Sept. 6, 1966 E. J. J. BENARD 3,271,123

METHOD OF MAKING HOLLOW GLASSWARE WITH A STEM AND A FOOT

Filed March 26, 1963 2 Sheets-Sheet 1

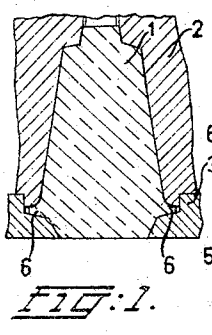

FIG. 1.

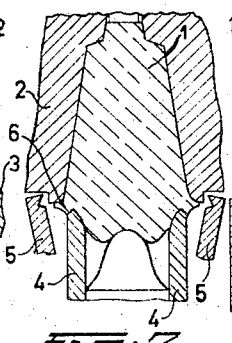

FIG. 2.

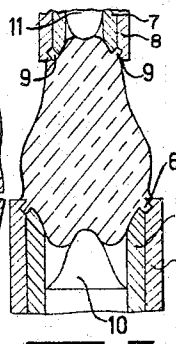

FIG. 3.

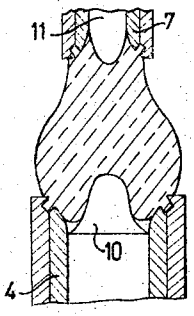

FIG. 4.

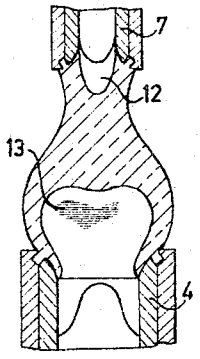

FIG. 5.

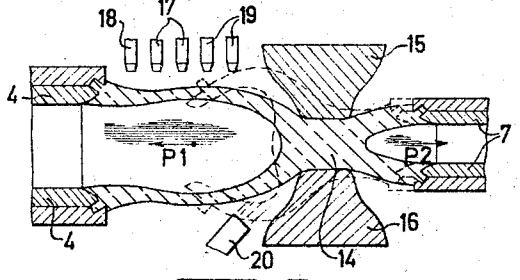

FIG. 6.

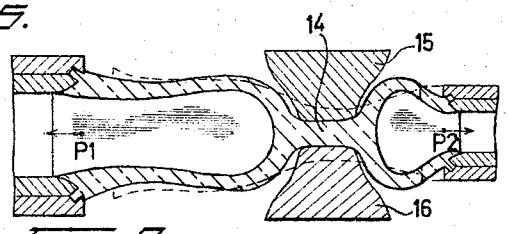

FIG. 7.

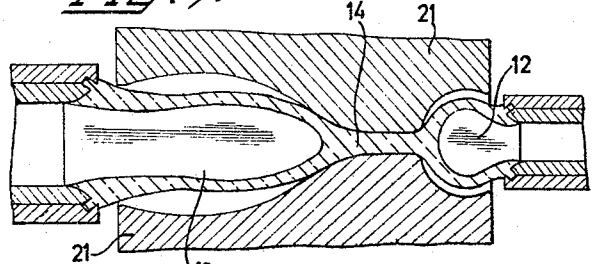

FIG. 8.

INVENTOR.
EMIL J. J. BENARD
BY
ATTORNEY

Sept. 6, 1966 E. J. J. BENARD 3,271,123

METHOD OF MAKING HOLLOW GLASSWARE WITH A STEM AND A FOOT

Filed March 26, 1963 2 Sheets-Sheet 2

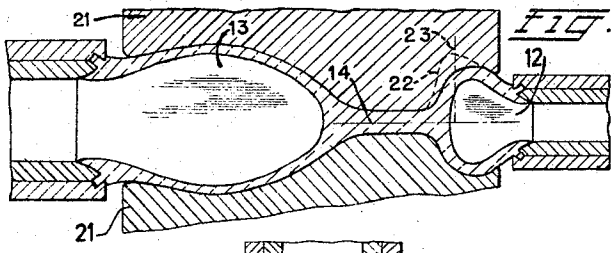

FIG. 9.

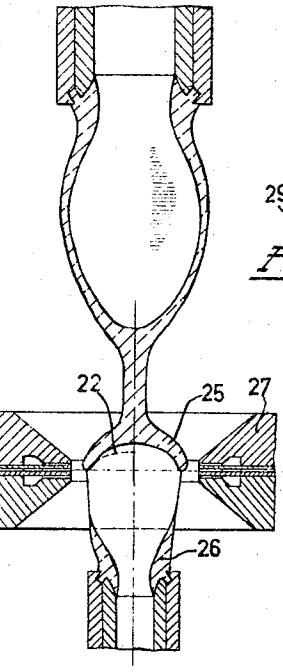

FIG. 10

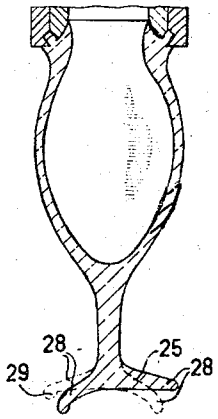

FIG. 11

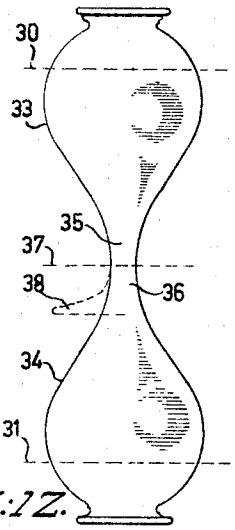

FIG. 12.

INVENTOR.
EMIL J. J. BENARD
BY
ATTORNEY

United States Patent Office 3,271,123 Patented Sept. 6, 1966

3,271,123

METHOD OF MAKING HOLLOW GLASSWARE WITH A STEM AND A FOOT

Emil Jan Johan Benard, Leerdam, Netherlands, assignor to N.V. Vereenigde Glasfabrieken (United Glassworks), Schredam, Netherlands, a limited-liability company of the Netherlands

Filed Mar. 26, 1963, Ser. No. 268,017
Claims priority, application Netherlands, Mar. 28, 1962, 276,533
3 Claims. (Cl. 65—80)

This invention relates to a method of making hollow glassware with a stem and a foot, and particularly to making such articles by mechanical means.

Heretofore in the production of thin-walled stemmed and footed glassware, such as goblets or the like, it has been possible to make bowls of high quality by blowing out a part of a preformed blank in a blowing mould. A difficulty resides however in making good quality stems and feet.

In the known method of pressing the stem and the foot against the blown bowl the general disadvantages connected with pressing are experienced, such as, the appearance of a seam on the surface, due to the fact that, when one does not wish to be restricted as to the design of the article, a two-part press mould must be used.

The known method of providing a blank with a very heavy lower end, drawing this downwardly by means of a number of rollers rotatable about a radial axis, to form the stem and forcing its extremity into a foot mould, has the disadvantage of lack of complete control as regards all parts of the article.

The primary object of this invention is to provide a method for making stemmed and footed hollow glassware by mechanical means wherein the result obtained is uniform, while the quality of the stem and the foot as well as the bowl measures up to a very high standard.

It is another object of the invention to provide such a method which is simple, and which has a sufficiently high production rate so as to keep the costs low.

Preferred embodiments of the invention are shown in the accompanying drawings wherein similar reference characters designate corresponding parts, all figures representing in outline axial sectional views of the glass body and showing the operative means applied thereto.

FIGURE 1 shows a blank in a mould.

FIGURE 2 illustrates the engagement of one end of the blank by a blowing head.

FIGURE 3 shows the blank removed from the mould and engaged by a second blowing head at the other end.

FIGURE 4 illustrates the forming of impressions in both ends of the blank by means of a pressing cone.

FIGURE 5 shows the first phase of inflation.

FIGURE 6 illustrates a next phase in which, after the blowing heads and the intermediate article have been positioned horizontally, the stretching and the shaping of the stem is initiated.

FIGURE 7 shows a subsequent phase of this treatment.

FIGURE 8 shows a further phase of the treatment in a blowing mould.

FIGURE 9 shows the final phase in the blowing mould.

FIGURE 10 illustrates a further treatment of the foot.

FIGURE 11 shows the finishing of the foot.

FIGURE 12 shows diagrammatically another example of articles which can be manufactured with the method according to the invention.

In FIGURE 1 a blank **1** has been taken up in a first mould **2**. The glass item **1** can be sucked into the mould **2** or supplied by a so-called "feeder system."

A ring **3** is disposed against the lower end of the mould **2**. Between mould **2** and lower ring **3** an annular rim

6 is formed on the blank **1**. In FIGURE 2 the lower ring **3** is removed from the first mould and is replaced by a blowing head, in the form of a vertical hollow spindle **4**. The gripping rim **6** formed on the blank **1** is seized by grippers **5** disposed on the spindle **4**, while the mould **2** is removed, as is shown in FIGURE 3. In this figure the blank **1** is transferred to the spindle **4, 5** and now from above a similar hollow spindle **7, 8** is positioned with its axis aligned with the axis of spindle **4, 5** and seizes the upper end of the blank, by means of grippers **8**, thereby forming a rim **9** on the blank **1**. Subsequently both spindles **4, 5** and **7, 8** are synchronously rotated. The mass of glass is continuously rotated in this way during the first treatment. Pressing cones **10** and **11** disposed inside the hollow spindles **4** and **7** are advanced through these spindles, to form initial impressions in the opposite ends of the mass of glass, as shown on FIGURES 3 and 4. The hollow spindles **4** and **7** are further used for the supply of blast air.

So far the preferred embodiment has been described. Other known methods of preforming the blank and blowing it, may be applied, the essence being that a blank is provided with two opposite impressions which subsequently are blown out.

As shown on FIGURE 5 a first inflation of the impressions formed by the pressing cones **10** and **11** is effected in a first blowing operation, so that the cavities **12** and **13** are formed.

The spindles with the glass article held between them are now swung into a horizontal position so as to position the glass article as indicated by dotted lines on FIGURE 6.

Stretching of the mass of glass is effected by longitudinal movement of the spindles **4, 7**, in the directions of the arrows P_1 and P_2, whereby the formation of the stem portion **14** is initiated by means of laterally supplied means, like stem tongs, indicated by the elements **15** and **16**. During such stretching of the glass mass, the viscosity of the glass is locally regulated, for example, by small blow pipes **17** and burners **18, 19, 20**. Only one of each of the blow pipes and burners is represented, but in reality a ring of such blow pipes and annular burners are arranged around the respective portions of the glass moulding, and the locations and directions of the ring of blow pipes and annular burners may be different from those represented diagrammatically in FIGURE 6.

FIGURE 7 shows, that after the initial inflation of the ends, as in FIGURE 5, and during the period of stretching and the formation of the stem portion **14**, a further inflation of the ends can be effected prior to the blowing out into the final shape of the cavities **12** and **13** in a blowing mould **21**, as shown on FIGURE 8. On inserting the blank in the blowing mould **21** a further stretching is effected, the dimensions of the cavities in the blowing mould in relation to the shape of the moulding, obtained by the previous treatment, being chosen in such a way that little or no clenching of the glass mass occurs.

FIG. 9 shows in full lines the shape after final blowing for the manufacture of a goblet with stem and foot, while dotted lines **22** indicate one of numerous possible modifications of the shape of cavity **12**. When the mould cavity has the shape indicated by dotted lines **22** the eventual melting off of the foot portion will take place along the dotted line **23**, contrary to the further treatment as described below. Also for the bowl **13** and the stem **14** all kinds of shapes are possible

FIGURE 10 shows the melting off of the moil **26** or waste glass from the foot **25** while the spindle **4** still supports the goblet or chalice. The moil **26** of the foot **25** is melted off by an annular burner **27**. This figure also shows by dotted lines **22** the different shape of foot,

which in FIG. 9 was indicated in a corresponding way.

With the shape of foot **25** as represented in FIG. 10 a further treatment is required, as shown on FIGURE 11. During such further treatment, the foot edge **28** is pushed upwardly into a position represented in full lines at the right. Subsequently the edge can be burnt in, whereby a bead is formed as is indicated in broken lines at **29** at the left in FIGURE 11. The melting off of the moil of the bowl of the goblet can be effected in a corresponding way.

Melting off and burning in can also take place after conveyance of the article to a machine specially devised therefor.

In the manner described above hollow glassware with a stem and a foot can be manufactured in a single piece in a very simple way, offering complete control of the shape, thickness and surface properties of all parts of the product.

FIGURE 12 represents the case in which the end portions of the blank are both inflated to form bowls **33** and **34**, and the central portion of the blank is rolled and stretched so as to form a stem portion of double length. This product after having been manufactured as described above is finished by severing the stem portion in the plane **37**, thus leaving stem sections **35** and **36** on the bowls **33** and **34**. Thereupon a separately made foot is welded to each of these stem sections **35**, **36**, as is indicated, for the stem section **35** of bowl **33** by the foot **38**, represented by a dotted line.

In the method illustrated by FIGURE 12, the eventual chalice is not produced without the formation of a weld, but with the mechanical operation described, two chalices without a foot are obtained at one time, whereby a particularly great production can be achieved with rather simple means. At the same time the general advantage of the new method can be attained in that various possibilities for the shaping of the stem become available, such as, a so called "drawn stem" or a stem with annular thickenings, and such stems are of a very high quality.

What I claim is:

1. A machine performed process for manufacturing hollow glassware with a stem and a foot, comprising

pressing a preformed blank to form impressions in the upper and lower ends of the blank, seizing the upper and lower ends of the blank and rotating the latter about a vertical axis while air is simultaneously blown into both of said impressions to initially inflate the end portions of the blank and have a solid intermediate portion therebetween, turning the blank to dispose its axis horizontally, pulling the opposite ends of the horizontally disposed blank in directions away from each other while simultaneously rolling the solid intermediate portion of the blank to form a stem therefrom and blowing air into the end portions for further inflating the latter, positioning the blank in a blowing mould, and blowing air into the further inflated end portions to effect final inflation of the latter to the shape of the blowing mould.

2. The process as in claim **1**; wherein the finally inflated end portions of the blank have moils thereon, and further comprising the steps of removing said moils from the finally inflated end portions of the blank to form a hollow bowl and a foot forming section with said stem therebetween, and finally shaping said foot forming section.

3. The process as in claim **1**; further comprising the steps of cutting said stem at the middle of the latter to form, from each blank, two hollow bowls each with an integral stem section extending therefrom, and attaching separately formed feet to the ends of said stem sections remote from the associated bowls.

References Cited by the Examiner

UNITED STATES PATENTS

1,127,381	2/1915	Byrnes	65—80
1,618,747	2/1927	Bartlett	65—80
2,082,695	6/1937	Garwood	65—79
3,071,946	1/1963	Watson et al.	65—78

FOREIGN PATENTS

664,056	8/1938	Germany.

DONALL H. SYLVESTER, *Primary Examiner.*

F. W. MIGA, *Assistant Examiner.*