May 7, 1963 M. S. SENDOR 3,088,753

PLASTIC BOOK COVER AND METHOD OF MAKING

Filed Nov. 18, 1959

Fig. 1

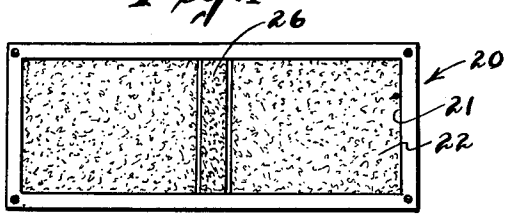


Fig. 3

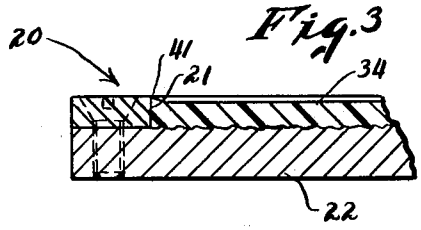


Fig. 2

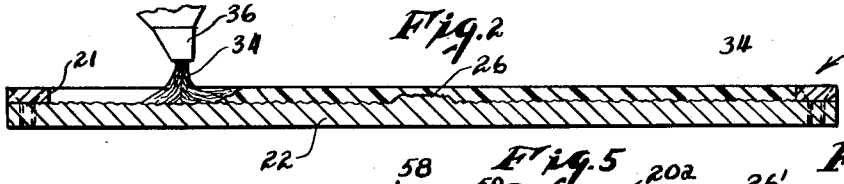


Fig. 5

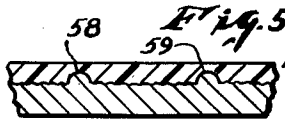


Fig. 6

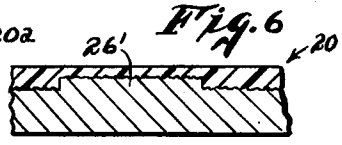


Fig. 4

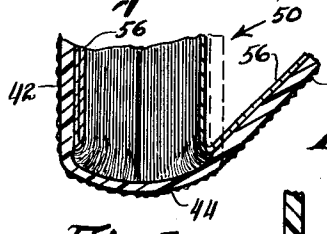


Fig. 8

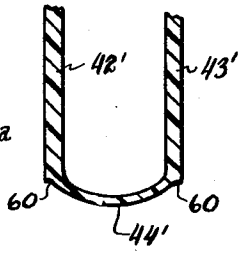


Fig. 9

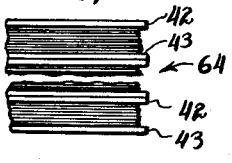


Fig. 10

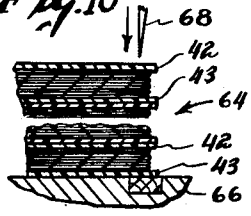


Fig. 7

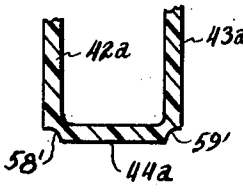


Fig. 12

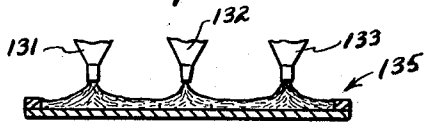


Fig. 11

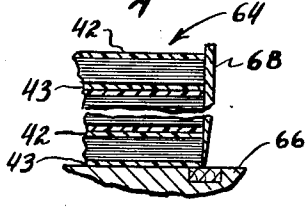


Fig. 14

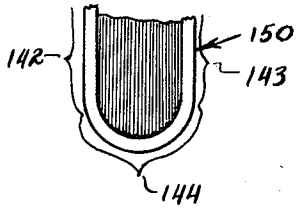
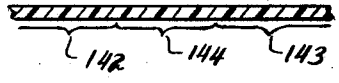


Fig. 13



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PLASTIC BOOK COVER AND METHOD OF MAKING

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10 Claims. (Cl. 281—29)

This invention relates to the manufacture of plastic book covers and to improved covers made of plastic. The invention relates more especially to the construction of rigid and semi-rigid covers.

One object of the present invention is to provide an improved, one-piece plastic cover, and to provide methods by which such covers can be constructed at low cost. The invention not only provides a cover which is less expensive to make, but it also reduces the cost of the book by simplifying the cover-making or case-making of the book. The cover of this invention can be made with front and back panels of larger area than the leaves of the book so that the covers overhang the top, bottom, and front edges of the leaves, as is conventional in most hard-cover books, or the front and back panels can be cut off flush with the edges of the leaves, when the leaves are cut without exposing any inside structure of the panels. This result is possible because of the homogeneous structure of the front and back panels, in contrast to the composite constructions of the prior art.

This invention provides one-piece covers which have greater flexibility at the regions where the front and back panels of the cover meet the connecting portion that extends across the back of the book. In some embodiments of the invention, this additional flexibility is obtained by thinner plastic sections, and in others by having a different compounding, such as more plasticizer in the original plastisol at the locations where greater flexibility is desired in the final cover. The cover of this invention, though flexible at the back of the book, does not stretch and thus avoids the distortion that makes rubber covers impractical.

This application is a continuation-in-part of my patent application, Serial No. 682,522; filed September 6, 1957, now abandoned.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is a top plan view of a mold for making the plastic cover of this invention;

FIGURE 2 is an enlarged, sectional view, on the line 2—2 of FIGURE 1 and showing the mold being filled with plastic, and showing the step of smoothing the top surface of the plastic;

FIGURE 3 is an enlarged, fragmentary view of one side of the mold and the cover therein, after the plastic material has solidified;

FIGURE 4 is a view showing a portion of a book with a finished cover made according to the method shown in FIGURES 2 and 3;

FIGURES 5 and 6 are enlarged, fragmentary, sectional views showing modified constructions at the center region of the mold in which the cover is made;

FIGURES 7 and 8 are fragmentary views showing covers made in the modified molds of FIGURES 5 and 6, respectively;

FIGURES 9, 10 and 11 are views showing the manner in which the cover of this invention can be used with a flush edge by cutting the plastic in the same operation in which the leaves are trimmed;

FIGURE 12 is a diagrammatic view showing the pouring of the plastisol into a mold in a manner to obtain more plasticizer in the material at the mid region of the cover;

FIGURE 13 is an enlarged sectional view through a book cover made in accordance with the method illustrated in FIGURE 12; and

FIGURE 14 is a view showing a book made with the plastic cover of FIGURES 12 and 13.

FIGURE 1 shows a mold **20** having a cavity **21** with a bottom plate **22**, preferably a removable plate. The bottom plate **22** is made with a rough surface simulating grained leather, and it can be made with depressions or protuberances for making other decorations or legends for a title. The bottom plate **22** is used to mold the outside of the cover.

The bottom plate **22** has a raised center ridge **26** for decreasing the thickness of the cover at the mid-region which extends across the back of the book and at the locations where the front and back panels merge with this mid-region of the cover. In the mold shown in FIGURE 3, the sides of the ridge **26** slope so as to produce tapered and gradual change from the thick sections of the front and back panels to the thin section of the mid-region across the back of the book.

A plastisol **34** is poured into the open mold cavity **21** from a nozzle **36**. This plastisol may be made from a wide variety of plastic materials of either the thermoplastic or thermo-setting type. The plastisol may be made of powdered polymer or copolymer, with or without monomer ingredients. The amount of plasticizer and the kind of plasticizer used in the plastisol **34** depends upon the stiffness desired in the final book. The term "plastisol" is used herein as a generic term to described a plastic material or mixture of plastic materials with or without plasticizer or other ingredients and used for the purpose of molding. As used herein for describing the broader aspects of the invention, the term "plastisol" includes also organisols.

The plastic materials used and the compounding of the plastisol with other ingredients for flexibility are well understood in the plastics art and no detailed description of them is necessary for a complete understanding of this invention. The essential limitation is that the plastisol which forms the mid portion of the book, at the juncture of the front and back panels with this mid portion, must contain sufficient plasticizer to hinge back and forth with repeated openings and closings of the book without cracking.

Particularly suitable plastics for the cover of this invention are polyvinyl acetate and polyvinyl chloride. The plastic is compounded so as to produce a cover having substantially no stretch. This avoids distortion and eventual breaking of the back when the book is pulled from a shelf by the mid-region of the cover.

The mold **20** is preferably filled with plastic to the level of the top edge of the mold. The top surface of the plastic flattens out by gravity.

The mold **20**, used to cast the plastic slab of this invention, preferably has no top. This permits the escape of gas during evaporation of any volatile ingredients and during polymerization of the plastisol when there is monomer used as one of the ingredients. The term "cast" is used herein to designate a placing of liquid into a mold and letting it harden in the mold to a solid condition.

The plastisol **34** is then heated. This step will be referred to herein as "heat curing," though the expression is used in a broad sense and to cover such operations as fusing, as in the case of a polyvinyl chloride plastisol. After the heat treatment, the plastisol is left in a stable condition and with the final physical characteristics which it has in the book cover.

The plastisol is a "wettable" material that tends to

climb up the sides of the mold or at least cling to them while in liquid condition, and when there is any shrinkage of the material, there is a slightly thickened edge 41, as shown in FIGURE 3, around the entire edge of the cover and somewhat like a flash. It is important, therefore, that the surface of the cover, at the top of the mold, be the inside surface. The thickened edge 41 is in no way objectionable on the inside of a finished cover, but would be very unsightly on the outside. Another reason for molding the outside of the cover against the bottom plate 22 is that the plate can impart decorative surface contours to the molded cover.

FIGURE 4 shows the plastic book cover removed from the mold 20, and applied to a book. The front panel is designated by the reference character 42 and the back panel by the reference character 43. The mid portion of the cover, which extends across the back of the book, is indicated by the reference character 44 and is considerably thinner than the front and back panels 42 and 43. This makes the mid portion 44 more flexible than the panels.

The book, designated by the reference character 50, is of conventional construction with a round back. A layer of paper 56 is shown bonded to the inside of each panel of the cover. This paper may be heat-sealed to the plastic cover by applying the paper while the plastic is still sticky in the mold. If applied before complete polymerization of the cover panels, the paper 56, which is somewhat porous, is actually bonded to the cover by an interlocking of the molecules of the cover with the paper.

If the paper 56 is not applied to the cover while the cover is still in a sticky condition in the mold, an adhesive must be used. Most adhesives are not suitable for this purpose. If the adhesive is applied when casing in the book, a slow drying adhesive is desirable to permit time for adjustment of the book in the cover. Latex base adhesives have been satisfactory in practice, and more especially a latex base adhesive sold by "Adhesive Products" in the Bronx, in New York City, under the trade designation "Quick-Tac No. 3953."

FIGURE 5 shows a mold 20*a* having two ridges 58 and 59 which produce thin hinge regions 58′ and 59′ (FIGURE 7) for connecting panels 42*a* and 43*a* with a mid-region 44*a* which extends across the back of the book.

FIGURE 6 shows a center ridge 26′ which differs from the ridge 26 of FIGURE 2 only in the construction of the sides of the ridge which are at right angles to the top surface in FIGURE 6 instead of sloping as in FIGURE 2. This ridge 26′ produces the cover construction shown in FIGURE 8 with low shoulders 60 at the locations where panels 42′ and 43′ join the mid-region 44′ of the cover.

FIGURE 9 shows front and back panels 42 and 43 on a stack of books 64 having leaves which have not yet been trimmed.

In FIGURE 10 the stack of books 64, with the covers on the books, is placed on a cutting machine 66 in position to be trimmed by a cutting knife 68. FIGURE 11 illustrates the trimming operation which leaves the edges of the panels 42 and 43 even with the edges of the leaves of the book 64. This is an operation which is usually not performed with hard covers which have stiffening panels inside covered with a layer of cloth or other decorative material, because such cutting off of the edges of the composite cover panels exposes the edges of the inside stiffener and destroys the attractive appearance of the cover. With this invention, the plastic material is homogeneous and the edges left by the cutting blade 68 have substantially the same appearance as the original molded edges.

FIGURE 12 shows another method for making a plastic book cover with greater flexibility at the mid portion of the cover. Three nozzles 131, 132 and 133 discharge plastisol into a mold 135. The plastisol discharged from the nozzles 131 and 133 is plasticized to produce stiff or semi-

stiff front and back panels; but the plastisol from the middle nozzle 132 contains more plasticizer so that the mid portion of the cover will be more flexible than the panels. The plasticized material from the middle nozzle 132 is preferably the same kind of material as the plastisol from the other nozzles, the only difference being the amount of plasticizer present. Thus the plastisol from the different nozzles merges in the mold and forms a single one-piece cover when subjected to the heat curing step. The nozzles 131, 132 and 133 are elongated so as to cause the plastisols from the different nozzles to meet along relatively straight lines when they flow together.

FIGURE 13 shows a book cover made in accordance with the method illustrated in FIGURE 12. The portions of the cover formed by plastisol from the nozzles 131 and 133 comprise stiff front and back panels 142 and 143. The cover has a mid portion 144, of the same thickness as the front and back panels 142 and 143, but more flexible because of the increased plasticizer in the plastisol poured into the middle portion of the mold.

FIGURE 14 shows a book 150 bound with the plastic cover made by the process shown in FIGURE 12.

The preferred embodiments of the invention have been illustrated and described, but changes and modifications can be made without departing from the invention as defined in the claims.

What is claimed is:

1. In a book comprising a plurality of leaves bound together in a cover having relatively stiff front and back panels over the front and back of the book, a connecting portion of the cover of one-piece construction with the front and back panels and extending across the back of the book, the inside surface of the cover being a continuous smooth surface and the outside surface having decorations thereon, the improvement which comprises a cover made of a non-stretchable synthetic polymer with its molecules in at least the connecting portion and in the panels at their regions of juncture with said connecting portion in an as-cast condition and the mass of plastic material at said regions of juncture being of the same density as adjacent parts of the panels but thinner and, therefore, more flexible than said panels, the outside surface of the cover having a recess therein extending for the full height of the cover and providing the reduced thickness of the cover, an area of the synthetic polymer that forms the outside surface of the cover at said thinner cross section being at a lower level and, therefore, recessed with respect to the adjacent outside surface area of the cover.

2. The book construction described in claim 1 and in which the cover is connected to the group of leaves in such relation that the stiffer front and back panels extend beyond the front, top and bottom edges of the leaves but not completely to the back edges of the leaves.

3. The book construction described in claim 1 and in which the leaves have their top, bottom and front edges even with one another, and the front and back panels of the plastic cover have top, front and bottom edges which are flush with the corresponding edges of the leaves, and the connecting portion of the one-piece plastic cover is attached to the back of the group of leaves.

4. The book construction described in claim 1 and in which the connecting portion of the cover is of reduced cross-section across its entire width between the front and back cover panels.

5. In a book cover having relatively stiff front and back panels for overlying the front and back of a book, and a connecting portion of the cover of one-piece construction with the front and back panels for extending across the back of the book, the improvement which comprises a cover made of a non-stretchable synthetic polymer with its molecules in at least the connecting portion and in the panels at their regions of juncture with said connecting portion in an as-cast condition and the mass of material at said regions of juncture being of the same density as adjacent parts of the panels but thinner and, therefore, more

flexible than said panels, the outside surface of the cover having a recess therein extending for the full height of the cover and providing the reduced thickness of the cover, an area of the synthetic polymer that forms the outside surface of the cover at said thinner cross-section being at a lower level and, therefore, recessed with respect to the adjacent outside surface area of the cover.

6. The plastic book cover described in claim 5 and in which the back portion of the cover is thinner than the panels across the full width of the back portion.

7. The plastic book cover described in claim 6 and in which the change in thickness between the panels and the back portion is abrupt and at substantially right angles to the outside surface of the panels so that there is a shoulder on the outside surface where the back portion merges with each of the panels.

8. The plastic book cover described in claim 6 and in which the change in thickness between the panels and the back portion is gradual so that there is no abrupt break in the surface contour of the outside of the cover.

9. The method of making a book cover having a width in one direction equal to at least the height of the book to be covered and having a width in the other direction sufficient to provide covers for the book, which method comprises pouring a mass of plastisol into two spaces having the dimensions of front and back covers of a book, confining the plastisol at the bottom and all sides of the spaces, locating the spaces with their lower limits in substantially the same plane and with confronting sides thereof parallel to and spaced from one another by a third space having a width substantially equal to the width of a back of the book, raising the level of the plastisol above a level of confinement on the spaced sides of the first and second spaces, so as to fill all three spaces while confining at least a portion of the bottom of the connecting plastisol in the third space space along the full length of the spaced sides, to a level higher than the bottom of the plastisol of the front and back covers, curing the plastisol while the top surface thereof is at its raised and a substantially uniform level, and while at least a portion of the bottom of the plastisol in the third space is at said higher level, to provide a one-piece cover having front and back panels connected by a back portion of thinner section and greater flexibility than the front and back panels over at least a portion of the width of the back.

10. The method described in claim 9 characterized by confining the bottom of at least some of the plastisol to decorative contour for an outside surface of the cover, supplying the plastisol to the spaces and the raised level as a wettable material that tends to climb up any side-confining surfaces, confining the plastisol at its peripheral limits above the level of the top of the plastisol inward from the regions of said peripheral limits, and confining the plastisol, that climbs up, at side limits equal to those at which the other plastisol is confined whereby the climbing up merely thickens the inside of the edge portions of the cover.

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