Oct. 20, 1953 J. R. HADEN 2,655,766

DIMPLING APPARATUS AND PROCEDURE FOR HOLLOW PARISONS

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Fig. 1A

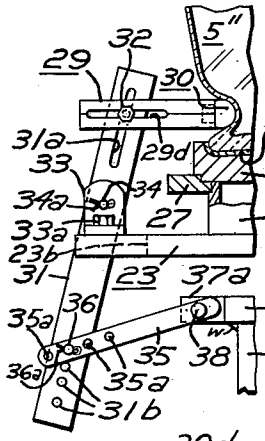


Fig. 1

Fig. 1B

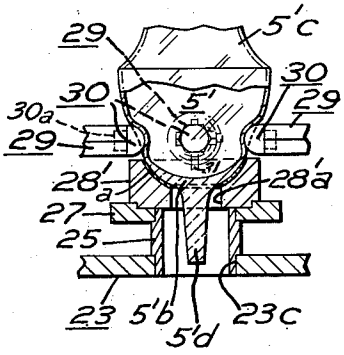
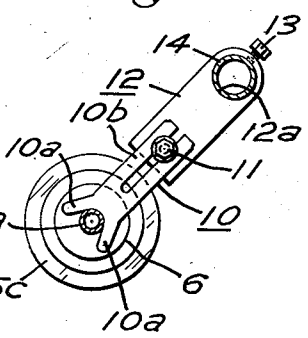


Fig. 2



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Fig. 3

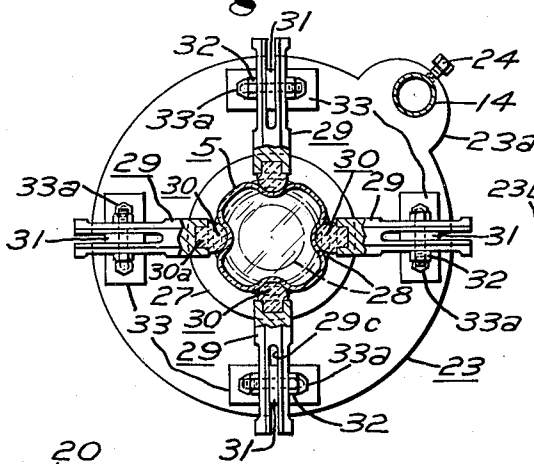


Fig. 4

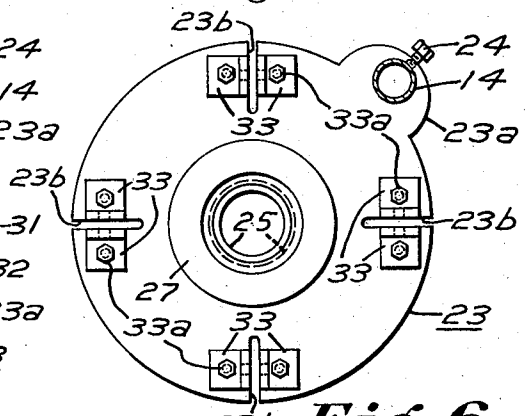


Fig. 5

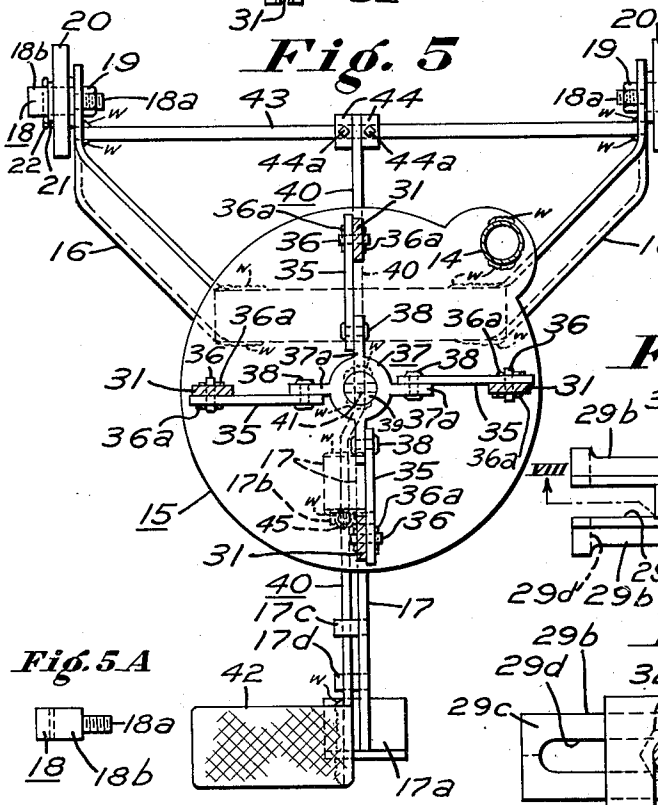


Fig. 6

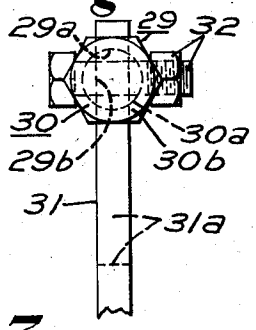


Fig. 5A

Fig. 7

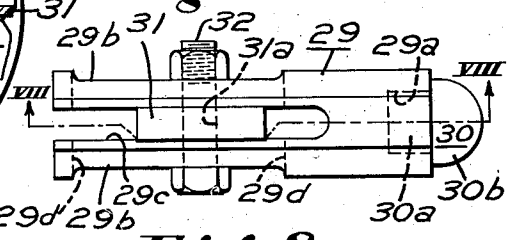


Fig. 8

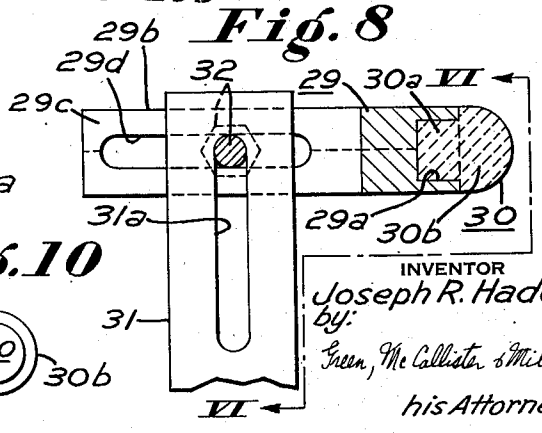


Fig. 9

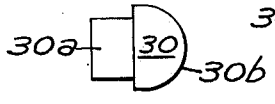
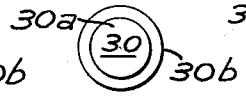


Fig. 10

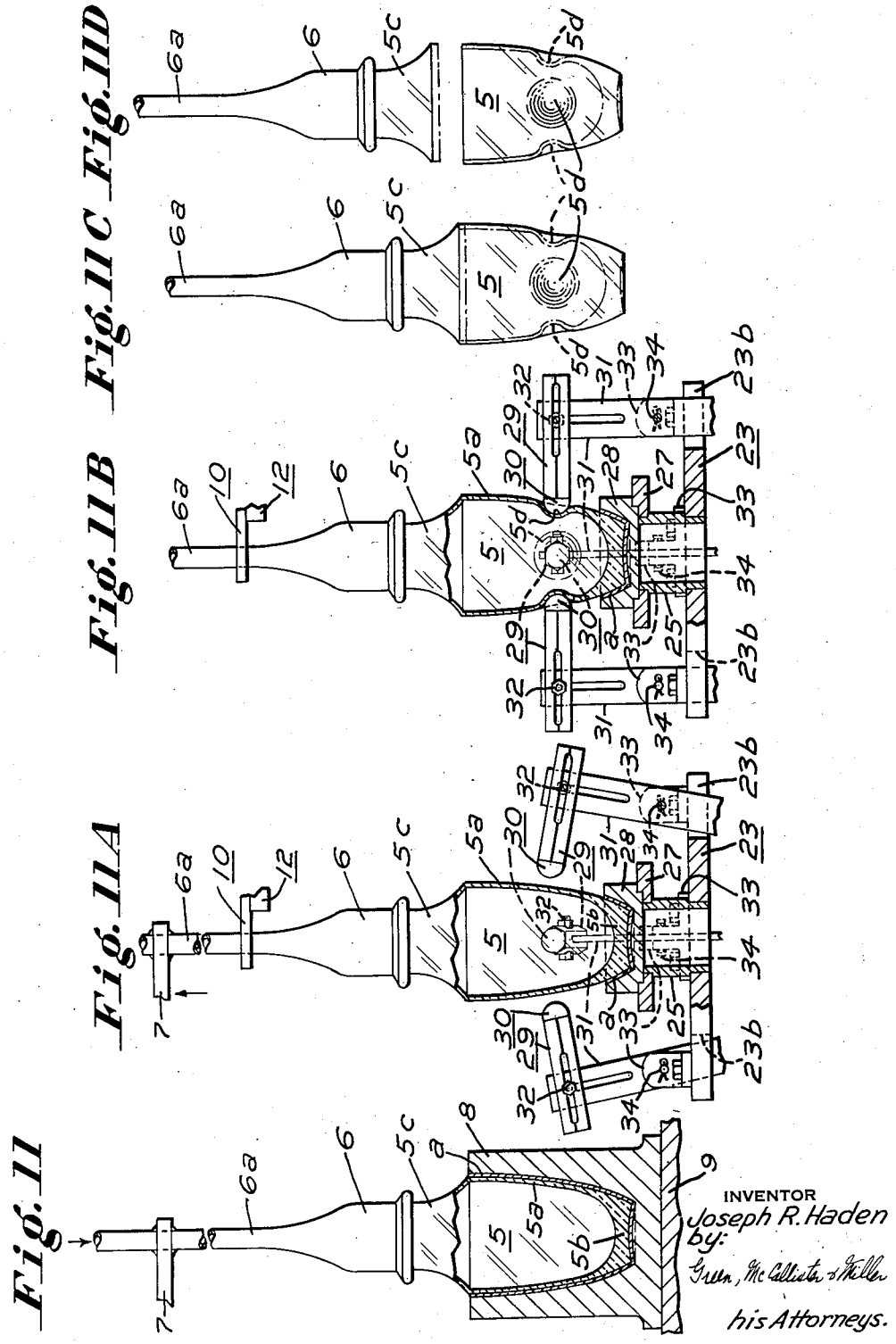


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UNITED STATES PATENT OFFICE

2,655,766

DIMPLING APPARATUS AND PROCEDURE FOR HOLLOW PARISONS

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Application November 7, 1951, Serial No. 255,255

5 Claims. (Cl. 49—22)

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This invention relates to the making of ware in the nature of glassware from vitreous or plastic materials. It relates particularly to the forming of good quality ware provided with dimples or outwardly-concave depressions in its side walls.

Prior to my present invention, it has been difficult to provide so-called pinch effects or dimples that measure up to good quality standards in table or bar ware. At best, the operation has been very expensive, produces many rejects, and has resulted in non-uniform dimples, in a non-uniform spacing of the dimples, and in dimples having a somewhat planar, inwardly-declining, tab-like entry portion that spoils the overall appearance effect and the symmetry of the design. It has been customary to produce such dimples by a hand operation employing a stick. This is time consuming and requires a highly skilled workman to obtain any semblance of accuracy. The danger of objectional distortion of the parison is always present.

If an attempt is made to produce dimples in a mold, a parting seam is also produced (a one-piece mold cannot be used). Thus, my invention pertains essentially to the dimpling of better quality ware such as is formed by a blowing operation effected in a one-piece mold. It should also be noted that accuracy becomes more and more important the smaller the size of the item or article to be provided.

After considerable work in this field, I have discovered a solution to the problem presented and have been able to simultaneously produce accurately spaced dimples of substantially fully symmetrical cone shape about the side walls of ware in such a manner as to substantially eliminate rejects.

An object of my invention has thus been to find a solution of the problem presented.

Another object has been to determine the important factors involved in producing better dimple or pinch effects in glasses, goblets, stemware, etc.

A further object has been to devise procedure and apparatus for carrying out the principles of my invention.

A still further object has been to provide apparatus for simultaneously producing uniform dimples at a series of transversely spaced-apart locations about the wall of an article of ware and without causing undesired distortion or deformation of the ware.

These and many other objects will appear to those skilled in the art from the following description of my invention.

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In the drawings,

Figure 1 is a side view in vertical elevation and partial section showing apparatus of my invention; in this figure, the dot and dash lines show a starting position of dimpling fingers and actuating mechanism therefor, while the full lines show their final (substantially horizontal) position.

Figure 1A is a fragmental view in side elevation and partial section showing operating linkage of the apparatus of Figure 1 adjusted to provide vertically lower indentations or dimples.

Figure 1B is a fragmental view in side elevation and partial section showing a modified form of mold for use in the machine of Figure 1 to adapt it for dimpling a stemware parison.

Figures 2, 3, 4 and 5 are horizontal sections taken, respectively, along the lines II—II, III—III, IV—IV and V—V of Figure 1.

Figure 5A is a detail of studs shown in Figure 5.

Figure 6 is a vertical end elevation taken along the line VI—VI of and on the same scale as Figure 8.

Figure 7 is an enlarged top plan detail of a dimpling finger of the apparatus of Figure 1.

Figure 8 is a side section taken along the line VIII—VIII of and on the same scale as Figure 7.

Figure 9 is an enlarged side elevation showing a carbon tip used with the finger of Figure 7; Figure 10 is an enlarged plug end view in elevation of the carbon tip.

Figures 11 to 11D, inclusive, are somewhat diagrammatic views in vertical elevation (some being in partial section), illustrating operational steps employed in accordance with the principles of my invention.

As shown in Figures 11 to 11D, in carrying out my invention, I first blow-form a parison or half-sham shape **5** having a relatively thinner bowl or side wall portion **5***a*, a relatively heavier or thickened bottom wall end or base portion **5***b* and a moil top portion **5***c*. In this step, see Figure 11, I employ a blow head **6** whose pipe **6***a* is carried by a secured-on swing arm **7**. A unitary blow mold **8** having a paste layer *a* is mounted on a table **9**. When the parison **5** has reached a semi-plastic condition (at about 2000° F. for soda, potash or lead glass), it is transferred by the blow head **6***a* and swing arm **7** to a slip-on, relatively shallow-bottom, positioning mold **28** of an apparatus of my invention, see Figure 11A. It will be noted that mold **28** has a paste layer *a* and that its height is slightly greater than the thickness depth of the base or heel **5***b* of the semi-finished shape or parison **5**. At this time, see

Figures 2 and 11A, the pipe 6a transversely or horizontally enters an open-end alignment slot provided by outwardly-diverging fingers 10a of an adjustable guide arm 10. The pipe 6a rests against a curved base portion of the bifurcated end of the guide arm 10 which provides the fingers 10a. The other end of the arm 10 has an open-end guide slot portion 10b which is engaged by a washer and bolt assembly 11 to adjustably secure it to extend transversely or horizontally-outwardly from a support arm 12. The outer end portion of the support arm 12 is threaded to receive the bolt of the assembly 11 and its other end portion has a bore 12a therethrough to slidably mount it on a vertical tube or upright member 14. A set bolt 13 is employed to lock the arm 12 on the member 14.

It is important that the parison 5 be supported at its upper end by the pipe 6a and at its lower end within the shallow base mold 28 and properly aligned by the guide arm 10, while an upward tension is maintained by the head 6 to both prevent it from sagging into its base portion and from being distorted about its vertical or longitudinal axis. The full weight of the parison 5 is prevented from resting on the mold 28.

In the third step, see Figures 11A and 11B, rounded carbon tip ends 30 of a set of circumferentially spaced-apart dimpling fingers 29 are simultaneously advanced into contact and pressing-in engagement with side wall portions 5a of the parison, while the latter is fully supported in the manner above described. It will be noted that the fingers 29 are arranged to provide diametrically-opposed pairs and that they complete their pressing-in operation on a transverse or horizontal plane that is at right angles or perpendicular to the longitudinal or vertical axis of the parison 5. I have determined that fully symmetrical dimples 5d of cone shape may be thus produced without the old tab-like entry portion of prior procedures. In this connection, it is highly important that the rounded tips 30 of the fingers 29 end or complete their operation on such a plane. In addition, I have discovered that an initial angular contact and partial entry and final withdrawal of the tips 30 is desirable and does not spoil the final or ultimate symmetry of the dimples in the parison 5. It will thus be noted that each tip 30 moves forwardly into the side wall portion 5a on an arc towards the parison and particularly, towards the base or bottom portion 5b of the parison 5 (thus, towards the base mold 28), and that the arc is defined by the tip 30 moving about the pivot point 34.

In Figure 11C, I have shown a dimpled and now substantially cold set parison 5 removed from the apparatus by the blow head 6 and in Figure 11D, I have shown a final step wherein the moil portion 5c is removed or cut off in any conventional manner to provide a finished article.

In Figure 1, I have shown a dimpling apparatus of my invention which has a stationary platform 15 mounted on a pair of outwardly-backwardly inclined rear leg members 16 (see also Figure 5) and an outwardly-forwardly inclined front leg member 17 having a floor foot portion 17a. All the leg members are secured to the platform 15 by weld metal w to provide a standard for the apparatus. Each of the leg members 16 has a stud 18 (see Figure 5A) secured thereon between a nut 19 and a shouldered portion 18b. The nut is mounted on a smaller diameter threaded end portion 18a of the stud. The outer end portion 18b of the stud has an enlarged or shouldered bearing surface to rotatably receive a caster or wheel 20 thereon. The wheel 20 is retained in position by a washer 21 and cotter pin 22. It will thus appear that the dimpling apparatus may be moved to a convenient location by lifting its front leg member 17 off the floor and wheeling it on its back leg members 16.

The vertical upright member 14 at its lower end extends through the table 15 and is secured thereto by weld metal w to project upwardly therefrom. An upper support member or upper mold table 23 (see Figures 1, 3 and 4) has a bore in its offset side portion 23a to slidably receive the upright member 14 on which it is adjustably secured by a set bolt 24.

A sleeve-like mount 25 is removably mortised (see Figures 1 and 1B) about a vertical axis of the upper table 23 and carries a slip-on collar 27 and the slip-on, shallow bottom mold 28. The sleeve-like mount 25 is mortised to not only receive the collar 27, but is mortised to removably fit within an opening 23c through the upper table 23.

In Figure 1B, I have shown a slightly modified bottom mold construction 28' for forming dimples in a stemware parison 5' having a bottom stub 5'd. The slip-on mold 28' is, like the mold 28 of the embodiment of Figure 1, mortised to the collar 27, but additionally has a central bore 28'a to bypass the downwardly projecting stub 5'd of the parison 5'.

As shown in Figures 1, 3, 7 and 8, each dimpling or press finger 29 has an open-end bore 29a in its front end to receive a carbon button-like tip 30. Such a type of tip prevents checking or cracking of the glass which it engages. As shown in Figures 9 and 10, the tip 30 has a cylindrical end 30a that is adapted to be press-fitted into the bore 29a and has a semi-spherical, glass-contact end 30b whose back shoulder portion abuts against the end wall of the finger 29.

Each finger 29 has a backwardly-outwardly extending, bifurcated end portion 29b defining an open-end, vertical slot 29c to receive an upper end of an operating lever arm 31 therein. Each finger 29 also has a horizontal, closed-end slot 29d in each wing of its bifurcated end portion 29b to adjustably receive a bolt and nut assembly 32. The assembly 32 extends through a vertical, closed-end slot 31a in the lever arm 31 and the opposed slots 29d of the finger 29, see Figure 8.

Each operating lever arm 31 extends downwardly through an open-end, slotted portion 23b of the upper table 23 (see Figures 1 and 4) and is pivotally mounted between a pair of mounting ears or brackets 33 by a pivot pin 34 that is held in position by a pair of cotter pins 34a. The bracket ears 33 are mounted on the table 23 by bolts 33a. The lower end of the lever arm 31 has a series of holes 31b in a longitudinally spaced relationship therealong to provide a number of possible operating connection points between the lever arm 31 and a connecting link arm 35. The link arm 35 also has a series of holes 35a therethrough in a spaced relationship longitudinally along its outer end portion for the same purpose. A pivot pin 36 is removably positioned to operatively connect the two arms 31 and 35 by means of a pair of their holes 31b and 35a and is held in position by cotter pins 36a at each of its end portions (see Figure 5).

A centrally positioned clevis or sleeve-like connector 37 has a series of radial lug portions 37a, each of which is pivotally connected to the inner end of one of the link arms 35 by a headed pin

38. The connector 37 fits over and is secured (as by welding) to an upper end of a vertically-extending operating rod member 39 that extends through and is slidably reciprocal within a central opening 15a in the platform or lower (primary) table 15. The lower end portion 39a of the operating rod member 39 is bifurcated to receive an intermediate portion of a strap-like, foot-actuated, lever member 40 and to which it is pivotally connected by a headed pivot pin 41. A foot tread 42 is welded to extend transversely from the front end of the member 40 to move it downwardly about its opposite or back end. As shown in Figures 1 and 5, the back end of the lever member 40 is pivotally mounted on a cross rod 43 and fixed in position thereon by a pair of collars 44 and their set screws 44a. The cross rod 43 is, see Figure 5, welded at its ends within holes in and between the pair of back leg members 16.

A tension spring 45, at its upper end shackled to a stud 17b on the front leg member 17 and at its lower end through a hole 40a in the actuating lever member 40 normally urges the latter upwardly to the dot and dash position of Figure 1 against an upper stud stop 17c that is fixed to and extends from a side of the front leg member 17. A lower stud stop 17d, mounted in a like manner, limits the maximum extension of the spring 45, the maximum actuation of the lever mechanism and thus, the maximum inward movement of the dimpling fingers 29 and their tip ends 30 with respect to side walls of the parison 5. The dot and dash lines of Figure 1 showing the starting and return positions of the apparatus parts while the full lines show their positions at the completion of the inward movement of the tip ends 30. It will be noted that the fingers 29 and their tip ends 30 are on a plane at right angles to the vertical or longitudinal axis of the parison 5 at the completion of such inward movement. This is also true when the point of vertical contact of the tip ends 30 is varied (see Figure 1A) to provide a different horizontal or transverse plane of contact with the sides of the parison 5 or 5'' of Figure 1A.

The type of inward and outward movement of the fingers effects an insetting or dimpling operation that assures an absolute accuracy of the operation (which is essential in smaller sizes of hollow articles such as a whiskey glass) and dimples that are fully symmetrical. The dimples not only give a highly pleasing ornamental effect, but provide positive finger grips for holding the article (which is particularly advantageous when the article bowl or side walls are wet with moisture or any liquid).

It is important that the side walls of the hollow parison 5 be supported with a shape-retaining, but a non-attenuating tension while the dimpling operation is being effected. This is accomplished by resting its bottom on the shallow mold 28 and applying a slight tension to its moil 5c by means of the blow head 6. The weight of the bottom 5b of the parison is sufficient for this purpose. It is also important that the dimpling finger ends 30 move forwardly into and backwardly out of contact with respect to the side walls or bowl portion of the hollow parison at an angle with respect to a transverse plane through the parison that is perpendicular to its longitudinal axis, and that the finger ends complete their inward movement or depression of the localized areas 5d of such side walls in a plane substantially parallel to or on such transverse plane.

What I claim is:

1. In an apparatus for dimpling a side wall portion of a semi-plastic hollow parison of vitreous or plastic material having a support standard and an upper mold table, the combination of, a rod member operatively mounted on the standard to extend upwardly therefrom towards the mold table, a connector secured on an upper end portion of said rod member, links each pivotally mounted at one end on said connector, lever arms pivotally mounted intermediate their opposite end portions on the mold table to extend substantially vertically thereof, lower end portions of said lever arms being pivotally connected to the other ends of said links, dimpling fingers adjustably secured on upper end portions of said lever arms to extend transversely-inwardly therefrom, a base mold mounted on the mold table to receive a base portion of a hollow parison therein, each of said dimpling fingers having a semi-spherical tip to be moved into a side wall portion of the parison when it is positioned on said base mold, said dimpling fingers being secured on said lever arms to move forwardly in an arcuate path towards said base mold into the side wall portion of the parison supported thereby to a final dimpling position with respect to the side wall portion of the parison, and means for actuating said rod member and said dimpling fingers through said links and lever arms to move said tip into and out of the side wall portion of the parison.

2. In making an improved hollow dimpled article of vitreous or plastic material by utilizing a pressure finger having a semi-spherical tipped end and wherein the material has the characteristic of becoming plastic under heat application thereto, a method of the character shown and described which comprises, providing a hollow parison of the material in a hot semi-plastic condition, supporting the parison with its side wall under a positive shape-retaining tension and with its base wall within a base mold while forming a symmetrical and uniformly depressed area of limited extent in the side wall of the hot parison by: moving the tipped end of the pressure finger transversely-inwardly along an arc towards the longitudinal axis of the parison and into point contact with the side wall thereof, advancing the tipped end inwardly along such arc from the contact point and expanding the contact point into a relatively small depressed and substantially symmetrical contacted area about the tipped end, terminating such inward advance with the longitudinal axis of the tipped end at right angles to the longitudinal axis of the parison, and withdrawing the tipped end backwardly along such arc and out of contact with the side wall without deforming the relatively small and substantially symmetrically depressed area therein.

3. A method as defined in claim 2 wherein a pair of diametrically-opposed pressure fingers having tipped ends of the construction set forth are simultaneously moved inwardly and advanced and withdrawn in the defined manner, and a pair of symmetrical and uniformly depressed areas of limited extent are simultaneously formed within the opposite portions of the side wall of the parison.

4. A method as defined in claim 2 wherein a hollow parison having a relatively thin side wall and a thickened base wall is provided and the

tipped end is moved into point contact with the relatively thin side wall and advanced along the arc in a direction towards the thickened base wall thereof.

5. In an apparatus of the character shown and described for making depressed substantially symmetrical dimples of limited area without tab-like entry portions in a side wall of a hot semi-plastic hollow parison of vitreous or plastic material which apparatus has a base mold to receive a base wall of the parison, the combination of means to vertically support the parison along its longitudinal axis with its side wall under a positive shape-retaining tension and with its base wall positioned within the mold, at least one pressure finger having a semi-spherical tipped end, an actuating arm operatively connected to said finger and having means holding it in a primary position at which it supports said finger with its tipped end out of contact with and extending in a transversely-inclined plane towards the side wall of the parison, said actuating arm having means substantially limiting its advance to a secondary position at which it supports said pressure finger with its tipped end pressed within the side wall of the parison and on a transverse plane that is at right angles to the longitudinal axis of the parison, means operatively connected to said actuating arm and advancing said arm from its primary to its secondary position to move the tipped end of said pressure finger transversely-inwardly along an arc towards the longitudinal axis of the parison into point contact with its side wall and along the arc from the contact point into a relatively small depressed and substantially symmetrical area within the side wall, and said holding means withdrawing said actuating arm outwardly from its secondary to its primary position to move the tipped end of said finger transversely outwardly along the arc and out of the depressed area within the side wall of the parison without deforming the relatively small depressed and substantially symmetrical area therein.

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