Aug. 1, 1933. J. M. YOUNG 1,920,287

CONTAINER CLOSURE

Filed July 10, 1929

Fig. 1

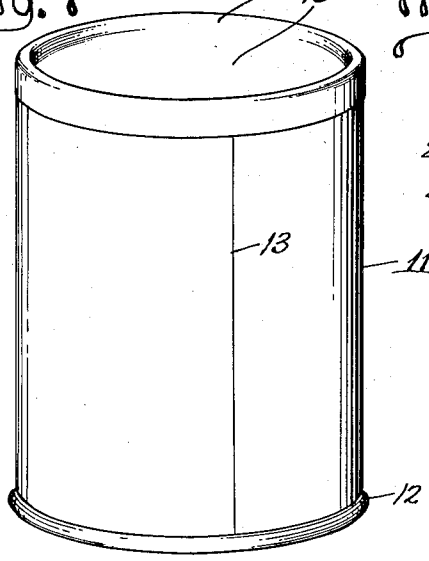


Fig. 4

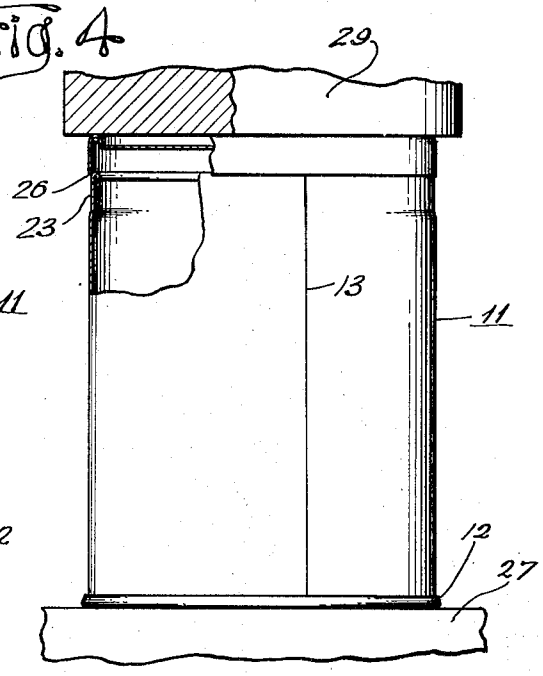


Fig. 2

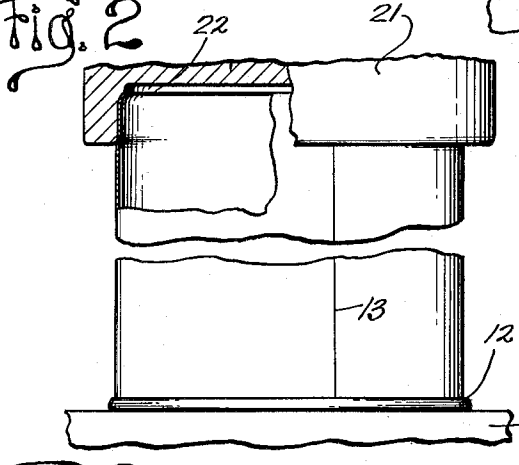


Fig. 5

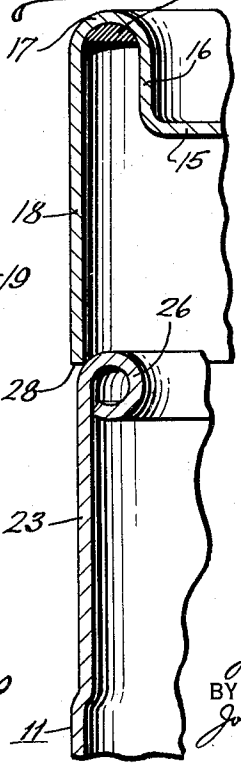


Fig. 6

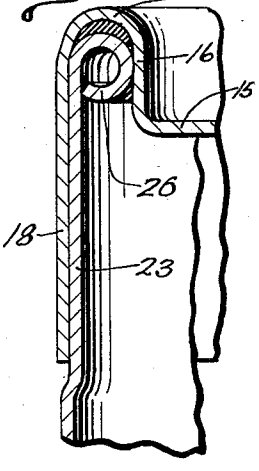
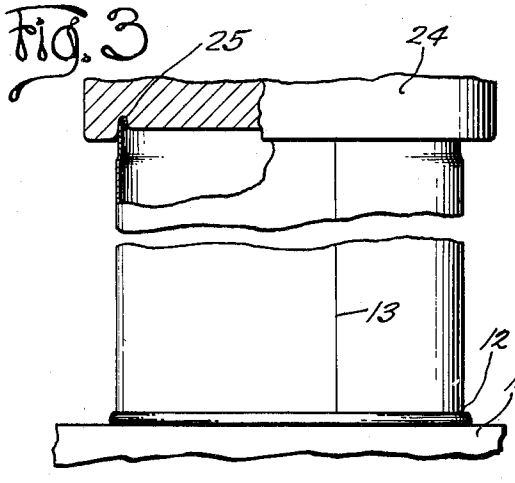


Fig. 3



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CONTAINER CLOSURE

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Application July 10, 1929. Serial No. 377,142

4 Claims. (Cl. 220—42.)

This invention relates in general to containers and more particularly to a novel and improved hermetic end closure for containers, and the method of applying the same.

An object of my invention is the provision of an improved hermetic end closure of simple construction which utilizes the inherent elasticity of the metal of its depending flange to produce a permanent or inseparable connection between it and a portion of the container body which has been brought to a predetermined size.

Another object of my invention is the provision of an end closure for a container which is applied to the latter by forcing or driving a depending flange part having a relatively small internal diameter over a container part which has been brought to a predetermined size of larger external diameter, thereby stretching the metal of the closure flange within its elastic limits over the sized container area to produce a permanent connection therebetween.

Another object of my invention is the provision of an end for a container which may be permanently applied to the container body without interfolding of flange parts of body and closure, without the use of solder or other third securing agents and which can be made hermetic by the addition of a gasket or compound lining.

Still another object of my invention resides in the method of applying my improved drive fit closure by means of simple and inexpensive pressure closing mechanisms.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Fig. 1 is a perspective view of one type of container to which my invention is applicable.

Fig. 2 is an elevational view of the container body with parts broken away to show the sizing of the body and the starting of the top curl by means of a die mechanism.

Fig. 3 is a view similar to Fig. 2 showing the finishing of the top curl by means of a die mechanism.

Fig. 4 is an elevational view of the container body and end closure positioned between two pressure closing mechanisms.

Fig. 5 is an enlarged cross-section of part of the sized and curled container top and end closure before the end has been driven home, and

Fig. 6 is a view similar to Fig. 5 with the end closure completely assembled to the container top.

To illustrate a preferred embodiment of my invention I have shown my improved end closure applied to a well known type of sheet metal container which comprises a cylindrical body 11 having a bottom end 12 double seamed or otherwise permanently and hermetically secured thereto, and also having the usual side seam 13.

The top closure 14 comprises, a drawn shell having a central sunken panel 15, a vertical wall part 16, a rounded shoulder or recess 17, and a depending annular flange or skirt portion 18 of substantial width or vertical dimension (of more than three sixteenths of an inch in width) to provide an adequate sealing area. When this shell is made from a one piece blank by a drawing die, its dimensions and especially the diameter of its depending flange 18, which is adapted to come in sealing contact with the container body, are accurately predetermined by the dimensions of the die.

To obtain the best sealing results from my improved closure it is desirable to have the sealing area on the body of substantially accurate predetermined diameter proportioned to the internal diameter of the cover flange so as to attain the results herein described. This can be readily accomplished by a slight necking-in of the upper part of the body by die action, and one way of accomplishing this sizing of the container body 11 is illustrated in Fig. 2 wherein the container body is shown positioned between a support or lower chuck 19 and an upper chuck or ring die 21 having a cylindrical recess 22 of a diameter which is precisely equal to the desired diameter of the annular sealing area 23 of the container body 11, so that when the sizing die 21 is forced down upon a container body 11, which has been placed in concentric alignment with the recess 22, the container is brought to a predetermined diameter, as by a slight necking-in of the said sealing area, to provide a peripheral sealing area 23.

It will be noted that the annular wall defining the cylindrical recess 22 of the die 21 is substantially straight except at the top where it is bent inwardly for the purpose of forcing inwardly the upper edge of the container body 11 to start the inward curling of the body top. This curling action is completed by another die 24 (shown in Fig. 3) having a die face or recess 25 which conforms to the outer surface of the finished curl 26 of the container body 11.

Referring now to Fig. 4, the finished and sized container body 11 is shown positioned upon a

lower support or chuck 27, which may be the same part of the same machine as support 19, or may be part of another machine. The top closure 14, with the edge 28 of its depending flange 18 touching the upper extremity of the sealing area 23 at the inward bend of the curl 26, is placed over the open container body and the closure 14 is now ready to be forced or driven home over the body sealing area 23 by means of an upper pressure member 29, actuated by any suitable mechanism (not shown) engaging and pressing down upon the outer rim of the shoulder 17. Considerable pressure must be exerted by the member 29 to force and stretch the metal of the depending flange 18 within its elastic limits, which have been determined by experiment, about the body sealing area 23.

The outer diameter of the body sealing area 23 having been predetermined and made uniform and the inner diameter of the depending flange 18 also being uniform and predetermined, the difference between these diameters can be so regulated that the tightness of the sealing connection can be substantially determined at will. In all cases, the inner diameter of the depending flange 18 is smaller than the outer diameter of the sealing area 23. How much smaller depends upon the weight of the sheet metal stock used and other varying or desired conditions. When the flange 18 has been fully driven home over the body sealing area 23, the metal of the flange 18 has been stretched and a tight metal to metal seal has been created between the body and the closure which is permanent, that is to say, the closure can only be removed and the container opened by cutting or mutilation of the closure, preferably by cutting out the sunken panel 15 by means of a suitable can opener, or otherwise.

The closure 14 may be made hermetic by placing a gasket or lining compound 31 in the closure recess 17, as clearly illustrated in Fig. 5. When the closure 14 is forced into sealing engagement with the can body, this lining compound or gasket 31 is squeezed between the top surface of the curl 26 of the body and the inner surface of the closure recess or channel 17, and the closure is thus made both liquid and air tight.

It should also be noted that instead of the die sized sheet metal container body 11, a container body of glass or other solid material having a sealing area of uniform predetermined size could be employed in connection with my improved closure without departing from the spirit and scope of my invention.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts, without departing from the spirit and scope of the invention, or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A sheet metal container having a peripherally curved body and cover, said cover having a depending flange devoid of inward projections and designed for application to said body, the surface of the body which engages the cover being devoid of outward projections, the internal diameter of the cover flange being so proportioned to the external diameter of the body at its end that when the aforesaid flange is applied to the body there will be sufficient tensional stress in the flange and a sufficient degree of compression in the can body as to produce a permanent and substantially inseparable bond between the can body end and the aforesaid cover-flange.

2. A sheet metal container having a peripherally curved body and cover, said cover having a depending flange devoid of inward projections and designed for application to said body, the surface of the body which engages the cover being devoid of outward projections, the internal diameter of the cover flange being so proportioned to the external diameter of the body at its end that when the aforesaid flange is applied to the body there will be sufficient tensional stress in the flange and a sufficient degree of compression in the can body as to produce a permanent and substantially inseparable bond between the can body end and the aforesaid cover-flange, the said end of the body being proportioned, independent of the rest of the body, to said internal diameter of the cover flange.

3. A sheet metal container having a peripherally curved body and cover, said cover having a depending flange devoid of inward projections and designed for application to said body, the surface of the body which engages the cover being devoid of outward projections, the internal diameter of the cover flange being so proportioned to the external diameter of the body at its end that when the aforesaid flange is applied to the body there will be sufficient tensional stress in the flange and a sufficient degree of compression in the can body as to produce a permanent and substantially inseparable bond between the can body end and the aforesaid cover-flange, the said end of the body being necked-in and proportioned relative to said internal diameter of the cover flange.

4. A sheet metal container having a peripherally curved body and cover, said cover having a depending flange devoid of inward projections and designed for application to said body, the surface of the body which engages the cover being devoid of outward projections, the internal diameter of the cover flange being so proportioned to the external diameter of the body at its end that when the aforesaid flange is applied to the body there will be sufficient tensional stress in the flange and a sufficient degree of compression in the can body as to produce a permanent and substantially inseparable bond between the can body end and the aforesaid cover-flange, the cover being provided with a gasket.

JOHN M. YOUNG.