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PROCESS FOR MAKING THREE DIMENSIONAL DISPLAY ITEMS

Original Filed Dec. 14, 1956

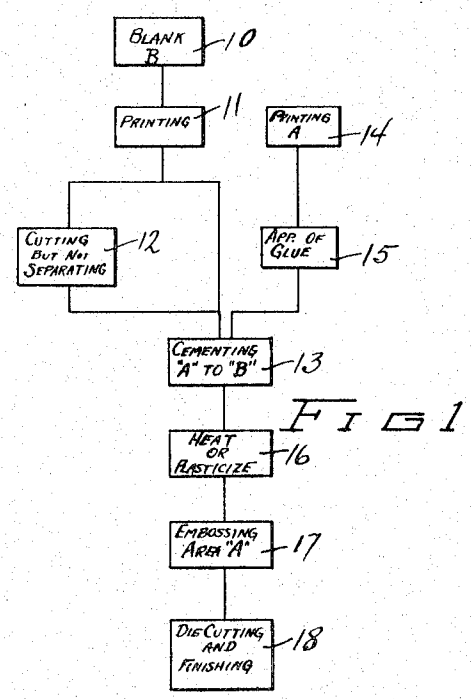


FIG 1

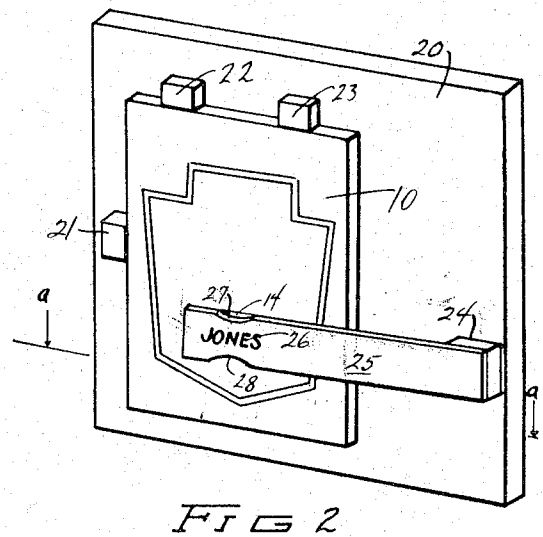


FIG 2

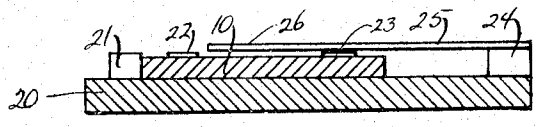


FIG 2a

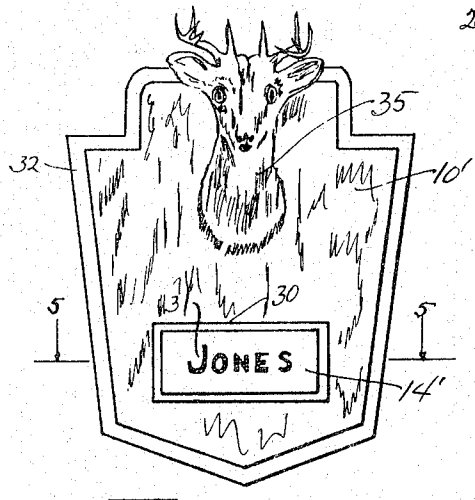


FIG 4

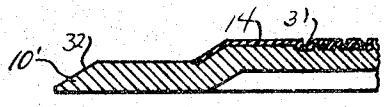
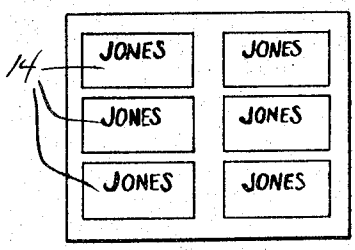


FIG 5

FIG 3



INVENTOR.
WILLIAM SWARTZ

BY Greene, Rineles & Durr

ATTORNEYS

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PROCESS FOR MAKING THREE DIMENSIONAL DISPLAY ITEMS

William Swartz, Highland Park, Ill.
(1430 W. Wrightwood Ave., Chicago, Ill. 60614)

Original application Dec. 14, 1956, Ser. No. 628,460, now Patent No. 3,057,073, dated Oct. 9, 1962. Divided and this application Apr. 26, 1965, Ser. No. 450,701
2 Claims. (Cl. 156—220)

This invention relates to the process for manufacturing three dimensional display and advertising devices from flat sheets of moldable materials with printed symbols thereof showing in relief.

This application is a continuation-in-part of U.S. application Serial No. 820,668 filed June 16, 1959 now abandoned which is a division of U.S. application Serial No. 628,460 filed December 14, 1956 now Patent No. 3,057,073.

The process of the invention is especially adapted for manufacturing display plaques with a backing of heavy cardboard and similar fibrous materials. For such plaques, the cardboard or other backing material should be self-supporting and about 1/16 to 3/8 inch in thickness.

In the manufacture of such displays from inexpensive materials such as cardboards, fiber boards, vulcanized fiber boards, etc., it is desirable to provide a name plate of contrasting color, preferably metallic, which is more decorative than the cardboard. It is the name plate portion which is most effective when made in three dimensional form by an embossing process, for example.

Heretofore the only acceptable method of making good display plaques with a three dimensional name plate or similar portion has been by a process which may be called post finishing. By this post finishing process the display plaque is first embossed, then colored by rollers, air gun sprays with stencils or by hand finishing. Post finishing is an awkward, clumsy and expensive process.

This invention is based on the discovery of a method whereby excellent three dimensional display items containing letters and similar symbols having large plateaus raised about 1/16 to 1/2 inch above the remaining surface of the plaque may be made by a prefinishing process, i.e., by first printing and later embossing to produce the plateau areas. According to the process the name plate or similar portions to be embossed are separately printed in large numbers, then cut out and separately applied to the sheet from which the plaque is to be formed just prior to embossing the sheet. Heretofore, any method which printed prior to embossing in a plaque of the type defined, was undesirable or impractical because it was impossible to obtain even fair registration between the printed portion (such as a name plate area) to be embossed and the portion which is actually embossed.

The fiber boards employed as backings are aqueous systems containing as much as 10% moisture. If a foil is united to such a backing and the foil is printed, the drying of the backing which takes place incidental to the drying of the printing ink will result in shrinkage of the backing by as much as 1/2 inch for a length of about 12–18", whereas the foil is substantially non-shrinkable. Under such conditions it is impossible to obtain good registration. The backing itself may be printed over all or a portion of the surface by conventional processes where no registration of any parts of the printed picture with the subsequently embossed area is required.

The name plate portions, which are separately applied to the backing, are of necessity much smaller in area than the area of the backing material to which they are applied. These name plate portions usually make up the advertising portion of the finished product and when

the backing is finally cut to the form of a shield, for example, the name plate portions simulate the relatively small metallic plates of decorative shields.

Metallic effects on the name plate can be obtained by first providing a foil covered paper and printing the foil surface with various transparent inks to provide the gold rose, blue metallic and similar metallic effects desired. Opaque coatings can also be applied to provide certain areas with a non-metallic appearance. The foils of such foil coated papers can be as thin as .00035" or as heavy as .006. The foil, per se, has almost no shrinkage. However, the foil coated paper name plates act as a unit in the embossing process and the foil follows the contours given by the embossing step without tearing or separating from the paper backing.

By gang printing a multiplicity of the name plate portions separately from the carboard backing the printing is done more accurately and at less expense. A special apparatus is provided for fixing the name plate to the backing in the proper position prior to embossing, so that registration is always obtained. This apparatus is the subject of said Patent No. 3,057,073.

As stated above, the backing material should be at least 1/16 and not more than 3/8 of an inch thick. Backings under 1/16" in thickness do not form self-supporting display items. With thicknesses greater than 3/8", the material of the backing is too thick for pressure applied from the rear of the backing to be transmitted to the front portion with sufficient resolution to obtain the accuracy in raised letter surfaces required.

The height to which such lettering or other symbols can be raised depends somewhat on the taper permitted between the flat top of the letters or symbols and the general level of the backing surface. With a small taper of 1°–3°, the letters may be raised to a maximum of 1/8"; with a taper of 3°–7°, the letters may be raised to a maximum of about 1/4"; with a taper of 7–25°, the letters may be raised as much as 1/2".

It will be realized that exact registration of the letters or symbols with the embossing is rarely attainable. When it is stated in the specification and claims that "substantially exact" registration is obtained it will be understood that the lack of registration is not readily apparent to the naked eye. What "lack of registration" is readily apparent to the naked eye depends somewhat on the size of the lettering. For lettering in which the letters are about 1/4 inch high, a registration within about .005" is desirable and such registrations are readily obtainable by applicant's process. Registration in the prefinishing process of the invention is difficult to obtain not only because of the differences in shrinkage under the influence of moisture between the backing and the name plate, but also because the step of embossing is also a distorting operation and, therefore, initial variations in registration are usually further exaggerated during embossing.

The glue that is employed is any liquid glue which contains water as the vehicle. An aqueous glue is employed since the moisture thereof plasticizes the backing and paper of the name plate to make them embossable. Suitable glues are vegetable or animal glues or glues comprising resin emulsions.

The glue is an important part of the detail. It must contain enough moisture to emboss properly and sufficient plasticizer to hold the water so that the fibers do not drink up the water deep into the board and starve the joint. Should they do this, the joint will not emboss properly. On the other hand, if too much plasticizer is used in the glue, the joint will pick up moisture in a damp climate and will delaminate. In early experiments, many of these products delaminated because of this treacherous vulnerability. The balance is both precarious and exacting. The glue should contain sufficient water to form a

liquid rather than a paste. A very satisfactory glue contains about 53% water.

Where the stock must be die cut to unusual nonrectilinear shapes the original point of registration would be lost and this makes registration for embossing based on the new shape difficult or impossible. According to the present invention the stock is not completely die cut to final shape until after registration is obtained and embossing is carried out on the blank form and the label or plate is accurately glued, with top surface registration, upon the blank form or backing just before the embossing step so that expansion or contraction due to losses in water content do not throw the plate out of registration. The name plate is treated with a glue just before being applied to the background so that it has a high proportion of water and embosses easily without tearing.

In the drawing:

FIG. 1 is a flow sheet setting forth the various steps of the process.

FIG. 2 is a top plan view of the apparatus for positioning the printed area to be embossed on the background sheet.

FIG. 2*a* is a cross sectional view of the device of FIG. 2 taken on line *a*—*a* of the latter.

FIG. 3 is a view showing how the areas to be embossed are printed.

FIG. 4 is a view of a finished plaque made according to the invention.

FIG. 5 is a cross sectional view of the plaque taken on line **5**—**5** of FIG. 4.

As illustrated in the flow sheet of FIG. 1 the sheet **10** is first printed as shown at **11**. This first printing is to provide the desired color effects in the nonembossed areas. Thereafter, the blank **10** of thick fibrous material, may be at least partially die cut without however, separating the die cut portion from the blank as shown at **12** or the printed blank may have the name plate portion (to be embossed) cemented thereto before cutting as shown at **13**. The printed panel or name plate **14** has aqueous glue **15** applied just before being positioned and cemented to the blank **10**. The positioning is carried out by surface registering the name or symbol to be embossed in a predetermined position. After the name plate portion **14** has been applied to the background the assembly is heated or otherwise plasticized at **16** to make it moldable and is then immediately embossed in the area **14** as shown at **17** in an embossing machine having similar positioning blocks as those for the name plate locating means.

Thereafter the plaque is die cut or removed from the remainder of the blank as shown at **18**. Additional finishing steps include painting the beveled edges, etc.

The device for locating the name plate area in the proper position is shown in FIG. 2 and comprises a flat base board **20** with two or more positioning studs **21**, **22**, **23** extending upwardly therefrom. Attached to one side of the baseboard **20** is a block **24** carrying in cantilever fashion a transparent strip **25** of approximately the same width as the height of the area to be embossed. This transparent cantilever **25** bears adjacent its end at least a portion **26** of the printed indicia of the name plate area **14**. The cantilever **25** is spaced above the backboard **20** by block **24** a distance slightly greater than the thickness of the plaque blank **10** so that the plate **14** may

be manipulated so that the indicia on the plate **14** exactly matches the corresponding indicia **26** of the cantilever **25**. The cantilever **25** is flexible so that it can be lifted up at the end if desired. The cantilever **25** may be narrower than the printed sheet to be attached at some areas as for example at **27** and **28**. This facilitates the positioning of the printed sheet or name plate **14**. Just before positioning the plate **14** on the blank **10**, the former is coated with glue and may be lightly touched to the area close to where it is to be attached. After manually sliding the plate or area **14** in place as determined by matching the indicia **26** with that of the area **14** the latter is pressed into place. Although attempts have been made by others to carry out an automatic name plate pasting and embossing operation, such process cannot obtain an average registration of better than ¼" to ½" on more than 80% of the total pieces processed. A 20% overshoot on advertising displays results in such a poor quality of product that the technique is considered unusable for customers who demand high quality products.

Thereafter the blank **10** is heated or otherwise placed in a more moldable condition if necessary and passed to the embossing machine. The embossing machine has studs located similarly to studs **21**–**23** of the positioning device so that exact registration is obtained.

A completed plaque is shown in FIG. 4. A three dimensional figure **35** may be attached to the top of plaque **10'**. As shown in FIGS. 4 and 5, the name plate **14** has been embossed and now has an outer bevel **30** and indicia **31** in relief.

The features and principles underlying the invention described above in connection with specific exemplifications will suggest to those skilled in the art many other modifications thereof. It is accordingly desired that the appended claims shall not be limited to any specific feature or details thereof.

I claim:

1. A method for making a three dimensional plaque comprising the steps of printing a blank to provide the desired color effects, partially severing the blank to provide the desired outline of the plaque, applying a printed panel to the surface of the blank in a preselected position within the plaque outline, embossing the blank within the plaque outline to raise selected portions of the panel above the surface of the blank, and completely severing the plaque from the blank.

2. A method as defined in claim **1** wherein the printed panel is applied to the surface of the blank by coating the panel with an aqueous glue.

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EARL M. BERGERT, *Primary Examiner.*

H. F. EPSTEIN, *Assistant Examiner.*