

Aug. 16, 1966

G. KRAUS

3,266,451

CONTAINER BODY FLANGING APPARATUS AND METHOD

Filed June 26, 1963

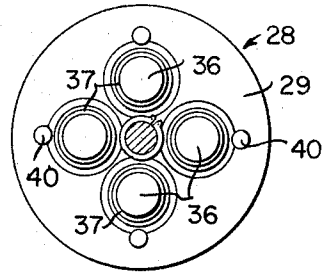
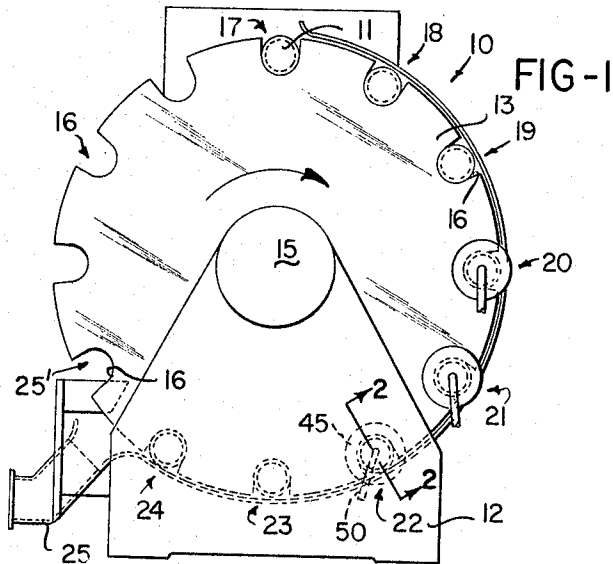


FIG-4

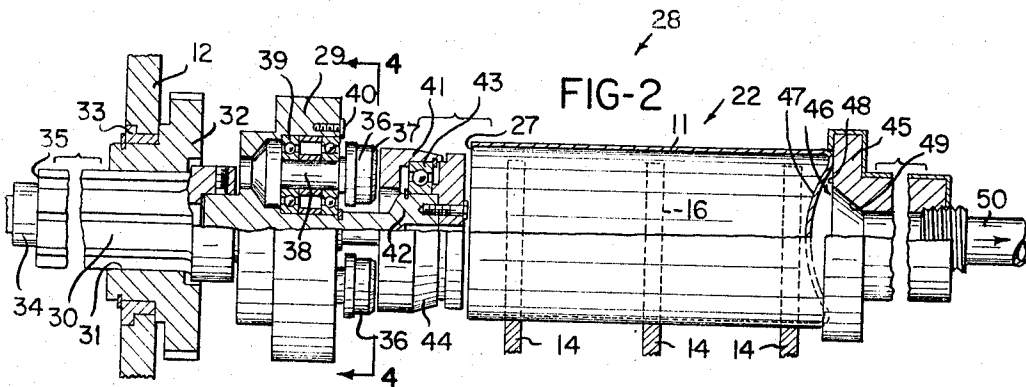
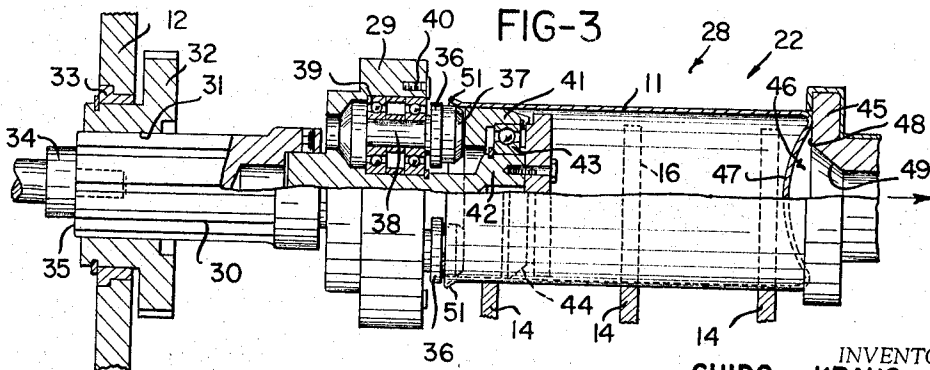


FIG-3



INVENTOR.
GUIDO KRAUS

BY *Glenn Palmer*
Matthews
HIS ATTORNEYS

1

2

3,266,451 CONTAINER BODY FLANGING APPARATUS AND METHOD

Guido Kraus, Chesterfield County, Va., assignor to Reynolds Metals Company, Richmond, Va., a corporation of Delaware

Filed June 26, 1963, Ser. No. 290,775
10 Claims. (Cl. 113-120)

This invention relates to an improved apparatus and method for flanging an open end of a container body or the like.

It is well known that substantially cup-shaped elongated, metallic container bodies can be formed by suitably drawing a pre-formed, smaller cup-shaped container body, whereby the resulting container body has an open end and an opposed closed end.

Thereafter, the open end of the container body must be suitably flanged in order to provide means for readily attaching a cover member to the container body to close a desired product within the container body and complete the container construction.

In the past, such flanging method and apparatus have comprised means for jamming a tapered cone or the like into the opened end of the can to stretch the metal at the opened end thereof to form the desired outwardly directed peripheral flange at the open end of the container body.

However, it has been found that such prior known flanging means not only tends to crack the resulting flange during the stretching of the metal, but also such prior known flanging means produces container bodies having random heights as no means can assure a uniform depth of insertion of the tapered cone within the container bodies.

According to the teachings of this invention, however, an improved method and apparatus for flanging a container body or the like is provided wherein cracked flanges are eliminated and a closer tolerance can be maintained to produce uniform heights of the flanged container bodies.

In particular, one embodiment of this invention comprises means for spinning the flange on the open end of the container body, whereby a uniform working of the metal of the container body is provided by several passes of spinning means of this invention so that rupture of the metal of the container body is substantially reduced or completely eliminated.

In addition, the flanging means of this invention can be accurately controlled so that the flanged container bodies will have uniform heights.

Accordingly, it is an object of this invention to provide an improved method for flanging an open end of a container body or the like, the method of this invention having one or more of the novel features of this invention as set forth above or hereinafter shown or described.

Another object of this invention is to provide an improved apparatus for flanging an open end of a container body or the like, the apparatus of this invention having one or more of the novel features of this invention as set forth above or hereinafter shown or described.

Other objects, uses and advantages of this invention are apparent from a reading of this description, which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a schematic end view illustrating a typical application of the apparatus and method of this invention.

FIGURE 2 is an enlarged, fragmentary, partial cross-sectional view taken on line 2-2 of FIGURE 1.

FIGURE 3 is a view similar to FIGURE 2, illustrating

the apparatus of this invention in another operating position thereof.

FIGURE 4 is a cross-sectional view taken on line 4-4 of FIGURE 2.

While the various features of this invention are hereinafter described and illustrated as being particularly adaptable to flange an open end of a container body or the like, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide means for operating on any desired article.

Therefore, this invention is not to be limited to only the embodiment illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURE 1, an apparatus is generally indicated by the reference numeral 10 and is utilized for performing various operations on a container body or the like, as indicated by the reference numeral 11 in FIGURES 2 and 3.

In particular, the apparatus 10 includes a frame structure 12 supporting a star wheel 13 or the like formed of three plates 14, FIGURES 2 and 3, disposed spaced from each other and rotatable relative to the frame means 12 about an axis of rotation 15, as illustrated in FIGURE 1, the plates 14 respectively having a plurality of container body receiving notches 16 formed in the outer periphery thereof.

The star wheel 13 is adapted to be indexed in a clockwise direction, as illustrated in FIGURE 1, to receive a formed container body at the station 17 thereof and sequentially carry that particular container body 11 through the stations 18, 19, 20, 21, 22, 23 and 24, whereby the completed container body 11 of this invention is ejected into a hopper 25 as the particular can receiving notch 16 of the star wheel 13 passes between the station 24 and the next station 25'.

Since the star wheel 13 momentarily pauses at each station, suitable apparatus can be provided at that particular station for operating on the can body 11 while the star wheel 13 is stationary.

For example, when the container body 11 is indexed to the station 20, the open end 27 of the container body 11 can be suitably trimmed to remove the ragged edge thereof and to form the container body 11 with a desired height.

Similarly, when the star wheel 13 indexes the particular container body 11 to the station 21, further trimming and/or deburring of the open end 27 of the container body 11 can take place by suitable apparatus.

When the particular container body 11 is indexed by the star wheel 13 to the station 22, the open end 27 of the container body 11 is flanged by the apparatus and method of this invention, which will now be described.

As illustrated in FIGURES 2-4, the flanging apparatus and method of this invention is generally indicated by the reference numeral 28 and comprises a head 29 that is adapted to be rotated and axially moved in any suitable manner.

For example, the head 29 can be interconnected to a splined shaft 30 received in a splined bore 31 of a driving gear 32 rotatably mounted in the frame means 12 by suitable bearing means 33. Thus, upon rotation of the gear 32 by suitable power means, the gear 32 causes like rotation of the head 29 about an axis of rotation corresponding to the axis of rotation of the splined shaft 30.

In order to cause axial movement of the rotating head 29, a suitable cam operated or hydraulically operated ram 34 is operatively interconnected to the end 35 of the splined shaft 30 and can be actuated by the cam means, hydraulic means or other suitable actuator to cause axial movement of the splined shaft 30 relative to the gear 32,

whereby the head 29 can be moved toward and away from the container body 11, while the head 29 is continuously rotated for a purpose hereinafter described.

The head 29 rotatably carries one or more rollers 36 respectively having beveled flanging surfaces 37 for a purpose hereinafter described. Each roller 36 has a stub shaft 38 rotatably received in bearing means 39 carried by the head 29 and detachably secured therein by fastening means 40, whereby each roller 36 is adapted to rotate independently about the axis of rotation of its stub shaft 38 while the head 29 is rotating about its axis for a purpose hereinafter described.

Therefore, it can be seen that the rollers 36 are adapted to be orbited about a circular path as the head 29 rotates while the rollers 36 are adapted to rotate about their own axes.

A container body centering member 41 is rotatably carried on a projecting portion 42 of the head 29 by suitable bearing means 43, the centering member 41 having a beveled leading surface 44 to readily enable the centering member 41 to be received in the open end 27 of the container body 11 in a manner hereinafter described.

A support member 45 is carried by the frame means 12 of the apparatus 10 of FIGURE 1 and is disposed spaced from the head 29 in the manner illustrated in FIGURES 2 and 3, the support member 45 having a pocket portion 46 to receive the closed end 47 of the container body 11 in the manner illustrated in FIGURES 2 and 3.

The pocket defining surface 48 of the support member 45 is interrupted by a passage means 49 to be interconnected to a suitable vacuum source by conduit means 50, whereby the container body 11 is adapted to be held tightly against the surface 48 of the support member 45 when a vacuum is imposed on the passage means 49 to not only support the container body 11 relative to the head 29 but also to tend to prevent rotational movement of the container body 11 through its frictional engagement with the surface 48 of the support member 45 for a purpose hereinafter described.

The operation of the method and apparatus 28 of this invention will now be described.

Referring to FIGURE 2, the head 29 of the apparatus 28 is normally disposed in its left-hand position a sufficient distance from the support member 45 to permit the star wheel 13 to index in a clockwise direction in FIGURE 1 and bring a particular container body 11 between the head 29 and the support member 45, whereby the star wheel 13 remains stationary in this position until the apparatus 28 has performed its flanging function.

After the container body 11 has been disposed in the position illustrated in FIGURE 2, suitable mechanism causes the ram 34 to axially move the rotating head 29 to the right in the manner illustrated in FIGURE 3, whereby the container body centering member 41 of the head 29 is telescopically received in the open end 27 of the container body 11 to positively align the container body 11 relative to the rollers 36.

As the head 29 continues to move to the right, the same compacts the container body 11 against the surface 48 of the support member 45, whereby a vacuum can be imposed in the passage means 49 to tightly hold the container body 11 against the surface 48 thereof and tend to prevent rotational movement of the container body 11 relative to the support member 45.

As the head 29 axially advances to the right, the rotating head 29 causes the beveled surfaces 37 of the rollers 36 thereof to be partially received in the open end 27 of the container body 11, whereby additional advancement of the head 29 to the right causes the rollers 36 to progressively spin an outwardly directed flange 51 on the open end 27 of the container body 11 in the manner illustrated in FIGURE 3.

The axial advancement of the head 29 to the right is terminated by the stopping of movement of the ram 34 to the right, whereby the degree of flanging of the container body 11 is held within desired tolerances so that the flanges 51 of the container bodies 11 are substantially uniform and the resulting container bodies 11 have substantially uniform heights.

While the head 29 can have one or more rollers 36 and can be orbited at any suitable rotational speed, the embodiment of the head 29 illustrated in the drawings utilizes four rollers 36 and is rotated at approximately 1,800 to 2,000 r.p.m.

As the head 29 rotates to cause the rollers 36 to spin the outward flange 51 on the container body 11, it can be seen that the rollers 36 are adapted to respectively rotate about their own axes, which are disposed spaced from and parallel to the axis of rotation of the head 29.

After the head 29 has been axially moved to the right to the desired degree to perform the above described flanging operation, the ram 34 is moved back to the left to carry the rotating head 29 therewith until the head 29 is again disposed in the position illustrated in FIGURE 2.

At the same time or in any desired sequence therewith, the communication between the passage means 49 of the support member 45 and the vacuum source is terminated, whereby the container body 11 is free to move relative to the support member 45 when the star wheel 13 is again indexed in a clockwise direction in FIGURE 1 to move that completed container body 11 to the station 23 and bring another container body 11 to the apparatus 28.

While the support member 45 has been described and illustrated as being a stationary member, it is to be understood that the same can be axially movable toward and away from the head 29 in substantially the same manner that the head 29 is axially moved if desired. In this manner, the head 29 could be fixed from axial movement and the support member 45 could cause the relative movement between the container body 11 and the head 29 to perform the flanging operation in the manner previously described. Also, an axially movable support member 45 could be utilized in combination with the axially movable head 29 is desired.

Therefore, it can be seen that this invention provides an improved method and apparatus for flanging an open end of a container body or the like, the method and apparatus of this invention providing the flanging operation in a simple and non-time consuming manner to prevent cracks in the resulting flanges and to maintain a substantially uniform height of the container bodies.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. Apparatus for flanging an open end of a container body or the like comprising a rotatable and axially movable head carrying at least one roller rotatably mounted to said head about an axis of rotation disposed spaced from and parallel to the axis of rotation of said head, said roller having an annular and beveled flanging surface, said head rotatably carrying a container body centering member to be received in said open end of said container body to align said container body relative to said roller, a support member spaced from said head to be engaged by the other end of said container body to hold the same from movement relative to said head, means for rotating said head, and means for axially moving said rotating head toward said container body to cause said roller to flange said open end of said container body.

2. Apparatus as set forth in claim 1 wherein said roller is at least partially received in said open end of said container body to form an outward flange on said container body.

5

3. Apparatus as set forth in claim 1 wherein means is provided to introduce said container body between said head and said support member.

4. Apparatus as set forth in claim 1 wherein vacuum means is provided to hold said container body against said support member.

5. Apparatus as set forth in claim 1 wherein said head has a bore therein, bearing means disposed in said bore, and shaft means carried by said roller and being received in said bearing means to rotatably mount said roller to said head.

6. A method for flanging an open end of a container body or the like comprising the steps of providing a rotatable and axially movable head having at least one roller rotatably mounted thereto about an axis of rotation disposed spaced from and parallel to the axis of rotation of said head, said roller having a flanging surface, providing a container body centering member that is rotatably mounted to said head, disposing the other end of said container body against a support member disposed spaced from said head, rotating said head, and axially moving said rotating head toward said container body to cause said centering member to be received in said open end of said container body to align said container body relative to said roller and to cause said roller to flange said open end of said container body.

7. A method as set forth in claim 6 wherein said roller

6

is at least partially received in said open end of said container body to form an outward flange on said container body.

8. A method as set forth in claim 6 and including the step of introducing said container body between said head and said support member.

9. A method as set forth in claim 6 and including the step of holding said container body against said support member by vacuum means.

10. A method as set forth in claim 6 and including the steps of providing a bore in said head, disposing bearing means in said bore, and disposing a shaft of said roller in said bearing means to rotatably mount said roller to said head.

References Cited by the Examiner

UNITED STATES PATENTS

498,408	5/1893	Roth	214—1
983,278	2/1911	Hartlove	72—393
1,041,028	10/1912	Church	214—1
1,943,483	1/1934	Miller	214—1
2,687,163	8/1954	Smith	72—110
3,011,539	12/1961	Henrickson	72—117

CHARLES W. LANHAM, *Primary Examiner*.

H. D. HOINKES, *Assistant Examiner*.