

# **Chapter 5**

## **Milk Bottle Finishes and Closures**



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2014



# Chapter 5

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Because the subjects of both finishes and closures are so complex, I have given them their own chapter, separate from the rest of the dating information. Other returnable bottles – soda and beer – quickly developed standardized types of closures. For example, soda bottles evolved from cork closures to Hutchinson stoppers to crowns. Beer bottles went from corks to Lightning fasteners to crowns. Milk bottles, however, remained complex – even though the disk closure completely dominated the industry for the first half of the 20<sup>th</sup> century.

### Finishes and Closures

As with most bottle types, milk bottle finishes and closures changed over time. The early ones were borrowed from other container types, but the industry soon developed unique finishes and closures that were specially adapted to the unique properties of milk and dairy bottling. Closures and finishes continued to develop throughout the 20<sup>th</sup> century.

#### Tin-Top Finish

Prior to the invention of the ligneous disk (see below), milk bottles were sealed with some variation of the Lightning stopper, patented by Henry W. Putnam on March 15, 1859. The finish involved was either a wide, flattened ring or a rounded ring at the mouth of the jar. One of the earliest, was patented by Louis Whitman, who received Patent No. 225,900 on March

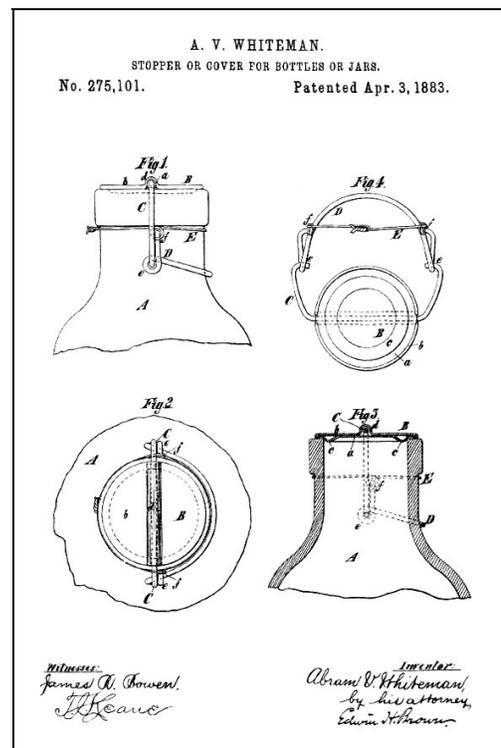


Figure 5-1 – Whiteman's 1883 finish and closure patent

23, 1880. His brother, Abram V. Whiteman, improved the system with Patent No. 275,101 on April 3, 1883. The finishes found on actual jars appear much more like those in Abram's drawing than the illustration by Louis (Figure 5-1). Various types of tin and glass lids, all with similar wire-bale closures, were used during the 1878-ca. 1915 period. The closures worked equally well on the cap-seat finishes made for the Common Sense bottles (see next entry), so many tin-top closures are found on finishes with cap-seats.

### Early Closures

One of the earliest closure types was the "tin top," a metal cap that was held in place by an arrangement of wires. These, and glass top closures, were essentially lightning-style fasteners. Indeed, a metal closure designed to fit a large opening, patented January 5, 1875, may be the first bottle-related patent connected with the dairy industry (Tutton 1994:2-3). According to Taylor (1971:82), tin tops in general may be dated from the early 1880s to "at least 1903," although Rawlinson (1970:13) stated that "for all practical purposes the use of the 'Lightning' type closure on milk bottles came to an end shortly before 1900." Subsequent experience suggests that some were still in use at least as late as 1912 or later (see discussion under Ligneous Disks below).



Figure 5-2 – Tin-top on Whiteman bottle (Paul Doucette collection)

Louis Whiteman applied for a patent on January 31, 1880, for a "Jar for Milk &c." and received Patent No. 225,900 on March 23 of that year (see Figure 5-1). Although the patent was for the jar, it centered around the cap, made of "metal or other suitable material" and held in place by a wire-bale arrangement (Figure 5-2). The seal was affected by a "flange overlapping the mouth of the jar, sealing it with the aid of a packing ring . . . preferably of cork."

This type of closure included the "common tin top" (No. 381,331) patented by G.L. Carll on April 17, 1888 (Tutton 1997:6), and the Smalley Milk Jar, patented by A.G. Smalley & Co. (No. 601,988) on April 5, 1898 (Taylor 1971:49; Tutton 1992:7; 1994:23). Gallagher & Munsey

(1969:333) dated this bottle at 1896. In addition to its glass closure, the Smalley jar is distinguished by a metal handle attached to the neck and upper body by metal bands (Figure 5-3). Small mouthed bottles (similar to large soda bottles) with actual lightning stoppers were used by some early dairies (Tutton 1997:6). Tutton (1994:5, 9-11) also illustrated other examples.

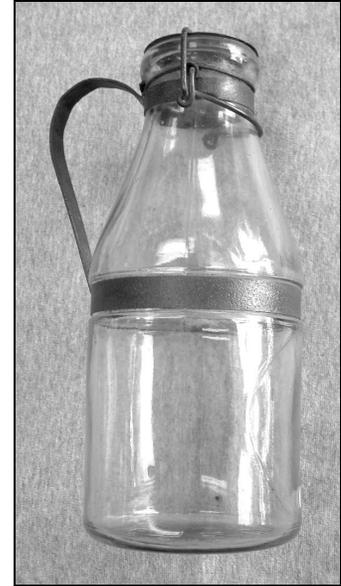


Figure 5-3 – Smalley jar with Lightning-style tin-top (California State Parks collection)

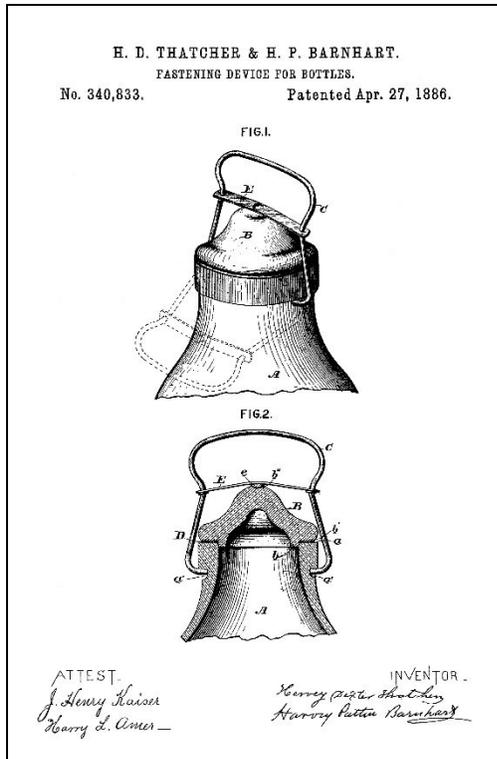


Figure 5-4 – Tin-top patented by Thatcher & Barnhart in 1886

A second early closure was the “glass top,” clamped in place by a thick wire. In operation, these were very similar to the lightning fastener used on beer bottles. Possibly the earliest of these was the glass closure and wire bale arrangement patented by Hervey D. Thatcher and Harvey P. Barnhart on April 27, 1886 (No. 340,833 –Figure 5-4).

Whitell Tatum & co. made the original milk bottle for Thatcher, but the C.A. Tatum

patented his own glass closed bottle (No. 389,263) for Whittall Tatum on September 11, 1888 (Tutton 1997:6 – Figure 5-5). Although I have not found a source for general dates, various glass stoppers were probably used in the late 1880s and early 1890s. A specific type of glass top was “F.K. Ward’s Milk Preserving Jar.” The jar was patented in both 1890 and 1892 (Gallagher & Munsey 1969:333; Taylor 1971:48; Tutton 1994:20).

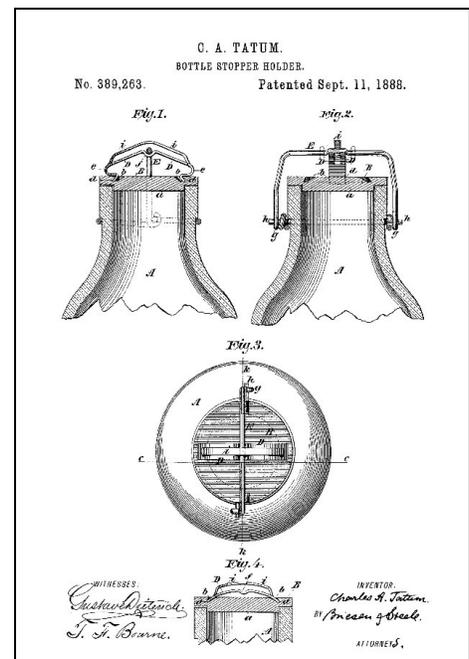


Figure 5-5 – Tatum’s 1888 patent glass-top stopper patent

## Common Sense Finish

The common sense or cap-seat finish consisted of a heavy, rounded ring at the very top of the bottle. Inside the throat, offset ca. .05 cm (3/8") deep (i.e., below the actual lip or rim) was a ledge or cap seat (Figure 5-6). A ligneous disk (initially made of cardboard or wood – later always of cardboard) fit tightly against the cap seat, creating an



Figure 5-6 – Early Common Sense (cap-seat) finish

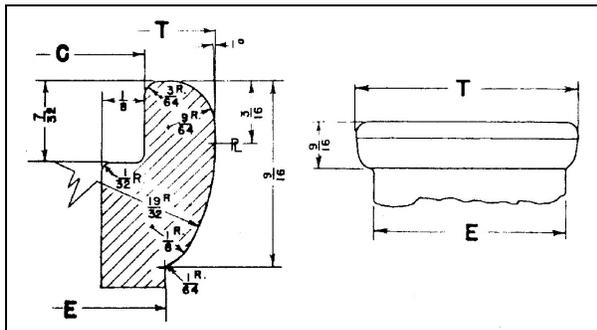


Figure 5-7 – Later cap-seat finish (Owens-Illinois drawing, 1947)

effective seal that was easy to remove and could be reused. The cap seat also prevented the disk from dropping into the milk below. This simple and effective seal, invented in 1889, was used for a full century. Rawlinson (1970:34) noted that the finish was sealed with “Plug Cap [ligneous disk], Seal-Kap, Sealon Hood, Cellophane Hood, and the Standard Seal Hood.” See the Common Sense section of Chapter 2 for patent details and Figure 2-3 for the patent drawing. The heavy, rounded rings on later cap-seat finishes were greatly reduced in size (Figure 5-7).

## Slogan Rolls

Slogan rolls were embossed messages applied to the underside of Common Sense and Syrup finishes on milk bottles (Figure 5-8). Each of the major milk bottle manufacturers offered a different slogan (Table 5-1). Slogan rolls began to be popular in the early 1940s but were phased out by the late 1950s to early 1960s (*The Milk Route* 1984:8). According to Rawlinson (1970:35), the slogan roll had a second application, aside from the obvious advertising value. A delivery man, especially at night, could tell by feel alone that the milk bottle he was picking up in front of a house belonged to his company rather than a competitor. The finishes were only made in the 56mm size.



Figure 5-8 – Slogan Roll

**Table 5-1 – Slogan Rolls (*Milk Route 1984:9*)**

| Slogan                                   | Glass House                    |
|--|--------------------------------|
| “A BETTER BOTTLE OF MILK”                | Lamb Glass Co.                 |
| “A BOTTLE OF MILK IS A BOTTLE OF HEALTH” | Thatcher Mfg. Co.              |
| “MILK FOR HEALTH IN A BOTTLE FOR SAFETY” | Owens-Illinois Glass Co.       |
| “COP THE CREAM BOTTLE COMPANY”           | Cop the Cream Bottle Co.       |
| “DRINK MILK FOR HEALTH”                  | Universal Glass Products Corp. |
| “PURITAN PURITAN”                        | Thatcher Mfg. Co. <sup>1</sup> |

### **Ligneous and Cardboard Disks**

After the introduction of a number of other closure types, the ligneous (cardboard) disk was introduced along with the “common sense” milk bottle in 1889 (patented September 17). Commonly called a cap or disk by modern archaeologists and a “plug” by collectors, the disk was sealed against a ledge, molded inside the mouth or throat of the “common sense” bottle (see Figure 5-1). This method of closure was easy to use and was acceptable for limited periods of time and transportation over short distances.

The ligneous disks originally sold for 40¢ per thousand and were available in lots of 1,000, 5,000, and 10,000 in sacks and 50,000 lots in barrels. The disks were marketed as cheap, sanitary, and easier to use than prior closures. The combination of the common sense bottle and the ligneous disk revolutionized the dairy industry, and the disk continued in use as long as glass containers were the industry norm (Gallagher & Munsey 1969:333; Jones & Sullivan 1989:161;

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<sup>1</sup> This was almost certainly a special embossing for the Dairy, Hy Vita Milk Co., Ship Bottom, New Jersey. Brad Blodget suggested that the slogan roll may have been connected to the Puritan Dairy, Perth Amboy, New Jersey. Although Perth Amboy is ca. 40 miles north of Ship Bottom, the dairies may have been connected in some way. The use of the slogan roll on the Hy Vita bottle may also have been accidental on the part of Thatcher.

Rawlinson 1970:13, 32-34). An ad in the Champion Milk Cooler Co. Dairy Supplies Catalog of 1899 states that the “caps are used but once and therefore are always clean and carry no filth or disease” (Tutton 1994:14).

An ad in the J.S. Biesecker Catalog of 1900 offers this description of the cap on the common sense milk bottle:

The cap or cover is made of heavy wood fibre, prepared so as to resist the moisture from within and without, and when pressed into the neck of the Jar to the shoulder with the thumb or finger it forms a tightly fitting cover. The operation of capping is quickly and easily accomplished, and when completed is perfectly tight, and can be handled in any position and transported without danger or leakage. The disc can be removed when the milk is required for use by inserting the blade of a penknife or any other sharp instrument and lifting the cap out. The cap can again be used and will seal the Jar reasonably tight, but their nominal cost allows the dealer to discard them after using them once (Tutton 1994:16).

Thatcher (1902:8) noted that:

The selection of woods for preparing [the caps] for the board machines, the method and process of manufacture of the board, the printing and cutting of the caps and the process required in the paraffining and water proofing all call for our personal supervision and constant watchfulness to produce a cap that will perform all the exacting and trying requirements and guard against the slightest defect in taste or odor.

Thatcher caps were available in three qualities: the Thatcher Cap (40 cents per thousand); the Star Cap (30 cents per thousand); and the Crescent Cap (24 cents per thousand) and were available in five diameters (see Table 5-2).

Later cap size became more standardized across the industry. According to the Creamery Package Mfg. Co. in 1912 (Tutton 1994:183), “By far the larger portion of milk bottles made are

No. 2 cap finish, the cap diameter being 1 21/32 inches.” They warned, however, that “large dealers . . . sometimes wish bottles that cannot be used by competitors. To accomplish this, bottles having larger or smaller cap finish than regular are used.” By 1923, there were 23 sizes of ligneous disks (Williams 1923:12). By at least 1940, cap size was measured in millimeters.

**Table 5-2 – Thatcher Cap Diameters (following Thatcher 1902:9)**

| Designation | Diameter (inches) |
|-------------|-------------------|
| No. 1       | 1 7/8             |
| No. 2       | 1 5/8             |
| No. 3       | 1 6/8             |
| No. 0       | 1 1/2             |
| No. 4       | 2 5/8             |

By at least 1917, caps had undergone various transformations. The San Lac Seal was made of “four disks from the best pulp board, wire stitched after being thoroughly waxed, which insures a proper coating on the edges.” The Perfection Pull Cap included a tab in the uppermost disk which could be bent upward and used as a handle to remove the cap. The base of the tab was reinforced by a staple through all four layers (Figure 5-9). Certified Caps contained a rectangular tab of paper stapled onto the cap (from the Dairymens Supply Co. catalog of 1917 – Tutton 1994:152-3, 159).

Flipper caps had their tabs built in as an extension (appearing as if a nipple extending from one side of the cap). The tab was bent upon insertion onto the cap seat and was thus left sticking up to aid in removal. The Kuvercap was advertised as “convenient and sanitary. Easy-to-grasp flange projects over rim, protecting pouring edge. Easy to lift off, and snap back on. Very low in cost.” Finally, the School Cap was a standard pull cap with a hole beneath the tab to allow a drinking straw to be inserted without removing the cap. This helped prevent spillage when used by children (from the Dairymens Supply Co. catalog of 1917 – Tutton 1994:152-3, 159).



Figure 5-9 – Perfection Pull Cap: Note staple & thumb tab

A combination of the cap (ligneous disk) and a metal closure (tin top) were offered by the Creamery Package Mfg. Co. by 1912. Replacement tops could be ordered: “Lightning Tin Top Trimmings with cover, spring and wire fastener; can be easily attached to jars where old trimmings become rusty or worn out” (Tutton 1994:185). These offered the customer either double protection or the option of which method to use for recapping.

### Wilbur L Wright

The disks patented by Wilbur L. Wright will serve as examples of the myriad inventions and designs that grew from the original ligneous disk. Wright also invented waxed-paper cartons, ice cream packaging, hoods, and machines to create all of these items. Wright’s disk patents include:

Patent No. 1,403,532 – applied Aug. 18, 1919; received Jan. 17, 1922 – “Closure Disk for Containers” – This is probably the father of the most common milk bottle disk closures, with a tab for removal (Figure 5-10).

Patent No. 1,462,995 – applied Aug. 15, 1922; received July 24, 1923 – “Closure Disk” – This was an improvement on the 1922 disk.

Patent No. 1,779,350 – applied March 5, 1928; received Oct. 21, 1930 – “Bottle Closure Disk” – This one was important because it introduced the idea of a staple to reinforce the pull tab. Disks with the staple-reinforcing became the industry standard (Figure 5-11).

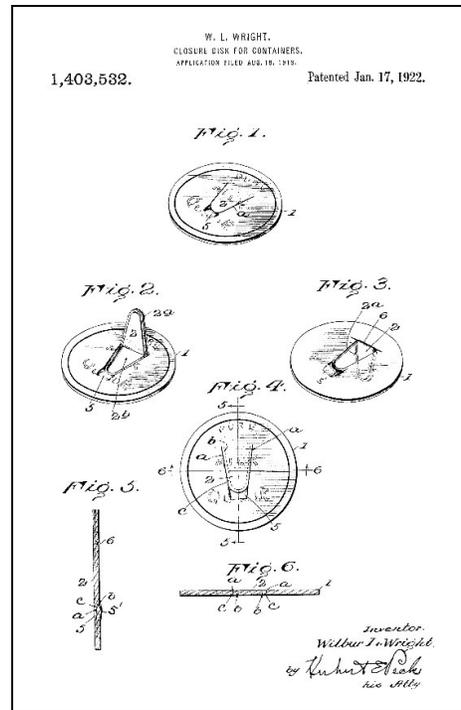


Figure 5-10 – Wright’s 1922 disk closure patent

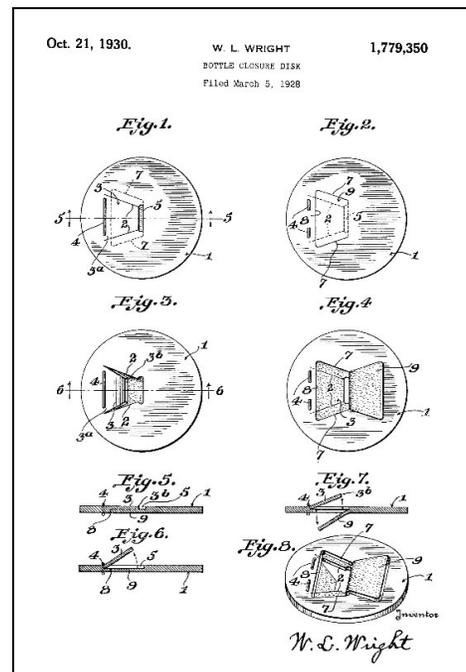


Figure 5-11 – Wright’s 1930 disk closure patent

## Standard Syrup Finish

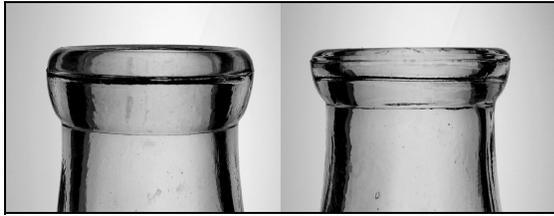


Figure 5-12 – Syrup & Common Sense finishes

(Figure 5-12 & 5-13). Only the 56mm plug cap (ligneous disk) and Seal-Kap were generally used with the Syrup finish, although a Sealon Hood was occasionally used (*Milk Route* 1984:8; Rawlinson 1970:35).

## Duplex Finish

A 1922 ad from the National Seal Co. (*Milk Dealer* 1922) touted the Duplex Seal as “the First Real Seal for Milk Bottles.” The milk bottles looked the same as other milk containers of the period, but the sides of the finishes had four lugs that the metal cap twisted onto (Figure 5-14). The seal was already popular on food bottles and jars, medicines, cold cream jars, and jelly glasses, although it did not seem to ever see much use on milk bottles.

## Holdfast Grip Finish

Essentially a modified 56mm. Common Sense finish, a series of tapered, downwardly projecting lugs were cut into the bottom two-thirds of finish. Rawlinson (1970:35) also noted that the finish was sealed with “Plug Cap [ligneous disk], Seal-Kap, Sealon Hood, Cellophane Hood, and the Standard Seal Hood.”

Originally known as the Jug finish, and later the Portland finish, the Syrup finish was a thicker variation of the Common Sense finish

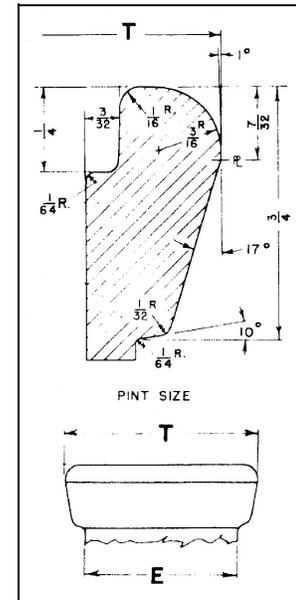


Figure 5-13 – Syrup finish (Owens-Illinois drawing, 1947)

**The First Real Seal for Milk Bottles**

At last—the seal for milk bottles that both the dairyman and the woman folk have been looking for.

The Duplex Seal—

—already well known to the woman because they use it in their homes every day—on 1200 different food products, medicines, cold creams and things like that.

More than that—women buy and use the Duplex Seal themselves to seal Jellies and Jams.

More than 3,000,000 Duplex Sealed Jolly Glasses were bought in just a few months last year—the introductory year on this item.

The milk bottle has always stood in even greater need of a sanitary seal.

The application of the Duplex Seal to the milk bottle makes the biggest single advance in milk distribution since the discovery of bottle sterilization.

With the Duplex Seal your milk is sealed air-tight, water-tight, germ-tight.

The housewife removes this seal with a quarter turn of the wrist. She replaces it with the same easy motion—re-sealing the bottle every time. No more forks, ice picks, thumbs in milk, spatter and splash.

The Duplex covers the bottle top. Plus can't settle on the lip, drip and can't leak. It stays sealed without creasing—and re-seals, keeping the milk good down to the last little bit.

The first dealer in a community to give his customers the advantage of this modern Duplex Seal gets a good big jump on competitors. But you must act quickly. Write for details.

**NATIONAL SEAL COMPANY, Inc.**  
Executive Office and Works: 14th Avenue and 16th Street, Brooklyn, N. Y.  
Manufacturing Plants: 1000 Broadway, New York, N. Y.; 1000 Broadway, New York, N. Y.

Figure 5-14 – Duplex Seal (*Milk Dealer* 1922)

As noted by the Dairy Antique Site (2011), Edward F. Glacken applied for a patent on November 29, 1924, and received Patent No. 1,650,440 for a “Bottle” on November 22, 1927. The finish of the bottle was the primary aim of the invention. The finish essentially consisted of a typical Common Sense bead with numerous embossed indentations that formed ridges around the lower edge of the finish (Figure 5-15). The main purpose of the rougher bottom edge was to provide a better grip for both delivery personnel and home users to prevent dropping.

### A Holdfast Spinoff

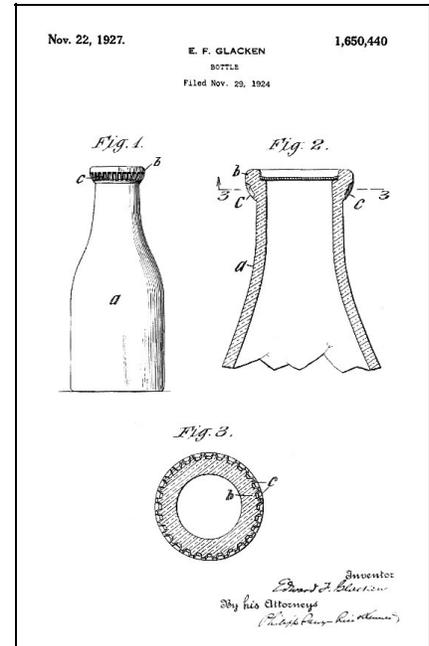


Figure 5-15 – Glacken’s 1927 patent for the Holdfast Grip finish

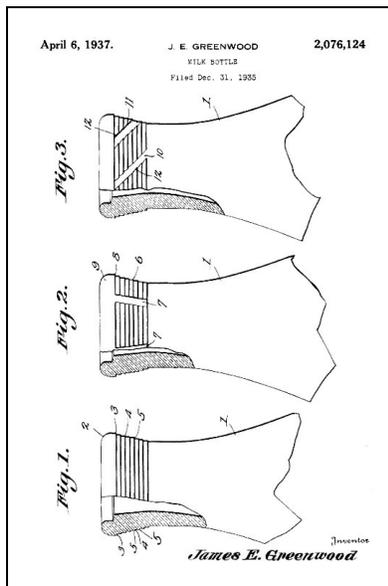


Figure 5-16 – Greenwood’s 1935 patent for a “grip” type of finish

Although I have not discovered a name for the design, James E. Greenwood applied for a patent on December 31, 1935, and received Patent No. 2,076,124 for a “Milk Bottle” on April 3, 1937 (Figure 5-16). Greenwood’s invention was actually a stepped series of horizontal ridges at the lower part of the large ring of the typical Common Sense finish. Greenwood assigned the patent to the Liberty Glass Co. This finish was an obviously intended to compete with the Holdfast finish, used by the Atlantic Glass Co. (Figure 5-17). The Dairy Antique Site (2011) noted the similarity of this finish to Glacken’s invention.



Figure 5-17 – Grip finish

### Standard Alseco Finish

John E. Sharp apparently worked for the Aluminum Co. of America (Alcoa) at least in part as a designer. From 1927 to 1945, Sharp, sometimes in conjunction with others, patented at

least 13 designs for aluminum caps, as well as patenting several machine designs. Of specific interest here, Sharp and Raymond W. Niver applied for a patent on April 18, 1930, and received Patent No. 1,796,729 for a “Closure” on March 17, 1931, the date embossed on many of the milk bottles with the Alseco finish (Figures 5-18).

A main object of the invention was to provide a “cap which can be easily applied and removed and which, when applied, protects the lip and the mouth of the container against contamination.” A key ingredient to the finish was “a plurality of spaced projections immediately below the bead.” A cap made of “thin pliable metal such as aluminum” could then be pressed onto the finish. The patent drawing showed wider projections, more pointed at the bases, than were used with the actual finish.

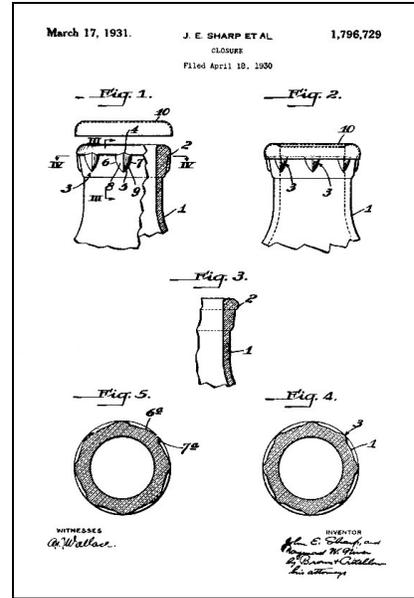


Figure 5-18 – Sharp & Niver 1931 Patent for the Alseco finish

The Dairy Antique Site (2013) noted the 1931 patent number embossed on some bottles with the Alseco finish and that many milk bottles from Golden State (California) and Meadow Gold used the finish. Many Meadow Gold bottles were marked with the phrase “Silver Seal” – the firm’s name for the aluminum cap.

The Alseco finish was made with and without a cap seat. The finish was again a modification of the Common Sense finish with two different sizes of downward projections. Although the industry made a 51mm size, the more common finishes were 54mm and 56mm. It was used with the same seals as the Common-Sense finish as well as using aluminum seals (Rawlinson 1970:35). When the aluminum cap was sealed over the edge of the finish, it conformed to the shape of the projections to lock the cap into place (Figure 5-19).

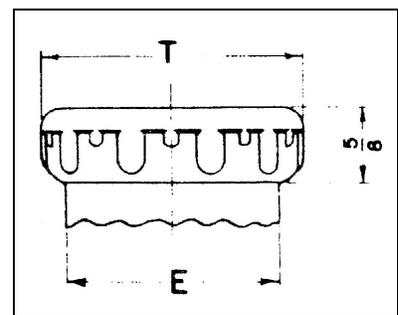


Figure 5-19 – Alseco finish (Owens-Illinois drawing, 1947)

The Aluminum Seal Co., New Kensington, Pennsylvania, used the name Alseco for its aluminum milk bottle hoods. Parents' Magazine first advertised these hoods on January 25, 1935, but ads in other venues soon followed. During World War II, however, there was an aluminum shortage, so Alseco recommended using finishes with cap seat capability during periods when aluminum was unavailable (*Milk House Moosletter* 1981:185).

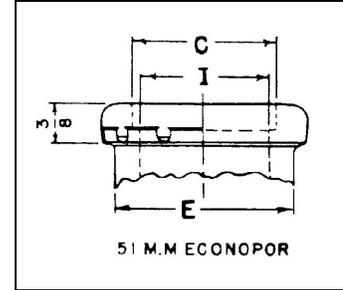


Figure 5-20 – Econopour finish (Owens-Illinois drawing, 1947)

As late as 1940, however, Alseco Hoods were being advertised for use with Econopour finishes. An ad noted that “a large dairy” began testing “single-capping milk with Alseco Hoods” in 1931. The ad further stated that dairies in 26 states were using Alseco Hoods (*American Journal of Public Health* 1940:1268).

### Econopour Finish

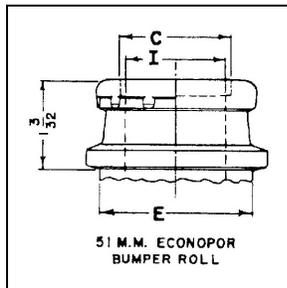


Figure 5-22 – Econopour finish with bumper roll (Owens-Illinois drawing, 1947)

Like the Alseco, the Econopour finish was made with or without a cap seat. Rawlinson (1970:36) illustrated this finish in two distinctive styles. The first was a rounded square when viewed from the side with rounded downward projections spaced evenly around the lower part (Figure 5-20). As with the Alseco,

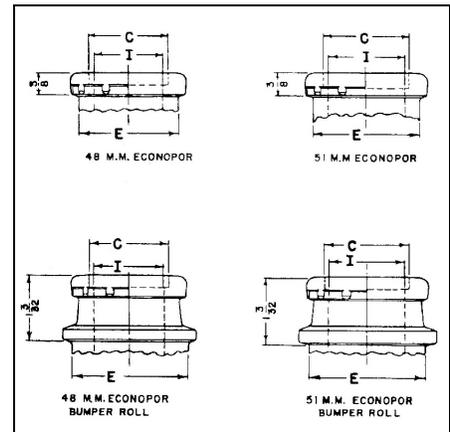


Figure 5-21 – Variations in Econopour finishes (Owens-Illinois drawing, 1947)

an aluminum cap sealed around the projections to hold the cap tightly against the finish. The most common size was 48mm, especially on lighter T-Square and round bottles. However, the finish was also made in 51mm and 56mm sizes. Rawlinson (1970:36) noted that the finish was sealed with a “Plug Cap [ligneous disk], American Seal Hood, Seal-Kap, Sealon Hood, Cellophane Hood, Standard Seal Hood, and the Aluminum Hood.”

Eventually, Econopour finishes were offered with or without cap-seat, with or without lugs, and with or without the bumper roll. This resulted in a total of eight choices (Figure 5-21).

The bumper roll was a more pronounced reinforcing ring below the finish (Figure 5-22 & 5-23). This ring was virtually identical to the later Dacro finish described below. Rawlinson (1970:36) noted that the style was created for the Borden Co. in a 43mm size. The finish was sealed with a disk, Seal-Kap, Sealon Hood, or an Aluminum Hood.



Figure 5-23 – Econopour finish with bumper roll

### Dacro Finish



Figure 5-24 – Early Dacro finish

Harvey Coale patented what would become the Dacro (Dairy Crown) finish on April 11, 1911. This was an adaptation of the same crown finish, first patented in 1892 by William Painter, that was used on soda, mineral water, beer, and catsup bottles. The original Dacro finish looked the same as the smaller ones on soda and beer bottles, with a sealing ring on top and a larger, reinforcing ring below (Figure 5-24).

Harvey Coale patented what would become the Dacro (Dairy Crown) finish on April 11, 1911. This was an adaptation of the same crown finish, first patented in 1892 by William Painter, that was used on soda, mineral water, beer, and catsup bottles. The original Dacro finish

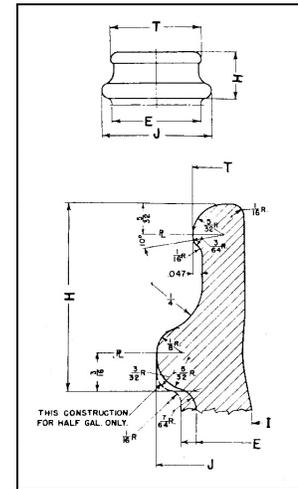


Figure 5-25 – Later Dacro finish (Owens-Illinois drawing, 1947)



Figure 5-26 – Later Dacro finish with bumper roll

On January 19, 1932, Frank L. Lloyd modified the Dacro finish so that the reinforcing ring became almost cup shaped and had some space between the sealing and reinforcing rings. Over time, the reinforcing ring gradually became modified into a rounded but much less pronounced shape, still noticeably below the sealing ring (Figures 5-25 & 5-26). See the Closure section below for a more in-depth discussion of the patents and evolution.

Some dairies, such as the The Deerfoot Farms Co. of Southborough, Massachusetts, used Dacro finishes in order to Pasteurize milk in the bottle. The milk would be placed inside the bottle and a metal or aluminum cap would be placed onto the lip. The milk would be filled to a line just below the

bulbous top. This created an expansion chamber, where the milk would expand during the heating process, preventing the bottle from breaking or the cap being blown off. Later crown top and Dacro-finished bottles (beginning in 1920) had arrows embossed in the glass pointing to the bottom of the “chamber” with “FILL TO THIS POINT” embossed next to it. Milk bottle collectors differentiate between the two styles by naming the earlier, 1910 finish, a “Crown Top” and the finish developed in 1932 the “Dacro” finish. The newer style was usually made in 45mm and 38mm sizes (personal communication, Paul Doucette, 5/22/2007).

### Dacro Closures

The Crown Cork & Seal Co., manufacturer’s of the crown cap for beer and soda bottles, also modified their cap design for use on milk bottles. The adapted closure was called the Dairy Crown or Dacro, and the name was adopted for both the cap and the finish (Dairy Antique Site 2011). Harvey Coale applied for a patent for a “Process of Packaging” on March 29, 1910, and received Patent No. 989,337 on April 11, 1911 (Figure 5-27). Coale’s object in adapting the crown cap to a jar or wide-mouth container was for “the packaging of milk or similar food products to be heated to destroy the harmful bacteria by placing the product in a suitable container, such as a jar, applying thereto a sheet metal closure . . . which is locked to the jar by being bent into engagement therewith.” Coale assigned the patent to the Crown Cork & Seal Co.

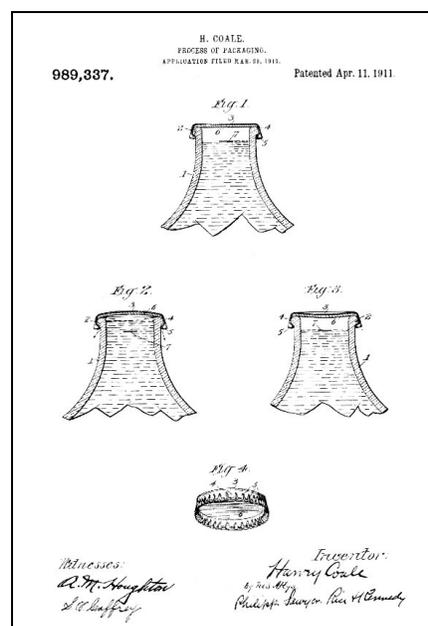


Figure 5-27 – Coale’s patent for what would become the Dacro finish and seal

Lauritz C. Garman applied for a patent (No. 1,200,482) on October 24, 1911, for a “Closure-Applying Machine” – to place Dacro caps on milk bottles. Although Garman applied for his patent very shortly after Coale adapted the Dacro cap, he did not receive his patent for almost five more years – on October 10, 1916. The milk bottles shown in his drawings depict a finish that closely resembled a large version of the crown finish applied to soda and beer bottles. These early Dacro finishes had the large reinforcing ring to support the pressure required to seat the cap on the sealing ring. Like Coale, Garman assigned his patent to Crown Cork & Seal.

The Dacro closure was never as popular as the Common Sense finish. Initially, the cork seal inside the cap imparted a flavor to the milk, but the substitution of other materials (e.g., wood or paper) reduced the distaste. The Dacro, however, required a special capping device (such as Garman’s invention) that was expensive and slower than the cappers for the common sense closure. The sheet metal cap created an additional problem. Each cap was delivered to the customer (dairy) as a flat disk, and the machine created the crown shape as part of the capping process (Dairy Antique Site 2011).

Albin H. Warth developed a new liner for the crown and applied for a patent on November 2, 1926. He called his invention a “Bottle Cap and Method of Producing Same.” Warth noted the effects of sheet metal, tin plate, cork, and the paper being used at the time (specifically, jute tag or sulphate tag) on the taste of the milk. His idea applied two “sheets of vegetable parchment” to “both sides of a sheet of paper stock” that was then glued to the inside of the sheet metal disk. This three-ply lining effectively blocked the disagreeable taste. Warth received Patent No. 1,732,958 on October 22, 1929, and assigned the patent to Crown Cork & Seal. The patent was reissued on November 8, 1932.

The next major change occurred on October 7, 1931, when Frank L. Lloyd filed for a



Figure 5-29 – Dacro cap

patent for a “Design for a Bottle” –

more specifically, a milk bottle. He received Design Patent No. 86,037 on January 19, 1932. Lloyd described his invention as an “ornamental design for a bottle,” but the real contribution was in the design of the finish. The reinforcing ring had become almost cup shaped, and there was little definition left to the sealing ring. This rather ugly design became the new Dacro finish (Figure 5-28). Ads for the new system appeared in September 1931, and many bottles were embossed on the bases with Dacro and the patent number (Dairy Antique Site 2011).

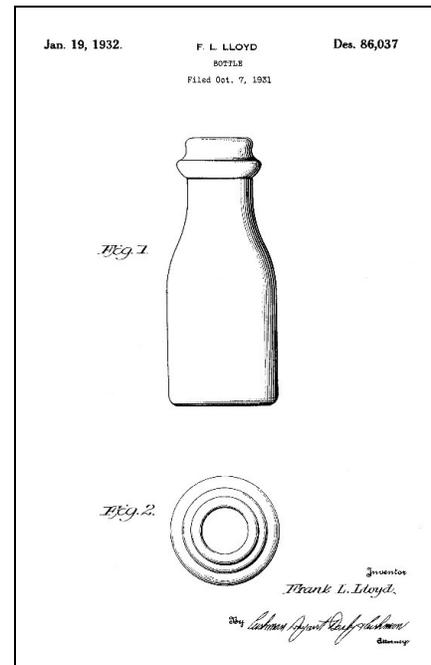


Figure 5-28 – Lloyd’s patent for a modified Dacro finish

At some point, aluminum Dacro caps were introduced (Figure 5-29). The idea of aluminum crowns was not new. George H. Gillette applied for a patent for a “Bottle Sealing Device” – actually a crown cap made from aluminum – on April 22, 1903, and received Patent No. 734,459 on July 21 of that year. Apparently, the device did not function in real life as well as Gillette claimed (Figure 5-30).

Although empirical evidence suggests that aluminum Dacro caps were used earlier, the only patent I can find for them was filed by Ralph E. Ford, of Bedford, England, on July 1, 1957, for “Closing and Sealing Bottles and Other Receptacles.” Ford received Patent No. 2,974,816 on March 14, 1961. Ford specifically stated, “The closure cap according to this invention is also suitable for closing bottles containing sterilised [British spelling] milk, the cap being able to withstand both the pressures occurring in the bottle during sterilisation and the vacuum created in the bottle on cooling.”

### Multicap Finish

The Multicap finish was made with the idea that it would serve virtually all of the milk bottle seals in vogue at the time (Figure 5-31). The 45mm size was made with or without a cap seat and is almost always found on square milk bottles. The cap seat was absent on the smaller, 38mm size. Hood closures did not work well with this finish, but it was used with disk seals, Seal-Kap, and aluminum closures (Rawlinson 1970:36). The main differences between the second variation of the Econopor and the Multicap seem to be less downward projections and a slightly larger distance between the sealing ring and the reinforcing ring.



Figure 5-30 – Dacro ad (*Milk Dealer* 1945a:16)

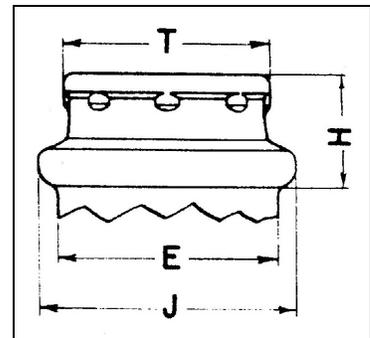


Figure 5-31 – Multicap finish (Owens-Illinois drawing, 1947)

## Later Variations

Variations in finishes became more and more complex (Figure 5-32). With the greater variety of seals and hoods, dairy owners were soon subjected to an almost bewildering set of choices. By 1958, the sub-variations had increased to the point where nuances made further classification somewhat moot (Figure 5-33).

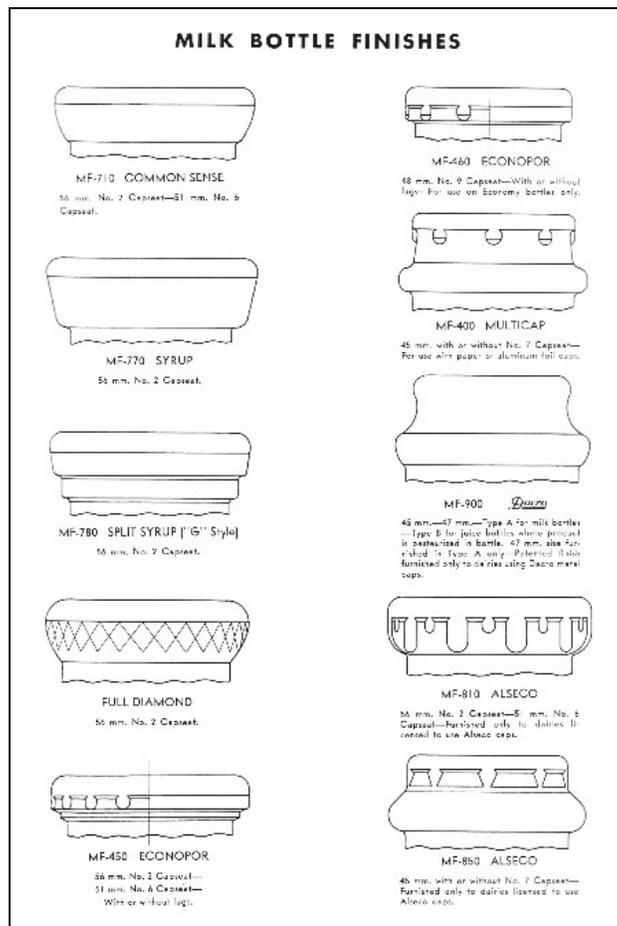


Figure 5-32 – Variations in finishes, ca. 1940s  
(Lamb Glass Co., n.d.)

# STANDARD MILK FINISHES

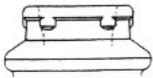
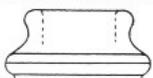
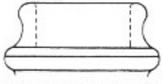
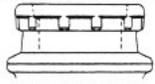
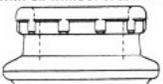
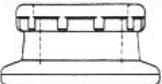
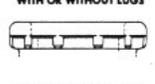
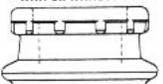
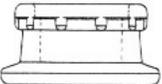
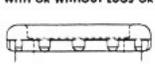
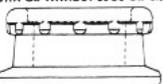
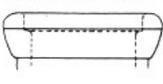
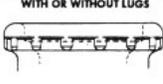
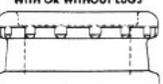
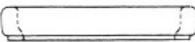
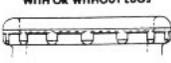
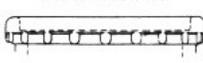
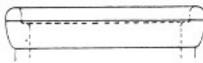
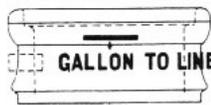
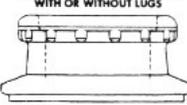
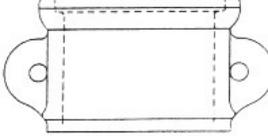
|  |   |   |
|--|---|---|
| <p style="text-align: center;"><b>38 mm O.I.G. 5035 MULTICAP</b></p>  <p style="text-align: center; font-size: small;">NOT FURNISHED WITH CAPSEAT<br/>1 5/16" Minimum Opening<br/>USES #5 SNAP ON CAPS FOR<br/>SEAL KAP - KLEENSEAL - SEALRITE<br/>CRIMP CAPS FOR ALUMINUM - DACRO<br/>STANDARD CAP &amp; SEAL - ECON-O-SEAL</p>                                  | <p style="text-align: center;"><b>38 mm O.I.G. 5026 DACRO TYPE A</b></p>  <p style="text-align: center; font-size: small;">NOT FURNISHED WITH CAPSEAT<br/>USES #18 DACRO DISC<br/>1 3/4" Minimum Opening</p>   |   |
| <p style="text-align: center;"><b>45 mm O.I.G. 5000 MULTICAP WITH OR WITHOUT C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #9 OR #7 DISC CAP<br/>1-3/32" Min. Opening With C. S.<br/>1-7/32" Min. Opening Without C. S.</p>   | <p style="text-align: center;"><b>45 mm O.I.G. 5028 DACRO TYPE A</b></p>  <p style="text-align: center; font-size: small;">NOT FURNISHED WITH LUGS OR C. S.<br/>1-7/32" Minimum Opening<br/>1-11/32" Min. Opening When Furnished<br/>on BULB NECK bottles</p>  | <p style="text-align: center;"><b>45 mm O.I.G. 5018 ECONOPOR WITH OR WITHOUT LUGS OR C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #9 OR #7 DISC CAP<br/>1-3/32" Min. Opening With C. S.<br/>1-7/32" Min. Opening Without C. S.<br/>17-3/4 OZ. WT. SQUARE &amp; ROUND LINES ONLY</p> |
| <p style="text-align: center;"><b>45 mm O.I.G. 5018-A ECONOPOR WITH OR WITHOUT LUGS OR C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #9 OR #7 DISC CAP<br/>1-3/32" Min. Opening With C. S.<br/>1-7/32" Min. Opening Without C. S.<br/>22 OZ. WT. SQUARE &amp; ROUND LINES ONLY</p>  | <p style="text-align: center;"><b>45 mm O.I.G. 5018-B ECONOPOR WITH OR WITHOUT LUGS OR C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #9 OR #7 DISC CAP<br/>1-3/32" Min. Opening With C. S.<br/>1-7/32" Min. Opening Without C. S.<br/>FOR HALF GALLON ONLY</p>   | <p style="text-align: center;"><b>48 mm O.I.G. 5019 ECONOPOR WITH OR WITHOUT LUGS</b></p>  <p style="text-align: center; font-size: small;">USES #9 1-5/16" DISC CAP<br/>1-7/8" Minimum Opening</p>  |
| <p style="text-align: center;"><b>48 mm O.I.G. 5021 ECONOPOR WITH OR WITHOUT C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #9 1-5/16" DISC CAP<br/>1-1/8" Minimum Opening<br/>1-11/32" Min. Opening Without C. S.<br/>OR BULB NECK ONLY</p>   | <p style="text-align: center;"><b>48 mm O.I.G. 5015 ECONOPOR WITH OR WITHOUT LUGS OR C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #9 1-5/16" DISC CAP<br/>1-1/8" Minimum Opening<br/>FOR HALF GALLON &amp; GALLON ONLY</p>  | <p style="text-align: center;"><b>51 mm O.I.G. 5004 ECONOPOR WITH OR WITHOUT LUGS OR C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #6 OR #4 DISC CAP<br/>1-7/32" Minimum Opening</p>   |
| <p style="text-align: center;"><b>51 mm O.I.G. 5008 ECONOPOR WITH OR WITHOUT LUGS OR C.S.</b></p>  <p style="text-align: center; font-size: small;">USES #6 OR #4 DISC CAP<br/>1-7/32" Minimum Opening<br/>FOR HALF GALLON &amp; GALLON ONLY</p>   | <p style="text-align: center;"><b>56 mm O.I.G. 4502 COMMON SENSE</b></p>  <p style="text-align: center; font-size: small;">USES #2 1-21/32" DISC CAP<br/>1-7/32" Minimum Opening</p>  | <p style="text-align: center;"><b>56 mm O.I.G. 5007 ECONOPOR WITH OR WITHOUT LUGS</b></p>  <p style="text-align: center; font-size: small;">USES #2 1-21/32" DISC CAP<br/>1-7/32" Minimum Opening</p>   |
| <p style="text-align: center;"><b>56 mm O.I.G. 5012 ECONOPOR WITH OR WITHOUT LUGS</b></p>  <p style="text-align: center; font-size: small;">USES #2 1-21/32" DISC CAP<br/>1-7/32" Minimum Opening<br/>FOR GALLON &amp; HALF GALLON ONLY</p>   | <p style="text-align: center;"><b>NO DEPOSIT DAIRY PRODUCTS JAR FINISHES W-O CAPSEAT</b></p> <div style="display: flex; justify-content: space-around;"> <div style="width: 45%; text-align: center; padding: 5px;"> <p style="text-align: center; font-size: small;"><b>68-70 mm O.I.G. 4557 COMMON SENSE</b></p>  </div> <div style="width: 45%; text-align: center; padding: 5px;"> <p style="text-align: center; font-size: small;"><b>68-70 mm O.I.G. 5046 DFL ALSECO</b></p>  </div> </div> |   |
| <p style="text-align: center;"><b>DAIRY PRODUCT JAR FINISHES-WITH &amp; WITHOUT CAPSEAT</b></p>  |   |   |
| <p style="text-align: center;"><b>59 mm O.I.G. 5027 ECONOPOR WITH OR WITHOUT LUGS</b></p>  <p style="text-align: center; font-size: small;">USES #1 1-7/8" DISC CAP<br/>1-9/8" Minimum Opening<br/>FOR RANDI-SQUARE JARS ONLY</p>   | <p style="text-align: center;"><b>70 mm O.I.G. 5038 ECONOPOR WITH OR WITHOUT LUGS</b></p>  <p style="text-align: center; font-size: small;">70 MM USES 2-3/8" PLUG CAP</p>   | <p style="text-align: center;"><b>68&amp;70mm O.I.G. 575 COMMON SENSE</b></p>  <p style="text-align: center; font-size: small;">68 MM USES 2-1/4" PLUG CAP<br/>70 MM USES 2-3/8" PLUG CAP</p>  |
| <p style="text-align: center;"><b>GALLON &amp; HALF GALLON FINISHES-WITH &amp; WITHOUT CAPSEAT</b></p>   |   |   |
| <p style="text-align: center;"><b>70 mm O.I.G. 576 COMMON SENSE</b></p>  <p style="text-align: center; font-size: small;"><b>ONE HALF GALLON TO LINE</b></p> <p style="text-align: center; font-size: x-small;">ALTERNATE CAPACITY LETTERING<br/>AND ARROW APPEAR ON BOTH SIDES<br/>USES 1-1/8" DISC CAP With Capsel<br/>Will Take Jenkins Snap Lock Handle</p> | <p style="text-align: center;"><b>56 mm O.I.G. 5043 ECONOPOR WITH OR WITHOUT LUGS</b></p>  <p style="text-align: center; font-size: small;">USES #1 1-21/32" DISC CAP<br/>1-7/32" Minimum Opening<br/>Will Take Jenkins Snap Lock Handle</p>   | <p style="text-align: center;"><b>70 mm O.I.G. 578-12-B COMMON SENSE</b></p>  <p style="text-align: center; font-size: small;">USES 2-3/8" DISC CAP With Capsel<br/>EARS FOR WIRE BALL HANDLE</p>  |

Figure 5-33 – Variations in finishes by 1958 (Owens-Illinois 1958:4)