June 23, 1936. I. NEWMAN 2,045,235

DEVICE FOR SHAPING SHEET MATERIAL

Filed April 4, 1935

FIG. 1.

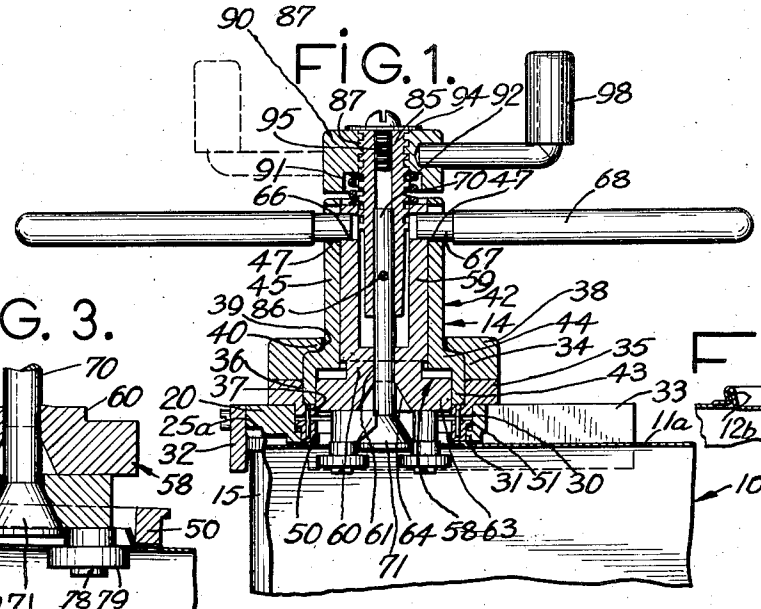


FIG. 1a.

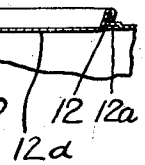


FIG. 3.

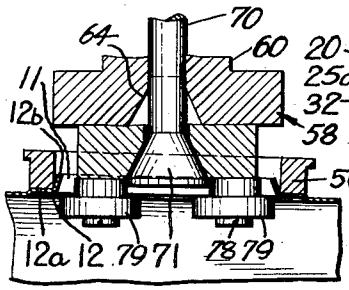


FIG. 2.

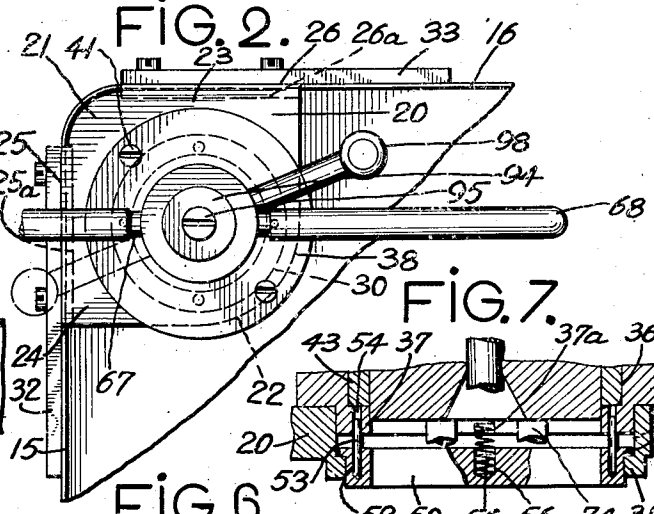


FIG. 4.

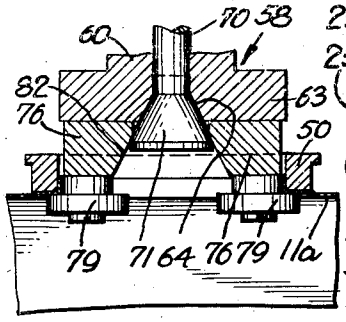


FIG. 7.

FIG. 5.

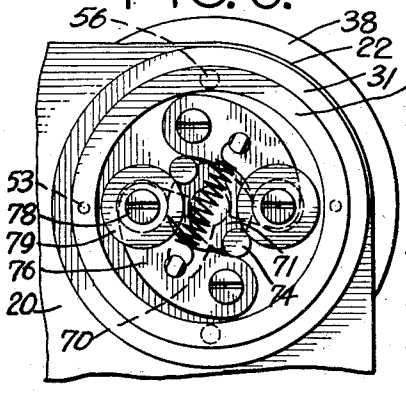
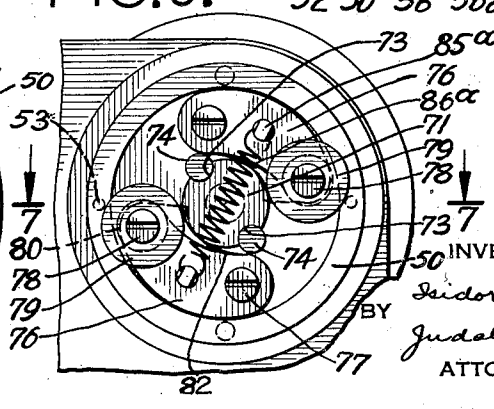


FIG. 6.



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UNITED STATES PATENT OFFICE

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DEVICE FOR SHAPING SHEET MATERIAL

Isidor Newman, New York, N. Y.

Application April 4, 1935, Serial No. 14,605

15 Claims. (Cl. 153—29)

This invention relates to devices for shaping sheet material, and is particularly directed to a device for shaping the rim edge of an opening in sheet material, for example, the rim edge of a filling hole in a can.

Cans which are used for packing fluids, petroleum products, chemicals, edible oils or the like containers which have a filling hole have been provided with caps or sealing closures for said holes usually constructed to grip an upwardly extending flange at the hole and crimped to said flange. It has been customary to pierce the can to permit the same to be emptied after which the empty can was discarded. In the case of larger or more expensive cans, it is desirable to refill and re-use the cans after the same have been emptied to eliminate the waste involved in discarding such cans. Instead of piercing the can, therefore, the cap may be removed or pulled off the flange at the filling hole in any suitable manner, for example, with the tool shown in my co-pending application for improvements in Devices for removing sealing closures, filed simultaneously with this application. Difficulty has been experienced, however, in applying a new cap to the flange by reason of the fact that in removing the cap the flange or rim edge of the filling hole becomes somewhat bent or misshapen. It is, therefore, an object of my invention to provide a device for straightening, reshapening or pressing out the rim edge or flange of the filling hole or opening in the can, to permit application of another sealing cap or closure thereto.

A further object of this invention is to provide a neat, compact and rugged device of the character described, which shall be relatively inexpensive to manufacture, comprise few and simple parts, be easy to assemble and manipulate, and which shall yet be positive in action and practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is an elevational, cross-sectional view of a device embodying the invention mounted on a can and ready for use;

Fig. 1*a* is a cross-sectional view of a portion of a can having a cap thereon;

Fig. 2 is a top plan view of the structure shown in Fig. 1;

Fig. 3 is an enlarged, detail view of the shaping portion of my improved device;

Fig. 4 is a view similar to Fig. 3 but showing the parts in rim pressing position;

Fig. 5 is a bottom plan view of my improved device mounted on a can and ready for use;

Fig. 6 is a view similar to Fig. 5 but showing the parts in rim pressing position; and

Fig. 7 is an enlarged, cross-sectional view of the bottom part of my improved device, with parts in cross-section and parts removed.

Referring now in detail to the drawing, **10** designates a can or container formed with a filling hole or opening **11** in the top wall **11***a* thereof and having a rim edge **12** at said opening.

Where cans are provided with sealing closures or caps for the filling holes and it is desired to re-use or refill the can after the same is emptied, the cap may be pulled off the flange formed at the filling hole in any suitable manner, for example, with a tool such as shown in my co-pending application for improvements in Devices for removing sealing closures, filed simultaneously with this application. In such cases, it has been found that the flange is bent, out of shape, and does not present the proper upstanding and perfectly annular flange to receive a new cap. The flange also often gets out of shape while the can is being used or shipped when new.

The can **10** is shown in the drawing for the purpose of illustration as being a square can having vertical walls **15** and **16**, and the rim **12** may be assumed to be out of shape as a result of removing the first cap and using the can. Such rim comprises an annular somewhat raised horizontal portion **12***a* and an upstanding flange **12***b*, on which the sealing cap **12***a* is crimped, as shown in Fig. 1*a*.

The device **14** embodying the invention is for reshaping flange **12***b* and portion **12***a* to permit the flange to receive a new cap. Said device comprises a plate **20** of substantially square shape but having a pair of opposite curved corners **21** and **22** and a pair of opposite square corners **23** and **24**. Said plate has a pair of adjacent side edges **25** and **26** disposed at right angles to one another, the underside of said plate adjacent said edges being cut away, as at **25***a* and **26***a*, for the purpose hereinafter appearing. Said plate **20** is formed with a central circular opening **30** and with an inwardly ex-

tending angular flange 31 at the bottom of said opening. Attached to the side edges 25 and 26, as by screws, are a pair of walls 32 and 33 extending below the lower surface of the plate 20. The walls 32 and 33 terminate short of the curved corner 21 of the plate and extend beyond said slide edges 25 and 26. It will now be understood that the plate 20 may be mounted on top of a can and at the corner thereof which has the opening 11, the walls 32 and 33 contacting the side walls 15 and 16 being received within the cut away portions 25a and 26a on the underside of said plate 20.

Fixed to the upper side of the plate 20 and disposed concentrically of the opening 30 is a flat ring 35 having a central circular opening 36 and being formed at the lower end of said opening with a downwardly and inwardly extending flange 37 received within the opening 30 of the plate 20. Fixed to the upper surface of the ring 35 is a second ring 38 substantially of the same outer diameter and provided with a central opening 39. Said ring 38 has adjacent the upper surface thereof an inwardly extending annular flange 40. The rings 38 and 35 and the plate 20 may be fixed together by screws 41 or in any other suitable manner.

Slidably mounted within the opening 30 of the plate 20 is a ring 50 having an outwardly extending annular flange 51 disposed between the flanges 31 and 37. The ring 50 slides within the flange 31; and the flange 51 limits the sliding movement of said ring. Said ring is provided on the upper surface thereof with a plurality of vertical openings 52 receiving pins 53 fixed within said openings and extending above the surface of said ring. The extending portions of said pins are slidably received within openings 54 formed in the flange 37 whereby said ring is maintained against rotary movement with respect to plate 20 and ring 35. Coil compression springs 56 disposed between the ring 50 and the flange 37 have the upper and lower ends thereof received in sockets 56a and 37a in said ring and flange and serve to normally move the ring away from said flange and the annular flange 51 toward the flange 31 of the plate 20.

When the device 14 is placed on the can, the portion 12a is contacted by the lower side of the ring 50, and the upwardly extending flange 12b is disposed within the said ring. It is the portions 12a and 12b which usually get out of shape and which are ironed out or pressed into proper shape in the manner hereinafter described.

Means is provided for pressing said portions 12a and 12b against the underside and inner surface of said ring. To this end there is rotatably and non-slidably mounted on the rings 35, 38, a tubular member 42 having a cylindrical portion 43 disposed within the openings 36, 39 and between the flanges 37 and 40. Extending from the cylindrical portion 43 is an annular, inwardly extending wall 44 from which there extends upwardly a tubular portion 45 passing through the opening in the upper ring 38. The member 42 is thus rotatably and non-slidably mounted on the rings 38, 35 and plate 20. The tubular portion 45 is formed adjacent the upper end thereof and on the undersides thereof with a pair of short vertical slots 47, for the purpose hereinafter appearing.

Disposed within the member 42 is a member 58 having a tubular portion 59 disposed within the tubular portion 45 of said member 42 and a bottom wall 60 at the lower end of the tubular portion 59 and having a central opening 61. Extending from said bottom wall 60 is an outwardly extending flange 63 received within the cylindrical portion 43 of the member 42. At the underside of said flange 63 is a conical opening 64 communicating with the through opening 61 in the wall 60. The tubular portion 59 is formed adjacent the upper end thereof with a pair of opposite openings 66 registering with the slots 47 in the tubular portion 45. Received within said openings 66 and fixed to member 58 and extending through the slots 47 are the inwardly extending reduced ends 67 of a pair of aligned outwardly extending handles 68. It will now be understood that the member 58 has a limited sliding movement with respect to the member 42 and that rotation of the member 58 with respect to said member 42 is prevented by the handles 68.

Slidably extending through the opening 61 is a stem 70 having a conical head 71 at the lower end thereof substantially of the same shape as conical opening 64 on the underside of member 58. Said stem 70 projects into the tubular portion 85 as shown in Fig. 1 of the drawing. The conical portion 71 is formed on opposite sides thereof with vertical, semi-cylindrical notches 73, and fixed to the underside of the flange 63 are a pair of pins 74 partially received within the notches 73 to prevent rotation of the stem 70 with respect to the member 58. Pivoted to the underside of said flange 63 are a pair of similar, symmetrically disposed, curved arms 76, pivoted on vertical pins or studs 77 screwed to the underside of said flange 63 and lying generally within the ring 50.

Rotatably mounted at the curved outer ends 80 of the arms 76, as on pins 78 screwed to said arms, and contacting the underside of said arms, are ring like members or rollers 79 partially extending beyond the outer ends of said arms. The inner sides of the arms 76 have bottom conical surfaces 82 contacting the conical surfaces of the portion or head 71. Fixed to the arms 76 are downwardly extending pins 85a interconnected by a coil tension spring 86a which tends to draw the arms together and maintain said arms in contact with opposite sides of the head 71.

Received on the upper end of the stem 70 is a tubular member 85 fixed to said stem by a transverse pin 86. Said tubular member 85 is formed adjacent the upper end thereof with multiple steep-pitched external threads 87. Screwed to the upper end of the tubular member 85 is a member 90 having an internal threaded surface receiving the threads 87, and being socketed on the undersurface thereof, as at 91. A coil compression spring 92 received within the socketed portion 91, is disposed about the tubular member 85 and between the upper end of the member 58 and the underside of the member 90. A washer 94 screwed to the upper end of the tubular member 85, as by screw 95, serves to limit the upward movement of the member 90 as the same is turned about the tubular member 85. A handle 98 is fixed to the member 90 and serves to turn said member on the tubular member 85.

The operation of the device will now be described. As shown in Fig. 1 of the drawing, the device 14 is placed on top of the can with the arms 76 and rollers 79 extending through the opening 11 and the member 90 contacting the washer 94 and the inner ends 67 of the handles

68 being at the lower ends of the slots 47. The ring 50 is pressed by springs 56 into contact with the upper surface of portion 12a of the rim 12. The flange 63 is somewhat spaced from the underside of wall 44 of member 42. The head 71 at the lower end of the stem 70 is disposed below the conical surface 64 and contacts the arms 76 as shown in Fig. 3 of the drawing, permitting the arms to be moved inwardly toward each other by the spring 86a.

As shown in Figs. 1 and 3 of the drawing, the rollers 79 are disposed below the portion 12a of the rim 12 and inwardly thereof. Upon turning the handle 98 in a clockwise direction, looking at Fig. 2 of the drawing, (with handle 68 held against rotation), the member 90 engaging the threaded tubular member 85 moves down toward the upper end of the tubular portion 45 of member 42, compressing the spring 92. After the member 90 contacts said tubular portion 45, further rotation of the handle 98 causes the tubular member 85 and the stem 70 to be raised, the head 71 contacting the cammed or conical surface 82, spreading the arms 76 and moving the rollers 79 toward the rim 12. After the arms have been spread, further rotation of the handle 98 will cause the stem 70 to lift the member 58 within the member 42, the inner ends 67 of the handles moving upwardly within the slots 47 and the flange 63 moving into contact with the wall 44 of said member 42. The outer ends 80 of the arms 76 thus move into contact with the flange 12b of the rim 12 and the rollers 79 move into contact with the portion 12a of said rim.

After the arms 76 and the rollers 79 are firmly pressed against the rim edge of the can opening, the handles 68 are rotated, the arms 76 rotating with the members 42 and 58 and pressing out or ironing out or shaping the portions 12a and 12b of the rim 12 all around the opening. The handles 68 may be given one or more revolutions until the rim is properly pressed into shape.

After the handles 68 are rotated for one or more revolutions and the flange 12b is properly shaped, the handle 98 may be rotated in counter-clockwise direction to lower the stem 70 and permit the arms 76 to move inwardly under action of spring 86a. The spring 92 facilitates the counter-clockwise rotation of the handle 98. The weight of the member 58 and handles 68 will cause said member to be lowered whereby the rollers 79 move away from the portion 12a of the can. Thereafter the entire device 14 may be readily lifted off the can.

The tool 14, it will be noted, is constructed with side plates to fit against the walls or corners of the can, and thus act as a guide for insertion of the tool into the filling hole of the can and for keeping the tool in place on the can during the straightening or reshapening operation.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A filling hole straightener for cans comprising a member adapted to be mounted on top of the can over the filling hole and having means engaging a side wall of the can for retaining the device on the can, said device having means adapted to project into the hole, means for moving said last mentioned means into engagement with the rim edge of the hole, and means for rotating said projecting means after the same has engaged said rim edge.

2. A device for shaping the rim edge of an opening in a sheet comprising a member adapted to be placed on said sheet and over said opening, said member having an opening concentric with the opening in said sheet, a second member rotatably and non-slidably mounted on said first member, a third member rotatably mounted within said second member for rotation therewith and having limited sliding movement with respect thereto, means on said first member adapted to engage one side of the rim edge at the opening in said sheet, and means on said third member extending through the opening in said sheet, movable into contact with an opposite side of said rim edge.

3. A device for shaping a cylindrical flange at an opening in a flat sheet, comprising means adapted to be placed on said sheet over said opening and engaging the outer surface of said flange, a member mounted on said means and disposed axially of said opening, an arm pivoted to said member on an axis parallel to the axis of said member, and having means thereon for engaging the inner surface of said flange, and means for causing pivotal movement of said arm with respect to said member.

4. A device for shaping a cylindrical flange at an opening in a flat sheet, comprising means adapted to be placed on said sheet over said opening and engaging the outer surface of said flange, a member mounted on said means and disposed axially of said opening, an arm pivoted to said member on an axis parallel to the axis of said member, and having means thereon for engaging the inner surface of said flange, means for causing pivotal movement of said arm with respect to said member, and means for causing axial movement of said member.

5. A device for shaping a cylindrical flange an opening in a flat sheet, comprising means adapted to be placed on said sheet over said opening and engaging the outer surface of said flange, a member mounted on said means and disposed axially of said opening, an arm pivoted to said member on an axis parallel to the axis of said member, and having means thereon for engaging the inner surface of said flange, means for causing pivotal movement of said arm with respect to said member, means for causing axial movement of said member, and means for rotating said member.

6. A filling hole straightening device for cans comprising a member adapted to be placed on the can and having an opening disposed above the filling hole of the can, a spring pressed ring mounted on said member and adapted to press against the upper side of said rim edge of said hole, a tubular member rotatably and non-slidably mounted on said member, a member mounted within said tubular member and having limited sliding movement with respect thereto and being adapted to rotate therewith, an arm pivoted to the underside of said last member and having means at the end thereof for pressing said rim edge against said ring, and means for causing pivotal movement of said

arm to move said means into rim engaging position.

7. A device for shaping the rim edge of an opening, comprising a member having an opening, a tubular member rotatably and non-slidably mounted on said member and having a longitudinal slot, a member disposed within said tubular member, a handle having a portion extending through said slot and fixed to said last mentioned member, and means mounted on said last mentioned member for movement away from the axis of said member into engagement with said rim edge.

8. A device for shaping the rim edge of an opening, comprising a member having an opening, a tubular member rotatably and non-slidably mounted on said member and having a longitudinal slot, a member disposed within said tubular member, a handle having a portion extending through said slot and fixed to said last mentioned member, means mounted on said last mentioned member for movement away from the axis of said member and into engagement with said rim edge, said last mentioned member having a axial opening, and a stem extending through said opening and having a head at the lower end thereof adapted to engage said movably mounted member, and means for causing axial movement of said stem.

9. A device for shaping the rim edge of an opening, comprising a member having an opening, a tubular member rotatably and non-slidably mounted on said member and having a longitudinal slot, a member disposed within said tubular member, a handle having a portion extending through said slot and fixed to said last mentioned member, means mounted on said last mentioned member for movement away from the axis of said member and into engagement with said rim edge, said last mentioned member having an axial opening, a stem extending through said opening and having a head at the lower end thereof adapted to engage said movably mounted member, means for causing axial movement of said stem, comprising a member fixed to said stem and formed with screw threads, and means engaging said screw threads and adapted to contact said tubular member.

10. A device for straightening the rim edge of a filling hole in the top of a can comprising a member mounted on the top of said can and having portions engaging the sides of said can for retaining said member in position on said can, said member having an opening, a ring mounted on said member, resilient means for pressing said ring against the upper surface of the rim edge of the hole in the top of the can, a tubular member mounted for rotation on said first member and being formed with a longitudinal slot, a member within said tubular member having an axial opening, a handle having a portion extending through said slot and connected to said last mentioned member, a pair of arms pivoted to the underside of said last mentioned member and each having a roller on the outer end thereof, a spring interconnecting said arms to pivot the rollers toward the axis of said last mentioned member, a stem extending through said axial opening and having a conical head at the bottom end thereof and disposed between and engaging said pivoted arms, means to prevent rotation of said stem with respect to said last mentioned member, a member fixed to said stem having external steep-pitched threads, and a member having internal steep-pitched threads engaging said external threads.

11. A device for straightening the rim edge of a filling hole in the top of a can comprising a member mounted on the top of said can and having portions engaging the sides of said can for retaining said member in position on said can, said member having an opening, a ring mounted on said member, resilient means for pressing said ring against the upper surface of the rim edge of the hole in the top of the can, a tubular member mounted for rotation on said first member and being formed with a longitudinal slot, a member within said tubular member having an axial opening, a handle having a portion extending through said slot and connected to said last mentioned member, a pair of arms pivoted to the underside of said last mentioned member and each having a roller on the outer end thereof, a spring interconnecting said arms to pivot the rollers toward the axis of said last mentioned member, a stem extending through said axial opening and having a conical head at the bottom end thereof and disposed between and engaging said pivoted arms, means to prevent rotation of said stem with respect to said last mentioned member, a member fixed to said stem having external steep-pitched threads, a member having internal steep-pitched threads engaging said external threads, and a handle thereon.

12. A device for straightening a flange on a filling hole of a can comprising a member mounted on the can, means on said member engaging the outer surface of said flange, a tubular member rotatably and non-slidably mounted on said first member, a member within said tubular member adapted to rotate therewith and being formed with an axial opening, a stem slidably mounted within said axial opening and provided with a conical head at the bottom end thereof, means for moving said stem longitudinally with respect to said last mentioned member, said last mentioned member having a conical opening at the bottom of said axial opening adapted to receive the conical head on the stem, an arm pivoted to said last mentioned member and being adapted to engage the inner surface of said flange, and said arm having a part-conical surface adapted to be engaged by said head as said stem is moved axially within the opening to cause pivotal movement of said arm into engagement with said inner surface.

13. A device for straightening a flange on a filling hole of a can comprising a member mounted on the can, means on said member engaging the outer surface of said flange, a tubular member rotatably and non-slidably mounted on said first member, a member within said tubular member adapted to rotate therewith and being formed with an axial opening, a stem slidably mounted within said axial opening and provided with a conical head at the bottom end thereof, means for moving said stem longitudinally with respect to said last mentioned member, said last mentioned member having a conical opening at the bottom of said axial opening adapted to receive the conical head on the stem, an arm pivoted to said last mentioned member and being adapted to engage the inner surface of said flange, said arm having a part-conical surface adapted to be engaged by said head as said stem is moved axially within the opening to cause pivotal movement of said arm into engagement with said inner surface, and means for causing simultaneous rotation of said tubular member and last mentioned member.

14. A straightener for the cylindrical flange of a filling hole in a can, comprising a member adapted to be placed on the can over the filling hole a spring pressed ring engaging the outer surface of the flange and having limited axial movement with respect to said member, a pivoted member for engaging the inner surface of said flange, and means for rotating the pivoted member bodily about the axis of said flange.

15. A straightener for the cylindrical flange of a filling hole in a can, comprising a part pivoted about an axis parallel to the axis of said flange and movable engagement with the inner surface of said flange, a non-rotating ring for engaging the outer surface of said flange, means for rotating said part about the axis of said flange, and means for moving said part about its axis toward the axis of said flange and out of contact with respect to said flange.

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