Patented Oct. 2, 1934

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UNITED STATES PATENT OFFICE

1,975,105

DUPLEX METAL ARTICLE

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Application October 20, 1933, Serial No. 694,449

2 Claims. (Cl. 29—181)

This invention relates generally to duplex metal articles composed of a metallic base portion covered on one or more sides with a metallic coating which is integrally united to the base portion. Specifically the invention relates to duplex metallic articles composed of aluminum and/or aluminum alloys.

Many of the strong or high strength aluminum alloys and, indeed, many other commercial aluminum alloys are subjected in service to conditions where the highest degree of corrosion resistance is of utmost importance. Structural aircraft shapes are an example of such use. To obtain a high degree of corrosion resistance in these aluminum alloys without sacrifice of the other properties which may be important, the alloys are covered on one or more surfaces with a coating of aluminum or an alloy of aluminum which is usually more resistant to corrosion than the alloy upon which the coating is placed. The methods of making such duplex articles are several, some of which are more satisfactory than others but all of which utilize in one form or another heat and/or pressure in order to effect a bond between the aluminum alloy which is to be protected and the protective coating. For the purposes of describing the present invention, the most satisfactory process now employed, that disclosed by Edgar H. Dix in U. S. Patent No. 1,865,089, will be selected.

In this process duplex articles may be made in many conventional shapes, such as sheet, tube, rod, and the like. When the manufacture of a duplex sheet is desired, a composite ingot is first made by casting the alloy to be protected against the coating material, which latter may be in the form of plates or sheets and consists of aluminum or an aluminum base alloy. The ingot is then subjected to heat and pressure, as by rolling and intermediate heating, to complete the initial bond produced by the casting, the working being continued to produce a sheet or plate of the desired thickness for fabrication. In this and other processes, such as rolling the coating, in sheet form, onto a slab composed of the alloy to be protected or simultaneously extruding two different aluminum compositions or by other processes, the element of temperature and/or pressure is important as will now be shown.

Many of the aluminum alloys now in use contain copper as an added alloying element. This useful alloying addition has a substantial solid solubility in aluminum and readily diffuses through that metal or its alloys. Moreover, aluminum base alloys containing copper often require the use of coatings to increase their corrosion resistance and, therefore, the body portion or core of the duplex metallic articles of the type above mentioned is often formed of an aluminum alloy containing copper. Referring now to the drawing, there is shown in perspective view a duplex metal article of the class described, one end of which has been cross-sectioned to show the protecting coating 1 and the body portion 2. At the boundary 3 between the elements 1 and 2 there exists, when the elements of the duplex structure are properly bonded together, a zone in which the alloy of the body portion and the metal or alloy of the protective coating lose their separate identities and tend to diffuse one into the other. A certain diffusion is necessary to a good bond but when, under the influence of heat and pressure, the elements of the alloy forming the body portion diffuse far into the coating, the corrosion resistance of the coating may be materially impaired, particularly if the coating is thin. To avoid this, it has heretofore been necessary to regulate carefully temperature and pressure conditions during manufacture of the duplex articles, with attendant expense.

The above is particularly true when copper is a constituent of the aluminum alloy which forms the base or body portion of the duplex article. Copper diffuses rapidly under the influence of heat and materially lowers, in most cases, the corrosion resistance of the coating.

The present invention is predicated upon our discovery that if the protective aluminous metal coating contain chromium, the diffusion of the copper from the base or body portion of the duplex metal through the protective coating is materially lessened or eliminated. The particular manner in which the diffusion of copper is prevented is not well understood and forms no part of this invention. Two logical possibilities exist—the copper either is prevented from material diffusion or it is neutralized as it diffuses and thereby becomes harmless. In any event, the presence of chromium in the coating metal decreases the heretofore mentioned effect of the diffusion without, however, preventing the formation of an adequate bond between the body portion and the coating.

In making the improved article which embodies our invention, we first alloy with chromium the aluminum or aluminum alloy which is to form the protective coating. Usually the thus formed chromium-containing alloy is submitted to a

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CARTON CONSTRUCTION

Filed March 23, 1932

Fig. 1

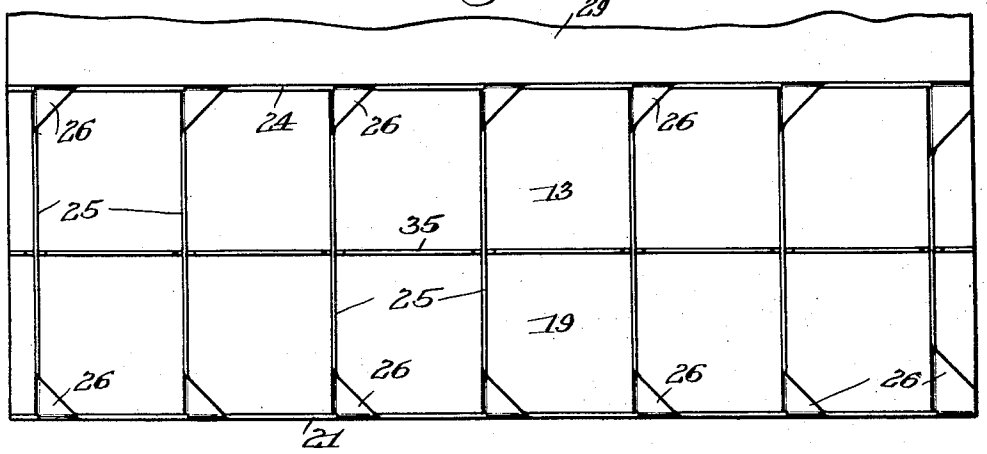


Fig. 5

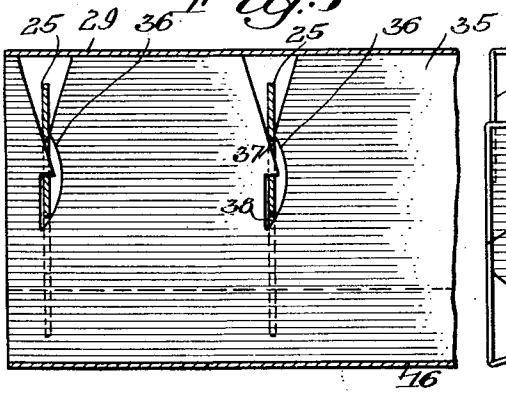


Fig. 2

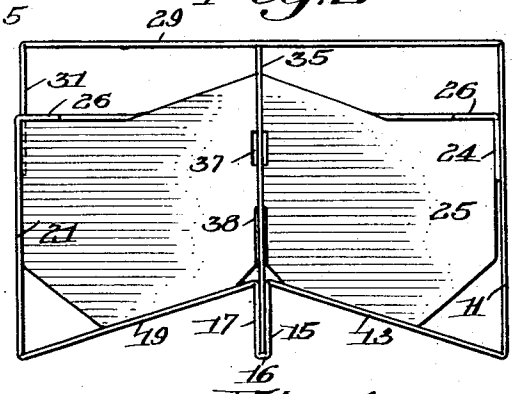


Fig. 3

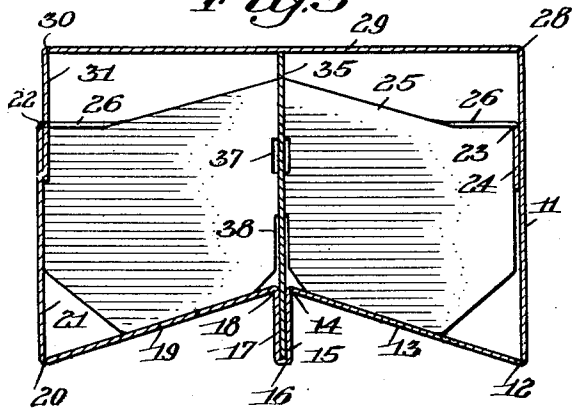
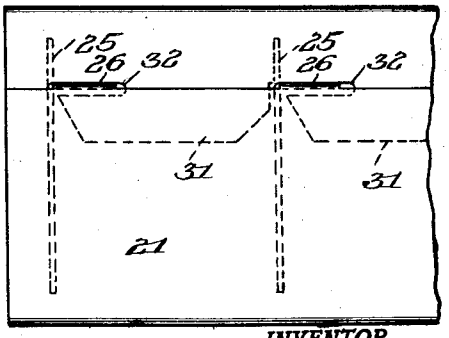


Fig. 4



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CARTON CONSTRUCTION

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Application March 23, 1932, Serial No. 600,612

9 Claims. (Cl. 229—29)

This invention relates to the construction of cartons especially designed for the packing of fragile articles such as eggs, and an object of the invention is to provide a generally improved and more satisfactory carton of this character.

Another object of the invention is the provision of improved partition means in such a carton.

Still another object is the provision of partition means so formed that it will strengthen and reinforce the carton, and which preferably will assist in supporting the cover of the carton.

A further object is the provision of a carton which is sufficiently strong and rigid so that danger of breakage of eggs packed herein is reduced to a minimum, which is provided with cushioning means for the eggs, and yet which is relatively easy to construct and economical with respect to the amount of material needed.

A still further object is the provision of an improved collapsible carton in the form of an integral structure having no loose or detached parts, which carton may be shipped or stored in flat condition and may be subsequently erected to form a sufficiently strong and rigid receptacle having cushioning means for safely supporting eggs.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawing:

Fig. 1 is a plan of a carton constructed in accordance with a preferred embodiment of the invention with the cover in open position and partly broken away;

Fig. 2 is an end view of the carton with the cover in closed position;

Fig. 3 is a transverse vertical section through the carton;

Fig. 4 is a front elevation of a fragment of the carton, and

Fig. 5 is a longitudinal section through a fragment of the carton.

The same reference numerals throughout the several views indicate the same parts.

The carton of the present invention is preferably constructed of any suitable sheet material such, for example, as cardboard. Preferably the main body of the carton and the transverse partitions are all made from a single piece or blank of sheet material, suitably scored and folded. Starting for convenience of description with the back wall 11 of the box, this wall extends down to the lower rear corner 12 formed by a score line, the material thence extending obliquely forwardly and upwardly to form an inclined bottom 13 for the rear row of cells and having a score line 14 at which the material is bent downwardly as shown at 15 and doubled back upon itself at 16 and thence extends upwardly at 17 to another score line 18, all as best shown in Fig. 3. From this score line it extends obliquely downwardly, as indicated at 19, to the front corner 20 also formed by a suitable score line. The oblique portion 19 forms a resilient cushioning bottom for the front row of cells of the carton. From this score line 20 the material extends upwardly to form the front wall 21 of the carton, and is folded at the score line 22 to extend horizontally rearwardly to the score line 23 at which point the material is bent downwardly for a short distance as indicated at 24, the portion 24 being suitably secured, adhesively or in any other desired manner, to the rear wall 11.

The portion between the score lines 22 and 23 is suitably cut and folded in known manner so that various parts of this portion may be turned through 90° from a horizontal plane to a vertical plane to form transverse partitions 25 formed from the same integral piece of material and connected by the triangular connectors 26 to the front wall 21 and securing portion 24.

At the top of the rear wall 11 is a score line 28 forming a hinge at the rear edge of the cover 29 which has another score line 30 at its front edge and a downwardly extending flap 31 having in it L-shaped notches 32 which may be engaged with the triangular connectors 26 at the front of the carton in order to hold the cover closed.

According to the present invention, the downwardly extending fold 15—17 above described runs preferably substantially along the center line of the carton and so elevates the middle of the box bottom that the portions 13 and 19, being free of the supporting surface on which the carton is placed, except at the front and rear corners of the carton, may act as resilient cushioning supports for fragile articles within the carton. In other words, the portions 13 and 19 may give or yield slightly so as to avoid breakage of fragile articles within the carton. Furthermore, the bottom 16 of the downwardly extending fold 15—17 is substantially in the plane of the front and rear corners 12 and 20 of the carton so that it will rest on any flat surface on which the carton is placed and form a support along the center line of the carton.

A strip 35 of suitable sheet material extends longitudinally along the carton substantially at