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C. N. DICKEY

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INTERCHANGEABLE LETTER DISPLAY DEVICE

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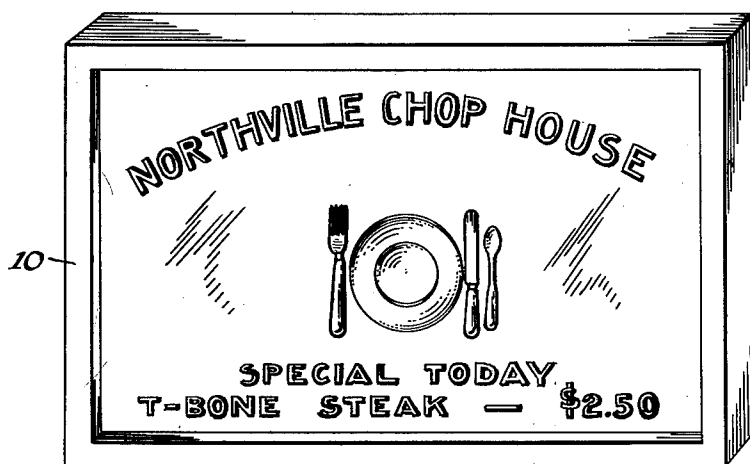


Fig. 1

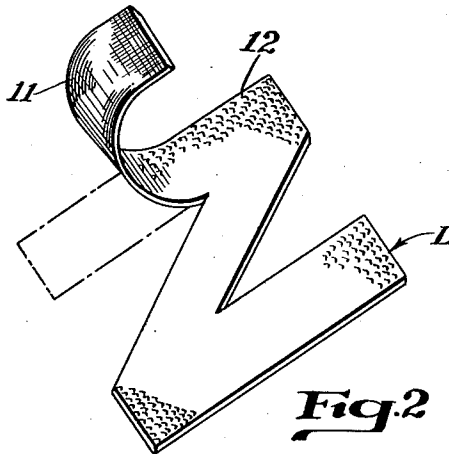


Fig. 2

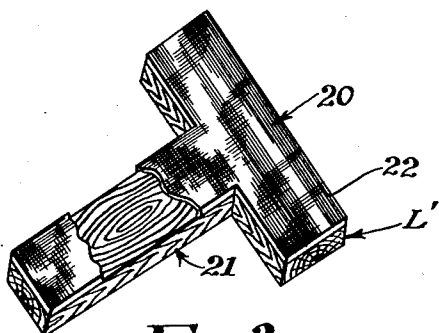


Fig. 3

INVENTOR.
CHARLES N. DICKEY.

BY

Richy & Watts

ATTORNEYS.

UNITED STATES PATENT OFFICE

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INTERCHANGEABLE LETTER DISPLAY
DEVICE

Charles N. Dickey, Northville, Mich., assignor, by
mesne assignments, to James S. Cushman, New
York, N. Y., and Harold F. Moonert, Wil-
loughby, Ohio

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2 Claims. (Cl. 40-140)

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This invention relates to a display device for interchangeable letters and decorative material and for design elements for assembly upon the surface or suitable background without special preparation of the surface or separate fastening device for the display elements.

There have been many attempts to provide interchanging devices of this character because of their inherent usefulness to business establishments such as restaurants, retail stores, department stores and the like wherein sign boards are employed, the context of which is variable. It has been proposed to use a panel having a crude rubber surface for mounting letters having a crude rubber surface, the letters being attached by the natural tackiness and cohesion of the rubber. Such a construction is undesirable and unattractive, the letters tend to stick together in storage, and rear illumination is difficult.

Others have proposed the use of letters made of thin transparent material that has the characteristic of retaining a static charge of electricity wherein the objects are maintained on the panel by static electrical energy. This arrangement is not dependable and the letters are of exceedingly thin flexible material because of the small magnitude of the retaining force.

It is an object of this invention to produce letters of such a nature that they will be retained on a smooth hard surface without the use of adhesive crude rubber facings, adhesives, felt pads, water films, slotted, grooved or specially constructed supporting surfaces, or vacuum cups, and which will remain in place indefinitely. This I accomplish by forming the letters of sheet flexible, rubber-like plastic material which may be formed as rather thin sheets but which may also comprise a laminated article having a facing of the rubber-like material described backed up by cloth, metal, plywood or the like. The undersides of the letters or display elements, i. e., the sides serving to mount them, are formed with a smooth polished surface. Letters of this type when applied to a support panel have a smooth polished surface will remain firmly adherent to the support until the user desires to remove them. The letters are readily removed by merely peeling them off the panel, but the force of gravity and the action of air currents and normally encountered vibration have no effect upon the adhesion of the letters to the support.

In the drawings:

Fig. 1 shows a sign embodying the invention;

Fig. 2 shows a letter embodying the invention;
and

Fig. 3 shows a laminated letter embodying the invention.

As seen in the drawings, Fig. 1 represents a sign made up of the letters and other decorative elements according to the principles of my invention. In the preferred form, the support panel 10 is made of glass. Ordinary window glass has a surface which is smooth enough to produce highly satisfactory results when employed in conjunction with my novel letters, and enameled metal plates are also satisfactory. The letters or design elements 11, seen in Fig. 2, have an under surface 11 which is smooth and polished. The outer surface 12 may be of any texture suitable to display.

I have found that letters made of flexible elastomeric vinyl plastic sheet material having a press-polished undersurface adhere to a pane of glass or polished metal with a great degree of tenacity.

It is probable that the adhesion results from several factors. For example, when the smooth surface 11 is pressed against the smooth panel 10, a large part of the air is excluded from between the surfaces, whereupon atmospheric pressure exerts an unbalanced force on the outer surface of the letters. With this pressure, the coefficient of friction between the letters and the panel is sufficient to retain the letters in mounted position against the force of gravity.

It is also probable that due to the polished nature of the letter surface and of the panel, a certain degree of molecular adhesion is obtained in accordance with the well-known principles of the Johannsen gauge blocks and the like. I have experimented with mounting letters on a panel in a bell jar and exhausting the air from the jar. Even though the surface of the letters was smooth to the touch without a semblance of tackiness and even though the glass was perfectly clean and dry, the letters remained mounted on the panel in the vacuum.

Although I have found that certain plastic materials such as an elastomeric vinyl plastic sheet are unusually effective, other flexible sheet materials may be mounted in the same manner. For example, if a molded natural or synthetic rubber sheet material is formed with the relatively smooth molded or polished surface, it will tend to adhere in the same manner. However, I have found that the tenacity of the mounting when rubber articles manufactured in accordance with normal commercial practice are employed, is not equal to that when the aforesaid synthetic plastic letters are used. I assume that the additional

adhesion of the plastic material is due to one or both of two differences between letters formed of such material and those formed of rubber. In the first place, the vinyl plastic materials respond readily to the production of a very smooth or press-polished finish, and according to the principles of my invention, the smoother the finish of the letters the greater will be the air pressure effects and the molecular adhesion referred to.

Secondly, it is probable that some of the plasticizer in the synthetic letters assists to increase the tenacity of the union. Although letters formed according to my invention appear perfectly smooth to the touch and show no tendency to adhere to the fingers or clothes of the user, it may be that upon pressing the smooth surface of the letters on the smooth surface of the panel, a minute amount of plasticizer exudes and assists in augmenting the intimate engagement of the parts.

An example of one composition that I have found produces good results is as follows:

Composition by weight

100 parts of polyvinyl chloride (powdered resin)
50 parts of dioctyl phthalate (plasticizer)
1 part of color pigment; for example, Channel Black
0.5 part lead stearate
2 parts of a resin stabilizer

Little or no fillers, such as clay or diatomaceous earth are used with this compound in order to obtain maximum smoothness of the molded sheet. Although the plasticizer content may be varied in the compound given, too much plasticizer gives a flabby sheet and very small amounts give a rigid, stiff sheet. The above materials are stirred or blended together and the resulting mixture is then placed on a hot plastic or rubber mill and milled approximately ten minutes at 275° F. This milling knits the mass into a homogeneous sheet of plastic. The milled stock is then transferred to the cavity of a hot mold in a hydraulic press for press polishing. The interior of the mold has a highly polished mirror-like surface, such as is produced by chrome plating and polishing. The press is closed and the plastic molded at 320° F. for two minutes at approximately 100 p. s. i. pressure. Before reducing the pressure the mold is cooled to room temperature. The pressure is then released and the sheet removed from the mold. I mold the sheet approximately .025" thick although thicker or thinner sections may be used. From this sheet the letters and designs may then be die cut.

Press-polished vinyl sheet or film might also conceivably be made by molding or casting the vinyl resins in molds having a smooth surface from solutions or dispersions of the plastic. The material might also be applied as a thin coating on other materials such as wood, paper or metal providing the mounting surface of the plastic material has a smooth, polished appearance or a smooth highly glossed surface. For example, a laminated letter L' appears in Fig. 3 wherein a coating 20 of the plastic material is applied to a wood backing member 21. The underside 22 of the composite letter is smooth and polished to effect the mode of operation described. If the backing member is flexible the letter is readily applied and removed, but if the backing member is rigid the letter should not be excessively large or the unit pressure of application will be too low.

Other elastomeric vinyl polymers and copoly-

mers would prove suitable for my purpose. For example, a plasticized vinyl chloride-vinyl acetate copolymer would work equally well. Certain rubber compounds will work to a lesser degree. The main disadvantage to the rubber compounds is that they lack a free plasticizer and it is difficult to obtain the highly polished surface required for best results. Consequently, greater effort is required to squeeze the rubber sheet against the smooth supporting surface and obtain a good vacuum seal.

Although glass is considered to be an ideal background for the letters and lends itself to illumination, I have found that any polished material or polished pane object will support the letters satisfactorily. This includes objects with a smooth polished surface coat of vitreous or baked enamel or certain paints not subject to softening by migration of the plasticizer. If compounded with a non-migrating plasticizer the letters could be used on any type of painted surface without any softening or damage to paint or to the letter. I find that display elements made as described may be pressed together with which a good union is effected. Thus, the panel could comprise an outer sheet of polished vinyl plastic or the like which sheet may be applied to cloth, wood, paper, etc., having a smooth outer surface. The plastic material, like the letters themselves, may be applied as a sheet of material fastened to the backing, or may be in the form of a coating for the backing.

Also, although I have explained at some length how to form a preferred kind of material, it will be understood that the claims are not necessarily limited to such material. The essence of the invention is in the provision of a design element having a surface formed of rubber-like or elastomeric material having a smooth or polished surface, or a lamination of such material with another material, which may be applied to panes of glass or other panels having a similar smooth surface. The term "polished surface" as employed in the claims refers to a smooth or glossy surface whether produced by an actual polishing application, cast, molded, or the like.

Throughout the specification the display has been referred to usually as "letters" but it will be understood that the invention is not limited to letters of the alphabet because the purpose of the invention may be employed regardless of the configuration of the applied object. For example, educational kits of letters, animals, objects, etc., may be made under the invention.

The terms "elastomeric" as used in this specification and the claims are terms generic to a class of synthetic substances having the properties of natural rubber, namely a very high degree of flexibility coupled with the ability to return to its original dimension after a certain degree of stretching. However, it is understood that the elasticity or percent elongation which produces no permanent set need not be anywhere near as high as that of natural rubber to carry out the present invention. The term includes synthetic plastic material including a plasticizer or its equivalent and having the properties described necessary to effect the invention.

Having thus described the present invention so that others skilled in the art may understand and practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. A character for use as a display element,

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formed as a homogeneous element adapted to be attached to a glossy support merely by application of slight pressure, said character being formed of a synthetic resinous elastomeric material and including a plasticizer therefor substantially in the proportion of two parts of elastomeric material and one part of plasticizer, said character comprising a piece of flat, flexible, air-impervious plastic material having at least one glossy, press polished, non-tacky surface by which said character may be firmly attached to said support, the amount of plasticizer in said material being sufficient to make the material flexible for attachment as defined, but insufficient to make the material flabby so as to be nonself-supporting.

2. A display comprising a support having a smooth, glossy, air-impervious surface, and a character formed as a homogeneous element adapted to be attached to said support surface merely by the application of slight pressure, said character being formed of a synthetic resinous elastomeric material and including a plasticizer therefor substantially in the proportion of two parts of elastomeric material and one part of plasticizer, said character comprising a piece of flat, flexible, air-impervious plastic material having at least one glossy, press polished, non-tacky

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surface by which said character may be firmly attached to said support, the amount of plasticizer in said material being sufficient to make the material flexible for attachment as defined, but insufficient to make the material flabby so as to be nonself-supporting.

CHARLES N. DICKEY.

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