barrels and like containers, and it has particular reference to the provision of an improved article which may be assembled with like structures in secure stacked relation.

It is a common practice to pile or stack barrels in rows and tiers and in such fashion that the stack assumes a regular pyramidal form, in which the upper barrels are supported by pairs of barrels disposed beneath. When barrels having smooth chimes are stacked in this manner, there is a tendency for the stack to collapse under the influence of adventitious vibratory forces. Such tendency produces a serious hazard to the well-being of the workmen, and it has been particularly noticed in connection with the stacking and handling of steel beer barrels, as used in the brewing industry.

As a means of preventing this creeping, and its attendant hazards, it has heretofore been proposed to deform the chimes, which constitute the bearing surfaces, in such fashion as to provide locking protuberances or depressions, so that, upon stacking, the barrels engage with each other to an extent sufficient to resist adventitious movement. While such means as I am familiar with are generally effective, situations arise in which some controlling objection may be raised against one proposal or another. Thus, in some cases, the established modes of handling barrels may constitute an objection, and, in other situations, the barrel may be of such size, or formed of such weight of metal, as to make the use of prior means either difficult or too expensive.

Accordingly, the present invention contemplates the provision of a novel and improved anti-skid or non-creeping barrel or like container, in which means are provided on the bearing areas to insure adequate inter-engagement or locking, and withal avoid the objections alluded to above. The principles of the invention, and ways in which they may be applied in practice, will best be understood from a perusal of the following description, read in connection with the accompanying drawing, wherein:

Fig. 1 is a plan view, showing, in full lines, the top of a barrel, and, in dotted lines, two superimposed barrels;

Fig. 2 is a perspective of a portion of the barrel chime, showing the anti-skid elements therein; and,

Fig. 3 is a diagram showing a stack of barrels.

Referring first to Fig. 3, there is shown a plurality of barrels having belly portions 11 of maximum diameter and chime portions 12 of less

diameter, disposed in two tiers 13 and 14 to constitute a stack. It will be observed that barrels A and B of tier 14 are close to each other, with their bellies 11 in tangential contact, and they are regularly superimposed on barrel C of tier 13, so that the point of tangency of barrels A and B would, if projected, pass through the center of the circumference of chime E on barrel C. This arrangement is also shown in Fig. 1, in which the tangent point of barrels A and B and the center of barrel C lie in a straight line containing the point O. Likewise, the circumference of barrel C directly underlies the centers X and Y of barrels A and B.

The foregoing description is generally applicable to a stack of barrels of the same size disposed in a regular pyramidal fashion, and, as a consideration of such stacking may be helpful in connection with further explanation, it will hereinafter be alluded to as "regular stacking" or by like expression.

A typical formation of the bearing surface or chime E of barrel C, in accordance with the present invention, is shown in Figs. 1 and 2. It will be observed that barrel C is illustrated as a sheet metal barrel having an integrally formed chime E, but it is to be understood that such need not be the case. Likewise, it may be mentioned that simply for exemplary purposes, it may be assumed that barrel C is formed from two sheet metal blanks from the same die or by the same tools and procedure, into a pair of cup-like halves, which are later placed one on the other and are welded around the belly 11. Other barrel forms, or methods of assembly may, however, be used in conformity with the principles of the invention.

The chime E is deformed with a plurality of protuberances 21, which, as shown, are defined by a succession of ridges or crests 22 alternating with troughs 23, merging into the sides of the barrel through rounded corners 24. These elements may be made of varying depth, as desired, but it will be observed that the ridge lines 22 all extend in the same direction (that is, clockwise or counter-clockwise) around the annulus forming the barrel end. This is a significant feature of the invention. Likewise, it will be observed that the trough lines 23 also extend in a similar direction, and, within limits, the angle which these lines make to the intersecting chime radius of each is also a constant.

The reason for this form of construction will now be explained. It is an object of the invention to provide a barrel having anti-skid elements, such as the elements 21, which will inter-engage

with like elements of a similar barrel, such as the barrels A and B. The form of elements just described, when properly made, attain this result, and also reinforce the barrel end without undue deformation of the metal. However, these elements cannot be formed in a haphazard manner, if adequate locking is to be secured, and the true mode of forming the ridge and trough lines may be now understood by reference to Fig. 1.

Let A and B represent the great circles of two barrels tangent at point O, and let the full line maximum circumference of barrel C represent the projected trace of an adjacent regularly stacked barrel. If circles A, B, and C have the same diameter, and if it be further assumed that these are perfectly cylindrical barrels, then it is apparent that the arc MXN represents the overlap of one barrel on the other, and that this arc, subtended by the angle MON, must always be 120°. In such case, no succession of lines can be drawn on the barrel ends, which lines all run in the same direction, unless they intersect each other at either or both of the points M and N. The arc MXN therefore represents the maximum overlap for regular stacking, but it is inconsistent with a condition of unilateral interlocking.

If the overlap arc be progressively diminished, the limiting value is zero, in which case the lines assumed to be drawn on the barrel end would lie in the same direction, but no bearing surface would be afforded, and hence stacking would be impossible. If the angle were slightly increased, a slight bearing surface would be provided, but interlocking at both points M and N would still be generally impossible with unilaterally extended protuberances.

I have discovered, however, that when the relation between the barrel diameter at the belly, and the chime diameter is such that the arc of the overlap is subtended by an angle of approximately ninety degrees, a condition arises at which interlocking may be effected. Thus, in the barrels A, B, and C, it will be observed that the relation between the belly radius and the chime radius is such that the overlap arc is subtended by the angle POR, which is a right angle. With this relationship, and upon regular stacking, barrels A and C contact at zones 15 and 16, while barrels B and C contact at zones 17 and 18, and arcs 15-16 and 17-18 represent half the total circumference of annulus E.

If, with this relationship established, a plurality of radial lines are now drawn through the centers of the proposed anti-skid elements, and these elements are laid off with their ridge lines 22 disposed at an angle of 45° to the radius, then the protuberances will all run around the barrel end in the same direction, and will change angular direction, relative to a base line such as the axis XOY, ninety degrees in passing from point P to point R. The directional change of the ridges over an arc equal to the overlap is thus equal to the overlap itself.

Reverting now to the suggestion heretofore made, that the two halves of the barrel could be made with the same dies, and thus identical, but later abutted, it will be understood that in doing so, the circular direction of the lines at

each end of the barrel will be reversed, when viewed from a fixed point. Thus, in looking down on the stack as shown in Fig. 1, the lower chimes D and F of barrels A and B show ridges running counterclockwise, whereas the top chime E of barrel C shows the ridges running clockwise, although with the same angular change. Accordingly, the superimposed ridge lines, as at bearing zone 15, are perpendicular to axis XOY, while at zone 16 they are both parallel to the same reference line. Accordingly, when the barrels are stacked, the crests and troughs of the respective protuberances interlock at all bearing zones, thus effectively securing the uppermost barrels from creeping over the supporting tiers.

It is not to be supposed, from this mathematical form of discussion, that the angular values given are absolute, although it will be apparent that close adherence to them is productive of the best results. I have found in practice that the arc of overlap may vary as much as ten degrees without introducing such irregularities as to prevent successful locking. Likewise, depending upon the depth of the protuberances 21, the angularity of the troughs 23 may be varied from the normal inclination of 45°. Most effective results, however, are achieved by adhering to the criteria given. It is of interest to note that, when the overlap arc for the chime is about 90°, an enhanced balance is imparted to the barrel, enabling it to be tipped end over end and otherwise handled in an easy manner. It is also to be noted that when the ridge angle is normal, a condition of complementary angles is established for points 15, 16, and 17, 18.

Barrels made in accordance with the foregoing principles, and in which the protuberances or essential interlocking elements all slope in a unilateral direction, may be easily removed from the stack by a slight rotational effort, although they are firmly held against accidental slipping or creeping. This feature also facilitates handling at the point of use.

In conformity with the patent statutes, I have described my invention in terms of the best practical embodiment now known to me, and I have also endeavored to set forth my understanding of its principles. It will be apparent to those skilled in the art that various modifications and variations may be resorted to, but all these I intend to encompass within the scope of the following claim.

I claim:

A barrel having a belly and chimes at each end, the relation between the belly and chime diameters being such that when said barrel is regularly stacked with like barrels, the overlap of the chimes of contacting barrels is between 80° and 100°, a plurality of closely spaced protuberances on the chimes, said protuberances being defined by crests all running in the same direction around the chime and at an angle of substantially 45° to the intersecting radius passing through each, whereby, upon regular stacking, said barrels will be interlocked against adventitious vibratory forces.

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