

The Ashley Semiautomatic Bottle Machine

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As noted in earlier studies (Bernas 2012; Lockhart & Burnas 2014) the earliest bottle machines in actual use in the U.S. were based on the Arbogast patent of 1882. The first actual operation was a decade after the invention – in 1892, followed by the Blue machine in 1896, but these devices only made wide-mouth bottles and jars. The British Ashley machine (also called the United or Johnny Bull machine) was a different breed: It made small-mouth bottles.

Howard M. Ashley and the English Origins

An all but forgotten chapter in bottle/jar machinery led to the eventual invention of a practical device. According to Gosney (2010):

In 1866 Josiah Arnall, the postmaster at Ferrybridge [England], submitted an idea to Edgar Brefitt for the mechanical production of glass bottles, but it was either too crude or revolutionary to prove convincing. Some twenty years later, H.M. Ashley, the manager of the iron foundry in Ferrybridge, went to live with Arnall and together they patented the first mechanical device, known as the ‘plank machine’ on July 2 1886.

On December 17, 1887, a reporter for the *Leeds Mercury* left these observations about his introduction to the Ashley machines in operation at the factory of Sykes & McVay at Castleford:

Another familiar land-mark is going. The Glass Bottle Trade is in process of being melted down into new parisons without Blow pipes and Blowers, and instead of 5 men being necessary to evolve an imperial receptacle for beer or aerated water it almost looks as if 5 innocently occupied adults might discover pastime in watching the conjoint labours of a machine and a youth in placing bottles at the service of good liquor as fast as they can be counted. Never since the days of the Pharaohs has anything so clever in glass-making been devised, nor

anything so simple. It has remained for a Yorkshireman, Mr. H.M. Ashley, of Ferrybridge, to revolutionise the trade (Hodkin1953:28N).

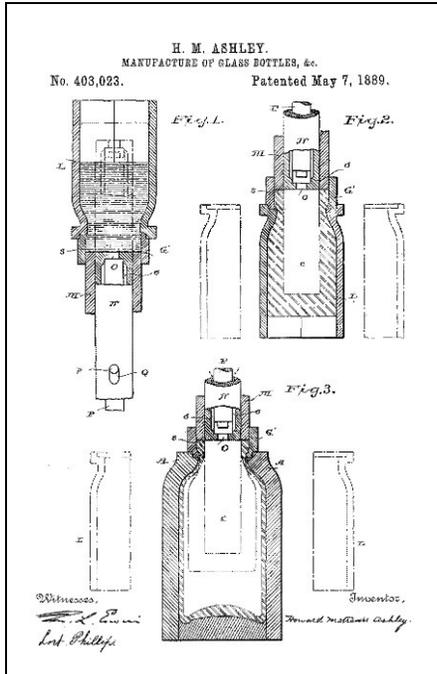


Figure 1 – Ashley’s first U.S. patent, showing a wide-mouth bottle (Patent No. 403,023)

Sykes & McVay installed the first Ashley machine in their Castleford factory in 1887. Because of the success of the machine the owners renamed the firm as the Ashley Bottle Co. Despite the *Mercury* reporter’s comments, seven men were required to operate the original Ashley machine. Because the early machinery was attached to a wooden board, the machine was affectionately called the “plank machine.” A new version appeared in 1889 and was called the Table or Pillar machine due to the way it was mounted. By the time the Ashley Bottle Co. ended in 1894, it had 22 machines in use. At that point, the stock of machines was purchased jointly by Bagley & Co. and Cannington, Shaw & Co. (Turner 1938:251-252).

Because these were some of the earliest in use, especially for the manufacture of jars, the machines designed by Howard Matras Ashley of Ferrybridge,

York, England, deserve some discussion. Ashley patented his first machine in England (British Patent No. 14,721) on November 13, 1886. Between 1887 and 1889, Ashley filed patents in a dozen other countries, including the United States.

The American Patents

Ashley initially applied for his American patent on September 26, 1887, but the patent was broken into five applications to address each specific function of the machine. He received Patents No. 403,023 and 403,027 on May 7, 1889. In addition, the patent office granted Ashley four more patents (403,716, 403,717, 403,718 and 433,062, respectively) on May 21, 1889, and July 29, 1890. The earliest U.S. patent illustrated a wide-mouth bottle (Figure 1), but subsequent patents included narrow-mouth ware (Figure 2).

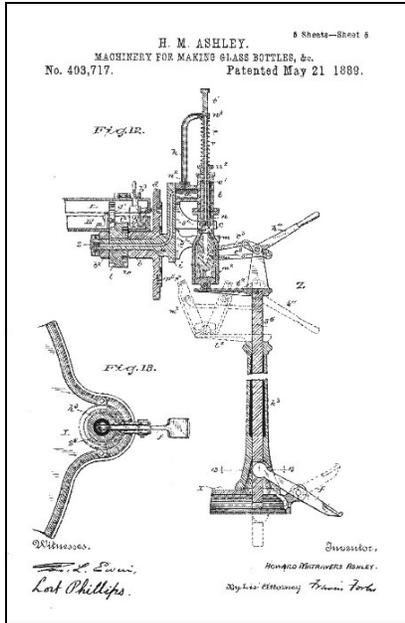


Figure 2 – Ashley patent with a narrow-mouth bottle (Patent No. 403,717)

The Ashley machine was a press-and-blow machine that operated in two stages. In the first stage, a worker dropped a gob of glass into a two-piece parison mold with a two-piece neck ring. The parison mold was upside down, so the gob of glass landed in the neck ring (Figure 3). The neck ring created the finish, and a plunger pushed upward to form the parison or blank into shape against the sides of the parison mold.

Since the parison was upside down, there was no baseplate at this stage.

The parison mold was then inverted, and the mold halves opened to release the parison – now suspended by the ring mold (Figure 4). The ring and parison then moved into the upright blow mold, where a puff of compressed air blew the parison into the final shape of the bottle. The mold halves were then opened, and the completed bottle was removed (Figure 5). See English (1921) for more discussion about Ashley and his machines.

Often called “Johnny Bull” machines, Ashley’s devices were used by several U.S. bottle manufacturers. These bottles should have had parting lines just below the finish (where the ring mold met both the parison and blow molds) as well as side seams that extended from the outer edge of the top of the finish to the post-bottom of the base.

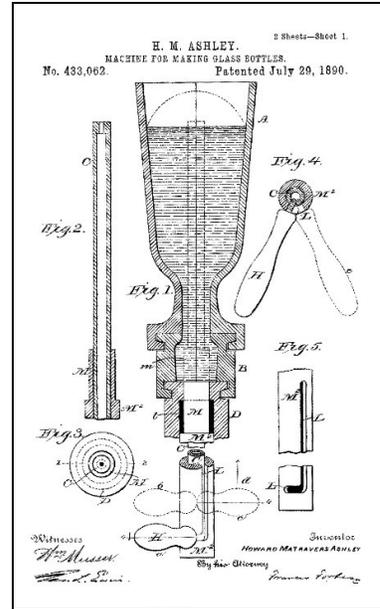


Figure 3 – Ashley’s upside down parison mold (Patent No. 433,062)

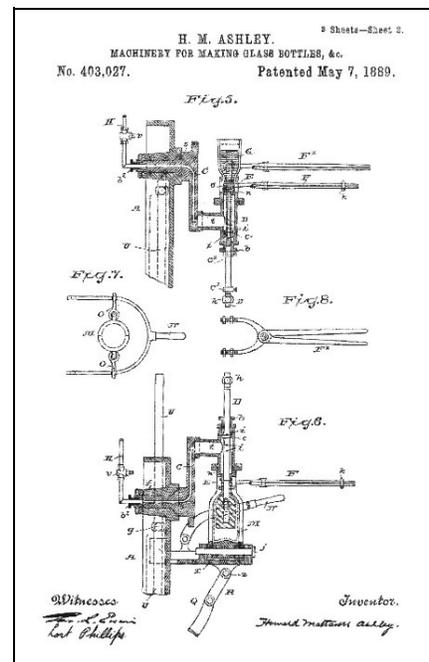


Figure 4 – Ashley’s inverted blow mold (Patent No. 403,027)

The base may have had concentric striations from being turned on a lathe, but it should *not* have ejection (valve) scars or typical machine scars. The machine was apparently used for the manufacture of both wide- and narrow-mouth bottles.

The Ashley machines thus produced bottles that had all but one of the typical characteristics of machine-made bottles – including the parting line (horizontal mold seam just below the finish). An important aspect of this description is that the exception – the lack of a machine scar – is a possible dating method. Virtually every other machine that was used to manufacture small-mouth bottles – whether semiautomatic or fully automatic – left some form of machine scar. Since the Ashley machine made the parison with the finish end down, there was no baseplate on the parison mold, so there was nothing to *create* a machine scar. Lindsey (2014) illustrated an example of a Hall’s Tonic bottle with Ashley machine characteristics (Figures 6 & 7).

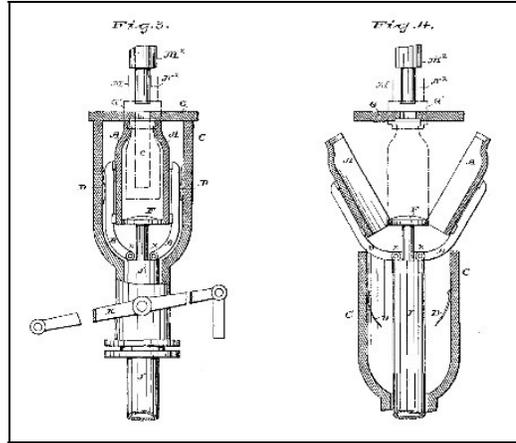


Figure 5 – Opened blow mold (Patent No. 403,716)

The Machines and the Union in the U.S.

The Glenshaw Glass Co., Glenshaw, Pennsylvania, was the first U.S. glass house to install a Johnny Bull machine in the season of 1907-1908.¹ Although the Ashley machine had been in use in England for two full decades, the spur that instigated use of the device on the western side of the Atlantic was the invention of the Owens Automatic Bottle Machine in 1903. The Owens machine made small-mouth bottles at a rate that made hand production obsolete

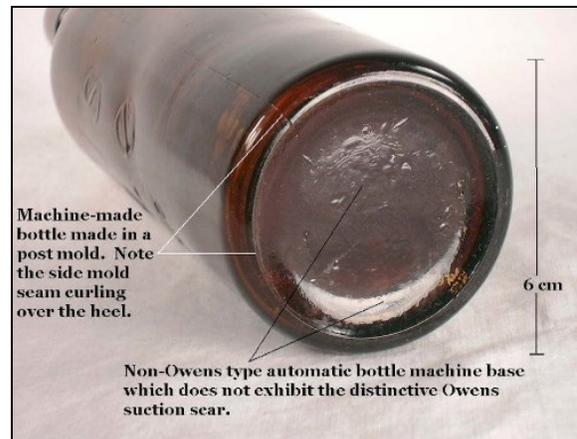


Figure 6 – Base of Ashley machine bottle (Lindsey 2014)

¹ Toulouse (1971:215) and Keller (1998:21-22) claimed that the Graham Glass Co. installed a Johnny Bull machine in 1905 and used it as a basis to develop the Graham machine, but we have been unable to find any primary source for that contention.

virtually overnight. Although semiautomatic machines could compete on large-mouth ware, the Owens was instantly the king of the small-mouth trade. The United machine was the only challenger to that supremacy (Glass Bottle Blowers' Assn. 1908:27-29).

As noted above, Glenshaw Glass installed the first U.S. version of the Ashley machine in the second half of 1907. By this time, the Phoenix Cap Co. controlled the rights to the Ashley machines in the U.S. By February 1908, the Glass Bottle Blowers Assn. sent representatives to observe the Glenshaw machine. Glenshaw "had asked concessions from the Association in working this machine such as allowing boys to operate it but with a skilled gatherer." Although the union initially balked at this idea, it soon reached a compromise in pay, with the gatherer making \$5.00 per day, and each boy receiving \$3.75 for the same period. The decision was made to "do all in our power to keep [the Ashley machine] out of non union factories and, as machinery was displacing blowers, we should miss no opportunity to create conditions that would either prevent their displacement or find work for them (Glass Bottle Blowers' Assn. 1908:27-29).



Figure 7 – Halls Tonic Bottle (Lindsey 2014)

A 1909 article (*National Glass Budget* 1909:1) cited Denis A. Hayes, president of the Glass Bottle Blowers' Assn., as intimating that "the invention in question [i.e., the United machine] will ultimately become something of a rival of the Owens automatic." The Ashley or United machine required "three men and one boy" in its operation and only produced "about six bottles per minute." The article claimed that the machine was no threat to the Owens unless its speed increased substantially; however, "that it is capable of making splendid ware there is no question." As of July 24, 1909, there were 19 Ashley machines in the U.S.:

4 at Hazelhurst, Pennsylvania, making grape juice, catsups, beers and quart brandies
2 at Coshocton, Ohio, making sodas
1 at Kansas City, Missouri, making pickles
3 at Milwaukee, Wisconsin, making beers, pickles, etc.
1 at Indianapolis, Indiana, “operated a short time”
1 at Shinglehouse, Pennsylvania, “no information”
3 at Terre Haute, Indiana, making extracts, beers
4 at Sharpsburg, Pennsylvania, making catsups, beers, flasks, and brandies²

Although the article did not include the names of the individual glass houses hosting the machines, we can determine many of them. This should allow researchers to identify specific attributes of various bottles and attribute them to individual glass houses.

Berney-Bond Glass Co., Hazelhurst, Pennsylvania
Coshocton Glass Co., Coshocton, Ohio
Obear-Nester Glass Co, Kansas City, Missouri
William Franzen & Son, Milwaukee, Wisconsin
possibly Fairmount Glass Works, Indianapolis, Indiana
Elk Flint Bottle Co., Shinglehouse, Pennsylvania
Root Glass Co., Terre Haute, Indiana
Glenshaw Glass Co., Sharpsburg, Pennsylvania

Commoner and Glassworker (1909:12) predicted that the performance of the “Johnny Bull” (Ashley) would improve the same way that wide-mouth semiautomatics ten years earlier had increased in production, ease of use, and decreased in the number of required operators by 1909. The union reported in 1910 that “during the last week of November 1909, there were two United Machines in operation at Glenshaw, Pa., making pint beers; the average daily production for each of the four shops was 245 2/5 dozen.” In January 1910, the “five machines at Milwaukee [Wm. Franzen & Son] were worked 183 days upon a piece work basis (Glass Bottle Blowers’ Assn. 1910:29).

² This was essentially the same list that the union presented in its minutes in 1908 (Glass Bottle Blowers’ Assn. 1908:31).

Two other major union concerns were the “three shift question” and the problem with the “summer stop.” In hand production, the typical setup included several “shops” – i.e. groups of blowers, other workers, and boys – working on two shifts. Machine production added a third shift because the machines could produce 24-hours a day. Similarly, a hand-production glass plant would “stop” for the two hottest summer months, but the machines could keep on turning out bottles. As a result, “Tibbey Brothers [a hand-production operation] had orders which they could not fill at the close of the fire [i.e., end of the blowing season] while the Glenshaw Glass Company [United Machines] are sending men out on the road to solicit orders” (Glass Bottle Blowers’ Assn. 1910:29, 110).

By 1912, there were “nearly a hundred [United machines] in operation” (*National Glass Budget* 1912:1). Unfortunately, the 1912 article only mentioned general statistics. Just a year later, in 1913, 96 United machines operated in the U.S. (probably the same ones enumerated in 1912). The *Journal of Industrial and Engineering Chemistry* (1913:951) noted that “the United machine (semi-automatic) is capable of producing 85 1/3 dozen of bottles per man a day.”

Various American machines began to outpace the United machines by the mid-teens. By 1915, various gob feeders replaced the gatherer and allowed semiautomatic machines to operate fully automatically. While this was good news for the industry in general, it was the death knell for the Ashley machines. Although many continued in use, virtually no one ordered new Ashley machines after the teens. The brief era had run its course.

Discussion and Conclusions

Although the Ashley machine was in use in England for two decades prior to its adoption in the U.S., its popularity in America lasted only a bit over a decade. It provided the only competition to the Owens machine in the production of narrow-mouth bottles. With improvements in U.S. machinery and new inventions, the Johnny Bull machines gradually faded from the American scene.

Of importance to archaeologists and collectors, the machines left no basal machine scars, although they did create the other typical machine characteristics, most notably the horizontal parting line (seam) around the neck of the bottle just below the finish. It is probable that some

of these bottles also had ghost seams on the sides, although we have not yet demonstrated that empirically. Since the machines were only used in the U.S. for a period between late 1907 and ca. 1920, this information provides a reasonable date range for these bottles. The end date, of course, is not entirely reliable; different glass houses continued to use the machines for varying periods of time.

One other ramification of this research concerns the typical method of determining a machine-made bottle. Jones & Sullivan (1989:36-38) suggested several characteristics for the determination of machine manufacture on a container, but many archaeologists and collectors have traditionally relied on basal scars as the primary format. The lack of a machine scar on bottles made by the Johnny Bull suggests that the parting line at the base of the finish may be a better determinant.

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