

Sept. 8, 1936.

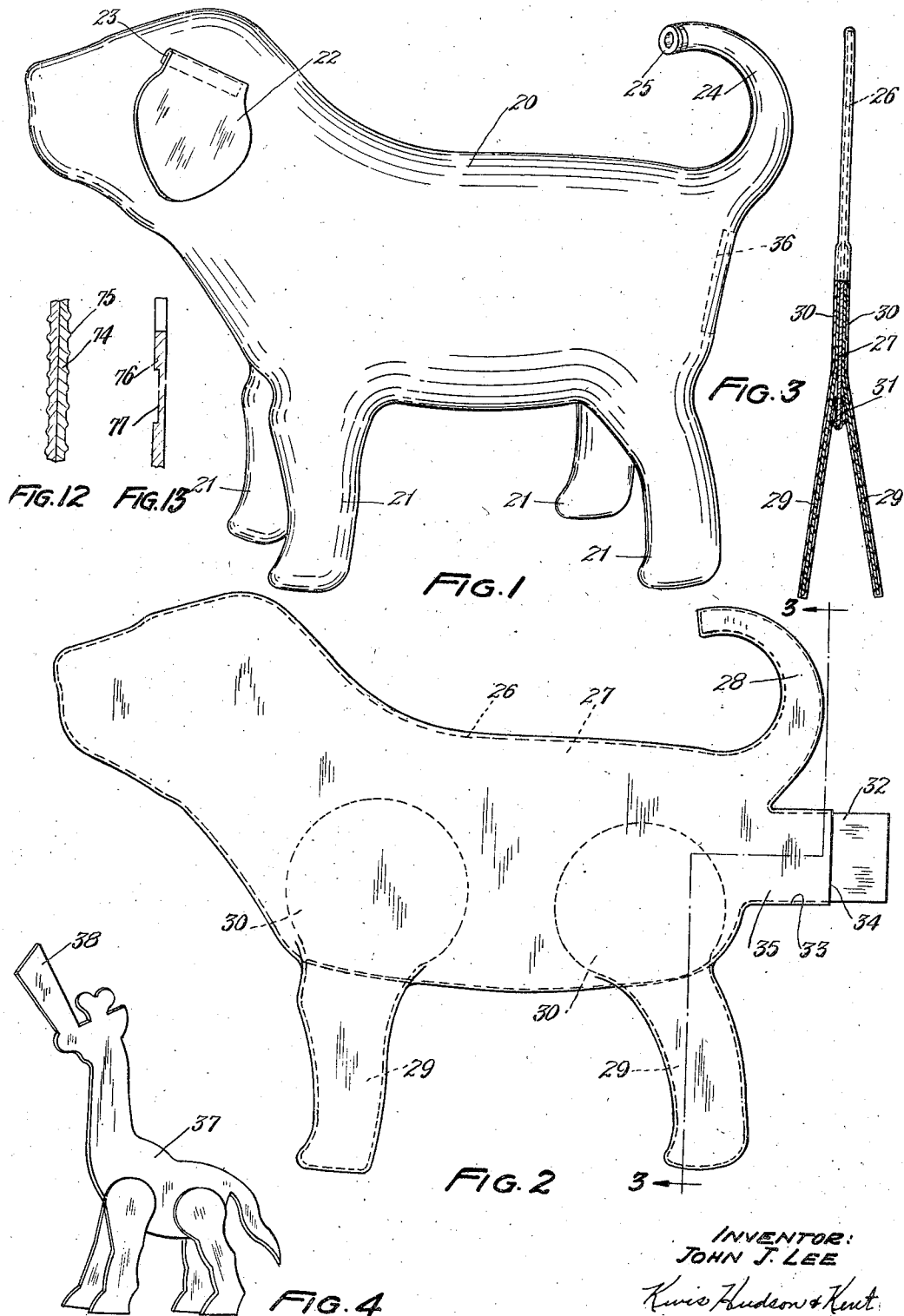
J. J. LEE

2,053,371

METHOD OF MAKING INFLATABLE ARTICLES

Filed Nov. 18, 1933

2 Sheets-Sheet 1



INVENTOR:
JOHN J. LEE
Kivis Hudson & Kent
ATTORNEYS

Sept. 8, 1936.

J. J. LEE

2,053,371

METHOD OF MAKING INFLATABLE ARTICLES

Filed Nov. 18, 1933

2 Sheets-Sheet 2

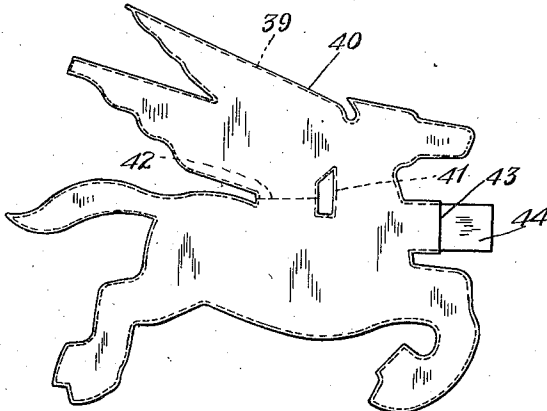


FIG. 5



FIG. 8

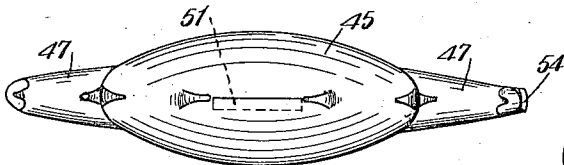


FIG. 7

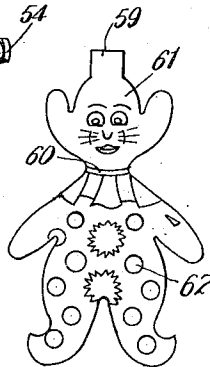


FIG. 9

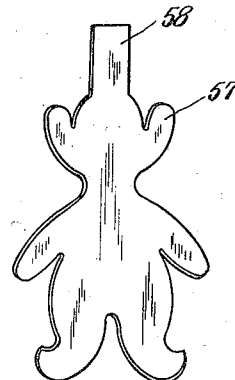


FIG. 10

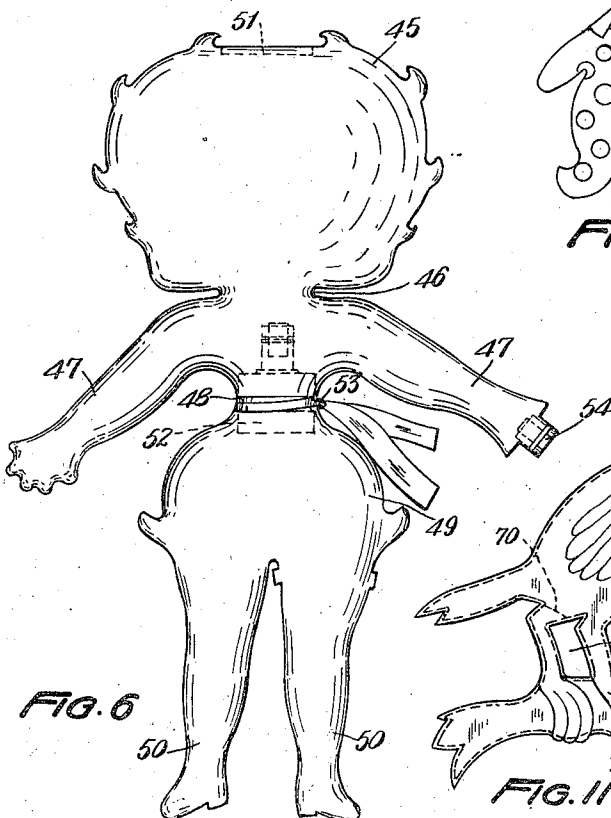


FIG. 6

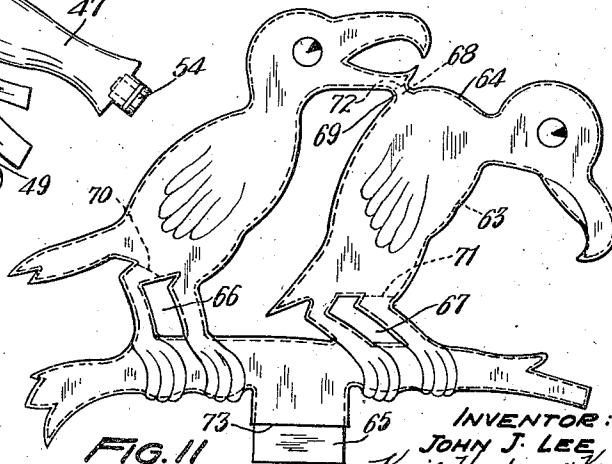


FIG. 11

INVENTOR:
JOHN J. LEE
Kunis Hudson & Kent
ATTORNEYS

UNITED STATES PATENT OFFICE

2,053,371

METHOD OF MAKING INFLATABLE ARTICLES

John J. Lee, Sandusky, Ohio, assignor to The
Barr Rubber Products Company, Sandusky,
Ohio, a corporation of Ohio

Application November 18, 1933, Serial No. 698,646

3 Claims. (Cl. 18—58)

This invention relates to a new and improved method employed in connection with the production of inflatable articles, such as toys, and has for its primary object the employment of a method which is simple, productive of articles superior to those produced by present day methods, and relatively inexpensive in comparison with the results obtained in the use thereof.

Another object of the invention resides in producing inflatable articles according to the new method which are seamless, thus improving the quality and lengthening the life of the articles.

A further object of the invention is to produce inflated articles according to the new method by a dipping process employing liquid latex as distinguished from the present methods of die cutting which employ calendered rubber.

A further object of the invention, according to the new method, contemplates the use of flexible or collapsible molds or forms simulating the article to be produced, thus making it possible to produce articles of a type heretofore practically impossible to produce according to the methods known and available at the present time.

Another object of the invention, according to the new method, is to produce inflatable articles simulating animals in which the legs are separate and distinct so that the inflated article or toy is capable of standing in its natural position without any other means of support.

A further object of the invention is to employ a method, such as the present method, which will permit insertion of noise makers within the resultant articles, thus rendering the articles more attractive to the purchasers and consequently more saleable.

With the objects above indicated and other objects hereinafter explained in view the invention consists in providing a new method for producing inflatable articles and the articles produced thereby hereinafter described and claimed.

Referring to the drawings:—

Figure 1 is a perspective view of an inflated article, simulating a dog, made in accordance with the new method;

Fig. 2 is a side elevational view of the inflatable article shown in Fig. 1 and showing the mold or form employed and its relationship with respect to said article;

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2 and showing the multiplicity of legs;

Fig. 4 is a perspective view of a form or mold employed in accordance with the method and simulating a giraffe;

Fig. 5 is a side elevational view of a different form of article showing the mold or form employed;

Fig. 6 is a front elevational view of an article, simulating a doll, inflated, and showing the use of a noise maker;

Fig. 7 is a top plan view of that shown in Fig. 6;

Fig. 8 is a front elevational view of an inflated article simulating an officer;

Fig. 9 is a front elevational view of an inflatable article simulating a cat and showing the article after removal from the mold or form;

Fig. 10 illustrates the mold or form for producing the article shown in Fig. 9;

Fig. 11 is a front elevational view of still another type of inflatable article, simulating crows, showing the form after submerging in latex and printed;

Fig. 12 is a fragmentary cross-sectional view of a form showing embossed or raised portions thereon; and

Fig. 13 is a fragmentary cross-sectional view of a form showing depressed portions thereon.

In the drawings Fig. 1 is illustrative of an inflated article 20 simulating a dog and produced in accordance with the new method which will be hereinafter described. To begin the explanation it will probably be well to explain that the method employed produces articles adapted for inflation substantially without distortion. In other words, an inflatable article is one which is adapted to be inflated to its normal limit without subjecting the rubber to overexpansion as distinguished from the ordinary type of rubber balloon or similar article which is subject to distortion upon inflation. The dog 20 has a plurality of legs 21 formed integral with the body portion and also made hollow so as to be inflatable. When the dog is inflated it is adapted to be supported by the legs 21 in an upright position to resemble a natural animal as much as possible. Ears 22, made of rubber, are secured at 23 to the head portion of the dog by means of a suitable adhesive or any other suitable means in such a manner as to permit the ears to move. At the rear portion of the dog there is provided a tail 24 of hollow construction so that when the same is inflated it will remain in a predetermined position and in the end of the tail 24 an inflating device 25 of the usual type is secured.

In Fig. 2 a form 26 is shown simulating the dog 20, shown in Fig. 1 and from which it will be readily apparent that the size of the form 26 is substantially the same as the size of the inflated

dog 20. The form 26 comprises a body member 27, an integral tail portion 28 and depending leg portions 29, there being a pair of front legs and a pair of hind legs extending laterally, as shown in Fig. 3. The upper portions of these legs are provided with substantially circular extensions 30 which are secured to the body portion 27 by an adhesive or other suitable means. The legs 29 are maintained in separated position, as shown in Fig. 3, by means of inverted V-shaped spacers 31 which extend longitudinally between the legs 29 and the adjacent portion of the body 27, the spacers being secured thereto by an adhesive or any other suitable means. At the rear portion of the body 27 is an extension 32 which serves as a means by which the form 26 may be submerged. Around the edges of the circular portions 30 a filler is employed so as to provide a tapering surface between the outer surfaces of the portions 30 and the adjacent outer surfaces of the body 27 so that form marks or blemishes will not appear on the ultimate article.

The form 26 is illustrated as made of a filled manila paper of sufficient rigidity to be submerged in a rubber solution and is of a non-reusable and collapsible type for reasons which will be later described. While this type of form is preferable for carrying out the purpose of the method, other types of collapsible or flexible forms may be employed wherein the same result is obtained.

In practicing the method the form 26 is submerged in a liquid rubber solution such as liquid latex, although dispersion of rubber, balata, resins or similar substances may be substituted, by holding the extension 32 and submerging the form so as to apply a rubber coating upon the form as indicated by 33. This liquid rubber solution may be of any desired color. The form 26 is maintained in the rubber solution for the required length of time, depending upon the thickness of rubber desired and is then withdrawn and permitted to dry at room temperature for a period of approximately thirty minutes. Preferably, the form with the rubber coating thereon is then cured by placing the same in an oven for a further period of approximately thirty minutes at a temperature of approximately 180° F., although other methods may be employed. After the rubber coating upon the form is cured, the form 26 is removed from the rubber article by collapsing and withdrawing the form through the opening 34 provided in the article by the extension 32. The removal of the form 26 is made possible and easily accomplished due to the flexibility or collapsibility of the form, inasmuch as the form may be crumbled inside of the rubber article and thus materially reduced in size so that it may be easily withdrawn through the opening 34. The rubber extension 35 surrounding the form extension 32 at one end of the dog adjacent the tail 24 is then trimmed off by any desired tool and the adjacent edges are secured together by an adhesive to provide an air-tight seal 36, as shown in Fig. 1. It will be noted that the article or dog, as in this case, is otherwise seamless which adds life and strength to the article as there are no seams which are subject to wear and resultant breakage. The end of the tail 24 is provided with an opening and the inflating device 25, already referred to, is secured therein so that the article or dog may be inflated. When the article or dog 20 is inflated, the legs 21, being hollow, are likewise inflated and, due to the construction of the form heretofore explained remain in an extended and separated position relatively so that

the dog may stand otherwise unsupported upon its legs.

To facilitate the stripping operation of the rubber article from the form 26, the latter may be treated in a solution known as a coagulant or similar material known in the art, which prevents any tendency of the liquid rubber solution adhering to the surface of the form, the preferred method being to have a dusting material suspended in the coagulant to assist the stripping of the rubber film from the flexible form. The addition of this material eliminates the possibility of the rubber sticking to the form during curing.

In Fig. 4 a form 37, simulating a giraffe, is illustrated showing the many types of characters or animals which may be produced in accordance with the present method. Attention is directed to the fact that the extension, such as 38, by which the form is supported while being submerged in the liquid rubber solution, should be located at a point remote from the extensions of the animal, such as the legs and tail, etc., so that after the form has been dipped and cured and it is desired to strip the rubber article from the form, these extensions, produced upon the form, will be more readily removable. Furthermore, it is to be noted that it is preferable to provide the rubber articles with an inflating device which is located in an extension remote from the sealed portion through which the form is removed.

In Figs. 5 to 11, inclusive, various types of inflatable articles and toys are illustrated which are of a substantially flat nature, that is, types of articles which are not intended to stand unassisted. In Fig. 5 a flying horse is shown, the form being indicated by the numeral 39 and the rubber coating indicated by the numeral 40. In this particular instance the form 39 has a central opening 41 which provides in the resultant article a similar opening. It will be readily appreciated that such an article as this could not possibly be produced according to the methods at present available, that is, in the die cut method in which sheets of calendered rubber are employed and the adjacent edges of the sheets along the contour of the article secured together by a suitable adhesive which results in a substantially continuous seam. In this type, however, according to the present method the rubber article 40 is readily stripped from the form 39 by breaking the form along the dotted line at the location indicated by the numeral 42, that is, along a portion between the opening 41 and the outer edge of the form. This permits the form 39 to be removed through the opening 43 provided in the forward end of the article by the extension 44 which is formed integral with the forward end of the form.

In Figs. 6 and 7 an inflated doll is illustrated which is made in accordance with the present invention, the form in this particular instance not being shown, as the doll is already in its inflated condition, the form, however, being substantially of the size of the finished doll and provided with extensions similar to those shown. The doll has an enlarged head portion 45 and a restricted neck portion 46 with arms 47 extending outwardly from the opposite sides thereof. There is a restricted waist portion 48, an enlarged hip portion 49 and depending legs 50, all of hollow construction and intercommunicating. At the top of the head portion 45 a sealed portion 51 is shown which is similar to the sealed portion 36, shown on the dog in Fig. 1. It is through this

opening, prior to sealing, that the form is removed and here again the form is readily removed due to the flexibility and destructibility of the same. It will be readily seen that if the form was not of this collapsible type it would be practically impossible to strip the rubber article from the form. As the opening through which the form is removed is relatively wide it permits insertion of a noise maker 52 therethrough which may be secured in the restricted waist portion 48 by an externally extending rubber sash 53 tied thereabout so as to force the waist portion into a circumferential groove provided in the noise maker. The ends of the rubber sash 53 are permitted to remain free. Therefore, by squeezing the doll air passing from either the head portion 45 through to the hip portion 49, or vice versa, will cause the doll to make the noise for which the noise maker is designed. In the end of one of the arms 47 an opening is provided and secured in this opening is an inflating device 54, through which air may be introduced into the article, but is otherwise prevented from normally escaping therefrom.

Fig. 8 shows a further type of inflated article produced in accordance with the method and simulates an officer. There is a seal 55 at the upper portion of the head through which the form is removed from the rubber article. In one of the foot portions of the rubber article an inflating device 56 is provided in a manner already explained and by which the rubber article may be inflated. In this illustration the outer surface of the rubber article may be printed or otherwise designed to provide the desired surface ornamentation. The step of printing or otherwise ornamenting the rubber article preferably takes place after the curing operation, but prior to the stripping operation. In this manner the form gives the rubber article rigidity and maintains the surface in a smooth condition to receive the ornamentation. It is to be understood, however, that if it is desired to apply surface ornamentation to the rubber articles the same may be applied at other periods, such as for example after the rubber article has been stripped from the form.

In Figs. 9 and 10 are illustrated further characters embodying the method. In Fig. 10 a form 57 is shown which simulates a cat and this form has the extension 58 provided at the upper portion thereof by which the form may be supported while being submerged in the liquid rubber solution. Fig. 9 illustrates the rubber article after it has been stripped from the form 57. In this case in the dipping operation the form 57 is submerged in a liquid rubber solution of any desired color, for example yellow, up to the point 59, indicated in Fig. 9, to apply a coating thereon. This coating is permitted to dry and the form with the yellow rubber coating is then submerged in a liquid rubber solution of a different color, for example blue, up to point 60. The form with the blue rubber coating is then removed from the solution and permitted to dry. It is next cured in the manner already stated and after the curing operation, but prior to stripping from the mold 57, the face 61 is printed upon the head portion and the surface ornamentation indicated at 62 applied to the body portion of the rubber article. After this printing operation the rubber article is stripped from the form 57 and is in the condition shown in Fig. 9. It should be understood that any number of colors may be applied to the rubber article by submerging the form in any number of colored liquid rubber solutions.

The application of each rubber solution, however, results in the rubber article having that much more thickness.

In Fig. 11 a still further character is illustrated representative of a pair of birds or crows. It is types of articles similar to this and similar to Fig. 5 which it has been practically impossible, by methods heretofore known, to produce, principally because of the openings which are provided in the form so as to make each bird individual and distinct. The form in this case is indicated by the reference numeral 63, while the rubber article or coating is represented by the reference numeral 64. The form at the lower end has an extension 65 by which the form may be supported, while it is being submerged in the liquid rubber solution. There is an opening 66 separating one crow's legs and an opening 67 separating the other crow's legs. Additionally, there is a joining strip 68 between the lower portion of one crow's bill and the adjacent portion of the other crow's back, the latter being to maintain the crows in proper relationship. There is also a space or opening 69 between the crows so that it should be readily apparent that it would be a most difficult proposition to construct a form of this character if such a form were not of the destructible and collapsible type, as it would be impossible to strip the rubber article from a permanent form. However, in this particular instance it is a rather simple matter requiring that the form be broken along the lines indicated by the reference numerals 70, 71 and 72, in which event the form 63 may be removed through the opening 73 provided by the extension 65. To assist in removing the form the same may be bent up in such a manner as to readily pass through the opening 73.

Before the rubber article is stripped from the form 63, and preferably after the curing operation of the rubber coating, the outside surface may be printed with any desired characters or surface ornamentation and in this instance the outer surface is printed black, leaving streaks and outline of yellow to represent as nearly as possible wings and other features found on a crow.

It is also possible by embossing the paper 74 to provide raised portions 75, as shown in Fig. 12, to secure a rough surface which, when dipped in the liquid rubber, will produce a rough rubber film which later may be printed in a manner so that the raised portions take the ink and the portions inbetween do not take the ink, thus making it possible to simulate hair such as on a dog, sheep, etc.

As is well known, embossed paper is only embossed on one side, consequently, if this particular type of paper is used as a paper form, the roughened surface of the rubber would only show on one side. In the case of an animal this roughened effect would have to be on both sides, hence this effect was obtained by pasting the smooth sides of two embossed papers together, as shown in Fig. 12, leaving the roughened surfaces to the outside of the form. This particular form would also be of the flexible destructible type.

It is also possible after dipping the form in the coagulant and drying, to superimpose by stamping or printing in stronger coagulant, thus securing rubber films of non-uniform gauge or thickness, the purpose being to secure reinforced portions, which in some instances when the toy is inflated will not distend in the same manner as the rest of the rubber film.

It is also possible by moistening either plain or

embossed paper and then drying in a heated mold to secure appendages such as ears, horns, tails of birds, etc., of a more life-like appearance. These ears, horns, etc. are to be applied to the form such as is shown in Fig. 1, only in this figure ears 22 are shown which are flat and pasted to the toy.

With the paper form it is also possible that some portions of the form, such as indicated by the numeral 16, in Fig. 13, may be depressed at 77 and when dipped in the coagulant will take up unequal amounts, thus bringing an unevenness of gauge and further of securing an unevenness of surface in the finished rubber film. This arrangement also will permit uneven distension of the inflated article.

While no inflating device is shown in this Figure 11, it is to be understood that it may be placed in any number of locations, for example on either end of the branch upon which the crows are supported or upon the tail of one of the crows or upon the bill of either of the crows, the most desirable location in the present instance being upon the right-hand end of the branch. While the noise maker 52 has only been indicated in connection with the doll illustrated in Fig. 6, it is to be understood that similar noise makers may be incorporated in all of the other types of figures shown and that it comes within the scope of the invention to include such noise makers in these other types of articles.

While I have described the preferred embodiments of the invention, it is to be understood that I am not to be limited thereto inasmuch as changes and modifications may be resorted to without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. The method of producing inflatable seamless articles which comprises immersing in a suitable solution a flat flexible severable form having a body portion with one or more marginal exten-

sions including an extension by which the form may be supported during the dipping operation and with a hole extending through the body portion wholly inside its margin whereby a coating is formed on the immersed portion of the form including its sides and outer edge and the inner edge formed by said hole whereby a portion of the article produced on the form wholly surrounds said hole, and after the article is cured stripping it from the form through an outer marginal opening in the article.

2. The method of making inflatable articles which comprises immersing in a suitable solution a flat flexible severable form composed of a body portion with flexible marginal extensions including an extension by which the form may be supported during the dipping operation and with a hole within its margin extending from side to side therethrough, whereby a film or coating is formed around both sides and the outer edge of the immersed portion of the form and around the inner edge bounding said hole, curing the article on the form, withdrawing the form through the opening formed by the supporting extension, sealing said opening, and forming an inflating opening in the end of one of the extensions of the article and inserting an inflating device therein.

3. The method of producing inflatable seamless articles which comprises immersing in a suitable solution a flat flexible severable form having a body portion with one or more marginal extensions including an extension by which the form may be supported during the dipping operation and with a hole extending through the body portion wholly inside its margin whereby a coating is formed on the immersed portion of the form including its sides and outer edge and the inner edge formed by said hole, and after the article is cured severing a portion of the form adjacent said hole therein and removing the form through an outer marginal opening in the article.

JOHN J. LEE.