Sept. 20, 1971 C. SIVELLE ET AL 3,605,330

FOAMED DOLL WITH APPENDAGES SECURED BY COLUMNAR, CELLULAR PORTIONS PROVIDING TORIONAL AND UNIVERSAL ANGULAR MOVEMENT THERETO

Original Filed March 3, 1967

FIG. 1

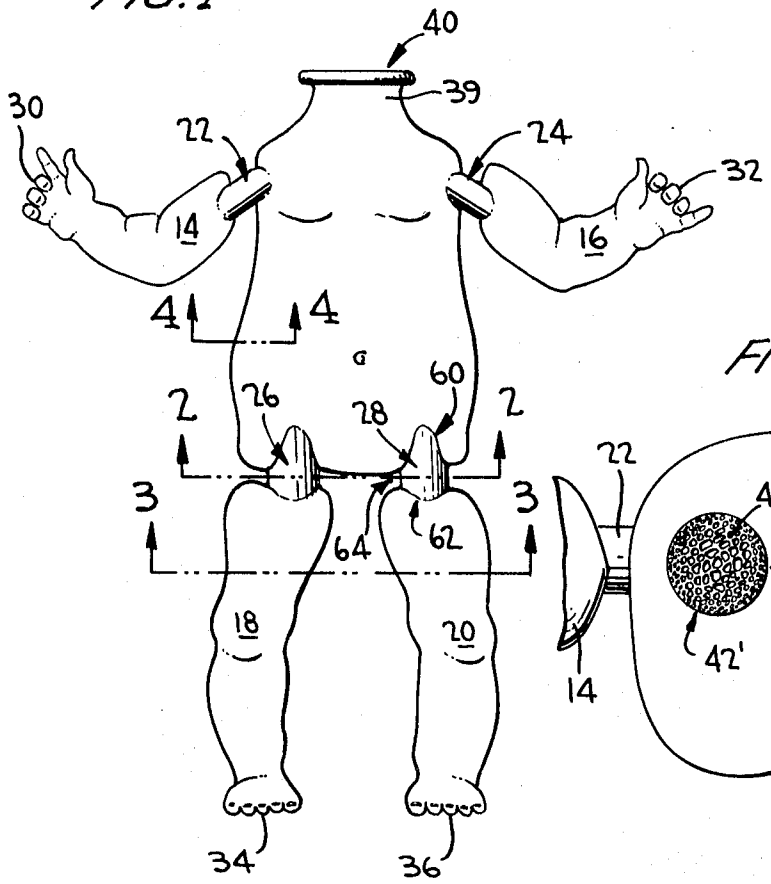


FIG. 2

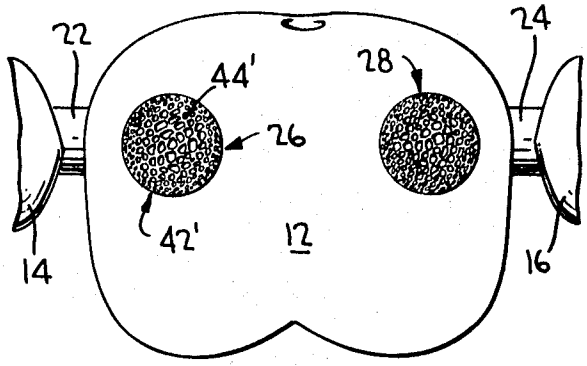


FIG. 3

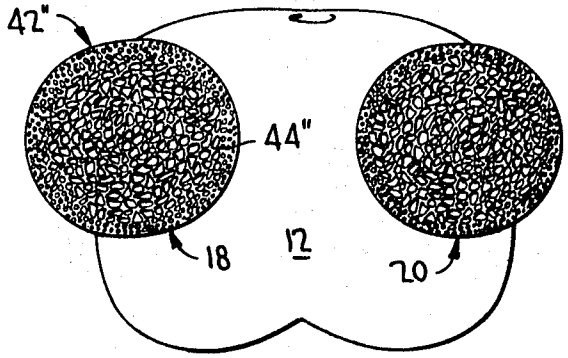
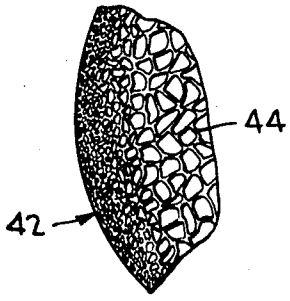


FIG. 4



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FOAMED DOLL WITH APPENDAGES SECURED BY COLUMNAR, CELLULAR PORTIONS PROVIDING TORSIONAL AND UNIVERSAL ANGULAR MOVEMENT THERETO

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Continuation of application Ser. No. 620,474, Mar. 3, 1967. This application Jan. 15, 1968, Ser. No. 698,049

Int. Cl. A63h 3/26

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ABSTRACT OF THE DISCLOSURE

A shaped foamed article including a body and at least one appendage secured to the body by a connecting portion of columnar nature, in which the body, appendage and connecting portion are integrally formed with a smooth outer skin and a cellular interior in such manner that the connecting portion has the cellular nature of its interior maintained, and in which the connecting portion, by virtue of its columnar nature and structure permits movement of the appendage attached to the body thereby in a plurality of different directions about a plurality of different axes with substantially equal ease.

This application is a streamline continuation of application Ser. No. 620,474, filed Mar. 3, 1967, and now abandoned.

This invention relates generally to plastic foam articles, and finds particular utility in connection with toys, such as dolls, animals, or the like wherein one or more limbs or extremities are coupled with a main body portion so as to be movable with respect thereto.

While the invention is not specifically limited to dolls of the type used as play toys by young children, the advantages and operational characteristics of the invention can be easily appreciated by specific reference to dolls, and accordingly, in following paragraphs of this specification, dolls are used as the basis for discussion. It will become apparent that similar advantages and operational characteristics would be applicable to other articles having a main body portion and one or more limbs or extremities coupled thereto and it is for this reason that it is to be understood from the outset that dolls are used for exemplary purposes of discussion herein.

The doll industry has engaged for some time in the production of dolls which include a main body portion and limbs, wherein the limbs are permanently, yet somewhat loosely, connected to the main body portion. Conventionally, the limbs would be formed as separate hollow plastic members, the body would be formed as a stuffed fabric unit, and then the hollow plastic members would be connected, by sewing, for example, to the main body portion, or fabric extensions thereon.

In the manufacture of such dolls, the body portion necessarily lacked the "feel" characteristics which could be achieved with the plastic members, namely, "feel characteristics" which closely simulate the feel of human skin. Furthermore, the manufacture of such dolls as made with fabric bodies necessarily required several separate operations.

Additionally, it is to be noted that even though relatively thin bodies with relatively coarse surfaces have previously been made or suggested for use as bottle holders or the like, and even though these relatively thin coarse surface articles may have had a main body portion with somewhat loosely connected limbs, such items were not, from a practical standpoint, useful as dolls of the type with

which the present invention is concerned. More particularly, in this regard, the present invention is concerned with baby dolls of the type having a body of reasonable thickness and of sufficient firmness to permit the doll to properly support toy clothes, to permit the doll to "sit up," to permit the doll to be used in the sense of a normal baby doll, and to permit a child to reasonably treat the same as a miniature baby or person. Moreover, in contrast with the prior art discussed above, the present invention is concerned with a doll which is essentially waterproof.

In co-pending U.S. patent applications Ser. Nos. 422,124 and 611,392 now abandoned, filed respectively on Dec. 30, 1964 and Jan. 24, 1967 and assigned to the same assignee as the present application, there is disclosed processes and apparatus for making foam articles, including dolls, from foamable plastic compositions, and particularly, foamable polyvinyl chloride, which processes and apparatus function to permit the formation of a final article which is unitary in nature and can be made in a single operation or operational sequence. Articles and dolls made consistent with such applications have a smooth exterior skin and a cellular interior throughout or substantially throughout the entire body including a main body portion, and if desired, one or more limbs, a head, or combinations thereof.

The processes and apparatus so disclosed in said co-pending applications can be used to make dolls, doll bodies, or parts thereof, as well as other shaped foamed articles. Moreover, such processes and apparatus have previously been found to be suitable for the production of doll bodies with flexibly connected limbs. Such doll bodies consistent with said co-pending applications and in turn consistent with the present invention can have virtually any shape or form, possess an external surface which has a smoothness, appearance and definition of detail simulating that which can be achieved with hollow articles "molded" of PVC, are lightweight in nature, soft and compressible, can be made with desired color characteristics which are permanent in nature, and are impervious to liquids.

In prior doll constructions of the specific type related to the instant invention, the flexible connections were provided by essentially "pinching" the material during its formation to provide a thin narrow joint between the doll body proper and a given limb or extremity. In other words, even though the material providing the connection between each limb and the main doll body was integral with the limb itself and the doll body, the same was essentially "pinched" so that the joint was formed of a thin section having a generally rectangular contour, which joint defined a preferred or given axis for movement of the connected limb with respect to the main body portion. Taking, for example, the main body portion as the simulated torso of a human baby and the limb as the leg, the connection between the leg and the torso was provided by a thin flat section of material, or what might be deemed a flat band of material. As a result, the band of material connecting the leg and the torso extended horizontally in normal use, and the leg was movable with respect to the torso in generally a front-to-back relationship. Due to the flexibility of the material from which the article is formed, some twisting movement or lateral bending might be possible, but from the standpoint of easy motion with slight shaking of the doll, the movement between the leg and the torso was made about a horizontal axis in normal upright position of the doll.

Furthermore, with the joints existing by virtue of the so-called "pinch" of the material in the connecting bands, the material within the confines of each band had what can essentially be regarded as a collapsed cell structure. In

particular, the body portion or torso and the particular limb which has here been taken as the leg possessed a smooth liquid impervious skin and a foamed cellular interior whereas the material in the connecting band had a collapsed cell structure in substantial part, even though the band was integral with the torso and the leg. The same conditions applied with respect to the cellular characteristics and the preferred axis of movement in relation to the connection between arms and the torso. However, the preferred axis for the arms was a vertical axis rather than a horizontal axis when the doll is in the normal upright position.

The present invention has as its principal objects, the provision of a foamed article which possesses the desirable characteristics set forth above and which can be made according to the processes and with the apparatus of the aforesaid copending applications, but which includes connecting joints between the main body portion and any one or more extremities that retain the same general cellular characteristics as the body and extremities and additinally permit movement of the extremities with respect to the body portion about a number of axes with mere shaking movement of the body.

More specifically, it is an important object hereof to provide a shaped foamed article, such as a doll or doll body, (a) which can be made with the processes and apparatus of the aforesaid co-pending applications; (b) which possesses the surface characteristics, feel characteristics, color characteristics and "water-tight" nature discussed above; (c) which comprises an integral unit with the desired outer skin and at least a substantially continuous cellular internal structure; and (d) which includes a torso or main body portion and one or more limbs or extremities wherein the limbs or extremities are connected to the main body portion through integral joints that permit movement of the limb(s) about a plurality of axes or in a plurality of different general directions.

With regard to the joint structure and integral nature thereof with respect to the main body portion and the extremity connected thereby, it is a significant specific object hereof to provide a foamed article conforming with the preceding objects and being characterized by an outer skin which is continuous with, and of the same nature as, the outer skin of the main body portion and the connected extremity, and by a cellular non-collapsed interior structure which is of the same general nature as the cellular interior structure of the main body portion and the connected extremity. Further, with particular reference to such joints, it is an object hereof to achieve the joint structure just mentioned where there is continuity in the external skin as well as in the cellular structure through the joint and into the respective connected members or portions.

Another particularly significant object of the invention is to provide such a joint structure wherein the joint itself takes the form of a columnar connection merging into the respectively adjacent portions of the main body and connected extremity, and wherein the columnar connection, by virtue of its cellular interior and mergence with the adjacent portions of the body and extremity permits easy movement of the connected extremity in a plurality of directions such as, for example, back and forth, side to side, and wobbling, with respect to the main body portion.

Even further, it is an object hereof to provide a foamed article consistent with the preceding objects and wherein such columnar connection is preferably cylindrical in shape and disposed between the lateral extremities of the particular limb which it connects to the main body whereby such columnar connection functions as a flexibly integrally connected post of reduced diameter or cross-section providing what may properly be deemed a universal type connection as distinct from a hinge-type connection.

In a more general aspect, it is an object hereof to provide a foamed article which, as indicated, can be made conveniently with the processes and apparatus of the aforesaid copending applications, and which requires merely shaping the mold so that it defines a columnar contour or passage between the main body portion and each extremity to be connected thereto consistent herewith.

The invention will be better understood, and objects other than those set forth above will become apparent, when consideration is given to the following detailed description. Such description makes reference to a preferred and illustrative embodiment of the invention shown in the annexed drawings, wherein:

FIG. 1 is a front elevational view of a doll constructed in accordance with the present invention;

FIG. 2 is a sectional view taken on the line **2—2** of FIG. 1 and showing the internal structure of the columnar leg connections of the doll of FIG. 1;

FIG. 3 is a sectional view taken on the line **3—3** of FIG. 1 and showing the internal structure of the legs of the doll of FIG. 1; and,

FIG. 4 is a fragmental sectional view taken on the line **4—4** of FIG. 1 and showing the internal structure of the main body portion of the doll of FIG. 1.

Since the processes and apparatus which are preferably used to make a foamed article consistent with the present invention are discussed in considerable detail in the aforesaid co-pending U.S. patent applications Ser. Nos. 422,124 and 611,392 filed respectively on Dec. 30, 1964 and Jan. 24, 1967, reference to such applications is made herein and the techniques and equipment there disclosed are adopted by reference in this application. Suffice it to say that the article of this invention is made by placing a desired quantity of a foamable plastic composition, and preferably and particularly a foamable polyvinyl chloride composition with PVC plasticizer(s), blowing agent(s), and stabilizer(s), in a mold and then processing the mold with the composition therein according to the techniques disclosed in such applications. Such mold would be constructed as also disclosed in such applications, but would have areas therein defining the joints or connections between body portions or members consistent with the present invention. As will be readily understood by those of ordinary skill in the art to which the present invention pertains, the ultimate article produced will have a shape which conforms with the interior contour of the mold cavity.

Having thus made reference to the techniques and equipment which can be used to produce the article of the instant invention, attention can be directed to the invention itself and the structural characteristics thereof. By referring to FIG. 1, it will be noted that the doll body **10** shown therein includes a main body portion or torso **12**, a pair of arms **14** and **16** and a pair of legs **18** and **20**. The arms **14** and **16** are connected with the main body portion **12** by columnar connecting portions **22** and **24** and similarly the legs **18** and **20** are connected to the main body portion **12** by columnar connecting portions **26** and **28**. The doll, as shown, has hands **30** and **32** integrally formed at the outer end of the respective arms **14** and **16**, and similarly feet **34** and **36** integrally formed at the lower end of the respective legs **18** and **20**.

The columnar connecting portions **22**, **24**, **26**, and **28** are substantially the same in nature, although the connecting portions **26** and **28** are shown as being of larger diameter than the connecting portions **22** and **24** in the illustrative embodiment of FIG. 1. In this regard, it should be noted that the invention is concerned with the provision of a shaped foamed article including a body and at least one appendage, but the preferred embodiment contemplates the formation of a doll and thus, as previously indicated, a doll is being described in detail in this specification. The particular doll so shown and described does not have a doll head connected therewith. However, if desired, an entire doll including a head can be made consistent herewith, or alternatively, the doll can include a head-connecting enlargement such as the connecting enlargement **40**.

The doll body **12**, connecting portions **22**, **24**, **26**, and **28**, and the arms **14** and **16** and legs **18** and **20** as well as the hands and feet are all formed as an integral structure, and each such part has a smooth liquid impervious outer skin. Moreover, each part has a cellular interior. The cellular interior will vary in density or pore size depending upon the amount of material introduced into the mold for making the particular product. The more material which is introduced into the mold, the denser and the smaller the pore size will become for each portion. For illustrative purposes, the doll of FIG. 1 has been assumed to be made from a sufficient quantity of material to give desired feel characteristics, flexibility and compressibility.

Thus, the interior structure of the main body portion **12** appears in cross-section as shown in FIG. 4. The surface region **42** is smooth and liquid impervious with the interior cell structure **44** varying in pore size from the surface region **42** inwardly with larger cells being found centrally of the main body portion **12**. Yet, there is a continuity in cell structure between exposed surface regions throughout the main body portion **12** and also throughout other parts connected therewith.

Specifically, by reference to FIG. 2, it will be noted that the columnar connecting portions **26** and **28** have a smooth and liquid impervious surface region **42'** and a cellular interior **44'**. Similarly, as will be noted from FIG. 3, the legs **18** and **20** have a smooth liquid impervious surface region **42''** and a cellular interior **44''**. This same continuity applies throughout the arms **14** and **16** and the feet **34** and **36** as well as through the neck area **39** and connecting enlargement **40**, and would also apply through and within an integrally formed head if the doll was made therewith. Thus, the body **12** and each appendage **14**, **16**, **18**, and **20**, include a generally smooth outer skin and a cellular structure integral with the skin and extending continuously within the confines thereof.

The connecting portions **22**, **24**, **26**, and **28** are columnar in form and also include a generally smooth outer skin and an integral cellular structure extending continuously within the confines of the skin. Since the article is made as a unitary item consistent herewith, the skin and cellular interior of each connecting portion is integral with, and of the same nature as, the skin and cellular interior of the body and the appendage with which each connecting portion is joined. The skin is accordingly continuous in nature and continuously envelops the entire article.

The transverse cross-sectional area of each columnar connecting portion **22**, **24**, **26** and **28** is substantially smaller than the cross-sectional area of the portion of the body and the portion of the appendage juxtaposed thereto. The columnar connecting portions are preferably cylindrical in contour, yet as shown, merge into the adjacent body and appendage areas. For example, the columnar connecting portion **28** is shown as merging into the body **12** at **60** and into the leg **20** at **62** thus providing a joint which is attractive in appearance as well as sufficiently strong and functional.

The columnar connecting portions **22**, **24**, **26**, and **28** are each preferably disposed centrally of the lateral adjacent extremities of the appendages (arms or legs) to which they attach, and additionally, each such connecting portion provides some free space between the appendage to which it connects and the adjacent body portion. In FIG. 1, such space is indicated at **64** between the leg **20** and the main body portion **12**, but similar spaces exit about each columnar connecting portion.

By virtue of the contour, arrangement and structure of the connecting portions, each permits relatively free movement between the main body portion and the arm or leg which it connects thereto. Thus, in the embodiment shown, the arms and legs can move with substantially equal ease up and down or back and forth. Furthermore, by virtue of the cellular nature of the interior of

the respective columnar connecting portions, each appendage can be comparatively easily twisted about the longitudinal axis of the associated connecting portion. There is thus a wide freedom of movement of each appendage with respect to the main body portion, or phrased another way, the structure of the unit and the connecting portions described above permits the arms and legs to be substantially equally easily moved about a plurality of axes with respect to the body portion.

The continuity throughout the unit of the smooth exterior surface region coupled with the continuity of cell structure between the main body portion and each appendage through the connecting portion associated therewith yields an item which can be easily handled by a child and moved a multitude of different ways while still remaining intact. Specifically, by using columnar connecting portions which, as shown, have longitudinal axes extending in generally the same direction as the longitudinal axes of the associated appendages, a child or other person playing with the doll can obtain various movements of the arms or legs in several different directions and/or can twist a given arm or leg without tearing or rupturing the smooth exterior skin or otherwise damaging the article.

The structure of the doll provided consistent with this invention permits one to shape the doll so that it is adapted to sit in an upright position if so placed by the user. Furthermore, the structure readily facilitates obtaining various motion characteristics for the arms and/or legs by merely holding the main body portion and imparting a slight shaking or wobbling thereto. The movement of the appendages is thus not limited to merely a hinge-type movement but instead, is a universal movement, and moreover, torsional movement of a given appendage about the longitudinal axis of its connecting portion, e.g., twisting a leg, does not tend to result in tearing or rupture of the article or connecting portion.

By providing columnar connecting portions, and preferably cylindrical connecting portions so dimensioned as to yield free space thereabout between the main body portion and a given appendage, the connecting portions are not unduly stretched at one end and compressed at the other when a user desires, for example, to move an arm up and down with respect to the body.

The provision of columnar connecting portions in combination with the provision of a continuous cellular interior structure throughout the body connecting portions and appendages and in combination with the reduced cross-sectional area of the connecting portions yields an ultimate product which is not subject to the limitations of an article having narrow thin band connections with substantially collapsed, if not totally collapsed, cells.

After reading the foregoing description and appreciating the particular advantages mentioned above, it should be apparent that the objects set forth at the outset of this specification have been successfully achieved.

Accordingly, what is claimed is:

1. A foamed doll article comprising a body and a plurality of appendages, each of said appendages being secured to said body by a connecting portion integral with said body and integral with its respective appendage to form a one-piece structure, said one-piece structure being skeleton-free and having a generally smooth outer skin extending continuously over said body and all of said appendages, said body and each of said appendages including a cellular interior integral with said outer skin and extending continuously within the confines of said outer skin, the cellular interior of each connecting portion being of the same nature as the cellular interior of the juxtaposed portion of the body and the juxtaposed portion of the appendage which said connecting portion attaches, each of said connecting portions having a central axis extending between said body and its respective appendage, the transverse cross-sectional area of each of each of said connecting portions being substantially

smaller than the cross-sectional area of the portion of the body and the portion of the appendage juxtaposed thereto and the length of each of said connecting portions being sufficient to define a spacing between the portion of the body and the portion of the appendage connected thereby, each of said connecting portions being of generally equal dimension in any direction transverse to said central axis at least over the extent of said connecting portions defining said spacing to permit each of said appendages to be substantially equally easily moved about a plurality of axes with respect to said body, and each of said connecting portions being sufficiently small in transverse cross-sectional area and sufficiently resilient due to its cellular interior to permit substantial torsional

movement of said appendage about its central axis as well as substantially universal angular movement of said appendage with respect to said body.

2. The doll of claim 1 wherein said cellular interior and said skin are formed of a vinyl plastisol.

3. The doll of claim 1 wherein each of said connecting portions is substantially cylindrical.

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