

- (21) Application No. 60059/71 (22) Filed 23 Dec. 1971 (19)
 (31) Convention Application No. 106 409 (32) Filed 14 Jan. 1971 in
 (33) United States of America (US)
 (44) Complete Specification published 22 May 1974
 (51) International Classification B21D 43/04
 (52) Index at acceptance
 B3Q 2A13 2C1 2C2 2C3A 4



(54) CLOSURE FLANGE FEED APPARATUS

(71) We, AMERICAN FLANGE & MANUFACTURING CO. INC., of 30, Rockefeller Plaza, New York, New York 10020, United States of America, a Corporation organised under the laws of the State of Delaware, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is directed to closure flange feeding apparatus and is particularly concerned with apparatus for feeding closure flanges to a work receiving position within a flange insertion die which inserts the flanges into container walls.

The trend toward automation in the drum container industry has made it necessary to increase the speed and efficiency of container fabricating operations. One such operation is the insertion of closure flanges in the head and sidewall of drum containers, such flanges having a cylindrical internally threaded neck surrounded by a flat polygonal base. This operation involves feeding a properly oriented closure flange into a flange insertion die mounted in a metal working punch press. Upon cycling of the press the flange is permanently secured within a suitably formed opening in the container wall. Flange feeding arrangements heretofore employed in flange insertion operations have tended to be inadequate to meet the present and future needs of the container industry.

According to the invention there is provided an apparatus for feeding closure flanges wherein said apparatus comprises a stationary base plate, a shuttle mounted for slideable movement on and with respect to said base plate, drive means carried by said base plate for imparting reciprocating movement to said shuttle, said shuttle including a flange receiving member, means for moving said flange receiving member relative to said shuttle, a flange feed chute carried by said base plate and adapted to feed closure

flanges to said flange receiving member when said shuttle is in a retracted position, a presser foot operatively connected to said drive means and overlying said flange receiving member and urging means for forcing said presser foot downwardly to discharge a flange carried by said receiving member when said shuttle is at a fully advanced position.

The flange feeding apparatus of the invention is capable of operating at high speed and with a high degree of efficiency. The invention, by virtue of its simplicity, offers improved dependability and reduces maintenance costs to a minimum. The foregoing is accomplished by means of a piston driven pusher member which receives the base of an oriented flange from a gravity fed entrance chute. The oriented flange is then advanced by the pusher member and, simultaneously with that advancing, a presser foot acting in conjunction with the pusher member bears against the uppermost end of the flange neck and positively positions the flange in a work receiving position within the insertion die. The pusher member and presser foot then retract for reception of another flange allowing the die to close and insert the positioned flange in a container wall in process.

An embodiment of the invention and a method of carrying it into effect will now be described by way of example and with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a flange feeding apparatus in accordance with the invention;

Figure 2 is a top plan view of the flange feed and a flange insertion lower die being fed;

Figure 3 is sectional view taken on the line 3—3 in Figure 2 looking in the direction of the arrows and showing the flange insertion upper die member;

Figure 4 is an enlarged top plan view of the pusher member in a retracted flange receiving position;

Figure 5 is an enlarged fragmentary top plan view with the pusher member in partially advanced position;

Figure 6 is a sectional view taken on the line 6—6 in Figure 4 and looking in the direction of the arrows;

Figure 7 is a sectional view taken on the line 7—7 in Figure 4 and looking in the direction of the arrows;

Figure 8 is a sectional view similar to Figure 7 but with the pusher member in the fully advanced position;

Figure 9 is a sectional view showing the pusher member in its retracted position;

Figure 10 is a sectional view similar to Figure 9 but with the pusher member in a partially advanced position;

Figure 11 is a sectional view similar to Figure 9 but with the pusher member in a fully advanced position;

Figure 12 is sectional view showing a closure flange positioned in the insertion lower die prior to insertion within a container wall opening; and

Figure 13 is a sectional view similar to Figure 12 but with the upper die member performing the flange insertion operation.

The flange-feeding apparatus of the invention as shown in Figure 1 comprises a base plate 1 having affixed thereto an upstanding wall 2. An air cylinder 3 is secured to the wall 2 by bolts 4 and has a longitudinally reciprocating piston rod 5 extending through an aperture 6 in the wall 2 (Figures 2 and 3). A movable shuttle 7 having an upstanding boss 7a at its inner end is connected by a nut 8 to the distal end of the piston rod 5 and is formed with guideways 9 along the side edges thereof. A series of guide rollers 10 are secured to the plate 1 and engage within the shuttle guideways 9. A longitudinally extending cutout section 11 is provided in the shuttle 7, the section 11 having a bottom wall 12 extending throughout a portion of the cutout section length defining a pair of side rails 13 and 14. An enlarged flange receiving pocket 15 is formed in the cutout section 11 intermediate its length and above the bottom wall 12. A flange retaining member 16 is secured to the guide rail 14. A flange guide member 17 is secured to the side rail 13 opposite the enlarged flange receiving pocket 15 and a pair of stop members 18 are secured to the side rails 13 and 14 adjacent the inner end of the cutout section 11. A longitudinally extending guide bar 19 is secured by screws 20 to the base plate 1 and is engaged within a central guideway formed in the lower surface of the shuttle 7.

A pair of reciprocating rods 22 extend through spaced apertures 23 in the upper end of the wall 2 and are provided with adjustable stop nuts 24 threadedly engaged at their outer ends. A second pair of adjust-

able stop nuts 25 are threadedly engaged at an intermediate point along the length of the rods 22. The inner ends of the reciprocating rods 22 are secured by nuts 26 to a mounting plate 27 having a central aperture 28 surrounding the piston rod 5. A reciprocating supporting rod 29 secured to the mounting plate 27, extends through an aperture 30 in the shuttle boss 7a and is surrounded by a longitudinally extending compression spring 31. A flange receiving pusher member, generally indicated at 32, is secured to the inner end of the rod 29 which is adapted for reciprocating movement relative to the base plate 1 and within the confines of the shuttle cutout 11. The pusher member 32 comprises a horizontal flange supporting panel 33 joined by a vertical wall 34 to an upwardly and inwardly facing inclined camming surface 35.

A horizontally disposed T-shaped presser foot 36 is positioned in vertically spaced relationship above the flange receiving pocket 15 and supported by a pair of bolts 37 threadedly engaged to the shuttle 7 within cylindrical recesses 38 in the shuttle rails 13 and 14. A pair of downwardly extending cups 39 are secured to the head of the T-shaped presser foot 36 for reception within the recesses 38, each of which is formed with an aperture 40 in its bottom wall surrounding the bolts 37. A coil compression spring 41 is housed within each of the cups 39 surrounding the bolts 37 and resiliently urges the presser foot 36 downwardly relative to heads of the bolts 37. The rearwardly disposed end of the presser foot 36 is formed with a rearwardly and downwardly facing inclined cam surface 42 adapted for sliding engagement with the pusher member cam surface 35.

A laterally extending closure flange feed chute 43 is secured to the base plate 1 with its leading end juxtaposed to the shuttle side rail 13 and in line with the pocket 15, with the shuttle 7 in a retracted position as seen in Figure 1. An upwardly opening channel 44 is formed in the upper surface of the feed chute 43 extending throughout the length thereof. An elongated flange retainer strip 45 is secured to the upper surface of each of the side edge portions of the feed chute 43.

The closure flange, which the invention is designed to feed, is generally indicated at 47, and, as clearly shown in Figure 12 prior to insertion in a container wall, comprises a cylindrical neck 49 surrounded by an octagonal base 48. The interior of the flange neck 49 is provided with a lower threaded portion 50 and an upper unthreaded portion 51. An annular gasket 52 surrounds the flange neck 49 immediately above the flange base 48. The container

3
wall 53 within which the flange 47 is inserted is formed, prior to the insertion operation, with an opening 54 surrounded by an upstanding neck 55.

5 The closure flange insertion die, into which the invention is designed to feed flanges, has a lower flange supporting anvil 56 surrounded by an annular compression ring 57. The compression ring 57 is supported by a series of bolts 58 surrounded by compression springs 59 which act between the lower surface of the ring 57 and the lower anvil 56. An upper die member curling anvil 60 is vertically aligned above the lower flange supporting anvil 56.

10 In operation, closure flanges 47 are fed down the feed chute 43, across the shuttle side rail 13 and into the pocket 15 where a flange is supported on the pusher member panel 33. Movement of a flange 47 beyond the shuttle side rail 14 is prevented by the retaining member 16. The air cylinder is then operated, prior to cycling of the flange insertion press, causing the piston rod 5 to advance carrying with it the shuttle 7, the pusher member 32 together with a flange 47, and the presser foot 36 disposed in closely spaced relationship above the flange neck 49. As the shuttle advances, the flange guide member 17 prevents entry of the following flange in the feed chute 43 from entering the shuttle pocket 15 as seen in Figure 5. As the piston rod 5 continues its movement, the stop nuts 24 on the rods 22 come in contact with the wall 2, terminating the forward movement of the pusher member 32. The shuttle member 7 continues to advance under the influence of the piston rod 5, resulting in compression of the spring 31 about the now stationary rod 29. As seen in Figure 11 continued advancement of the shuttle 7 causes the presser foot 36 to move downwardly in contact with the top of the flange neck 49 as the presser foot cam surface 42 moves down along the pusher member cam surface 35 under the influence of the springs 41. Upon termination of the stroke of the piston rod 5, the shuttle member pocket 15 is brought into vertical alignment with the lower anvil 56 of the flange insertion die. At this point the rearward end of the shuttle recess 11 contacts the pusher member 32 and the flange 47 is pulled off of the pusher member panel 33 and urged into the compression ring 57 by the overlying presser foot 36. The travel of the piston rod 5 is then reversed causing retraction of the shuttle 7 and subsequent raising of the presser foot 36 along the pusher member cam surface 35. Continued

tration of the shuttle 7 restores the parts to their initial position as shown in Figure 1. The flange insertion press is then cycled causing the upper curling anvil 60 to lower on the flange neck 49, forcing the flange base 48 against the lower supporting anvil 56, and causing the container wall 53 to depress the compression ring 57. Continued downward movement of the curling anvil 60 curls the upper portion 51 of the flange neck outwardly about the upper end of the container wall opening neck 55 compressing the gasket 52 between the juncture of the flange neck and base and the surrounding container wall neck. Upon opening of the insertion press the container wall is removed with the inserted flange and the complete cycle as above described is repeated.

WHAT WE CLAIM IS:—

1. An apparatus for feeding closure flanges wherein said apparatus comprises a stationary base plate, a shuttle mounted for slideable movement on and with respect to said base plate, drive means carried by said base plate for imparting reciprocating movement to said shuttle, said shuttle including a flange receiving member, means for moving said flange receiving member relative to said shuttle, a flange feed chute carried by said base plate and adapted to feed closure flanges to said flange receiving member when said shuttle is in a retracted position, a presser foot operatively connected to said drive means and overlying said flange receiving member and urging means for forcing said presser foot downwardly to discharge a flange carried by said receiving member when said shuttle is at a fully advanced position.

2. Apparatus according to claim 1, wherein said drive means is an air cylinder having a piston rod drivingly connected to said shuttle.

3. Apparatus according to claim 2, wherein said flange receiving member includes a drive mechanism operatively connected to said piston rod.

4. Apparatus according to claim 3 wherein said flange receiving member drive mechanism includes a stop means for terminating the forward movement of said flange receiving member at the fully advanced position of said shuttle.

5. Apparatus according to any one of claims 1 to 4, wherein the urging means includes a spring means for actuating said presser foot for moving said flange downwardly.

wall 53 within which the flange 47 is inserted is formed, prior to the insertion operation, with an opening 54 surrounded by an upstanding neck 55.

5 The closure flange insertion die, into which the invention is designed to feed flanges, has a lower flange supporting anvil 56 surrounded by an annular compression ring 57. The compression ring 57 is supported by a series of bolts 58 surrounded by compression springs 59 which act between the lower surface of the ring 57 and the lower anvil 56. An upper die member curling anvil 60 is vertically aligned above the lower flange supporting anvil 56.

10 In operation, closure flanges 47 are fed down the feed chute 43, across the shuttle side rail 13 and into the pocket 15 where a flange is supported on the pusher member panel 33. Movement of a flange 47 beyond the shuttle side rail 14 is prevented by the retaining member 16. The air cylinder is then operated, prior to cycling of the flange insertion press, causing the piston rod 5 to advance carrying with it the shuttle 7, the pusher member 32 together with a flange 47, and the presser foot 36 disposed in closely spaced relationship above the flange neck 49. As the shuttle advances, the flange guide member 17 prevents entry of the following flange in the feed chute 43 from entering the shuttle pocket 15 as seen in Figure 5. As the piston rod 5 continues its movement, the stop nuts 24 on the rods 22 come in contact with the wall 2, terminating the forward movement of the pusher member 32. The shuttle member 7 continues to advance under the influence of the piston rod 5, resulting in compression of the spring 31 about the now stationary rod 29. As seen in Figure 11 continued advancement of the shuttle 7 causes the presser foot 36 to move downwardly in contact with the top of the flange neck 49 as the presser foot cam surface 42 moves down along the pusher member cam surface 35 under the influence of the springs 41. Upon termination of the stroke of the piston rod 5, the shuttle member pocket 15 is brought into vertical alignment with the lower anvil 56 of the flange insertion die. At this point the rearward end of the shuttle recess 11 contacts the pusher member 32 and the flange 47 is pulled off of the pusher member panel 33 and urged into the compression ring 57 by the overlying presser foot 36. The travel of the piston rod 5 is then reversed causing retraction of the shuttle 7 and subsequent raising of the presser foot 36 along the pusher member cam surface 35. Continued

retraction of the shuttle 7 restores the parts to their initial position as shown in Figure 1. The flange insertion press is then cycled causing the upper curling anvil 60 to lower on the flange neck 49, forcing the flange base 48 against the lower supporting anvil 56, and causing the container wall 53 to depress the compression ring 57. Continued downward movement of the curling anvil 60 curls the upper portion 51 of the flange neck outwardly about the upper end of the container wall opening neck 55 compressing the gasket 52 between the juncture of the flange neck and base and the surrounding container wall neck. Upon opening of the insertion press the container wall is removed with the inserted flange and the complete cycle as above described is repeated.

WHAT WE CLAIM IS:—

1. An apparatus for feeding closure flanges wherein said apparatus comprises a stationary base plate, a shuttle mounted for slideable movement on and with respect to said base plate, drive means carried by said base plate for imparting reciprocating movement to said shuttle, said shuttle including a flange receiving member, means for moving said flange receiving member relative to said shuttle, a flange feed chute carried by said base plate and adapted to feed closure flanges to said flange receiving member when said shuttle is in a retracted position, a presser foot operatively connected to said drive means and overlying said flange receiving member and urging means for forcing said presser foot downwardly to discharge a flange carried by said receiving member when said shuttle is at a fully advanced position.

2. Apparatus according to claim 1, wherein said drive means is an air cylinder having a piston rod drivingly connected to said shuttle.

3. Apparatus according to claim 2, wherein said flange receiving member includes a drive mechanism operatively connected to said piston rod.

4. Apparatus according to claim 3 wherein said flange receiving member drive mechanism includes a stop means for terminating the forward movement of said flange receiving member at the fully advanced position of said shuttle.

5. Apparatus according to any one of claims 1 to 4, wherein the urging means includes a spring means for actuating said presser foot for moving said flange downwardly.



6. Apparatus according to any one of claims 1 to 5, wherein a closure flange guide and stop member are mounted on said shuttle for preventing feeding of flanges from said flange feed chute into said receiving member during advancement of said shuttle.
- 5 7. An apparatus for feeding closure flanges substantially as hereinbefore described with reference to the accompanying drawings. 10

JENSEN & SON,
Agents for the Applicants,
8, Fulwood Place,
High Holborn,
London, WC1V 6HG.
Chartered Patent Agents.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1974.
Published at The Patent Office, 25 Southampton Buildings, London WC2A 1AY
from which copies may be obtained.

