Nov. 29, 1960 R. E. JOHNSON 2,961,756

TOOL FOR INSERTION AND REMOVAL OF CLOSURE FITTINGS

Filed Oct. 29, 1956

FIG. 1

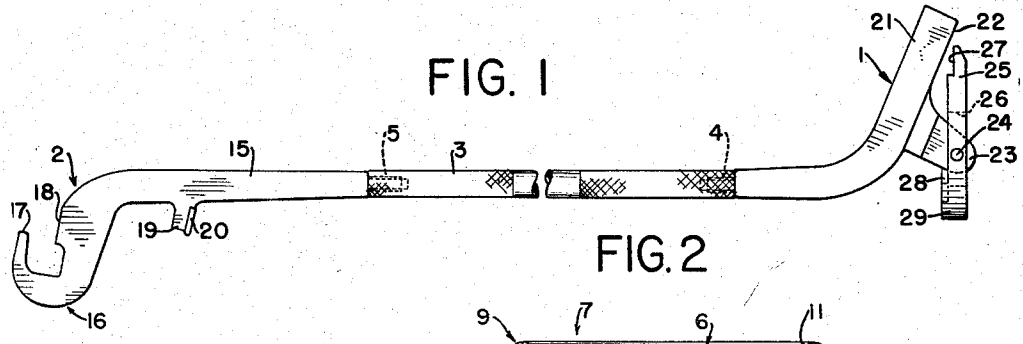


FIG. 2

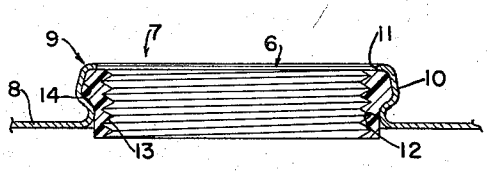


FIG. 3

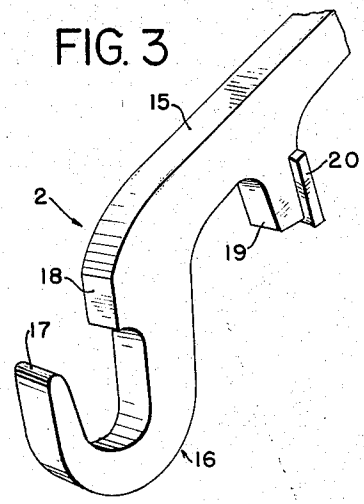


FIG. 4

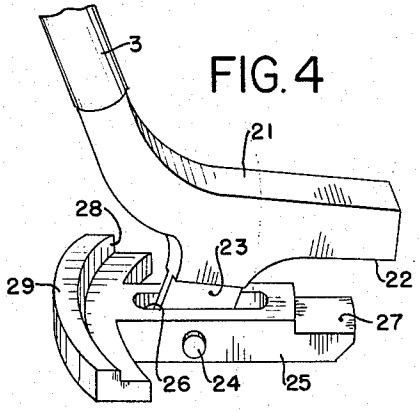


FIG. 5

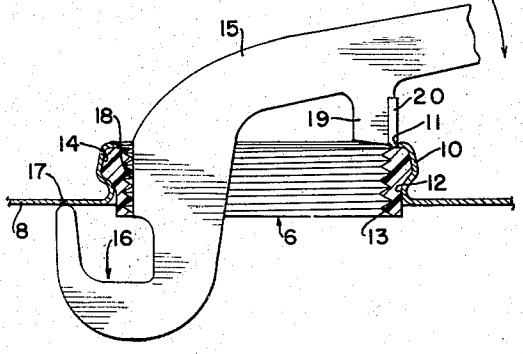
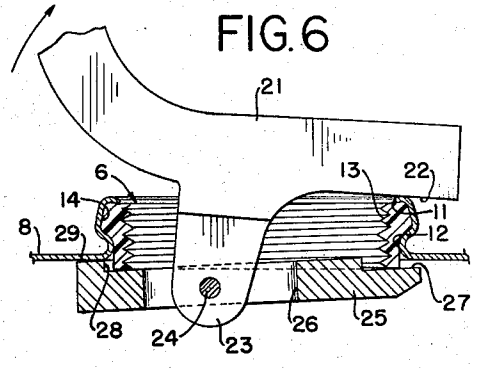


FIG. 6



INVENTOR
ROBERT E. JOHNSON

BY

Penrie, Edmonds, Morton, Yarrows & Taylor
ATTORNEYS

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TOOL FOR INSERTION AND REMOVAL OF CLOSURE FITTINGS

Robert E. Johnson, Easton, Conn., assignor, by mesne assignments, to American Flange and Manufacturing Co., Inc., New York, N.Y., a corporation of Delaware

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3 Claims. (Cl. 29—235)

The present invention relates to a tool for the insertion and removal of close fitting insert rings, and especially to a lever-action hand manipulated tool for inserting an internally threaded plastic ring into a drum discharge nozzle opening to receive a threaded closure plug and for removing said ring when desired.

Exit of contained liquid from the interior of the common cylindrical metal drum is afforded by a discharge opening in the head of the drum. This opening may consist of a nozzle defined by an upwardly extending circular lip integral with the surrounding sheet metal of the drum head. The nozzle with the threaded insert therein is employed to receive pumping apparatus for emptying the drum as well as for receiving a threaded plug closure member for sealing the drum during shipment. The external surface of the ring is unthreaded and may be slightly larger in diameter than the inside diameter of the discharge nozzle opening as well as larger than the overhanging and underhanging rims of the nozzle and the ring must therefore be forcibly inserted into place. This force fit aids in obtaining both a good seal and a secure seat for the plastic plug. However, it was found that with known tools insertion and removal of the ring were difficult operations at best. Furthermore, unintentional dislodging of the ring down through the opening into the interior of the drum was not uncommon. My invention embodies in a single tool means to eliminate this danger and to perform the insertion and removal operations quickly, efficiently, and with the least expenditure of effort.

The objects of my invention are accomplished in general by providing a light weight dual hand tool with lever-action means at opposite ends to insert and remove the ring. The interposed handle section serves as a rigid lever arm by which the required moment can be manually exerted to overcome the interference between the ring and the discharge opening. A hook member is incorporated in the removal means to serve both as a fulcrum point and as a grasping member adapted to retain the ring on the tool after it has been dislodged. On the insertion means a pivoted supporting member is employed as a mount by which the ring is retained on the tool prior to insertion.

Reference to the accompanying drawings and the following detailed description will more clearly illustrate my invention.

Fig. 1 is a longitudinal view of the tool;

Fig. 2 is a vertical section of an insert ring positioned in the nozzle of a drum;

Fig. 3 is a perspective view of the removal means;

Fig. 4 is a perspective view of the insertion means;

Fig. 5 is a vertical section of the removal means operationally positioned in the inserted ring, and

Fig. 6 is a vertical section of the insert means operationally positioned in the inserted ring.

In Fig. 1 the entire tool is shown consisting of insertion means 1, removal means 2, and handle section 3. The insertion and removal means are located on opposite end portions of the tool and are securely attached to handle section 3 by screw threads 4 and 5, respectively. Handle section 3 is an extended bar approximately a foot in lentgh and of sufficient diameter to be readily grasped in the operator's hand.

The plastic insert ring 6 is shown in Fig. 2 within discharge opening 7 located in the metal drum head 8. Discharge opening 7 is encircled by nozzle 9 having an annular channel 10 in the inside wall thereof defined by an inturned flange 11 and a throat 12. The nozzle is an integral part of the metal drum head 8. The plastic insert ring 6 has threads 13 formed on its inside diameter to receive an externally threaded closure plug. Shoulder 14 on the exterior surface of ring 6 cooperates with annular channel 10 in nozzle 9 when the ring is operationally positioned. To insure a tight fit of the ring in the discharge opening the diameter of the ring across the shoulder 14 may be slightly greater than the inside diameter of the annular channel 10. Thus the ring undergoes definite deformation during insertion.

Removal means 2 is shown in Fig. 3. Rigid straight arm 15, affixed to handle section 3, has hook member 16 depending downwardly from its extreme outer end and is faced off by abutting surface 18. Hook member 16, incorporated as the ring retaining means, extends beyond the end of straight arm 15 and is terminated by abutting surface 17. Foot 19 which serves as the dislodging member depends downwardly from straight arm 15, rearwardly of hook member 16. The lateral span of the rearward lower surface of foot 19 is increased by an arcuate extension 20 firmly attached to foot 19.

In the insertion means illustrated in Fig. 4, rigid bent arm 21 is affixed to handle section 3 and has an abutting surface 22 adjacent to its extreme outer end on the lower surface thereof. Depending downwardly from bent arm 21, rearwardly of surface 22, is member 23 drilled through laterally at its lower end to receive pin 24. Mount 25, centrally slotted at 26 to receive the lower end of member 23, pivots on the ends of pin 24 extending from either side of member 23. In operation mount 25 serves as the ring supporting means by underlying the ring prior to insertion. Adjacent to the outer end of mount 25 on the upper surface thereof is an abutting surface 27. The extreme inner end of mount 25 is defined by the flanged arc 28, the upper surface of which forms an abutting surface 29.

Fig. 5 illustrates the method by which the removal means is used to extract the inserted ring. Hook member 16 is directed through the ring and abuting surface 18 is brought in light contact with threads 13, thus locating the foot 19 at its proper position on the opposite upper surface of the ring as shown. This also places abutting surface 17 at the extreme end of hook member 16 in contact with the underside of the drum head 8. Handle section 3 is now directed manually downward as shown by the arrow, thus pivoting the entire tool about abutting surface 17 at the end of the hook member. Foot 19 descends forcing ring 6 downwardly and out of annular channel 10. When the ring is completely dislodged it falls onto hook member 16 and is then drawn out of the discharge opening in the grasp of the hook.

The method of inserting the ring is illustrated in Fig. 6. Ring 6 is first manually located on the upper surface of mount 25 encircling member 23 so that its lower outside surface abuts the flanged arc 28 on the left as shown. This locates the opposite lower edge of the ring on the abutting surface 27 at the outer end of mount 25. In this position the ring is safely supported on the tool and is now ready to be inserted into the discharge opening. The mount 25, arcuate flanged end first, is directed into the nozzle opening the ring 6 being manually deformed

to pass through the opening therewith. After the mount 25 and ring 6 are with the drum the handle section 3 is directed manually upwardly and to the right as shown by the arrow. After the ring snaps into place in the annular channel 10, the handle 3 is directed to the left thus unclamping the ring, and the mount 25 is removed upward therethrough.

It will be obvious to persons skilled in this art that the form of my invention herein illustrated is only one specific embodiment. Modifications may well be made to this form without departing from the scope of the invention and therefore I do not limit myself to this illustrated form but rather only to the extent set forth in the following claims.

I claim:

1. A tool for the removal of resilient plastic insert rings located in an annular channel of a nozzle formed in a drum head, wherein said rings are generally cylindrical and are formed with an outwardly extending rib receivable in a mating channel in the nozzle to hold said rings in place in the nozzle but are capable of being pushed out of the nozzle and wherein said tool is formed to push the rings out of the nozzle inwardly of the container and to catch them, before they drop into the container, on a tool portion which enables them to be fished out of the container, which tool comprises a handle portion at one end, a generally U-shaped hook portion at the other end and a depending insert dislodging member intermediate said hook portion and said handle portion, said hook portion having the opposed parallel legs of said U of substantial extent and spaced sufficiently to readily receive the side wall of said ring, said hook portion to be inserted through said ring and to lie beneath one lower edge thereof with the outermost end of said hook portion engaging the inner face of the drum to serve as a fulcrum and said depending insert dislodging member extending downwardly from said tool handle and spaced from said hook portion so as to engage the upper end of the side of said ring remote from the portion embraced by said hook, said dislodging member on the downward movement of said tool handle serving to press said insert out of said nozzle channel by the pivoting action of said tool about said fulcrum whereby said dislodged insert will drop on to the bite of said U for support thereby.

2. A tool as in claim 1, said depending insert dislodging member being of arcuate formation in its horizontal extent on a curve complementary to the curvature of the upper end of the ring member to be engaged thereby.

3. A tool as in claim 1, said depending insert dislodging member including an arcuate insert engaging extension on an arc complementary to the curvature of the upper end of the side of said ring.

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