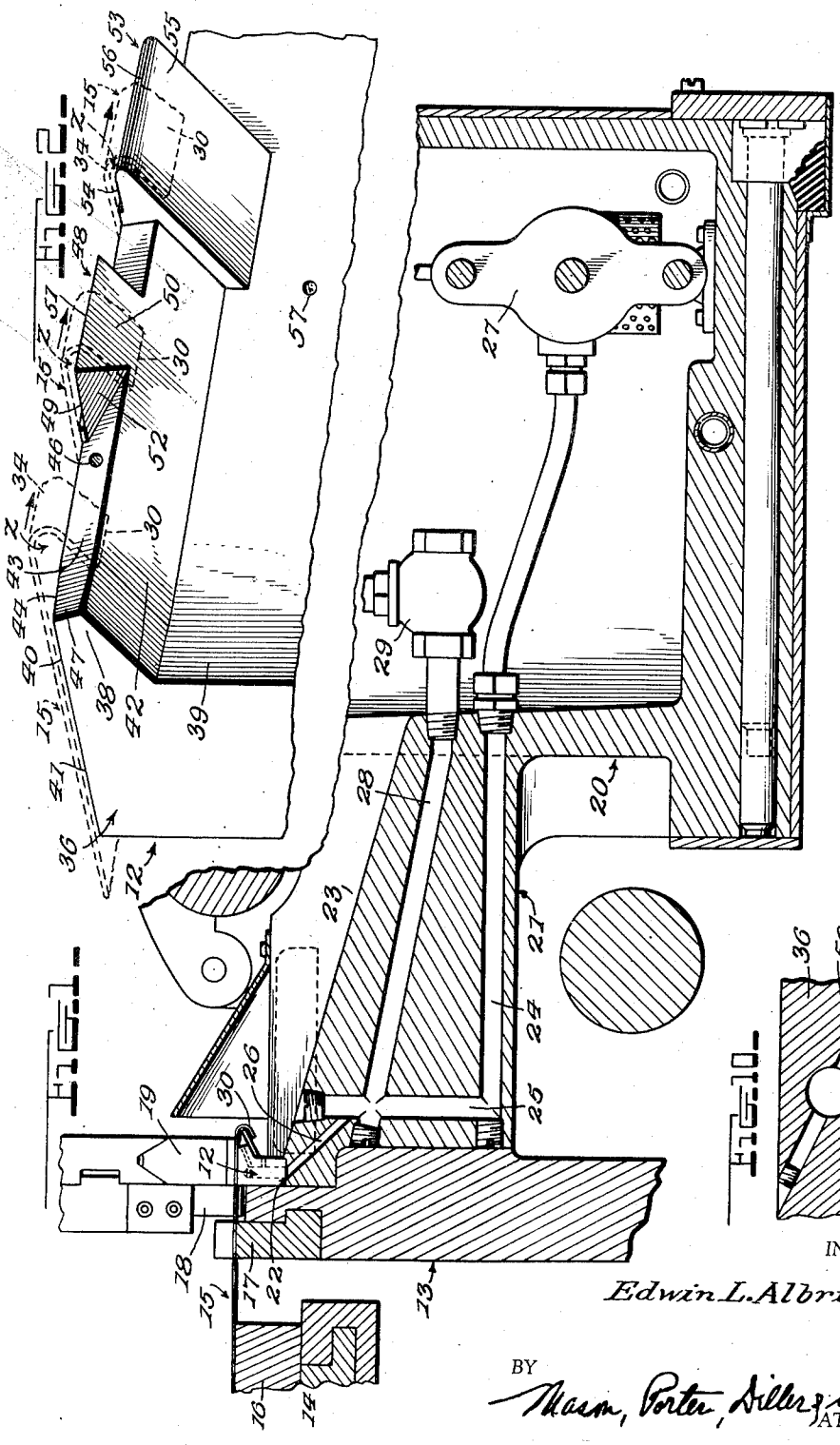
Dec. 11, 1956 E. L. ALBRIGHT 2,773,279

APPARATUS AND METHOD FOR APPLYING SIDE SEAM SEALING COMPOUND TO CAN BODY BLANKS

Filed July 15, 1955 2 Sheets-Sheet 1



INVENTOR

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BY

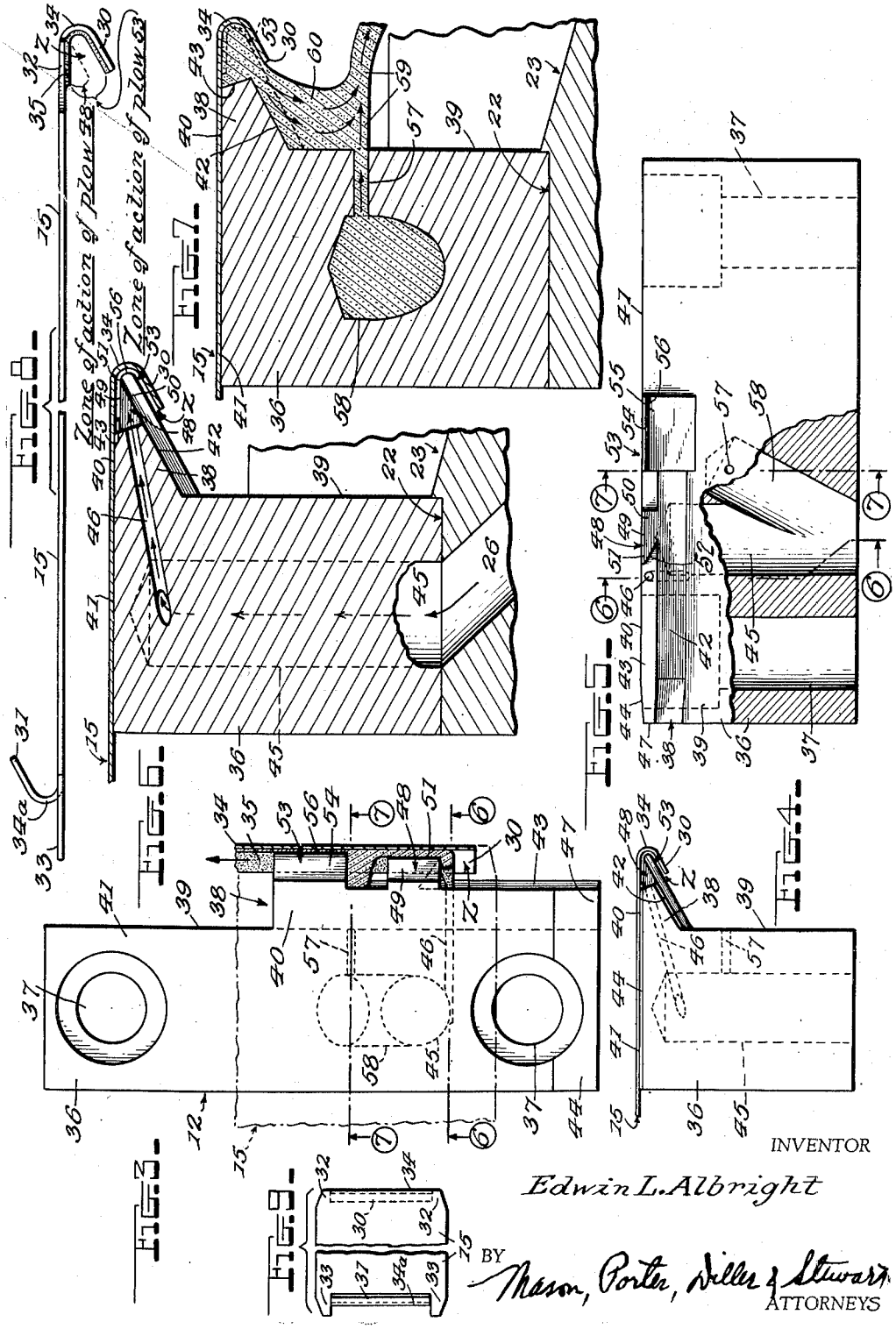
Mason, Porter, Sillers & Stewart

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2,773,279

APPARATUS AND METHOD FOR APPLYING SIDE SEAM SEALING COMPOUND TO CAN BODY BLANKS

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Application July 15, 1955, Serial No. 522,281

20 Claims. (Cl. 18—1)

This invention relates to the manufacture of cans having side seams in which inter-engaging hook flanges are sealed together by a sealing compound.

The invention relates more specifically to the application of fluid viscous sealing compound to the usual hook flanges of can body blanks prior to bending such blanks into desired form, interengaging said hook flanges and bumping them in the customary manner.

An apparatus has heretofore been provided in which can body blanks are fed over a nozzle having a sealing compound discharge port which injects a quantity of sealing compound into the zone between each blank body and one of its hook flanges, the blanks being fed along a straight path with this hook flange disposed downwardly and extending longitudinally of said path.

In this known apparatus, the nozzle is mounted at one side of a reservoir from which the sealing compound is pumped to the aforesaid discharge port, and a plow is provided for plowing out surplus compound from the aforesaid zone and evenly distributing the remaining compound. Also, a trough declines from the nozzle to the reservoir for not only returning the plowed-out surplus but for receiving and returning the compound ejected from the aforesaid discharge port in the gaps between the advancing blanks.

Such an apparatus is disclosed in a pending U. S. patent application filed jointly by myself and Philip F. Catalano, Serial No. 443,022, filed July 13, 1954. While this apparatus has obtained quite promising results, it has been found to possess some shortcomings which the present invention corrects.

In the prior apparatus, it was found that surplus sealing compound would at times crowd back over the nozzle and coat a portion of the blank along the margin of the intended seam line area or stripe. A most important object of the present invention has been to correct this; and it has been found that two plows in tandem would attain this end, a large portion of the surplus compound being plowed out by the first plow and the remaining surplus by the second plow. In connection with these plows, another object has been to so shape the first plow that it will downwardly crowd the sealing compound away from the top of the nozzle and toward the hook flange preventing stray travel from the aforesaid zone onto the blank and insuring proper coating of said hook flange.

In the prior apparatus, it was also found that the viscous sealing compound drooling down the nozzle from the plow would accumulate at the nozzle and cause trouble, instead of rapidly flowing down the aforesaid trough to the reservoir. Another important object of the present invention has been to correct this imperfection; and it has been found that a jet of fluid under pressure, directed against the drooling compound in a direction longitudinally of the trough and toward the reservoir, would efficiently carry the surplus compound back to said reservoir and would not allow any build-up of this surplus at the nozzle.

In attaining this end just mentioned, it has been a further object to utilize sealing compound pumped from the reservoir as the aforesaid "jet of fluid under pressure." This is preferably attained by placing the port from which this jet is ejected in communication with the conducting means which conducts the sealing compound to the zone defined jointly by the hook flange, bight and contiguous portion of each blank. Due to such communication, should the port which discharges the compound to the stated zone become clogged, the jet discharge port will relieve back pressure and prevent possible injury to the line through which the compound is pumped.

Another object of the present invention has been to provide a single simple nozzle embodying the improvements above discussed and easily applicable to the nozzle seat of the prior apparatus.

A still further object has been to provide a new and improved method for applying the sealing compound to the above mentioned zone of each body blank and insuring a uniform film of the compound accurately placed in the required manner.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 of the accompanying drawings is a vertical sectional view through a sealing compound applying apparatus improved in accordance with the present invention.

Figure 2 is a perspective view, partly broken away, showing the improved double-plow nozzle, a fragment of a can body blank being shown in dotted lines in three stages of its travel.

Figure 3 is a top plan view of the nozzle with a portion of a can body blank in section and illustrating the application and plowing out of the sealing compound.

Figure 4 is an end elevation of the nozzle.

Figure 5 is a side elevation of the nozzle, partly in section.

Figure 6 is a vertical transverse sectional view on line 6—6 of Figures 3 and 5.

Figure 7 is a similar view on line 7—7 of Figures 3 and 5, showing the manner in which the surplus sealing compound is jetted away from the nozzle.

Figure 8 is an end view of a blank coated by the improved apparatus and showing the zones of action of the two plows.

Figure 9 is a plan view showing the type of blank coated by the invention.

Figure 10 is a fragmentary horizontal sectional view showing a differently located port for conducting sealing compound to the jet ejecting port.

In Figure 1, the improved nozzle is generally indicated at 12 as constituting an element of an apparatus such as that disclosed in the pending patent application above referred to. This apparatus is secured to a portion 13 of a conventional body maker having the usual feedway 14 for the can body blanks 15, said feedway including a central support 16, reciprocatory feed bar 17, blank stop 18 and blank clamp 19. A reservoir 20 for the seam sealing compound is laterally spaced from the body maker by means of an arm 21, said arm having a seat 22 for the nozzle 12 and a trough 23 declining from said seat to the reservoir 20. The arm 21 has communicating ports 24, 25 and 26 through which the sealing compound is pumped from the reservoir 20 to the nozzle 12, the pump being shown at 27. The arm 21 is also formed with a port 28 having a hand adjusted globe valve 29, said port 28 being in communication with the aforesaid port 25. While the sealing compound is being pumped to the nozzle 12, some of the

compound will be short circuited back to the reservoir 20 through the port 28 and its valve 29. Adjustment of this valve will therefore determine the velocity of the sealing compound discharged by the nozzle 12. Due to the novel nozzle construction hereinafter described, the required amount of the nozzle discharged sealing compound will be retained on the can body blanks 15 as they are advanced along the feedway 14 and all surplus compound will be returned to the reservoir 20 through the trough 23 with no build up of compound at the nozzle. The trough 23 also receives the stream of sealing compound necessarily discharged by the nozzle 12 in the gaps between the advancing blanks and returns this compound to the reservoir.

The construction and functions of the nozzle 12 can be better understood by first explaining the general type of can body blank to be served by said nozzle. Reference may therefore be made to Figures 8 and 9 for this purpose. A can body blank 15 of the lock and lap type is shown, said blank having the usual outer hook flange 30, inner hook flange 31, and lap portions 32, 33 at the ends of said hook flange, respectively. Each hook flange is disposed at an acute angle to the body portion of the blank 15 and is joined by a bight 34 (or 34*a*) to the contiguous blank portion. The nozzle 12 applies a film 35 of sealing compound to the outer hook flange 30, the bight 34, and the contiguous blank portion as seen in Figure 8. Also, the film extends onto the lap portion 32 and the blank is thus in readiness to be formed into a can body in the usual manner, with the two hook flanges 30 and 31 interengaged and bumped tightly together.

While attention is upon Figures 8 and 9 it will be noted that Figure 8 illustrates the zones of action of the two plows above referred to.

One adequate nozzle structure is shown in Figures 2 to 7. A slight variation is shown in Figure 10, and while it is to be understood that other minor variations could well be made within the scope of the invention, the specific construction shown has proven to be highly efficient and reliable.

A horizontally elongated, generally rectangular nozzle body 36 has been provided, said body having openings 37 to receive attaching fasteners for mounting it upon the nozzle seat 22. This body 36 has a longitudinally extending overhang 38 which projects laterally from one vertical side 39 of said body. The upper side 40 of this overhang 38 is flat and disposed in the same horizontal plane with the flat upper side 41 of the body 36, and this plane is at the level of the can blank support 16 when the nozzle has been installed. The lower surface 42 of the overhang 38 inclines laterally away from the vertical body side 39 and extends to the longitudinal outer edge 43 of said overhang 38, said edge 43 being in an inclined plane at a somewhat obtuse angle to the upper side 40 of said overhang 38. The inclination of the lower surface 42 of the overhang 38 is preferably the same as the inclination of the hook flange 30. The front end of the body 36 and its overhang 38, toward which the blanks 15 are fed is bevelled at 44 to prevent possible catching of any of the blanks thereagainst.

Formed within the body 36, is a port 45 to communicate with the aforesaid port 26, and a sealing compound discharge port 46 branches from said port 45. This discharge port opens through the overhang edge 43 somewhat rearwardly from the front end 47 of the latter, and its function is to discharge an overabundance of sealing compound into the zone Z of each blank 15 as the latter advances over the nozzle, this zone Z being defined by the hook flange 30, the associated bight 34 and the contiguous portion of the blank.

At a somewhat more advanced point on the path along which the blanks 15 are fed, the outer edge 43 of the overhang 38 is provided with a plow 48. This

plow plows out a substantial quantity (preferably about half) of the surplus sealing compound from the zone Z and directs it downwardly at the inner side 39 of the body 36.

The plow 48 is elongated longitudinally of the overhang edge 47 and is of V-shape transversely with its upper and lower surfaces 49 and 50 meeting at an apex 51. The upper surface 49 is horizontal and is spaced downwardly from the upper side 40 of the overhang 38 a distance no less than the thickness of the required film 35 (Figure 8) to be left on the seam portion of each blank 15. The transverse width of this upper surface 49 is no greater than the width of the stripe of sealing compound to be left on the blank body adjacent the bight 34. The lower surface 50 of the plow 48 is inclined preferably in conformity with the inclination of the hook flange 30, and in the present disclosure this lower surface 50 merges into the lower surface 42 of the overhang 38. The front end surface 52 of the plow 48 is declined in the direction of blank travel to downwardly crowd the surplus sealing compound away from the top of the nozzle and prevent it from creeping onto the blank body along the margin of the desired stripe to be left on said blank body. The surface 52 also downwardly forces the sealing compound onto the hook flange 30 to insure proper coating of the latter.

At a somewhat further advanced point on the path along which the blanks 15 are fed, there is a second plow 53 projecting from the overhang 38. The functions of this second plow 53 are to plow out all remaining surplus of sealing compound from the zone Z and to smoothly trowel the desired film 35 left on the hook-flange 30, adjacent the bight 34 and the contiguous portion of each blank.

The plow 53 is elongated longitudinally of the overhang 38 and is of V-shaped transversely with its upper and lower surfaces 54 and 55 joined by a curved nose 56. The upper surface 54 is horizontal and spaced downwardly from the upper side 40 of the overhang 38 a distance corresponding to the thickness of the film 35 of sealing compound to be left on the blank. The transverse width of this upper surface 54 corresponds to the width of the stripe of sealing compound to be left on the blank body contiguous to the bight 34. The lower surface 55 is inclined in conformity with the inclination of the hook flange 30 and is in a plane spaced downwardly from the plane of the lower surface 50 of the first plow 48. This spacing is such as to space the surface 55 above the hook flange 30 a distance corresponding to the thickness of the film 35 to be left on said hook flange. The nose 56 is so curved as to be substantially concentric with the bight 34 and spaced from the latter a distance corresponding to the thickness of the film 35 to be left in said bight, as shown in Figures 7 and 8.

The second plow 53 not only plows out the surplus sealing compound left in the zone Z by the first plow 48, but it smoothly trowels the film 35 left on the seam and lap portion of the blank.

As the plows 48 and 53 plow out the surplus sealing compound, said surplus drools down the inner side 39 of the nozzle body 36 as shown in Figure 7. In the prior known apparatus above referred to, this drooling compound would build up to such an extent as to foul plow operation and cause straying of some of the sealing compound onto blank portions which should have remained uncoated. Similar faulty operation is prevented in the improved nozzle by directing a jet of fluid under pressure against the drooling surplus of sealing compound in a direction away from the nozzle body 36 and longitudinally of the trough 23. As the sealing fluid supplied to the discharge part 46 (above described) is suitable for the jet just mentioned, and as the pump 27 places this fluid under adequate pressure for said jet, it is preferable to shunt some of the pumped sealing

compound from the main nozzle port **45** to provide the required jet.

A discharge port for the jet is shown at **57** in the body **36**, said port being open at the body side **39** in the zone in which the drooling occurs. This discharge port **57** communicates with the port **45** in any suitable way, for example by way of the inclined port **58** of Figures 3, 5 and 7 or the oblique port **58***a* of Figure 10.

As illustrated in Figure 7, the jet **59**, ejected from the port **57**, causes entrainment of the drooling sealing compound **60** and thus rapidly returns it to the reservoir **20**, instead of allowing a drool build up against the nozzle to cause trouble as previously stated.

While the jet discharging port **57** is shown only in a two plow nozzle, its function and advantage would remain the same if embodied in a single plow nozzle, for example any of the nozzles disclosed by the presently pending patent application above identified.

Operation and method

Although the operation of the improved nozzle and the apparatus improved by said nozzle, as well as the method steps performed, would probably be clear from the foregoing, some recapitulation may be desirable, as follows.

The blanks **15** are advanced along the predetermined path over the nozzle **12**, the hook flanges **30** being disposed downwardly and extending in longitudinal alignment along said path. During travel of each blank over the nozzle **12**, the zone Z receives an overabundance of sealing compound from the discharge port **46**. A substantial amount of the surplus compound is then plowed out by means of the first encountered plow **48**, and the remaining surplus is then removed by the second plow **53**, leaving the desired film **35** on the hook flange **30**, bight **34**, contiguous portion of each blank and the lap portions **32**. The surplus compound drooling down the inner side **39** of the nozzle is entrained by the jet **59** (see Figure 7) and rapidly carried away from the nozzle. Thus, the present invention attains ends which were sought in the above identified application but were not fully realized prior to the improvements disclosed herein.

While the present disclosure has been directed to preferences, attention is again invited to the possibility of making variations within the scope of the invention as defined in the appended claims.

I claim:

1. An apparatus for applying side seam sealing compound to a can body blank of a type having a hook flange joined by a bight to the contiguous portion of the blank; said apparatus comprising means for feeding the blank along a predetermined path with the hook flange of the blank disposed longitudinally of said path, means adjacent said path for directing an overabundant quantity of sealing compound into the zone defined jointly by the hook flange, bight and contiguous portion of the blank, sealing compound plowing means advanced along said path from said compound directing means and constructed to plow out a substantial quantity of the surplus compound from the aforesaid zone, and additional sealing compound plowing means advanced along said path from the first mentioned plowing means and constructed to plow out the remainder of the surplus sealing compound.

2. An apparatus for applying side seam sealing compound to a can body blank of a type having a hook flange joined by a bight to the contiguous portion of the blank; said apparatus comprising means for feeding the blank along a predetermined path with the hook flange of the blank disposed longitudinally of said path, means adjacent said path for directing an overabundant quantity of sealing compound into the zone defined jointly by the hook flange, bight and contiguous portion of the blank, sealing compound plowing means advanced along said path from said compound directing means and constructed to plow out substantially half of the surplus compound from the aforesaid zone, and additional sealing compound plowing means advanced along said path from the first mentioned plowing means and constructed to plow out the remainder of the surplus sealing compound.

3. A structure as specified in claim 1; together with a single nozzle body in which said compound directing means and both of said plowing means are embodied.

4. A structure as specified in claim 2; together with a single nozzle body in which said compound directing means and both of said plowing means are embodied.

5. In a nozzle for applying side seam sealing compound to a can body blank of a type having a hook flange joined by a bight to the contiguous portion of the blank; a nozzle body having an upper surface along which to advance the blank with its hook flange disposed downwardly and in laterally spaced relation with one side of said body, said body having sealing compound conducting means terminating in a discharge port which opens at said one side of said body, said discharge port being of a size to discharge an over-abundant quantity of sealing compound into the zone defined jointly by the hook flange, bight and contiguous portion of the blank, one sealing compound plow advanced along said body from said discharge port, said one plow projecting laterally from said one side of said body and being constructed to plow out a substantial quantity of the surplus compound from the aforesaid zone, and a second sealing compound plow advanced along said body from said one plow, said second plow also projecting laterally from said one side of said body and being constructed to plow out the remainder of the surplus compound from said zone.

6. In a nozzle for applying side seam sealing compound to a can body blank of a type having a hook flange joined by a bight to the contiguous portion of the blank; a nozzle body having an upper surface along which to advance the blank with its hook flange disposed downwardly and in laterally spaced relation with one side of said body, said body having sealing compound conducting means terminating in a discharge port which opens at said one side of said body, said discharge port being of a size to discharge an over-abundant quantity of sealing compound into the zone defined jointly by the hook flange, bight and contiguous portion of the blank, one sealing compound plow advanced along said body from said discharge port, said one plow projecting laterally from said one side of said body and being constructed to plow out substantially half of the surplus compound from the aforesaid zone, and a second sealing compound plow advanced along said body from said one plow, said second plow also projecting laterally from said one side of said body and being constructed to plow out the remainder of the surplus compound from said zone.

7. A structure as specified in claim 5; each of said plows being of substantially V-shape and having an upper surface in a plane spaced downwardly from the aforesaid upper surface of said body, this downward spacing of at least said upper surface of said second plow corresponding to the desired thickness of compound to be left on the blank, said one plow having a lower surface positioned to be upwardly spaced from the hook flange a distance considerably greater than the aforesaid thickness, said second plow having a lower surface positioned to be spaced above said hook flange a distance corresponding to said thickness, said second plow having a rounded nose merging into its upper and lower surfaces.

8. A structure as specified in claim 5; the end surface of said one plow toward said discharge port being declined in the direction in which the blank is fed.

9. A structure as specified in claim 5; each of said plows being of substantially V-shape and having an upper surface in a plane spaced downwardly from the aforesaid upper surface of said body, this downward spacing of at least said upper surface of said second plow correspond-

ing to the desired thickness of compound to be left on the blank, said one plow having a lower surface positioned to be upwardly spaced from the hook flange, a distance considerably greater than the aforesaid thickness, said second plow having a lower surface positioned to be spaced above said hook flange a distance corresponding to said thickness, said second plow having a rounded nose merging into its upper and lower surfaces; the end surface of said one plow toward said discharge port being declined in the direction in which the blank is fed.

10. In a nozzle for applying side seam sealing compound to a can body blank of a type having a hook flange joined by a bight to the contiguous portion of the blank; a horizontally elongated body of generally rectangular form and having a flat upper surface along which to advance the blank with its hook flange disposed downwardly in laterally spaced relation with one vertical side of said body, said body having an overhang extending longitudinally thereof and projecting laterally from said one vertical side, said overhang having a flat upper side in the same plane with said upper surface of said body, said overhang also having a lower side which declines to said one vertical side of said body, said overhang also having a longitudinal outer edge disposed in a plane at an angle to the upper side of said overhang, said body having sealing compound conducting means terminating in a discharge port which opens through said outer edge of said overhang, said discharge port being of a size to discharge an overabundant quantity of sealing compound into the zone jointly defined by the hook flange, bight and contiguous portion of the blank, one sealing compound plow advanced along said edge from said discharge port, said one plow projecting laterally from said edge and being constructed to plow out a substantial quantity of the surplus compound from the aforesaid zone, and a second sealing compound plow further advanced along said edge, said second plow projecting laterally from said edge and being constructed to plow out the remainder of the surplus compound from said zone.

11. A structure as specified in claim 10; each of said plows being of substantially V-shape and having an upper surface in a plane spaced downwardly from the aforesaid upper surface of said body, this downward spacing of at least said upper surface of said second plow corresponding to the desired thickness of compound to be left on the blank, said one plow having a lower surface positioned to be upwardly spaced from the hook flange a distance considerably greater than the aforesaid thickness, said second plow having a lower surface positioned to be spaced above said hook flange a distance corresponding to said thickness, said second plow having a rounded nose merging into its upper and lower surfaces.

12. A structure as specified in claim 10; each of said plows being of substantially V-shape and having an upper surface in a plane spaced downwardly from the aforesaid upper surface of said body, this downward spacing of at least some upper surface of said second plow corresponding to the desired thickness of compound to be left on the blank, said one plow having a lower surface positioned to be upwardly spaced from the hook flange a distance considerably greater than the aforesaid thickness, said second plow having a lower surface positioned to be spaced above said hook flange a distance corresponding to said thickness, said second plow having a rounded nose merging into its upper and lower surfaces, the end surface of said one plow toward said discharge port being declined in the direction in which the blank is fed.

13. A plow for removing surplus sealing compound from the zone between a can body blank and an underlying hook flange of said blank; said plow comprising an elongated transversely V-shaped member for reception in said zone while the blank travels longitudinally of said elongated member with the hook flange underlying this member, said elongated member having a front end surface which declines in the direction of blank travel, said declined front end surface serving to downwardly crowd the surplus compound against said hook flange.

14. An apparatus for applying side seam sealing compound to a can body blank of a type having a hook flange joined by the bight to the contiguous portion of the blank; said apparatus comprising means for feeding the blank along a predetermined path with the hook flange of the blank disposed longitudinally of said path, means adjacent said path for directing an overabundant quantity of sealing compound into the zone defined jointly by the hook flange, bight and contiguous portion of the blank, sealing compound plowing means advanced along said path from said compound directing means and constructed to plow out surplus compound from the aforesaid zone, and means for directing a jet of fluid under pressure against the plowed out surplus of compound drooling from said plowing means to jet said drooling surplus away from the blank.

15. An improvement in a known apparatus in which can body blanks having downwardly disposed hook flanges are fed over a nozzle having a discharge port which directs an overabundance of sealing compound into the zone between each blank body and the downwardly disposed hook flange thereof, said known apparatus having a reservoir from which the sealing compound is pumped to said discharge port, also having plow means for plowing out surplus compound from the aforesaid zone, and also having a trough declined from said nozzle to said reservoir for returning the plowed out surplus to said reservoir; said improvement comprising additional sealing compound discharge means to which sealing compound is pumped from the aforesaid reservoir, said additional sealing compound discharge means being disposed below said plow means in position to direct a jet of sealing compound longitudinally of said trough toward said reservoir and against the plowed out surplus of sealing compound as it drools from said plow means, thereby accelerating return of said plowed out surplus to said reservoir and preventing it from accumulating against said nozzle.

16. A structure as specified in claim 5; said body having an additional sealing compound discharge port which communicates with said sealing compound conducting means and opens through said one side of said body, said additional discharge port being positioned to laterally direct a jet of sealing compound against the plowed out surplus compound as it drools from said plows, thereby preventing accumulation of said surplus against said body.

17. A method of applying side seam sealing compound to can body blanks each having a hook flange joined by a bight to the contiguous portion of the blank; said method comprising the steps of feeding the blanks along a predetermined path with their hook flanges disposed longitudinally of said path, at one point on said path injecting an overabundant quantity of sealing compound into the zone defined by the hook flange, bight and contiguous portion of each blank, at a more advanced point on said path plowing out a substantial quantity of the surplus compound from the aforesaid zone, and at a still further advanced point on said path plowing out the remainder of the surplus compound from said zone and troweling the compound left on said hook flange, bight and contiguous portion of the blank.

18. A method of applying side seam sealing compound to can body blanks each having a hook flange joined by a bight to the contiguous portion of the blank; said method comprising the steps of feeding the blanks along a predetermined path with their hook flanges disposed longitudinally of said path, at one point on said path injecting an overabundant quantity of sealing compound into the zone defined by the hook flange, bight and contiguous portion of each blank, at a more advanced point on said path plowing out substantially half of the surplus compound from the aforesaid zone, and at a still further

advanced point on said path plowing out the remainder of the surplus compound from said zone and troweling the compound left on said hook flange, bight and contiguous portion of the blank.

19. An improvement in a known method of applying side seam sealing compound to can body blanks each having a hook flange joined by a bight to the contiguous portion of the blank, said known method comprising the steps of (1) feeding the blanks along a predetermined path with their hook flanges disposed downwardly and longitudinally of said path, (2) injecting an overabundant quantity of sealing compound into the zone defined by the hook flange bight and contiguous portion of each blank, and (3) plowing out surplus compound from said zone; said improvement consisting in directing a jet of fluid under pressure against the plowed out surplus of sealing compound in a direction to drive this surplus away from the blanks.

20. An improvement in a known method of applying side seam sealing compound to can body blanks each

having a hook flange joined by a bight to the contiguous portion of the blank, said known method comprising the steps of (1) feeding the blanks along a predetermined path with their hook flanges disposed downwardly and longitudinally of said path, (2) injecting an overabundant quantity of sealing compound into the zone defined by the hook flange bight and contiguous portion of each blank, and (3) plowing out surplus compound from said zone; said improvement consisting in directing a jet of sealing compound under pressure against the plowed out surplus of sealing compound in a direction to drive this surplus away from the blanks.

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