March 24, 1942. A. N. SPÁNEL 2,277,374

FORM FOR DEPOSITED RUBBER ARTICLES

Filed May 3, 1939 2 Sheets-Sheet 1

Fig. 1

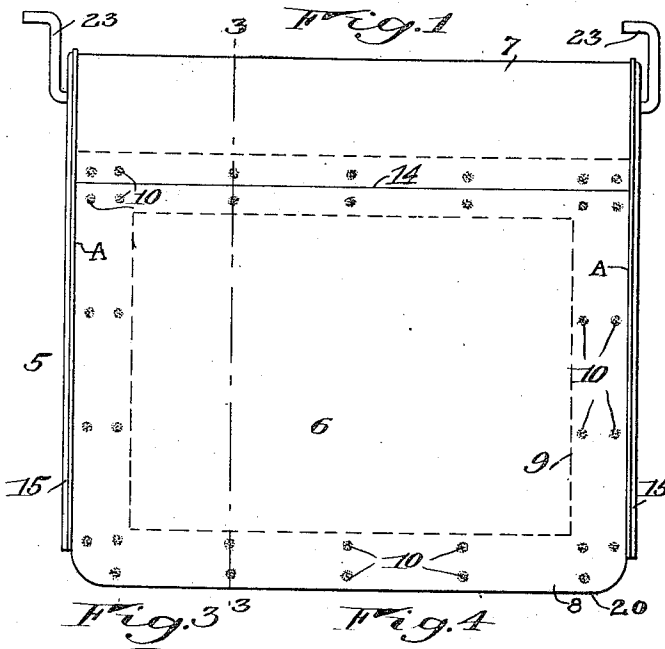


Fig. 2

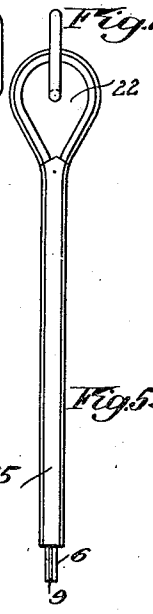


Fig. 5

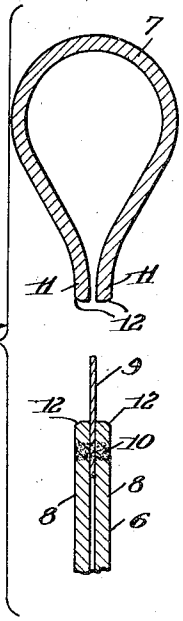


Fig. 3

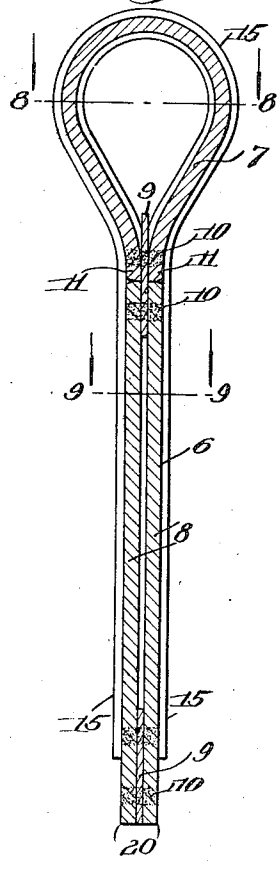


Fig. 4

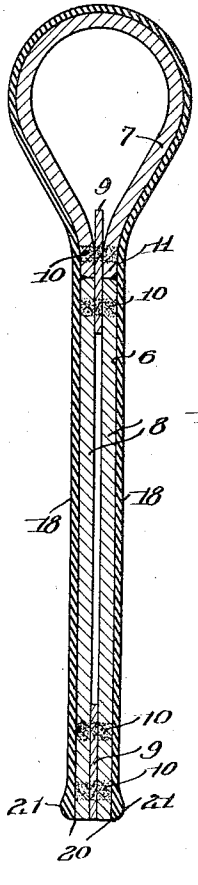


Fig. 9

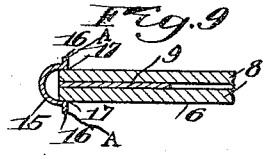


Fig. 8

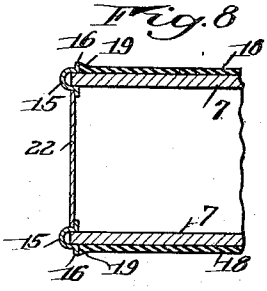


Fig. 7

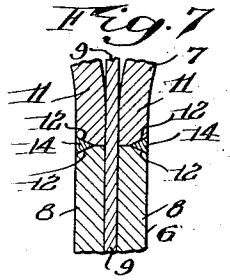
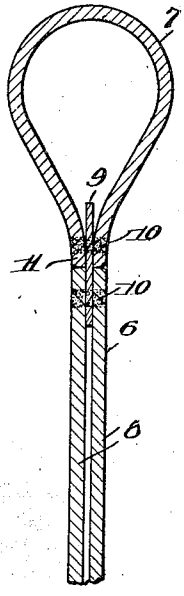


Fig. 6



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March 24, 1942. A. N. SPÁNEL 2,277,374

FORM FOR DEPOSITED RUBBER ARTICLES

Filed May 3, 1939 2 Sheets-Sheet 2

Fig. 10

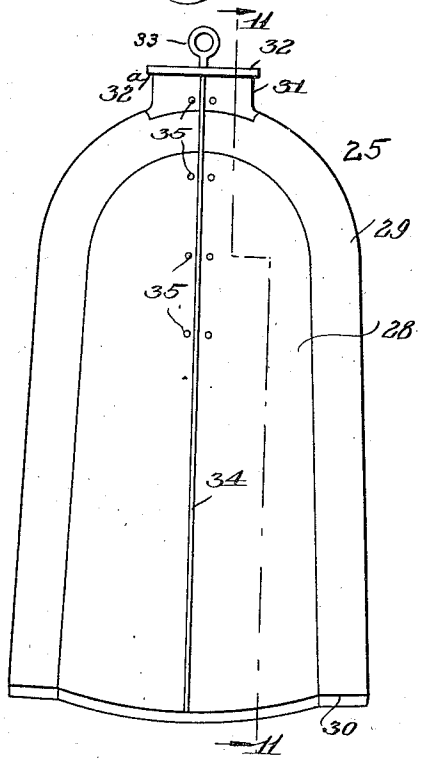


Fig. 11

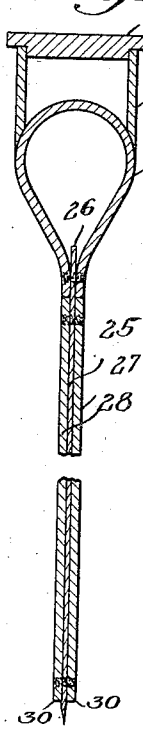


Fig. 14

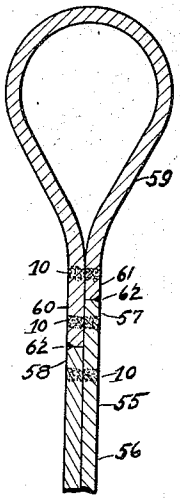


Fig. 12

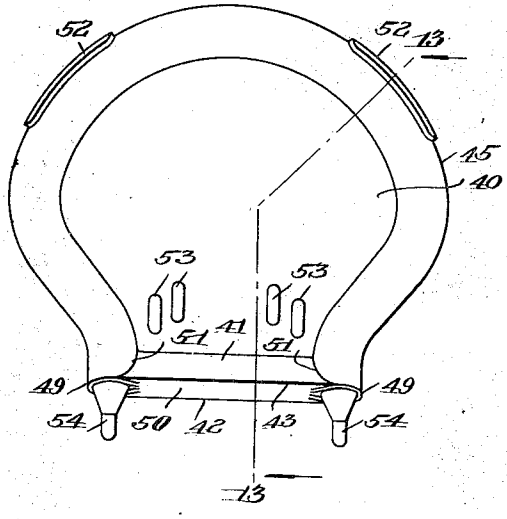


Fig. 13

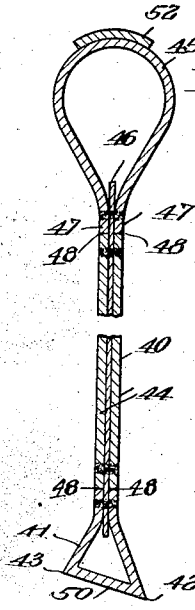
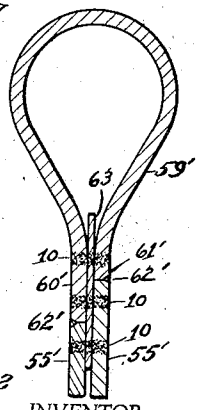


Fig. 15



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UNITED STATES PATENT OFFICE

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FORM FOR DEPOSITED RUBBER ARTICLES

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Application May 3, 1939, Serial No. 271,566

7 Claims. (Cl. 18—41)

This invention relates to forms for making deposited rubber articles.

In the past, forms for making hollow rubber articles have been cast from porcelain, glass or like materials. However, the casting and finishing of such forms has been expensive and where a large number of forms were necessary as in the case of quantity production of rubber articles, a large investment in patterns, dies and forms has been required. Furthermore, large forms such as are required in the making of rain capes and other large latex articles have embraced or constituted large volume mass, so that when a large number of these forms were dipped simultaneously there was a great displacement of latex, requiring an unwieldy and unduly large receptacle for the latex bath and costly, large amounts of latex in the bath.

Moreover, die castings can only be made so large and no larger because of casting size-limitations. Even true sand castings, where accuracy is important, are limited as to size.

To overcome the above disadvantages, I perfected forms which comprise suitable sheet material having rounded borders thereon so that the volume of the dipping form was materially reduced. These improved forms are disclosed in my Patent No. 2,100,576 granted November 30, 1937.

The forms disclosed in the mentioned patent accomplish their intended purpose and while a number of suggested constructions were disclosed for attaching the rounded border to the plate-like portion, the present invention has for its purpose to provide an improved method of attaching the rounded border to the panel or plate-like portion of the form whereby the manufacture of the forms is greatly simplified and an improved form is obtained.

It is accordingly an object of this invention to provide an improved method of securing a rounded border to the panel or plate-like portion of a form on which liquid latex articles may be made.

It is a further object of this invention to provide a form wherein a rounded border is secured to the panel or plate-like portion of a form, on which latex articles may be made, by means of a shim, shim-like sheet, or the like.

It is a still further object of this invention to simplify the manufacture of forms of this character whereby a smooth continuous article-generating surface on the form is obtained with a minimum of manual finishing, filing, grinding and other time and labor consuming finishing operations. It will be appreciated that a smooth form-surface is very important in the making of dipped latex or rubber articles.

These and other objects of the invention will appear from the detailed description and claims when taken with the drawings in which

Fig. 1 is a face view of a completed form embodying the principles of the present invention;

Fig. 2 is an edge view of the form illustrated in Fig. 1;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 3 but showing a trimmed coating of rubber on the form and illustrating particularly the uniformity of thickness of the coating and the character of the integral edge reinforcement obtained at the lower edges of the form;

Fig. 5 is an exploded, sectional view illustrating one step in the method of making the form shown in Fig. 1;

Fig. 6 is a sectional view illustrating another step in the manufacture of the form in Fig. 1, and showing the relation of the parts of Fig. 5 in their assembled condition;

Fig. 7 is an enlarged sectional view illustrating the manner of finishing the joint between the rounded border and the plate-like portion of the form;

Fig. 8 is a fragmentary horizontal section taken substantially on line 8—8 of Fig. 3 and illustrating a further step in the method of making the form shown in Fig. 1 and also showing a trimmed coating of rubber on the form to illustrate the character of the edge reinforcement at the side margins of the resulting article;

Fig. 9 is a fragmentary section taken on line 9—9 of Fig. 3 and illustrating another step in the method of making the form shown in Fig. 1;

Fig. 10 is a face view of a form on which a cape or the like may be made by depositing latex or the like thereon, this form being made in accordance with the principles of the present invention;

Fig. 11 is a vertical section taken on line 11—11 of Fig. 10;

Fig. 12 is a face view of a modified form on which pants or the like may be made, this form embodying the principles of the present invention;

Fig. 13 is a vertical section taken on line 13—13 of Fig. 12; and

Figs. 14 and 15 are cross-sectional views illustrating further modifications of the invention.

Generally the invention relates to a form comprising a panel or plate-like portion of sheet material such as aluminum or stainless steel cut to approximately the desired outline of the form and a rounded border also preferably made of sheet material such as aluminum or stainless steel, attached to a certain portion of the margin of the panel. As illustrated in the edge and sectional views of the drawings, the border is pref-

erably hollow and approximately ovate in cross section.

The form 5 (Fig. 1) may be used to make rectangular sheets of deposited liquid latex or rubber having integral edge reinforcements by coating the form with liquid latex, rubber or the like. The panel or plate-like portion 6 of the form 5, comprises two substantially rectangular superposed sheets 8 having a shim-like member 9 interposed there-between, the sheets and shim being secured together in any suitable manner as for example by spot welding as indicated at 10. The shim 9 may be of any desired thickness, but is preferably made relatively thin for the sake of economy and to keep the thickness of the completed form at a minimum. This shim may comprise an open rectangular frame as shown in Figs. 1 to 7 and 9 or it may be coextensive throughout with the sheet members 8 as illustrated in Figs. 11 and 13.

In utilizing the present invention the shim projects a suitable distance beyond the edge of the panel of the form at any part where it is desired to secure a rounded border to the form. Thus in the form 5 (Fig. 1) and particularly as shown in Figs. 3 to 7, the shim projects beyond the upper edge of the panel 6 to be received between the spaced edge portions 11 of the border 7. As previously mentioned the border is preferably hollow and may be conveniently formed of sheet material of substantially the same thickness as the sheet members 8 so that a relatively smooth butt joint is obtained when the form is completed. Although it is preferred to make this border hollow for the sake of economy and to keep the weight of the form at a minimum, it will be understood that it is within the purview of this invention to utilize a solid, rounded border having a suitable kerf or slot provided in the lower edge thereof to receive the projecting part of the shim.

By referring to Fig. 5, wherein the relation of the panel and border are shown just prior to assembling these parts, it will be noted that the corners of the abutting edges of the sheet members 8 and of the border 7 are rounded or beveled as indicated at 12 so that the resulting butt joint may be filled with solder or the like, as shown at 14 in Fig. 7, to insure a smooth, uninterrupted surface on the article-generating area of the form, for again it will be noted that a smooth form-surface is required in the making of articles deposited from liquid latex or rubber.

After the border 7 has been slipped over the projecting portion of the shim, it is secured thereto in any suitable manner as by spot welding as shown at 10 in Fig. 6 or by riveting or soldering the parts together. The form is then completed by applying the channel strips 15 as shown in Figs. 1, 2, 3, 8 and 9 to the side edges of the sheet members 8 and the ends of the border 7. These strips may be soldered or otherwise suitably secured to the form. As shown in Figs. 8 and 9, the projecting flanges 16 of these channel strips together with the adjacent surface of the form provide recesses 17.

If desired the ends of the hollow border 7 may be closed by means of the end plates 22 shown in Figs. 2 and 8, to prevent latex from entering therein. In using the form it may be suspended from a supporting rack (not shown) by means of the brackets 23 secured to these end plates.

When liquid latex, rubber or the like is deposited on the completed form, as by dipping it one or more times in a bath of latex or the like or by spraying latex or the like thereon, a substantially uniform layer of latex or rubber 18 in Fig. 4 is deposited over the curved surface of the border 7 and on the surfaces of the panel or plate-like portion 6 while in the mentioned recesses 17 the rubber accumulates as shown in Fig. 8, to provide thickened integral edge reinforcements 19 on the side margins of the resulting article. Thickened deposits of rubber will also accumulate immediately above the lower abrupt edges 20 of the plate-like portion 6 to generate integral edge reinforcements of the character shown at 21 in Fig. 4, on the opposite ends of the resulting article. Trimming of this article is facilitated since a line of weakness develops in the latex or rubber layer at each of the abrupt edges of the form. Thus the layer of rubber over the outer surfaces of the channel strips 15 may be torn or cut away to the abrupt edges A (Figs. 1 and 9) of these strips. Similarly the rubber deposited on the lower end of the form between the abrupt edges 20 may also be torn or cut away. When the article has been properly "set," dried or cured, and trimmed, it is ready for use.

Referring to Figs. 10 and 11, there is shown a modified form 25 on which a rain cape, having an integral collar of the military type, may be made. This form is made in substantially the same manner as the previously described form in that the projecting edge 26 of a shim-like member 27, fastened between sheet members 28, is secured to a rounded border 29. However, in this modification the rounded border 29, which may be hollow as shown or of solid cross-section, extends along the two sides and across the curved top of the sheet members 28. The shim 27 may comprise an open rectangular frame as in the case of the form shown in Fig. 1 or may be coextensive with the sheet member 28 as shown in Fig. 11. As in the previously described form, the sheet members 28 and the border 29 may be secured to the shim 27 in any suitable manner as by spot welding, soldering or riveting. It will be noted that the shim may project beyond the lower abrupt edges 30 of the plate-like section to facilitate trimming of the waste rubber deposited on the form below the abrupt edges 30.

A collar-generating extension 31, which merges smoothly with the surface of the border 29 is provided at the upper end of the form. The top of the collar-generating extension is provided with a plate 32 which overhangs the extension 31 and provides therewith a recess 32a similar to the recess 17 (Fig. 9), in which deposited rubber will accumulate to provide an integral edge reinforcement for the collar. An eye bolt 33 fixed to the plate 32 provides a convenient means for suspending the forms from a dipping rack or the like (not shown). This form is also provided with a raised strip 34 which generates an opening in the layer of rubber deposited on the form. The margins of the cape at the opening defined by the strip 34 will be integrally reinforced since rubber will accumulate in the recesses formed by the sides of the strip and the adjacent surface of the form. A series of spaced studs 35 may be provided on the plate-like portion of the form adjacent the strip 34 to generate reinforced button holes or tie string receiving openings in the cape deposited on the form whereby the completed article may be fastened about the wearer by means of headed studs or tie strings inserted in the openings.

The form 25 is used in the same manner as the previously described form in that a layer of

latex or rubber is deposited thereon by dipping it one or more times in a bath of latex or the like, or by spraying latex or the like thereon. The rubber will be deposited over the surfaces of the sheet members 28 and the rounded border 29 as well as the lateral surface of the extension 31, as a continuous layer of substantially uniform thickness. However, thickened deposits of rubber will accumulate immediately above the lower abrupt edges 30 and in the recesses defined by the overhanging plate 32 and the strip 34 as well as around the lateral surfaces of the studs 35 to provide integral edge reinforcements for all of the margins of the resulting rubber cape. As is now well known the layer of rubber deposited on the form will have thin or weakened sections therein at the abrupt edges of the strip 34, studs 35, plate 32 and at the lower abrupt edges 30 so that the waste rubber overlying the top of the strip, studs and plate, as well as below the lower abrupt edges 30 may be readily trimmed away. When the article has been properly "set," dried or cured, and trimmed it is ready for use.

In Figs. 12 and 13, the invention is incorporated in a form for making latex or rubber baby pants. This form comprises a panel or plate-like portion 40 terminating at its lower portion in a straight border 41 shaped to have a generally triangular cross-section. It will be noted that the apex 42 of this border is lower than the apex 43 thereof, so that at the top opening of the deposited garment, the front portion thereof is shorter than the back portion of the same whereby these garment portions are offset in the finished article. The straight border 41 may be formed of sheet material of the same thickness as the sheet members 44 and secured to the shim 46 in the manner shown in Fig. 13 or it may be made by bending the lower ends of the sheet members 44 to provide the desired border. The curved margin of the panel 40 has attached thereto a curved border 45 rounded in cross-section. This rounded border 45 is secured to the panel 40 by means of the shim member 46 fastened between the sheet members 44 and projecting beyond the margins thereof and extending into the space between the edge portions 47 of the border. While the border 45 may be solid, it is preferred that it be hollow and made of sheet material of substantially the same thickness as the sheet member 44. It will be understood that as in the case of the previously described forms the shim member 46 may be secured to the sheet members 44, the rounded border 45 and the straight border 41, in any suitable manner as by spot welding as shown, or by soldering or riveting, if desired. The joint 48 will also preferably be finished in the same manner as the joint 14 of the form shown in Fig. 1.

It will be noted that the ends of the rounded border 45 are cut on a bias as indicated at 49 so that they are in alinement with the lower face 50 of the triangular border 41. It will be noted also that the ends of the triagular border are curved as indicated at 51 to snugly engage the end portions of the rounded border. Spaced portions of the upper surface of the rounded border have attached thereto flattened elliptical plates 52 which constitute bosses to generate leg openings in the resulting garment. The front face of the panel 40 near the portion thereof which generates the top opening in the pants, may have fastened thereon, spaced pairs of bosses 53 which are preferably plates of flattened elliptical outline soldered or otherwise fastened to the face of the panel without any seam between these parts. Supporting pins 54 inserted in the open end of the rounded border 45 and filling the same, serve to support the form on any suitable dipping rack (not shown).

In coating this form with latex or rubber, the rubber will be deposited on the surface of the panel 40 and on the exposed surface of the border 45 as a layer of substantially uniform thickness. However, at the junction between the bosses 52 and the borders 45, the rubber layer will accumulate to have an increased thickness similar to the edge reinforcements 19 shown in Fig. 8, while at the abrupt edge of each boss, the deposited layer will have a line of weakness therein so that the portions of the rubber layer on the exposed face of each of the bosses can be torn or cut away. Similarly in the junction between each of the bosses 53 and the panel 40, the rubber layer will also accumulate in a manner similar to the edge reinforcement 19 shown in Fig. 8 while at the abrupt edge of each boss, a line of weakness will be developed in the layer so that the rubber on the face of each of these bosses can be stripped away to provide ventilating openings with reinforced margins in the resulting garment. Adjacent the abrupt lower edges 42, 43 and 49 of the form, the rubber will accumulate in a manner similar to the edge reinforcement 21 shown in Fig. 4. However, at these abrupt edges, a line of weakness will develop in the deposited layer so that the rubber on the face 50 of the straight border 41 and on the ends of the rounded border 45 can be stripped away to provide a top opening in the resulting garment. When the garment has been properly "set," dried or cured, the form may be removed through the top garment opening and an article substantially trimmed, will result.

In Figs. 14 and 15 there are illustrated further modified constructions which may be used for securing a rounded border to the panel or plate-like section of a form with or without shims. Thus, either of these modified constructions may be used for securing the rounded borders to the panels of the forms shown in Figs. 1, 10 or 12. As shown in Fig. 14 the edges of the sheet members 55 which constitute the panel or plate-like section 56 of the form, are offset so that the edge 57 projects beyond the edge 58, wherever it is desired to secure a rounded border to the panel. As in the previously described forms, the sheet members 55 may be secured together as by spot welding 10 or in any other suitable manner. The border 59 which may be solid, although it is preferred to make it of sheet material of substantially the same thickness as the sheet members 55, is provided with the offset edge portions 60 and 61. The edge portions 60 and 61 as shown in Fig. 14, are complementary to the offset edge portions 57 and 58 of the panel so they may be secured in abutting relation to provide the smooth joints or seams 62. It will be understood that the joints 62 are finished in the manner shown in Fig. 7, whereby the exposed surfaces of the sheet members merge smoothly with the outer surface of the rounded border 59. The edge portions 60 and 61 of the border as well as the overlapping edge portions 57 and 60 are preferably spot welded together as indicated at 10.

The construction shown in Fig. 15 is identical with that shown in Fig. 14 except that a shim member 63 is interposed between the spaced edge portions 60' and 61' of the border 59' and

the spaced sheet members 55' to facilitate assembly of the form and to add additional strength to the finished form. The seams or joints 62' are completed in the manner illustrated in Fig. 7 and the parts are secured together in any suitable manner, preferably by means of spot welding as indicated at 10.

While the several shim members have been shown as comprising an open rectangular frame or a sheet member coextensive with and projecting beyond certain portions of the margin of the panels or plate-like portions of the several forms, it will be understood that the shim members may comprise relatively small pieces of sheet metal secured between and projecting beyond the margin of the sheet members of the panels at spaced parts thereof.

While there has been disclosed several specific embodiments of the invention, it will be understood that various modifications and adaptations will occur to those skilled in the art and therefore such modifications and adaptations are to be considered as falling within the scope of the present invention as defined by the claims.

What I claim is:

1. A form on which articles may be made by depositing liquid latex or the like thereon, comprising a panel including a pair of superposed sheet members, a border made of sheet material of substantially the same thickness as said sheet members, said border including a section rounded in cross-section and terminating in edge portions, and means for securing the border to the panel with said edge portions of the border abutting the edges of said sheet members whereby the surfaces of said panel merge smoothly with the outer surface of the border certain of the abutting edges of said sheet members and said border being beveled to provide a recess, and means filling said recess flush with the surface of the sheet members and border.

2. A form on which articles may be made by depositing liquid latex or the like thereon, comprising a panel including superposed sheet members having a shim secured between said members with a part of said shim projecting beyond at least a portion of the margin of said panel, and a border rounded in cross section, having an opening in which the projecting part of the shim is secured to maintain said border in abutting relation to the margin of the panel, the surfaces of said panel merging smoothly with the outer surface of said border.

3. A form on which articles may be made by depositing liquid latex or the like thereon, comprising a panel including superposed sheet members having a shim secured between said sheet members with a part of said shim projecting beyond at least a portion of the margin of said panel, a border made of sheet material and having a portion, rounded in cross-section and terminating in spaced edge portions of approximately the same thickness as said sheet members, and means for securing the projecting part of said shim between said spaced edge portions of the border with said edge portions in abutting relation to said sheet members, the surfaces of said panel merging smoothly with the outer surface of said border.

4. A form on which articles may be made by depositing liquid latex or the like thereon, which comprises a panel including sheet members secured in superposed relation with at least a portion of the edge of one sheet member offset with respect to a corresponding portion of the edge of the other sheet member, and an enlarged border rounded in cross section and made of sheet material of substantially the same thickness as said sheet members, said border having edge portions offset with respect to each other, the offset of the edge portions of said border being substantially complementary to the offset of said edge portions of said sheet members, said border being secured to said panel with the offset edge portions of said sheet members in substantially abutting relation with the offset edge portion of said border, whereby the surfaces of said panel merge smoothly with the outer surface of said border.

5. A form on which articles may be made by depositing liquid latex or the like thereon, which comprises a panel including sheet members secured in superposed relation with at least a portion of the edge of one sheet member offset with respect to a corresponding portion of the edge of the other sheet member, a shim-like member secured between said sheet members with a part thereof projecting beyond said offset edge portions, and a border rounded in cross-section, said border having edge portions offset with respect to each other, the offset of the edge portions of said border being substantially complementary to the offset of said edge portions of said sheet members, said edge portions of the border being spaced apart to receive the projecting part of said shim-like member, said border being secured to said panel and the projecting part of said shim-like member with the offset edge portions of said sheet member in substantially abutting relation with the offset edge portions of said border whereby the surfaces of said panel merge smoothly with the outer surface of said border

6. A form on which articles may be made by depositing rubber or the like thereon, comprising a panel including superposed sheet members having a shim secured between said members with a part of said shim projecting beyond at least a portion of the margin of said panel, a border made of sheet material and having a portion rounded in cross section and terminating in spaced edge portions of approximately the same thickness as said sheet members, and means for securing the projecting part of said shim between said spaced edge portions of the border, with said edge portions in abutting relation to and in alinement with the adjacent edge portions of said sheet members.

7. A form on which articles may be made by depositing rubber or the like thereon, comprising a panel including superposed sheet members having a shim secured between said members with a part of said shim projecting beyond at least a portion of the margin of said panel, a border made of sheet material and having a portion polygonal in cross section and terminating in spaced edge portions of approximately the same thickness as said sheet members, and means for securing the projecting part of said shim between said spaced edge portions of the border, with said edge portions in abutting relation to and in alinement with the adjacent edge portions of said sheet members.

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