

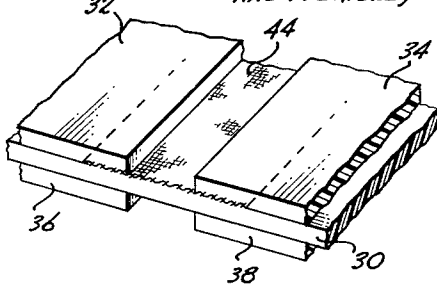
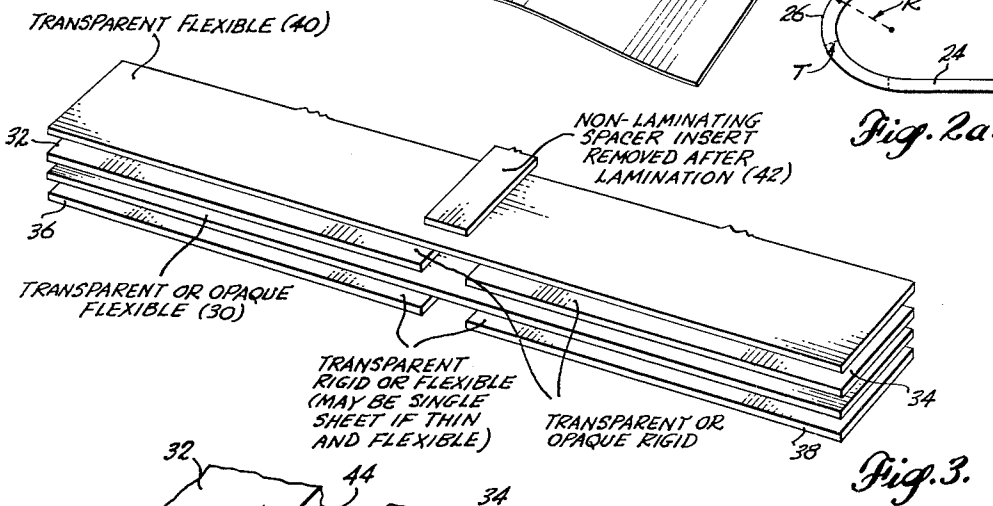
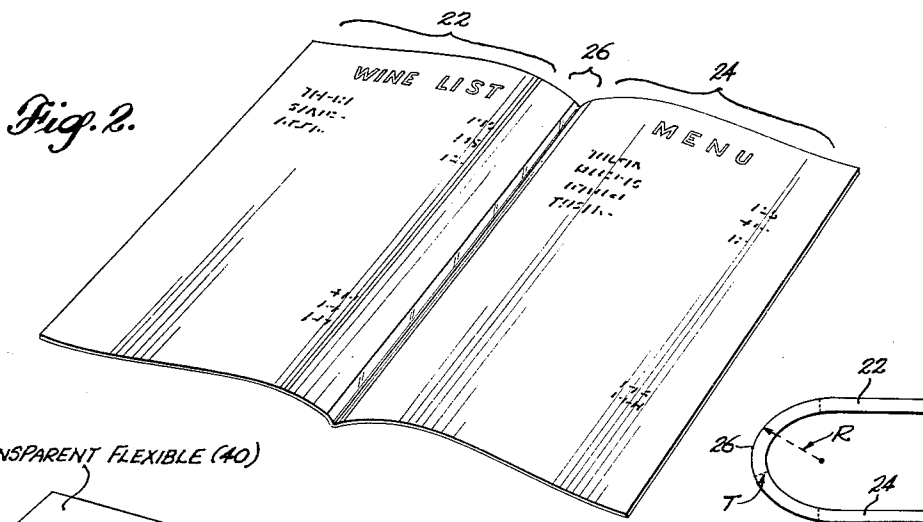
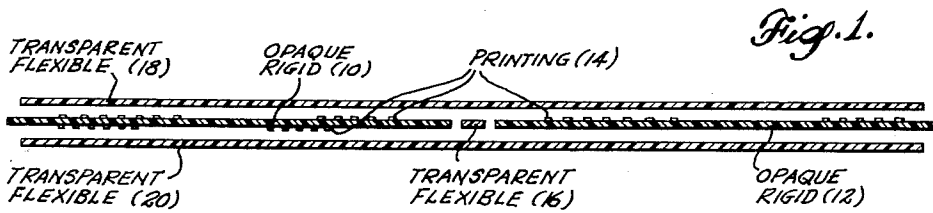
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SELF-HINGING LAMINATED PLASTIC FOLDERS

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SELF-HINGING LAMINATED PLASTIC FOLDERS

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The present invention relates to durable, esthetically attractive, self-hinging laminated plastic folders and method of fabricating same in flat condition by thermolamination, such folders being of the so-called single fold type and having particular utility for protected display of printing and/or artistic material subjected to hard usage, such as restaurant menus, sales brochures, single hinged cover sheets, and the like.

Common practice with respect to display folders such as restaurant menus, for example, is to simply print all or part of the menu on good quality paper then accomplish a single fold simply by creasing the paper. The hard usage normally involved with this type of menu renders such weakened and unsightly at the crease and corners in a fairly short time, and continuing replacement of such menus from being creased, torn, or simply worn, is a chronic as well as costly problem. Attempts to cover or encase paper menus in plastic creates a delaminating problem and, if bordering is used, much of the esthetic quality desired is lost. Prior attempts have been made, such as in binder notebooks, to provide an all-plastic cover of a multi-fold type, such as disclosed in Schade U.S. Patent No. 2,390,125 and Schade U.S. Patent No. 2,486,330, but the delamination problem as well as other disadvantageous characteristics incident to hard usage of the hinge areas, has led to use of bordering to prevent delamination where the laminated product includes both rigid and flexible or non-rigid sheets in its makeup.

To obviate the esthetic disadvantage of bordering, and provide a simple fabricated all-plastic folder having uniform appearance, thickness and constituency edge to edge along with desirable relative stiffness or rigidity in the leaves while retaining relative flexibility in the hinge area of the folder, the present invention provides an integrated, self-hinging plastic folder demonstrating great durability under hard use, and which is strong, durable, and easy to clean with completely smooth hinge and face surfaces, yet is not so rigid as to be unnatural to handle, each leaf of the folder appearing superficially to be but a single sheet, the printing and/or artistic presentation on the folder nevertheless being fully covered and fully protected. In denoting the leaves of the folder as having the same "constituency edge to edge," as indicated above, it will be understood that all laminated layers or plies thereof are edgewise coextensive and non-bordered, and consequently are trimmable to desired size without regard to bordering. As a further characteristic of folders of the present invention, such are economically fabricated from a composite of so-called rigid, unplasticized plastic sheets and of so-called flexible, plasticized plastic sheets, with thermobonding of the two types of sheets under conditions resulting in a migration of some of the plasticizer from the flexible sheets into the rigid sheets, the laminated layers or plies being non-delaminatable and thus obviating any necessity for edge bordering, and having a flexure characteristic which is neither limp nor rigid. Further, folders typical of the present invention have a self-forming and form retaining hinge area characterized by a plurality of layers or plies of flexible plastic sheets, integrally laminated in the absence of any rigid sheet so as to be non-creasing and developing a semi-permanent set when left folded as in normal use, even though thermally formed flat. Being smooth surfaced throughout, and impervious

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to greases and the like, folders of the instant invention are much more sanitary, being inherently more clean and easier to clean than conventional treated paper menus.

Certain forms of folders typifying the invention also are adapted to the development of silhouette or "depth" effects in the printing and/or artistic layout. Certain laminating makeups can also provide an opaque hinge area of the same color as the color of the leaves, as desired. In certain forms, involving an opaque hinge area, the folder construction of the present invention also provides a modified form of hinge area makeup wherein such can be structurally reinforced if desired by laminating therein a woven silk insert. Further, the folders are readily adaptable to a wide variety of color scheme possibilities, and are of a nature so as to be readily trimmable to desired size without loss of appearance or danger of edge delamination.

One important practical advantage arising from the folder construction of the present invention is that should the leaves of the folder become creased or bent, such can be restored to new condition simply by ironing with a hand iron at low temperature or simply by repressing the folder in a conventional laminating press for a short time, with edge retrimming if desired, all without loss of display layout detail or general appearance. In practice, it has been found that restaurant menus made according to the present invention outwear treated paper menus by at least 25 to 1 even without restoration.

These and other objects, features, advantages and characteristics of hinged folders and methods of fabricating the same according to the present invention will appear from the following detailed discussion and accompanying illustration of certain typical types and forms thereof, wherein like numerals refer to like parts, with corresponding legends for ready understanding, as appropriate, and wherein:

FIG. 1 is an exploded, somewhat diagrammatic view of a sheet assemblage typical of the present invention, illustrating the makeup of sheets preparatory to lamination under heat and pressure to fabricate a folder with the coloring confined to an intermediate layer, and with a transparent or translucent hinge;

FIG. 2 is a perspective view on a somewhat reduced scale, illustrating a folder having the makeup shown in FIG. 1, with the folder unfolded to show the general nature thereof and in particular the semi-permanent set characteristic of the hinge area;

FIG. 2A is a fragmentary end view on an enlarged scale of the hinge area of the folder illustrated in FIG. 2, showing the hinge configuration thereof when folded;

FIG. 3 is an exploded, perspective view of the lower edges of a modified form of sheet assembly for practice of the present invention, by means of which the hinge area can if desired be of the same color as the outer faces of the folder leaves, and whereby certain silhouette effects can be obtained; and

FIG. 4, is a fragmentary perspective view on an enlarged scale of a portion of the assemblage shown in FIG. 3, illustrating a further modified form of hinge wherein the hinge is reinforced by laminating therein an insert of woven virgin silk.

Turning to a more specific consideration of the method of fabricating the folder illustrated in FIGS. 2 and 2A by heat and pressure lamination of the sheet assemblage shown in FIG. 1, the makeup therefor first involves preliminary preparation of two opaque rigid sheets or layers 10 and 12, having complementary or contrasting printing and/or artistic layout 14 compatibly printed on one or both faces thereof.

As will be understood, the showing in FIG. 1 of printing 14 is necessarily dimensionally exaggerated, for clarity

of illustration, and is actually impressed in and completely level with the surface of sheets 10 and 12 in the formed folder, as a result of the laminating process.

The intermediate layer arrangement as shown in FIG. 1 next involves placement of one or more thin, narrow, transparent flexible inserts 16, one being shown, in contiguous relation with the inner edges of said sheets 10 and 12, along with the placement of such sheets and inserts between respective upper and lower continuous transparent flexible sheets 18 and 20. With respect to the showing of FIG. 1, it will be understood that while the exploded view involves representation as to actual spacing between the edges of the flexible insert or inserts 16 and the inner edges of rigid sheets 10 and 12, the actual assembly involves contiguous contact therebetween and actual contact of such intermediate layer with the upper and lower sheets 18 and 20 in the makeup of the "sandwich" for lamination.

To provide suitable examples of specific, fully compatible sheet materials consistent with the purposes of the present invention, opaque rigid sheets 10 and 12 can be .010"-.015" rigid Vinylite, Calendared, an opaque, unplasticized polyvinyl chloride-acetate copolymer (PVCA, Rigid), marketed by the Bakelite Corporation, for example, and the display layout, such printing and/or artistic layout 14, can be a vinyl or other compatible ink applied by a silk screen, lithographic or like process in a manner known conventionally per se, for example, and transparent flexible sheets 18 and 20 can be .005"-.010" Char Non-Rigid, No. 1004, CP UL 15 Ultron, a plasticized, clear polyvinyl chloride marketed by Monsanto Chemical Company.

As known in the trade and as used herein, vinyl type plastic sheet stock which is "unplasticized" is classifiable as "rigid," with further appropriate designation as to being "opaque" (or "colored"), or "transparent," while a second classification exists as to "plasticized" vinyl sheet stock which is termed "flexible," and "opaque" (or "colored"), or "transparent." For a further discussion of the recognized classifications of vinyl plastic stock, reference can be made to Modern Plastics, Encyclopedia Issue For 1961, volume 38, No. 1A, dated September 1960, at pages 490, 491, for example. This reference also discusses various known "plasticizers," as at page 412 et seq.

Thus constituted, the assembly illustrated in FIG. 1 is placed flat in a laminating press and thermally bonded at suitable heat and pressure to produce an integrated, multi-ply article which is non-delaminatable. With the sheet materials above specifically identified, suitable laminating technique can involve a temperature in the laminating press of about 260° F., at between 1500 and 2000 p.s.i., for about 60 seconds, by way of example. Any suitable finish desired can be obtained, the finish on the surfaces of sheets 18 and 20 being determined by the finish of the laminating press plates, and can be matte (with non-compatible matte finished acetate), or satin (with satin finish metal plate faces), or polished (with polish finish plate faces).

Upon removal from the press and being cooled, the flat, formed article is edge trimmed (i.e. cut) to desired size, then folded. Rather remarkably, a folder left folded either individually or stacked one upon the other (as is common in production) naturally develops between relatively rigid front and back leaves 22 and 24 a narrow hinge area 26 which is rather rightly curved but non-creasing, and has a characteristic, semi-permanent set under normal room conditions (i.e. a room temperature of about 70° F.). The natural set of hinge area 26 persists for several minutes or even longer, even though the formed folder is left opened on a flat surface, and is readily restorable and settable in either direction of fold (i.e. is reversibly foldable), simply by again folding and leaving the folder folded for a time. In addition, the hinge is quite strong. For example, a bottom edge trimming there- of about an inch wide, under full strength manual strain

test cannot be separated or permanently deformed in the hinge area.

The natural radius of the folded hinge area is determined by several factors, including the width of the hinge insert 16 and the aggregate thickness of hinge area 26. In the example above detailed, a width of insert 16 of about 3/8 inch has been found quite satisfactory, resulting in the natural hinge radius with the thicknesses of sheet materials specified of about five times the thickness of the hinge area 26. This relation as to hinge area thickness and curvature when folded is illustrated at FIG. 2A, the imaginary radius of curvature R of said hinge area 26 being about five times the thickness T thereof, as shown. As will be apparent, if the hinge area is widened, then the natural hinge radius is increased, generally considered.

The tightly curved, non-creasing, semi-permanent set in hinge area 26 results in the folder being overall esthetically quite attractive and providing a book-like impression when open and closed, which is more pleasing to a user than a folder which simply falls completely flat when opened, and without the complications of trying to thermally form a permanently set hinge area.

In the makeup of hinge area 26, and while the flexible insert 16 is shown at FIG. 1 as a single sheet, it has been found preferable in some instances to employ a plurality, e.g. two or three, thinner flexible sheets to build up an overall thickness equal to or slightly less than the thickness of contiguous rigid sheets 10 and 12, with some improvement as to lasting quality in the semi-permanent set of the hinge area when folded.

Of particular interest also, as to the nature of the formed folder, is the feature that it has leaves with the superficial appearance of a single sheet of plastic, and is desirably neither quite as rigid as the initial rigid sheets, nor as flexible as the flexible sheets from which the folder is made. It appears, in this respect, that the thermobonding lamination of the sheets causes a substantial degree of migration of the plasticizer constituent of the flexible sheets into the unplasticized rigid sheets. Notwithstanding the unitary appearance of the leaves, however, microscopic examination does reveal in the laminate the existence of clearly discernible and recognizable interbonded layers or plies corresponding to the initial "sandwich" sheets.

The exploded, perspective view of FIG. 3 serves to illustrate several additional types of folder construction, all of which are characterized by a flexible intermediate layer. In one such type of modified construction, intermediate layer 30 is opaque, (i.e. colored), flexible sheet, respective inside panels 32 and 34 are opaque and rigid, and the outside panels 36 and 38 are clear rigid to serve as relatively stiff and durable protective covers for the exterior surfaces of the leaves, while the interior faces of sheets 32 and 34 on which a printed and/or artistic layout are provided, are protectively covered by clear flexible sheet 40. To provide sharp delineation of the inside edges of sheets 32 and 34 and thermal bonding contact between the hinge area forming surfaces of flexible sheets 30 and 40, a non-laminating spacer insert 42 can be placed superposed in the hinge area during the lamination under appropriate heat and pressure such as the laminating condition specified in connection with the form of the invention shown in FIGS. 1 and 2, and such insert 42 is removed after lamination. A suitable non-laminating spacer 42, when making the folder from vinyl type flexible and rigid sheet materials as also specified in connection with the earlier example, can be simply rigid cellulose acetate sheet of appropriate thickness cut to desired hinge area size.

The folder makeup shown in FIG. 3 has the very practical capability of providing an arrangement by which an edge-to-edge base color can be achieved in a plastic folder without necessity of printing the color; this being important because continuous overprinted layers of plastic laminate are susceptible to print film delamination. In the

FIG. 3 setup, any desired outer color is imparted simply by selecting intermediate flexible layer 30 in the desired colored opaqueness. Consistent with this feature, the inside color of the folder can be different than the outer color by having layer 30 of the selected outer color and inside rigid sheets 32 and 34 of the selected inner color, either with or without a flexible opaque hinge insert of the same color therebetween.

As another practical ramification of use of continuous flexible sheet 30 as the intermediate layer in the assemblage of FIG. 3, this permits use of an artistic or pictorial layout (such as available from non-continuous printing processes, for example photolithography), to be presented on the entire outside of the folder in apparent continuity edge to edge. Further, the non-creasing nature of the formed hinge provides that such continuous layout does not crease or assume the appearance of being split after the folder is subjected to use.

As a still further modification in the laminating makeup illustrated at FIG. 3, outside transparent rigid sheets 36 and 38 can be replaced with a single, continuous clear flexible sheet like inside clear flexible sheet 40 if adequately thin (.003-.005 inch), in which event sheet 40 can be omitted if desired, as where protective covering of the inner surfaces of sheets 32 and 34 is not deemed necessary. Continuous inner protective sheet 40 is necessary, however, if the outer protection is provided by separate sheets 36 and 38, in order for there to be more than one flexible sheet in the makeup of the hinge area to impart to the hinge its characteristic semi-permanent set. As another variation respecting the assemblage illustrated at FIG. 3, either clear or opaque flexible sheets can be inserted in the hinge area to reinforce and become part of same, in which event a thinner non-laminating spacer insert 42 is employed, or such spacer insert is dispensed with, as appropriate, the important consideration in this respect being that the resulting hinge area in the formed folder should not have a composite thickness dimension greater than the composite thickness dimension of the folder leaves.

As yet another variation of the laminating construction illustrated at FIG. 3, clear flexible sheet is used as the intermediate layer 30 with printing and/or artistic layout printed on the outer surface thereof. With this variation, rigid sheets 32 and 34 are opaque and of a coloring selected to complement or contrast the color of the printing and/or artistic layout on sheet 30, and clear exterior cover sheet or sheets 36 and 38 along with clear interior cover sheet 40 complete the assembly. In the formed folder, the dimensional spacing between the background provided by opaque sheets 32 and 34 on the one hand, and the printing and/or artistic layout on the outer surface of intermediate sheet 30 on the other hand provide a silhouette or "depth" effect to the outside surfaces of the folder. Obviously, similar "depth" effects can be developed with respect to the interior printing and/or artistic layout by using opaque flexible sheet as the intermediate layer 30 for background, along with transparent rigid sheets 32 and 34 having the printing and/or artistic layout placed on the inside surface thereof.

With respect to suitable sheet thicknesses for the folder makeup illustrated at FIG. 3, it has been found that intermediate layer 30 can suitably be .008-.020 inch gauge, inside rigid sheets 32 and 34 can be .010-.015 inch gauge, outside protective sheets 36 and 38 can be .003-.010 inch or can be a single continuous flexible sheet of .003-.005 inch gauge, as desired, and inside protective flexible sheet 40 can suitably likewise be .003-.005 inch gauge. Correspondingly, the overall thickness of the leaves can be about .020-.040 inch. As will be recognized, appropriate choices of the numerous gauges of commercially available rigid and flexible sheets of any selected complementary or contrasting colors can be utilized. Also, various chemical types of commercially available thermoplastics can be used so long as full compatibility as to thermobonding is

maintained, consistent with the basic proposition here presented as to the formation of a tightly curved, non-creasing, semi-permanent folded hinge area and as to the compositely part rigid, part flexible laminated layering found in the leaf construction, along with the uniformity in constituency out to the top, bottom and outer edges of the leaves, without bordering.

FIG. 4 serves to illustrate yet another form of hinge construction. As is generally known, one way of structurally reinforcing laminated plastic sheet is to laminate in or on the assemblage a reinforcing strip of raw, undyed, woven silk. However, external reinforcement by raw silk, which cannot be colored and still remain compatible insofar as thermally bonding to the plastic sheet, is considered unattractive in appearance and oftentimes antagonistic to the desired color scheme. From this point of view, one of the important advantages of the forms of folders above discussed in connection with FIG. 3 involving use of an opaque flexible intermediate layer 30 is that the folder construction permits hinge reinforcement by means of raw, undyed silk if desired, without any detracting from the external appearance of the folder. Specifically, as illustrated in the enlarged and fragmentary view of FIG. 4, reinforcement of the hinge area in any variation of the FIG. 3 construction involving an opaque flexible intermediate layer 30 simply entails placement of a rather narrow strip of raw, undyed silk 44 between the inside surface of said layer 30 and the facing edge surfaces of inside sheets 32 and 34. Then, when the assembly is thermally laminated, silk strip 44 bonds both to sheet 30 and to the edge portions of sheets 32 and 34, as well as to that portion of flexible cover sheet 40 in the hinge area, said sheet 40 having been omitted from the illustration presented at FIG. 4, for clarity of illustration. With such placement of the reinforcing silk strip 44, said silk strip 44 is completely concealed insofar as the external appearance of the folder is concerned, and also proves practically invisible to a user viewing the interior faces of the folder, in that such is also covered interiorly by the hinge area portion of flexible sheet 40. For complete concealment, silk strip 44 can be interiorly covered in the hinge area by a narrow flexible opaque strip which is in turn covered by flexible cover sheet 40.

A further and related practical advantage incident to use of silk strip 44 in the hinge makeup without detriment to appearance characteristics of the folder is that presence of silk strip 44 in the hinge area renders the folder practical for use with staple attached pages in the folder.

While the foregoing discussion and the accompanying illustrations relate the invention to what has been described as a "single fold" folder having a single hinge forming a return bend substantially midway between the outer edges (cf. FIGS. 2 and 2A), it will be readily understood that the invention is equally applicable to any menu or other type of display folder wherein more than one return bend fold occurs, such as where a main or center leaf has two reverse bend folds, one at each side thereof, the side leaves being of lesser width than the main or center leaf. Manifestly, such construction simply involves an assemblage of two single fold folders, the hinge area of each of which can have the characteristic construction provided by the present invention.

As will be understood, appropriate selection of suitable flexible and rigid plastic sheet materials for practice of the invention can be based on the known properties of numerous commercial available plastic sheeting, consistent with the requirements that such are to be fully compatible in terms of thermal bonding. Other generally known factors entering into the choice of materials for a particular use and purpose include non-combustibility, tear and crinkle resistance, printability, and extent of specific resistivity sought as to deterioration by abrasion, acids, alcohols, heat, cold, alkalies, grease and oils, organic solvents, water, high humidity and sunlight.

From the foregoing discussion of several character-

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istics constructional forms and fabricating techniques characteristic of the invention, various further modifications, adaptations, and applications in the employment thereof will occur to those skilled in the art within the scope of the following claims.

What is claimed is:

1. A laminated plastic display folder having cut edges with a single fold, reverse bend, tightly curved, non-creased, semi-permanent hinge made up of a plurality of flexible plies in laminated arrangement and joining relatively rigid leaves, each said leaves also being of multiply laminated construction including a rigid ply in each leaf area and continuous therein from the adjoining hinge area to the cut edges of the leaf, said folder having at least one flexible ply spanning and forming a part of said hinge and also of the relatively rigid plies in the leaf area, each said flexible ply being continuous to the cut edges of the leaves and said folder being of substantially uniform thickness at said hinge and throughout said leaves.

2. A folder according to claim 1, wherein said flexible ply is transparent and each said rigid ply is opaque.

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3. A folder according to claim 1, composed of vinyl type plastic, and having an overall thickness in the hinge and leaves of about .020-.040 inch, with a hinge about 3/8 inch wide.

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References Cited by the Examiner

UNITED STATES PATENTS

2,177,879	10/39	Schade	-----	154-118
2,339,586	1/44	Roberts	-----	281-29
2,390,125	12/45	Schade.		
2,486,330	10/49	Schade	-----	281-29
2,725,913	12/55	Horwin	-----	40-159 X
2,788,041	4/57	Carver	-----	154-118 X
2,997,417	8/61	Dirks	-----	156-227
3,068,140	12/62	Biddle	-----	156-227

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