

May 18, 1943.

W. BRUNING ET AL
CLAMPING RING ASSEMBLY

2,319,762

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2 Sheets-Sheet 1

Fig. 1.

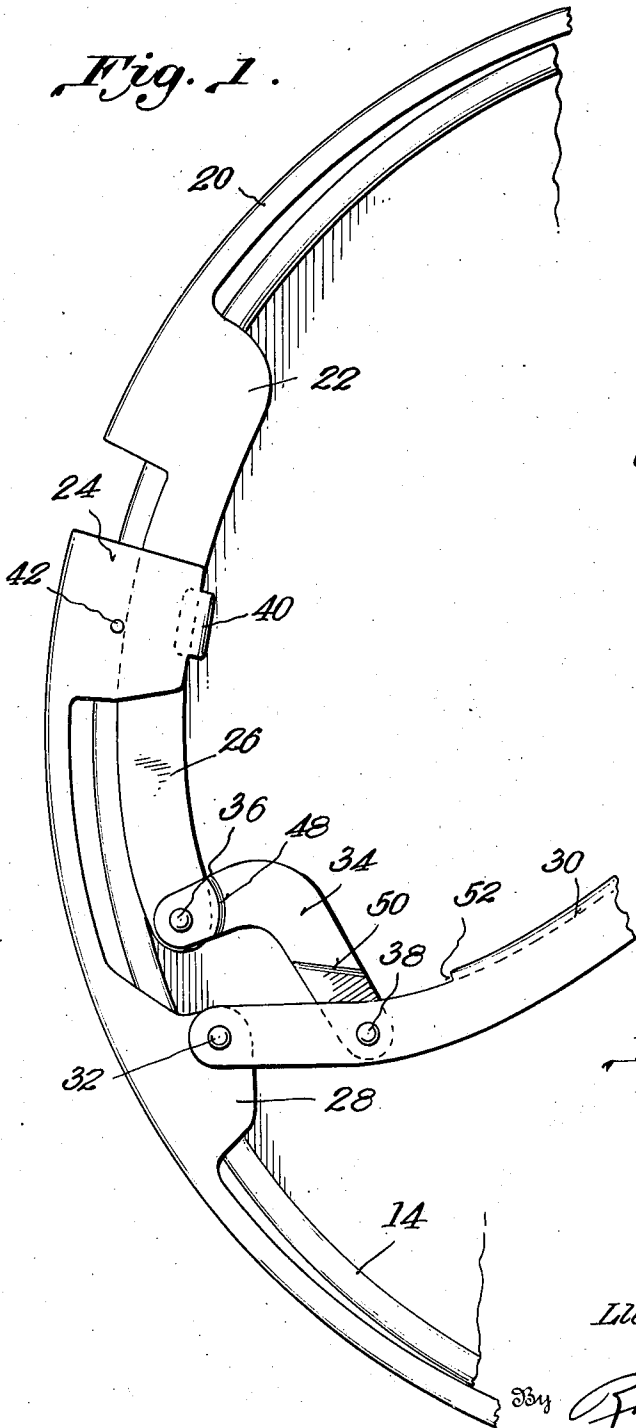


Fig. 5.

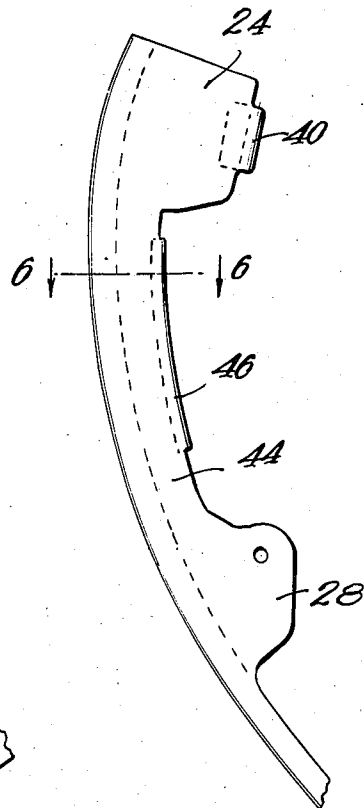
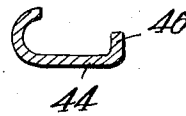


Fig. 6.



Inventor
William Bruning,
Lloyd D. Simonson,

By *Richard L. Underwood*
Attorney

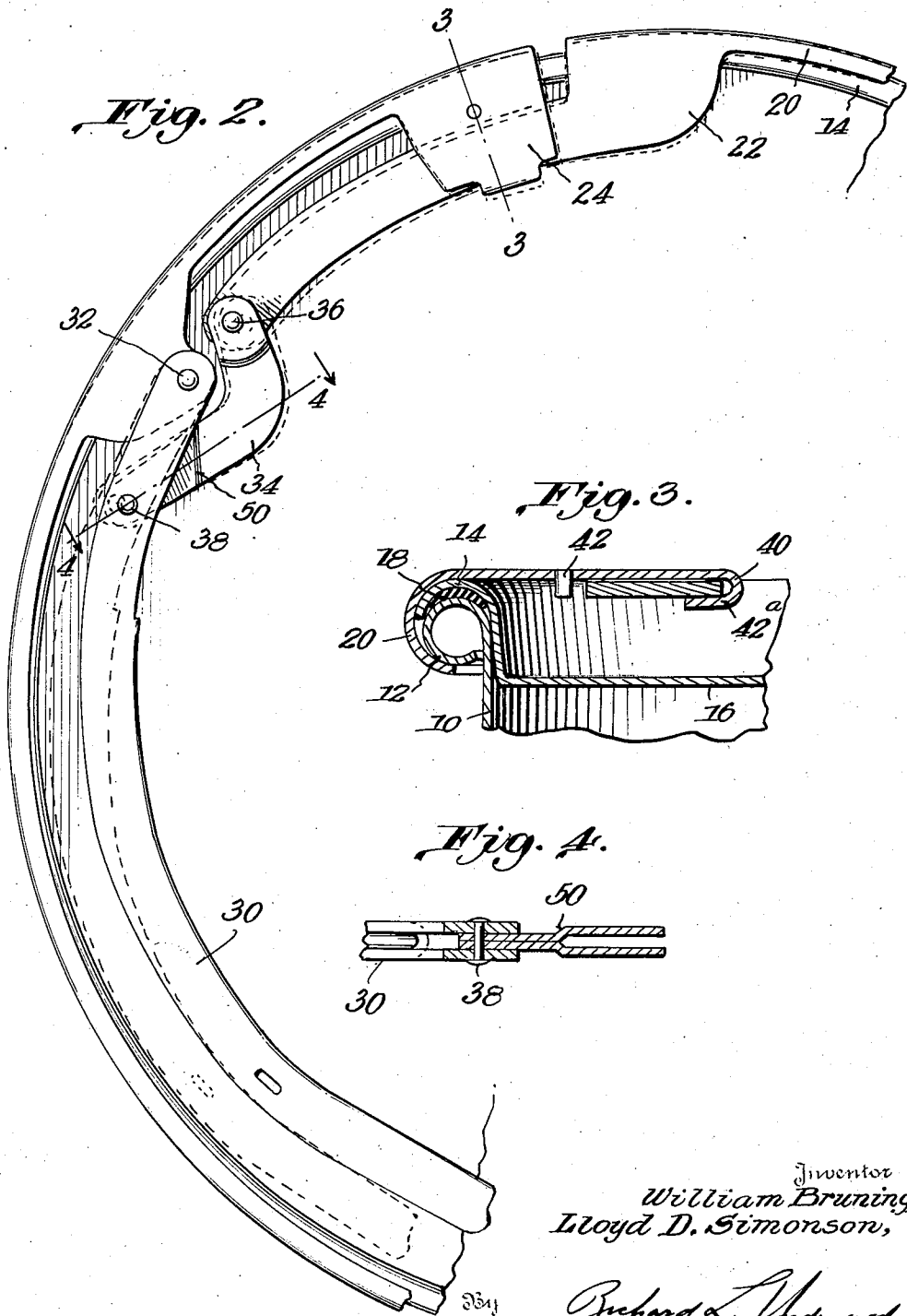
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2 Sheets-Sheet 2



Inventor
William Bruning
Lloyd D. Simonson,

Richard L. Anderson
Attorney

UNITED STATES PATENT OFFICE

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CLAMPING RING ASSEMBLY

William Bruning, Port Richmond, N. Y., and
Lloyd D. Simonson, Rochelle Park, N. J., as-
signors to Atlas Steel Barrel Corporation,
Bayonne, N. J., a corporation of New Jersey

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9 Claims. (Cl. 220—61)

This invention relates to clamping rings primarily for metal drums of the full removable head type and has particular reference to an improved closure mechanism for such rings.

The type of ring customarily used for this purpose is a split metal ring, channeled in cross-section, having means associated therewith for forcing the ring ends apart and drawing them together about the assembled drum and drum head or cover. An object of the invention is to eliminate the binding action which frequently occurs when the ring ends are drawn together to clamp the drum head down upon the drum.

A further object of the invention is to so arrange the linkage in conjunction with the ends of the ring and the actuating lever whereby the ring ends are pulled together that substantially all the effective force on the ring ends during closing movement of the lever operates circumferentially in close proximity to the ring itself.

An important feature of the invention resides in a means for accomplishing the above described objectives and at the same time insuring a fluid-tight seal at the ring ends themselves. This is accomplished by so arranging the linkage that during closing movement of the actuating lever a definite radial pull inwardly is imparted to both ends of the ring, thereby creating a snug engagement of each end with the periphery of the assembled drum and drum head.

Various other objects and meritorious features of the invention will be apparent from the following description taken in conjunction with the drawings, wherein like numerals refer to like parts throughout the several figures, and wherein:

Figure 1 is a plan view of the functional parts of the improved ring in operative position upon a drum;

Fig. 2 is a view similar to Fig. 1 illustrating the parts in closed position;

Fig. 3 is a section along 3—3 of Fig. 2;

Fig. 4 is a section along 4—4 of Fig. 2;

Fig. 5 illustrates a slight modification; and

Fig. 6 is a section along 6—6 of Fig. 5.

Referring now to the drawings, and particularly to Fig. 3, the numeral 10 represents the wall of a metal drum. This wall is curled over along the top margin thereof as indicated at 12 to seat the peripheral flange 14 of a full removable drum head 16. It is customary to use a gasket 18 as indicated to insure a fluid-tight seal.

A clamping ring 20, channeled in cross-section as illustrated in Fig. 3, is customarily drawn up

tight about the assembled drum and drum head to seat the head firmly upon the gasket.

Referring now more particularly to the improved closing mechanism here involved, each end of the ring 20 is provided with an inwardly extending lug as indicated at 22 and 24. A rigid arcuate arm 26 of substantially the same curvature as that of the ring itself extends circumferentially from lug 22 toward the other end of the ring.

The invention in its broadest form comprises a third lug 28 circumferentially removed from lug 24 to which an operating lever 30 is pivotally secured as indicated at 32. A substantially right-angled link 34 is pivotally connected to the end of arcuate arm 26 at 36 and similarly secured to lever 30 at 38, a point intermediate the extremities of the lever.

Means are provided intermediate the pivoted end of lever 30 and the ring extremity to which arcuate arm 26 is secured for guiding said arm and maintaining it in spaced relation to the ring itself. In the form illustrated in Figs. 1 and 2 this means comprises a depending lip 40 at the inner extremity of lug 24 together with a projection 42 depending from said lug in spaced relation to the lip. The arcuate arm 26 rides between these two guide elements as it moves circumferentially during opening and closing of the ring. As illustrated in Fig. 3, lip 40 may be bent under as indicated at 42a to provide a partial support for the arcuate arm during its circumferential movement.

In the form illustrated in Figs. 5 and 6 the metal on the upper portion of the ring between lugs 24 and 28 is somewhat enlarged as indicated at 44 and a lip 46 depends therefrom along a substantial part of the distance between said lugs.

It is to be noted that the fulcrum points at which closing force is exerted on the ends of the ring are spaced from and operate away from the two respective ring ends. This creates a tendency during closing movement to draw the ring ends gradually inwardly. By virtue of this linkage arrangement the pull exerted on the ring ends is substantially circumferential and an even drawing of the ends toward one another is insured, the tendency to bind being substantially eliminated. The guide means along which extension arm 26 passes positively limits the circumferential movement of the split ends and the entire force exerted on operating lever 30 is transmitted to the ring ends in the desired direction, reducing to a minimum the wasted com-

ponent forces necessarily inherent in other forms of linkage.

Link 34 is preferably curved and deformed as indicated at 48 adjacent its pivotal connection to the end of arcuate arm 26, thereby limiting swinging movement of the link with reference to the arcuate arm in a counterclockwise or ring opening direction. This arrangement enables counterclockwise movement of lever 30 to force the arm 26 in a direction to open the ring ends.

An additional feature of the invention resides in a further deformation of the link 34, indicated at 50. This deformation is adapted to cooperate with the side wall of lever 30 near its pivoted end to impart a distinct radially inward movement to the split ends of the ring during final closing movement of the lever. In Fig. 2 the assembly illustrated in full line shows the position of the parts just before this final movement of lever 30. It is to be noted that at this point the deformation 50 in link 34 bears against the end of the lever. Fully closed position is illustrated in dotted lines and it will be noted that the link 34 has been forced radially inwardly somewhat. This movement is transmitted through pivot 36 to the end of arcuate arm 26, thus causing lug 22 to move directly radially inwardly and, by virtue of the guide means associated with lug 24, this lug is forced radially inwardly along with lug 22. This final distinct radially inward movement is imparted to link 34 because, after abutment of deformation 50 with lever 30, further movement of the lever about its fixed pivot 32 cannot cause further relative movement between lever and link and the link is therefore cammed inwardly with the aforesaid desirable result. This final movement imparted to the ends of the ring assures a neat, fluid-tight engagement of the ends of the ring about the assembled drum and drum head.

While the particular structure of the various elements heretofore defined is not a problem before us insofar as this invention is concerned, the lever illustrated is bifurcated adjacent its pivoted end, from a point indicated at 52 in Fig. 1. The bifurcations lie on each side of lug 28 at the pivotal point. The lever is otherwise U-shaped in cross-section and, during opening movement of the ring, the inner extremity 52 of the bifurcation will bear against the inner periphery of link 34 to limit pivotal movement of the lever with reference to the link in this direction.

The exact form of link 34 is not material, although in the embodiment illustrated a double link is shown. The two link portions are contiguous at the point of pivotal connection of the lever between the bifurcations thereof, but spread slightly apart to provide the deformation 50, the cooperation of which with the end of the lever during final closing movement has already been described. The two link portions are further spread apart at 48 to encompass the extremity of arcuate arm 26 and permit pivotal connection between the link and the arm.

Having described a specific form of the invention, various modifications will be apparent to those skilled in the art, and for that reason we wish to limit ourselves only within the scope of the appended claims.

What we claim is:

1. A clamping member comprising a split channeled ring, an arcuate arm secured to and projecting beyond one end thereof, an operating lever pivotally connected adjacent one of its ends with said ring at a point arcuately remote

from the other end of the latter, a link pivotally connecting the free end of said arm with said lever at a point between the free end of the latter and its pivotal connection with the ring, and guide means associated with the ring between its pivotal connection with the lever and the adjacent free end of the ring cooperable with said arm to retain the latter in spaced relation to the ring.

2. A clamping member comprising a split channeled ring, an arcuate arm secured to and projecting beyond one end thereof, an operating lever pivotally connected adjacent one of its ends with said ring at a point arcuately remote from the other end of the latter, a link pivotally connecting the free end of said arm with said lever at a point between the free end of the latter and its pivotal connection with the ring, and guide means associated with the ring between its pivotal connection with the lever and the adjacent free end of the ring cooperable with said arm to retain the latter in spaced relation to the ring, said guide means comprising a lug extending laterally away from the free end of said ring and having a projection thereon adapted to receive said arm.

3. A clamping member comprising a split channeled ring, an arcuate arm secured to and projecting beyond one end thereof, an operating lever pivotally connected adjacent one of its ends with said ring at a point arcuately remote from the other end of the latter, a link pivotally connecting the free end of said arm with said lever at a point between the free end of the latter and its pivotal connection with the ring, guide means associated with the ring between its pivotal connection with the lever and the adjacent free end of the ring cooperable with said arm to retain the latter in spaced relation to the ring, said guide means comprising a lug extending laterally away from the free end of said ring having a projection portion limiting movement of the arm in one radial direction, and an enlarged ring portion extending between the point of pivotal engagement of the lever with the ring and the adjacent free end thereof having a depending portion operable to limit radial movement of the arm in the other direction.

4. A clamping member comprising a split channeled ring, an arcuate arm secured to one end of said ring inwardly thereof and projecting beyond said end, an inwardly extending lug associated with the other end of said ring, a second inwardly extending lug spaced circumferentially from said first-mentioned lug, a lever pivotally connected to said last-mentioned lug, a link pivotally connecting the end of said arcuate arm with said lever at a point intermediate the ends thereof, and guide means associated with said end lug adapted to receive the arcuate arm and guide the same during opening and closing of the ring.

5. A clamping member comprising a split channeled ring, an arcuate arm secured to one end of said ring inwardly thereof and projecting beyond said end, an inwardly extending lug associated with the other end of said ring, a second inwardly extending lug spaced circumferentially from said first-mentioned lug, a lever pivotally connected to said last-mentioned lug, a link pivotally connecting the end of said arcuate arm with said lever at a point intermediate the ends thereof, said link including means cooperable with the extremity of said lever for imparting a radially inward movement to the

ends of said ring during final closing movement of the lever, and guide means associated with said end lug adapted to receive the arcuate arm and guide the same during opening and closing of the ring.

6. A clamping member comprising a split channeled ring, an arcuate arm secured to one end of said ring inwardly thereof and projecting beyond said end, an inwardly extending lug spaced circumferentially from the other end of said ring, a lever bifurcated at one end and pivoted at said end to said lug, and a link pivoted at one extremity to the end of said arcuate arm and at the other between the bifurcations of said lever, said link including a deformed portion adjacent its pivotal connection with said lever cooperable with the bifurcation of the lever to force the end of said arcuate arm radially inwardly during the final stage of closing movement of the lever.

7. A clamping member comprising a split channeled ring, an arcuate arm secured to one end of said ring inwardly thereof and projecting beyond said end, an inwardly extending lug associated with the other end of said ring, a second inwardly extending lug spaced circumferentially from said first-mentioned lug, a lever bifurcated at one end and pivoted at said end to said last-mentioned lug, a link pivoted at one extremity to the end of said arcuate arm and at the other between the bifurcations of said lever, said link including a deformed portion adjacent its pivotal connection with said lever cooperable with the bifurcation of the lever to force the end of said arcuate arm radially inwardly during the final stage of closing movement of the lever,

and guide means associated with said end lug adapted to receive the arcuate arm and guide the same during opening and closing of the ring.

8. A clamping member comprising a split channeled ring, inwardly extending lugs adjacent each end, guide means on the under face of one lug, an arcuate extension of substantially the same curvature as the ring extending from said other lug past said guide means in spaced relation to the ring end associated with the latter, an operating lever pivotally connected with the ring adjacent a point arcuately remote from said last-mentioned end, and a link pivotally connecting the end of said arcuate extension with a point on said lever removed from its pivotal connection with the ring.

9. A clamping member comprising a split channeled ring, an arcuate arm secured to and projecting beyond one end thereof, an operating lever pivotally connected adjacent one of its ends with said ring at a point arcuately remote from the other end of the latter, and an angled link pivotally connecting the free end of said arm with said lever at a point between the free end of the latter and its pivotal connection with the ring, said link including a deformed portion adjacent its pivotal connection with the lever, said deformity contacting said lever and constituting a stop against relative pivotal movement between link and lever during the final stage of closing movement of the lever whereby continued movement of the latter forces the end of said arcuate arm radially inwardly.

WILLIAM BRUNING.
LLOYD D. SIMONSON.