

PATENT SPECIFICATION

(11) 1 509 811

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- (21) Application No. 1405/76 (22) Filed 14 Jan. 1976
(23) Complete Specification filed 11 Oct. 1976
(44) Complete Specification published 4 May 1978
(51) INT CL² B65D 11/06
(52) Index at acceptance
B8D 1B1 4B 7PY CA1
B5K 3
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(54) IMPROVEMENTS IN OR RELATING TO CONTAINER DRUM ASSEMBLIES

(71) We, GPG HOLDINGS LIMITED of Cranford, Blackdown, Leamington Spa, Warwickshire, a British Company, 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:—

10 This invention relates to a container drum assembly and to a method of manufacturing such an assembly.

15 According to the present invention there is provided a container drum assembly comprising a plastics moulded drum body part forming a mouth, a plastics moulded closure member closing the mouth and a plastics ring member located at the periphery of the closure member and bridging the joint between said closure member and the drum body part, the ring member being secured by welding to both the closure member and the drum body part to form a seal which extends over the joint.

20 Further according to the present invention there is provided a method of manufacturing a container drum assembly which comprises moulding a drum body part in plastics material to provide said part with a mouth, locating a plastics moulded closure member on the drum body part to close the mouth, and welding a plastics ring member to both the closure member and drum body part so that said ring member extends around the periphery of the closure member and bridges the joint between the closure member and the drum body part to form a seal therebetween.

25 Preferably the ring member is secured by spin welding on to both the closure member and the drum body part.

30 To facilitate such welding, the surface of the ring member may be formed to be of substantially complementary profile to the surfaces with which it engages on the closure member and the drum body part.

35 The ring and closure members will usually be formed by injection moulding in ther-

moplastics material while the drum body part is conveniently formed in thermoplastics material by blow moulding. The ring member and closure member may be formed initially as separate components or alternatively these members may be formed in the first instance as an integral moulding from which the part constituting the ring member is severed from the part of the moulding which constitutes the closure member.

40 Conveniently the closure member engages with the mouth of the drum body part in accordance with the inventions which are the subject of our Patent Specifications Nos. 1,430,983 and 1,440,939.

45 Embodiments of the present invention will now be described by way of example only with reference to the accompanying illustrative drawings in which:—

50 Figure 1 is a cross section through part of an assembly in accordance with the invention in which the ring member welded to both the closure member and the drum body part is constituted by an individually pre-moulded component, and

55 Figure 2 is a further form of assembly shown in section similar to that of Figure 1 in which the ring member is initially formed as a moulding integral with the closure member.

60 The container drum assemblies illustrated each comprise a thermo plastics drum body part 1 which is blow moulded as an integral unit to be of substantially circular section with a closed base (not shown) and a mouth formed by a corrugated portion 2 of the drum part side wall. The mouth of the drum body part is closed by a closure member 6 which is partly received therein. The closure member 6 is injection moulded in thermo plastics material and incorporates one or more bung holes 16 (Figure 1) through which the drum is intended to be filled and emptied and which is sealable by a bung (not shown).

65 The corrugated portion 2 which is formed during the blow moulding of the drum body

part is of substantially "S"-shape in section through the wall thickness of the drum part so that the upper tail end of the "S"-shape provides a peripheral lip 4 which is directed radially inwardly of the mouth while a lower portion of the "S"-shape provides an inwardly directed internal convex peripheral protruberance 3. Formed between the internal protruberance 3 and lip 4 is an endless inner peripheral groove 5.

The closure member 6 has an endless external flange portion which comprises two circumferentially spaced and parallel ribs 11 and 12 extending radially outwardly relative to the cap and which are braced together by an array of bridging portions 15 which portions are circumferentially spaced around the closure member 6. Incorporated in the member 6 and extending downwardly thereof is a peripheral skirt 7 having an outwardly directed foot portion 10. This skirt with its foot portion 10 defines, together with the rib 12, a first external circumferential recess 8 on the cap. A second external circumferential recess 9 is provided on the closure member between the rib 11 and an uppermost and outwardly extending flange 13 of that member.

With the closure member 6 assembled in the drum body part 1 the peripheral flange portion formed by the ribs 11 and 12 of the closure member is closely received in the inner groove 5 of the drum wall while the peripheral protruberance 3 of the drum wall is simultaneously closely received in the circumferential recess 8 of the closure member. In addition the second recess 9 of the member 6 closely receives the inwardly directed lip 4 of the drum wall. To achieve such assembly the appropriate portion of the closure member 6 is preferably inserted into the mouth of the drum body part 1 while the mouth is in a thermally expanded condition (which is desirably achieved shortly after blow moulding of the drum body part and while the latter is at a temperature above ambient). By assembling the drum in this manner it will be appreciated that as the corrugated portion of the drum body part cools it will contract radially and thereby urge the lip 4 and protruberance 8 into close engagement with their respectively associated recesses on the closure member while the flange portion presented by the ribs 11 and 12 is urged into engagement with the recess 5 in the drum wall as a result of the radially inwardly directed compression forces which are applied to the closure member from the drum wall. The reaction on the ribs 11 and 12 is in a sense to urge these towards each other and the bridging portions 15 are provided to alleviate such movement. Consequently the closure member will be firmly secured against outward movement

relative to the drum body part by virtue of its rib 11 being anchored beneath the lip 4 and the foot portion 10 of the skirt being anchored beneath the circumferential protruberance 3 of the drum wall.

After assembly of the drum body part 1 and closure member 6 an annular ring member 17 (Figure 1) is welded to both the closure member and drum body part to form a seal therewith and also to bridge and seal the joint between the member 6 and the drum body part. The ring member 17 is formed by injection moulding in plastics material and its inner face is profiled to correspond with the surfaces of the closure member and the drum body part with which it is to be welded. The ring member is spin welded to unite with the assembled closure member and drum body part by rotating the ring member and applying its profiled face against the corresponding surfaces of the closure member and drum body part so that the frictional heat developed is sufficient to effect the weld and seal the joint between the closure member and the drum body part.

The ring member 17 is conveniently moulded to include an array of apertures 18 within which pegs of an appropriate rotor mechanism are received to impart spinning motion to the ring member.

In the embodiment of Figure 2 the ring member is formed by severing a flange part 13a from a plastics moulding which incorporates the closure member 6. The flange part 13a may initially be formed on its moulding in a similar manner to the flange 13 in Figure 1 and is severed at line 19 from the portion of the moulding which constitutes the closure member 6 prior to the closure member being assembled with the drum body part 1. The ring member 13a thus provided is secured to the assembled closure member and drum body part by spin welding in a manner similar to that previously described to form a seal with, and to seal the joint between, the closure member and the drum body part.

WHAT WE CLAIM IS:—

1. A container drum assembly comprising a plastics moulded drum body part forming a mouth, a plastics moulded closure member closing the mouth and a plastics ring member located at the periphery of the closure member and bridging the joint between said closure member and the drum body part, the ring member being secured by welding to both the closure member and the drum body part to form a seal which extends over the joint.

2. A container drum assembly as claimed in claim 1 in which the ring member is spin welded to both the closure member and the drum body part.

part is of substantially "S"-shape in section through the wall thickness of the drum part so that the upper tail end of the "S"-shape provides a peripheral lip 4 which is directed radially inwardly of the mouth while a lower portion of the "S"-shape provides an inwardly directed internal convex peripheral protruberance 3. Formed between the internal protruberance 3 and lip 4 is an endless inner peripheral groove 5.

The closure member 6 has an endless external flange portion which comprises two circumferentially spaced and parallel ribs 11 and 12 extending radially outwardly relative to the cap and which are braced together by an array of bridging portions 15 which portions are circumferentially spaced around the closure member 6. Incorporated in the member 6 and extending downwardly thereof is a peripheral skirt 7 having an outwardly directed foot portion 10. This skirt with its foot portion 10 defines, together with the rib 12, a first external circumferential recess 8 on the cap. A second external circumferential recess 9 is provided on the closure member between the rib 11 and an uppermost and outwardly extending flange 13 of that member.

With the closure member 6 assembled in the drum body part 1 the peripheral flange portion formed by the ribs 11 and 12 of the closure member is closely received in the inner groove 5 of the drum wall while the peripheral protruberance 3 of the drum wall is simultaneously closely received in the circumferential recess 8 of the closure member. In addition the second recess 9 of the member 6 closely receives the inwardly directed lip 4 of the drum wall. To achieve such assembly the appropriate portion of the closure member 6 is preferably inserted into the mouth of the drum body part 1 while the mouth is in a thermally expanded condition (which is desirably achieved shortly after blow moulding of the drum body part and while the latter is at a temperature above ambient). By assembly the drum in this manner it will be appreciated that as the corrugated portion of the drum body part cools it will contract radially and thereby urge the lip 4 and protruberance 8 into close engagement with their respectively associated recesses on the closure member while the flange portion presented by the ribs 11 and 12 is urged into engagement with the recess 5 in the drum wall as a result of the radially inwardly directed compression forces which are applied to the closure member from the drum wall. The reaction on the ribs 11 and 12 is in a sense to urge these towards each other and the bridging portions 15 are provided to alleviate such movement. Consequently the closure member will be firmly secured against outward movement

relative to the drum body part by virtue of its rib 11 being anchored beneath the lip 4 and the foot portion 10 of the skirt being anchored beneath the circumferential protruberance 3 of the drum wall.

After assembly of the drum body part 1 and closure member 6 an annular ring member 17 (Figure 1) is welded to both the closure member and drum body part to form a seal therewith and also to bridge and seal the joint between the member 6 and the drum body part. The ring member 17 is formed by injection moulding in plastics material and its inner face is profiled to correspond with the surfaces of the closure member and the drum body part with which it is to be welded. The ring member is spin welded to unite with the assembled closure member and drum body part by rotating the ring member and applying its profiled face against the corresponding surfaces of the closure member and drum body part so that the frictional heat developed is sufficient to effect the weld and seal the joint between the closure member and the drum body part.

The ring member 17 is conveniently moulded to include an array of apertures 18 within which pegs of an appropriate rotor mechanism are received to impart spinning motion to the ring member.

In the embodiment of Figure 2 the ring member is formed by severing a flange part 13a from a plastics moulding which incorporates the closure member 6. The flange part 13a may initially be formed on its moulding in a similar manner to the flange 13 in Figure 1 and is severed at line 19 from the portion of the moulding which constitutes the closure member 6 prior to the closure member being assembled with the drum body part 1. The ring member 13a thus provided is secured to the assembled closure member and drum body part by spin welding in a manner similar to that previously described to form a seal with, and to seal the joint between, the closure member and the drum body part.

WHAT WE CLAIM IS:—

1. A container drum assembly comprising a plastics moulded drum body part forming a mouth, a plastics moulded closure member closing the mouth and a plastics ring member located at the periphery of the closure member and bridging the joint between said closure member and the drum body part, the ring member being secured by welding to both the closure member and the drum body part to form a seal which extends over the joint.
2. A container drum assembly as claimed in claim 1 in which the ring member is spin welded to both the closure member and the drum body part.



3. A container drum assembly as claimed in either claim 1 or claim 2 in which the drum body part is formed by blow moulding and the closure member is formed by injection moulding.

4. A container drum assembly as claimed in any one of the preceding claims in which the ring member has an inner surface which is welded to both the closure member and the drum body part and said inner surface is profiled to be substantially complementary to the surfaces of the closure member and the drum body part to which it is welded.

5. A container drum assembly as claimed in any one of the preceding claims in which the ring member and closure member are formed, in the first instance, as an integral moulding from which the part of the moulding constituting the ring member is severed from the part which constitutes the closure member prior to the ring member being welded into the assembly.

6. A container drum assembly as claimed in claim 3 or either claim 4 or claim 5 when appendant to claim 3, in which the wall of the drum body part adjacent to the mouth is of substantially corrugated formation to provide an inwardly directed internal peripheral protuberance spaced from the peripheral edge of the wall at the mouth; the closure member has an endless peripheral external flange portion and a peripheral skirt portion which portions are received within the mouth of the drum body part, said skirt and flange portions together forming an external peripheral recess on the closure member; and wherein the closure member engages with the drum body part by location of the internal peripheral protuberance of the drum wall in the external peripheral recess of the closure member.

7. A container drum assembly as claimed in claim 6 in which a peripheral lip directed inwardly of the mouth is provided on the wall of the drum body part at the peripheral edge thereof and the closure member has an endless external peripheral groove in which is received the inwardly directed lip of the drum wall.

8. A container drum assembly as claimed in either claim 6 or claim 7 in which the

drum wall engages with the closure member to apply inwardly directed compression forces to the closure member.

9. A container drum assembly as claimed in claim 8 in which the drum wall is shrunk into engagement with the closure member.

10. A container drum assembly substantially as herein described with reference to the accompanying illustrative drawings.

11. A method of manufacturing a container drum assembly which comprises moulding a drum body part in plastics material to provide said body part with a mouth, locating a plastics moulded closure member on the drum part to close the mouth, and welding a plastics ring member to both the closure member and the drum body part so that said ring member extends around the periphery of the closure member and bridges the joint between the closure member and the drum body part to form a seal therebetween.

12. A method as claimed in claim 11 which comprises spin welding the ring member to both the closure member and the drum body part.

13. A method as claimed in either claim 11 or claim 12 which comprises forming the closure member and ring member as an integral moulding, severing the part of said moulding constituting the ring member from the part which constitutes the closure member and welding the ring member part into the assembly subsequent to the closure member part having been fitted to the drum body part.

14. A method of manufacturing a container drum assembly substantially as herein described.

15. A container drum assembly when made by the method as claimed in any one of claims 11 to 14.

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