Nov. 12, 1935. G. GOEBEL 2,020,776

LAMINATED MATERIAL

Filed Nov. 11, 1933

Fig. 1.

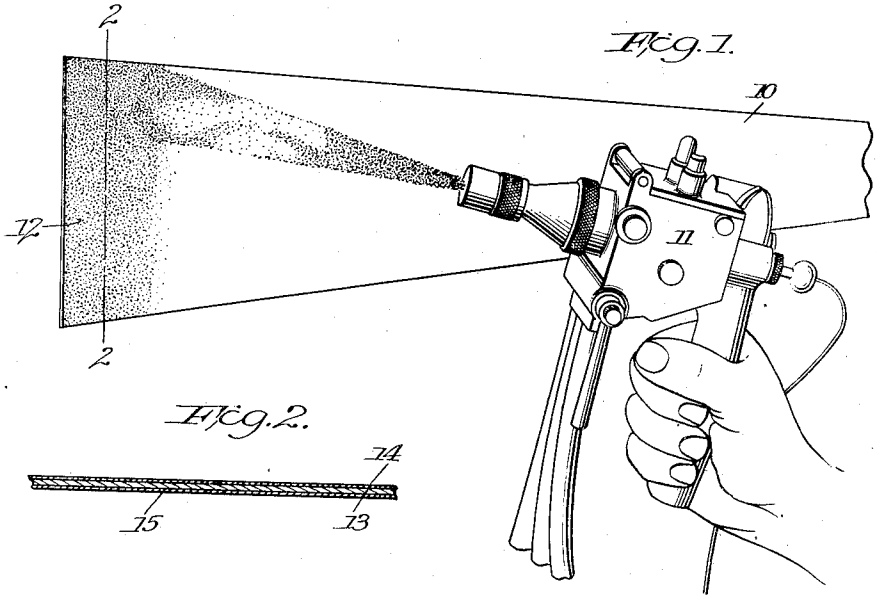


Fig. 2.

Fig. 3.

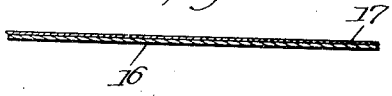


Fig. 4.

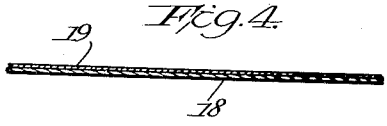


Fig. 5.

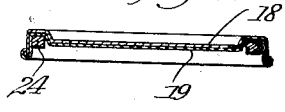


Fig. 6.

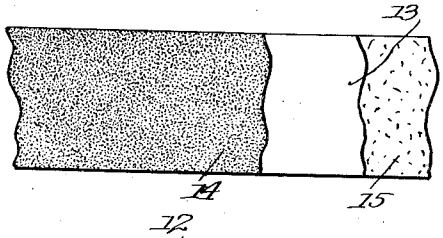


Fig. 7.

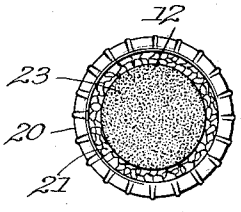
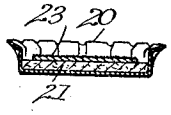


Fig. 8.



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UNITED STATES PATENT OFFICE

2,020,776

LAMINATED MATERIAL

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Application November 11, 1933, Serial No. 697,679

1 Claim. (Cl. 215—39)

The present invention relates to container caps, and particularly to facings therefor of sprayed metal. By facings, I mean a protective and resistant film or layer of the sprayed metal which facing is exposed to the contents of the receptacle being sealed. The purpose of the facing is to prevent off flavors and contaminations from developing in the contents as well as to eliminate the possibilities of objectionable chemical action and discoloration.

By sprayed metal, I mean a film produced by a spraying operation in accordance with a process wherein a particular metal is melted, atomized and sprayed in fine molten particles onto the surface to form an adherent metal coating thereon. Specifically, the metal to be sprayed is applied to the spraying devices in the form of a standard gauge wire. This wire is automatically fed at a uniform speed into an oxyacetylene flame. The flame immediately and continuously melts the end of the wire. A stream of compressed air atomizes the molten metal and blows it in a fine spray out of a nozzle on the applying device and onto the surface to be coated where it impacts with high velocity, adheres and instantly cools to form a coating.

The facing is applied as a layer either directly to the cap body, or to a separate base material which is affixed to the cap body. In either case, the union between the facing layer and the surface with which it is associated is characterized by maximum adherence, and the metal particles cohere tenaciously to one another. There results a film or layer which is (1) hard in that is does not scar or distort in normal use and which is abrasion resistant; (2) flexible so as to accommodate itself to irregularities in the container sealing surface and the usual cap cushion or sealing liner without cracking; (3) continuous and gas and liquid impervious; and (4) adherent to the undersurface throughout its entire area and in effect, becomes an integral part of such undersurface or base.

In the case of caps, particularly those in which a center spot facing or an overall facing is employed including a paper facing or a metal layer such as aluminum foil or tin foil and affixed to a cushion liner, there is a tendency to scar the facing during shipment of the caps. This same objection arises when the caps are in the hoppers of crowning machines where the movements to which they are subjected likewise result in a similar scarring and distortion of the metal spots and facings.

Also, in the case of paper and metal foil facings, particularly center spots usually applied to a cushion liner, there takes place during the shipment of the caps or while they are in the hoppers, by reason of their contact with one another, a tearing or loosening of the spot from the cushion so that the cap becomes ineffective as a seal.

With the present invention, the metal particles sprayed in the manner above described form a thin continuous film directly on the cap or separate facing material, and the particles of this film are coherent with respect to each other and adhere to the surface which is coated, in such a manner as to, in effect, become an integral part of such surface or base. The film is abrasion resistant, flexible and tenacious, and the union with the undersurface is complete throughout the area of the facing.

Stated briefly, a facing of sprayed metal in accordance with this invention is not scarred during the shipment of the caps or while they are in the crowning hopper and the union between the facing and the undersurface or base is such that there is no danger of the facings becoming separated even under abnormal conditions.

An important advantage of the invention therefore resides in the complete prevention either of multilation of the spot or facing or its peeling from the undersurface or cushion liner base.

Of equal importance is the ease with which laminated sheet and strip spotting material having a film of sprayed metal may be prepared and handled. By reason of the strong coherence of the particles of the film and the tenacious, i. e., substantially integral, adherence of the film to the adjacent layer whether it be fabric such as paper, an adhesive tissue or metal, the composite structure is strengthened very perceptibly. Hence, cheap paper or even an adhesive tissue may be coated with the film, and the laminated structure rendered of enhanced strength. Since the film is flexible and free from any tendency to crack and strongly adherent, the sheets may be rolled, slit into spools of appropriate width for the particular caps, and fed to the punching machine and punched without fear of mutilation of the material or the separation of the layers. This is a decided advance in that present spotting material of paper or foil is weak, exhibits a tendency to distort and must be carefully watched in view of the ever present possibility of separation of the laminations.

Referring to the drawing:—

Figure 1 is a perspective view showing a so-called "MetaLayeR" sprayer and the manner of coating a base material with any suitable metal;

Figure 2 is a sectional view of a sheet or strip facing material comprising a layer of paper having on one side a film of sprayed metal and on the opposite side a film of adhesive;

Figure 3 is a sectional view of a sheet or strip of facing material comprising a layer of adhesive to which is applied a layer of sprayed metal;

Figure 4 is a sectional view showing a sheet or strip of sheet metal having applied thereto a coating of the sprayed metal;

Figure 5 is a sectional view of a cap produced from the sheet material of Figure 4;

Figure 6 is a top view broken away and illustrating the association of the three layers constituting the material of Figure 2;

Figure 7 is a view looking into the interior of a spot crown, showing a spot of the material of Figures 2 and 6 applied thereto; and

Figure 8 is a sectional view of the cap shown in Figure 7.

In carrying out the present invention, the base layer which is to receive a coating of sprayed metal is indicated as a whole at 10 and the metal spraying device is indicated as a whole at 11. The base layer is preferably roughened as by a sand blast in the case of a metal sheet and where the spray is to be applied to paper, a rough or cheap paper may be used or one which has a sufficient number of crevices and indentations to prevent any gliding of the particles from the base.

A thin metallic film of the particles is obtained as indicated at 12 which is continuous. This film is characterized by having the particles strongly coherent to one another and possessing a maximum adherence to the base. No adhesive is used for securing the film to the undersurface, which results in a saving in adhesive, as well as eliminates the steps of adhesive application and subsequent care of the sheet required in cases where an adhesive is used. The film is flexible, hard and abrasion resistant and substantially indestructible in that it appears to become a part of the base to which it is applied and is inseparable therefrom.

In the manufacture of spotting materials and facings, it is customary to prepare a laminated structure in the form of a sheet or strip and punch out the spots or facings therefrom. This is usually accomplished in a spotting or punching machine where, as punched, the spot or facing is applied upon a cap.

In Figure 2, I have illustrated a sheet or strip material having a base of paper 13, a layer of sprayed metal 14 on one side thereof, and on the opposite side a layer of adhesive 15, preferably a thermoplastic adhesive. I have used successfully as the adhesive, gutta percha tissue, and as the backing, bleached or unbleached kraft paper, express paper, and in fact, any paper of light gauge is suitable.

In Figure 3, I have illustrated a similar strip material wherein the base comprises a strip or sheet of gutta percha tissue 16 to which is applied a layer of sprayed metal 17.

The film as heretofore stated materially enhances the strength of the composite or laminated structure shown in Figures 2 and 3. The sheet will be rolled and slit into spools, without fear of distorting the material or separating the layers. These same desirable results obtain, when the spooled material is fed to the spotting machine and punched.

In Figure 4, the base 18 is formed of sheet metal and has applied thereto a layer 19 of sprayed metal.

Referring to Figure 6, I have shown a representative strip of the spotting or facing material from which it will be observed that the respective layers of sprayed metal, paper backing and adhesive are coextensive. This is likewise true of the material shown in Figures 3 and 4.

The spots or facings are punched from the strip or sheet materials as for example that shown in Figure 6 in the form of overall facings, for substantially completely covering the interior face of the cap, or as center spot facings of less diameter than the diameter of the cap.

In Figures 7 and 8, I have shown a so-called spot cap. The spot 20 is punched from one of the materials shown in Figures 2 and 3 and by means of the adhesive is secured to a cushion disc 21 of cork or cork composition or similar well known liner material adhesively affixed to the shell 23 of the cap.

In Figure 5, I have illustrated a cap stamped from the laminated metal material shown in Figure 4 so that it has an interior facing of sprayed metal. The circumferential sealing groove in the cap is provided with a ring liner of suitable cushion material 24. With this type of cap, the usual paper or composition facings are omitted.

In preparing the facings, I am not limited to any particular metal, since I find that paper, an adhesive tissue, or metal, may be sprayed in accordance with the process described with various metals such as molten aluminum, zinc, tin, nickel, or copper, and in fact, any metal may be employed as found suitable for the particular purpose.

An important advantage of the facings produced with the use of sprayed metal resides in the imperviousness of the film, its flexibility and continuity, and particularly the strong adherent union between the particles of the film and the similar strong union between the film and the surface to which it is applied. Scarring of the cap is completely eliminated and no instance has been found where the facing has become separated from the base. In fact, mutilation and peeling of the facings is eliminated.

The film may be applied to have any desired thickness, and it is found that where desired a thinner base material may be used which with a thin sprayed metal film will give a laminated structure of less thickness than conventional facing or spotting material.

The spraying process employed is known as the "MetaLayeR" process and the applying device as a "MetaLayeR".

While I have described several embodiments of the invention herein, it is to be observed that the invention is applicable under numerous circumstances in connection with container caps and the appended claim is not to be limited to the particular instances herein shown and described.

I claim:—

A cap comprising a shell, a cushion liner therein, and a facing material comprising a backing layer united to the liner and having a substantially continuous resistant film united to the backing layer and consisting of sprayed metal.

GEORGE GOEBEL.