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E. W. OTTO

2,364,870

METHOD OF PRODUCING LAMINATED PLASTIC ARTICLES

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Fig. 1.

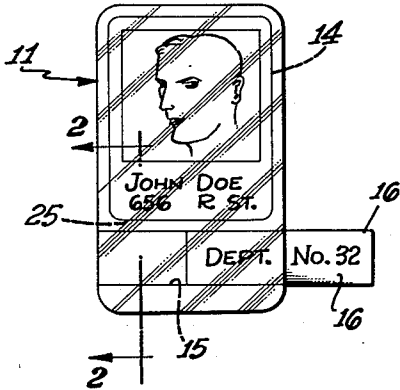


Fig. 2.

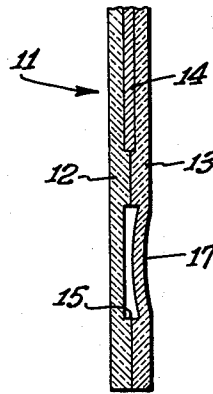


Fig. 3.

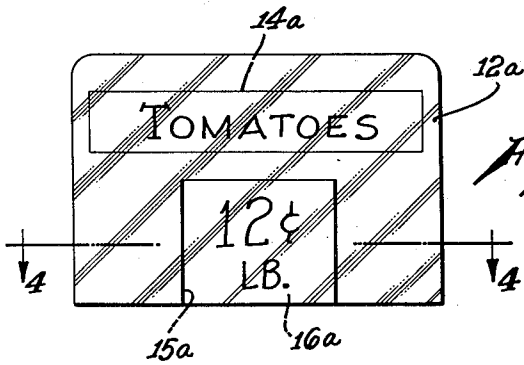


Fig. 4.



Fig. 5.

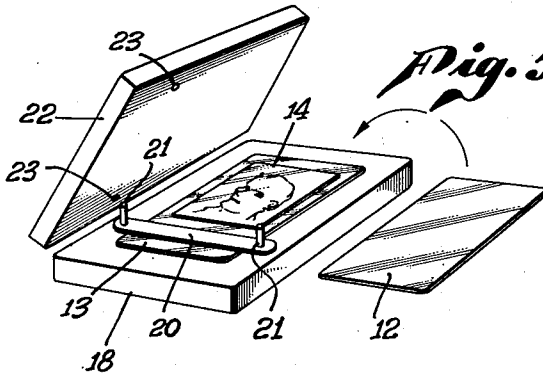


Fig. 6.

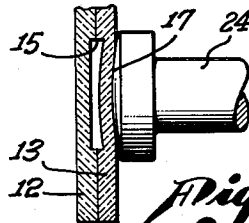
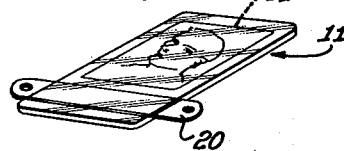


Fig. 7.

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METHOD OF PRODUCING LAMINATED PLASTIC ARTICLES

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4 Claims. (Cl. 18-59)

This invention relates generally to a method of producing laminated plastic cards and particularly to laminated cards such as are commonly used for identification badges and the like.

Identification cards or badges made up of two sheets of plastic material and an intermediate identification sheet or photograph are widely used in industrial plants and the like for the ready identification of employees to aid in excluding unauthorized persons. Since the identifying sheet between the two plastic sheets is sealed in place there is no means of altering this without destroying or marring the card. In many instances it would prove desirable to have some interchangeable or removable element which could be inserted in the identification card. Such a means could be used to indicate that an employee is a part of a certain department.

It is, therefore, a primary object of my invention to provide a method of producing an identification card or similar article which has a permanent identifying sheet sealed between two united sheets of plastic and in addition has a recess or slot for the insertion of a removable card or the like which may be used as a temporary indicia. It is a further object to provide a method of making an article of the type indicated in which the portion of the card surrounding the recess or slot is transparent.

It is also an object of my invention to provide a method of producing a slotted or recessed plastic, laminated article which has retaining means for yieldably holding a card inserted in the slot.

These and other objects will be apparent from the drawing and the following description. Referring to the drawing, which is for illustrative purposes only—

Fig. 1 is a plan view of a laminated identification card embodying the invention;

Fig. 2 is an enlarged fragmentary sectional view through the card of Fig. 1 taken on line 2-2 of Fig. 1;

Fig. 3 is a plan view of a modified form of card embodying the invention;

Fig. 4 is a cross section on line 4-4 of Fig. 3;

Fig. 5 is a perspective view showing elements of the card prior to assembly for the uniting operation together with means for forming the recess or slot in the card;

Fig. 6 is a perspective view of the card at one step in the process; and

Fig. 7 is a fragmentary sectional elevation of the card showing the final step of the process.

More particularly describing the article produced by my method, reference numeral 11 gener-

ally indicates a laminated article illustrated as a personnel identification card. Referring particularly to Figs. 1 and 2, the card 11 comprises two plastic sheets 12 and 13 respectively which may be formed of any desirable transparent plastic, such as ethyl cellulose for example. Sealed between these sheets is a sheet 14 which may bear a photograph and/or other identifying means as indicated. Such identification cards including the parts 12, 13 and 14 are ordinarily made by subjecting the sheets to heat and pressure in order to unite the two plastic sheets about the intermediate identification sheet, or the sheets 12 and 13 are joined without heat by the use of a solvent which tends to liquify the surfaces of the sheets so that they can be united.

It is a feature of my invention that an identification card or other laminated article can be produced which is provided with a slot or recess, such as indicated by numeral 15 in Figs. 1 and 2, for the reception of a removable card 16 as shown in Fig. 1. Preferably although not necessarily, means are provided for yieldably engaging the inserted card to prevent its accidental removal. One means of accomplishing this is to provide an inwardly curving section or portion 17 on one of the plastic sheets in the region of the slot.

Reference is made to Figs. 3 and 4 to show another form that the article produced by my method may take. In these figures reference numerals 12a and 13a indicate plastic sheets, reference numeral 14a a sealed-in card and 15a a recess which extends inwardly from one edge of the card but does not extend through to the opposite edge as shown in the form shown in Figs. 1 and 2. It is thus to be understood that the recess or slot may take any desirable form or extent, the recess itself lying in the plane of the card.

In my process the plastic sheets are placed one upon the other with the identifying sheet to be sealed between them placed intermediate them, such as indicated in Fig. 5, where the lowermost plastic sheet 12 is shown to one side before being placed on the other two. In order to provide the recess or slot 15 in the completed article I utilize a thin strip of metal or other suitable material 20 of the desired configuration and place this between the two plastic sheets when assembling them. Preferably means are provided on the plate 18 to support the strip of metal and hold it in place and such means has been shown as the pins 21 mounted in and extending above the surface of the plate. The strip 20 is suitably apertured to

fit over these pins. After the upper sheet 12 has been placed on top of the sheets 13 and 14 and strip 20, an upper pressure plate 22 is placed over the sheets and the several sheets subjected to heat and pressure in order to seal the plastic sheets together about the card 14 and the recess or slot forming strip 20. Any known means may be used for heating the pressure plates 18 and 22 and for forcing them together to exert the necessary pressure on the plastic sheets. The upper plate is provided with a pair of holes 23 to receive the pins 21. The amount of heat and pressure treatment to be used depends upon the type of plastic sheet.

After the parts have been maintained heated for a sufficient length of time the plates are preferably cooled while still under the influence of pressure. The pressure may then be removed and the laminated unitary article shown in Fig. 6 removed. The article at this stage of the process has the metal strip 20 embedded therein and the next step in the process is the removal of this strip by pulling it out from the card. Any suitable mechanism can be used for this purpose, the holes in the end of the strip 20 affording a means by which the strip can be conveniently gripped.

After the strip 20 is removed one of the plastic sheets is deformed to provide a yieldable means for retaining a card, such as that indicated at 16, within the slot or recess. This can be done by pressing a heated member 24 against the plastic sheet in the region of the recess to deform it as shown in Fig. 7. Of course I contemplate that it may be desirable in some cases to omit this deformation of the wall and provide a card with a straight walled slot or recess.

Although it is not shown in Fig. 6, the operation of joining the three sheets to deform the laminated article may result in some irregularity at the edges of the article and it is, therefore, often desirable to trim the edges after the strip 20 has been removed, or the edges may be smoothed by means of a solvent.

It is advantageous to have the plastic sheets as clearly transparent as possible in the region of the slot 15 and in order to accomplish this I have found that the strip 20 should preferably have a hard, dense, smooth surface. A metal strip, coated with chromium, is particularly suitable.

In the form of the article illustrated the sealed in sheet 14 has been shown as completely sealed in at all four edges by the united plastic sheets 12 and 13. It is not essential to the invention that the sheet 14 be so positioned and I contemplate that it may be desirable to have the lower edge, indicated by numeral 25 in Fig. 1, act as a part of the wall means defining the slot or recess 15. In this connection it may facilitate assembly of the laminated articles to have the plate 18 marked or scored so that the back or lower sheet 13 can be quickly placed thereon with relation to the guide pins 21. The strip 20 can then be placed on the guide pins and the edge of the strip used as a guide for placing the sheet 14, the two members being placed together in edge to edge relation. The upper sheet 12 can then be placed over the assembled parts so that its edges are immediately above those of sheet 13.

Although I have shown and described particular method of practicing my invention I contemplate that various changes and modifications can be made without departing from the invention and I

intend to cover such changes as come within the scope of the claims.

I claim as my invention:

1. In the method of producing a laminated plastic article with a recess or slot therein, the steps of superposing one sheet of plastic on another with a relatively non-plastic member therebetween, said non-plastic member preventing contact of said plastic sheets over a portion of their areas; subjecting the sheets to heat and pressure to unite them about said non-plastic member; cooling said sheets while maintaining them under pressure; subsequently removing said non-plastic member to leave a recess in the article; and subjecting one of said plastic sheets to heat and pressure in the region of said recess to deform the wall of said recess inwardly.

2. In the method of producing a laminated transparent plastic article having a recess or slot to receive a removable card or the like, the steps of superposing one sheet of plastic on another of corresponding size and shape with a thin flat non-plastic smooth-surfaced member of given shape and size less than the size of the sheets therebetween, said non-plastic member preventing contact of said plastic sheets over a given portion of their areas; subjecting the sheets to heat and pressure to unite them about said non-plastic member; cooling said sheets while maintaining them under pressure; subsequently removing said non-plastic member to leave a recess in the article; and subjecting one of said plastic sheets to heat and pressure in the region of said recess to deform the wall of said recess inwardly.

3. In the method of producing a laminated transparent plastic article having a recess or slot to receive a removable card or the like, the steps of superposing one sheet of plastic on another with a smooth surfaced thin metal member therebetween, said member preventing contact of said sheets over a limited portion of their areas and having a portion extending beyond the margins of said superposed sheets; subjecting said sheets to heat and pressure to unite them about said member; cooling said sheets while maintaining them under pressure; withdrawing said member from between said sheets by utilizing the protruding portion of the member to obtain a grip on the member and causing relative movement between the united sheets as a unit and said member; and subjecting the outer surface of one of said sheets to heat and pressure in the region of said recess to deform said sheet inwardly into said recess.

4. In the method of producing a laminated plastic article, the steps of superimposing one sheet of plastic on another with a relatively non-plastic member interposed between said sheets wholly within the boundary thereof, and a second relatively narrow non-plastic member between said sheets, extending to the opposite side edges of said sheets, said non-plastic members preventing contact of said plastic sheets throughout the extent of said non-plastic members, subjecting the sheets to heat and pressure to unite their adjoining faces about said non-plastic members, cooling said sheets while maintaining them under pressure and subsequently removing said second non-plastic member to leave a recess in the article between said sheets.

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