

Hazel-Atlas Glass Co.

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The best-laid plans sometimes go far beyond the wildest imaginations. When Charles Brady teamed up with Charles Tallman in 1885 to make glass inserts for fruit jars, they could never have dreamed that their enterprise would one day be one of the top glass firms in the U.S. – especially since the new firm made fruit jar liners because no one else felt they were sufficiently profitable. The Hazel Glass Co. quickly expanded into making opal ointment pots and similar items, then fruit jars and product jars. Although Tallman disappeared from the records, Brady financed the Blue machine and began the first truly successful semiautomatic production of wide-mouth containers in 1894.

Brady and his associates formed a new corporation – the Atlas Glass Co. – in 1896, specifically to make fruit jars by machine. Hazel continued with liners and product jars. The two merged with other Brady enterprises in 1902 to form the Hazel-Atlas Glass Co., dominating the market in commercial wide-mouth production. The firm began experiencing financial difficulties in 1956 and sold to the Continental Can Co. In turn, Continental Can sold the glass business to the Brockway Glass Co. in 1965.

Histories

Hazel Glass Co., Wellsburg, West Virginia (1885-1886)

Charles N. Brady¹ and Charles H. Tallman began a factory in Wellsburg, West Virginia, making opal (milk glass) liners for Mason jars on September 3, 1885 (Roller 1971:240). Brady was the president of the Riverside Glass Co., producing tableware, while Tallman was the secretary and treasurer of the Bellaire Stamping Co. – predominantly making lamps and fixtures, although it did manufacture some fruit jars (see the Other B section for a history of Bellaire Stamping). Although Riverside produced liners, it did not want to continue making such low-

¹ For a biographical sketch of Brady, see Roller (1983:436-437).

return items for Bellaire.² Brady and Tallman contributed \$600 each and built two day tanks in an old mill adjacent to the Bellaire plant. The small plant began to make porcelain³ liners for fruit jars at four presses. Initially, the new firm purchased its “batches” (molten glass) from the adjacent Riverside Glass Co. and actually delivered it to the tanks by wheeling it across the street in wheelbarrows (Algeo 1956:1; Evans 1928:16; Florence & Florence 2004:5; Roller 2011:668).

Originally, the plant had only one customer: the Bellaire Stamping Co. Hazel made the liners to fit on the jars made by Bellaire (Caniff 2001:5). Initially, the factory was unnamed, but Brady’s sister-in-law actually contributed the name “Hazel” for the smoke stack in March 1886, following a steel industry tradition. She apparently chose the name randomly. The firm quickly outgrew its facilities and moved to Washington, Pennsylvania, in 1886 (Algeo 1956:2; Roller 2011:669).

Hazel Glass Co., Washington, Pennsylvania (1887-1902)

Brady built a new plant at Washington, Pennsylvania, because the natural gas supply in Wellsburg began to decrease, and the town of Washington offered the company a factory site. Construction began in 1886, and the new plant produced its first liners on January 10, 1887, at its four day tanks. Although Mason jar liners were the first products, the plant soon added opal ointment jars and salve boxes to the inventory – the first firm use of opal (milk) glass for this purpose (Algeo 1956:18; Hawkins 2009:258).

The plant soon built a six-pot furnace, used to make fruit jars, oil “cans,” lamp bases, molasses jars, and other products – all of flint (colorless) glass. The company purchased new property and built another building with a 12-pot furnace on June 12, 1888, that produced fruit

² To clarify, when an opal (milk) glass disk was held in place inside a metal lid, becoming an integral part of the lid, it was called a liner. A glass, ceramic, or metal disk held in place by a metal screw band was called a lid or insert. The ones discussed in this study were all inserts.

³ Although the industry always called these porcelain, they were actually milk or opal glass.

jars, oil “cans,” molasses “cans,” lamp bases and chimneys at a 12-pot furnace.⁴ Brady and Tallman registered the company as a corporation of the State of Pennsylvania on May 3, 1889.⁵ The plant added an eight-pot furnace in 1892. Business was so good that Brady resigned his position with Riverside Glass to concentrate on the Hazel plant (Algeo 1956:18; Caniff 2001:6; Florence & Florence 2004:5; Roller 1998; 2011:669; Toulouse 1969:361).

The company built another eight-pot furnace in 1893, adding catsup, maple syrup, and chili sauce bottles to the production list. This was Hazel’s entry into the small-mouth bottle field. During this period, Brady subsidized experimentation that ultimately resulted in the Blue glass machine. Designed and built by Charles E. Blue, this was the first practical machine to make large-mouth ware. Blue received his first patent in 1894, and Hazel began using the machine about that time (Algeo 1956:18; Hawkins 2009:258). For more information on the Blue machine, see Lockhart & Bernas 2014.

By the start of 1894, Hazel Glass had a 12-pot furnace and an 8-pot furnace both making flint glass products, primarily fruit jars – as well as two day tanks producing fruit jar liners, ointment jars, and patch or salve boxes. Later in the year, the plant installed its first continuous tank along with the first Blue machines – although Algeo said that the tank did not go into production until the following year. This opened the way for more dramatic developments (Algeo 1956:41-42).

Also in 1894, the Hazel Glass Co. was the first glass house in the U.S. to use the Phoenix closure for food jars (Algeo 1956:35-36). Alfred E. Weissenthanner brought the device – invented by his Father in France in 1892 – to the U.S. in 1893 and obtained a U.S. patent in 1902. Julius A. Landsberger controlled the patent – at least in the western U.S. – between 1902 and 1904. Exactly when and how Hazel Glass became involved is unclear. See the Giles-Clough section for more information on this and other early packer closures.

⁴ Toulouse (1971:241) is the only source that claims this furnace made aqua glass. The term “can” was used throughout the glass industry, even though the oil “cans” were made of glass. These were probably originally made of tin.

⁵ This 1889 reference is the last mention of Tallman in connection with the Hazel Glass Co. We have found no explanation for his disappearance from the records.

The firm used the closure on jelly, cherry, pickle, preserve, jam, cheese, and other jars. The Phoenix was the first cap made to standardized sizes – which set the tone for the industry. The cap became very popular and was first used by Reid Murdock & Co. and the Sprague Warner Co. on packer jars made by Hazel (Algeo 1956:35-37, 43; Creswick 1987a:267; Florence & Florence 2004:5-6; Roller 1983:458-459; Six 1993:12; Toulouse 1969:361; 1971:240-241).

In 1895, Charles Brady and Will Henry invented a rotary-press machine to improve the process of making glass liners and ointment pots that were still produced using a side-lever (hand) press. Called the Merry-Go-Round by the workers, it was turned by hand, but it increased the speed of production immensely. Because Brady formed the Atlas Glass Co. in 1896 specifically to make fruit jars (see below), the Hazel Glass Co. shifted away from fruit jar production and concentrated on the manufacture of Vaseline, jam, and pickle jars, ink and polish bottles, and other wide-mouth packers – plus the opal lids and pots (Algeo 1956:25, 27).

Hazel tore down two day tanks for opal glass and replaced them with a continuous tank in August of 1897. By November, however, the plant was listed as having two furnaces with 20 pots and six day tanks with 24 rings. Algeo said that all of the furnaces had been replaced by four continuous tanks by 1898, but an 1899 listing still included one furnace with eight pots – probably making small-mouth bottles (Algeo 1956:42; Roller 1998).

About this time, the demand for opal glass for use in the cosmetics industry soared, and Hazel devoted one tank to the manufacture of opal pressed ware. The firm also made opal novelties, such as the Hen-in-Nest and Battleship Maine containers, bird baths, and other unusual items. The other three tanks made flint glass – Vaseline, ink, and shoe polish bottles, jam, pickle, and other jars. Some of the earliest customers were Chesebrough Mfg. Co., Carters Ink Co., and two firms noted above that were the first to use the Phoenix caps. In late 1893 or early 1894, Tank No. 4 began producing narrow-mouth bottles – catsup, chili sauce, maple syrup, etc. – by hand. The firm stopped making small-mouth bottles in 1912, but reinstated those in 1920 – with the acquisition of the Kearns-Gorsuch Glass Co. (Algeo 1956:42-43).

Opal glass use – by such firms as Mentholatum – increased dramatically between 1894 and 1904, and Hazel's production of opal glass ointment pots and other items also soared. The factory devoted one continuous tank to opal glass production. Because of the use of the Phoenix

cap, the manufacture of cheese and meat jars (notably for Armour and other meat packers) also saw a dramatic increase. Hazel Glass made cheese and beef extract jars on the U.S. Glass or Ripley machines (see Lockhart & Bernas 2014 for more information on the Ripley machines). The firm also made opal novelties, such as the Hen-in-Nest and Battleship Maine containers, bird baths, and other unusual items. J.C. Brady (brother of C.H.) formed the Wheeling Metal Co. in 1899. The Wheeling Metal Co. made a general line of screw-on and other lids in tin plate, brass, and aluminum – as well as zink caps for Mason jars (Algeo 1956:42, 47-48).

By 1900, Hazel was ready to expand again. The firm purchased the Griffith Tin Plate Co. factory in 1900 – also in Washington – and converted it to glass production. The new plant became Hazel No. 2, while the older one was called Hazel No. 1 (Algeo 1956:44). This was also the year that W.S. Brady, brother to Charles H. Brady, opened the Republic Glass Co. at Clarksburg, West Virginia. See more discussion below.

Hazel added a second tank to No. 2 in 1902 and a third in 1903. Initially, Hazel No. 1 made small bottles, with larger ware produced at No. 2, but increased business forced the firm to convert the second tank at Hazel No. 2 to also make Vaseline, ink, and other small containers. Blue machines made most of the products, but the plant also included “two or three Teeple and Johnson machines” that made cherry and olive bottles (Algeo 1956:44-45).⁶

In 1901 or 1902, Hazel changed the smaller wide-mouth tank to amber glass to fill major contracts for snuff bottles for the Geo. W. Helme Co., P. Lorrillard, Wayman Bruton, and the U.S. Tobacco Co. The American Snuff Co. required bottles with openings too small for the Blue machine to make, so it was not until 1910 (with Owens machines – see below) that Hazel landed that contract (Algeo 1956:44). See the section on the Cohansey Companies for more information on these bottles. The various entities consolidated in 1902 to form the Hazel-Atlas Glass Co.

⁶ We have found little information on the Teeple-Johnson machines. They were apparently side-lever press machines that were mostly operated by manpower (Fergusson 1922:36; Glass Bottle Blowers Assn. [1912] 2012).

Containers and Marks

H (1886?-1930s)

According to Caniff (2001:6-7), the Hazel Glass Co. embossed the letter “H” and a number on the bases of its jars. These one- or two-digit numbers appeared either to the right of the “H” or below it. Hazel Plant No. 1 continued the code at least until the early 1930s. These “H” marks are noted below on various wide-mouth packer jars and bottles, although they were not used consistently. The letter was *not* embossed on Vaseline jars made at the Hazel plant. See the Hamilton, Hart, Heinz, Hemingray, Holt, and Other H files for more information. The section on the Great Holt Myth: A Study of Misidentification has the most comprehensive coverage.

HAZEL (ca. 1890-ca. 1904)

Roller (1983:151) described a mouth-blown Hazel fruit jar that was only identified by “THE HAZEL” embossed on the milk glass lid (Figures 1 & 2). The jars were first made by the Hazel Glass Co., then by its descendant, the Hazel-Atlas Glass Co. from ca. the 1890s to at least 1904 but no later than 1905. Creswick (1987a:82; 1987b:62) dated the lids 1887-1907 and noted an error lid misspelling HAZLE. She suggested that the HAZEL jar was made during the 1896-1901 period (Figure 3).



Figure 2 – Hazel lid (North American Glass)



Figure 1 – Hazel jar (North American Glass)

The Roller editors (2011:234) agreed that the lid was embossed “THE / HAZEL” and that Hazel Glass advertised the jars by at least 1894 – a clear indication that Hazel made both the jars and the lids. They were likely made from ca. 1890 into the early 1900s. Although these mouth-blown jars appeared in Hazel sources until ca. 1906, they were replaced about that time by

machine-made jars. The base of the jars were embossed with the letter “H” plus a number (apparently, the “H” was usually above the number).

MASCOT (1886-1887)

The story of the Disk Immerser – a controversial liner made by the Hazel Glass Co. – is complex and cryptic. The original jar was embossed “MASCOT (slight arch) / DISK (horizontal) / IMMERSER (slight inverted arch)” on the front and had a lid embossed “TRADE MARK DISK

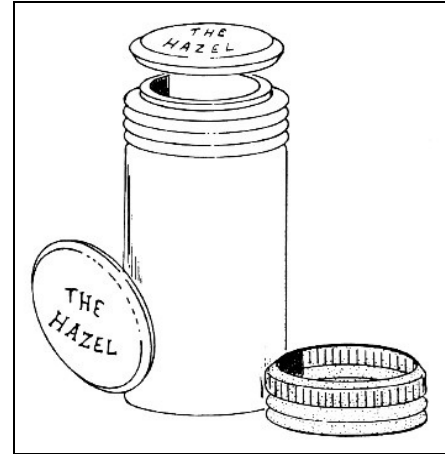


Figure 3 – Hazel jar & lid (Creswick (1987a:82)



Figure 4 – Disk Immerser (North American Glass)

IMMERSER. PATD. NOV 30.80 JULY 20.86” around “MASCOT” [or MASCOTTE (French)] on top of the Immerser and “PAT. NOV. 23.75 SEP 12.76” on the bottom (Roller 1983:207) (Figures 4).

Elizabeth S. Hunt, of Cleveland, Ohio, applied for a patent for an “Improvement in Fruit Jars” on September 15, 1875, and received Patent No. 170,172 on November 23, 1875 (Figure 5). Her invention consisted of an “immersing plate . . . which is made to hang below the plane of the lid or cover . . . upon the contents of the package” to keep those “contents submerged in its preserving liquor or fluid.” The patent had no assignment. Her second patent (No. 182,119) was for an “Improvement in Preserving-Packages for Fruits, etc.” She applied for this one on August 5, 1876, and received it on September 12 of that year (Figure 6). This second patent was to improve the “means employed for retaining the immersing-plate in position, and in its

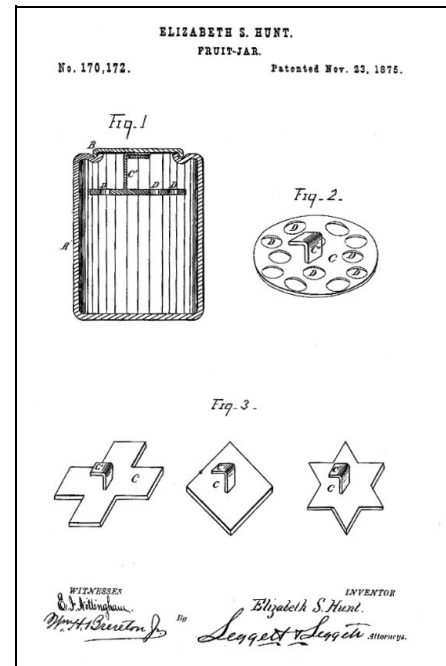


Figure 5 – Hunt 1875 patent

construction, so as to suit differently-formed packages” – primarily a different shape of the immersing plate. There seems to be no evidence that either patent was used prior to the Disk Immerser.

William Andrew of Jersey City, New Jersey, followed with an application on September 22, 1880, for a “Cover for Vessels.” On November 30 of that year, he received Patent No. 234,842 (Figure 7). Andrew claimed that his invention had “a longer or deeper neck” than the previous ones, and was

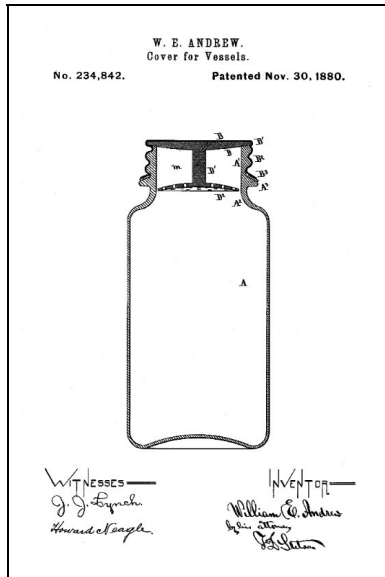


Figure 7 – Andrew 1880 patent

held in place by a “screw-threaded upper portion” – a threaded lid similar to those used on Mason jars. An ‘internal groove or annular recess’ at the top of the metal lid attached the lower (glass) part to the lid. William Somerville, of St. Louis, Missouri, introduced the final patent in this series, applying for a “Jar” on March 29, 1880, and receiving Patent No. 345,999 on July 20 of the same year (Figure 8). Sommerville introduced the term “immerser” and claimed an improvement in the

“construction and arrangement of immersers used in fruit-jars or cans for preventing the rising of the fruit above the surface of the sirup.” His drawing looked like the final Disk Immerser that was placed on the market.

Roller (1983:207) noted that Sommerville was the president of the Missouri Glass Co. of St. Louis, the sales outlet for immerser jars and lids in 1886 and 1887. Although we have no direct historical evidence, Sommerville must have

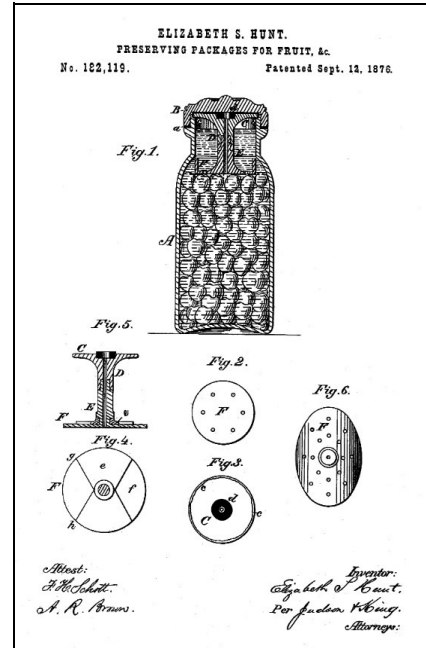


Figure 6 – Hunt 1876 patent

“internal groove or annular recess” at the top of the metal lid attached the lower (glass) part to the lid. William Somerville, of St. Louis, Missouri, introduced the final patent in this series, applying for a “Jar” on March 29, 1880, and receiving Patent No. 345,999 on July 20 of the same year (Figure 8). Sommerville introduced the term “immerser” and claimed an improvement in the

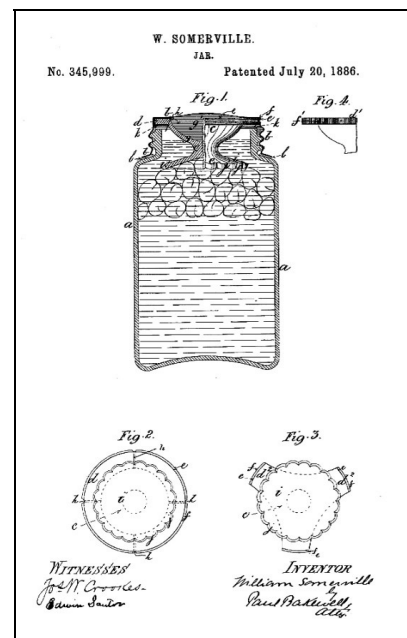


Figure 8 – Somerville 1886 patent

purchased the earlier patents in order to apply the numbers to the Immerser. The Missouri Glass Co. began the production of window glass in 1850, but a new firm (still using the older name) took over the factory in 1856. By 1859, the plant made glass tubes and rods, vials, lamps, tumblers, decanters, candle holders, etc. The plant may have been idle from 1860 to 1863, and Missouri Glass sold the factory to the Planters Glass Co. in 1865. At that point, the firm became a jobber in glass and ceramic articles until it closed ca. 1912. See the section on the Missouri Glass Co. for more information.

Roller (1983:207) did not know the manufacturer of the Mascot, and he did not hazard a guess – nor did he list a date range. Creswick (1987a:113) illustrated the jar, and noted that both the Bellaire Stamping Co. and the Ridgeway Refrigerator Mfg. Co. advertised the closures – although she presented no dates for the ads. She suggested the Hazel Glass Co. as the manufacturer in 1885 but noted that other glass houses could have made the jars. It is clear from her drawing that the Mascot Improved (see below) was *not* made from the same mold (Figure 9).

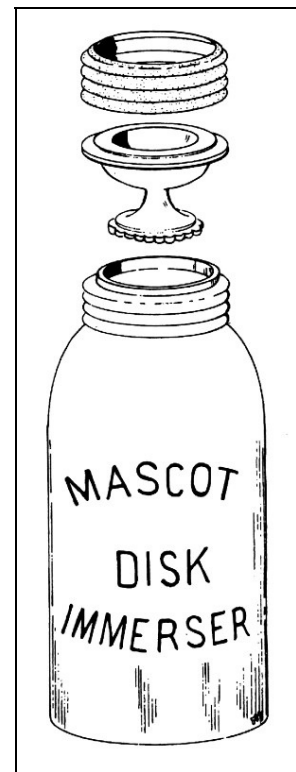


Figure 9 – Mascot jar
(Creswick 1987a:113)

The Missouri Glass Co. advertised the jars in 1886 and 1887, so it seems logical that a St. Louis glass house made the jars. Since Missouri Glass sold its factory in 1865, it could not have made these jars. The Mississippi Glass Co. had shifted to plate glass in 1885, so the most likely choices were the Lindell Glass Co. or the Frederick Heitz Glass Co. (see those respective files). The jars were made of aqua glass, a color not associated with the Hazel Glass Co. See the discussion below and the Discussion and Conclusions.

MASCOT IMPROVED (ca. 1887-ca. 1896)

Toulouse (1969:195) illustrated a mouth-blown jar embossed “THE (horizontal) / ‘MASCOT’ (slight arch) / TRADE MARK / PAT’D (both horizontal) / IMPROVED (slight inverted arch)” on the front and suggested that it was made by the Mason Fruit Jar Co., Philadelphia, Pennsylvania, from 1885-1900 (Figure 10). He explained: “On the back of this jar

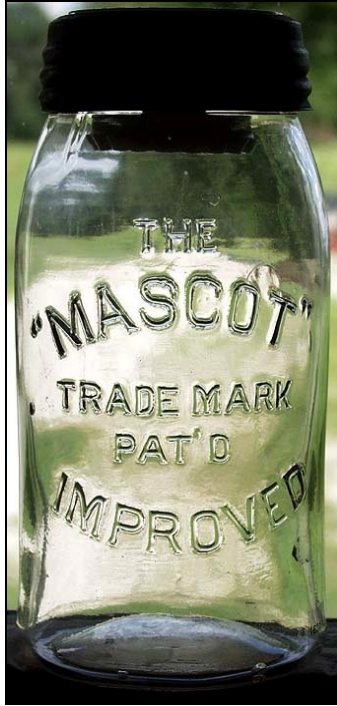


Figure 10 – Mascot Improved (North American Glass)

is a ‘Tudor Rose’ design, also identified with this particular glassmaker through finding it on an opal lid with the name: Mason Fruit Jar Co., Philadelphia, Pa.” He also claimed that the opal liner was embossed “THE ‘MASCOT’ IMPROVED - TRADE MARK PAT’D -” in a circle around the Tudor Rose symbol (Figure 11). No other source placed the rosette design on the back of the Mascot jar – although it was certainly on the liner.



Figure 11 – Mascot insert (North American Glass)

In refutation of Toulouse, Charles N. Brady – the president of the Hazel Glass Co. – registered “THE (horizontal) / MASCOT (arch) / TRADE MARK (horizontal) / IMPROVED (inverted arch)” (No. 17,583) on February 25, 1890, claiming a first use on March 17, 1889 (Creswick 1987a:113, 258; Roller 1983:422). Roller (1983:207) added that Brady specified that the trademark could be changed by including “a spray of flowers or other ornaments.” He said the maker of the jar was uncertain, but it was probably the Hazel Glass Co. between ca. 1889 and the early 1890s – certainly basing the starting date on Brady’s first use claim.

Probably the earliest variation of the jar had a line drawing of the Immerser figure between “MASCOT” and “IMPROVED” (Figure 12). The Roller editors (2011:313) noted that this variation was extremely rare. It seems probable that Hazel Glass only made a single mold with this labor-intensive design and probably used those in the initial marketing drive. Once the jar was a sure seller, the firm had no need for the more elaborate design.

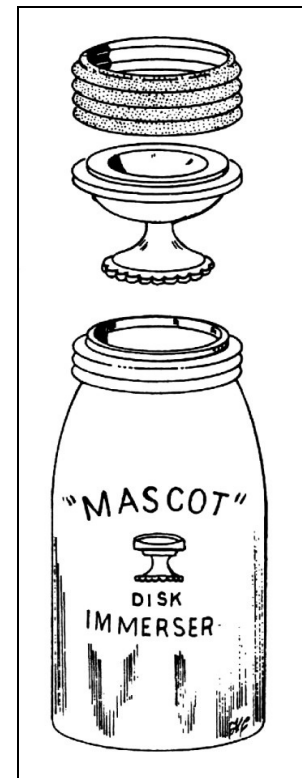


Figure 12 – Mascot Disk Immerser (Creswick 1987a:115, 117)

Creswick (1987a:113) added that the mark was used from 1885 to 1902 and that another jar was embossed “THE (horizontal) / ‘MASCOTTE’ (arch) / TRADE MARK / PAT’D (both horizontal) / IMPROVED (inverted arch)” (Figure 13). Interestingly, some jars had the Disk Immerser, while others had an opal liner with the Rosette design (see above).

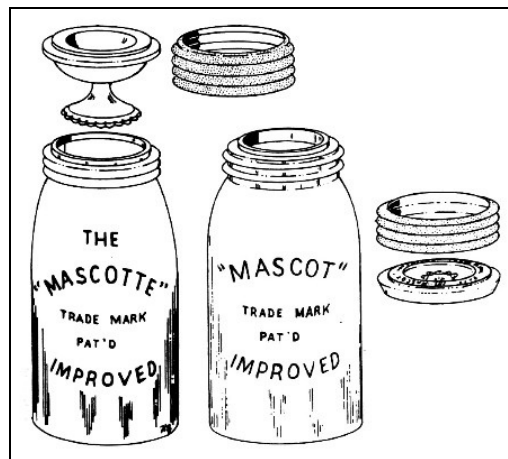


Figure 13 – Mascot Improved (Creswick 1987a:113)

Discussing the Mascot Improved and the trademark date, the Roller editors (2011:669) stated that “it seems likely the IMPROVED referred to several 1888 and 1889 Brady patents for methods of forming the sealing of jars. Hazel may have made the ghosted versions of these jars, embossed “THE MASONS IMPROVED” . . . but this is not certain.

Creswick (1987a:119-120) illustrated some of the Mason or Mason’s Improved jars that may have derived from the Mascot Improved (see below).

The Roller editors (2011:213-214) added that the Bellaire Stamping Co. advertised the immerser disk (i.e., the Mascot) in 1887 and 1888. The editors further stated that “the rosette design and ‘Mascot Improved’ trademark registration have long seemed to be associated but they appear together only on the milk glass lid.” The bases of half-gallon sizes were embossed with an “H” along with 9, 10, or 15 plus a “teeter-totter’ underline.” Unfortunately, they did not define or illustrate a “teeter-totter’ underline.”

“MASON’S” – MASON’S PATENT and the “Tudor Rose”

As noted above, Toulouse (1969:195) discussed the Mascot jar, claiming that it had a “‘Tudor Rose’ design” on the back of the jar (although the symbol was not identified with the Masot *jars* by any other source). He further stated that an opal glass lid with the name of the Mason Fruit Jar Co., Philadelphia, Pa., was also embossed with the “Tudor Rose” – also unsupported by any other source.

In his later book, Toulouse (1971:344) continued to identify the Mason Fruit Jar Co. as the user of the “Tudor Rose” symbol (although he added “or, whatever name”). He knew very little about the firm, but he dated both the “MASON” in quotation marks and the “rose” ca. 1885-1900 and linked them with the Mason Fruit Jar Co. He further suggested that the firm began business after the Mason-jar-related patents had expired but took the precaution of embossing “MASON” in quotation marks to avoid a suit.

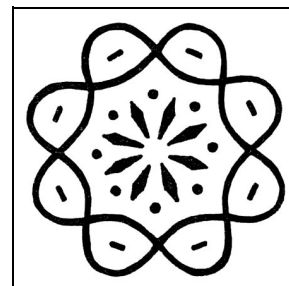


Figure 14 – Rosette design (Roller 1983:245)

Roller (1983:245) called this pattern a “rosette design” and stated that it had been “coined previously as “snowflake” or Tudor Rose,” neither being appropriate. The original name and significance of the design have not been determined, despite diligent searching.” Toulouse (1969:195) had used the term Tudor Rose for this design, and we agree with Roller that the term is inappropriate (Figure 14). The actual Tudor Rose was a five-petaled flower, totally unlike this design. We also question the term “rosette design” – there being nothing in the symbol to indicate a rose. However, rather than create yet another name, we will use the “rosette design” title.

Roller treated the Quotation Mason and the Rosette Mason as two different jars. The first was embossed “THE (horizontal) / ‘MASONS’ (slight arch – in quotation marks) / IMPROVED (slight inverted arch)” on the front with no embossing (notably no rosette figure) on the reverse (Figure 15). He added a colorless variation with “MASCOT” TRADEMARK PATENT ghosted through and below “MASONS” and another (also colorless) with “decorative ridges near shoulder and heel.” Although he was uncertain, he noted the Bellaire Stamping Co. and Hazel Glass Co. as possible manufacturers, although he failed to include a date range. He also noted that the correct lid for the jar was not known (Roller 1983:220).

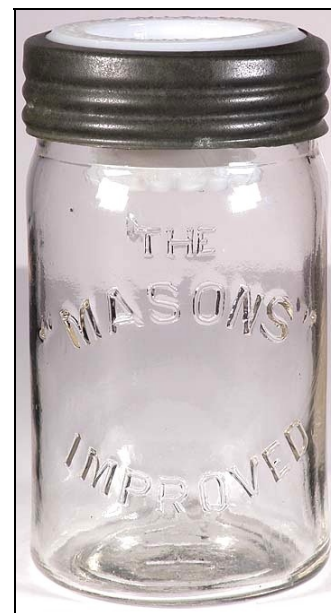


Figure 15 – “Masons” Improved (North American Glass)

Roller (1983:235) noted the rosette design on the reverse of an aqua, colorless (SCA), or amber, shoulder-seal jar embossed

“MASONS / PATENT / NOV. 30TH / 1858” on the front. The jar was sealed by one of two methods. One liner was embossed “PORCELAIN LINED CAP FOR MASON FRUIT JARS” around a rosette figure, with the same information stamped on top of the metal cap. The second had the Disk Immerser as described in the Mascot section (above). He suggested the Bellaire Stamping Co., the Missouri Glass Co., or the Hazel Glass Co. as the producer.

Creswick (1987a:137) illustrated a Mason’s Patent jar with the 1858 patent date on the front and the “rosette” on the reverse but followed the Toulouse identification of the Mason Fruit Jar Co. as the maker (Figure 16). In a refutation of Toulouse, however, Creswick noted “Porcelain Lined Cap for Mason Jars (tudor rose)” on both the

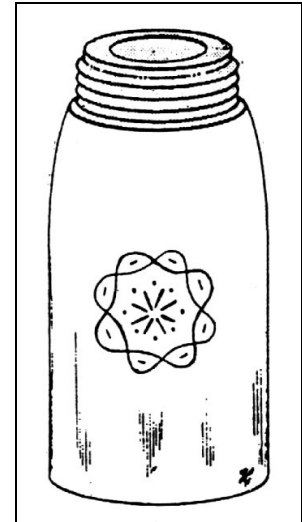


Figure 16 – Mason rosette (Creswick 1987a:137)

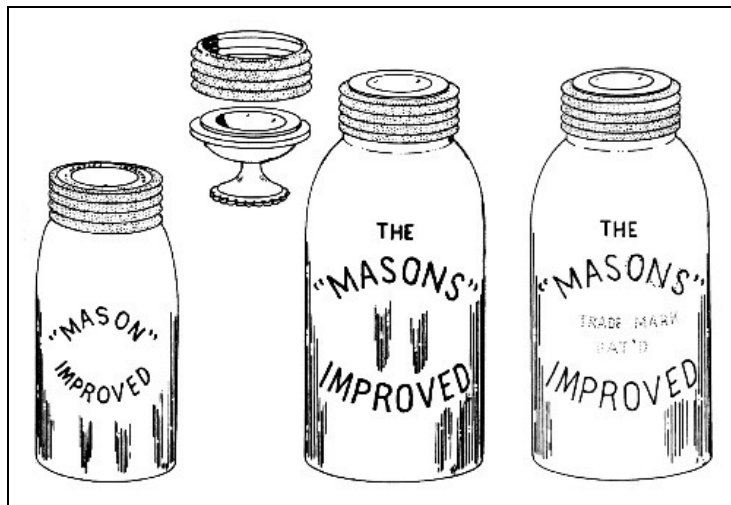


Figure 17 – “Masons” Improved (Creswick 1987a:119-120)

inside and outside of the lid – the same lid described by Roller. Creswick (1987a:117, 118-119) also included the two Mason’s Improved jars described by Roller as well as two others. One had “MASON’S” (slight arch – in quotation marks) above a drawing of a Disk Immerser, with “DISK / IMMERSER” below it. The second was embossed “MASON’ (arch in quotation marks) / IMPROVED (inverted arch) on the front (Figure 17).

The Roller editors (2011:669) noted that “there is also some belief that [the Hazel Glass Co.] made some of the ‘MASON’S PATENT’ jars embossed with a ‘rosette’ due to their close ties with the Bellaire Stamping Company.” As noted above, the editors stated that the relationships between Hazel, Bellaire, the rosette logo, and the two jars were not clearly understood. They also stated that the rosette design has been frequently associated with Bellaire and Hazel even though the single opal liner is the only link with either firm and the design.

The Roller editors (2011:336) noted THE “MASONS” IMPROVED with an “H” and a “4” on the base as well as “H” with 18, 21, or 23 basemarks, and the decorative ridge shoulder/heel design with “H” plus 23, 25, or 28 on the base. Despite the “H” basemarks and the ghosted “MASCOT,” they still maintained that the manufacturer was unknown – although possibly the Bellaire Stamping Co. or the Hazel Glass Co. It may be notable that the Roller editors did not include the jar with “MASON” in an arch and “IMPROVED” in an inverted arch or the one with the drawing of the Immerser – both illustrated by Creswick. See the Discussion and Conclusions section for a date range and an attempt to make sense of all the conflicting information.

SAFETY VALVE – HC monogram in a triangle (1895-ca. 1918)

Toulouse (1969:270-271) discussed four variations of the Safety Valve jars. The jar had a complex glass lid with a central valve to vent the contents during boiling. The jar had ornate designs encircling the shoulder and heel that Toulouse described as a “Greek key design” (Figure 18). The base was embossed “SAFETY VALVE (arch) / {HG partly enclosed in a triangle} / PAT^d MAY 21 1895 (inverted arch)” (Figures 19 & 20). He claimed that the jars were made by the Hamilton plant of the Diamond Glass Co., Diamond Flint Glass Co., and the Dominion Glass Co. from ca. 1895 to ca. 1930.



Figure 18 – Greek key design (North American Glass)



Figure 19 – Safety Valve jars (North American Glass)

A second variation had “HG in a diamond” in the center,” and a third one was identical to the first except that the Greek key designs were missing. A final example only had “SAFETY VALVE” on the base. Toulouse noted that Henry C. Dilworth of East Orange, New Jersey, received Patent No. 539,674 on May 21, 1895 (applied November 6, 1894) and added that John Algeo of Hazel-Atlas informed him that the lid was “considered a



Figure 20 – Safety Valve base
(North American Glass)

good seal, but expensive. It was used commercially, as by J. Hungerford Smith & Co. for glassed fruits for the hotel trade, as well as for fruit jars, and was not discarded until about 1930" (Figure 21).

In his second book, Toulouse (1971:243) showed this mark as being used by the Hamilton Glass Works, Hamilton, Ontario, Canada, from “probably 1893 to 1896.” The mark was used on Hamilton’s Safety Valve fruit jar in 1895. Assuming that the Toulouse dates are correct, the jars were actually made at the Hamilton Glass Co. (not Works).

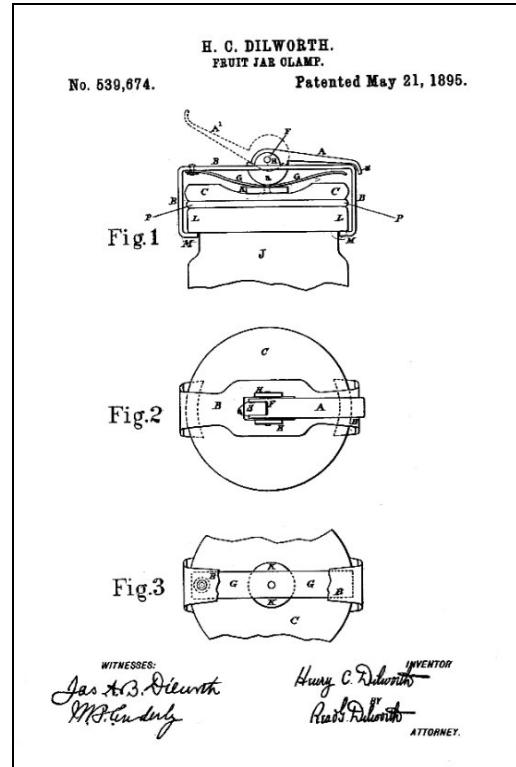


Figure 21 – Dilworth 1895 patent

According to Toulouse (1971:243), the Hamilton Glass Works, Hamilton, Ontario, Canada, used this mark “probably 1893 to 1913, or beyond.” The Diamond Glass Co. used the diamond as its mark and apparently added the HG to identify the Hamilton plant when it took control. The reason for the “beyond” is that the diamond was also used by Dominion Glass Co., successor to Diamond in 1913.

Toulouse may have received erroneous information from an informant. He not only recorded the logo as “HG” – he also drew the logo that way. Roller (1983:314-315) corrected the information to read “HC” (see Figure 21) – clearly seen on the jars, themselves – and produced positive evidence (including an ad from December 12, 1895, and a brochure ca. 1904) that the jars were first made by the Hazel Glass Co., later by Hazel-Atlas. The clamp was stamped “SAFETY VALVE PATD MAY 21 1895.” He dated the jars between 1895 and the 1910, although the Safety Valve Fruit Jar Co. began in 1908 as a sales outlet for the jars.

Roller noted that Henry C. Dilworth patented the jar, and J. Dale Dilworth – one of the founders of the Safety Valve Fruit Jar Co. – was the secretary and treasurer of the Salem Glass Co., so that firm likely also made some of these jars (also see the section on the Salem Glass Co.). Henry Dilworth registered the “HC over a triangle” trademark on August 11, 1896, claiming first use at May 21, 1895. The Greek Key design was from the patent of William H. Dilworth (see below). Roller mentioned that he did not know if there was a family connection between these three Dilworths. The Minnesota Stoneware Co. at Redwing, Minnesota, also made white stoneware jars with “SAFETY VALVE HC” over a triangle. The jars were made with and without the Greek Key design.



Figure 22 – 1909 ad (*Good Housekeeping*)

Located at 10 4th St., Salem, New Jersey, the Safety Valve Fruit Jar Co., incorporated on November 21, 1908, with a capital of \$50,000. William H. Hazelton was its agent (State of New Jersey 1914:616). A 1909 ad in *Good Housekeeping* magazine noted that “large packers of fine fruits and vegetables have been using [the Safety Valve Fruit Jar] for years” (Figure 22). The firm continued to be listed in New Jersey tax documents until 1908.

William H. Dilworth applied for a patent for a “Design for a Fruit Jar” on May 17, 1886, and received Design Patent No. 16,817 on July 27 of the same year. He called the shoulder and heel designs a “Greek border” (Figure 23). Note that this was almost a decade earlier than the Henry C. Dilworth patent (see above). The drawing showed a wire handle for carrying.

Creswick (1987a:188) added that Safety-Valve jars were used by commercial (product) firms, such as H.W. Pettit, E.C. Hazard, Burnett, True Fruit, and Crandell & Godey – as well as others. She illustrated the jars and claimed the Salem Glass Co. as the main producer, although both Hazel and Hazel-Atlas also made them (Figure 24). Jerry McCann and Tom Caniff



Figure 23 – Dilworth 1886 patent

suggested that the “equilateral triangle in the trademark actually represents the Greek letter delta, or D, standing for Dilworth.” The editors also noted that some of these jars were embossed with the HA monogram, placing their manufacture after 1923 (Roller 2011:669). This is almost certainly correct: since the initials are “HC” over the triangle, it almost certainly forms Dilworth’s initials – H.C.D.

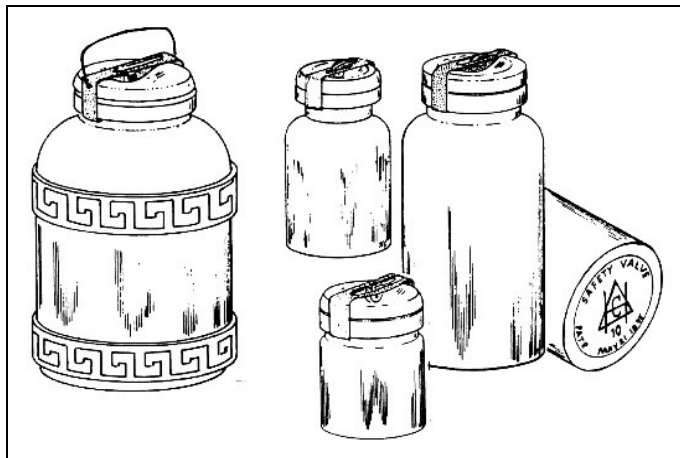


Figure 24 – Safety Valve jars (Creswick 1987a:188)

Dating these jars is a bit odd. The design patent was received in 1886, almost a decade earlier than 1895, the patent for the closure. Thus, the jar was not made prior to 1895. However, the Safety-Valve Fruit Jar Co. did not open until 1908. The 1909 ad for the fruit jar is probably the key to understanding. The ad stated that “large packers of fine fruits and vegetables” had been using the jar for years. In other words, the closure began its existence on packers’ jars and only became advertised as a fruit jar in 1909. Hazel-Atlas probably stopped producing the jar ca. 1918, when the Safety Valve Jar Co. closed.

All of this leaves unanswered questions that we cannot resolve with current data. We do not know why the Dilworths (probably) had Hazel (and later Hazel-Atlas) and Salem both make the jars – if that is what happened. Even though one of the principals in the Safety Valve Jar Co. was involved with the Salem Glass Works, and the jar firm was also located in Salem, we do not know for certain that the Salem Glass Works made any of the jars. If that is correct, of course, we still need to know why not. Both Hazel and Hazel-Atlas certainly made and advertised the jars, but the relationships between the two glass houses and the various Dilworths remains far from clear.

Atlas Glass Co., Washington, Pennsylvania (1896-1902)

Brady next teamed up with R.J. and George Beatty and J.W. Paxton to form the Atlas Glass Co., also in Washington, Pennsylvania. The group formed the new firm specifically to use

the Blue Semiautomatic Machine, developed by Charles E. Blue of Wheeling, West Virginia (see Lockhart & Bernas 2014 for more information about the Blue machine). The plant's first products were probably the "-Atlas-" jars. Although fruit jars were the main product, the factory also made bird baths, lantern globes, seed boxes, and Vaseline jars. The firm incorporated in early April of 1896, and the plant began operation on July 20 with a 20-ton, six-ring continuous tank. By September, the plant was producing 30,000 Mason jars a day on five Blue machines (Algeo 1956:45; Hawkins 2009:39; Roller 1998; 2011:669; Toulouse 1971:241).

Because Hazel made flint glass, it was difficult to compete with the Ball Brothers, who specialized in fruit jars made of "green" glass – which was much cheaper. Atlas filled in that gap (Algeo 1956:46). Toulouse (1971:241) claimed that Hazel had added a green glass furnace fairly early, but he may have been mistaken, since Algeo specified flint (colorless) glass was specific to Hazel.

In 1897, the United States Glass Co. sued the Atlas Glass Co., claiming that the Blue machine infringed other patents. The suit discovered earlier patents from an English firm, so Brady purchased the rights to those patents. However, they had expired, so the patents were now free for anyone to use, and the flood of semiautomatic machines began. For more information on the various Blue machines, see Lockhart and Bernas 2014.

Atlas Glass merged with the Wheeling Metal Co. and the Republic Glass Co. in October 1901 to form the Atlas Glass & Metal Co. The Republic Glass Co. had been formed in 1898 to make jelly glasses and tumblers with semiautomatic machinery. In 1902, Atlas and Hazel merged to form the Hazel-Atlas Glass Co. (Caniff 2001:11; Creswick 1987a:262; Florence & Florence 2004:6; Roller 1983:459; Six 1993:6; Toulouse 1969:362; 1971:55, 421).

Containers and Marks

ATLAS

Discussing the Atlas EZ Seal jar, Toulouse (1969:22) stated that "John Algeo, retired Sales Manager for Hazel-Atlas tells me that this jar was the initial production of the Atlas glass Co. in 1898." The jar was embossed "ATLAS (arch with two small circles before the word and

three after) / E-Z / SEAL (both horizontal) / TRADE MARK REG. (inverted arch)” on the jar front.

The Roller editors (2011:670), however, reached a different conclusion. The first mention for E-Z seal jars that they could find was a letter dated January 13, 1906, offering the jars. The editors noted that Atlas Glass advertised the jars embossed “-ATLAS- MASONS’S PATENT NOV. 30TH 1858” and “-ATLAS- MASONS’S PATENT” in 1898 trade journals. (Figures 25). The earlier Roller edition (1983:20) had reached a similar but less positive conclusion, dating the Nov. 30th 1858 jars ca. 1898-1900s. Roller noted that the jar was “probably one of the earliest jars made by Atlas Glass Co. Since the ‘- Atlas -’ is often lighter than the rest of the embossing, it is possible that it was cut into acquired molds.”



Figure 25 – -Atlas- Mason (North American Glass)

Roller added a variation embossed “MASON / FRUIT / JAR” with “ATLAS” ghosted above “MASON”; “WHITNEY (arch)” ghosted between “MASON” and “FRUIT”; and “PAT’D 1585 (inverted arch)” between “FRUIT” and “JAR.” Why this Whitney jar showed up with Atlas is a mystery. See the section on the Whitney Glass Works for more information on that firm.

He dated the Mason’s Patent jars ca. 1896-1919 and noted that they were sealed by typical Mason jar lids (embossed with the Hazel-Atlas Glass Co. name or Simplex glass lids (see the section for the Perfection Glass Co. for more on the Simplex jars and lids). He added variations ghosted “JAR SALT DETROIT SALT CO. MASON’S PAT.” or “JAR SALT” on the reverse.

Creswick (1987b-8-9) illustrated six variations (plus the Whitney jar). She dated the Whitney variation ca. 1896-1900 but mostly assigned dates of 1900 or later to the others. One variation she dated to the 1920s (Figure 26). Atlas jars continued to be made by the Hazel-Atlas Glass Co. (see below).

Republic Glass Co., Wheeling, West Virginia (1898-1901)

W.S. Brady, brother to Charles H. Brady, opened the Republic Glass Co. at Clarksburg, West Virginia, in 1900 to make tumblers on the Cleveland press machines.⁷ Jelly tumblers were in great demand for housewives who canned jelly at home. In addition, the plant discovered an automated technique for glazing

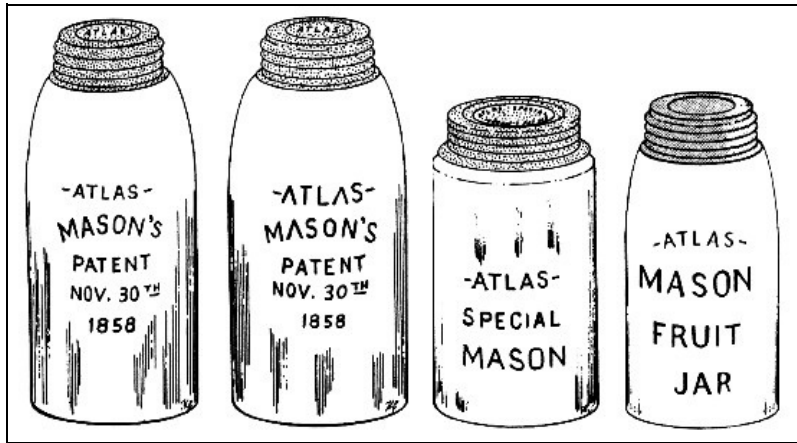


Figure 26 – -Atlas- jars (Creswick 1987b-8-9)

the rims of the jelly tumblers to make drinking tumblers, opening up a new market. The firm also sold tumblers for the packaging of shredded codfish, sliced bacon, chipped beef, and peanut butter, using the Giles Vacuum Cap and finish (Algeo 1956:27, 48-49). See the Giles-Clough section for more on the Giles cap.

According to Welker and Welker (1985:87), the firm incorporated in 1900 with a capital of \$100,000. The plant was built and operational before the end of 1900. It was absorbed by the Atlas Glass & Metal Co. in 1901. The factory made pressed glass and tableware, but “packers’ ware such as jelly tumblers were the main products.

Hazel-Atlas Glass Co., Wheeling, West Virginia (1902-1957)

Incorporated in West Virginia, in 1902, Hazel-Atlas was a merger between the newly formed Atlas Glass & Metal Co. and the Hazel Glass Co. The company began with four glass plants (three in Washington, Pennsylvania, one in Clarksburg, West Virginia) and one metal plant in Wheeling, West Virginia (Roller 1983:459). In 1904, the plants at Washington,

⁷ Although Republic deserves mention here as part of the Hazel-Atlas combine, tumbler machines, such as the Cleveland press, are beyond the scope of this work. We are likewise unclear about the term “glazing the rims” – although this may refer to a type of fire polishing, where the top seam is removed.

Clarksburg, and Wheeling made “proprietary ware and fruit jars, tumblers and packers’ ware” at ten tanks with 80 rings (*American Glass Review* 1934:171).

By 1904, Atlas invented the “dog churn machine” for making pressed lids. The machine revolved vertically instead of horizontally and used gravity to drop out the finished lid. It also used the first mechanical feeder system to deposit a gob of glass into the mold (Algeo 1956:63). Also in 1904, Hazel-Atlas converted one of the tanks to make small-necked olive and cherry jars, and the Clarksburg factory began making tumbler-shaped jars for packing everything from meat to jelly. About this time, the Clarksburg plant also began making tableware (Florence & Florence 2004:6).

Hazel-Atlas acquired the exclusive license to use the Owens Automatic Bottle Machine for the production of virtually all kinds of packers’ ware on May 20, 1909,⁸ and Hazel No. 2 installed the machines that year. At that point, the firm removed the Teeple-Johnson machines. Unlike most of the other licensees, Hazel-Atlas paid almost no royalties to the Owens Bottle Machine Co. Instead, the firm paid its share as dividends on the 5,000 shares of stock it had deeded to Owens (Algeo 1956:64, 66; Evans 1928:16; Scoville 1948:105, 107). By 1910, the firm had adapted its own feeder system to all the machines in every plant, except the hand production tank at Hazel No. 1 (Algeo 1956:64).

The plant ceased production of small-mouth bottles – the last items made by hand – in 1912 (Algeo 1956:64). By 1913, Hazel-Atlas was listed as using both mouth-blown and automatic machine processes to make “milk, packers’ and preservers” bottles and fruit jars at 16 continuous tanks (*Journal of Industrial and Engineering Chemistry* 1913:954). It is likely that the report used 1912 date, thus including mouth-blown production. In 1914, the firm installed 11 Owens Automatic Bottle Machines at Factory No. 2, Washington and three more at the Clarksburg plant. All made a “general line” of bottles (*Glass Industry* 1928:16; *Journal of Industrial and Engineering Chemistry* 1914:864).

The Toledo Glass Co., the owner of Owens’ automatic pressed glass machines, issued a licence granting exclusive rights to make pressed tumblers to Hazel-Atlas in 1915 (Scoville

⁸ A 1912 court case, however, stated that the date was June 22 (reported in Roller 1998).

1948:151). A French chemist (known only as Duval) who was hired by Hazel-Atlas as a laborer, pestered the foreman to allow him to try a new secret ingredient in the glass batch. Manganese had been used as a decolorant, but increasing problems (including the wartime shortage) were making the current flint (colorless) glass unsuitable (see Lockhart 2006a for a discussion of this very complex subject). He was finally allowed to try, and his “secret ingredient” created a high-quality colorless glass. Selenium, his “secret,” soon became the standard (Florence & Florence 2004:7).⁹

The firm built a new plant with a single tank at Grafton, West Virginia, in 1916 and added a second tank the following year – along with six more Owens machines (Florence & Florence 2004:7; *Glass Industry* 1928:16; Roller 1983:459). The Grafton factory made hollowware (Six 1993:12). In 1917, the Washington plant used one 6-arm Owens machine and ten 10-arm machines to make “preservers and miscellaneous bottles.” The Clarksburg factory used one 6-arm machine and two 10-arm machines to produce “proprietary medicine ware and jars.” The unit at Grafton only boasted three 10-arm machines, but the product was only listed as “bottles” (Palmer 1917:213).

In an interesting, although possibly apocryphal story, Alego related that Hazel-Atlas “backing into” the manufacture of the cobalt blue Vick’s Vaporub jars because the “smaller Maryland factory” (Maryland Glass Corp.) could not keep up with the demand in 1917.¹⁰ Alego was actually off by a year. The Spanish Flu epidemic first hit the United States in March 1918 and continued to take a toll until June 1920. Millions died, creating a great demand for the medicines of the day – including Vick’s Vaporub. The Maryland Glass Corp. was the major producer of cobalt blue bottles (Algeo 1956:61, 90; Florence & Florence 2004:7). See the section on the Maryland Glass Corp. for more on the firm and their cobalt blue bottles.

Although Algeo could not define a reason, the cosmetic business increased dramatically after World War I – so much so that Hazel No. 1 replaced the opal tank with two new ones in 1919, converting the old tank to flint production. Opal (milk glass) cosmetic jars had always

⁹ Although the story may be true, selenium had been used as a decolorant by some glass houses at least as early as the 1880s.

¹⁰ Roller (1998) reported that blue glass production began in 1916.

been marketed by the company as medicine containers, but the 1928 catalog was changed to actually sell them as cosmetic jars. This probably indicates a flood of milk glass jars on the market during the 1920s.

The Blue machine finally became fully automatic in 1920, the same year the firm began shipping containers to the West Coast. By 1920, Hazel-Atlas had seven tanks at Hazel No. 1, four at Hazel No. 2, five at Clarksburgh, two at Grafton, and four at Atlas – a total of 22, plus the cap plant at Wheeling. In 1920, Hazel-Atlas developed the Hazelcap – a one-piece aluminum vacuum cap with a rubber gasket that created a side seal. It also had a tear-off feature and was used for about 15 years (Algeo 1956:66, 76, 91-92, 148; Florence & Florence 2004:7).

Hazel-Atlas bought the Oklahoma Glass Bottle Co. at Blackwell, Oklahoma, in 1920 as well as the Kearns-Gorsuch Glass Co. at Zanesville, Ohio – along with the right to use the new Hartford paddle feeders – an improved gob feeder system.

The Kearns-Gorsuch Bottle Co. had plants at Zanesville

and Barnesville, Ohio, in 1920, but the Barnesville plant was destroyed by fire soon afterwards.

The company then built a second factory at Zanesville to make narrow-neck bottles, jugs, tumblers, and other products (Figure 27). These placed Hazel-Atlas back in the bottle business.

The Zanesville No. 2 plant was completed and began production in 1923. In 1923, Hazel-Atlas began to use a fully automatic version of the Blue machine (called the A.E. machine) to make small semi-wide mouth and wide mouth ware, such as Vaseline, ink, and polish bottles (Algeo 1956:106, 110). See the section on Kearns-Gorsuch for a history of that firm. As far as we can tell, the Oklahoma Glass Co. use no manufacturer's mark, so it is unlikely that we will produce a history of the firm.

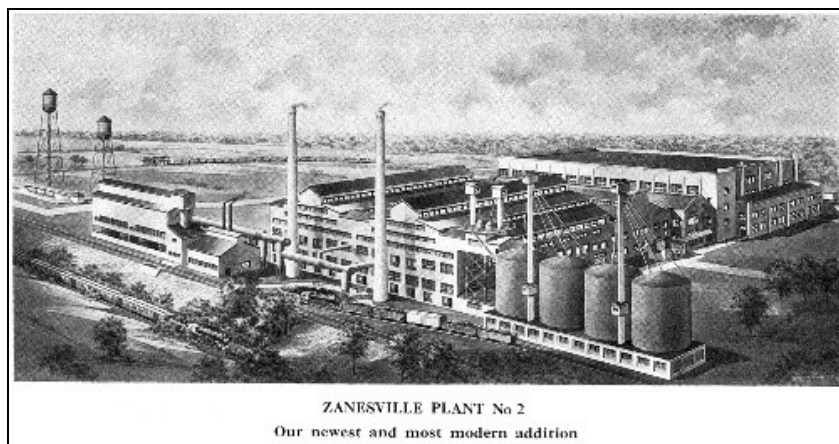


Figure 27 – Zanesville plant (Hazel-Atlas)

By 1927, Hazel-Atlas made “packers and preservers glassware, opal ware, amber ware, druggists supplies, fruit jars, pressed tumblers and jellies, metal goods, etc.,” along with tableware, all by machine at 27 continuous tanks. With the addition of the former American Glass Casket Co. at Ada, Oklahoma, in 1928, the list of tanks grew to 28. By 1928, Hazel-Atlas had three plants at Washington, Pennsylvania (with 7, 4, and 4 tanks respectively); five tanks at the Clarksburg factory, two tanks at Grafton; a single tank at the Blackwell, Oklahoma, plant; two plants at Zanesville (with 2 and 3 tanks); and other factories to make metal lids and other raw materials and components (*American Glass Review* 1927:95, 135; Evans 1928:16).

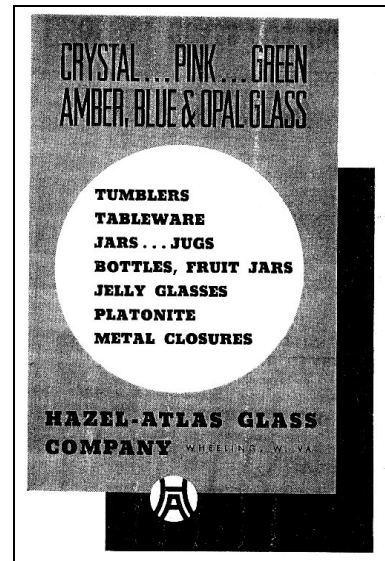


Figure 28 – 1938 as (*American Glass Review* 1938:95)

The company added plants at Oakland, California, and Lancaster, New York, in 1929. In 1934, the former Atlas plant began decorating operations and some tableware production, while closing one of the four continuous tanks (see Table 1). The list again expanded in 1935, with the addition of fruit jar caps, and decorated glassware (Figure 28). The number of tanks varied, with a high of 32 in 1943 (Algeo 1956:129; *American Glass Review* 1929:98; 1935:86; 1943:101; Roller 1998).

In 1951, Hazel-Atlas operated 13 factories using 33 tanks (Toulouse 1969:363), but the company became a division of Continental Can Co. on September 13, 1956 (Hawkins 2009:260). Citing the Anti-Trust Act, the Supreme Court voided the 1956 purchase, and Continental sold all but the Plainfield, Illinois, plant (built by Hazel-Atlas in 1957) to the Brockway Glass Co. in 1964; Brockway closed Hazel No. 2 in 1965. The Kerr Glass Co. later purchased the Plainfield factory (Encyclopedia.com 2016; Roller 1998; Toulouse 1971:242). The company changed its name to Brockway, Inc. in 1982, and Owens-Illinois merged with Brockway in 1988, renaming the combined giant Owens-Brockway (Carnegie Library 2005; O-I 2005).

Table 1 – Hazel-Atlas Factories and Dates of Operation (after Toulouse 1971:240 – revised by other sources)

Location	Former Name*	Date Opened**	Date Closed †
Washington, PA	Hazel Glass Co. No. 1	1902 [1888]	1957
Washington, PA	Hazel Glass Co. No. 2	1902 [1900]	
Washington, PA	Atlas Glass Co.	1902 [1896]	ca. 1965
Wheeling, WV		1902 [1898]	ca. 1964
Clarksburg, WV		1902 [1900]	ca. 1965
Grafton, WV		1916	1957
Zanesville, OH	Kearns-Gorsuch Glass Co. No. 1	1920	1957
Zanesville, OH		1923	
Blackwell, OK	Oklahoma Glass Co.	1920	ca. 1955
Ada, OK	American Glass Casket Co.	1928	
San Francisco, CA		1929	
Oakland, CA		1931	
Lancaster, NY	Hygeia Glass Co.	1929	1963
Pomona, CA		1947	
Montgomery, AL		1948	
Plainfield, IL		1957	1964

* Factories created by Hazel-Atlas will not have former names.

** This is the opening date as a Hazel-Atlas plant; even if the factory were open earlier under a different name, 1902 is the earliest date it could have been part of Hazel-Atlas. Dates in brackets reflect the date the earliest five plants were built.

† Factories still open or not sold to other glass companies as of 1970 will not have a closing date.

Containers and Marks

The mid-1930s was an important period with the introduction of the “White” screw cap (Florence & Florence 2004:8). Although continuous-thread finishes had been used on jars and wide-mouth bottles since at least 1858, their introduction to small-mouth containers is not well researched. Current empirical and patent research suggests that the use of continuous-thread finishes and screw caps on small-mouth bottles began ca. 1923.

Discussing Hazel-Atlas, Toulouse (1971:242) claimed that “in 1915, the bead for holding the jar for transfer between blank and blow molds made distortion less of a problem for the newly-developed more flexible lid.” This is a somewhat odd remark for two reasons. First, transfer of the parison to the blow mold is and was accomplished by leaving the neck ring attached and moving the parison *and* neck ring together. The only machines needing to grasp the finish for moving the parison were milk bottle machines or bottles with very simple finishes – made by a similar process. Second, the bead on Mason jars appeared in the 1908 Hazel-Atlas catalog. The purpose was to seal the jar more efficiently than the older, shoulder seal caps.

HA monogram (1923-at least 1971, probably ca. 1982)



Figure 29 – HA logo (Jay Hawkins)

Roller (1983:152) remarked that the “‘H over A’ trademark was registered by Hazel-Atlas Glass Co. on June 24, 1924, with use claimed since July 1923.” If the company used any mark prior to that time, we have not found any record of it.

Peterson (1968:49) concurred with the initial 1923 date.

Toulouse (1971:239) had dated the mark as used from 1920 to 1964 – obviously prior to the discovery of the trademark registration. The initial date may also have been one of his notorious typographic errors. Berge (1980:83) showed a 1964 chart with the HA monogram (Figures 29 & 30), which suggests that Continental Can and Brockway may have continued the



Figure 30 – HA logo (Fort Laramie collection)

use of the old logo. A 1971 chart still illustrated the HA monogram (Hanlon 1971:6-17). The logo was gone from the listings by 1982 (Emhart 1982:74-75).

During the ca. 1940s, HA marks followed at least three patterns:

0-7393 / (H over A) / 14
15 / (H over A) / 0-7263
(H over A) / 0-7549 / 5
(H over A) / 0-7549 / 9
(H over A) / 6754 / L15

Although they are shown here as zeros, the first letter preceding each four-digit code is probably an “O” (see section on factory codes below).

Another study of a tightly dated site (1942-1944) produced other variations from the same time period (Lockhart 2006b):

(H over A) / 2K4743
14 / 4-303 / 0 (H over A) A
(H over A) / 5K4406
2-10 / (H over A) 5792

The four-digit codes were almost certainly catalog numbers. The single-digit codes may be mold codes.

The Bottle Research Group examined 33 Hazel-Atlas milk bottles in the California State Park collection (Sacramento) in 2006. The typical H-over-A mark was embossed on the bases of most bottles, but was occasionally found on the heels. The mark was accompanied by numbers (usually to the left of the mark in superscript position): 1, 5, 11, 20, 21, 22, 23, 29; none included letters. These did not correlate with size (e.g., #20 was found on quarter pints, pints, and quarts), nor with dates, and they probably do not indicate plant designations.¹¹ All but one bottle in the

¹¹ Since the primary product of Hazel-Atlas was fruit jars and packers, it is unlikely that *eight* plants would produce milk bottles.

collection were made by the press-and-blow method (leaving a valve or ejection mark). The exception was machine made by a blow-and-blow process.

The Cove Creek Dump report (Rossillon 1999:Appendix B.1.a and B.1.b) listed details of several Hazel-Atlas bases and showed that the company was not using date codes on its bottles until after ca. 1937. The Fort Stanton POW Dump site further extends the period. The site was used to house captured German merchant mariners from 1941 to 1945. Glass found at the dump confirms the 1941-1945 period. However, bases marked with the HA logo did not include discernable date codes. A privy containing glass artifacts with date codes between 1945 and 1947 also demonstrated that associated Hazel-Atlas bottles from those years did not yet have date codes. However, a Hazel-Atlas bottle from 1957 – after Continental Can took control – *did* have a date code (Rosenberg 2008:68-79).

Factory Codes

It is possible that Hazel-Atlas used a unique system for identifying individual factories. There is good evidence that a “K” on the base indicated the former Kearns-Gorsuch factory at Zanesville, Ohio (see discussion of “K” logo in the Kearns-Gorsuch section), and “H” may have represented the former Hygeia Glass Co., Lancaster, New York, acquired by the company in 1929 (see the section on Hygeia Glass for more information). Giarde (1980:52) added that:

Hazel-Atlas also made coffee creamers using the HA mark. . . . On the coffee creamers many also have a “K” embossed on the bottom as well as two numbers separated by a dash (e.g. 6-8 or 3-10). The meaning of the “K and the numbers is presently unknown to this writer. The numbers are not consistent in all cases with dates so probably they do not represent the year of manufacture. In several instances creamers have been found without the HA mark but with a “K” and the numbers separated by a dash. These are undoubtedly Hazel-Atlas coffee creamers. Creamers marked with the HA have also been found without the “K” mark.

These creamers were almost undoubtedly made at the former Kearns-Gorsuch plant. We possess a colorless bottle with two handles at the neck that is embossed on the base “LOMAX & FORD /

INC / 14 - 7 / K.” Another (courtesy of William Barrett) was embossed “U.S.A. / A2” in the center with “K-929” to the left and the H-over-A logo to the right (Figure 31). These were undoubtedly made at the former Kearns-Gorsuch factory.



Figure 31 – K-929 base (William Barrett)

Caniff (2007a:7-9) noted a series of jars, the earliest of which bore the K-G in an oval mark accompanied by “5-444.” Other jars were embossed “1-K-444” or “1-K444” on the base without the K-G logo. Another size jar was embossed “16-K-643” on the base. Hazel-Atlas include the same jars in their 1930 catalog with the HA logo and the designations “K-444” and “K-643” on the bases. Although the K in the oval was a Kearns-Gorsuch logo, a “K” mark without the logo almost certainly indicated the former Kearns-Gorsuch plant on Hazel-Atlas jars.

Later jars were embossed on the bases with “K / {four-digit date in italics} / {single-digit numbers}”. The dates in italics (1873, 1875, 1876, 1877, 1878, and 1880) bear no relationship to the date the bottle was made, although a jar with a liberty bell and “1776” / “1976” in ACL on the side was embossed *1876* on the base. In fact, Caniff was unable to find any significance to the dates.

Of the 15 plants we could trace, only five, including the two Kearns-Gorsuch factories; Hygeia; the Oklahoma Glass Co. at Blackwell, Oklahoma (1920); and the American Glass Casket Co., Ada, Oklahoma (1931), could fit into this type of plant code. If this hypothesis is correct, we could expect the following:

- A = American Glass Casket Co.
- H = Hygeia
- K = Kearns-Gorsuch (both plants)
- O = Oklahoma Glass

We have now encountered examples of all four expected letters (even with our small sample) – frequently in a {letter} - ##### or similar format. The four-digit codes could easily be

catalog or model codes, and stray one-digit numbers might be mold codes. If another type of code exists for the plants built by Hazel-Atlas (and the original Washington, Pennsylvania, plants), we have not discovered it.

N (before 1923)

Hawkins (2009:259-260) cited Weiskircher as stating that Hazel-Atlas used an “N” mark on fruit jars prior to the adoption of the HA logo in 1923. The only “N” basemark we have recorded was on a prescription bottle. We hypothesized that the bottle was used by the Obear-Nester Glass Co. See that section for more discussion. The letter could also have been used by a currently unknown glass house with a name beginning with the letter “N.”

HA



Figure 32 – HA basemark



Figure 34 – Catsup finish

The Bottle Research Group has now recorded two examples of machine-made catsup bottles with “HA” embossed on the base (Figures 32 & 33). The one from the Tucson Urban Renewal collection had a “1” above the initials, and an example in our possession on a machine-made Curtice Brothers catsup bottle has a “3” below them. The finish style was one used in the 1930s-1940s (Figure 34). Hazel-Atlas stopped making catsup bottles by hand in 1912 and did not resume production (by machine) until the acquisition of the Kearns-Gorsuch factory at Zanesville in 1920. Although this mark does not fit with any referenced logo from Hazel-Atlas, we are at a loss to make any other sense of the initials. Perhaps a single engraver misunderstood the instructions for the H-over-A logo.



Figure 33 – Catsup bottle

ATLAS

Toulouse (1969:22) listed a total of 26 jars with “ATLAS” in their names, including the EDJ, E-Z Seal, Good Luck, and several types of Mason jars (Toulouse 1969:21-27). In his later book, Toulouse (1971:55) noted five variations of the mark and dated their use between 1896 and 1964.

Roller (1983:15) reported that “the ATLAS jars were made for about 70 years by the Atlas Glass Co., 1896-1902; Hazel-Atlas Glass Co., 1902-1957; Continental Can Co., Hazel-Atlas Glass Div., 1957-1964 and Brockway Glass Co., Inc., for several years after 1964.” He then referred to the dates for the HA logo and continued, “Sometime between 1913 and 1924 is the closest we can date the ‘dropped-A’ ATLAS from presently available Hazel-Atlas paper materials [Figure 35]. The ‘ATLAS’ trademark was registered on July 31, 1906, with no claim as to its first use.”

Jars made by Atlas included the ATLAS EZ SEAL in numerous variations, ATLAS GOOD LUCK, ATLAS JUNIOR MASON, ATLAS IMPROVED MASON, ATLAS MASON, ATLAS WHOLEFRUIT JAR, and a variety of other Mason jars (Figure 36). Many of these continued to be made by the companies that followed Atlas Glass Co. (see above) (Roller 1983:15-22). Roller (1983:18) also included a page showing illustrations of six variations of Atlas lids.

Creswick (1987b:5-10) listed and/or illustrated a total of 73 variations of Atlas jars, including jars just marked ATLAS, ATLAS EZ SEAL (and E-Z SEAL), ATLAS GOOD LUCK, ATLAS MASON, ATLAS IMPROVED MASON, ATLAS MASON IMPROVED, ATLAS SPECIAL MASON, and ATLAS STRONG SHOULDER MASON (Figure 37). These were generally marked

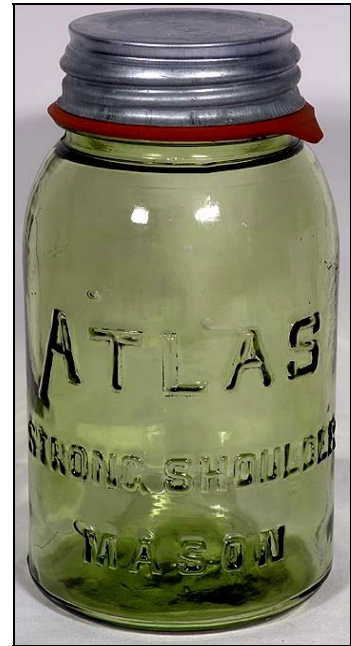


Figure 35 – Dropped-A Atlas (North American Glass)

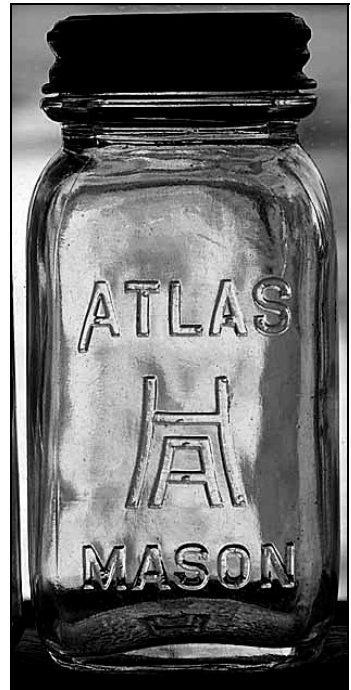


Figure 36 – Atlas Mason bank (North American Glass)

on the sides, although the word ATLAS appeared at least once on a base. The HA monogram was frequently represented on either the body or the base. Date ranges varied from the 1890s to the 1950s. See Creswick (1987b:5-10) for details.

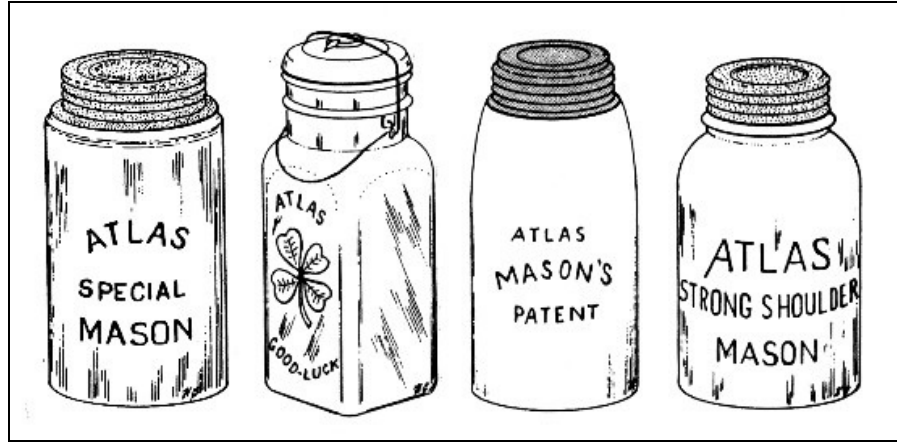


Figure 37 – Atlas jars (Creswick 1987b:6-9)

Hazel-Atlas also made a line of Mason jars, some from the old Atlas molds. The words ATLAS and PAT'D were ghosted on some of the jar. In one case, A.B.G.A. was ghosted over PAT'D. A B.G.A. were initials for the Anglo-Belge Glass Association, a London-based glass jobbing firm. No date range was applied to these jars (Roller 1983:214).

An unusual item was the ATLAS STRONG SHOULDER MASON in the form of a bank. These were put out by Hazel-Atlas and embossed with the HA mark on the base. The banks were made in fairly large numbers by Hazel-Atlas as a promotional item from at least 1938 to the 1940s. The banks/jars were topped with “small slotted zinc caps or slotted top-seal lids and screw bands” (Caniff 2007b:8).

Creswick (1987a:9) added another oddity, an ATLAS MASON FRUIT JAR with ghosted “WHITNEY” and “PAT'D 1858” as well as the same jar with the “ATLAS” also ghosted. She noted that “these jars would seem to indicate that the Atlas Glass Company made some of the Whitney jars.” We speculate that this could also mean that Atlas used some Whitney molds.

ATLAS SEAL-ALL MASON

Hazel-Atlas registered the ATLAS SEAL-ALL MASON trade mark (No. 342,673) on January 26, 1937, claiming first use on February 26, 1936 (Roller 1983:424). This is included with the ATLAS section.

E-Z SEAL

As noted above, Toulouse (1969:22) cited Algeo as his source for 1896 as the initial date for E-Z seal production. However, Hazel-Atlas registered the E-Z trade mark (No. 81,527) on April 18, 1911, claiming the first use in 1904 (Roller 1983:423). Creswick (1987b:7) noted that the E-Z trade mark was renewed in 1931 and again in 1951. Despite the trade mark claim, she stated that records show that the jars were first produced in 1896 by the Atlas Glass Co., and Hazel-Atlas continued production. The 1896 date almost certainly reflects the Algeo memory that these were the first jars produced by Atlas Glass

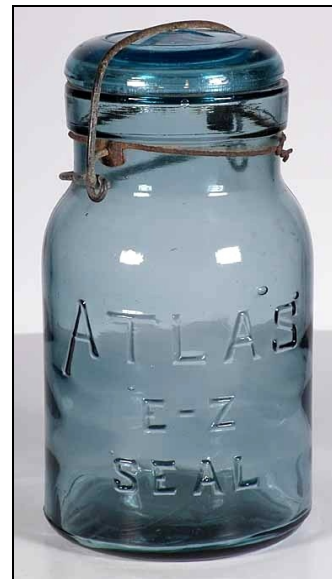


Figure 38 – Atlas E-Z Seal (North American Glass)

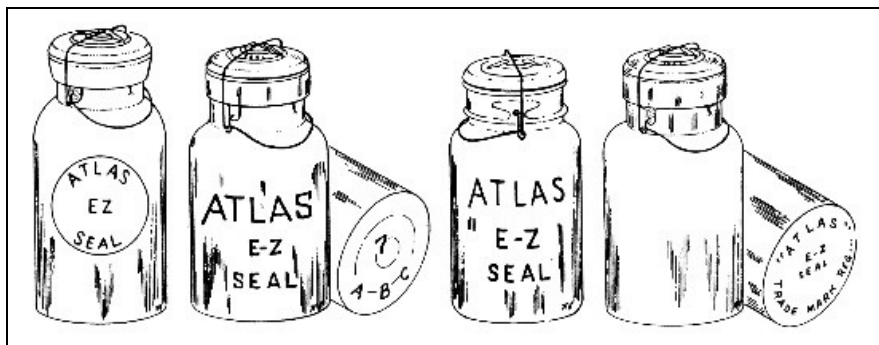


Figure 39 – Atlas E-Z Seal (Creswick 1987b:63)

Jars appeared with both EZ SEAL and E-Z SEAL marks, almost always in conjunction with the ATLAS trade mark (Figure 38).

Creswick (1987b:6-7) illustrated 20 variations

of the ATLAS E-Z (or EZ) SEAL jars and only one jar with E-Z SEAL without the word ATLAS (Figure 39). All are essentially the same style with a noticeable neck, glass-top, and wire bail lids. Toulouse (1971:22-23) included seven of these, all including ATLAS. One had an engraver's error leaving off the "L" in "SEAL." The company also exported these jars, and they were still advertised in Australia as late as 1914 (Roller 1983:151).

HAZEL PRESERVE JAR (1923-at least mid-1930s)

Toulouse (1969:144) reported a jar embossed "HAZEL" in a slight arch on the front – although no other source mentioned this embossing. He may have confused this with the Hazel Preserve Jar. The jar was machine made, and he dated it ca. 1896-1901. The company offered

the HAZEL PRESERVE JAR in two formats. One variation had the HA logo between HAZEL and PRESERVE; the other bore the mark on the base (Figure 40). The jars were made “sometime after the mid-1920s” (Roller 1983:152). Creswick (1987b:63) illustrated the jars and agreed with the 1920s date. According to the Roller update (2011:235), these wire-bale jars were made with three different boss styles: 1) half-round dimples; 2) H-shaped bosses; and 3) T-shaped bosses. These were all made sometime after the adoption of the HA monogram in 1923.



Figure 40 – Hazel Preserve Jar (North American Glass)

HAZEL-ATLAS

Toulouse (1969:144-145) noted three of these jars. According to Roller (1983:151; 2011:235) the HAZEL-ATLAS EZ SEAL andn LIGHTNING SEAL jars were first made in 1906. Creswick (1987b:62) illustrated the HAZEL-ATLAS mark embossed on the sides of HAZEL-ATLAS E-Z SEAL and LIGHTNING jars, with E-Z SEAL made from ca. 1902 to 1915, and LIGHTNING manufactured during the ca. 1902-1940 period.

SIMPLEX (1906-ca. 1908)

Hazel-Atlas made the Simplex jars and lids during 1906 and 1907, probably into 1908. For more details on the jar’s manufacture, variations, and dating, see the section on the Perfection Glass Co.



Figure 41 – TF ligature

TF ligature

Toulouse (1971:493) illustrated the TFligature with a “2” to the left but noted that the numeral varies. In an example we found, the number to the left was “11” (Figure 41). Toulouse identified the user of the mark as the Hazel-Atlas Glass Co., and our example had the HA logo embossed to the right of the ligature. The jars were closed with a Lightning fastener. Toulouse (1969:306; 1971:493) dated the jars from 1910 to 1930 and noted the some jars have the HA logo, and some do not.

Creswick (1987b:130) illustrated the jar and noted numerals of 3, 4, 5, 9, and 10 to the left. She claimed the lid was marked “J. Hungerford Smith & Co. Rochester NY.”¹² She stated that Hazel-Atlas made the jars for Smith and that Smith made soda fountain requisites. Neither author explained or even hinted at what the TF (or FT) could indicate. We, too, have no clue.

Other Fruit and Packer Jars

Although we have attempted to list the more common jars, Hazel-Atlas produced numerous fruit and packer jars, many with embossed names. Caniff (2001) has attempted to catalog all these jars, but such a listing is beyond the scope of this study.

Discussion and Conclusions

Aside from several trade marks associated with jars, Hazel-Atlas typically only used a single manufacturer’s mark – H over A – from 1923 to at least 1965, although the firm may have also used and “N” and/or “HA” briefly. The company appears to have used up to four-digit numerical codes for model or catalog numbers and single-digit codes for mold designations. For plants that did not originate in the Hazel-Atlas System, the firm used a single-letter code indicating the first letter of each former company (e.g. “K” for Kearns-Gorsuch) to identify bottles and jars made at those plants. No code is known for the original plants or those built by Hazel-Atlas. We have found no evidence that the company used date codes prior to the 1956 sale to Continental Can. Our only date coded example was made in 1957, and there is good empirical evidence that there were no date codes prior to 1945. We have no later sample from which to draw information.

This study of Hazel-Atlas glass, however, added two fairly significant aspects to the study of opal or milk glass jars. These are ubiquitous on some archaeological sites, but information, particularly dating, has been scarce. The contribution by Algeo has added a credible date for the initial use of ointment pots and similar pressed containers by Hazel-Atlas (apparently the first in the industry) in 1887 or 1888. Two other important dates are 1894, when

¹² References from the period called the firm J. Hungerford Smith Co. – with or without the ampersand.

cosmetic use of these milk glass containers seems to have begun and 1919, when cosmetic use of opal glass dramatically increased. These should be useful for dating the ubiquitous milk-glass, pressed cosmetic jars found on many 20th century archaeological sites.

Mascot Jars and Quotation Masons

As noted above, the Missouri Glass Co. advertised the Mascot Disk Immerser in 1886 and 1887 – which is not surprising considering that William Somerville, the inventor of the jar was president of Missouri Glass. He almost certainly obtained the rights to the earlier three patents for similar immersing units. Although Somerville remained president of the firm until at least 1911, it is clear that *something* happened to convince him or the firm to discontinue involvement with the jars. Missouri Glass was primarily involved with the sales of lamps and lamp accessories, so the reason for discontinuing the jars may simply have been to concentrate on the primary aim of the firm.

Although the Missouri Glass Co. ceased glass production in 1865, it remained a jobber, mostly in lamps – as noted above. Therefore, the firm needed a glass house to make the jars. Although there were certainly other options, it seems likely that Missouri Glass would have chosen a factory close to its own base in St. Louis. Our research indicates that only three St. Louis factories made fruit jars: Mississippi Glass Co., Lindell Glass Co., and Frederick Heitz Glass Works. Mississippi Glass switched to plate glass production in 1885, so we can eliminate that plant. As far as we can tell, the other two only made wax sealers, and it takes a different production technique – using grinding wheels – to manufacture jars with continuous-thread finishes.

Of course, the Belleville Glass Co., located just across the Mississippi River to the east, also made jars, but it, too, only produced wax sealers. That only leaves one possibility close to home. The Illinois Glass Co. was located at Alton, Illinois, just across the river to the north. Illinois Glass made Mason jars by at least 1896 (the earliest catalog we have) and probably produced the jars much earlier. The Illinois Glass Co. is therefore the most likely manufacturer of the first Mascot jars.

Although the method of delivery and the reason for the choice is unclear, Somerville must have transferred his interest in the Disk Immerser patents to the Bellaire Stamping Co. in 1887. Bellaire began advertising the jars in 1887 and probably used the ones embossed with their names, although they may also have procured the molds from the St. Louis area glass house (possibly Illinois Glass Co.) and made some jars with the “MASCOTT DISK IMMERSER” embossing as well. However, Bellaire only advertised the jars until 1888, probably because they were not typically in the firm’s product line. In this case, the transfer of the patent to the closely related Hazel Glass Co. is unsurprising.

Since Charles Brady claimed March 17, 1889, as the first time that he used the “Mascot” Improved trademark, the transfer of the product was almost surely complete by that time. The use of the name, Brady’s registration of the trademark, and H+number basemarks on many of the jars makes the identification of the Hazel Glass Co. as the maker of the Improved jar relatively certain. Because of the jars with ghosted “Mascot Trade Mark Pat’d” and the similarity of the “MASONS” in quotation marks, the Hazel Glass Co. as the manufacturer of the Quotation Masons jars is almost equally clear.

The timing, however, is less certain. The ghosting suggests that Hazel discontinued the Mascot at some point and reworked the molds to make Mason jars. We can place an end date of 1896 on the Quotation Masons because Hazel ceased production of fruit jars when the Atlas Glass Co. was formed that year. Since Atlas only made jars by machine, and the Quotation Mason jars were all mouth blown, production of the jars could not have continued under Atlas. The remaining question centers on the transition between Mascot and Mason. Unless currently unknown records surface, we have no way to determine the year or range of the change or whether it was a gradual transition or an abrupt switch. We have selected ca. 1892, the median date of the 1889-1896 range, as the probable transition date. See Table 2.

Rosette Logo

The connection between the rosette design, the Hazel Glass Co., the Bellaire Stamping Co., and the Mason Fruit Jar Co. has never been satisfactorily explained. Toulouse (1969:195; 1971:344) connected the “Tudor Rose” (rosette design) with the Mason Fruit Jar Co., stating that the rosette design was “identified in the white glass liners of Mason zinc caps by the full name

of the company” – i.e., the Mason Fruit Jar Co. However, no other source has agreed that such an liner exists. The Roller editors (2011:340, 353) demonstrated a strong correlation between the keystone symbol and the Mason Fruit Jar Co., but never noted a single instance where the rosette design was connected with the firm. Therefore, the Mason Fruit Jar Co. can be dropped from the discussion.

Table 2 – Probable Sequence for Mascot Jars

Jar	Probable Manufacturer	Dates
Mascot Disk Immerser	Lindell Glass Co.	1886-1887
Bellaire Stamping Co.	Bellaire Stamping Co.	1887-1888
“Mascot” Improved	Hazel Glass Co.	1888-ca. 1891
“Mascotte” Improved	Hazel Glass Co.	1888-ca. 1892
“Mason” Improved	Hazel Glass Co.	ca. 1892-1896

So, the remaining questions center around who *did* use the rosette design, and what connected that to the Mascot jar-lid producers. Our first issue is a slight difference in logos. The rosette design on the fruit jars was created by taking two four-pointed “stars” and superimposing one atop the other, turned at a 45-degree angle to create eight elliptical ovals in a ring around a six-point open “star” in the center. The jar design included a dash in each elliptical oval (total of eight) and dots between each of the six points on the central motif. The stamped designs on the accompanying caps even included dots between the ellipses. On the Mascot Improved lids, however, the design was simplified – no dots or dashes (Figure 42). So, the question, unanswerable with current data, is: What – if anything – is the significance of the addition (or deletion) of the dots and dashes? Was this simply a mold-maker’s whim? Or did someone intentionally alter the design to avoid potential legal issues? At this point, we simply do not know.

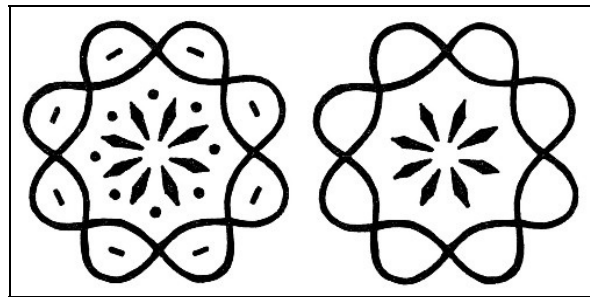


Figure 42 – Rosette logos

Removing the Toulouse red herring, two sets of jars and lids should at least suggest a hypothesis. The Mascot lid and liner – with the Rosette figure – was only used on the Mascot Improved jars, and those jars are clearly connected with the Hazel Glass Co. through the Mascot Improved trademark. Although past researchers have suggested a possible connection to the Bellaire Stamping Co., that proposition is unlikely, since the lid and liner were used on Mascot Improved jars rather than the earlier ones that more likely produced by Bellaire.

Mason jars with the rosette figure on the reverse side were sealed by two types of lids. One had the Disk Immerser, the other had a metal lid with a porcelain (opal) liner – both of which were embossed with the rosettes. If the rosette was connected with Hazel Glass through the Disk Immerser, then it seems logical that the Disk Immerser lids on the rosette Mason jars would also be products of the Hazel Glass Co. Stated as a hypothesis, the Hazel Glass Co. made the Mason jars with the rosette design.

There are two complicating factors with this hypothesis. First, we have already suggested that Hazel Glass made the Quotation Mason jars (i.e., ones with “MASONS” in quotation marks). This would now have the firm making rosette Mason jars – with Mascot lids – concurrently with Mascot jars. A bit later, Hazel would be producing two types of Mason jars. Fortunately, other glass houses produced both Mason Patent and Masons Improved jars (e.g., see the section on the Clyde Glass Works). Thus, our hypothesis passes at least one test. The rosette jars were likely made ca. 1887-1896.

The second issue revolves around glass color. The sources agree that the jars were produced in aqua, colorless, apple green, and amber glass. According to Algeo, Hazel only made colorless glass, although Toulouse (1971:241) claimed that the plant added a “green” (i.e., aqua) furnace early. No other source agrees with Toulouse, but all of the others were highly influenced by Algeo. Algeo was going by old memories – his and other workers – that may or may not have been accurate. We have no clue where Toulouse derived his information. While this is a dead end, there is at least some question.

Amber glass is even more of a stumbling block. There is no record that Hazel ever used amber glass; it does not show up until the Hazel-Atlas period – too late for mouth-blown jars. Hazel *did* continue to produce mouth-blown bottles at the Hazel No. 1 plant until 1912. It is

remotely possible that the plant could have made some jars at that furnace, but it is highly unlikely. Unless there is some evidence unknown to us, the presence of an amber jar with the rosette design virtually destroys the hypothesis. Hopefully, something in this discussion will lead future researchers to a different conclusion or place them along a different track.

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Sources

Algeo, John S.

1956 "Story of the Hazel-Atlas Glass Co.," Unpublished manuscript. [12/21/1956]

American Glass Review

1927 "Glass Factory Yearbook and Directory." *American Glass Review*, Pittsburgh, Pennsylvania.

1934 "Glass Factory Yearbook and Directory." *American Glass Review*, Pittsburgh, Pennsylvania. Includes reprint of the *Glass Trade Directory for 1904*. Commoner Publishing Co., Pittsburgh, Pennsylvania.

1935 "Glass Factory Yearbook and Directory." *American Glass Review*, Pittsburgh, Pennsylvania.

1943 "Glass Factory Yearbook and Directory." *American Glass Review*, Pittsburgh, Pennsylvania.

Berge, Dale L.

1980 *Simpson Springs Station: Historical Archaeology in Western Utah*. Cultural Resource Series No. 6. Bureau of Land Management, Utah.

Caniff, Tom

2001 "The Hazel-Atlas Story." In *Fruit Jar Annual: The Guide to Collecting Fruit Jars*, Vol. 6. Privately published by Jerome J. McCann.

2007a "Fruit Jar Rambles: Half-Pint Candy Jars." *Antique Bottle and Glass Collector* 23(9):6-9.

2007b "Fruit Jar Rambles: An Old American Custom." *Antique Bottle and Glass Collector* 24(5):6-9.

Creswick, Alice

1987a *The Fruit Jar Works, Vol. I, Listing Jars Made Circa 1820 to 1920's*. Douglas M. Leybourne, N. Muskegon, Michigan.

1987b *The Fruit Jar Works, Volume II, Listing Jars Made Circa 1900 to Modern*. Privately printed, Grand Rapids, Michigan.

Encyclopedia.com

2016 "Continental Can Co., Inc."

<http://www.encyclopedia.com/doc/1G2-2841900044.html>

Evans, G. Wesley

1928 "Some Achievements of Hazel-Atlas." *Glass Industry* 9(1):16.

Fergusson, F.F.

1922 "Development of Bottle Manufacture." *Purchasing Agent: Magazine of Centralized Buying* 11(10):35-37. [October]

Florence, Gene and Cathy Florence

2004 *The Hazel-Atlas Glass Identification and Value Guide*. Collector Books, Paducah, Kentucky.

Glass Bottle Blowers Assn.

[1912] 2012 Report of the Conference and Final Agreement Between Representatives of the Glass Bottle Blowers' Association of the United States and Canada and the American Flint Glass Workers Union of North America, held at Pittsburgh, April 16th through 20th, Inclusive, 1912. Rare Book Clubs.

Glass Industry

1928 "Some Achievements of Hazel-Atlas." *Glass Industry* 9(1):16.

Hanlon, Joseph F.

1971 *Handbook of Package Engineering*. McGraw-Hill, New York.

Hawkins, Jay

2009 *Glasshouses & Glass Manufacturers of the Pittsburgh Region, 1795-1910*. iUniverse, Inc., New York.

Journal of Industrial and Engineering Chemistry

1913 "The Present Status of the Glass Bottle and Hollow Ware Industries in the United States." *Journal of Industrial and Engineering Chemistry* 5(11):951-954.

1914 "The Present Status of the Glass Bottle Industry in the United States." *Journal of Industrial and Engineering Chemistry* 6(10):864-865.

Lockhart, Bill

2006a "The Color Purple: Dating Solarized Amethyst Glass Containers." *Historical Archaeology* 40(2):45-56.

2006b "The Hanford Construction Site: A Study in Relevance." Unpublished manuscript.

Lockhart, Bill and Barry Bernas

2014 "Turning Blue: Charles Blue and the Early Jar Machines." In *The Guide to Collecting Fruit Jars: Fruit Jar Annual 2014*, by Jerry McCann, pp. 19-47. Privately published.

Palmer, Walter B.

1917 *The Glass Industry: Report on the Cost of Production of Glass in the United States*. Miscellaneous Series No. 60, Department of Commerce, Government Printing Office, Washington, D.C.

Roller, Dick

1983 *Standard Fruit Jar Reference*. Privately published.

1998 "Washington, PA History Notes." Dick Roller files.

2011 *Standard Fruit Jar Reference: 2011 Update*. Edited by Jerome McCann and Barry Bernas. Fruit Jar Annual/Phoenix Press, Chicago.

Rosenberg, Seth Andrew

2008 "Corner Stores and Bottles: African-American Consumption in Indianapolis." Master's Thesis, Ball State University, Muncie, Indiana.

Rossillon, Mitzi

1999 *The Cove Creek Civilian Conservation Corps Dump, Volume I: Report & Appendices*. Renewable Technologies, Inc., Butte, Montana.

Scoville, Warren C.

1948 *Revolution in Glassmaking: Entrepreneurship and Technological Change in the American Industry, 1880-1920*. Harvard University Press, Cambridge, Massachusetts.

Six, Dean

1993 *The Index to Dean Six's Encyclopedia of West Virginia Glass*. West Virginia Museum of American Glass, Ltd., Weston, West Virginia.

Toulouse, Julian Harrison

1969 *Fruit Jars*. Thomas Nelson & Sons, Camden, New Jersey.

1971 *Bottle Makers and Their Marks*. Thomas Nelson, New York.

Welker, John and Elizabeth Welker

1985 *Pressed Glass in America: Encyclopedia of the First Hundred Years, 1825-1925*.
Antique Acres Press, Ivyland, Pennsylvania.

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