A PRIMER ON MOLD SEAMS

by Dr. Julian Harrison, Toulouse

PART 1

AUTHOR'S NOTE: This discussion is primarily concerned with glass in the form of a container. The object is to enable the bottle collector to ascertain the general mold type used to make his bottle, and form it to supplement other knowledge by reasonable guesses as to the period of time within which his bottle might have been made.

The several mold replicas pictured are based on publications by certain nineteenth century writers, modified by the author so that they would all produce the same bottle shape for direct comparison.

Mr. Alex Kerr arranged to have the wood turning done at the Santa Ana plant of the Kerr Glass Company. The author shaped and fitted the hinges, pins, dowels, stops and carvings; made the final assembly; and painted the molds. Black was used on the sides which went together to form seams; silver was used for the highly polished glass contacting surfaces; and gray was

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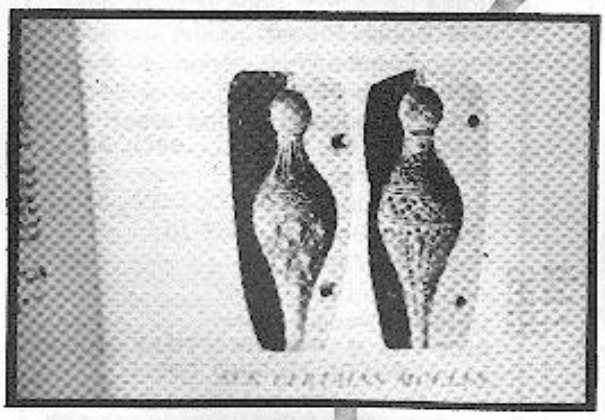

Figure 2. Four part molds of stone, from early Islamic period. Use for glass open to proof. From: Journal of Glass Studies, The Corning Museum of Glass. P. 55, Vol. I, 1959. Sur Certains Moules, Trouves A Milet *by Henri Seyrig*

Figure 1. Mold seams in first century A.D. Sidonian Glass. Three-part mold. Note heavy seam in neck, traceable vertically. Signed: ENNIWN ETTOIEI *(Ennion made it). Photo courtesy of The Corning Museum of Glass. One of three known bottles from this mold.*

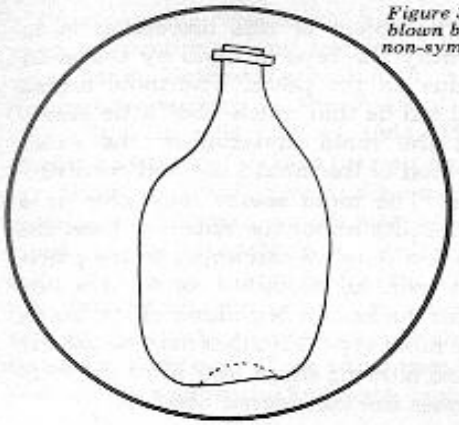

Figure 3. The completely free-blown bottle will have areas of non-symmetry, and no mold seams.

Figure 4. Replica of tapered dip mold from the author's set.

used on the rest to represent normal cast iron. Black was also used on supporting members not normally part of a mold.

While in general they are both seams, the glass making fraternity usually refers to the vertical junctures between matching mold halves, as seams, but horizontal junctures, as between non-matching mold elements, as parting lines. Thus "neck ring seams" would refer only to the vertical seams at the neck ring area, while "neck ring parting lines" would refer to the juncture between the neck ring and the body mold, or the neck ring and the collar above it.

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No matter how carefully molds are made, the junction of two separate pieces (often called 'parts') of the composite mold leaves a mark on the surface of the glass piece that is blown within it. The marks of repairs, such as the peening of a mis-cut or unwanted letter or element of decoration, are examples of the faithfulness with which hot glass will mirror the surface condition of the metal. Even a deep scratch in the mold may show on the surface of the glass, and metal scale, or oxides of iron formed in use from the repeated heatings and coolings, and only a few thousandths of an inch thick, can leave visible marks. The double seam, when machine made bottles may have been made using both a seamed blank mold, and a seamed finishing mold, is another example of the impression of a discontinuity on the glass piece. In hand blowing, the momentary touching of the parison to the lettered bottom, then lifting it for better adjustment, leaves an impression as a ghostly set of letters beside the wanted ones.

The cyclic heating of the mold, followed by cooling each time a bottle is blown, and the unavoidable unevenness in temperature at the edges of the mold (seams) warps the mold ever so little but enough to disturb alignment and alter the gap between mold parts. This repeats every time a bottle is blown, and much of this alteration takes place while the hot bottle is within the mold and is being expanded into final shape. Finally, the glass maker depends in part, and with other 'vents', upon the small distance between iron faces as an air exit. If the air within the mold cannot escape ahead of the 'balloon' of glass advancing toward it a pressure will build up and prevent the glass from reaching the mold wall in some area. This causes a condition called 'not blown up", and the bottle shape departs from that wanted.

Thus, what the glass maker calls seams or parting lines on the mold, and seams on the glass, is an inevitable result of the necessary use of separate mold parts.

By discovering the position and the extent of mold seams as marked on the glass surface (and there also called 'seams') one may surmise much about the molds used to make a particular piece of glassware, no matter how old. In this study we are concerned chiefly with hand blowing of bottles, more especially in the nineteenth century. The reasoning will apply equally well to other years, and to art and table glassware as well.

Molds are Centuries Old

When the blowpipe came into use some twenty centuries ago, man was already familiar with the use of molds. In the sense that it was a fixed form or shape, the sand core about which the ancients wound threads of glass as early as forty centuries ago, then followed by fusing the threads together by heat, and finally digging out the sand core, was a mold of an internal sort. It had no seams. The shallow bowls that they formed by placing bits of broken glass and powdered glass on the surface of an open, bowl-shaped, and necessarily shallow mold, usually cut and carved with a design on that surface, then heating the glass to fusion, was another use of a mold that left no seam.

It can be argued that their use predisposed man to the use of molds for shaping glass, so that the introduction of the blowpipe (said to be about the middle of the first century B.C.) could have been first for the blowing of glass into shapes determined by molds, rather than for free-hand blowing which would have taken time to determine as a technique, both as to the manipulation and as to the auxiliary tools.

Be it as it may, the use of the external mold introduced a new problem, with a difficulty all its own—how to get the piece out of the mold. The mold had to be with separating, and matching, parts. Man soon solved this problem to some extent by making the mold in parts keyed together with dowels. By the end of the first century A.D. he was using two, three, four and even six part molds — having so many separating leaves whose composite made the completed shape of the glass piece.

Figue 1, by courtesy of The Corning Museum of Glass, is of a piece signed by the Sidonian, ENNION, known to have made glass in the first century, A.D., and is one of at least three pieces from the same mold. Note the seam in the neck, traceable down the side. It was blown in a three part mold.

How do we know it was a three part mold, and how do we know others to have been blown in two part, four part, and six part molds? Because we are able to find that number of mold seams on the glass surface.

The object of this discussion is to identify the type of mold by the mold seams on the piece. The mold seams will tell us that much—but little else—not the mold material or the exact method of the mold's use and construction. The mold seams may give us a generality about the date—at least the *earliest* date we can apply to the piece, but with no certainty as to how late after the known beginning of the use of the mold type. Methods may be used in hand blowing shops long after the techniques are considered obsolete.

Figure 5. Bottles from a tapered dip mold will have no seams unless caused by a slight 'blow-over' at the base of the shoulder, or widest point. This is shown by the dotted lines.

We cannot tell if the molds were hinged, or of what material they were made, so far as the seams of the bottles are considered. Wooden molds intended to define the final shape would have quickly burned away, or became so charred in use that any designs would have become progressively dimmer. Successive pieces would have become larger in dimensions. (The possibility that pieces were annealed in the mold would have ruled out wood.) If the glass vessel were heavy walled, holding a considerable amount of heat, the wood would have charred most rapidly, and fewer pieces would have been possible than with thin walled pieces. This does not preclude the use of wood for 'turn-mold' bottles, where no lettering is involved, nor as preliminary shaping tools prior to further blowing free-form. It does mean that sharp lettering and design, and the use of wood molds, are not compatable.

Ceramic and clay molds have been used for centuries, and are still being used. M. A. Bezborodov and A. A. Abdurazakov. writing in the *Journal of Glass Studies,* p. 64, Vol. VI, 1964 (The Corning Museum Of Glass) report finding three scorched clay molds, made with relief patterns, found with other glass making artifacts in a third century, A.D. glass plant in Russia. The ease with which bronze could have been remelted, to make other molds or other things as a salvage of its value, would account for failure to find such molds today.

Figure 6. The turn-mold bottle will have no mold seams, but may have horizontal score-marks from an uneven mold surface.

Stone may have been used. One small group of stone molds, which may or may not have been used for glass blowing, is known. They are shown in *Figure 2,* taken from Vol. I, p. 55, 1959, of the *Journal of Glass Studies* "Sur Certaines Moules Trouves A Milet" by Henri Seyrig. Each mold appeared to have been made with four leaves, or separating parts, keyed for register by lead dowels or plugs. There is no indication of any hinging or other method of holding the parts in either an open or a closed position. Although use for glass blowing or casting is but one guess, the stone was a type that would resist the action of moderate heat.

It is not known whether these ancient glass blowers arranged to "quick-open" the mold in order to transfer the piece alone to the lehr, or whether they annealed the piece while still in the mold.

During the growth of technology during the past two or three hundred years, and the more recent acceleration, many types of molds have been developed. One product of change was the way in which the molds opened—especially in respect to the place of hinging. Each type left a characteristic, though different, seam pattern on the resulting glass. Usually the presence of a seam in a specific area of the bottle, regardless of the more common seams in other areas, is an indication of the kind of mold-part separation.

In this discussion, therefore, we will dwell upon the seam positions that are different for each type of mold design, together with a suitable name for the mold. The illustrations will be, in part, by photographs of the author's replicas of nineteenth century mold designs. Bottle outlines, with exaggerated mold seams will illustrate the positions of the characteristic seams.

1. Bottles Without Mold Seams

a. Free Blown Without Molds.

Off-hand, or free-blown, bottles are initially blown as the "natural" almost globular shape that glass assumes because of surface tension when the gather is inflated free from any restraint save the necessary attachment to the blowpipe. Modification of this shape may come through tooling and the manipulation of the blowpipe during the blowing process, and by the forming of the 'push-up' or 'kick-up' to provide it with a plane bearing surface on which to stand. The height may be made tall by swinging the blowpipe to allow centrifugal force to stretch out the gather, or made short by holding the blowpipe in a vertical position with the gather at the top so that gravity can compress the pattern. Additional effects are obtained by rolling in the glassmaker's 'block' or by marvering or rolling on the stone or metal flat surface known as the 'marvre'. The many tools that the glassmaker has developed over the years all could be brought to make further modifications.

Squeezing the bottle between two paddles, or by resting opposite sides briefly on the marvre produce the 'chestnut' shape—left alone or with a long neck, it would be called a 'calabash'. The gather could be pressed into a dip mold having an incised design,

before blowing or at a stage of partial blowing, in order to impart a pattern to the surface of the gather before the final blowing without the benefit of restraint of a mold.

Free blown bottles differ to some degree from each other even when made by the same workman. Their common similarity, to this discussion's interest, is that they have no seams. *Figure 3* illustrates with a little exaggeration the lack of symmetry that is one indication of a free blown bottle.

There is nothing about the fact that there are no seams that will give us a useful date. (Other conditions and logic may do this.) Free blown bottles were being made almost a score of centuries ago—they are being made today.

b. Dip Mold Body—Free Blown Shoulder.

Bottles otherwise free blown may have been modified by one restraint—the use of a 'solid' or one-piece *dip mold,* tapered with the small diameter near the bottom of the bottle, and with a straight taper to the widest point at the open top of the mold, at the base of what will be the curve into the shoulder. When the bottle being blown nearly fills the dip mold, the blowing pressure is reduced as the blowpipe is carefully lifted in order to draw up the shoulder. When this is shaped to the satisfaction of the blower he stops blowing and carefully lifts the bottle out of the tapered mold. He transfers the bottle to a pontil or snap and completes the shaping of the finish at that part which had hitherto been attached to the blowpipe.

Thus the bottle body will be closely constant in dimension while the shoulder slope and the height will vary. The action of pressing the hot-glass tipped pontil against the bottom both to adhere it and to form the push-up, as well as setting the hot bottle upright, both contribute o a common bell-bottom appearance. *Figure 4* illustrates the dip mold in my set, and *figure 5* is drawn to show only the possibility of a mark around the middle, as defined by the top of the dip mold, when the glass might be blown with a slight 'blow-over'.

The fact that the tapered mold-blown bottles, hitherto regarded as free blown, were actually blown in a dip mold has also been recently advanced by James F. Shaffer, II, writing under the title: "Free Blown Bottles" in the June, 1969, *Western Collector*. Shaffer's argument agrees with those I have often expressed—that the smooth tapers and wrinkle-free surfaces of such bottles could not have been produced on the marvering table. It is quite a different thing to roll a relatively cool bottle on the table than the relatively hot gather. It is quite different as to the rest of the shape than rolling a blown cylinder on the half cylinder block. From other considerations it would appear that the mold used for many 18th century wine bottles was a dip mold.

Shaffer adds a missing proof, in that he has found such bottles with a line similar to a mold seam line around the point of widest diameter. Such a line could be produced by a slight 'blow-over' during the blowing operations if the glass blower had continued the glass blowing over-long. It would have bulged the glass over the top edge of the mold—a tight belt around the waist would be a good comparison. Even if the glass were then drawn up in shaping the crease would persist.

The employment of the dip mold was greatly aided by a phenomenon that aids the blowing of many types of glassware—the fact that a piece will blow 'from the bottom upward'. What is meant is that since the glass is hottest on the blowpipe away from the cooling effect of contact with the blowpipe, the end of the parison away from the blowpipe begins to swell first when blowing starts, and a ball will form at the *end* of the parison. This is at the bottom when the blowpipe is held vertically over, and into, the mold. The ball swells outwardly until it meets the restraint of the mold wall and becomes fixed in shape at the point of contact. The bubble then enlarges progressively higher in the mold as a sort of rolling motion. The glass blower can watch the progress of expansion as he blows the piece in the open top mold, and diminish his effort as the bubble approaches the top of the mold.

Open top molds (either dip molds or shoulder height hinged or keyed molds when the ware was lettered or highly decorated) were among the earliest of molds. Molds of this description were used in the first century, A.D., at Sidon.

The art seems to have been forgotten for many years. Of particular importance to the bottle collector, the use of the tapered dip mold seems to have been a transition between the bulb and onion shaped bottles of the 16th and 17th centuries, to the tall shapes with dip mold bodies and sectional mold shoulders of the late 19th century. Traditionally the wine bottle is not lettered —pragmatically the wine bottle could not be lettered so long as it was blown in the 'solid' tapered dip mold.

Turn mold bottles were blown in molds which had a special surface treatment for those surfaces contacting glass. This surface was generally wetted between each blowing. The water flashed into steam as the hot glass contacted it, so that the bottle 'rode' on a cushion of steam. This facilitated the rotation and it gave the bottle a high polish.

The surface was covered with a 'paste' of an organic fiber, even sawdust, in a binder that was evaporated

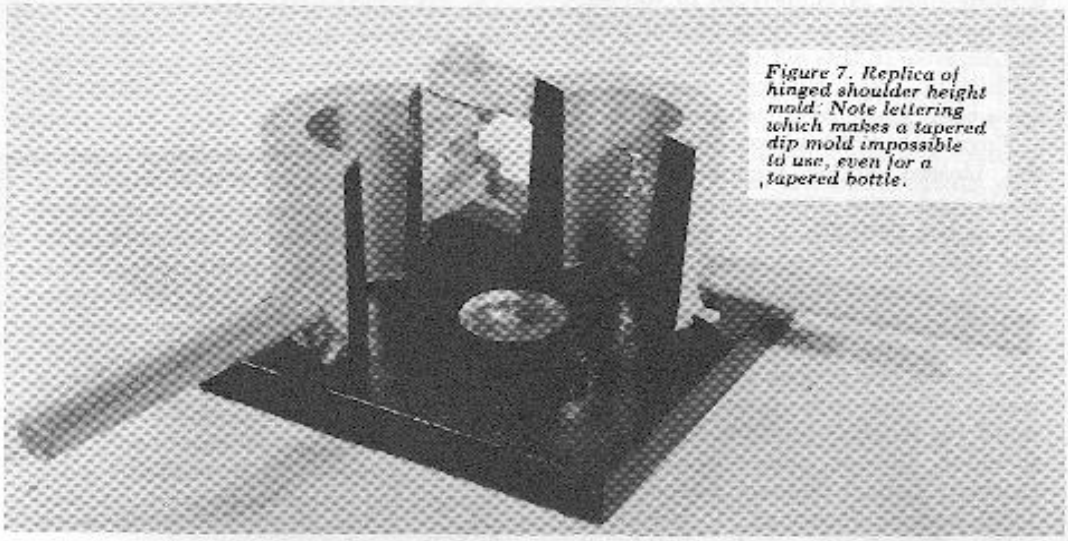


Figure 7. Replica of hinged shoulder height mold: Note lettering which makes a tapered dip mold impossible to use, even for a tapered bottle.

c. Turn-Mold Bottle.

First to correct any false impression by this traditional name—the bottle is normally rotated within the mold and the mold does not rotate. One or two patents called for rotating molds, but there is no evidence that the practice was successful.

While the molds in which turn-mold bottles were blown had to be in separable parts in order to define the body and shoulder contours, and while ordinarily these parts would leave impressions of their junctions as seams on the bottles, the rotation of the bottle during the blowing operation eliminated all seams. The rotation against the sides of the mold simply rubbed them out while the glass was still plastic.

No lettering or decorative design could be used. The bottle had to be circular in cross section at all horizontal levels. It could have any vertical contour.

by the heat of the baking process that was part of the preparation of the mold. This left the surface coated with a soft, water absorbent, layer. There was almost no wear on the iron that backed the 'paste', so that molds had long lives. The 'paste' did wear rapidly (a day in modern machine tumbler making) but upon wear, the remaining paste was removed and a new facing prepared.

It was also possible to make molds of hard wood for turn-molding of bottles. Generally these are not treated with the 'paste' since the natural charring supplies the effect gained by paste on iron. Wood molds were often boiled in chemical solutions as a preparation. The paste coated iron mold was probably an outgrowth of the wooden mold used for the same purpose. As noted, the iron mold could be re-coated almost indefinitely—the wood mold might be burned out after making six to eight dozen *heavy* bottles. The wood mold

could make several times that many thin walled bottles or "shell" tumblers. *Note that this use of wood is solely to make bottles which have no lettering or design, and which are rotated during the blowing process.*

The turn mold bottle acquired a high polish during the turn-blowing operation, but it also acquired horizontal grooves or scratches, sometimes best visible by reflected light. Thus the turn mold bottle, while having no seams, carries its own positive identification as such. *Figure 6* attempts to show these turning lines. Irregularities in the surface burned away as the mold was used, and because of this action the so-called "Whittled Mold Bottles" could never have been made in a wooden mold.

Turn mold bottles became popular in the United States beginning in the 1870s and were produced possibly as late as the 1910-20s, going out with the last of the hand blowing shops. Several United States patents were granted in the 1870s and 1880s for 'seamless bottles' with and without turn molding. The period was probably earlier in Germany, whence came many of our turn mold (or twister) blowers. A section of Streator, Illinois, where a number of German 'twister blowers' settled in the 1880s became known as "Twister Hill".

The popularity, and possibly the novelty, of turn mold bottles is attested by the fact that many glass companies used the term 'seamless' as a part of their corporate name. Perhaps, also, their salesmen were not above pointing out that the bottles would not split because they were not stuck together at the seams!

2. Hinged Shoulder Height Mold Identifying Seam Characteristic: Seam on Side Disappears at or Just Above the Widest Diameter

Bottles have been made in this fashion for nineteen centuries (ENNION and JASON, first century A.D.) although their mold parts must have been keyed or dovetailed or dowelled to register together rather than hinged. This style has the same general operating functions already described for the dip mold, except that the shoulder height hinged mold is opened on its hinged support today in order to remove the bottle. The operator may watch the progress of the blowing as with the dip

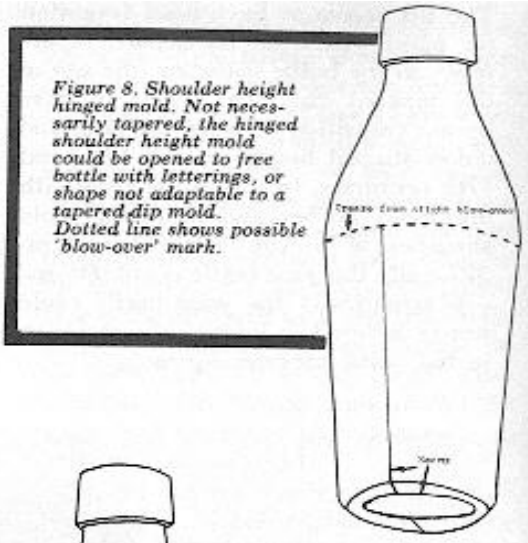


Figure 8. Shoulder height hinged mold. Not necessarily tapered, the hinged shoulder height mold could be opened to free bottle with letterings, or shape not adaptable to a tapered dip mold. Dotted line shows possible 'blow-over' mark.

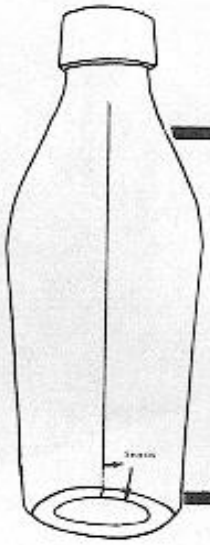


Figure 9. Mold seam is rubbed out just below the finish by the jaws of the finishing tool. Exact level at which the seam disappears is immaterial in this hand operation.

mold, and he must likewise shape the shoulder by his own skill.

The mold differs from the shoulder height dip mold in that it may be lettered and decorated. It need not be tapered. Its side wall need not be a straight line, and the design need not be symmetrical or 'regular' in any way. *Figure 7* shows a replica of such a mold, open to show a monogram and tapered only because all the mold replicas are made relative to the same bottle design. *Figure 8* illustrates the seams on a bottle from such a mold. Only the disappearance at the shoulder is important —the design of the rest is not.

The object of this mold design was to avoid the limitations just mentioned for the dip mold. While decorations could be made, as they were made in the 1st century, A.D., with clay and stone molds, production was limited both in speed and number produced. The ad-

vent of the brass mold, perhaps in the 17th or 18th centuries, followed by the iron mold possibly in the 18th century, and definitely by the 19th, made a new kind of mass production of decorated and lettered bottles possible. Much occurred in the newly opening age of the commercial demand for a container, and glass was already used as a container. The evolution of the wine bottle was followed by the development of other shapes for other products.

(Skeptics who believe that all merchandising is modern should read page 457 of McKearins' *American Glass*, Crown Publishers, New York, for the advertisement of Thomas W. Dyott, of Philadelphia, 1825. It starts with offering 20,000 gross of apothecaries vials and 15,000 gross of patent medicine bottles. It includes at least ten other classifications of bottles *now named for the product they were identified with*. So quickly did glass bottles become traditionally named, as part of their commercial use. To become identified, the shape had to be reproducable.)

Such molds were not limited to a separation into two halves. Even in ENNION's time three to six parts were used. The choice of the mold structure was a function of the severity of the lettering, area coverage by the decoration, closeness to seams for decorating elements, and the like, which will be shown under "6. three part molds" later. A shoulder height mold was not limited as to the number of leaves making up its girth.

3. Mold Type Not Material Identifying Characteristic: Seam Disappears in the Neck.

a. Action of the Finishing Tool.

This seam condition, and the two others that follow under group 3, does not come from the mold design but from treatment of the bottle after it has been removed from the mold. So far as the mold is concerned, it may be two-part or any number of parts, and with a 'cup' bottom, a 'post' bottom, or any construction whatever, just so the bottle has side seams that go all the way to the finish as the bottle comes out of the mold and is prepared for the hand finishing operation.

The seam structure is shown in *figure* 9. The important thing is the disappearance of the seam in the neck. It is there rubbed out by the finishing tool, a hand held clamp whose jaws, closing about the finish area and which have the contour desired in the finish, also contact the neck area. It is rotated, or the bottle is rotated during this operation so that turn lines *in the neck only* (as contrasted with turn mold bottles) are produced. This is the last operation generally performed in hand bottle making, after which the bottle is 'finished', with that word then becoming generic for the result the tool produced.

While the glass worker could use his pucella or other hand tools for this contouring operation, and did so before the tool was developed in England in the 1830s (circa 1850-55 here), the tool most likely to rub out the seams was the jawed 'finishing tool' — a sort of pliers-shaped clamp having a central mandrell to enter the bottle mouth and prevent it from collapsing under the pressure from the jaws, and two opposing jaws that were cut with the desired finish contour on their inner surfaces. The jaws were squeezed together while the bottle (or the tool) was being rotated between them, so that the contour was impressed as a complete circle about the neck of the bottle. It is apparent from the author's collection of about a hundred such patents that the tools became increasingly complicated as time passed — finishing tools were still being patented even sixty years after Amasa Stone received his patent (the first in the U.S.) for such a tool in 1856. Probably tools were in use even before Stone's patent as they could have been imported, or copied, from England.

Generally, but not always, a quantity of glass was added to the bottle lip before applying the tool. This is often evident by the folds of glass where the neck meets the added glass and where the tool rubs the glass of both. There are often signs of two surfaces of glass within the mass at the bulb of the finish. The proper name of this condition is 'laid-on-ring' — 'applied lip' tells us nothing of the method, while 'laid-on-ring' tells us it is ring-shaped and 'laid' as the glassworker calls this method of adding glass. This name also does not imply that all such additions are at the lip of the bottle. The first such additions of glass were slightly below the lip

(McKearins' *American Glass,* p. 424, Plate 221 and 222). Laid-on-rings are also used for decorative purposes, with several often being spaced at various levels on the neck of a bottle, or a vase.

As noted, the tool was first used in England — Bontemps, writing in 1869 said that the tool had been used in England for over 30 years. Amasa Stone's 1856 patent may or may not have been the first to be used here as the tool could have been imported from England, or copied from English sources without patenting here. Until the 1870s the application was apt to be crude and rough under commercial bottle making demands because the use of the furnace opening as a gloryhole was insufficient as a heating device unless the bottle was held in the heat so long that the bottle shape softened. Since corks were the chief closures, the neatness of the finish was of less concern.

Demand creates ingenuity, and by the 1870s there began a thirty year rush of new closure invention. With it came a great elaboration of the finishing tool. With that came the development of the separate coal and gas fired glory hole (often 'sweetened' by the addition of pine knots and resin) with which to give intense localized heat to the finish while keeping the rest of the bottle to its wanted shape. We can use this as a rough date. From the 1830s to late 1870s the result of the use of the finishing tool was often rough, confined largely to cork finishes, apt to show laps in the neck attachment of the laid-on-ring—any of these might date the bottle as pre-1870. After the late 1870s the greater heat made for finishes so smooth that the laid-on-ring was virtually undetectable—the two glasses appear as one. Finish designs became more complicated.

b. Action of a Pressing Tool.

Instead of the rotating, hand-held tool, a press could be used for much the same purpose. Many were patented in the 1880s and later. Almost all were bench mounted because of their weight or to free one of the glass workers hands in order that he could operate the lever. Both presses and bench-operated rotating finishing tools grew up together, with some presses either rotating in the press-jaws, or having the bottle rotate with them.

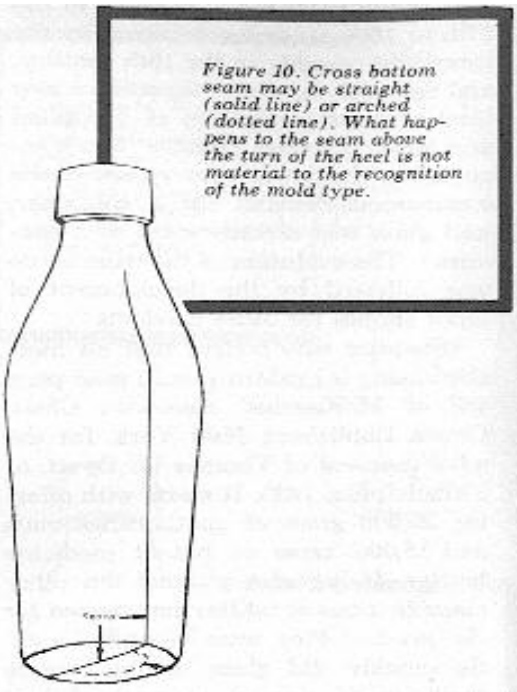


Figure 10. Cross bottom seam may be straight (solid line) or arched (dotted line). What happens to the seam above the turn of the heel is not material to the recognition of the mold type.

Most press jaws had seamless tops, being in one piece, but necessarily had to have seamed halves for that part of the bottle contact that was made below the bulge of the finish. This meant that there was a horizontal seam around the widest part. Even when the press jaws, or the bottle, did not rotate, the clamping of the press-jaws against the neck eliminated the seam at that point.

One design making the groove ring wax sealed fruit jar clamped the finish below, and scribed the groove by a rotating piece above, thus making a seamless finish top.

c. Flared or Fired Lip.

Especially when a cork was to be the closure, a bottle could be finished either as a straight neck (often termed sheared even when not obviously trimmed with the use of a pair of shears), or flared and fire-polished. In either case the finish portion of the bottle was first heated at the glory hole. For a straight neck only enough heating was applied to round off the edges where the bottle cracked off the blow pipe. For the flared neck the heating was prolonged until the neck was made plastic enough so that the application of a tool, even a wooden stick, would make the

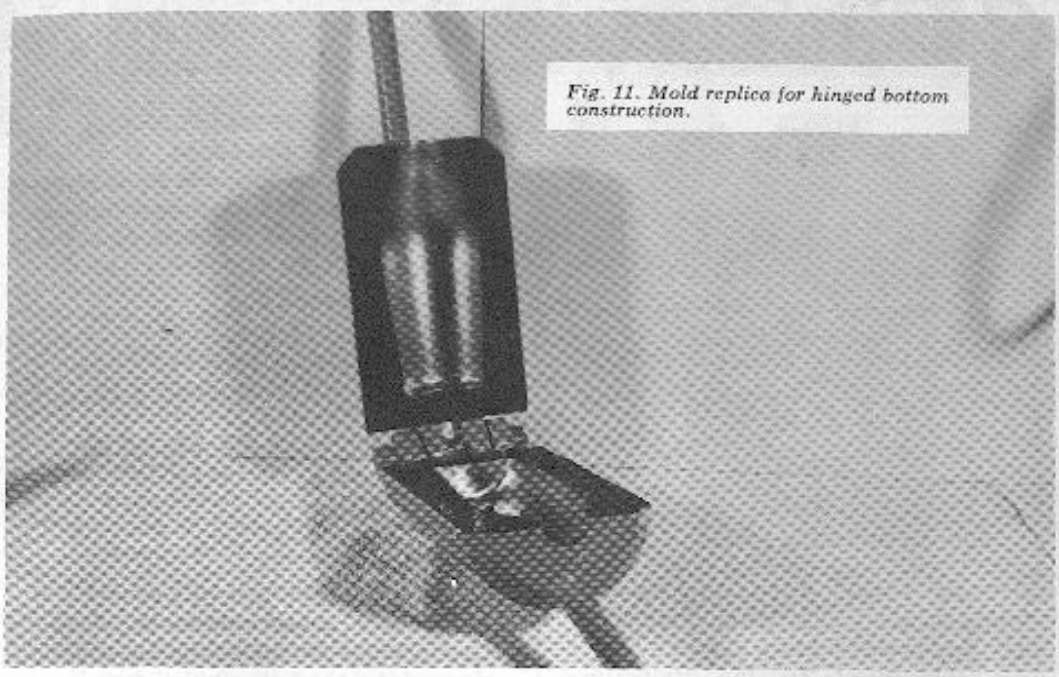


Fig. 11. Mold replica for hinged bottom construction.

flair while the bottle was being rotated in a snap at the chair. A certain amount of the seam would disappear due to the fusion of the glass.

There is no 'date' for this technique. It was already old in the first century, A.D.—it is still being used today. Make no estimates of antiquity solely on the presence of a flared or fired neck.

4. Hinged Bottom Mold Identifying Seam Characteristic: Seam Crosses the Bottom of the Bottle

The cross bottom seam may be straight or it may take a half-circle about the central push-up. In either case, the ends turn the heel and proceed upward toward the finish where they may be modified by other conditions. The thing that counts is that only in the hinged bottom mold does the seam cross the bottom. *Figure 10* illustrates the bottle and *figure 11* the mold. The half circle sometimes found is shown as a dotted line. This mold form was in use by 1810 since bottles known to have been made about this date are seen with cross-bottom seams. In some bottles of this period the seam is partly obliterated by a pontil scar. In other bottles, as in some railroad flasks, the cross-bottom seam intersects a ring shaped pontil from the use of the blowpipe as a pontil — see: "Empontilling," by Julian Harrison Toulouse; *The Glass Industry*, March and April, 1968, page 137. This would represent dating about 1830.

The seam position is also seen on bottles that must have been made subsequent to 1850-55 since there are no pontil scars—hence probably held in a snap case for finishing. Even later, as in the 1870s-80s, the bottom hinge construction was shown in patents for foot-operated mold opening and closing. Hence the cross bottom mold seam could be considered common from 1810 to 1880.

(Treat terminal dates with care. We can always have some indication of a starting date for a technique if we can find who first put the idea into practice. But any technique, once developed, can be used right up to the present — as many collectors know who have been so unfortunate as to rely too heavily on a popular termination date as sure evidence of true antiquity — and thus acquired 'quick-aged' antiques. □

(To be continued next month)

A PRIMER ON MOLD SEAMS

by Dr. Julian Harrison Toulouse

(Continued from last month)

5. Three Part Mold, With Dip Mold Body Identifying Seam Characteristic: Lowest Seam Circles Body at Widest Point—Two Seams from This Seam Upward.

This is the 'three-part mold' best known to the collector of utility bottles, such as the wine bottle already mentioned in connection with dip molds. It was most popular, subject to the limitations just mentioned, about 1870 to 1910. The body of the bottle was tapered and without lettering or decoration. It would be possible to letter the shoulder but this was seldom done. One patent lettered the top area of the body by means of a hinged plate that swung out after the bottle was blown.

The mold represents an important step from the simple dip mold, with its more satisfactory control of the shoulder contour and bottle height in a growing trend of mechanized bottle filling. *Figure 12* shows the position of the seams, considering hand held finishing tools rubbing out part of the upper neck seam.

There are at least two designs for molds that will impart mold seams to the bottle in the manner shown by *figure 12*. The bottle cannot tell us which one might have been used to make it. In one type the two mold halves that shape the shoulder are hinged by a vertical pin at the back of the body (dip) mold. The two halves open and close by a horizontal movement as shown in *Figure 13*.

In the other two part mold giving the same seam arrangement on the bottle, each shoulder half-mold is separately hinged by a horizontal hinge on either side of the top of the dip mold section. Each half moves in a vertical plane in order to open or close. *Figure 14* illustrates this design.

6. Three Part Mold With Three Body-Mold Leaves.
Identifying Seam Characteristic: Three or More Vertical Seams from Near Base to Near Finish Depending on Other Factors.

This is the three-part mold more commonly known to the collector of art glass, but it is occasionally found used with highly decorated bottles. Each part is a complete segment (or leaf) of the body mold from base to neck. The bottom may be either 'post' or 'cup' design. Generally the post design was favored for hand operated, three part molds.

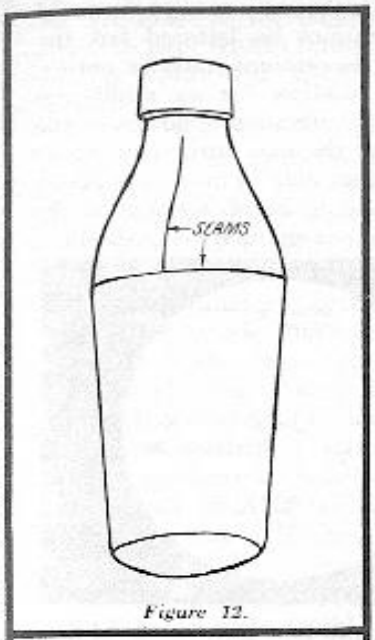


Figure 12.

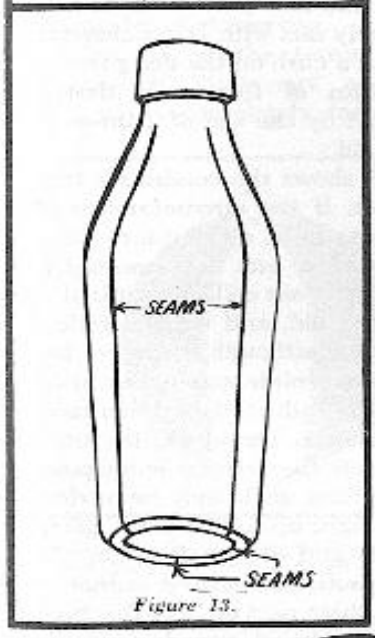


Figure 13.

Figure 12. Wine bottle type of three part mold. Seam around shoulder and seams from shoulder to neck, on opposite side—disappearing at the neck if finished with a hand tool.

Figure 13. Alternate mold design for wine-type bottle making in three-part mold. Hinge is vertical.

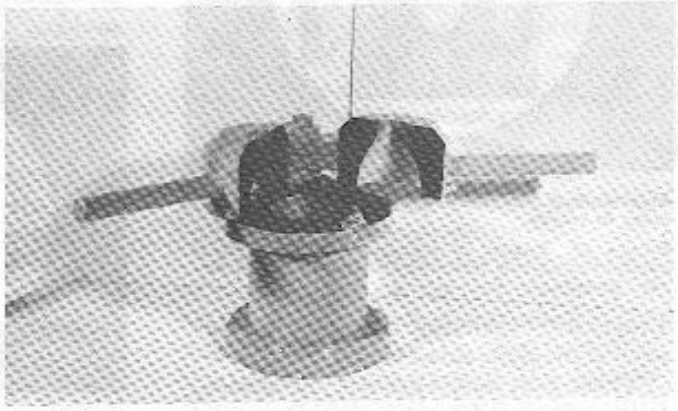


Figure 14.

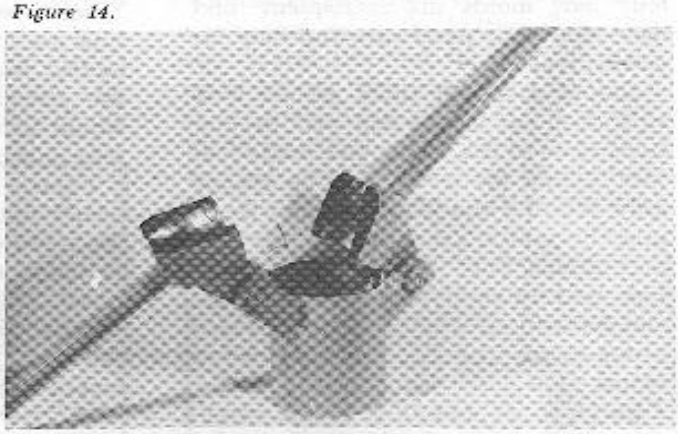


Figure 15.

Figure 14. Alternate mold design for wine-type bottle making in three part mold. Hinges are horizontal.

Figure 15. Seam position in highly decorated types of glass ware, shown as in three part mold. Third vertical seam is behind the bottle because they are generally, but not absolutely required to be, 120 degrees apart.

Figure 16. Radii of gyration and theoretical depth of letters, two-part mold.

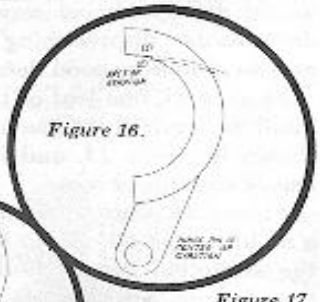


Figure 16.

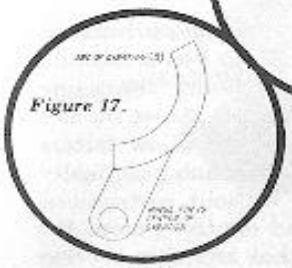


Figure 17.

Figure 17. Radius of gyration and theoretical position of closest letter approach to seam, three-part mold.

There are two alternate objectives in deciding to use three, or more, parts in the designing of the mold. First is that a poly-part mold enables deeper cut letters and decorations, and a closer approach to the seams. A three part mold almost meets these objectives, and a four part mold should satisfy them completely. The second objective is that three sided, or four, or five, or six, or seven or eight-sided pieces may have to have an equal number of parts in the mold because of the angles involved. A greater number of sides than eight would easily be handled as a paneled piece with two sides to a mold leaf.

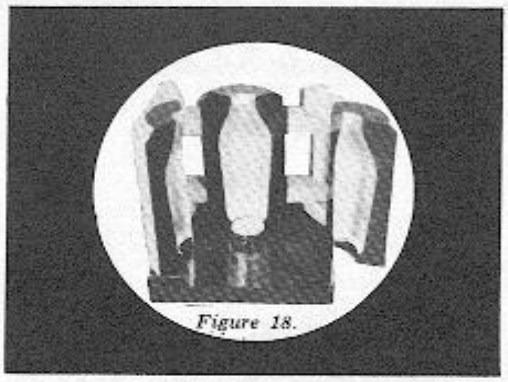


Figure 18. Three part mold type for decoration close to seams.

Figure 19. Radius of gyration and theoretical position of closest letter approach to seam, four-part mold.

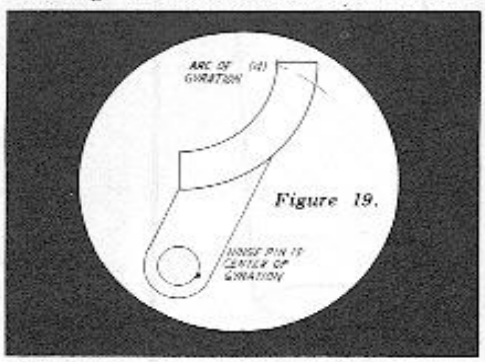
Practically speaking the same is true even of an eight sided bottle.

Three part molds are not uncommon, four part molds are infrequent, and more than four parts rare and only for special reasons.

Round and poly-sided pieces, both with deep cut letters and with decorations close to the seams, are made that way so that the molds may be opened after blowing the piece, without dragging the mold edges through letters and decorations. Poly-part molds are therefore used for esthetic reasons of design and decoration, except for the polysided group mentioned. *Figure 15* shows two seams of a three part molded bottle. *Figures 16, 17 and 18* show the conditions that obtain at the critical edge areas with two part, three part and four part molds, respectively.

Figure 16 shows the radii of gyration about the hinge pin of the mold for the areas near the edge of the mold, for a two-part mold. The radius describing arc (1) crosses the face of the mold at so shallow an angle that it indicates that almost no shallowness of cut of a letter would prevent the metal edge at the edge of a letter near the mold edge from dragging across that letter and smearing it as the mold was opened. By going to arc (2) some depth of cut would be possible, but a wide area between that arc and the edge of the mold could not be utilized. The width of the 'no-mans-land' varies with the bottle diameter and the distance from the hinge pin center to the cavity center, and could range from a half-inch to well over an inch.

Not only is there an area of the mold face that cannot be lettered but the letters and decorations must be noticeably more shallow for an additional distance. This dictation of design by the limitation of the two part mold would be very undesirable in many instances. It would seldom be of moment in the making of commercial containers—



hence three and four part molds of this type are rarely met with in commercial bottles. Such a curb on the designer by the mechanics of this mold design would be met by the use of a three or four part mold.

Figure 17 shows the conditions that would obtain if the circumference of the mold were to be divided into three sections, usually, but not essentially, equal. The art glass collector calls this a three-part mold, and we will follow this convention although it ignores the fact of a bottom plate as another mold part. Now the radius of gyration may be drawn almost to the edge of the mold face to indicate the extreme letter position. The cutting angle may be moderately steep right up to this point, given sharp letters and design. Position (3) shows the probable limiting radius of gyration. A three part mold of this type would satisfy almost any demand for decorations approaching the seams, and would allow good detailing.

In general, one leaf of the three part mold is secured to the bottom plate, shown in *figure 18,* and the two other leaves are hinged to it.

Figure 19 shows the comparisons in a mold composed of four leaves making the complete circle. Using the same descriptions, position (4) shows the arc of gyration which would allow letters and decorations to approach practically to the mold seam without restrictions as to sharpness and depth—except for a new restriction that any thin section

of metal, as when a deep-cut letter is set too close to the edge of the mold must be kept within limits or a section of the metal will 'burn', or oxidize, rapidly.

Bottles were made from molds having three and more parts at least by the first century, A.D. Ironically we would have trouble today approaching the side seams so closely with machine bottle making; first because mass production machines are generally limited to two-part molds; and second because the hotter glass temperatures (and different composition) used for machine made glass would burn out the small wall between letters and mold edge much faster than in hand blowing.

Indirectly this indicates that the early highly decorated molds could not have been made of wood since thin wood partitions left by any close approach to the seam would have burned away almost at first use.

The use of the terms: 'two-part', 'three-part', 'four-part' and the like may not be completely definitive of the way the mold is constructed. They are descriptive terms that depend upon an understanding of just what parts of the mold are being counted. The wine bottle mold previously described as a three-part mold (circular seam at widest diameter) was truly made in three parts. The art glass designation of three part mold ignores the fact of a bottom plate as a fourth part. This without moment so long as we know just what we mean. Calling such a mold a four-part mold now, after so long in designation as a three-part mold, would be even more confusing. It is probably best to continue the present semantically incorrect nomenclature.

A modern mold for the manufacture of bottles, under a correct counting of all the parts in contact with glass at the final blowing stage (i.e., not including the three or more parts in the parison forming stage) might have to be called a *nine part* mold: the bottom plate, two side plates inserted in the two body mold halves, two neck ring halves, a collar, and a plunger tip. It would very likely be called a two part mold since the body was formed from two matching halves, and therefore presented two side seams.

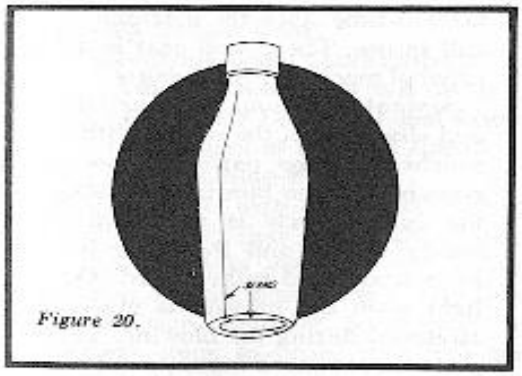


Figure 20.

Figure 20. The seam characteristic from a post bottom mold is a circle symmetrically placed on the bottom, no matter what other seams show.

Figure 21. A post bottom mold. Note the central pillar on the bottom plate, about which the side mold halves close.

Figure 22. Feathery form of suction machine 'cut-off' scar. Since it is formed as part of the 'blank' mold operation it is stretched by the blowing after it is formed, and it is generally not centered.

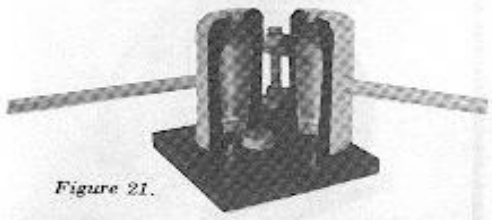


Figure 21.

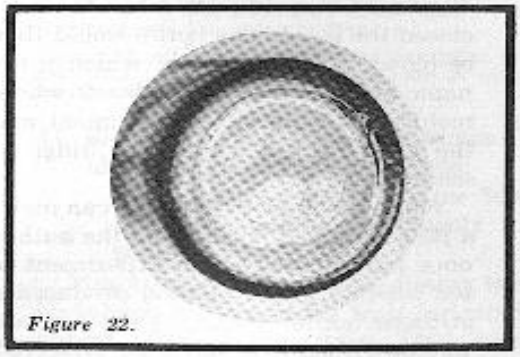


Figure 22.

7. Post Bottom Mold
Identifying Seam Characteristic:—
A Circular Seam Symmetrically Placed on the Bottom of the Bottle, Either Coincident With the Bearing Surface (or Bottom Contact Area on Which the Bottom Stands) or With a Slightly Larger (Never Smaller) Diameter. Side Seams Join the Bottom Circle.

The circle formed by the seam on the bottom will always be centered. This will distinguish it from other bottom seams or pseudo-seams. From this bottom seam the two or more side

seams branch off, turn the heel, and rise to the top of the bottle. Post bottom molds may be used with any of the poly-part molds.

The name 'post bottom mold' comes from the design of the bottom plate. It has a raised platform in the center of the bottom-forming area, and this is called the post. Its top surface is shaped to the desired contour of the bottom of the bottle within the ring seam formed by the post.

The two, or more, parts of the side mold close about the post, and include all of the radius of the heel of the bottle, or nearly all since the post *may* be slightly larger than the contact circle. This takes the seam slightly away from the bottom contact circle and renders the bottle more stable, and less likely to rock should a worn mold make a projection in the seam. *Figure 20* shows the seam pattern; *figure 21* the mold.

This construction was much favored during the hand blowing days, and was already old when Mason showed it in the fruit jar mold he patented on November 23, 1858, one week before his famous jar. The virtue of the construction was that it allowed automatic alignment of mold parts when the 'boy' closed the mold. The bottle would then be blown without 'off-sets' which is the name given to a part of a bottle where mold parts were out of alignment and the glass formed a stepped bridge at some seam.

While the modern machine can make a post bottomed bottle (and the author once participated in an experiment to see whether either method produced a stronger bottle—negative) the cup bottom described later has been preferred. Machines may be adjusted to prevent off-sets, and the incised form of the cup bottom is easier to use and handle.

There are at least two 'pseudo-seams' to consider in connection with the post bottom mold seam. Note in *figure 20* that the bottom circle is *symmetrically placed and branched into the side seams*. The pseudo-seams are neither.

8. Suction Machine 'Cut-Off' Scar Identifying Seam Characteristic: Irregular, Often Feathered, Bottom Circle, Varying From Faint and Wide Spread to Strong and Small (Inch) Diameter.

This mark may be considered to be a 'blank' seam showing through, and intersecting, the finishing mold seams. It is made as the junction between the knife that severs the glass from the pot, and the side of the bottom opening of the blank mold. The junction is actually a shearing action. The featheryness comes from the sliding action of the knife and the rolling of slivers of glass in the narrow clearance between knife and mold. The formation dates from the 1904 development of the first suction machine and continues to the present time since the machine type is still in use. The cut-off scar is definite proof of machine manufacture.

Several conditions may vary the size and character of the mark. With heavy weight ware the parison is not much stretched in the blowing operation, so the cut-off circle is more apt to be nearly round, and the seam is more pronounced and rather 'hard'. On very light ware the parison is much more stretched during the blowing. The diameter of the mark becomes quite large, the circle may become distorted, and the whole appearance is lighter. The mark may even extend around the curve of the heel to the lower sidewall. *Figure 22A* shows a 'hard' scar and

Figure 23A. A 'hard' suction cut-off scar, sometimes mis-called a 'pontil' scar. Note feathers.

Figure 23B. A 'spread' suction cut-off scar. Note 'feathers.'

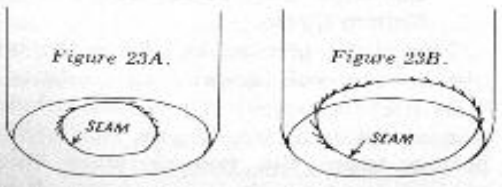


Figure 24. A common valve mark, as found on a milk bottle.

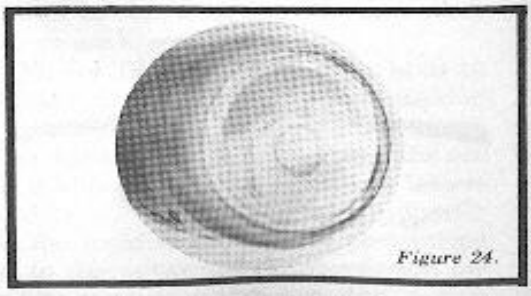


Figure 22B a 'spread' scar. *Figure 23* is a photograph of a suction machine 'feather'.

9. Machine Made 'Valve' Mark Identifying Seam Characteristic: A Circular Bottom Mark, Seldom Centered, and Formed as an Indentation Into the Glass Surface.

Generally the diameter is from ½ to ⅞ths of an inch. It is most often found on wide mouth foods of the 1930s and 1940s and even later, and on many milk containers. The aspect is *hard*, i.e., strongly marked, often indented deeply enough that a fingernail may follow it as an indented groove. A typical valve mark is shown as *figure 24*, taken from a milk bottle.

The name is a reference to a device used on those machines that used a solid, or dip, mold in which to form the blank or parison, and then pushed the blank up in the mold by a push-up plunger, or 'valve' in the bottom so it could be grasped by tongs for transfer to the finishing mold.

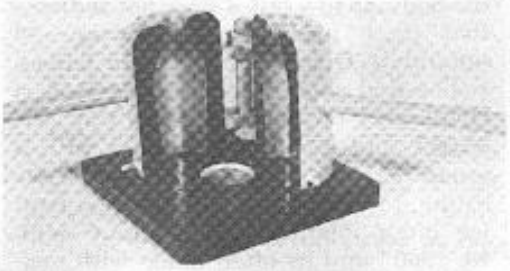
Amateur collectors sometimes refer to this as a *pontil* mark.

10. Cup Bottom Mold Identifying Seam Characteristic: Lowest Bottle Seam Is a Circle Around the Heel at, or Just Below, the Tangent of the Heel Radius and the Side-Wall.

In conrast with the post bottom mold, the part that shapes the bottom of the bottle is cut into the bottom plate as a small depression or cup. The construction requires some sort of limiting stops in order to center the body mold halves over the cup without off-set.

The cup bottom is the more common machine mold type. *Figure 25* shows a cup bottom mold and *figure 26* the seam structure of such a bottle.

Figure 25. Cup bottom mold. Note the depression that shapes the bottom of the bottle.



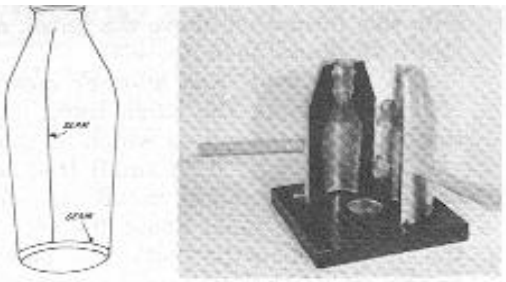


Figure 26. Seam structure on a bottle made in a cup bottom mold. The lower seam circles the bottle in the heel-side tangent area. From it the side seams rise.

Figure 27. Blow-back mold. The blow-back is the small, bulb-shaped, part almost at the top of the mold.

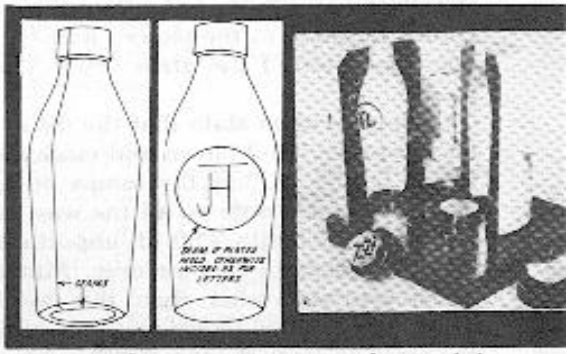


Figure 28. Seam structure goes to the top of the finish in bottles from a blow-back mold.

Figure 29. One form of plated mold. The replaceable 'plate' is the round part in the center, but the plate may have other shapes.

Figure 30. Plated mold, showing one plate in place and other alternate plates. Shown as with post bottom mold.

11. Blow-Back, and Blow-Over Molds Identifying Seam Characteristic: Seam Goes All the Way to the Top of the Bottle, Which Is Usually Ground or Fired.

Mason secured a patent claiming the blow-back feature in his fruit jar mold patent of November 23rd, 1858, and Homer Brooke later claimed that it was well known in the industry and that the technique had been imparted to Mason by his father and himself. It was used so long as hand made finishes were blown in the mold in order to standardize their forms. This included screw threads and other complex forms such as external lugs, ramps or spirals, or sharp cornered ledges for wire and other clips.

The purpose of the blowback was to provide a place where the glass would blow thinner, and be easily cracked off without making cracks that might extend into the wanted part of the bottle.

The blow-back itself was a circular, bulb-like formation above the finish, as *figure 27;* seams as in *figure 28.*

The "blow-over' was another means of accomplishing the same thing and the bottle cannot tell us which method was used to make it. A small fraction of an inch of straight metal was designed into the mold above the top of the finish. When the bottle was blown to the extent that the mold was filled, and by keeping on blowing, helped somewhat by a wiping action of the blowpipe across the face of the top opening of the mold, the glass blower would balloon the glass above the mold and 'pop' it free. The method was simple and easy to do—also it was dangerous to safety of the blower, and frequently distorted the glass inside the mold.

Collectors often state that the difference between hand blown and machine blown bottles is that the seams on a machine made bottle go all the way to the top of the bottle. This all-important exception negates that premise. Many finish contours other than this were also made by hand tooled methods with the seam going to the top of the finish.

12. Plated Mold

Identifying Seam Characteristic: A Circular or Oblong Seam on Either or Both Side Walls, Not Touching any Other Seam, and Appearing in Round, Oblong and Panelled Bottles.

This seam is caused by the junction of the body-mold part and a removable insert, called a plate, placed in a hole in the body mold part. It enabled the glassmaker to blow personalized bottles for a buyer whose needs were too small to justify the expense of a complete mold. This same body mold could then serve many customers who would agree to the same arrangement. In addition to the personalized part on the plate, the mold might also carry standardized information common to all users, such as capacity, weight and product (if a product-associated design).

The Foster Sealfast fruit jar used many interchangeable plates in order to personalize fruit jars for many grocers and wholesalers. Dairy bottles are often made with such plates in order to satisfy the needs of the small dairy. The many patents concerned with the difficulties of fitting oblong plates to panelled bottles for medicinals and prescriptions indicate that these were 'small lot' items. In the panelled bottle an object was to hide the seam in a corner of the panel.

Unfortunately a very common decoration not at all connected with the use of plated molds is the line of a circle or an oblong or the like, incised into the mold, surrounding the letters. There seems to be no sure way in which to tell these decorative lines from plate seams. Only if the seams are ragged, have evidence of fins or broken tops as when the hot glass penetrated deeply into a seam, or otherwise grossly made (and this would be a rarity) can we even suspect, let alone prove, the use of a plated mold. *Figure 29* shows the seam position; *figure 30* shows the mold and parts.

Some people refer to this as the use of a 'slug plate'. Since the two words mean essentially the same thing, the phrase is redundent. In addition the phrase seems not to have been used in the glass making industry but only by collectors, where I first heard it after thirty years in the glass industry. I made a survey of all the patents I have been able to find on plated mold use in the United States and *did not* discover the word 'slug' in a single patent by the men who used the plates.

The first patent involving a plated mold appeared in 1867, but it was for details of holding the oblong plate in place. Evidently the idea of plates was old by that time, and I would estimate that plates were in use before 1860. They are still being used today.

13. Separate Neck Rings

Identifying Seam Characteristic: A Parting Line (Seam) Between Finish and Body Mold.

This horizontal seam is in itself not a proof of machine made bottles. It only indicates that the neck rings (finish rings) were separate parts from the body mold—but it does not indicate that these neck ring halves opened separately from the body mold halves.

The first such patent was by Robert Hemingray on Sept. 18, 1860, Pat. No. 30,063, and it was for a mold with a separate neck ring which opened by lifting, to make the groove for the fruit jar often identified as "Patent Sept. 18, 1860" and as often made with mis-

Figure 31.

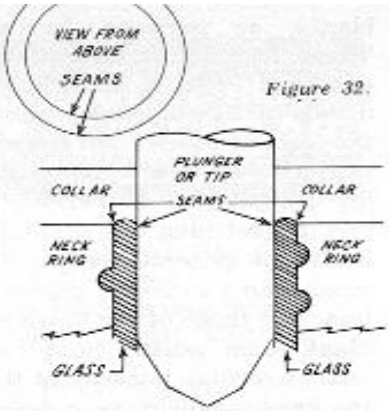


Figure 32.

Figure 31. Parting line (or seam) between finish and body mold is no an exclusive indication of machine made bottle.

Figure 32. The seams on the top of the finish, and how they are formed in a composite machine bottle design.

Figure 33.

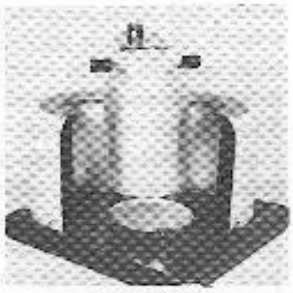


Figure 34.

Figure 33. Relation of plunger tip, collar, pressed parison in half a neck ring, and the blank mold in the press operation of press-and-blow machines. The push-up bar in the center-bottom would make a valve mark if the blank mold had been one-piece. Press-and-blow operation is generally used for wide mouth ware.

Figure 34. Relaion of neck ring (half ring is shown), blown bottle in the ring, and the body molds in the blow operation of press-and-blow machine operation.

Figure 35.

Figure 36.

Figure 35. Relation of plunger tip, collar, neck ring (showing parison in half ring) and blank mold in the first blow operation of blow-and-blow machine operation as used for narrow mouth ware.

Figure 36. Relation of neck ring, blolwn bottle (in a half ring) and finishing mold in the second blow operaion of blow-and-blow machine operation.

dated lettering. Most of the patents that followed called for neckrings that were separable, but bolted to the body mold so that the two operated as one unit.

Hence, the finding of a parting line between finish and body mold parts must have other confirmation before deciding whether the bottle is hand or machine made.

Figure 31, right hand arrow and line, shows one position of such seams, slightly below the angle that starts the bulge of the finish. The seams can be at the angle just mentioned, or it can be on the lower part of the bulge itself, as shown by the two other arrows.

14. Machine Made Bottle Identifying Seam Characteristic: One or More Seams Circle Top of Finish.

Warning: there is an important exception—beverage and beer bottles are often 'firepolished' to smooth the top of the finish.

Figure 37. Ghost seams from the machine made blank or parison, near their counterparts from the finishing mold. Note that they join in the viciniy of the finish, which is formed as part of the blank, and has no finishing mold counterpart. Ghost seam is shown by dotted lines.

One thing almost all machines have in common is a 'tip' or 'plunger' which merely defines the inner throat diameter of the finish in the case of narrow mouth 'blow-and-blow' bottles, or also presses the parison into shape in the wide mouth 'press-and-blow' jars. In either case the tip necessarily contacts glass. Since to guide the tip a collar also descends into contact with the glass —therefor the junction between tip and collar leaves a seam, and this seam is circular in form.

Since the collar also contacts the neck rings, their junction also produces a seam that is circular, concentric with, but larger and outside of, the tip-collar seam. These two seams can be a mark of a machine made glass piece (container) with certainty. If they are smoothed over by firepolishing, other signs must be relied upon to indicate machine making for the bottle.

If the seams on the side of the finish disappear into a smooth and highly polished, shining area on the top of the finish, firepolishing can be verified. Hand blown bottles were firepolished

also, but they would lack the seams on the side of the finish. Since the crown beverage finish came into important use only some years after it was patented, and since hand held, rotating, finishing tools were used for the crown finish until the machine production started, a firepolished crown finish is almost certain to be machine made.

Figures 32-36 show a plan view and an elevation of a magnified arrangement of tip, collar and neck rings and the various relationships of the tips, collars, neck rings and molds for press-and-blow and for blow-and-blow machine operation. In the plan view the two circles are the two seams, although some designs may depart from this exact relation. In the elevation, the junction of the tip and collar is shown as the locus of one of these seams; the collar-neck ring junction is the other.

There are details that form a third seam in the concentric series, but that is only an addition that does nothing to add to any proof of machine operation.

Press-and-blow operation is that generally used in the making of wide mouth ware, in which the plunger can be large enough to enter deeply into the mold and actually shape the parison in the first stage of the machine opeartion. It is a pressing operation, but in the second stage the bottle is *blown* into shape by air pressure. Thus it is associated with wide mouth jars.

Blow-and-blow operation is that generally used in the making of narrow mouth ware, or bottles. The plunger cannot be large, so air pressure is used to blow the glass into the shape of the finish. It is followed by a blowing operation in the finishing mold just as in Press-and-blow.

15. Machine Made Bottle
Identifying Seam Characteristic: Irregular 'Ghost Seams' Beside the Normal Seams.

Not until after the advent of the Arbogast principle of a separate 'blank' mold to shape the finish and to do the work that the marvering table does in hand blowing of bottles, was the first semi-automatic bottle blowing machine possible. In most, but not all, of the machine designs that followed, the 'blank' mold was made in two hinged halves—the exceptions were largely those already mentioned under 'valve marks'. These halves resulted in blanks, or parisons, having seams. When the blank was transferred to the finishing, or blow, mold slight movements of the blank in transfer, centrifugal action in rotary machines, irregularity in heat balance and resulting irregularity in blowing, and the fact of stretching the 'skin' of the glass itself, all generally cause the blank mold seams to fail to register in position with those of the finish mold. The blank seam usually is still seen as a faint, irregular imagery of the lines of the finishing mold, as in *figure 37*. The blank and finishing mold seams appear to cross one another; the latter is superimposed on the blank seam. The irregular 'ghost' seam appears both alongside the side seam in the body area, but also appears on the bottom, where the seam appears very like the post bottom seam except that it is quite faint, and not centered, or symmetrical. The blank seam is at the bottom of the blown bottle because the blank is very much smaller in diameter than the finishing mold, and does not stretch large enough to disappear up the side wall. The blank is smaller because it need only be large enough to contain the glass volume needed for the bottle, which also must be large enough to hold the bottle's intended capacity. *Figure 33* shows some ghost seams.

SUMMARY.

The seams on a bottle tell us much, and have been discussed as follows:

1. When there are no seams whatever:
   a. the piece may be free blown without molds, or
   b. it may have been blown in a shoulder height dip mold with hand shaped shoulder, or
2. A seam disappearing at the shoulder means a bottle blown in a shoulder height hinged mold.
3. Seams disappearing in the neck area may be blown in any mold, but the seam rubbed out with a hand held finishing tool.
4. If a seam crosses the bottom the mold was a two piece, hinged bottom type.
5. A horizontal seam around the widest point, with two side seams going upward means a three part mold based on a dip mold bottom.
6. Three or more side seams from heel to finish means a three part (or more) mold for decorative designs.

BOTTLE BUFFS' CALENDAR

DECEMBER

7 San Antonio, Texas, Haase Antiques, 250 Kelly Dr. Flea Market.

14 Milwaukee, Wisc., Blue Bound Bowl, Milw. Jim Beam & Antique Bottle Club.

JANUARY 1970

17-18 Las Vegas, Nevada, Int'l Hotel Conv. Center, So. Nevada Antique Bottle Collectors, Inc.

FEBRUARY

14-15 Belmont, Calif., San Mateo County Fairgrounds, Peninsula Bottle Collectors.

21-22 Canyonville, Ore., Southern Oregon Bottle Club.

28-March 1 Buena Park, Calif., Retail Clerk's Union Hall, Antique Bottle Collectors of Orange County.

PLAN AHEAD

Change of address? Change in number of copies? Attach your complete address label and let us know before the 10th of the month—for the following month's issue.

7. Circular seam symmetrical with bottom, joining two or more side seams means a post bottom mold.
8. Irregular, feathery, non-symmetrical bottom seams usually mean a machine made bottle from suction machine equipment.
9. Small diameter, *indented* into surface rather than extending, non-symmetrical, on the bottom, usually is the valve mark of a press-and-blow machine.
10. Circular seam in heel-side wall tangent area means a cup bottom mold.
11. Seams to top of finish, which is then ground to level, usually indicate hand blown in blow-back mold, or snapped off by blow-over method.
12. Circular or oblong seams in side wall, not connected with other seams are made by plated molds.
13. Horizontal seams below finish area mean separate neck rings but do not prove manchine manufacture.
14. One or more seams circling top of finish show machine manufacture.
15. 'Ghost seams' seams come from the use of a separate blank mold—hence indicate machine manufacture. □