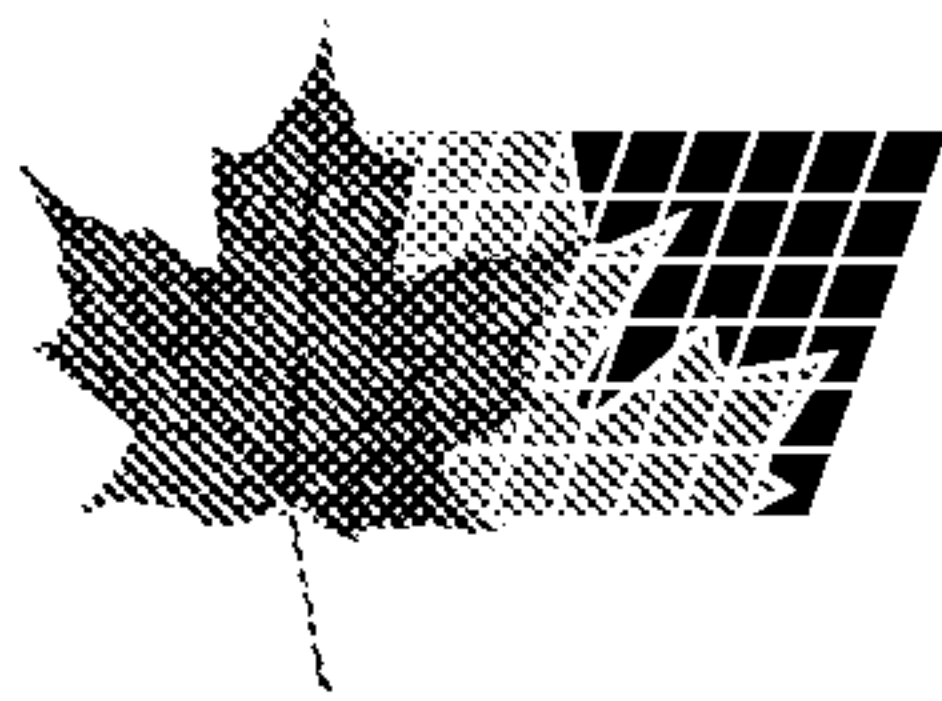




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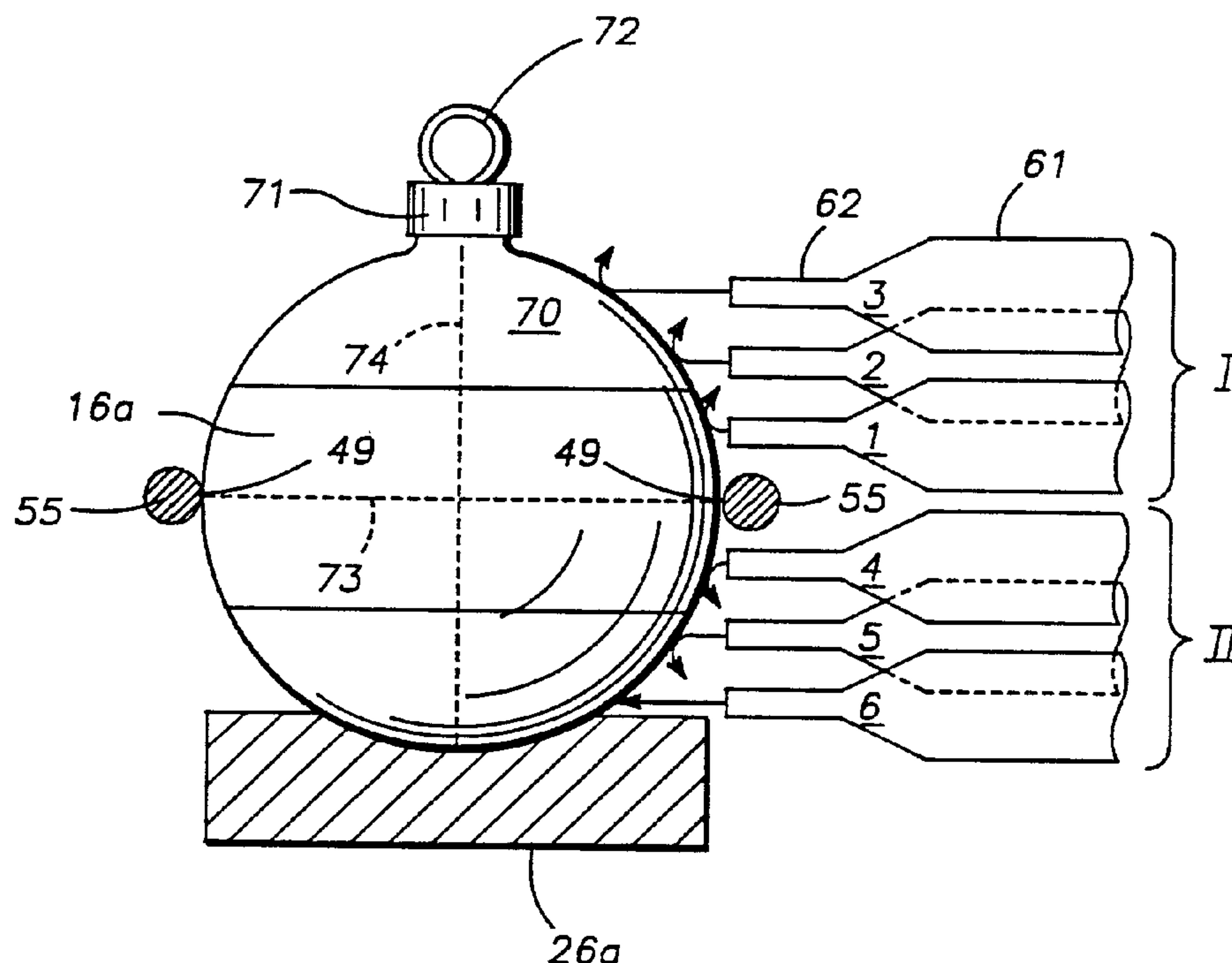
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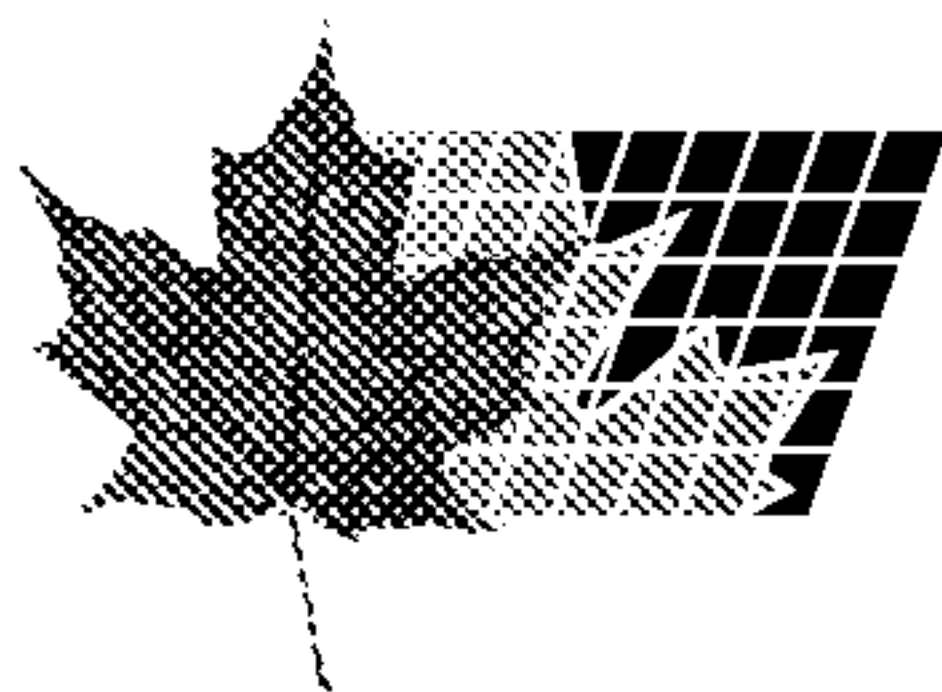
(54) **PROCEDE D'ETIQUETAGE D'ARTICLES AYANT DES
SURFACES CONVEXES**

(54) **METHOD OF LABELING ARTICLES HAVING CONVEX
SURFACES**



(57) L'invention porte sur des procédés d'application de segments de matériau thermorétractables (16) (tels que des étiquettes ou des bandes décoratives) sur des articles (25) (tels que des contenants ou des articles de décoration) présentant des surfaces convexes. Ledit procédé consiste à fixer les deux extrémités dudit

(57) Method for applying heat shrinkable segments of material (16) (e.g., labels or ornamental bands) to articles (25) (e.g., containers or ornaments) which have convex surfaces. The segment (16) is attached at both ends by adhesive to the convex surface (46) (or the trailing end of the segment (16) may be lapped over and



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segment (16) sur la surface convexe (46) au moyen d'un adhésif (ou à fixer l'extrémité arrière du segment (16) sur l'extrémité avant de celui-ci (16) à l'aide d'un adhésif). Les points de fixation adhésifs tiennent dans une zone limitée telle que la zone présentant le plus grand diamètre, ou la circonférence d'une sphère, les plus grandes parties du segment (16) se trouvant des deux côtés de cette zone limitée n'étant pas fixées. Lesdites plus grandes parties sont ensuite soumises à une thermorétraction sur la surface convexe (46).

adhesively attached to the leading end of the segment (16)). The adhesive attachments are confined to a narrow sector, e.g., the sector of widest diameter, or a circumference of a sphere, leaving major portions of the segment (16) on either side of such narrow sector unattached. These major portions are then heat shrunk onto the convex surface (46).



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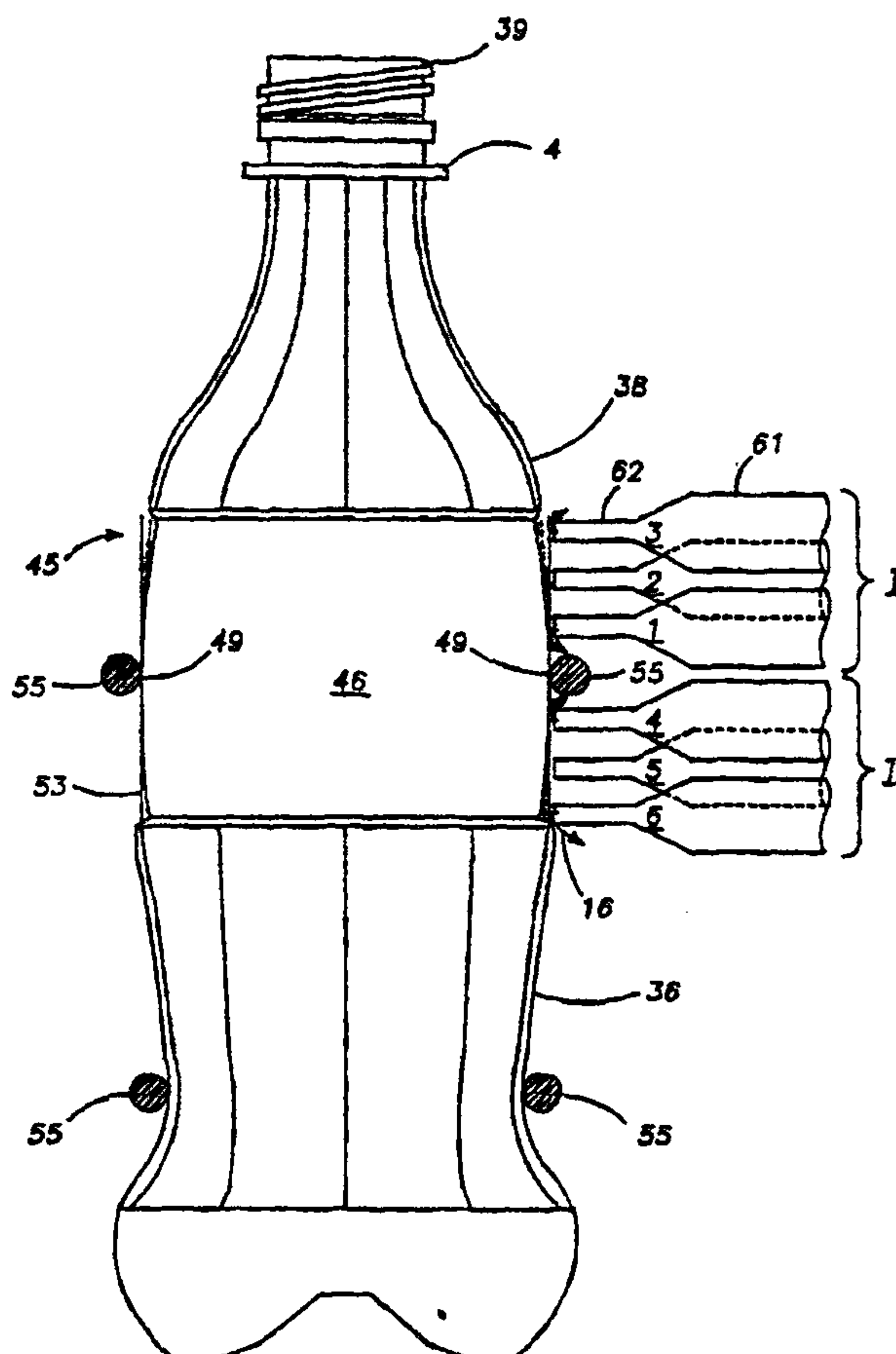
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(54) Title: METHOD OF LABELING ARTICLES HAVING CONVEX SURFACES

(57) Abstract

Method for applying heat shrinkable segments of material (16) (e.g., labels or ornamental bands) to articles (25) (e.g., containers or ornaments) which have convex surfaces. The segment (16) is attached at both ends by adhesive to the convex surface (46) (or the trailing end of the segment (16) may be lapped over and adhesively attached to the leading end of the segment (16)). The adhesive attachments are confined to a narrow sector, e.g., the sector of widest diameter, or a circumference of a sphere, leaving major portions of the segment (16) on either side of such narrow sector unattached. These major portions are then heat shrunk onto the convex surface (46).



METHOD OF LABELING ARTICLES HAVING CONVEX SURFACES

This invention relates to applying heat shrinkable films to articles such as bottles, other containers and ornamental or novelty items such as Christmas tree ornaments, artificial
5 Easter eggs, etc.

BACKGROUND OF THE INVENTION

It is known and commonly practiced to apply heat shrinkable films such as labels to the cylindrical portions or bodies of containers by adhering the leading end of a label to the
10 body by means of an adhesive, then wrapping the label around the body of the container and attaching the trailing end by adhesive to the container or lapping it over and attaching it to the leading end of the label. In carrying out this process the upper edge of the label and/or the lower edge of
15 the label is allowed to extend over an inwardly sloping or contoured portion such as the shoulder of a bottle without being attached thereto. Thereafter heat is applied to shrink the unattached edge or edges onto the contoured portions of the container.

20 This method has been quite successful. However, a problem exists when the surface (or a portion of the surface) to which the label is applied is convex and presents a sector of maximum diameter or circumference with the remainder of the convex surface sloping inwardly toward the axis of the
25 article. Heretofore it has been proposed, as in Spiegel U.S. Patent 3,829,348 to apply a decorative heat shrinkable

2152058
film to a spheroidal or spherical ornamental article such as
a Christmas tree ornament or artificial Easter egg by
providing the film in the form of a tube which is oversize
in relation to the circumference of the ornament, fitting
5 the tube over the article and then heat shrinking it onto
the article.

Another approach to the problem is represented by Inoue U.S.
Patent 4,225,049 which applies a heat shrinkable film to a
container such as the familiar Coke bottle, such having a
10 convex portion presenting a sector of maximum diameter and
circumference. Inoue, like Spiegel, provides a preformed
tube of heat shrinkable film material which, however is
smaller in diameter than the maximum circumference of the
container. This tube is stretched and fitted over the
15 container and is released and it is held in place by the
elasticity of the film. It is then heated to shrink the
entire tube onto the container.

Both such approaches have serious disadvantages such as the
necessity to preform the tube in one operation and on one
20 piece of equipment, then remove it and place it over the
container or ornament and shrink it onto the container
ornament.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide
25 improvements upon heat shrink application of segments of
heat shrinkable sheets to convex surfaces of articles.

It is a particular object of this invention to provide an
apparatus, a system and a method whereby heat shrinkable
material may be applied rapidly to, and attached
30 sufficiently for the purpose to a convex sector on an
article, and then heated to shrink the remainder of the
material properly onto the convex portion and, if desired,
onto other parts of the article.

Yet another object is to provide articles so wrapped.

The above and other objects of the invention will be apparent from the ensuing description in the appended claims.

5 SUMMARY OF THE INVENTION

In accordance with the present invention a segment of heat shrinkable film is attached to the widest portion or circumference of a convex surface by adhesive confined to the leading end, then the segment is wrapped around the article
10 and the trailing end is attached to the article or it is lapped over the leading end of the segment and it is attached by means of an adhesive. In this operation as thus far described only a narrow sector of the film or segment aligned with the sector of maximum circumference of the article is
15 attached adhesively to the article and it leaves portions of the segment above and below this narrow sector unattached. Then heat is applied to shrink the entire segment including the unattached upper and lower parts onto the article.

According to one aspect the invention provides a
20 method of applying segments of heat shrinkable sheet material to an article, such article having a central, vertical axis, a bottom, a top and a body portion between the bottom and top, at least a portion of said body portion having an outer surface centered on said central axis and presenting a convex
25 surface which is also centered on said central axis, said convex surface presenting a sector of maximum diameter, said method comprising: (a) providing a segment of heat shrinkable sheet material having a leading end, a trailing end, upper and lower edges joining the leading and trailing
30 ends, and a body portion bounded by said ends and edges, (b) adhesively attaching the leading end of the segment to said

3a

sector, (c) then wrapping the segment around said convex surface and adhesively attaching the trailing end to said sector or to the leading end of said segment overlying said sector, (d) so conducting steps (b) and (c) that the segment
5 is attached to the convex surface along a narrow area adjacent said sector of maximum diameter and major portions of the segment on either side of said narrow area are unattached and then (e) heat shrinking said major portions onto said convex surface.

10 According to another aspect the invention provides in the application of a segment of heat shrinkable material to a convex surface of an article, and wherein the segment is applied by adhesive to secure it in substantially tangent relation to that portion of the convex surface of maximum
15 diameter and is then heat shrunk onto such surface, the improvement which comprises effecting such heat shrinking by jets of hot air directed against the so attached segment above and below the area of maximum diameter.

According to yet another aspect the invention
20 provides a heat shrink apparatus for continuously heat shrinking segments of heat shrinkable material onto articles, each article having a top, a bottom and a body portion between the top and bottom and having a vertical axis extending between the top and bottom, said body portion
25 including a convex sector centered on said axis and presenting an area of maximum diameter, said apparatus comprising: (a) a heat shrinking station, (b) means for continuously moving such articles through such station, each article having attached thereto a segment of heat shrinkable
30 sheet material having a leading end, a trailing end, upper and lower edges joining the ends and a body portion bounded by the ends and edges, each segment being wrapped around an

3b

article and adhesively attached to said area of maximum diameter, (c) means for spinning each such article during movement through the heating station and (d) means for applying currents of hot air to each segment as it passes
5 through said station, such application being above and below the area of maximum diameter and being effective to push the segment against the article and to shrink it onto the convex area.

According to still another aspect the invention
10 provides an article having a top, a bottom, a body portion between the top and bottom, and an axis extending between the top and bottom, said body portion having a surface which is convex and is centered on said axis, said convex surface having a maximum circumference and a major area on each side
15 of said maximum circumference, said article also having a segment of heat shrinkable sheet material which is bonded to said maximum circumference by adhesive and is adhered to said major areas by being heat shrunk onto them.

According to a further aspect the invention
20 provides a method applying a segment of heat shrinkable sheet material to an article, said article having a convex surface presenting a sector of maximum circumference or diameter, said segment having a leading end and a trailing end unattached to the leading end, said method comprising: (a)
25 adhesively attaching the leading end of the segment to said convex surface, (b) then wrapping the segment around the article, (c) adhesively attaching the trailing end of the segment to the convex surface or lapping it over and attaching it adhesively to the trailing end of the segment,
30 (d) conducting steps (a), (b) and (c) in such manner that only a narrow sector of the segment is attached to said sector of maximum circumference or diameter and major

3c

portions of the segment on either side of said narrow sector are unattached to the article, and (e) then applying heat to the segment to shrink said major portions onto the article.

BRIEF DESCRIPTION OF THE DRAWINGS

5 FIGURE 1 is a top plan view of a system for applying heat shrinkable labels to articles such as containers having a convex sector to which it is desired to apply the labels.

10 FIGURE 2 is a view in elevation of a container of the type described above.

 FIGURE 3 is a section taken along the line 3-3 of Figure 1 showing how a label is initially applied to a container.

15 FIGURE 4 is a section taken along the line 4-4 of Figure 1 showing how hot air is applied to complete the label application.

2152058

-4-

FIGURE 5 is a view looking down on the heating station.

FIGURE 6 is a view similar to that in Figure 2 showing a labeled container.

FIGURE 7 is a view of a portion of the system and apparatus of Figure 1 but shown applying decorative bands to Christmas tree ornaments.

FIGURE 8 is a view of a Christmas tree ornament.

FIGURE 9 is a view similar to that of Figure 3 but showing application of such a band to a Christmas tree ornament of Figure 8.

FIGURE 10 is a view similar to that of Figure 4 but showing heat shrinking of the ornamental band onto the Christmas tree ornament of Figure 8.

FIGURE 11 is a view of the Christmas tree ornament with a decorative band applied to it.

FIGURE 12 is a view of an artificial Easter egg having a decorative band heat shrunk around it.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and first to Figure 1, a system designated by the reference numeral 10 is provided, including a roll 11 of heat shrinkable label material 12 which is fed continuously by way of a series of guide, tensioning and drive rollers (unnumbered) to a cutter 13 comprising a back-up roller 14 and a rotating or oscillating cutter roller or knife 15 which severs individual labels 16 from the continuous label stock and deposits each label on a vacuum drum 17 rotating with a shaft 18. Preferably each label is cut after its leading end is deposited on the vacuum drum and the vacuum drum 17 is rotated at a surface

speed slightly exceeding the speed of the label material 12 to apply a small tension to the label material. Each label, in turn, is rotated past a glue applicator 19 rotating on a shaft 20 which applies hot melt glue and/or solvent to the leading end of the label and to the trailing end of the label.

The equipment thus far described may be of well known construction such as that described in U.S. Patent 4,108,110.

Containers 25, described in detail below with reference to Figure 2, enter the system at the right as viewed in Figure 1 on a conveyor 26. Each container, in turn, is delivered to a star wheel 27 rotating with a shaft 28 and is deposited in a pocket 29 and is then trapped between a curved guide or roll-on pad 30 and the star wheel. Each container in turn is released by the star wheel as the star wheel continues rotation and enters the space between a curved roll-on pad 31 and the vacuum drum 17, such pad being concentric to the vacuum drum. Vacuum is released for each label as it reaches the point of contact with a container, so that it can be wound around the container as the container spins, the adhesive at the leading and trailing ends of the label serving to adhere the container, either in a full wrap fashion wherein the trailing end is lapped over and adhered to the leading end, or what is termed a "spot label" where the trailing end does not extend to the leading end of the label. The labeled container is then released to the conveyor 26a, being spun and compressed by a belt 32 on rollers 33 and 34 and a plate or pad 35 to more securely attach the label to the container.

The star wheel-roll on pad-container feed and spinning means may be, e.g., that shown in U.S. Patent 4,500,386.

Referring now to Figure 2, a container 25 such as that described above is shown in elevation, such being of plastic

2152058

-6-

construction, e.g., PET, polyethylene, polyvinyl chloride or polypropylene of a grade and thickness suitable for construction of container. The container may be made of glass, metal or other material but usually it is made of plastic. This container is shaped as follows: There is a lower portion 36 which is fluted as shown for purposes of decoration and/or reinforcement; there is a bottom portion including projections 37 which provide the bottom of the bottle; there is an upper inwardly sloping neck or shoulder portion 38 which is also fluted and there is a threaded top 39 to receive a screw cap and a projecting ring 40 which is useful in transporting the container, empty or filled, from place to place as needed.

The manufacture of such containers is well known. The threaded top is commonly made by injection molding and is attached to a tube of thinner material which is blown in a mold into the shape which is shown.

Between the lower portion 36 and the upper portion 38 is a contoured mid-portion or sector 45 presenting a convex surface 46 including an upper portion 47, a lower portion 48 and a mid-portion or area of maximum diameter 49. The sector 46, or label panel as it is known, is thinner than the upper and lower portions 37 and 38. Typically such container is of twenty ounce size, but the present invention is applicable to larger and smaller containers and to containers of other shapes which have in common a sector which is convex. Such convex sector may constitute larger or smaller portion of the overall surface of the container.

The usual purpose of the contoured sector 45, besides being an integral part of the structure, is to receive a label. It is, of course, desirable that the label be applied smoothly, evenly, attractively and securely. This presents a problem in that a non-shrinkable label, if applied properly, requires pressure from some kind of pressure member to conform it to the convex surface 46. This is

difficult to achieve. A heat shrinkable label can be applied to the portion 49 of maximum diameter but this also presents a problem in that initial application to the portion 49 of maximum diameter is difficult unless a
5 pressure member or a matching concave shape is employed.

Referring now to Figure 3, a container 25 of the type shown in Figure 2 is shown squeezed between the vacuum drum 17 and the roll-on pad 31. The container is shown in elevation and the vacuum drum and roll-on pad are shown in section. A
10 label 16 is shown trapped between the container 25 and vacuum drum 17 and between the container 25 and the roll-on pad 31 at the mid-section 49 of maximum diameter. The spacing of the drum 17 and the roll-on pad 31 are such as to squeeze the mid-section 45 inwardly, creating a small flat
15 area shown at 49a to which the label adheres sufficiently for purposes of the invention.

The container 25, being plastic, is flexible and is amenable to such a flattening operation. If a glass container or a container of thick plastic or other material which is not
20 flexible is used, such may not be possible. However, by using a good quality of adhesive and/or applying an adequate pressure the label may be secured sufficiently for subsequent operations as hereinafter described.

Referring again to Figure 1, containers 25 to which labels are thus initially applied pass from conveyor 26a through a connecting conveyor 50 onto a conveyor 51 which moves the initially labeled containers through a heat shrink station 52, the containers being spun by a belt 53 trained around rollers 54 of which one is driven, the containers being
30 restrained against lateral movement by rods 55, see Figure 4. One of the rods 55 is located to contact the label 16 and the container 25 at the area 49 of greatest diameter.

Referring now to Figures 4 and 5, a series of nozzles 60 are provided each having an inlet tube 61 and a fan shaped mouth

62, each tube being connected to an electric heater and an air blower (not shown) which can be adjusted as to temperature, volume and velocity of the air. There is an upper set of nozzles indicated as I and a lower set of
5 nozzles indicated as II. The upper set I is aligned with the portion of the label 16 which is above the mid-portion 49 of maximum diameter and the lower set II is aligned with the label below such mid-portion. The mouth 62 delivers a
10 wide but thin current of hot air which may be described as knife-like.

Referring more particularly to Figure 4, the nozzles in the upper set I are numbered 1, 2 and 3; the lowest of these nozzles, numbered 1, is juxtaposed to the label 16 just above the mid-portion 49 of the sector 45; No. 2 is located
15 just above No. 1; and No. 3 is located near the top of label 16.

The lower set II are numbered 4, 5 and 6; No. 4 is located just below the mid-portion 49; No. 5 is located lower; and No. 6 is located near the bottom edge of the label 16.

20 Referring now to Figure 5, the nozzles of set I are arranged as shown; i.e., with nozzle 1 being located at the starting point of the heating station 52; nozzle 2 being downstream and nozzle 3 being still further downstream at about mid-point of the heating station 52.

25 The lower set II of nozzles 4, 5 and 6 are similarly arranged with No. 4 being upstream relative to No. 5 and No. 5 being upstream relative to No. 6.

As a container 25 travels through the heating assembly 52 with a label attached at the mid-portion 49 of the container
30 and spins as it travels, the label is first heated by nozzle 1, which causes it to shrink onto the container near the mid-portion 49; then it is heated by nozzle 2 and is caused to shrink farther up; and then it is heated by nozzle 3 and

is caused to shrink so that the entire upper part of the label is shrunk onto the sector 47 of the container.

The same procedure is carried out by nozzles 4, 5 and 6 causing first that portion of the label close to the mid-
5 portion 49 to shrink onto the container, then a portion farther down and finally the lower most portion is shrunk onto the container.

Variants of this progressive heat shrinking procedure may be employed. For example, the lower set of nozzles 4, 5 and 6
10 may be located directly below the upper set of nozzles; or the two sets may be overlapping in relation to their distribution along the path of travel; or the lower set II may precede the upper set I. Also, the number of nozzles in each set may vary. For example, either set may consist of
15 two or even one nozzle where the region 47 and/or the region 48 is short. Where one of the portions 47, 48 is longer than the other it may be provided with more nozzles than the other portion.

Another consideration is as follows: It is desirable to
20 limit the shrinkage as much as possible to shrinkage along the length of the label, i.e., in the direction of the leading and trailing ends of the label and to minimize shrinkage across the label, i.e., in the direction of the upper and lower edges of the label. Accordingly, heat
25 shrinkable labeling material having such a property is preferred, such being well known in the art.

Also the air speed and temperatures should be such as to cause the desired shrinkage but not to distort the film or the container.

30 In Figure 6 is shown a completely labeled container with the label uniformly applied to and adhered to the convex sector 46.

In the description above, the use of glue or solvent to adhere the label to the container are described and are preferred but heat sealing, for example as in U.S. Patent 5,137,596 may be used, or heat activatable adhesive may be
5 used.

Also, knife-like jets of hot air are preferred but currents of hot air other than knife-like jets may be used, e.g., as in U.S. Patent 4,704,173.

Referring now to Figures 7-12 and first to Figure 7, a
10 portion of the machine of Figure 1 is shown in which, with one exception, the same reference numerals are employed. The exception is the article 70 which takes the place of the container 25 of Figures 1 and 2. As shown in Figure 8 the article 70 is a spherical Christmas tree ornament made in
15 the usual manner of, for example, blown glass, molded plastic (e.g., high density polyethylene, polyethylene terephthalate (PET) or a two piece metal sphere. It has a neck 71 and a loop 72 for suspending it from a branch of a Christmas tree.

20 As in Figure 1, the ornament 70 travels along a conveyor 26 and each is picked up in turn by the star wheel 27 and is confined in a pocket 29 of the star wheel 27 and a guide 30 and is caused to move forwardly, to the left as viewed in Figure 7, between vacuum drum 17 and curved pad 31. A band
25 16a carried by the vacuum drum 17 is applied to each ornament in turn, then the ornament is released from the vacuum drum and moved forwardly on conveyor 26a compressed between a pad 35 and a moving belt 32. The band 16a replaces the label 16 of Figures 1 and 3 and is of heat
30 shrinkable material. It may be coated with a metallic coating and it may bear any desired decorative design.

Referring again to Figure 8, the ornament 70 is shown as a sphere which has a circumference 73 lying in a plane which

is perpendicular to the diameter 74 of the sphere which passes through the neck 71.

Referring now to Figure 9, it is the same as Figure 3 except that the spherical ornament 70 is used in place of the container 25. The ornament is shown moving between the vacuum drum 17 and the pad 31, being squeezed between the pad 31 and the vacuum drum 17.

If desired or if necessary, in order to hold and confine the ornament 70 in the right position with the diameter 74 passing through the neck 71 in vertical position. The conveyor 26 may be formed with cups such as shown at 26a in Figure 9 in which the ornaments are placed in the upright position, i.e., with the neck 71 vertical and which holds the ornament in such position throughout processing. Other positioning means are discussed below.

As will be seen, the pressure exerted on the ornament may be (and preferably is) such as to create a small flattened sector on the sphere such that the band 16a which has adhesive on its leading and trailing ends, is adhered to the sphere along a narrow sector which, although narrow, is not limited to a single line. If the ornament is incompressible then the sector of contact of the band 16a with the sphere will, of course, be narrower than it would be if the sphere is somewhat compressed.

Referring now to Figure 10, which shows an arrangement of nozzles 61, these blow hot air onto the band 16a which has been applied as shown in Figure 9, such operation being as described above in connection with Figures 4 and 5.

The end product is shown in Figure 11.

Referring now to Figure 12, an ornamental band 16b is shown applied to an artificial Easter egg 80. This egg is not spherical, being somewhat pear-shaped and having its widest

diameter at 81. The shape of the Easter egg 80 at its diameter 81 is circular. An ornamental band 16b is applied in the same manner as the band 16a is applied to the ornament 70, such being adhesively attached to the Easter
5 egg at its widest diameter, then heat shrunk onto the egg.

As will be apparent, it is desirable to hold the Christmas tree ornament 70 so that its diameter 74 is vertical and to hold the Easter egg 80 with its maximum diameter vertical so that the band 16a or 16b is properly applied. This may be
10 accomplished in various ways, e.g., as described above the conveyor or conveyors may be provided with cups in which the articles are placed and which serve to hold them in the proper position. Alternatively a band applying and heat shrinking apparatus may be used such as shown in U.S. Patent
15 No. 4,416,714 in which each article is gripped, in its turn, between upper and lower chucks such as shown in Figure 8a of such patent, the chucks being shaped to cup opposite ends of the article and so as not to interfere with the neck 71 and suspension ring 72 of the Christmas tree ornament. The
20 articles may be fed to the turret on a conveyor fitted as described above with cups to align them properly. This assumes, of course, that the structure of the article or the chucks (or both) are such as not to do damage to the articles.

25 If the sector of maximum circumference or diameter of the article to which the segment is applied is non-circular, e.g., if it is elliptical, a turret type of machine may be used such as shown in Figure 8a, U.S. Patent No. 4,416,714 in which the chucks are carried on a mounting which permits
30 radial movement of the chucks together with cam means to move the chucks radially inwardly and outwardly to conform to the varying radius of the sector to which the segment is being applied.

Alternatively the articles may be held by hand and the
35 segment wrapped manually about them.

In addition to the articles described above, the invention may be applied to other articles, e.g., to labels and decorative wrappings for perfume bottles and beauty care products having convex surfaces.

- 5 It will thus be apparent that a new and useful method of applying heat shrinkable labels, bands, etc. to convex surfaces, a new and useful system and apparatus for carrying out the method and new and useful articles have been provided.

-14-

1. A method of applying segments of heat shrinkable sheet material to an article, such article having a central, vertical axis, a bottom, a top and a body portion between the bottom and top, at least a portion of said body portion having an outer surface centered on said central axis and presenting a convex surface which is also centered on said central axis, said convex surface presenting a sector of maximum diameter, said method comprising:

- (a) providing a segment of heat shrinkable sheet material having a leading end, a trailing end, upper and lower edges joining the leading and trailing ends, and a body portion bounded by said ends and edges,
- (b) adhesively attaching the leading end of the segment to said sector,
- (c) then wrapping the segment around said convex surface and adhesively attaching the trailing end to said sector or to the leading end of said segment overlying said sector,
- (d) so conducting steps (b) and (c) that the segment is attached to the convex surface along a narrow area adjacent said sector of maximum diameter and major portions of the segment on either side of said narrow area are unattached and then
- (e) heat shrinking said major portions onto said convex surface.

2. The method of Claim 1 wherein the article is caused to spin to wrap the label about it in step (c).

3. The method of Claim 1 wherein the article is caused to spin during step (c).

4. The method of Claim 1 wherein the article is caused to spin in both steps (c) and (e).

5. The method of any of Claims 1 to 4 in which the article is a container having a flexible convex surface and in

2152058

-15-

step (b) the sector of maximum diameter is slightly flattened during segment application.

6. The method of any of Claims 1 to 4 in which in step (e) a plurality of jets of hot air are applied to the segment above the sector of maximum diameter, such jets being applied at different levels in relation to the area of maximum diameter and a plurality of jets of hot air are applied to the segment below the sector of maximum diameter, such jets being applied at different levels in relation to the sector of maximum diameter.

7. The method of Claim 6 wherein the article is caused to move past the jets of hot air while spinning about its central axis and the jets are arranged so that areas of the segments closest to the sector of maximum diameter are exposed first to jets and areas further removed from the sector of maximum diameter are exposed later to jets.

8. In the application of a segment of heat shrinkable material to a convex surface of an article, and wherein the segment is applied by adhesive to secure it in substantially tangent relation to that portion of the convex surface of maximum diameter and is then heat shrunk onto such surface, the improvement which comprises effecting such heat shrinking by jets of hot air directed against the so attached segment above and below the area of maximum diameter.

9. The improvement of Claim 8 wherein the article is caused to move past a series of knife-like jets of hot air, some of which are above and others of which are below the area of maximum diameter, and the article is caused to spin during such movement.

10. A heat shrink apparatus for continuously heat shrinking segments of heat shrinkable material onto articles, each article having a top, a bottom and a body portion between the top and bottom and having a vertical axis extending between the top and bottom, said body portion including a convex sector centered on said axis and presenting an area of maximum diameter, said apparatus comprising:

- (a) a heat shrinking station,
- (b) means for continuously moving such articles through such station, each article having attached thereto a segment of heat shrinkable sheet material having a leading end, a trailing end, upper and lower edges joining the ends and a body portion bounded by the ends and edges, each segment being wrapped around an article and adhesively attached to said area of maximum diameter,
- (c) means for spinning each such article during movement through the heating station and
- (d) means for applying currents of hot air to each segment as it passes through said station, such application being above and below the area of maximum diameter and being effective to push the segment against the article and to shrink it onto the convex area.

11. The apparatus of claim 10 in which said means (d) is in the form of a series of air nozzles which apply knife-like jets of hot air and are arranged along the path of travel of the articles, one or more of the nozzles being located above and one or more others below the area of maximum diameter.

12. The apparatus of either claim 10 or claim 11 including a label applicator for applying heat shrinkable segments to the convex sectors of the articles including means for flattening the area of maximum diameter of each article during label application, means for spinning each article about its vertical axis during such label application and means for adhesively attaching the leading and trailing ends of the label to the flattened portion of said area.

13. An article having a top, a bottom, a body portion between the top and bottom, and an axis extending between the top and bottom, said body portion having a surface which is convex and is centered on said axis, said convex surface having a maximum circumference and a major area on each side of said maximum circumference, said article also having a segment of heat shrinkable sheet material which is bonded to said maximum circumference by adhesive and is adhered to said major areas by being heat shrunk onto them.

14. The method of any of claims 1 to 4 in which in step (d) heat shrinking is accomplished by applying currents of hot air to said major portions.

15. A method applying a segment of heat shrinkable sheet material to an article, said article having a convex surface presenting a sector of maximum circumference or diameter, said segment having a leading end and a trailing end unattached to the leading end, said method comprising:

- (a) adhesively attaching the leading end of the segment to said convex surface,
- (b) then wrapping the segment around the article,
- (c) adhesively attaching the trailing end of the segment to the convex surface or lapping it over and attaching it adhesively to the trailing end of the segment,
- (d) conducting steps (a), (b) and (c) in such manner that only a narrow sector of the segment is attached to said sector of maximum circumference or diameter and major portions of the segment on either side of said narrow sector are unattached to the article, and
- (e) then applying heat to the segment to shrink said major portions onto the article.

16. The method of Claim 15 wherein said sector of maximum circumference or diameter is circular.

17. The method of Claim 15 or Claim 16 in which the article is a container and in step (b) it is caused to spin to wrap the segment about it.

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1/10

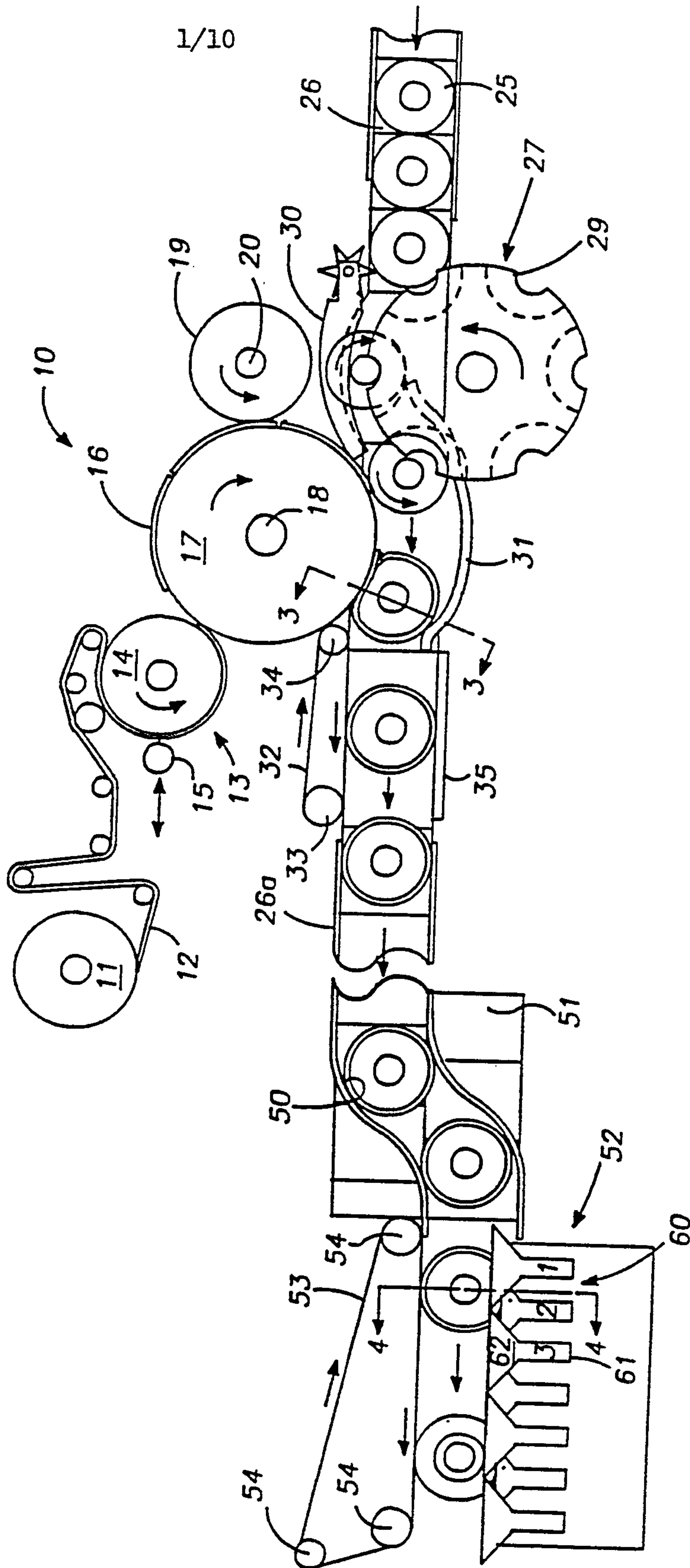


FIG. - 1

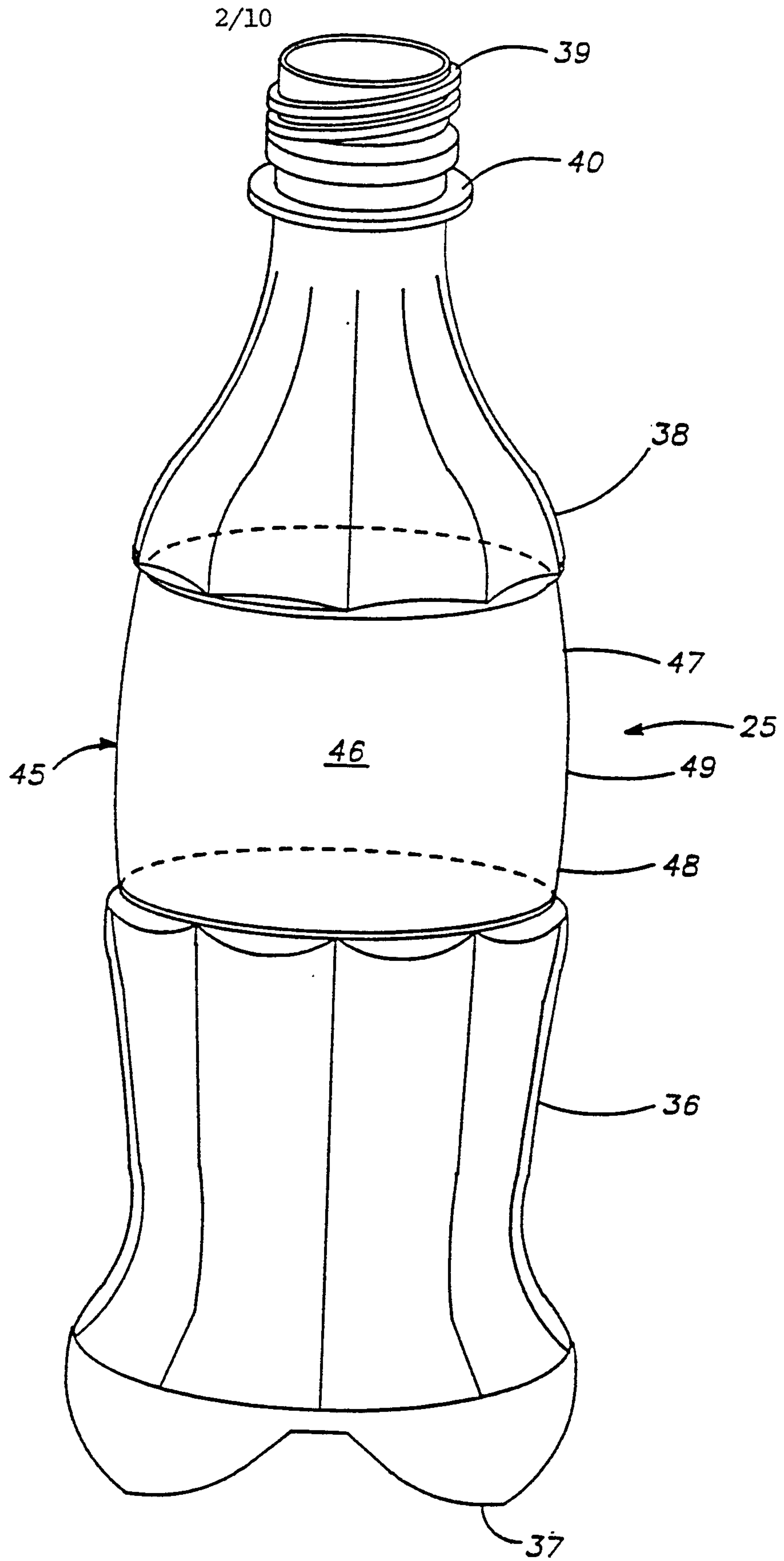


FIG. -2

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3/10

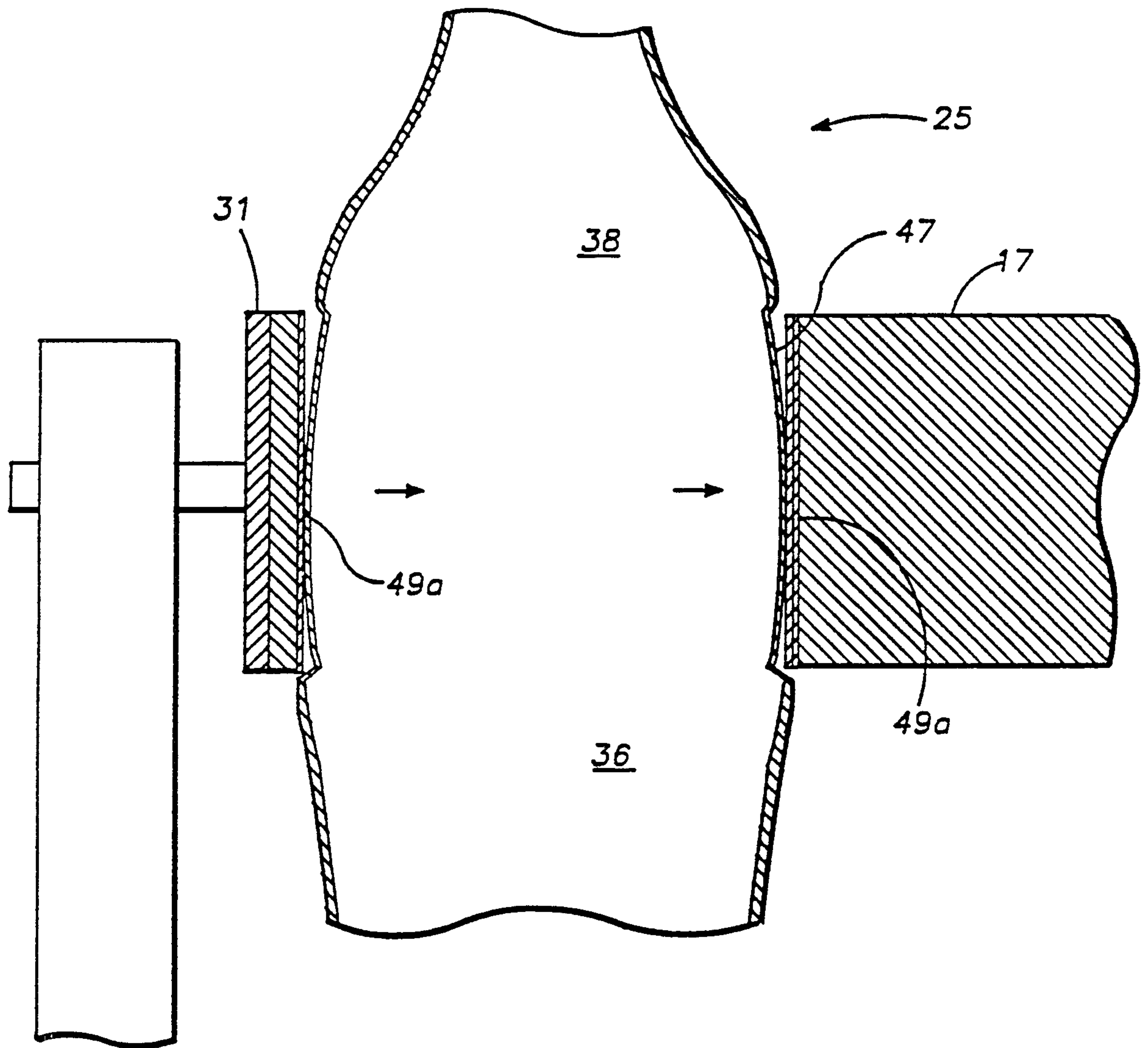


FIG. -3

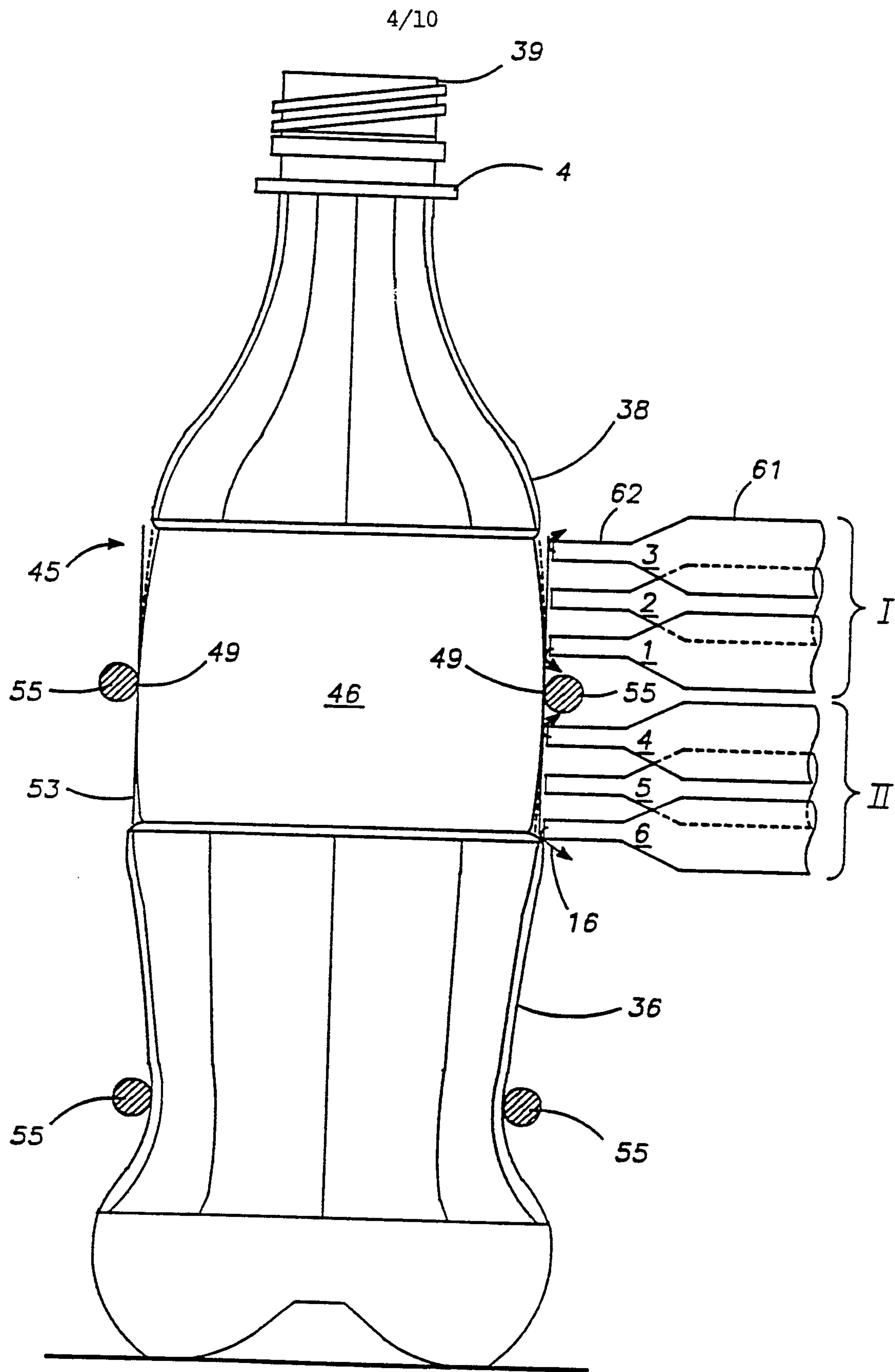


FIG. -4

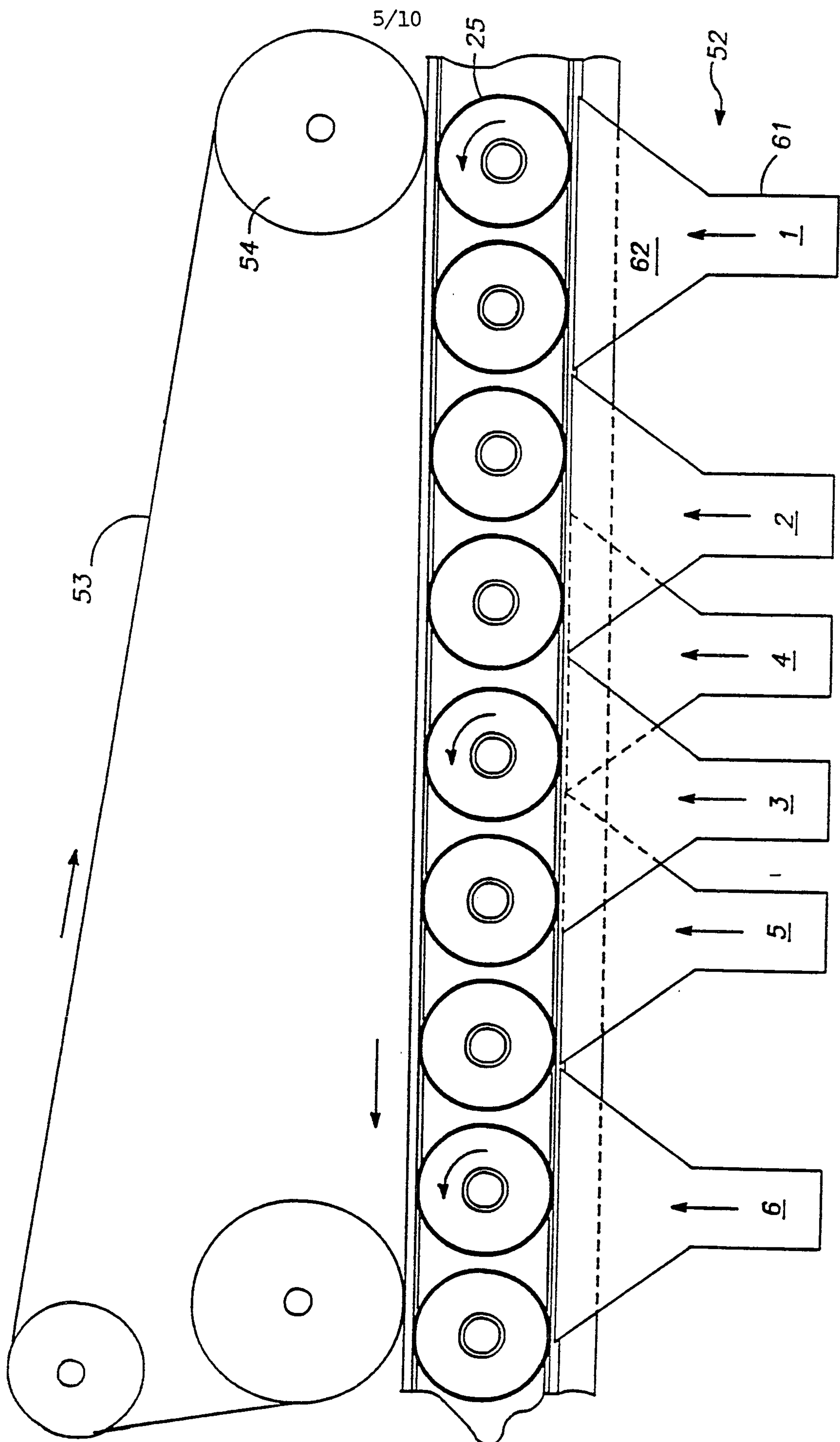


FIG. -5

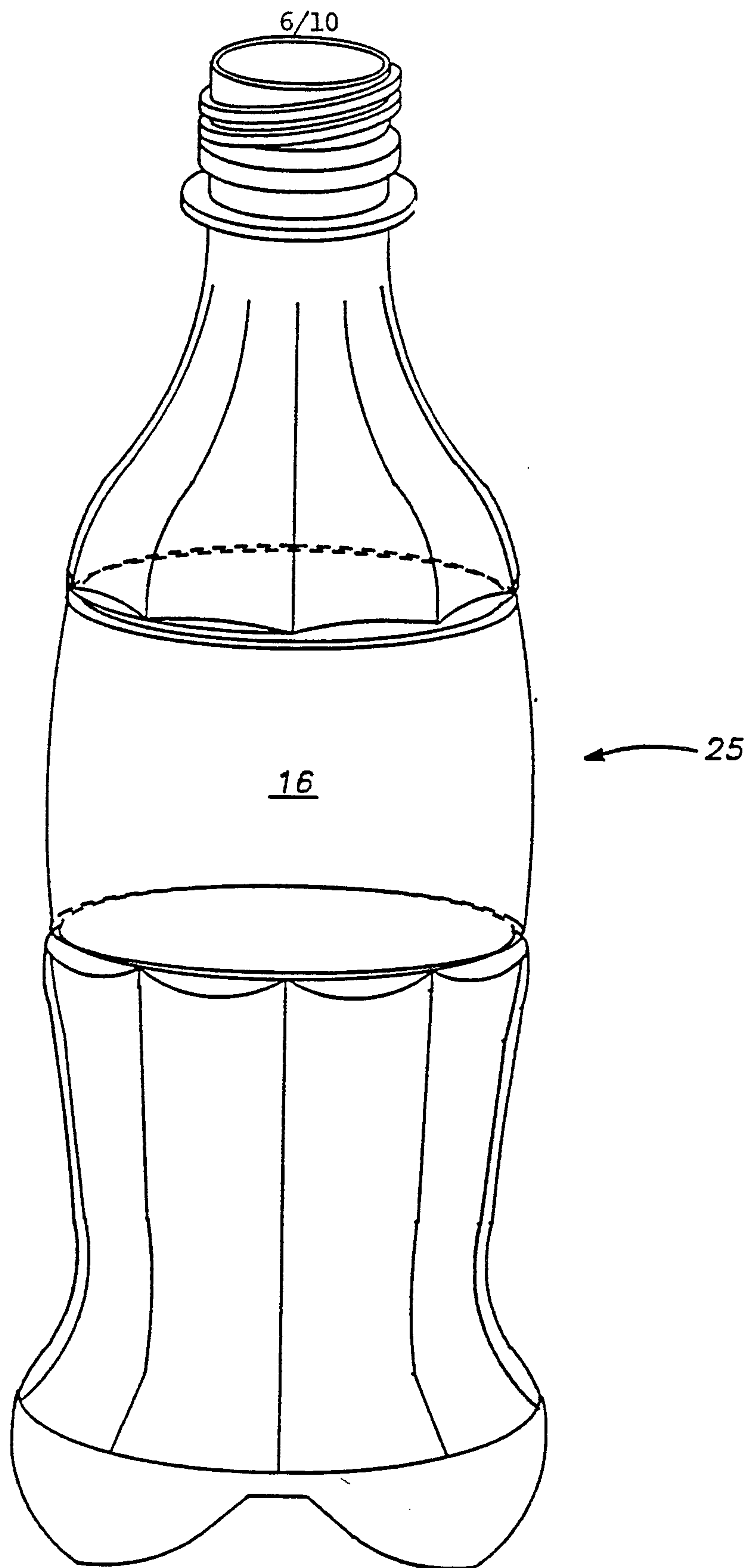


FIG.-6

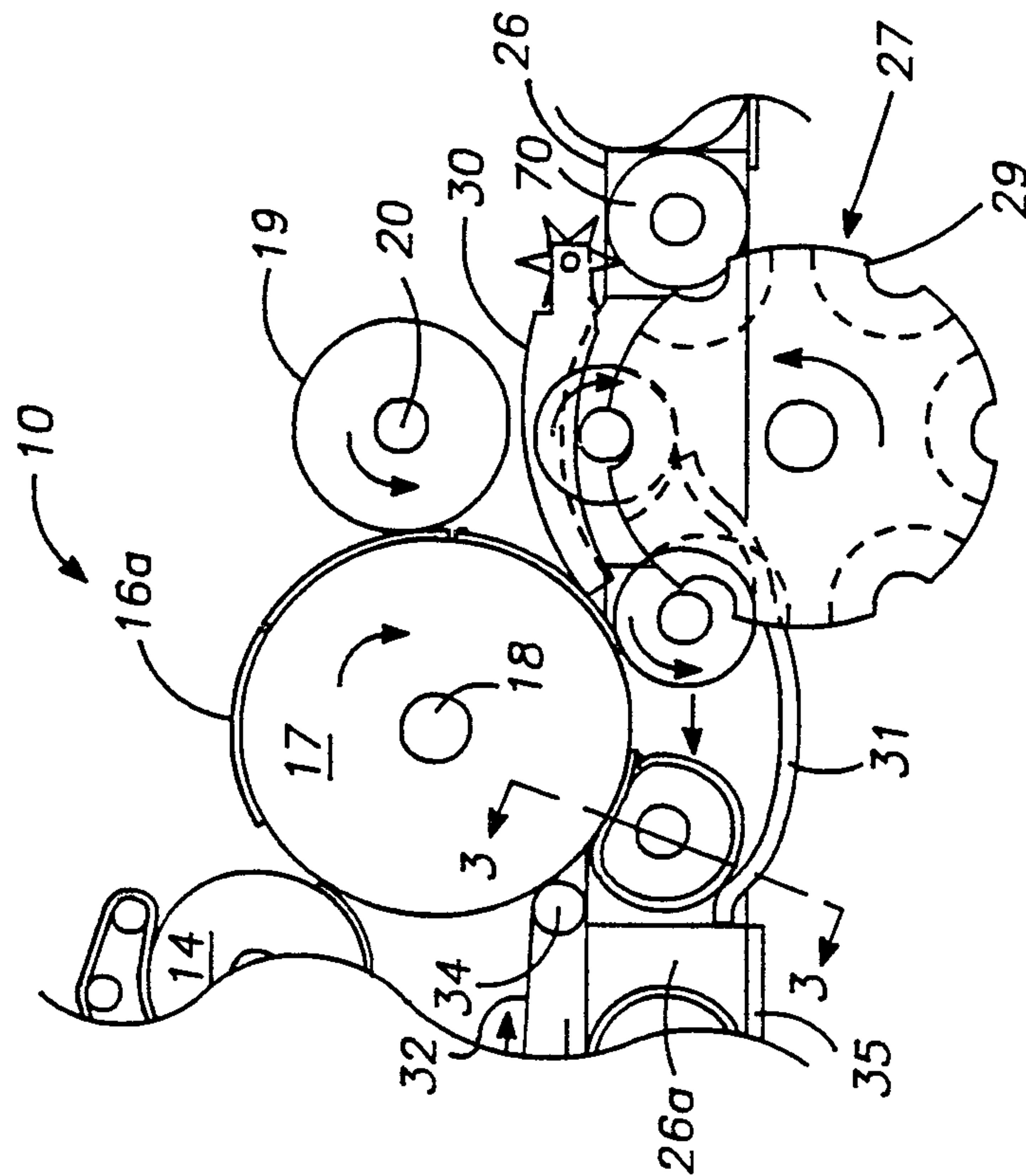


FIG. -7

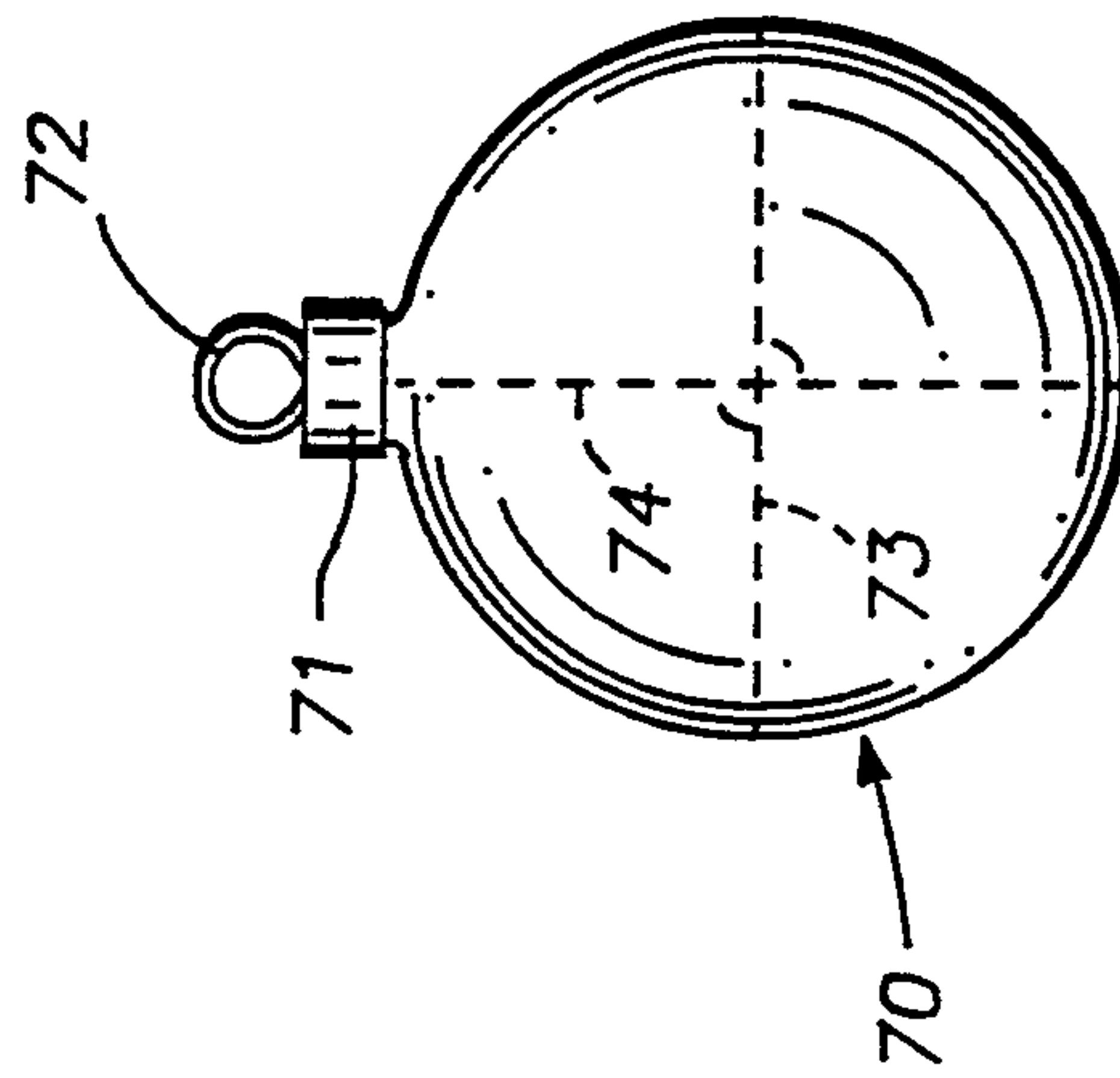
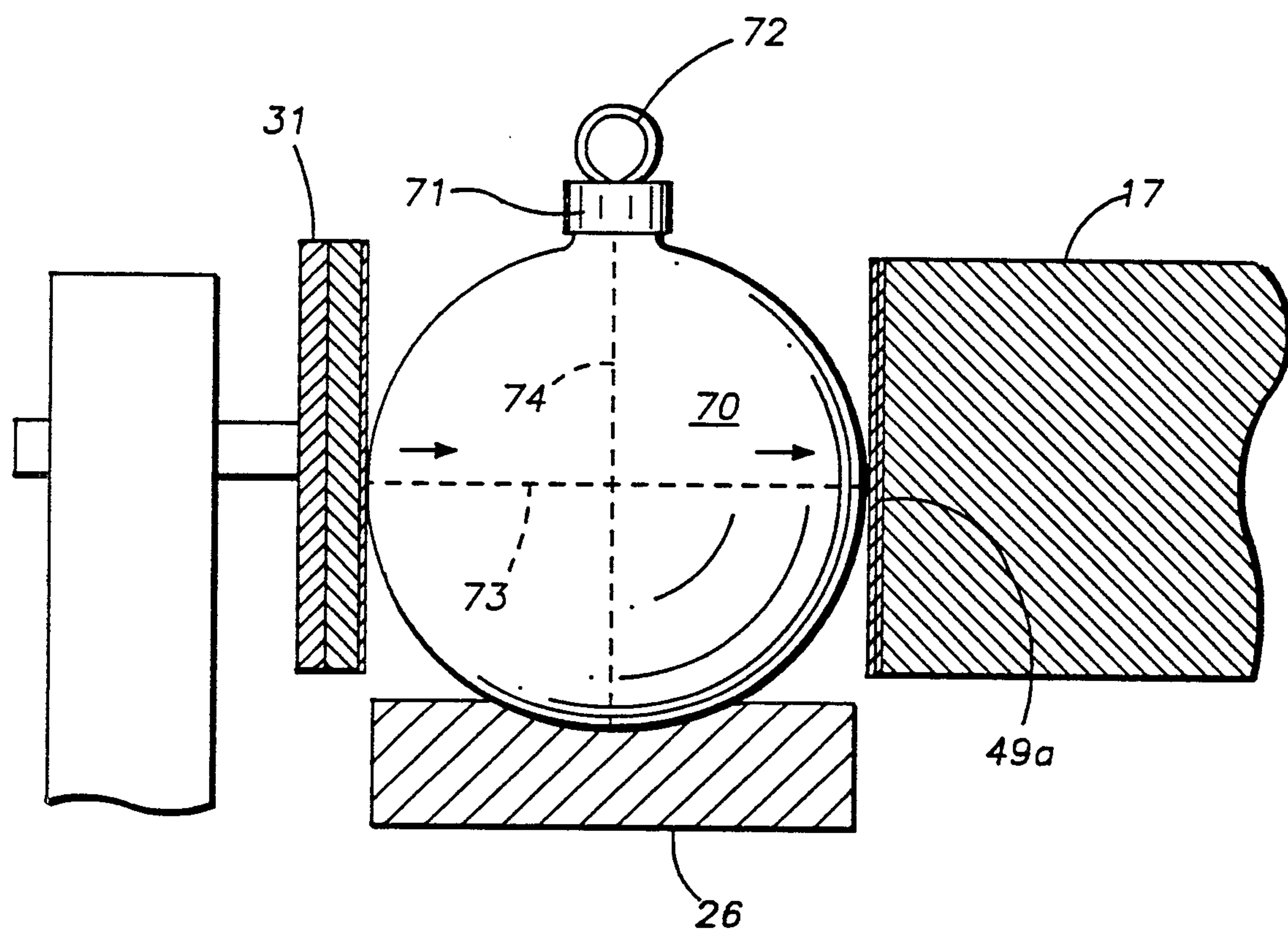


FIG. -8

*FIG. -9*

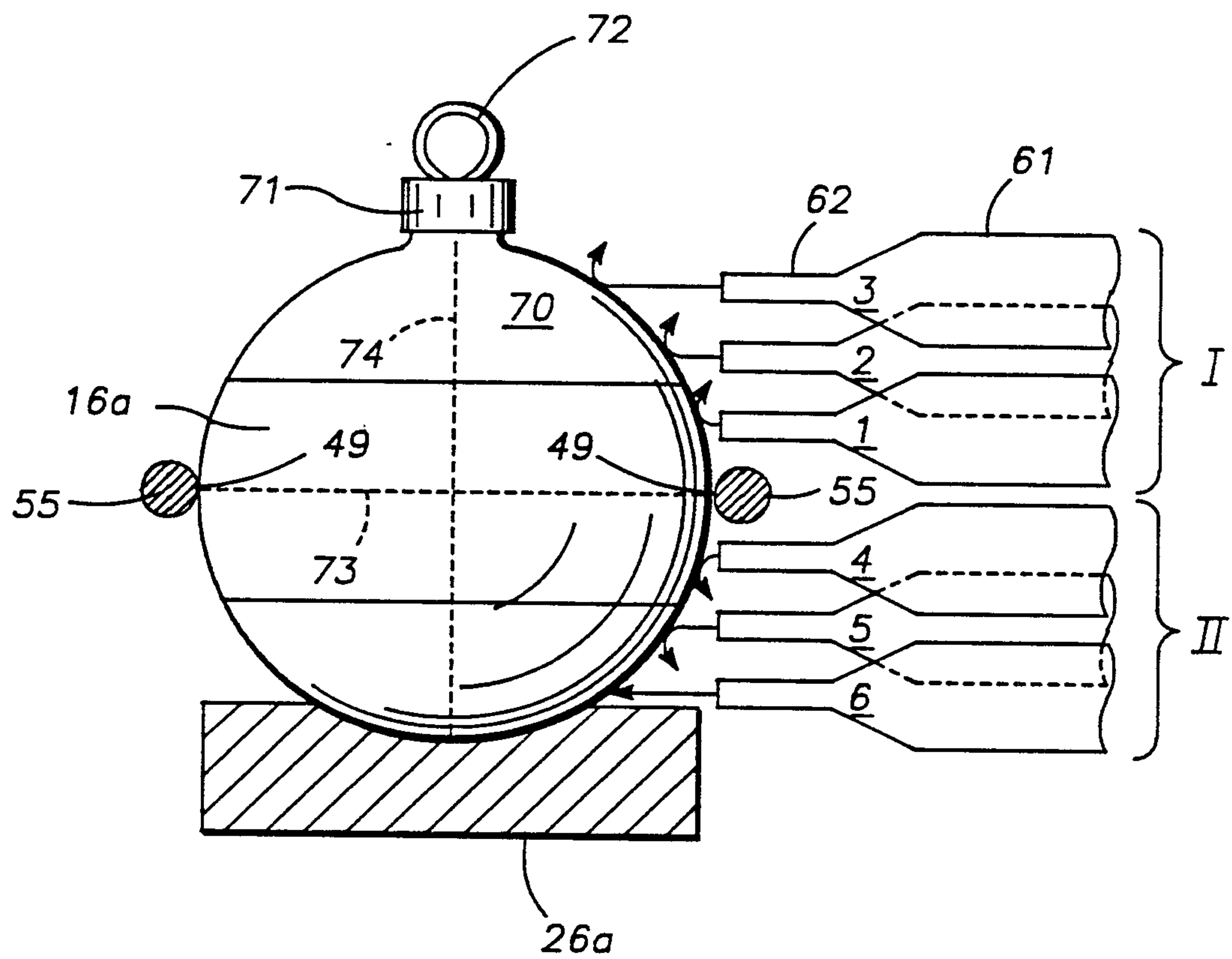


FIG. - 10

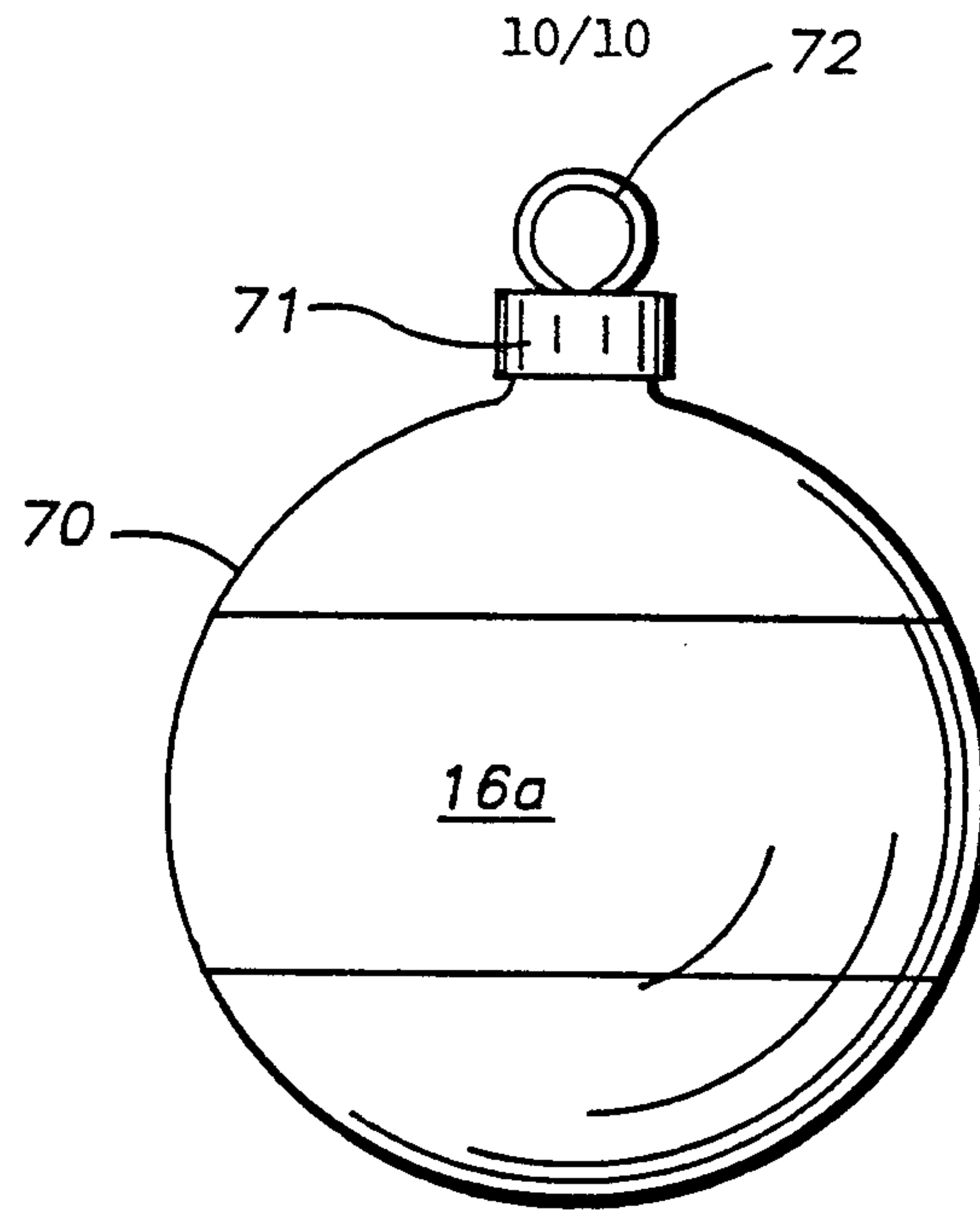


FIG. - 11

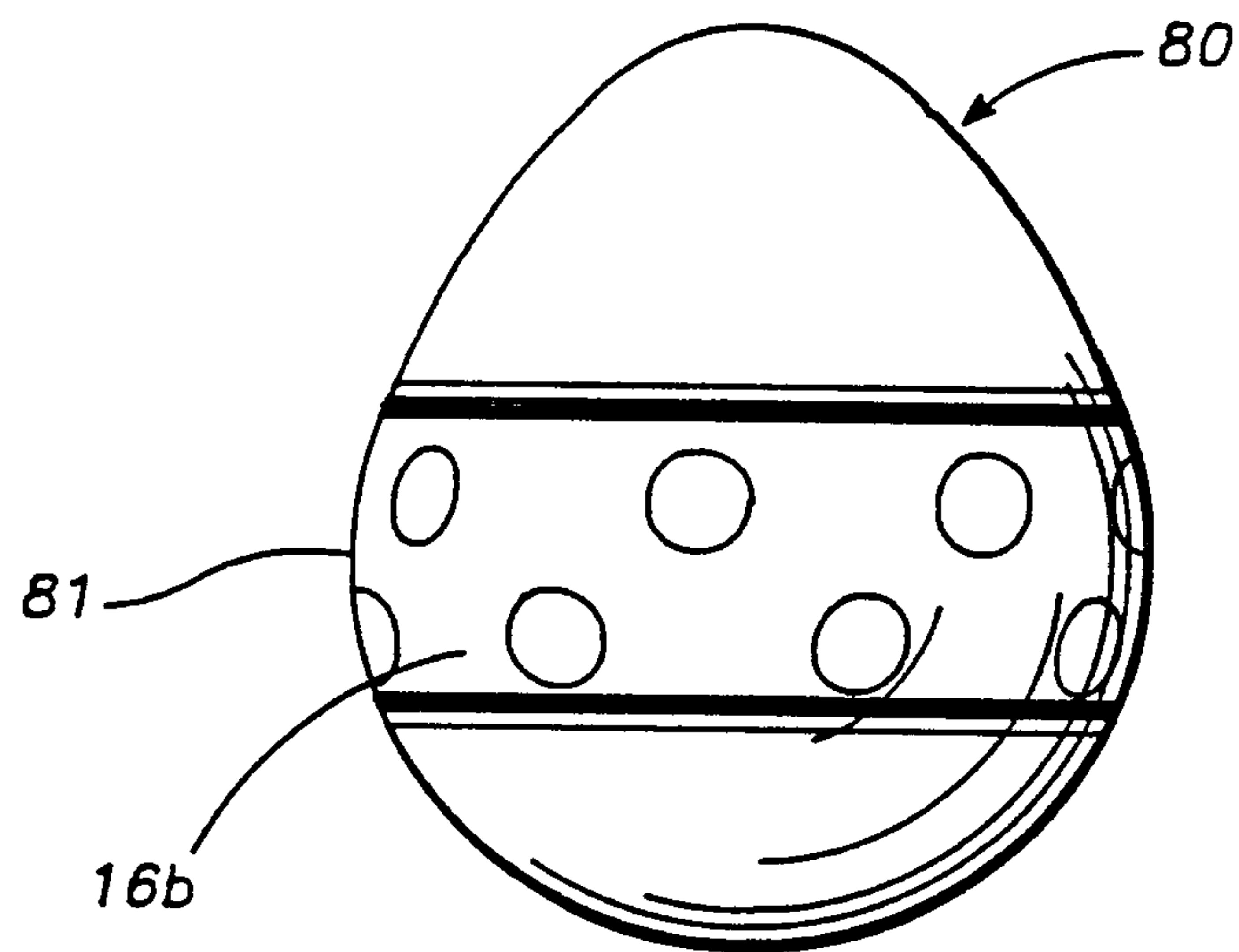


FIG. - 12

