PATENT SPECIFICATION

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COMPLETE SPECIFICATION

An Improved Method and Means for Sealing Sheet Metal Boxes

We, THEODORE BARON, a British Subject, of Windsor House, Lindhurst Road, London, N.W.3, and ROBERT WEINBERGER, a German Citizen, of 16, Brewery Road, London, N.7, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has for its object to provide an improved method and means whereby an air-tight and water-tight sealing may be conveniently and efficiently effected between the lid and the body of a tin plate or other metal box without need for resorting to soldering.

According to this invention the joint between related metal box parts is effectively sealed by applying thereto with the aid of heat and pressure a composite sheet material composed of a strip of tin, aluminium or like metal foil faced on one side with india rubber, gutta percha or like impervious material adapted under the influence of heat to soften and assume an adhesive condition. A further feature of this invention is the provision of an improved apparatus by means of which the composite sheet material may be prepared and applied to metal boxes requiring to be sealed.

It is possible to apply the rubber in a liquid form on to the foil in the machine as is the case in the application of adhesives, but this is not advisable since rubber solvents are inflammable and dangerous.

Metal foils can be provided with a coating of rubber in a separate working process and the strips wound up into the form of spools which later on can be used in the box sealing machine.

It is, however, better for the gutta-percha to be wound on separate spools and placed in the machine and united in the machine itself and in the same working operation, with the metal foil since in this way a preliminary heating of the length of foil is saved. If the strip of foil provided with the coating is placed in contact with the tin, the strip must be heated as otherwise the tin would not take this reliably and accurately.

On the annexed drawing is shown diagrammatically a tin sealing machine, arranged, according to the invention, for this process.

1 is a spool of metal foil, 2 the gutta-percha spool, and 3 and 4 the separate lengths of material which are carried over the drum 5. This drum is heated. The rubber strip unites with the metal strip owing to the heat rendering it soft and adhesive.

If only one spool is used, with the rubber combined with the metal foil, the composite material 6 must be carried over the heating body 7.

For the further conveyance of the strip of material into the range of the tin or box 16, the grips or fingers commonly employed in labelling machines cannot be used since the soft viscous gutta-percha would at once soil and glue up these parts. According to the invention therefore this conveyance is instead effected by suction devices. The arrangement of the conveyor device shown by way of example, consists of a chain conveyor 12 on which are fitted in pairs of small suction cups of holders 10, 11. These suction holders are connected by small tubes or pipes 14 with a band 13 travelling therewith. This band closes an air space which is subdivided. The chamber 15 is under vacuum or partial vacuum. When the pair of suction holders come within the range of the length of material, they also come into communication with the chamber under vacuum or partial vacuum and the material is held by suction and carried along. When the strip is in the correct position with respect to the box 16 to be sealed, which is moved transversely to the length of material, a cutter 9 which may be of any desired type, comes into operation and cuts this strip 8 from the continuous length of web. In the meantime, the suction holders 10, 11 carry the length of material along. The space between the suction holders 10 and 11 as indicated above, must be left for the passage between them of the boxes 16 to be sealed. Naturally the path of the conveyor or chain 12 must be in a plane

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removed from that in which the suction holders travel, and thus the suction holders must project laterally out of the path of the chain 12.

Although the sealing strip is warmed, and the rubber facing is still sticky it is carried along by the suction holders in a reliable manner, resembling that usual with sealing strips coated with gum and used for closing cardboard boxes. The suction holder shown on the left can, like the suction holder shown on the right, communicate either with the chamber under partial vacuum or with the atmosphere. A certain resistance to the pulling of the strip by the box 16 must be offered, in order to ensure that the separated strip contacts securely with the side of the box 16.

On being depressed the box 16 with the attached sealing strip 8 passes down a chute formed between opposed guide members 17, 18 which consists of heated plates pressed resiliently by springs 19 against the side walls of the box. As the box enters this chute the free portions of the sealing strip are brought into engagement with the sides of the box as shown at 16^1, and the heating effect of the plates 17, 18 brings about a vulcanisation of the rubber facings of the sealing strip.

On reaching the end of this chute the box is propelled laterally by a reciprocating pusher 21 into a passage formed between opposed guide members 22, 23, also consisting of heated plates adapted to be pressed resiliently against the boxes by springs 24, this passage being directed at right angles to the above mentioned chute. Just before the box is moved from one channel way to the other as shown at 16^2 a reciprocating blade 20 moving parallel with but in advance of the pusher 21 and turns down on to the wall of the box that terminal part of the strip 8 which is towards said pusher 21. Immediately following this action the box is moved by the pusher 21 into the channel formed between the opposed guides 22, 23, whereupon the remaining terminal part of the foil strip is turned down on to the wall of the box where it also laps over the opposite end of the foil in order to complete the seal as shown at 16^3. The further movement of the boxes into, from and through the machine may be provided for in any desired way since this forms no part of the present invention.

We are aware that it has previously been proposed to render cigarette and other boxes air proof and moisture proof by adhesively affixing over the joint between the body of the box and its cover a rip seal consisting of a strip of cellulose derivative or metal foil the inner side of which is coated with glue and carries a strip of lesser width or a cord adapted to assist in tearing the seal strip when it is required to open the box but we make no claim to such arrangement.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Process for the air and water-tight sealing of metal plate tins for various purposes, according to which a strip of tin, aluminium, or like metal foil, faced on one side with rubber, gutta-percha or the like, softened and rendered adhesive under the action of heat, is pressed into contact with the parts along the line of union between the body of the tin and the lid.

2. Process according to Claim 1, characterised in that the union of the metal and the rubber strips takes place in the same working cycle as the application of the closing strip to the box itself.

3. A machine for carrying out the process according to claim 1, characterised in that a metal strip is supplied to the machine, which metal strip is already provided with a coating of rubber, this compound strip being heated before being applied to the box.

4. Process according to Claims 1 and 2, characterised in that the union of the metal and the rubber strip takes place by drawing the two strips together around a heated cylinder.

5. An apparatus for carrying out the process according to Claims 1, 2 and 4, characterised in that the length of sealing material is carried into the path of the boxes to be sealed by means of suction holding devices.

6. Apparatus according to claim 5 characterised by the provision of pairs of suction cups or holders which communicate with suction chambers, one wall of these chambers being constituted by a band which moves at the same speed as the pairs of suction cups or holders.

7. The improved apparatus for the sealing of metal plate tins substantially as herein described with reference to the accompanying drawing.

Dated this 9th day of May, 1940.

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