May 5, 1942. K. STUART ET AL 2,281,889

FASTENING AND SEALING RIMS AND ARTICLES EMBODYING THEM

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Fig. 1

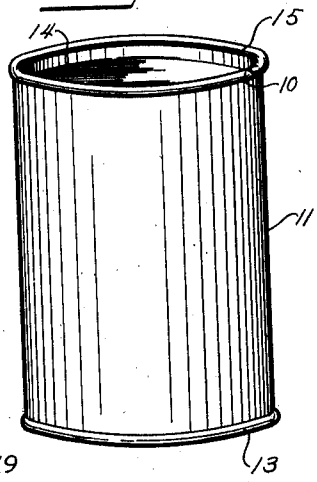
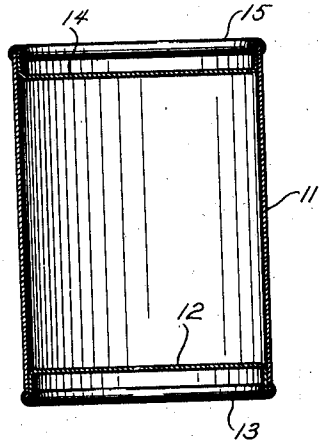



Fig. 2



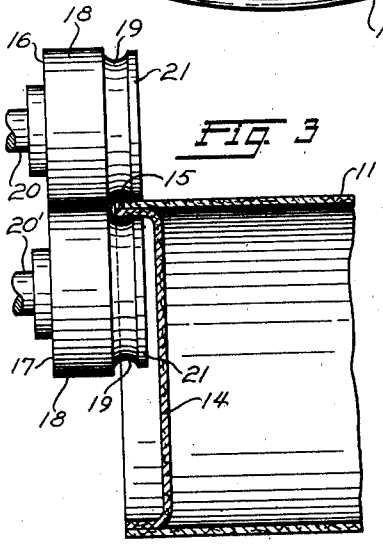




Fig. 3

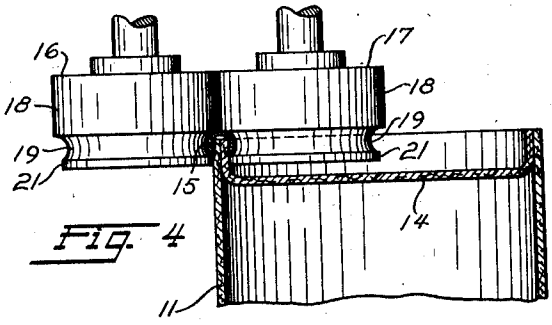



Fig. 4

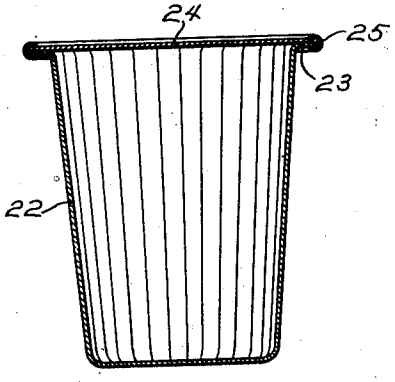



Fig 6

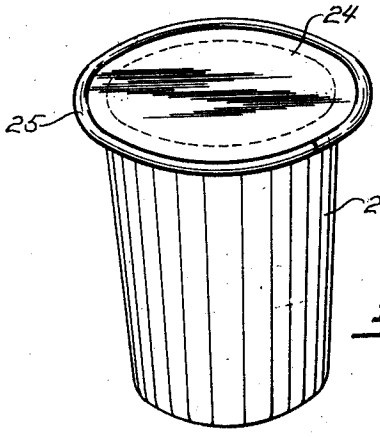



Fig. 5

Inventors

Kimberly Stuart

Allen B. Wilson

By Strauch & Hoffman

Attorneys

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FASTENING AND SEALING RIMS AND ARTICLES EMBODYING THEM

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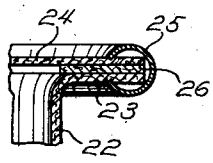



Fig. 7

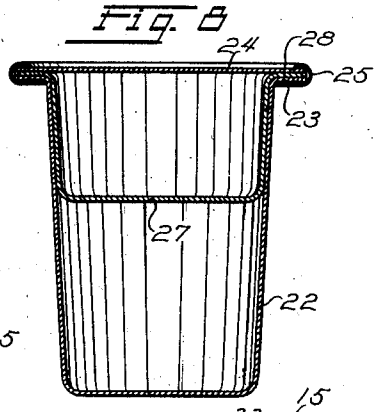



Fig. 8

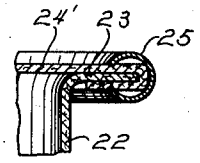



Fig. 9

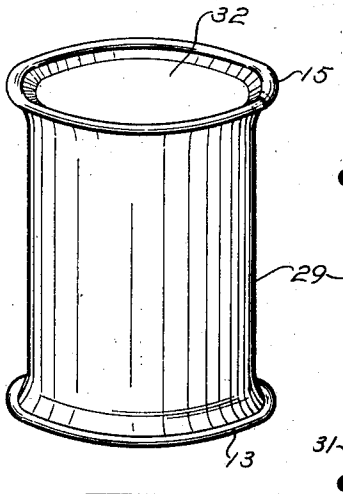



Fig. 10

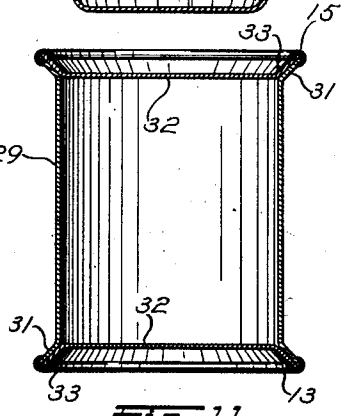



Fig. 11

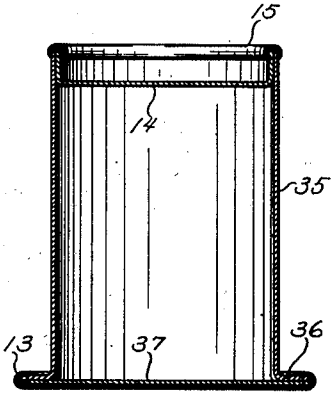



Fig. 13

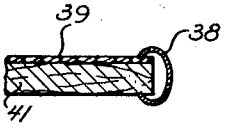



Fig. 14

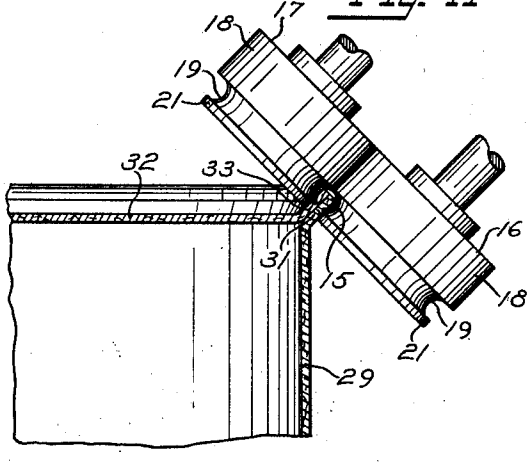



Fig. 12

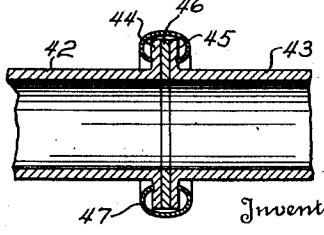



Fig. 15

Inventors

Kimberly Stuart

Allen B. Wilson

By Strauch & Hoffman

Attorneys

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2,281,889

# UNITED STATES PATENT OFFICE

2,281,889

## FASTENING AND SEALING RIM AND ARTICLE EMBODYING IT

Kimberly Stuart, Menasha, Wis., and Allen B. Wilson, Evanston, Ill.; said Wilson assignor, by mesne assignments, to Elizabeth R. B. Stuart, Menasha, Wis.

Application May 8, 1939, Serial No. 272,516

1 Claim. (Cl. 229—5.7)

This invention relates to fastening and sealing means and is more particularly concerned with the use of rim strips for binding, sealing and strengthening joints or connections between articles.

Bent rim strips of various shapes and sizes have been used heretofore for binding joints on containers and like articles; but the main objections to these strips of the prior art have been that they must be quite wide to provide necessary strength, rigidity and clamping areas, thereby involving the use of a large amount of strip material. Usually these strips must be preformed before use; and most of them require separate locking or securing devices such as staples, nails and special clips. These features are objectionable in the prior art because the strip material is relatively expensive as compared to the cost of the articles with which it is ordinarily used, and most strips are rather difficult to attach to the articles, even with the aid of special fastening means.

With the above in mind, it is a major object of the present invention to provide a novel, tight, inexpensive self locking rim strip joint assembly which employs a minimum amount of strip material and can be quickly applied to the article.

A further object of the invention is to provide a novel joint assembly between two or more articles to be secured together wherein a rim strip extending along the joint is transversely bent to embrace the joint and compressed to force the opposite lateral edges of the strip into intimate locking engagement with the material of the articles at opposite sides of the joint.

A further object of the invention is to provide a novel fastening and sealing joint between a container and a closure therefor, such as a cover or a bottom wall, wherein a strip of rigid material, such as metal, extends along and is transversely bent about adjacent edge portions of the container and cover and compressed into biting engagement with said edge portions. Either the container or the closure member, or both, may be flanged; and, if desired gaskets or the like may be interposed between the closure members and the container.

Other objects of the invention will presently appear as the description proceeds in connection with the appended claim and the annexed drawings wherein:

Figure 1 is a perspective view of a cylindrical container whose end closure members are attached according to the invention.

Figure 2 is a section through the container of Figure 1 illustrating the rim strip joints more in detail.

Figures 3 and 4 illustrate respectively horizontal and vertical forming rolls for securing rim strips to container such as those of Figure 1.

Figure 5 is a perspective view of a pleated cup provided with a cover joined to its lip according to the invention.

Figure 6 is a section taken through the cup of Figure 5.

Figure 7 is a section of the upper portion of a cup similar to that of Figure 6 illustrating a gasket between the cover and the container.

Figure 8 illustrates a further embodiment of the invention wherein a two compartment receptacle is sealed by the rim of the invention.

Figure 9 illustrates a further form of the invention where the closure member is folded over a flanged cup lip before the rim strip is applied.

Figure 10 is a perspective view of a rimmed container having angularly flared ends for attachment to the closure members.

Figure 11 is a section through the container of Figure 10.

Figure 12 illustrates an angular forming roller arrangement for rimming the container of Figure 10.

Figure 13 is a section through a rimmed container having a header and a flat bottom.

Figure 14 illustrates, in section the invention as applied to effect a joint between any two parallel sheet articles which may be of different material.

Figure 15, a sectional view, illustrates the invention as applied to a conduit joint.

Referring to Figures 1 to 3, a cylindrical tube 11 has a bottom header 12 secured thereto by a metal rim 13 and a top header 14 secured thereto by a metal rim 15. If desired, a suitable gum or other adhesive may be employed between the headers and the internal wall of tube 11, but such is not necessary to practice the invention.

Tube 11 and headers 12 and 14 may be composed of the same or different materials and are preferably of some fibrous material such as stiff cardboard, fiber board, kraft paper, laminated board, laminated paper and foil, wood, veneers and the like. However, any other suitable materials such as plastics, rubber compositions, or the like may be employed.

It is only necessary that the materials used in tube 11 and the headers be yieldable enough or of such nature as to permit the rim strips to be locked in biting engagement with the same. Practically, strips 13 and 15 are made of a ma-

terial harder than the materials used in the tube and headers, and preferably strips 13 and 15 are made of relatively thin gauge sheet steel or another suitable metal which will maintain a given shape when bent or compressed as will later appear.

In Figure 3, forming rolls 16 and 17, which are preferably identical, are illustrated in position for securing rim 15 about adjacent edges of tube 11 and header 14. These forming rolls are preferably the same as those disclosed in the copending application of Wilson and Swangren Serial No. 228,028 filed September 1, 1938 and comprise contacting roll surfaces 18, cylindrical grooves 19 and relatively narrow end flanges 21 which are spaced according to the thickness of the articles upon which the rim is attached.

Rollers 16 and 17 are mounted upon relatively displaceable horizontal drive shafts 20 and 20' which are suitably driven as disclosed in the above mentioned application.

Tube 11 is supported for rotation on a suitable mandrel with header 14 inserted in place. Header 14 fits snugly within tube 11 and is maintained therein by friction, or a suitable adhesive if desired or necessary, until the rim can be applied. The cylindrical walls of tube 11 and header 14 are parallel and preferably terminate flush with each other at the end of the tube as shown in Figures 2 and 3.

With rollers 16 and 17 separated slightly, tube 11 with the header in place is advanced to insert the matched walls of the header and tube in the pass between the rollers. As rollers 16 and 17 are brought together into operative position the walls to be joined are clamped tightly between the roller flanges 21 while their free edges extend into the space defined by grooves 19.

Strip 15, which may be flat or slightly preformed, is cut to proper length and pushed past the matched edges of the header and tube into the pass between rollers 16 and 17 defined by grooves 19. Strip 15 passes in a plane substantially normal and tangential to those edges. Operation of the rollers bends and compresses strip 15 transversely, until it assumes a generally circular or C-shaped cross section to embrace the adjacent edges of the header and tube; and the opposite lateral edges of strip 15 are forced to bite and sink a substantial distance into the material of the header and tube. As rollers 16 and 17 rotate they simultaneously attach the rim strip and frictionally cause rotation of the mandrel progressively about its axis until the entire strip has been secured to the container. Strip 15 is preferably longer than the circumference of tube 11 and has its opposite ends overlapped in tight interlocking engagement as illustrated in Figure 1 at 10. The amount of this overlap is preferably about one-half an inch. Tube 11 is reversed to attach header 12 and strip 13.

The structure and operation of the forming rollers 16 and 17 and other apparatus for insuring proper feeding of the rim strip are fully disclosed in the co-pending application of Allen B. Wilson and Edward V. Swangren Serial No. 228,028 filed September 1, 1938 for Rimming machine and methods, and need not be further described. The present invention is concerned mainly with the use of the rim of the invention for providing a tight sealed joint, and the preferred manner of applying this rim is by means of the apparatus above described, although obviously it can be applied in other ways.

Although the invention has been described above for attaching rims to articles having generally circular or elliptical peripheries, it is capable of application to articles of any shape whether the edges to be joined extend in curved or flat planes. The rim may be applied to side wall joints as well as top and bottom closures.

The above described invention has been found especially advantageous for attaching headers to liquid containers such as beer or soft drink cans, and the biting embedded engagement of the clenched rim on the container provides an effective gas and liquid tight seal at the joint. In addition, providing a fastening and sealing means, rims 13 and 14 reenforce and strengthen the container as a whole and insure that there are no sharp projecting edges which might cut the hands of a handler or puncture adjacent containers. Also, the rimmed cans present a neat and finished appearance which adds greatly to their sales attraction.

The shape of the bent or clenched rim depends upon the shape of grooves 19; and, although a generally circular pass has been found most desirable since it directs the opposite lateral edges of the strip at the most effective angle for biting into the joint material, the grooves may define a pass of generally elliptical shape or any other suitable contour as desired.

In the modification of Figure 4, the forming rollers are arranged upon vertical axes so that the tube 11 may be held in a suitable mandrel also rotatable about a vertical axis, and the strip 15 is fed in a substantially horizontal plane. This apparatus accomplishes the same results as that illustrated above at Figure 3 and has been found advantageous for certain types of shallow cans.

Figures 5 and 6 illustrate the invention as applied to a cup-shaped receptacle or container 22 which may be of the type formed by dies from a single sheet of material, with the excess material at its side walls accumulated in the form of folded pleats.

This cup may be formed without a flanged lip and provided with a header similar to that at 14 of Figure 2, as desired, but preferably its open end terminates in an outwardly extending peripheral lip or flange 23. A flat cover 24 whose diameter is preferably equal to the outer flange diameter is laid upon the flange. If desired a suitable adhesive or wax can be placed between the contacting surfaces of the cover and flange.

A rim 25 is then clenched along the notched flange and cover edges to fasten the cover to the cut and seal its contents from external impurities and leakage. Rim 25 is similar to rims 13 and 15 and is preferably attached by the above described forming roller arrangement while held in a mandrel of suitable design similar to that disclosed in the above mentioned application.

If desired, cup 22 may be provided with a suitable annular gasket 26 interposed between the cover and the flange as illustrated in Figure 7. The container may comprise a two compartment device wherein a shallow auxiliary cup 27 containing one product is nested within cup 22 containing a separate product and is provided with a flange 28 interposed between the flange 23 and cover 24. When rim 25 has been applied it fastens and seals off the whole container, while isolating the compartments from one another.

In the modification illustrated in Figure 9, cup 22 is provided with a cover 24' of relatively flexible material which is bent over, around and under flange 23. Rim 25 clenches the flexible cover material tightly on both sides of this joint and forces it with such pressure against the flange that there is no leakage past the edges of the flange.

In any of Figures 7, 8 and 9, suitable adhesives or waxes may be used between the flanges, gaskets and covers, insuring even greater efficiency of the joint depending upon the purpose for which the container is desired.

In the modification illustrated in Figures 10 to 12, a cylindrical tube 29 is formed with outwardly flared end portions 31; and top and bottom closure members 32 are dished or formed with inclined peripheral edge areas 33 which are adapted to interfit snugly upon flared portions 31 as illustrated in Figures 11 and 12. Rim 34 is clenched upon the matched edges at 31 and 33 by forming rollers 16 and 17 which may be arranged at a suitable angle to the axis of the container as illustrated in Figure 12. Preferably this angle is about 45° to insure clearance of the rollers at opposite sides of the joint.

In the embodiment illustrated in Figure 13, a cylindrical tube 35 is flanged at its bottom end at 36 and a suitable flat bottom closure member 37 is clenched thereto by rim 13. At its upper end tube 35 is provided with a header 14 in the manner described above in connection with Figures 1 to 3.

In the embodiment illustrated in Figure 14, a rim 38 applied according to the invention is clenched about the matched edges of two sheets or rims 39 and 41 of different material such as cloth and wood respectively. One advantageous application of this idea is in securing cloth or composition top coverings upon a thin slab of wood as for light trays, card tables and the like.

In the embodiment illustrated in Figure 15, a pair of conduits 42 and 43 are positioned with flanged ends 44 and 45 respectively abutting opposite sides of an annular gasket 46 with the whole joint secured and sealed by a suitable clenched rim 47 according to the invention. This provides a simple leaktight conduit joint.

In all of the above described modifications the articles to be joined together and the rim strip may be composed of the same materials as above discussed in detail in connection with Figures 1 to 3, and suitably disposed mandrels and forming rollers depending upon the shapes and sizes of the articles to be joined may be employed as desired.

The clenched rim of the invention not only provides a tight joint but reenforces and strengthens the articles to resist handling stresses and provides a neat, modern appearing assembly having no sharp projecting edges or unsightly fastening clips.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claim rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claim are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

In an article of manufacture, a plurality of members constructed of sheet material and having edge portions disposed in engagement and defining a closed geometrical figure; a reinforcing rim disposed along and smoothly curved around the edge portions of said members, so as to cover the latter and conform to the shape of said closed figure and being tightly secured to said members throughout the length of said edge portions, said rim being of generally C-shape in transverse section and having its opposite lateral edges facing each other and tightly gripping opposite sides of the outermost of said members, thereby enclosing an edge portion of said members, said rim having a transverse cross-sectional dimension at right angles to the opposite sides of said members which is as great or greater than any other cross-sectional dimension thereof; said rim being longer than said edge of said article and having its ends telescoped one within the other, with their telescoped portions tightly gripped together, so as to provide a strong frictional interlock which will resist both lateral and longitudinal displacements of the ends of said rim with respect to each other.

ALLEN B. WILSON.
KIMBERLY STUART.