Sept. 18, 1951 H. B. MORRIS 2,568,129

BLOWING OF ARTICLES

Original Filed May 15, 1947

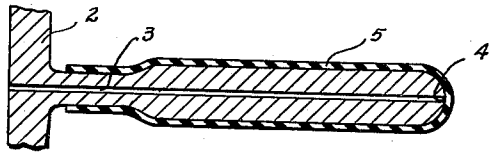


fig.-1

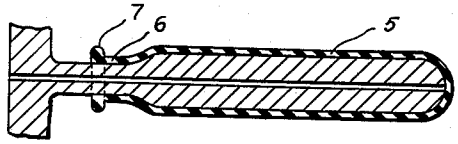


fig.-2

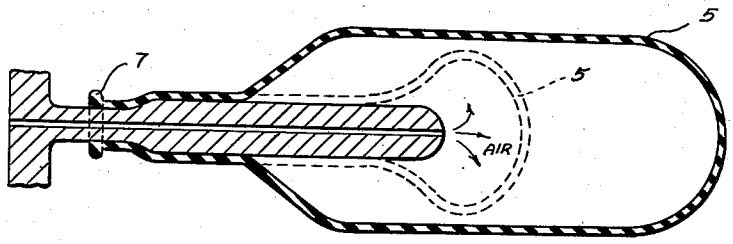


fig.-3

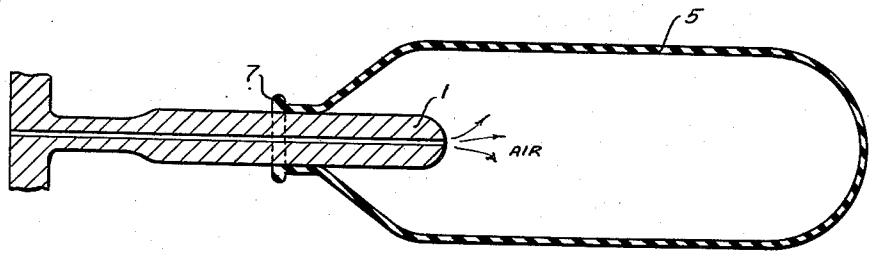


fig.-4

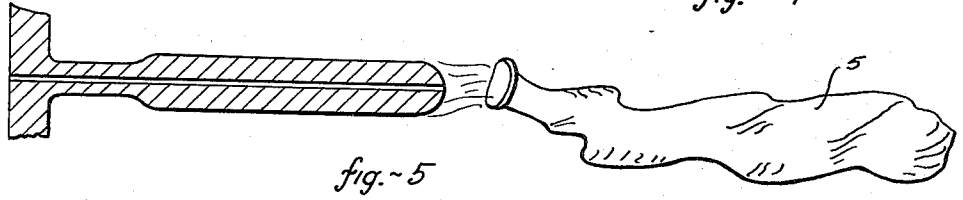


fig.-5

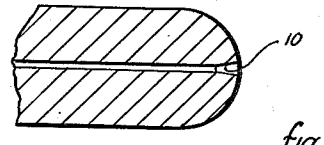


fig.-6

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BLOWING OF ARTICLES

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Original application May 15, 1947, Serial No. 748,265. Divided and this application December 3, 1949, Serial No. 130,961

3 Claims. (Cl. 18—58.7)

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This invention relates to the blowing of articles of rubber and other elastomers.

In carrying out the invention a form for a balloon or the like is covered with an elastomer, as by dipping the form into a dispersion or solution of the elastomer, the deposit of the elastomer is cured on the form and then is blown from it. The inflation of the cured article on the form serves as a means for detecting imperfect articles which contain pinholes or the like, and separating these from articles which are free from pinholes. The perfect articles are blown from the forms, and the imperfect ones burst and are scrapped. This eliminates the usual inspection step. To detect pinholes and other minor deflects the article should be inflated until its surface is at least doubled. Thus, in this process the article is automatically inspected and removed from the dipping form.

The invention will be further described in connection with the drawings, in which—

Fig. 1 is a section of a form covered by a deposit of latex formed by dipping;

Fig. 2 shows the same after the formation of a bead on the dipped article;

Fig. 3 illustrates the process of inflating the article;

Fig. 4 illustrates the completely inflated article partially removed from the form;

Fig. 5 illustrates how the article is blown from the form; and

Fig. 6 is a detail showing a preferred type of perforation in the end of the form.

Although in the detailed discussion of the invention given herein, the invention will be described more particularly in connection with a dipping operation in which the form is first dipped into a coagulant and then into latex, it is to be understood that the invention is not limited to formation of the deposit of the elastomer by dipping. If the deposit be formed by dipping any of the various commercial types of dipping may be employed, whether or not a coagulant be employed and whether the form be dipped in a dispersion or a solution of the elastomer. The form may be of aluminum, but it is to be understood that the invention is not limited thereto, as glass and porcelain forms and other commercial forms may be used. The forms shown are of simple configuration. More complicated forms may be employed in carrying out the invention. The forms may be of paddle design, or they may be shaped as desired to form a balloon or other article of simple outline, or they may be shaped to form balloons

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and the like of more intricate designs which represent animals, etc. Although air is mentioned as the inflating medium, other fluids may be used. Thus, the invention is not limited to the details of the illustrations which follow.

In Fig. 1 a form 1 which generally cylindrical in shape is shown mounted on a base 2. This form may be one of many in a bank of forms. These forms may be located close to one another, as is the usual practice at the present time, but they are preferably spaced so that the inflated articles will just touch or will not quite touch one another. If contact of the cured articles on inflation is not detrimental, such spacing is no essential. The line 3 passes from a source of compressed air through the length of the form to the opening 4, which is at the end of the form which first comes into contact with the dipping bath when the forms are dipped vertically.

Although the drawings do not illustrate the layer of coagulant which may be under the dipped film, it is understood that in a preferred method of dipping into latex the deposit 5 is formed by dipping the form 1 first in a coagulant and then in a suitably compounded latex. The coagulant may contain talc or other lubricant to prevent adherence of the deposit to the form.

After dipping and obtaining the deposit 5, the narrowed portion 6 of the deposit which is to form the neck of a balloon, is rolled from the base forward as is customary to form the bead or ring 7. This is illustrated in Fig. 2.

After rolling, the balloon is cured. This may be done by passing the form with the deposit on it, through a curing oven, as is common commercial practice. Any method of curing on the form may be employed. If the balloon is to be dried or cured in a high frequency field, the form is made of glass or porcelain or other dielectric.

After curing, the balloon is inflated. At present it is customary to strip the cured balloon from the form and then inflate for inspection by manually placing the balloon over a nozzle which is connected with a source of compressed air. This is a time-consuming operation. By blowing the article while on the form the inspection is automatic. If the deposit is faulty for any reason so that it cannot be inflated, it will remain on the form when the air pressure is turned on. If there is a weak spot in the balloon it will explode when inflated and the remnants of the exploded balloon may be retained on the form but in a deflated condition.

Inflation which doubles the area of the balloon will expose most weak spots. Inflation to several times the original size of the balloon will be usual. The degree of inflation will depend upon such factors as the tensile stress of the elastomer, the deposit thickness, the percent the bead or neck of the article, if any, must be stretched to be removed from the form, etc. If there are no imperfections in the balloon, it automatically passes inspection and will be blown from the form. Thus the process includes automatic inspection and stripping from the form.

Fig. 3 illustrates, in dotted lines, how, on inflation, the end of the balloon may first become enlarged. Or the balloon may be lifted a minimal amount from the form and then start to inflate in the center or elsewhere. The inflation continues along the form until the entire balloon to the bead 7 is inflated. After the whole balloon has become inflated to the extent necessary to enlarge the bead 7 so that it embraces the portion of the form of largest diameter, the air pressure will lift the bead from the form sufficiently to allow a thin film of air to pass under the bead, and when this takes place the finished balloon 5 will be ejected from the form as shown in Fig. 4. Immediately after leaving the form, the balloon starts to deflate and Fig. 5 shows it in a partially deflated condition.

It will be understood that when the form is dipped in coagulant, and later dipped in latex, plugs of the coagulant and/or latex may form in the opening 4. If the portion of the plug which is formed by the latex is of any substantial thickness, it will be apt to become compressed by the pressure of the compressed air against it, and this will enlarge its diameter. Thus, when the air is turned on, the plug will tend to become more tightly wedged in the opening. Fig. 6 shows a preferred form of opening in which the wall 10 of the opening is conical.

In all of the drawing the compressed air passage is enlarged to facilitate illustration. In actual practice the size of the opening 4 or 10 will usually not exceed a small fraction of an inch in diameter, although the form may be as much as a foot or so in length, or it may be a small form not over an inch or two in length.

Thus, the process may be used for the inspection and removal of balloons and other articles

manufactured by curing an elastomer deposit on a form. The process is applicable to dipping in either a solution or dispersion of the elastomer.

This application is a division of my application Serial No. 748,265 filed May 15, 1947.

The invention is defined in the appended claims.

What I claim is:

1. The method of preparing and automatically inspecting elastomer articles which comprises forming a layer of elastomer on each form in a bank of forms, rolling a bead at the edge of each layer where each form enters its article, curing the elastomer layers, and then introducing air under pressure through each form into each article at a point away from where the form enters the article thereby inflating the imperforate articles.

2. The method of preparing and automatically inspecting balloons which comprises forming a layer of elastomer on each form in a bank of forms, each form including a neck by which the form is supported and a part of which is covered by the elastomer layer, rolling a bead at the edge of the layer on the neck, curing the elastomer layers, and then introducing air under pressure through the respective forms into each balloon at a point away from the neck thereby inflating the imperforate balloons and then blowing them from their forms in air-inflated condition, and thus separating imperforate balloons from perforate balloons.

3. The method of preparing and automatically inspecting an elastomer article which comprises forming a layer of elastomer on a form, rolling a bead at the edge of the layer where the form enters the article, curing the elastomer layer, and then introducing air under pressure through the form into the article at a point away from where the form enters the article, thereby inflating the imperforate article.

HAROLD B. MORRIS.

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