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


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 present 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 15, 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 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 fur-
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 the excess 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 body 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 34a) 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 12. 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 beveled at 44 to prevent possible catching of any of the blanks therengainst.

Formed within the body 36, is a port 45 to communicate with the foresaid 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 is 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 45 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-shaped 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 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 46 of the plow 48 is inclined 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 droops 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 pressure against the drooling 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 port 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 56 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 29, 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 52. After 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.

1. A 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, 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.

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 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 said blank is disposed, 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.

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 said blank is disposed, and constructed to plow out substantially half of the surplus compound from the aforesaid zone, and a second sealing compound plowing means 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 deflected 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
2,773,279

7

8

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 blank to 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 compoun
d 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 down
wardly 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 flat upper 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 con
tiguous 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 sur
plus compound from the aforesaid zone, and a second seal
ning compound plow further advanced along said edge, said
second plow projecting laterally from said edge and be
ing 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 some 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.
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 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.
13. An apparatus for applying side seam sealing com
pound 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.
14. 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 overabundant of sealing compound into the
zone between each blank body and the downwardly dis
posed hook flange thereof, said known apparatus having a
reservoir from which the sealing compound is pumped to
said discharge port also having plowing means for plow
ing 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 said 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.
15. A structure as specified in claim 5; said body
having an additional sealing compound discharge port
which communicates with said said sealing compound con
ducting 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.
16. A method of applying side seam sealing compoun
d 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 con
tinguous 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 trowelling the compound left on said hook flange,
bight and contiguous portion of the blank.
17. A method of applying side seam sealing compoun
d 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 compo
und 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 fluid under pressure against the plowed out surplus of sealing compound in a direction to drive this surplus away from the blanks.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Inventor</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,185,088</td>
<td>Kronquest</td>
<td>Dec. 26, 1939</td>
</tr>
<tr>
<td>2,287,356</td>
<td>Newman</td>
<td>June 23, 1942</td>
</tr>
<tr>
<td>2,313,750</td>
<td>Hothersall</td>
<td>Mar. 16, 1943</td>
</tr>
<tr>
<td>2,522,324</td>
<td>Wilkerson</td>
<td>Sept. 12, 1950</td>
</tr>
</tbody>
</table>