Arthur, Burnham & Gilroy
A Study of Unlikely Relationships in Early Fruit Jars

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One of the most interesting aspects of glass container research is uncovering connections and relationships – in this case, between jobbers (wholesale dealers), manufacturers, patents, and jar types. Although readers typically only see the end results, the research for many articles begins with a curiosity about a jar (or bottle, or lid, or finish style, or anything else) that may actually appear in the middle or end of the finished product. Once research begins, it tends to create its own direction – often converging with other research that leads to still other ideas.

The Bottle Research Group (BRG) is interested in *all* aspects of glass container (bottle and jar) research, but we are most actively investigating different embossed manufacturer's marks. That interest spread to other logos and names that identify jobbers and major firms – marks that could easily be mistaken for those of actual glass manufacturers. When Jerry McCann and Barry Bernas updated the Dick Roller's 1983 *Standard Fruit Jar Reference* and made it available in 2010, we naturally used it to update our manufacturer's marks files.

One of the jars that was a new addition to our records was embossed "C. BURNHAM & CO / MANUFACTURERS / PHILIDA" on the front face. Despite the embossing, Burnham was a manufacturer of lids and other metal items – not a glass house. The firm was a jobber in fruit jars, and the jar bearing the company name was the last in a series of jars and lids that extended through at least five jar variations and several lid styles. The series takes us all the way back to the earliest of the grooved-ring, wax-sealer fruit jars – an entirely different closure style from those used by Burnham – and the story begins with a series of early fruit jar patents.

Patents

The Spratt and Arthur patents described below are generally agreed upon as the earliest ones leading to the development of the grooved-ring, wax-sealer fruit jars.

James Spratt, 1853

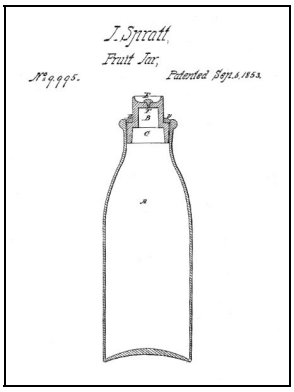

Figure 1 – Spratt's 1853 fruit can patent

James Spratt of Cincinnati, Ohio, received Patent No. 9,995 for an "Improvement in Bottle Fastenings" on September 6, 1853 (Figure 1). Although Spratt's later stopper idea does not appear to have been used in the patent, Spratt was already advocating the use of glass instead of tin cans – the apparent preferred method at the time. He noted that "there are many objections to preserving edibles in tin . . ." He also used wax to seal his stopper.

James Spratt, 1854

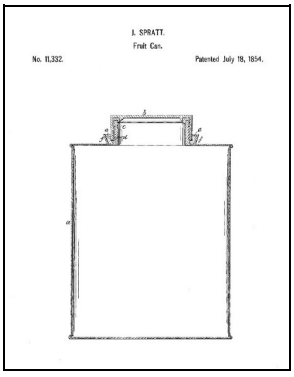

Figure 2 – Spratt's 1854 fruit can patent

On July 18, 1854, James Spratt received Patent No. 11,332 for an "Improvement in Hermetic Sealing." The device was for the "Hermetically-Sealing of Preserve-Canisters" – sealing fruit cans. Spratt used a screw cap and threaded top but admitted that he had been unable to achieve a seal no matter what type of gasket he tried to use. His ultimate answer was wax in a groove at the base of the neck. The Spratt patent is the earliest to suggest the grooved ring and wax sealing that would become one of the two most popular seals for fruit jars for the next half century (Figure 2).[1]

Toulouse (1969:415) suggested that Spratt "refers to the fact that glass jars are even then being sealed with wax. Just when that use started is therefore before 1854." Toulouse almost certainly drew his conclusion from the passage in Spratt's patent that stated: "The fact of air generally getting access after some period of exposure is verified by experiments during several seasons made by myself and others." However, the reference to "air generally getting access" almost certainly indicated cans – not glass. Spratt had stated earlier in the patent description that

[1] Since numerous researchers, including Toulouse (1969), Roller (1983), Creswick (1987), and the editors of Roller (2010) – as well as the Bottle Research Group – have searched patent records with no other success, Spratt's 1854 patent was almost certainly the first to suggest using a grooved ring, sealed with wax on a glass jar.

> The simple use of wax for a glass jar answers, because, after the upper portion is cooled, the slow conducting nature of the vessel prevents the remelting of the wax; but such is not the case with metal cans because their rapid conduction of heat keeps the wax so soft . . . causes blow holes in the wax. . .

It is thus probable that cans had used wax as a sealant prior to Spratt's patent. However, those cans may or may not have had the grooved rings. Spratt simply did not say. Unfortunately, patent documents prior to ca. 1870 did *not* include the application date.[2] That date would tell us a great deal more about how early wax and possibly grooves were used in conjunction with canning in tinned steel vessels. We maintain that jars made to the Arthur's patent – discussed below – were the first actual wax-sealer glass jars.

Robert Arthur, 1854

Robert Arthur of Washington, D.C., received Patent No. 11,513 for an "Improvement in Closing the Mouths of Bottles, &c. [etc.] Air-Tight" on August 15, 1854. Arthur's patent was very different. He required an "annular groove" at the base of the bottle neck, which could be filled with mercury, water, glycerine, molasses, or honey. The lid fit tightly over the finish/neck and extended into the liquid, creating the seal. This appears to be the first use of the term "annular groove" in bottle/jar literature (Figure 3).

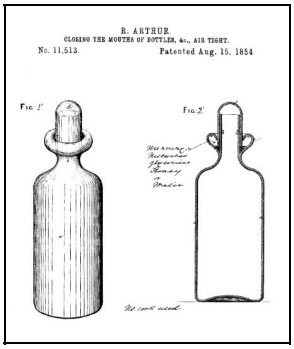
R. ARTHUR.
CLOSING THE MOUTHS OF BOTTLES, &c., AIR TIGHT.
No. 11,513. Patented Aug. 15, 1854.

Figure 3 – Robert Arthur's 1854 patent

Robert Arthur, 1855 and 1856

On January 2, 1855, Arthur received Patent No. 12,153 for an "Improvement in Self-Sealing Preserve Cans." Arthur's invention was for "making vessels with an annular groove or receptacle at or near the outer edge of the top, furnished with a cover, the rim of which passes loosely into the groove. The groove may . . . be formed while the material of which the vessel is made is in a plastic state." As noted by Toulouse (1969:341), "plastic state" probably indicated that Arthur included glass as one of the materials that could be used in the manufacture of his

[2] We have recorded spans as long as six or seven years between the application date and the date the patent was actually awarded.

"preserve cans." Arthur called attention to his drawings of "a tin canister . . . hermetically sealed" and "an earthen jar . . . with a tin lid, also hermetically sealed." Although the patent was certainly adapted to glass vessels, Arthur made no specific claim to glass or any material other than tin cans and ceramics (Figure 4).

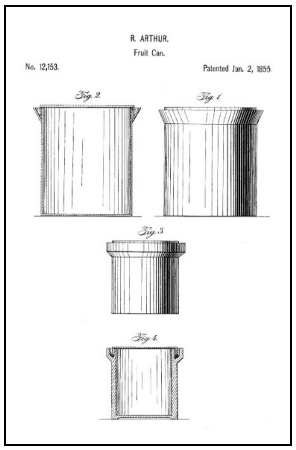

Figure 4 – Robert Arthur's 1855 patent

Toulouse (1969:415) noted this patent – along with the Spratt patent discussed above – was one of the earliest that led to the grooved-ring, wax-sealer fruit jars. Toulouse stated that "Arthur is hailed as the inventor of the groove-ring jar in glass and pottery but I do not believe that this is true since he himself described as a bad condition the lack of close fit between container and cover *then on the market*" (his emphasis).

Toulouse probably referred to the passage where Arthur stated that he had "found by experience that vessels constructed with a simple groove and cover fitting imperfectly in it (as must be the case with all cheap vessels intended for common use) . . ." It is important to recall that Arthur was discussing tin cans and ceramic jars – not glass. We maintain that Arthur does, indeed, deserve the title of father of the grooved-ring wax-sealer *glass* fruit jar. The earlier wax sealers were made from other materials.

There were problems, however, with Arthur's system. On June 10, 1856, he received Reissue No. 370, which used the same drawings (albeit in a different order) along with a description of how to avoid a situation where the fruit or vegetable contents inside cooled faster than the sealing medium – one of the major flaws in his original patent. The account, however, was apparently insufficient, so Arthur received another reissue (No. 403) on October 14, 1856, with additional explanations. He also discussed the problems with Spratt's 1854 patent and why his patent was an improvement.

Fridley & Cornman, 1859

William Fridley and Frederick Cornman used an entirely different approach to the sealing issue in their "Improvement in Preserve-Cans." On October 25, 1859, the pair received

Patent No. 25,894. The jar required a "cover provided with two lugs . . . to pass under two spiral projections or screw threads . . . on the exterior of the neck." This cap had a "large hole . . . in the center of the head" that was sealed with a gasket made of "india-rubber, gutta-percha or other suitable air-tight packing material." The hole allowed the gasket to form an air-tight seal when the contents of the jar cooled down (Figure 5).

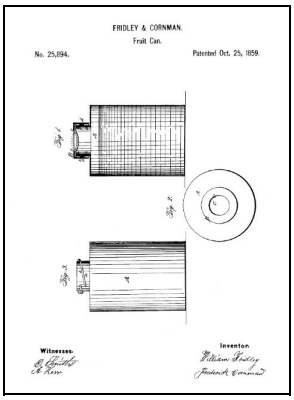
FRIDLEY & CORNMAN.
Fruit Can.
No. 25,894. Patented Oct. 25, 1859.
Witnesses.
Inventors.
William Fridley
Frederick Cornman

Figure 5 – Fridley & Cornman's 1859 patent

Although the patent called for lugs built into the cap, the actual jars that were embossed with the patent date had two lugs molded on the outside neck of the *jar* (creating matching depressions on the inside of the neck). The cap was constructed of metal with the lower edges bent under to form "threads" to hook under the lugs. The opening in the top of the lid was originally circular but eventually took the shape of a rounded, five-point star. Caniff (2010:5) noted that this same principle "helped the modern top-seal metal lid with its pop-up feature to become almost the only fruit jar closure used in this country today."

Histories, Jars, and Marks

In some cases, the relationships between the patents, the jars, and firms that commissioned the containers are tenuous and circuitous. Although we will deal with these in chronological order, the earliest jar in this series is related to the final one – without any relevance to those in between – even though the in-between three jars led up to the final one. Hopefully, this somewhat cryptic explanation will become clearer as we look at the jars and firms individually.

These early firms were true pioneers in the field of glass jars. The companies were manufacturer's of tin cans and tin lids; they did *not* manufacture ceramic or glass containers. As jobbers, they commissioned the containers from glass houses, but their contribution to the glass fruit jar industry is immeasurable. Wax-sealer fruit jars remained popular into the first decade of the 20th century.

Arthur, Burnham & Co., Philadelphia (1855-1857)

The saga of Robert Arthur is intriguing, mysterious, and – at least for his involvement in glass – short. As noted above, Robert Arthur received his first patent for a grooved ring filled with liquid on August 15, 1854, followed by his patent for grooved-ring preserve cans and ceramic jars on January 2, 1855. Although he listed his residence as Washington, D.C., at the time of both applications, we do not know when he applied for either one. As mentioned in the discussion of the Spratt patent (above), it is unfortunate that these early patents did not include the dates of application. For reasons that will become apparent below, it would be very helpful to know *when* Arthur applied for his patents.

By the time Arthur applied for a reissue of the patent, he had moved to Philadelphia, probably seeking financial backing from his brother, Timothy, the publisher of *Arthur's Home Magazine*. Robert Arthur received the first reissue for his 1855 patent on June 10, 1856. Again, it would be helpful to know when he *applied*. He was still in Philadelphia, when he received the second reissue on October 14 of that year.

Although obviously a part-time inventor, dentistry was Robert Arthur's primary profession. He also had at least some roots in Philadelphia. In 1852, T.S. Arthur (brother Timothy) was on the "Board of Corporators" for the new Pennsylvania College of Dental Surgery, where his brother, Dr. Robert Arthur, was one of the founding teachers (Scharf & Wescott 1884:1662). Robert may have moved to Washington in 1853 or 1854, or he may have just used that address for his first two patent documents. In any event, he was back in Philadelphia at some point in 1854.

T.S. Arthur featured an editorial and an advertisement for Arthur's Patent Self Sealing Airtight Preserving Can in the March and May 1855 issues of *Arthur's Home Magazine*. Arthur noted that the can was invented by "Doct. Robt. Arthur" and that the magazine had "called attention to this excellent and useful invention last Fall," although "it was introduced too late in the season . . . to come into general use." This indicates that at least some cans had been produced during the fall of 1854 – prior to Arthur's receipt of the patent (Arthur 1855:338, 395).

In the May issue, Arthur noted that "the inventor has made arrangements to have the market fully supplied during the coming season." The patent cans were "manufactured and sold by Arthur, Burnham & Co., No. 60 South Tenth Street. Philadelphia" and would be available in other major cities (Arthur 1855:395). The 60 S. 10th St. address was the first location of Arthur, Burnham & Co.

The firm of Arthur, Burnham & Co. was certainly operating by May 1855, when it advertised in *Arthur's Home Magazine* and may have been formed as early as 1854. The firm was first listed in the Philadelphia city directory in 1856 and remained in the following directory.[3] The business was still located at 60 S. 10th St. in 1856 but had moved to NE 10th and George streets by 1857 (Caniff 2008:6).

Robert Arthur was likely connected with the firm in its earliest days, but he seems to have shifted his interest to brother Timothy very soon. Although Timothy mentioned "the inventor" having "made arrangements to have the market fully supplied" in 1855 (Arthur 1855:395), Robert was never connected with the firm or the cans in later publications. Robert Arthur was only listed as a dentist at 254 Walnut in 1856 and 1857 and was no longer in the directories after that. His brother, Timothy (generally enumerated as "T.S."), was only listed in connection with *Arthur's Home Magazine* during those years (living near his brother – at 103 Walnut), but he was one of the principals of the succeeding firm (see below). This suggests that Timothy was the one actively selling the cans and jars made under Robert's patent.

The second member of the firm is not in doubt. George Burnham was listed at the same address as Arthur, Burnham & Co. in both 1856 and 1857. Born in 1817, Burnham began working as a clerk for the locomotive works of M.W. Baldwin in 1837 and became a full member of the firm when it reorganized as M. Baird & Co. upon Baldwin's death in 1866. He became a partner when the firm again reorganized as Burnham, Williams & Co. (Jordan 1914:178). An inventor in his own right, it is likely that Burnham furnished the expertise to

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[3] City directories only recorded firms when the agents found them. Sometimes, a firm could be missed for several years prior to inclusion in the directories. Even more common, if a firm entered business late in the year (after the publication of the directory), it would not appear until the next year's issue. Thus, a plant opening in October of 1855 would certainly not be listed until the 1856 directory.

actually manufacture the cans and lids, while Arthur furnished the capital. Possibly, Robert Arthur was the "& Co." of the firm. At some point in late 1857 or early 1858 (probably late 1857), the company reorganized.

Cans and Jars

It is likely that Arthur, Burnham & Co. mostly sold cans and ceramic jars, although the firm probably commissioned glass jars during its last year in business. The actual facility probably made its own cans and lids, although there is no evidence that the plant actually produced any pottery or glassware. These were both almost certainly manufactured by local factories. Arthur, Burnham & Co. then added the cement to the grooves, packed appropriate containers, and shipped them around the city for sale.

Cans

We have found no internet listings for cans or jars marked with the name of Arthur, Burnham & Co. Both should have been on the market in 1855, so they were probably generic and may have been made (or at least ordered) prior to the actual issuance of the patent. The write-up in *Arthur's Home Magazine* (Arthur 1855:359) indicated that cans were manufactured by the fall of 1854 (*certainly* prior to the patent), and the full-page ad in 1855 noted that "both cans and jars. . . are now manufactured and for sale" (Arthur 1855:338). It is virtually certain that some of the cans were generic – without any company identification. The ad in *Arthur's Home Magazine* (Arthur 1855:338) only illustrated the patent drawing.

Ceramic Jars

The first jars were probably ceramic. Leybourne (2008:13-14) described three yellow ware ceramic jars with wax-seal grooves, none of which included the company name. Two had information "incised on heel":

1. R. ARTHUR'S PATENT
2. R. ARTHUR'S PATENT JANUARY 2, 1855

A third had no incised information

An unusual characteristic of these cans and jars was that they were apparently sold with sealant already in the grooves. The 1855 *Arthur's Home Magazine* ad (Arthur 1855:338) instructed the public that:

> The cans and jars are constructed with a channel around the mouth near the top which the cover fits loosely. This channel is filled with a very adhesive cement for the purpose and allowed to harden. In order to seal the vessel hermetically, it is necessary to heat the cover slightly and press into place. It may be opened with as much ease as it is closed by slightly warming the top

Glass Jars

Leybourne (2008:13), Roller (2010:30), and McCann (2011) all described a single glass jar that was probably made at the end of the Arthur, Burnham & Co. period. The jar had straight sides, tapering sharply inward at the shoulder to a groove around the neck, but the sides had no visible seams. McCann suggested that the jar was blown into a dip mold. The rim (or lip, or mouth) "was fire polished." The base was embossed "ROBERT ARTHUR'S PATENT JA^{N} 2$^{\underline{ND}}$ 1855" in a circle around the outside, with a "glass tipped solid iron bar pontil" scar in the center.[4] None of the sources stated whether the embossing was in a Rickett's-type plate.

In his study of fruit jars, Toulouse (1969:337) mentioned that many "wax sealers of the Arthur pressed groove-ring type . . . are not lettered." He further noted that the finish was "pushed down while hot after removal from mold." This method was very likely used on only the earliest grooved-ring jars.

Roller (1983:14) had originally claimed that "the grooves in these jars were formed by pressing down on the blowpipe while the glass was still slightly molten." The editors of the recent revision (Roller 2011:29), however, countered that "examination of the jars suggest it is more likely that the wax groove was molded rather than formed."

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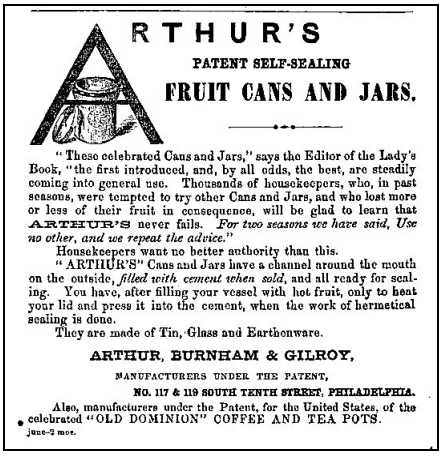
[4] McCann (2011:47) noted the basemark as beginning "R. ARTHUR . . ." – although both others stated it as "ROBERT ARTHUR . . ."

Since the other jars were all embossed with the name of the latter company, this is the only one that could have been made for Arthur, Burnham & Co. It may well have been a "pilot" model, made in small quantities to test the market. The crudeness of the manufacturing technique (attaching a pontil) would probably have made these jars more expensive than the ones that followed. Because all the others were made for Arthur, Burnham & Gilroy, this jar was very likely manufactured during the last year in business, 1857.

Arthur, Burnham & Gilroy, Philadelphia (1857-1861)

By June 1857, Washington L. Gilroy joined the firm, now under the label of Arthur, Burnham & Gilroy.[5] Gilroy had not been included in the 1856 Philadelphia directory, but he was listed as dealing in "hydrants" at NE 10th & George – the same address as Arthur, Burnham & Co. – in 1857. The 1858 city directory placed the new firm at the older address (NE 10th & George) on page 824 but showed a new address – 117 & 119 S 10th – on page 16 (Figure 6). It is likely that Gilroy actually joined the firm in late 1857, at the old location. With renewed energy from Gilroy, the firm probably moved in early 1858 (Smith 1994:101).


R T H U R'S
PATENT SELF-SEALING
FRUIT CANS AND JARS.

"These celebrated Cans and Jars," says the Editor of the Lady's Book, "the first introduced, and, by all odds, the best, are steadily coming into general use. Thousands of housekeepers, who, in past seasons, were tempted to try other Cans and Jars, and who lost more or less of their fruit in consequence, will be glad to learn that ARTHUR'S never fails. *For two seasons we have said, Use no other, and we repeat the advice.*"

Housekeepers want no better authority than this.

"ARTHUR'S" Cans and Jars have a channel around the mouth on the outside, *filled with cement when sold*, and all ready for sealing. You have, after filling your vessel with hot fruit, only to heat your lid and press it into the cement, when the work of hermetical sealing is done.

They are made of Tin, Glass and Earthenware.

ARTHUR, BURNHAM & GILROY,
MANUFACTURERS UNDER THE PATENT,
NO. 117 & 119 SOUTH TENTH STREET, PHILADELPHIA.

Also, manufacturers under the Patent, for the United States, of the celebrated "OLD DOMINION" COFFEE AND TEA POTS.
june-2 mos.

Figure 6 – Arthur, Burnham & Gilroy fruit can ad (DeBows)

Along with listings under the "Fruit Cans and Jars" heading, the firm was also in the "Tinsmiths" column. Roller (1983:14) noted that the company was a jobber rather than a glass house, although he had no idea who actually made the jars. In all likelihood, Arthur, Burnham & Gilroy continued to manufacture tin cans and lids – but had others make the jars. By the time of this reorganization, Robert Arthur had left Philadelphia – possibly for Baltimore, where he died on June 22, 1880 – and it is certain that Timothy S. Arthur was the "Arthur" at the beginning of the firm's name.

By 1859, the firm was listed in the directory as "manufs. patent articles" – probably still meaning the cans and lids. The following year, however, Gilroy was listed separately. Gilroy

[5] Smith (1994:101) cited an ad for the firm in the June 1857 issue of *Godey's Ladies Book*.

was at 117 S. 10th engaged in "furnishings," while Arthur, Burnham & Gilroy was at 119 S. 10th as "home furnishings." The firm was listed under "Force Pumps," "Planished Ware Manufacturer," and "Tinsmiths" in 1861. By the following year, the listing was gone – along with the company. T.S. Arthur continued to operate *Arthur's Home Magazine*; George Burnham took a position as a bookkeeper, and Washington Gilroy was listed only as a "Gentleman" by 1863. Arthur, Burnham & Gilroy had become just another footnote in history.

Cans and Jars

Arthur, Burnham & Gilroy commissioned several variations of marked jars, ceramic containers, and cans. Creswick (1987:8) claimed that "the [glass] jars were made by more than one glass maker. The maker on the west coast was the San Francisco & Pacific Glass Works . . . owned by Carlton Newman." Creswick derived her evidence from Toulouse (1971:471), when he stated that "San Francisco and Pacific was making great quantities of fruit jars under license from the Hero Glass Works in Philadelphia and the Arthur groove-ring fruit jar under license from the Arthur, Burnham & Co., also of Philadelphia." See the Discussion and Conclusions section to learn why the Arthur, Burnham & Co. attribution to San Francisco & Pacific was incorrect.

Table 1 – Chronology of Arthur's Patent Containers

Medium	Pertinent Markings	Firm	Dates
Tin	none	Arthur, Burnham & Co.	1854
Ceramic	patent name or none	Arthur, Burnham & Co.	1855
Glass	patent name	Arthur, Burnham & Co.	ca. 1857
Tin	patent name	Arthur, Burnham & Gilroy	1857
Ceramic	patent name; firm name	Arthur, Burnham & Gilroy	1857
Glass	patent name; firm name; 10th & Geo. address	Arthur, Burnham & Gilroy	1857
Glass	patent name; firm name; Philadelphia	Arthur, Burnham & Gilroy	ca. 1858

Although we have no solid evidence, cans – actually manufactured by Arthur, Burnham & Co. – were probably the firm's primary merchandise. Both ceramic and glass jars were likely secondary products. The emphasis on "patent articles" faded after 1859, although the firm continued to be advertised as "tinsmiths" until the final listing in 1861. See Table 1 for a chronology of these containers.

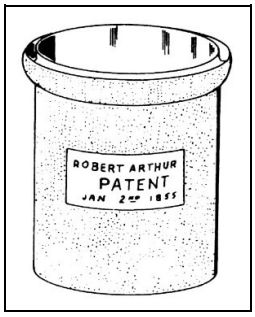


Figure 7 – Robert Arthur Patent can (Creswick 1987:7)

Cans

Creswick (1987:7) provided two examples of markings on cans. In both examples, the information was embossed on a brass tag or plaque that was soldered to the can. One was simply embossed "ROBERT ARTHUR / PATENT / JAN 2ND 1855" on a 1" x 2" tag (Figure 7). The other was embossed "R. ARTHUR'S PATENTED JAN 2D 1855 SELF SEALING AIR TIGHT PRESERVING VESSEL" on a round brass plaque around a basket of fruit. We have not discovered the actual line spacing for the second one. It is possible that many of the firm's cans were made without labels. Arthur, Burnham & Gilroy probably sold preserve cans until the firm ceased business in late 1861 or early 1862. Leybourne (2008:13) and McCann (2011:47) contained similar information.

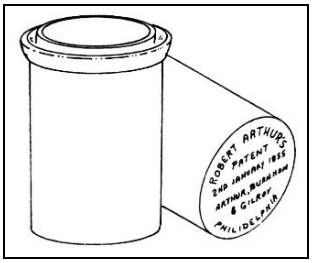


Figure 8 – Arthur, Burnham & Gilroy ceramic jar (Creswick 1987:8)

Ceramic Jars

As noted in the section on Arthur, Burnham & Co. (above), three variations of the ceramic jar were likely made, probably between 1855 and 1857. In addition to these, Creswick (1987:8), Leybourne (2008:12), and Roller (2010:30) all described and/or illustrated a yellow ware ceramic jar (described by the Roller editors as "cream or queensware") stamped on the heel (in an oval) or base with the patent information. There may have been more than one pattern. Creswick's illustration showed the basal stamping as "ROBERT ARTHUR'S (arch) / PATENT / 2ND JANUARY 1855 / ARTHUR, BURNHAM / & GILROY (all horizontal) / PHILADELPHIA (inverted arch)" (Figure 8). Roller (2010:30) however, noted that the stamping was "ROBERT ARTHUR'S PHILADELPHIA, PENNA around PATENT / 2 JANUARY / ARTHUR'S, [*sic*] BURNHAM / & GILROY in center."

Glass Jars

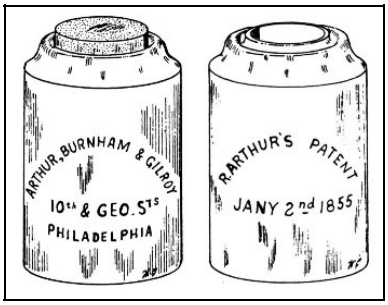


Figure 9 – Arthur, Burnham & Gilroy glass jar (Creswick 1987:8)

Roller (1983:14; 2010:29-30) and Creswick (1987:8) illustrated and/or described a total of four glass jars that referenced the Arthur patent. According to our chronology, three of these were made for Arthur, Burnham & Gilroy. The jars were manufactured in two distinct shapes. The most common form (although all of these containers are rare) was a jar with straight sides, tapering sharply inward at the shoulder to a groove around the neck. The rim of the jar was ground flat. The lid was made of metal, with the sides flaring outward slightly (Figure 9).

The second style was variously described as "wasp-waist" (Roller 1983:14); "bulbous shaped" (Leybourne 2008:13); or "pot-bellied stove appearance" (McCann 2011:47). The term "bulbous" is probably the most accurate; the jar resembles an incandescent light bulb (Figure 10). See Table 2 for a summary of characteristics.

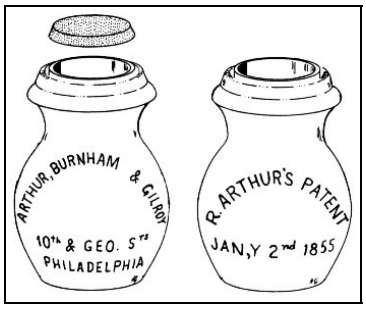


Figure10 – Bulbous Arthur, Burnham & Gilroy jar (Creswick 1987:8)

Table 2 – Glass Jar Variations – Arthur's Patent

Front Embossing	Back Embossing	Base	Shape
bare	bare	ROBERT ARTHUR'S PATENT JA^{N} 2$^{\underline{ND}}$ 1855	Straight
ARTHUR BURNHAM & GILROY / 10TH & GEO. STS. / PHILADELPHIA*	R. ARTHUR'S PATENT / JAN^{Y} 2$^{\underline{ND}}$ 1855*	bare	Straight
same	same	bare	Bulbous
MANUFACTURED BY / ARTHUR BURNHAM & GILROY / PHILADELPHIA	same	bare	Straight

* In each case, the first line is arched; the others are horizontal.

The most common variation had straight sides and was embossed "ARTHUR BURNHAM & GILROY (arch) / 10TH & GEO. STS / PHILADELPHIA. (both horizontal)" on one side (sources disagree on whether this was the "front" or "reverse" side). The other side was embossed "R. ARTHUR'S PATENT (arch) / JANY 2ND 1855 (horizontal)" (Figure 11). The bulbous variation had the same markings, although the Creswick drawing did not show the underline on "2ND" and had a comma after "JAN" (before the "Y"). Also of interest, Creswick (1987:8) explained that the first bulbous jar that was found had a lid embossed with "Spratts Patent July 18, 1854." The lids on these two early jars may have been at least somewhat interchangeable. The third variation was similar to the first one (straight sides) except that the non-patent side was embossed "MANUFACTURED BY (arch) / ARTHUR, / BURNHAM & GILROY / PHILADELPHIA (all horizontal)" (Figures 12-14).

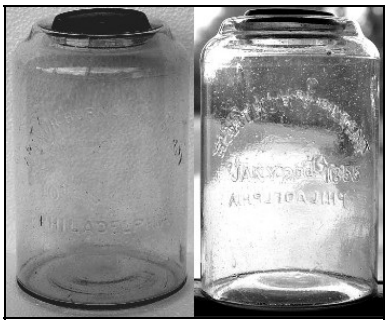


Figure 11 – Arthur, Burnham & Gilroy glass jar (North American Glass)

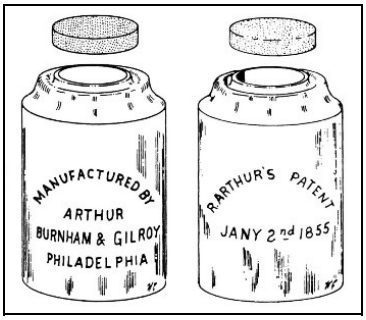


Figure 12 – "Manufactured by" jar (Creswick 1987:7)

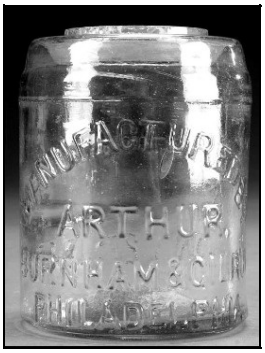


Fig. 13 – "Manufactured by" jar (American Bottle & Glass)

As mentioned above, Roller (1983:14) had originally claimed that the grooves in the jars were formed by hand., while the editors of the later revision (Roller 2010) noted that the wax groove was created during the molding of the jar. After the reorganization that created Arthur, Burnham & Gilroy, probably in late 1857, the firm only remained at the older 10th & George streets address for about a year. Thus, the jars embossed with the address were almost certainly made during 1857 or 1858. The bulbous jars were probably either a special order or a stylistic experiment – apparently an unsuccessful one.

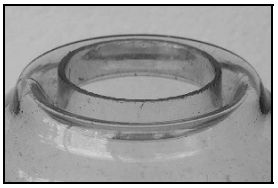


Figure 14 – Finish of Arthur jar (North American Glass)

When the firm needed a reorder, the group probably made the decision to drop the address in favor of just "PHILADELPHIA" in case they made another move. The "MANUFACTURED BY" jars were therefore almost certainly made in 1858 or 1859. By 1860, the directory listings tended away from the patent containers.

Huyett & Fridley, Carlisle, Pennsylvania (1859-1862 or later)

As noted in the Patents section above, in 1859, William Fridley and Frederick Cornman received a patent for an improvement in fruit cans that centered around a lug finish with a complementary cap. The cap was made with a hole in the center that was covered with a rubber gasket that would expand if the food inside had spoiled and contract if the seal worked correctly. Fridley was a tinsmith and dealer in stoves, while Cornman was a cabinetmaker. There is no mention in the historical record of Cornman's actually taking part in the sale or distribution of jars made with this patent, although he did not immediately assign his share of the patent to anyone.

An ad in the November 26, 1859, *Scientific American* (1859:348) described the patent and addressed "William Fridley or Samuel C. Huyett to whom the patent has been assigned at Carlisle Pa." (Figure 15). It is thus pretty certain that Cornman assigned his share of the patent to Huyett fairly soon after he and Fridley received it. Caniff (2010:5) pointed out that the ad referred to the product as the "Improved Preserve Can." This may indicate that glass jars were unavailable until 1860.

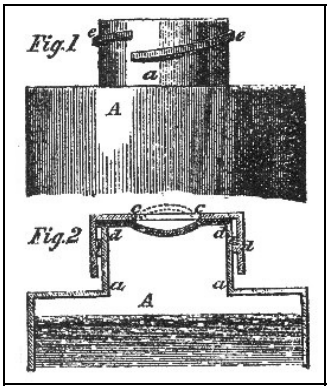


Figure 15 – Drawing of Fridley & Cornman can top (*Scientific American* 1859:348)

According to the 1860 census, Samuel Huyett had a wife, Catherine, and several children. Another couple and a domestic servant shared the household. Huyett was a "Grocer" and held real estate valued at $5,000 along with personal property worth $1,700. It is thus likely that Huyett was the financial backer, while Fridley provided the day-to-day operation of the new firm.

The pair formed the firm of Huyett & Fridley at some point in late 1859 or early 1860 at Carlisle, Pennsylvania. The company was listed in the 1860 Industrial Census as making "Fruit Cans" with a capitalization of $1,500. The listing makes it clear that the partners did not produce glassware, although they almost certainly made the tin lids. The firm remained in business until at least 1862, possibly later (Roller 1983:161; Roller 2010:203; 247).

Jars and Marks

Huyett & Fridely made lids that fit on cans (Figure 16), ceramic jars, and glass jars with at least three different types of embossing. These included KEYSTONE, FRIDLEY & CORNMAN'S PATENT, and HUYETT & FRIDLEY. Each of these followed a slightly (or even notably) different trajectory. As noted in the patent section, one of the most interesting features of the jars and lids is that the patent noted both two lugs and a continuous thread embossed on the finish, but the actual jars had only the lugs. The patent document stated that the lid was "provided internally with two lugs . . . to pass under two spiral projections or screw-threads . . . on the exterior of the neck." The actual lid, however, had two sections bent under to engage the lugs on the finish.

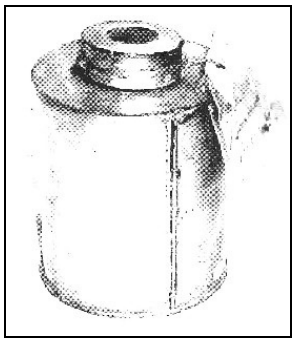


Figure 16 – Tin can with Fridley & Cornman lid (Caniff 2010:4)

Caniff (2008:9; 2010:10) discussed two generic forms of these jars. Since all four variations described below had essentially the same shape, the generic versions could have been intended as any of the models. One of these was a generic glass container with lugs and a Fridley & Cornman's closure. The other was made of clay (Figure 17). Caniff (2010:10) described the process:

Figure 17 – Ceramic jar with Fridley & Cornman lid (Caniff 2010:10)

The jar was apparently slip cast in a two-piece mold, made by pouring clay slip – a mixture of clay and water – into a dry plaster of paris mold. As the mold absorbed the moisture, the slip dried, forming a shell inside the mold. When the shell, or wall of the jar, was thick enough, the excess slip was poured out and the shell was then allowed to finish drying before the mold was taken apart and the item fired and glazed.

KEYSTONE (1860-1861)

Creswick (1987:94) illustrated a jar that was simply embossed "KEYSTONE" in a slight arch on the front (Figure 18). Like all the other jars made for the patent, this one had straight sides and two external lugs at the finish. The *Pittsburgh Evening Chronicle* for June 7, 1860,

said that a "Keystone Fruit Jar" was made by Adams, Macklin & Co. (Caniff 2008:8; 2010:6; Roller 1983:180; 2010:277). Adams, Macklin & Co. was in business at Pittsburgh from ca. 1854 to ca. 1861, so the glass house made this jar just prior to its reorganization as Adams & Co. ca. 1861. The mysterious Mr. Macklin apparently died in 1857, and his widow seems to have remained involved with the firm. Mrs. Macklin likely divested herself of her share of the business in late 1860 or early 1861, creating the reorganization that formed Adams & Co. (Hawkins 2009:9-10).

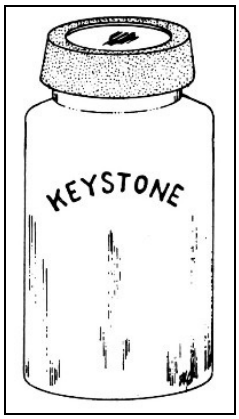


Figure 18 – KEYSTONE jar (Creswick 1987:94)

The KEYSTONE jars are very rare, so it is virtually certain that Adams & Co. did not continue to make them after the reorganization. However, since molds were some of the highest cost items, they were generally reused. Leybourne (2008:210), Caniff (2008:9; 2010:9-10), Roller (2010:278), and McCann (2011:155) all listed three variations where "KEYSTONE" had been peened out, leaving a "ghost" of the word (Figure 19).


Figure 19 – Jar with ghosted KEYSTONE (North American Glass)

These variations were made for other closures including the wax sealer, cork, or Willoughby Stopple. Although the lug finishes on the neck were molded during the blowing process, it would have been easy to alter those by hand to form the other finish styles. However, the shoulder of the ghosted jars may have been slightly altered as well – a more difficult but not impossible task. One variation even had an iron-pontil scar. These later jars were much more common and were probably made until the molds wore out. For more on manufacturers, see the Discussion and Conclusions section.

FRIDLEY & CORNMAN'S PATENT (ca. 1859-1861)

While the KEYSTONE jar was made and distributed by Adams, Macklin & Co., Huyett & Fridley sold cans on their own. An article in the *Scientific American* (1859:348) advised that information on the cans could be obtained from either Fridley or Huyett at Carlisle. The article made no mention of jars. However, at least two "Ladies Choice" jars were made to the Fridley & Cornman patent.

As shown in Creswick (1987:64) these had the same shape as the KEYSTONE jars but the first was embossed "FRIDLEY & CORNMAN'S (arch) / PATENT / OCT. 25TH 1859 (both horizontal) / LADIES CHOICE (inverted arch)" on the front (Figures 20 & 21). A half-gallon variation was made with an engraver's error that replaced "FRIDLEY" with "FRIEDLY." As with the earlier Arthur jars, some of these were made in yellow ware ceramics. However, only the lids were stamped with the Fridley & Cornman patent information (Caniff 2010:9; Leybourne 2008:158). All of these jars are rare, suggesting that either a limited number were manufactured or that the jars enjoyed a fairly short period of production.

Figure 20 – FRIDLEY & CORNMAN'S jar (North American Glass)

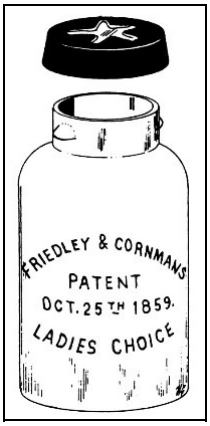


Figure 21 – FRIDLEY & CORNMAN'S jar (Creswick 1987:64)

H.S. Ringwalt, a Pittsburgh glass dealer, began advertising the "Ladies Choice Fruit Jars & Cans" on June 1, 1860, while noting that they had been used the previous season (Roller 1983:161). Although the Ladies Choice was advertised later (see next section), the variations embossed with the Fridley & Cornman patent information were probably only made for a short time, likely 1859 to ca. 1861. Creswick (1987:86) suggested Adams, Macklin & Co. as the manufacturer of the jars, although that was probably based on the ad for the KEYSTONE jars.

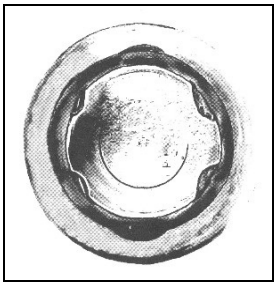


Figure 22 – Fridley & Cornman's jar with internal lugs (top)

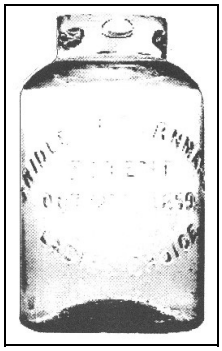


Figure 23 – Fridley & Cornman's jar with internal lugs (side)

Caniff (2008:8-9; 2010:9) noted an interesting variation of the "FRIDLEY & CORNMAN'S" jar. This one had the same embossing and had the typical two lugs formed on the outside of the finish. However, it also had four "not-quite-equidistant lugs" molded into the *inside* of the throat (Figures 22 & 23). The external lugs faced the front and back of the jar, while the internal ones were spaced in inter-cardinal directions relative to the front of the jar. Caniff speculated that the jar was "made to accommodate some type of internal stopper, as well as the regular Fridley & Cornman closure."

Although the Creswick drawings of the Fridley & Cornman jars show the front lug slightly offset from the center, the actual photos we have seen show the lug situated directly (or almost directly) in the center of the front mold half of the jar. These were probably molded into the neck of the jar during the blowing operation – in the same manner that the screw threads were molded into Mason jars. The neck was then cut or wetted off *above* the lugs and ground flat (Figure 24). Both the external and internal lugs, in all the Fridley & Cornman patent jars, would therefore have been fast and easy to make, with uniform lug size and placement.

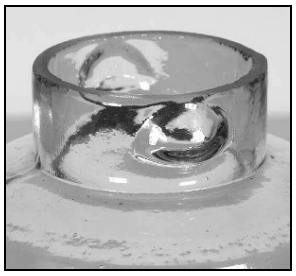


Figure 24 – Finish of Fridley & Cornman jar (North American Glass)

HUYETT & FRIDLEY (1862-1863)

Figure 25 – HUYETT & FRIDLEY jar (North American Glass)

These jars again had the same appearance as both the original KEYSTONE and the FRIDLEY & CORNMAN PATENT jars. However, these were embossed "HUYETT & FRIDLEY (arch) / CARLISLE, PA (horizontal) / LADIES CHOICE (inverted arch)" – also on the front (Figures 25-27).

Figure 26 – Finish of Huyett & Fridley jar (North American Glass)

A July 17, 1862, ad by R.A.O. Kerr in the *Altoona Tribune* also offered Ladies Choice jars and cans "manufactured and sold by Haller & Samuel, sole agents" at Philadelphia (Figure 28). The jars were also advertised in the *Utica Evening Telegraph* (New York) as late as January 22, 1863 (Caniff 2008:8; Roller 1983:131, 160). Creswick (1987:86), however, suggested Adams, Macklin & Co. of Pittsburgh as the maker, although the firm of Haller & Samuel – "sole agents" – was located at Philadelphia (see the A.R. Samuel section for more on Haller & Samuel). As with the jars described above, these are rare and were likely only made for a short time – probably just from late 1862 to sometime in 1863 or a bit later.

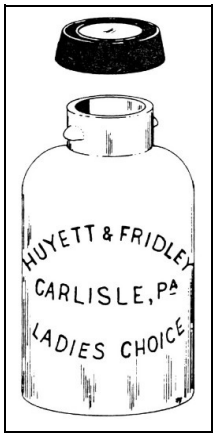


Figure 27 – Huyett & Fridley jar (Creswick 1987:86)

Adam R. Samuel began construction of the Keystone Glass Works in 1862, and the plant started production on February 22, 1863. The firm was one of the earliest to manufacture fruit jars almost exclusively. Samuel's sons operated the factory until at least 1875. For much more information about this company, see the A.R. Samuel section (McKearin & Wilson 1978:173; Roller 1983:44; 1998; 2010:648).

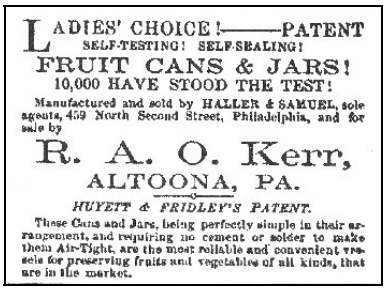

LADIES' CHOICE!——PATENT
SELF-TESTING! SELF-SEALING!
FRUIT CANS & JARS!
10,000 HAVE STOOD THE TEST!
Manufactured and sold by HALLER & SAMUEL, sole agents, 459 North Second Street, Philadelphia, and for sale by
R. A. O. Kerr,
ALTOONA, PA.
HUYETT & FRIDLEY'S PATENT.
These Cans and Jars, being perfectly simple in their arrangement, and requiring no cement or solder to make them Air-Tight, are the most reliable and convenient vessels for preserving fruits and vegetables of all kinds, that are in the market.

Figure 28 – R.A.O. Kerr in the *Altoona Tribune* (Caniff 2010:7)

The patent office issued Patent No. 29,544 to John M. Cooper and William L. Haller on August 7, 1860, for an "Improvement in Sealing Fruit-Cans." Haller immediately assigned his share to Cooper. Although the drawing and description indicate that the sealing device was for use on cans, it was obviously adapted for glass jars (Figure 29). The drawing indicated a cast-iron clamp held in place by a wing-screw to affect the seal – virtually identical to the lids shown in Creswick (1987:78). See the A.R. Samuel section for a description and the patent drawing.

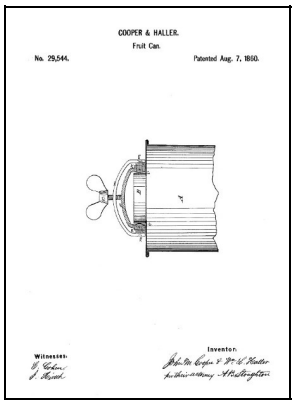

COOPER & HALLER.
Fruit Can.
No. 29,544. Patented Aug. 7, 1860.
Witnesses:
Inventors:

Figure 29 – Cooper & Haller 1860 patent

Lids

Roller (1983:78) provided a concise description of this closure and finish: "Top seal (on ground lip), gutta-percha gasket and cast-iron cap engaging two lugs on jar neck." Although the earlier sources (Roller 1983:131; Creswick 1987:64) only listed two lids, Caniff (2008:6-7) and Roller (2010:118, 203, 247, 277) listed three variations of the lids with each jar. We have revised their order based on probable use.

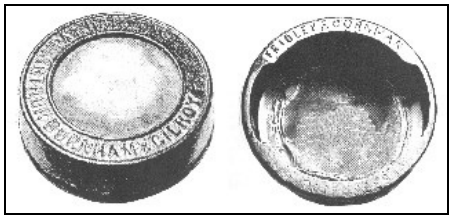


Figure 30 – ARTHUR BURNHAM & GILROY lid (Caniff 2010:8)

1. "ARTHUR BURNHAM & GILROY PHILA PAT. OCT. 25 1859" on the upper face around a large circular opening, with "FRIDLEY & CORNMAN / PAT OCT. 25, 1859" on the bottom edge (Figure 30)

2. “FRIDLEY & CORNMAN’S (arch around top of upper face) / PATENTED OCT 25 1859” (inverted arch around bottom of upper face) – all around a large circular opening (Figure 31)

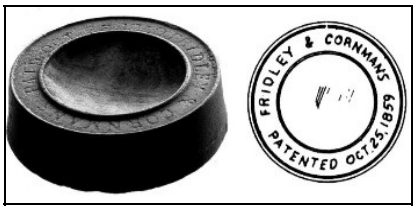


Figure 31 – FRIDLEY & CORNMAN’S lid (Creswick 1987:64; North American Glass)

3. “FRIDLEY & CORNMAN’S / CARLISLE (both arched around top of upper face) / PA. / PATENTED OCT 25 1859” (both in inverted arches around bottom of upper face) [The last line is upside down compared to the other three lines to form a complete circle with the top line.] All this is around what the Roller group called a “petal shaped opening” that could also be described as a five-point, rounded star. A jar depicted by North American Glass also showed a six-petal or six-pointed star (Figures 32 & 33).

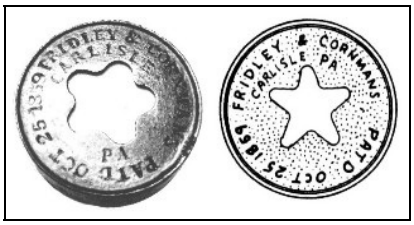


Figure 32 – FRIDLEY & CORNMAN’S 5-petal lid (Creswick 1987:64; Caniff 2010:8)

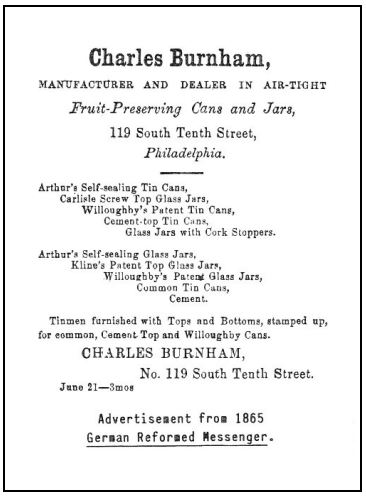
The first lid in our order requires some speculation The patent date on both imprints (OCT. 25 1859) is for the Fridley & Cornman jar and lid. The inclusion of the Arthur, Burnham & Gilroy name, therefore, must indicate that the older company made the lid. When Huyett & Fridley opened, the firm contracted to have the glass jars made, but the plant may not have yet been set up to produce the lids. The Arthur, Burnham & Gilroy lid, therefore, may have been the first in the series. Like the second lid, the first had a round hole in the center, providing continuity between them. The second and third variations were probably made by Fridley.


Figure 33 – FRIDLEY & CORNMAN’S 6-petal lid (North American Glass)

C. Burnham & Co., Philadelphia (1862-ca. 1866)

When Arthur, Burnham & Co. ceased operations in late 1861 or early 1862, it was not the end of business, only a change in management. As noted above, the principals – T.S. Arthur, George Burnham, and Washington Gilroy – all moved into different professions (Arthur continuing to run *Arthur’s Home Magazine*). However, a new listing appeared in 1862. Charles Burnham – George Burnham’s nephew – was enumerated in 1862 as a “manufactr” of

"druggist's tin ware" at the same 119 S. 10th St. address formerly used by Arthur, Burnham & Gilroy. Subsequent listings dropped the manufacturer designation.


Charles Burnham,
MANUFACTURER AND DEALER IN AIR-TIGHT
Fruit-Preserving Cans and Jars,
119 South Tenth Street,
Philadelphia.

Arthur's Self-sealing Tin Cans,
Carlisle Screw Top Glass Jars,
Willoughby's Patent Tin Cans,
Cement-top Tin Cans,
Glass Jars with Cork Stoppers.

Arthur's Self-sealing Glass Jars,
Kline's Patent Top Glass Jars,
Willoughby's Patent Glass Jars,
Common Tin Cans,
Cement.

Tinmen furnished with Tops and Bottoms, stamped up, for common, Cement-Top and Willoughby Cans.

CHARLES BURNHAM,
No. 119 South Tenth Street.
June 21—3mos

Advertisement from 1865
German Reformed Messenger.

Figure 34 – Burnham 1865 ad (Roller 1983:78)

Roller (1983:78) illustrated a June 21, 1865, advertisement for "Charles Burnham, Manufacturer and Dealer in Air-Tight Fruit-Preserving Cans and Jars" (Figure 34). Along with various cans, Burnham offered:

Arthur's Self-sealing Glass Jars
Carlisle Screw-top Glass Jars [Fridley & Cornman patent]
Kline's Patent Top Glass Jars
Willoughby's Patent Glass Jars
Glass Jars with Cork Stoppers

This ad, coupled with the business history, connects "C. Burnham & Co." with both the earlier Arthur, Burnham & Co. and with Huyett & Fridley through the "Carlisle Screw-top Jars." It is interesting to note that the 1868 Philadelphia City Directory listed A.R. Samuel as "Manufacturer and Proprietor" of Kline, Haller, Willoughby, Franklin, and Mason fruit jars (Roller 1983:648). It is thus highly probable, especially given the Haller & Samuel connection with the earlier Fridley & Cornman jars, that A.R. Samuel made the jars offered for sale by Burnham (Roller 2010:118; McCann 2011:78).

Like his predecessors, Burnham probably made the lids and the cans, although he likely bought the jars from Samuel. His directory listings continued to have the same wording until at least 1867 (the last edition we could access). He remained in business, selling stoves and other sheet metal products until at least 1875 (*Journal of the Franklin Institute* 1875:104). It is probable, however, that the jars embossed with his name were only made for a very few years.

Jars and Marks

Toulouse (1969:55) illustrated "C. BURNHAM & CO. (slight arch) / MANUFACTURERS / PHILAD^{A}" embossed on the side of a fruit jar (Figure 35). Although he

could not identify the maker, he noted that the jar lid was patented in 1859. Roller (1983:78) added that the jar fit the lids patented by Fridley & Cornman in 1859. Creswick (1987:24) illustrated the jar and lid (Figure 36). The lid was slightly different from the ones used on the Fridley & Cornman/Huyett & Fridley jars, although the finish was the same. These were stamped "FRIDLEY & CORNMAN'S (arch) / PATD OCT 29 1859 (inverted arch)" (Figure 37). There was apparently only one variation of this jar ever made – almost certainly by A.R. Samuel & Co. Sources with prices (e.g., Leybourne 2008:93; McCann 2011:78) show that the jars are rare.

Figure 35 – C. BURNHAM & CO. jar (North American Glass)

Discussion and Conclusions

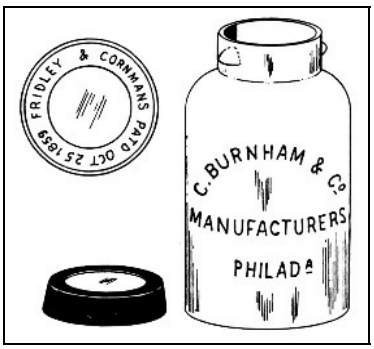


Figure 36 – C. Burnham & Co. jar (Creswick 1987:24)

Our evaluation of the early patents suggests that Robert Arthur, indeed, deserves the title of "Father of the Grooved-Ring, Wax-Sealer Fruit Jar." Although Toulouse (1969:415) suggested that Arthur indicated earlier grooved-ring glass jars, that was an interpretation of Arthur's patent document. Our assessment of the same document indicated nothing about any previously used glass containers with similar characteristics, although Spratt's 1853 patent demonstrated that the use of wax as a seal began earlier – likely on cans.


Figure 37 – C. Burnham lid (North American Glass)

Because these jars were some of the pioneers of the fruit jar industry, the manufacturing history is very limited. Roller (2010:676) stated that "[A.R.] Samuel began building the Keystone Glass Works in 1862 after making fruit jars for several years at one of the furnaces of the Kensington Glass Works." A search through the best sources we can find for the Kensington Glass Works (Dr. T.W. Dyott) of Philadelphia failed to disclose any information about fruit jars manufactured at any Dyott plant (McKearin 1970; McKearin & McKearin 1941:585; McKearin & Wilson 1978:38-41). This does not entirely discount the idea, however. The McKearins were highly biased in favor of flasks. The Dyott plants were certainly in a position to blow fruit jars in 1860.

We could find no glass houses at Carlisle at all and none in Philadelphia that made fruit jars prior to the opening of A.R. Samuel in February 1863. With the possible exception of the Dyott plants and two Pittsburgh glass houses discussed below, the only Pennsylvania factory that made fruit jars in 1860 appears to have been Adams, Macklin & Co. at Pittsburgh – producing "KEYSTONE" jars. When the firm reorganized ca. 1861, Adams & Co. continued to produce fruit jars, notably the Buckeye, Adams patent, and Bennett patent jars (Hawkins 2009:3-4, 9-10).

There were certainly other glass houses that made fruit jars, although they were few. One of the strongest was Potter & Bodine at Bridgeton, New Jersey, less than 10 miles southeast of Philadelphia. The firm grew out of Bodine & Sons (1846-1855) and was in business from 1855 to 1863, when it was replaced by F.&J. Bodine (McKearin & Wilson 1978:132). When Joseph J. Borden received Patent No. 19,964 for a process to form the wax groove on wax-sealer fruit jars on April 13, 1858, he assigned it to David Potter and Francis L. Bodine. The firm made several variations of grooved-ring wax-sealer fruit jars embossed "POTTER & BODINE'S / AIRTIGHT FRUIT JAR / PHILAD$^{\underline{A}}$" (Creswick 1987:178-179; Roller 1983:290).

H.S. Ringwalt advertised Ladies Choice Fruit Jars on June 1, 1860, at Pittsburgh. These were also probably produced by Adams, Macklin & Co. – although there were at least two other fruit jar manufacturers at Pittsburgh that early.[6] William McCully & Co. formed ca. 1840 and remained in business until 1909. McCully made fruit jars from at least the 1860s, possibly as much as a decade earlier. McCully used a wide variety of logos, although the first one was probably not embossed on containers until ca. 1858 (Farnsworth & Walthall 2011:70).

C. Ihmsen & Son, in business from 1860-1861, was probably the next earliest Pittsburgh jar manufacturer. The firm made a slight name change – to C. Ihmsen & Sons – in 1861 and continued until the next reorganization – as the Ihmsen Glass Co. – ca. 1876. The plant made grooved-ring wax-sealer fruit jars as early as 1860-1862 – embossed with the glass house name – but apparently did not continue jar production (Lockhart et al. 2005a).

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[6] Cunningham & Ihmsen (1866 to 1878), was a bit too late for these jars. The firm made Mason jars and wax-sealers at least as early as 1878. The wax sealers bore the firm's C&I logo on the bases, other styles the full glass house name. Cunninghams & Co. succeeded the earlier firm in 1878 and continued to make wax sealers and other jars embossed with the firm name or the "C&Co" initials until the start of Cunningham & Co., Ltd., in 1886 (Lockhart et al. 2005b).

The Pittsburgh location makes the Dyott plants at Philadelphia an unlikely choice as the manufacturer. Both other Pittsburgh glass houses had clearly established manufacturer's marks – almost certainly in use by 1860 – but the Ladies Choice and Keystone jars had no such logos. Thus, it seems probable that Adams, Macklin & Co. made both Ladies Choice and Keystone fruit jars in 1860 and probably 1861.

However, to somewhat upset this particular bottle cart, Jay Hawkins (personal communication 12/5/2011) noted that he had

> not seen anything to indicate that the Fridley & Cornman jar is the "KEYSTONE" jar made by Adams, Macklin & Co. Additionally, we don't dig them here either. If they were made here, some would have likely been sold here. We would find shards.

However, these jars are rare, and it may just be that none have been found at Pittsburgh digs. Both Keystone and Ladies Choice jars were manufactured *somewhere*, probably in Pennsylvania, and both were advertised for sale in Pittsburgh – and there are no other jars with characteristics from that period marked "KEYSTONE." It is possible, of course, that Adam, Macklin & Co. made generic (i.e., unembossed) jars with that brand name.

At this point, however, another mystery appears. An Altoona, Pennsylvania, dealer offered Ladies Choice jars – presumably the ones made to the Fridley & Cornman patent – on July 17, 1862. The vendor noted that the jars were "manufactured and sold by Haller & Samuel, sole agents" at Pittsburgh (Roller 1983:131, 160). Despite the wording, Haller & Samuel were jobbers or wholesalers – they did not make jars.

Although A.R. Samuel began construction of the Keystone Glass Works in 1862, the plant did not actually begin production until February 22, 1863 – *seven months* after Haller & Samuel were apparently selling Ladies Choice jars to a retailer at Altoona!! Did Samuel have an agreement with his old employer, Dr. Dyott, so he could use the Dyott plant until his own began production? There seems to be no one else making fruit jars at Philadelphia – and only Adams & Co., McCully, and Ihmsen by that time at Pittsburgh.

The final jars, made for C. Burnham & Co. seem to all have been made by A.R. Samuel at Philadelphia. Since that includes the Arthur's patent jars, it seems likely that Samuel received the rights to make the Arthur's jars when Adams, Macklin & Co. reorganized. Thus, Samuel probably made the C. Burnham & Co. jars for the Fridley & Cornman patent.

As noted above, Creswick (1987:8) said that the San Francisco & Pacific Glass Works produced jars for Arthur, Burnham & Gilroy. However, the San Francisco Glass Works and Pacific Glass Works did not consolidate to form the San Francisco & Pacific Glass Works until June 9, 1876 – far too late to have made any of these jars. Although the Pacific Glass Works was created in 1862, the firm did not advertise the first California-made fruit jars until June 9, 1871 – called the Victory Fruit Jar (Freidrich 2011:120). It is thus highly unlikely that *any* of the Arthur's patent jars were ever made on the Pacific Coast.

A bit of speculation is in order at this point. Why did the Arthur jars lose popularity? There are probably two answers, and these, alone, may be oversimplifying the explanation. First was the competition with other jar closure types. Although jars made to the Arthur patent may have helped shift the public away from canning in tin and ceramics, they never enjoyed a great popularity – as evidenced by the scarcity of the jars today. The various screw, lug, Lightning, and other fastener types were simply more efficient than Arthur jars. Second, the Borden Patent (discussed above), used by Potter & Bodine, created the new method of forming the groove on wax-sealing jars that was so superior to the crude Arthur containers that they simply became outmoded virtually overnight. The style of the Bodine jars rapidly became the industry standard.

Jars made to the Fridley & Cornman patent were also doomed – for similar reasons. In this case, the lug closure system simply could not compete with the continuous-thread finishes of the Mason jars. As with the Bodine-style wax sealer finishes, the Mason jars became the industry standard for screw-on closures.

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Sources

Arthur, T.S.

1855 *Arthur's Home Magazine* 5:338, 395.

Caniff, Tom

2008 "Fruit Jar Rambles: Fridley & Cornman's Patent." *Antique Bottle & Glass Collector* 24(6):6-9, 37.

2010 "Fridley & Cornman's Patent." In *Guide to Collecting Fruit Jars: Fruit Jar Annual, Volume 15 – 2010*, pp. 4-10. Privately Published, Chicago.

Creswick, Alice

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

Farnsworth, Kenneth B. and John A. Walthall

2011 *Bottled in Illinois: Embossed Bottles and Bottled Products of Early Illinois Merchants from Chicago to Cairo, 1840-1880*. University of Illinois, Urbana. Studies in Archaeology No. 6, Illinois State Archaeological Survey.

Friedrich, Warren B.

2011 *Early Glassworks of California*. Privately printed, California.

Jordan, John W.

1914 *Encyclopedia of Pennsylvania Biography, Illustrated*. Lewis Historical Publishing Co., New York.

Journal of the Franklin Institute

1875 "Steam Heaters, Heaters, Ranges and Ventilators." *Journal of the Franklin Institute* 69(2):104.

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

Leybourne, Douglas M.
2008 *The Collector's Guide to Old Fruit Jars: Red Book 10*. Privately published, North Muskegon, Michigan.

Lockhart, Bill, David Whitten, Bill Lindsey, Jay Hawkins, and Carol Serr
2005a "The Dating Game: The Ihmsen Glass Company." *Bottles and Extras* 16(2):26-31.

2005b "The Dating Game: Cunningham Family Glass Holdings." *Bottles and Extras* 16(3):14-20.

McCann, Jerry
2011 *The Guide to Collecting Fruit Jars: Fruit Jar Annual, Volume 16 – 2011*. Privately Published, Chicago.

McKearin, Helen
1970 *Bottles, Flasks and Dr. Dyott*. Crown Publishers, New York.

McKearin, Helen and George McKearin
1941 *American Glass*. Crown Publishers, New York.

McKearin, Helen and Kenneth M. Wilson
1978 *American Bottles & Flasks and Their Ancestry*. Crown Publishers, New York.

Roller, Dick
1983 *Standard Fruit Jar Reference*. Acorn Press, Paris, Illinois.

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

2010 *Standard Fruit Jar Reference: 2010 Update*. Edited by Jerome McCann and Barry Bernas. Fruit Jar Annual/Phoenix Press, Chicago.

Scharf, John Thomas and Thompson Wescott
1884 *History of Philadelphia 1609-1884*. Vol. 2. L.H. Everts, Philadelphia.

Scientific American
1859 "Improved Presere Can." *Scientific American* 1(22):348.

Smith, Andrew F.
1994 *The Tomato in America: Early History, Culture, and Cookery*. University of South Carolina Press, Columbia.

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

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

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