

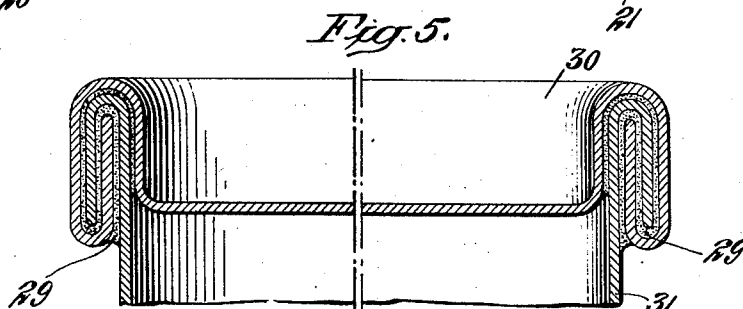
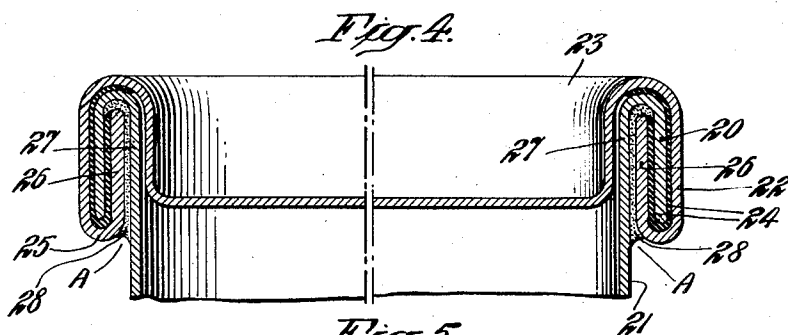
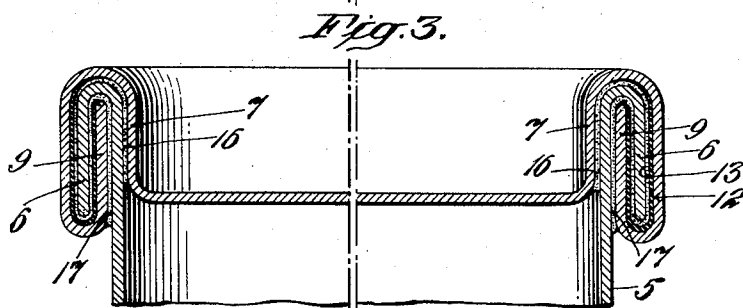
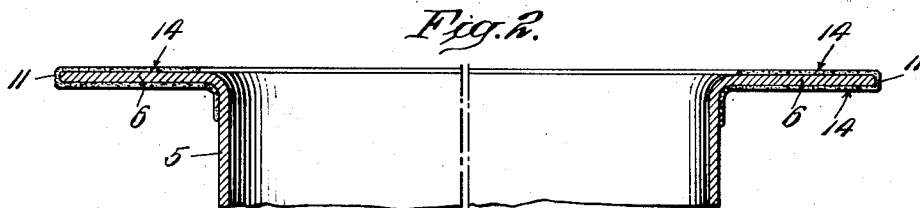
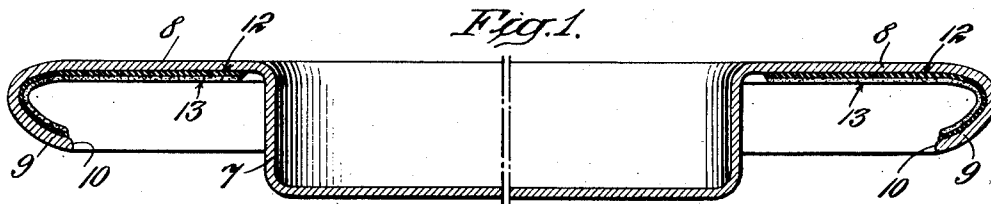
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CAN AND CLOSURE THEREFOR

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CAN AND CLOSURE THEREFOR

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7 Claims. (Cl. 220—81)

The invention relates to an improvement in cans and closures therefor, and more particularly to an improvement in sealing the joint between the ends or covers and the body portion of tin cans whether of cylindrical or other shape.

The cans for containing dry food products, such as powdered milk, are usually composed of a body portion which may be cylindrical or of other shape provided at one or both ends with a laterally extending flange or lip, and an end or cover having a laterally extending flange or lip. In closing or sealing the can the lip of the body portion and the lip of the cover are brought together and folded upon each other to form a joint hermetically sealing the contents of the can from the atmosphere. To assure an air-tight joint it has been the practice heretofore to provide either the lip of the body portion or the lip of the cover with a layer of seaming material such as rubber cement which fills the space or joint between the adjacent surfaces of the lips of the can. It has been found, however, that none of the seaming preparations in use heretofore is absolutely air-tight. This is particularly noticeable where the can is closed under vacuum or the contents of the can are of such a nature that they develop a vacuum in the can after the can has been closed. In the canning of powdered milk, for example, the can filled with the milk powder is subjected to a vacuum to withdraw the atmospheric air therefrom, and particularly the oxygen, and then a non-oxidizing gas is introduced into the can and the can is closed. In the course of time the powdered milk absorbs part of this gas and produces a partial vacuum in the can. Under such conditions even the most carefully fashioned cans in which an unstable and porous seaming substance, such as rubber cement or other usual organic seaming substance is used to fill and seal the joint between the cover and the body portion of the can will in many instances develop a small leak and permit air to enter the can and have a deleterious effect upon its contents.

One of the main objects of the invention is to effectively seal the joint between the mutually engaging or cooperating surfaces of the lip of the cover and the lip of the body portion of the can.

Another object is to provide a sealing substance which is self-sealing or self-healing in the sense that it readjusts its position in such a way when disturbed in its sealing relation with the seam of a can that it resists any tendency to develop a leak through the seam.

Rubber cement, varnish and other organic

seaming substances, when used in can seams, tend to have fissures develop therein or otherwise allow of the formation of leakage channels in a comparatively short time, particularly when the can is subjected to extremes of temperature within ordinary ranges and when the can is subjected to new stresses and strains in the course of handling or otherwise.

In accordance with the present invention an improved seal is made by providing either or both of the mutually engaging or cooperating seam surfaces of the can with a film or coating of a stable, non-porous and otherwise non-permeable, non-volatile, permanently plastic and self-sealing substance, for example, an amorphous mineral wax, such as petrolatum, or a mixture of petrolatum and beeswax or the like. The coating of this sealing substance may be laid over the lips of the cover and body portion before the lips are folded together to form the sealing joint, or may be laid over the usual unstable, porous seaming substance, such as the usual rubber cement, before folding the lips into the joint. It may also however, be applied to a filled and closed can in such manner as to be drawn into the joint between the cover and the body portion of the can by capillary attraction. The dense non-volatile plastic sealing substance enters the pores or minute openings in or around the usual seaming substance such as the rubber cement and establishes an impassable seal between two adjacent layers of the unstable, porous seaming substance or between a layer of the unstable porous seaming substance and the adjacent part of the can or cover. The invention is more fully described hereinafter and is particularly pointed out in the appended claims.

In the accompanying drawing illustrating the preferred manner in which the invention is put into practice, Fig. 1 is a longitudinal section through a can cover on an enlarged scale showing the application of a layer or coating of stable, non-porous sealing substance applied to the usual seaming material on the inner surface of the flange or lip portion of the cover; Fig. 2 is a longitudinal section through one end of a can and showing the application of a layer of the stable, non-porous sealing substance to the projecting flange or lip thereof; Fig. 3 is a longitudinal section through the end of the can shown in Fig. 2 to which the cover shown in Fig. 1 has been applied and the cooperating lips of the can and cover folded together and inwardly against the body portion of the can to establish a tight joint between them; Fig. 4 is a longitudinal section

through one end of a closed can provided in the first instance with the usual unstable, porous sealing substance and to which a stable and non-porous sealing substance has been applied according to the present invention after the closing of the can, and Fig. 5 is a longitudinal section through one end of a closed can made similarly to the can shown in Fig. 3, except that the seam does not contain the usual seaming substance but is filled with only the plastic sealing substance.

It is assumed that the invention is applied to a can the parts of which have been treated as heretofore to form an air-tight joint between the cover and the body portion of the can. Such a can is illustrated in the drawing. In Fig. 2 is shown one end of the body portion 5 of a cylindrical can provided with a laterally extending flange or lip 6. In Fig. 1 is shown a dish-shaped end or cover consisting of the body portion 7 of the same shape as the body portion 5 of the can and adapted to fit therein, as indicated in Fig. 3, when the parts are brought together to close the can, and a laterally extending flange or lip 8 having a downwardly and inwardly turned outer end 9. The diametrical distance between the inner edges 10 of the intumed ends 9 of the lip 8 is slightly greater than the diameter of the flange or lip 6 as determined by the outer edges 11 of the latter so that the upper surface of the lip 6 may contact with the under surface of the lip 8 when the cover is inserted into the open end of the body portion 5 preparatory to folding the lips together. The under surface of the lip 8 is coated with a layer of the usual seaming material, such as rubber cement, and which is indicated by the heavy section lines 12. This seaming material extends from the extremity 10 of the lip 8 to almost the body portion 7 of the cover. The seaming material is applied in a layer of uniform depth in well-known manner.

When the can is closed by inserting the cover into the open end of the body portion of the can with the upper surface of the lip 6 lying against the under surface of the lip 8, the two lips are folded together in the manner shown in Fig. 3, whereby the seaming material 12 is interposed as a layer between the mutually engaging portions of the lips. In spite of the most careful adjustment of the rolls of the machines for folding the lips together, it has been found impossible to make all the cans absolutely air-tight when the joint between the lips has been filled with only rubber cement or any other seaming material heretofore proposed or in use.

This leakage may, or may not, be due to the fact that these cements or seaming compounds contain a certain amount of volatile ingredients, and are unstable and more or less porous to air. In any event, whatever the cause of the leakage, I have discovered that the leakage can be prevented if a layer or coating of a stable, non-porous and otherwise non-permeable, non-volatile, permanently fluid or plastic, self-sealing substance, such as mineral oil or a petroleum product, such as petrolatum with or without addition of beeswax or paraffin wax, be applied to either or to both lips, preferably before the lips are brought together for folding. The sealing substance may be applied in fluid or in plastic form. If the sealing substance employed is plastic it should preferably have a yield point just sufficiently high to prevent its flow through capillaries up to .1 mm. in diameter when exposed to a pressure differential of one atmosphere at temperatures ranging

up to 120° F. Substances such as stiffeners of higher melting point, such as beeswax or paraffin wax may be added to the petroleum oil or to the petrolatum in order to produce a sealing substance having an optimum yield point with a maximum mobility. I have found that a sealing composition containing oily material as its major ingredient and preferably composed of three parts of petrolatum and one part of beeswax will make a vacuum tight seal in a capillary having a diameter of .2 mm. at temperatures up to 120° F.

In Fig. 1 the improved sealing substance is shown applied as a layer or coating 13 on the layer of usual seaming material 12. This layer of sealing substance is usually sufficient to produce an absolutely tight joint between the lip of the cover and the lip of the body portion of the can when they are folded together. If desirable this improved sealing substance can instead be applied on the lip of the can as shown in Fig. 2 either on its upper or lower surface or both. If necessary such layer could also be applied both to the cover and to the lip of the can. However, care should in any case be taken to limit the amount of the sealing substance applied so as to avoid an excessive squeezing out of same during the seaming operation.

If the improved sealing substance is applied as an oil no heating may be required to cause it to adhere in an even layer of uniform depth to the surface of the seaming material or to the metal surface of the lips. But if the sealing substance is in plastic form, as when a mixture of petrolatum and beeswax or paraffin wax is used, it will be desirable to heat the mixture sufficiently to cause it to flow smoothly when applied to the lips of the cover and the body portion of the can. The application of the sealing substance to the lips of the cover and the body portion of the can may be effected in any preferred manner, as by the usual lining or gumming machines. When the can lips coated with the improved sealing substance, as indicated in Figs. 1 and 2 are brought together and folded in the usual manner, some of the sealing substances will be squeezed into the slight space between the outer surface of the body portion 7 of the cover and the inner surface of the body portion 5 of the can, and between the outer surface of the body portion of the can and the under or inner surface 15 of the end 9 of the lip 8, as indicated at 16 and 17, respectively, in Fig. 3. The sealing substance accordingly connects the cooperating surfaces of the cover and body portions of the can to form a self-sealing barrier against leakage between the interior and exterior of the can.

In case a batch of cans already made up according to former practice, that is to say, with the lip of the cover provided with a layer of seaming material of rubber cement or the like, develops an undesirably large percentage of leaky cans, these cans can be treated according to the present invention by heating the ends of the cans and applying to them a heated mixture of petrolatum and beeswax. In Fig. 4 there is represented one end of a can formed according to the former practice, the lip 20 of the body portion 21 of the can being folded together with the lip 22 of the cap or cover 23 with a layer of seaming material 24 interposed between them. The mixture of petrolatum and beeswax having been melted until it flows freely and the end of the can having been heated slightly the melted mixture will be applied at the point A at the junction between the body portion of the can and the

lower end of the downturned fold 25 of the lips; the heat softened sealing material will flow into the slight space between the inner fold 26 of the lip 22 and the adjacent part 27 of the body portion 21 of the can as indicated by the stippled material 28, thereby effectively sealing the can and preventing ingress of air into the can or egress of gas from the can.

The closure between the head and body portion of the can shown in Fig. 5 is prepared similarly to that of Fig. 3, except that the usual sealing material 12 illustrated in Figs. 1 and 3, is omitted and the sealing substance 13, Fig. 1 is applied directly to lip 8. In this form of the invention, the plastic self-sealing substance 29 is the only sealing material filling the space between the cooperating or face to face surfaces of the head 30 and body portion 31, and by adhering to these cooperating surfaces forms a connection therebetween which effectively seals the seam against leakage.

In each of the above described modifications, the permanently plastic, self-sealing substance forms a viscous, impermeable barrier against leakage between the cooperating surfaces at the seam of the can. Since the plastic self-sealing substance does not deteriorate with time as in the case of rubber seams, the effectiveness of the seal is maintained under the varying conditions of stress and strain to which the seam of can is subjected when the can is handled, piled with other cans, or undergoes the various changes produced by temperature variations, and variations of the pressure differential between the interior and exterior of the can.

It will be understood that the illustrated cans in the drawing and especially the joints thereof are shown greatly exaggerated in order to bring out as clearly as possible the features and the principle of the invention.

I claim:

1. A closure for the folded seam of a can adapted to contain dry products, wherein the seam is formed by a body portion having a lip and a cover portion having a lip interfolded with said body lip, said closure comprising a layer of sealing composition filling the seam between said lips, said composition consisting of an amorphous mineral wax and beeswax.

2. A closure for the folded seam of a can wherein the seam is formed by a body portion having

a lip and a cover portion having a lip interfolded with said body lip, the closure comprising a layer of sealing composition filling the seam between said lips, said composition consisting of about three parts of petrolatum and one part of beeswax.

3. A closure for the folded seam of a can adapted to contain dry products, wherein the seam is formed by a body portion having a lip and a cover portion having a lip interfolded with said body lip, said closure comprising a layer of sealing composition filling the seam between said lips, said composition comprising petrolatum and wax adapted to be applied in a melted condition and characterized by substantial permanency and being substantially non-porous.

4. A closure for the folded seam of a can adapted to contain dry products, wherein the seam is formed by a body portion having a lip and a cover portion having a lip interfolded with said body lip, said closure comprising a layer of sealing composition filling the seam between said lips, said composition comprising beeswax, petrolatum and paraffin wax adapted to be applied in a melted condition and characterized by substantial permanency and being substantially non-porous.

5. A closure for the folded seam of a can adapted to contain dry products subject to oxidative destruction by atmospheric oxygen, comprising beeswax, petrolatum and paraffin wax characterized by substantial permanency and being substantially non-porous.

6. A closure for the folded seam of a can adapted to contain dry products subject to oxidative destruction by atmospheric oxygen, comprising beeswax, petrolatum and paraffin wax characterized by substantial permanency and being substantially non-porous, the quantity of petrolatum being in excess of the combined beeswax and paraffin wax.

7. A closure for the folded seam of a can wherein the seam is formed by a body portion having a lip and a cover portion having a lip interfolded with said body lip, the closure comprising a layer of sealing composition filling the seam between said lips, said composition consisting of beeswax and an amorphous mineral wax having a yield point sufficiently high to form a vacuum tight seal in a capillary having a diameter of .1 mm. at temperatures up to 120° F.

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