



## Archive Fact Sheet: Cooperage



**Coopers at St. James's Gate Brewery, 1890 GDB/DB06/0049**

### Background Information

The craft of 'coopering' involves the manufacture of wooden casks. Various hand tools were used with great skill to fashion wooden 'staves' (long thin curved individual sections) which were then fastened together with metal hoops forming different sizes of cask, or wooden vessels such as pails and churns. Coopering has been practised for many centuries and is still practised in some parts of the world today. Those who make the casks are known as 'Coopers'.

There are three main categories of coopering known as white, dry and wet. White coopering involves the manufacture of pails, butter churns, tubs and other household utensils for daily use. Dry coopering involves the manufacture of casks for holding dry goods such as flour, tobacco or vegetables. Wet coopering involves the

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manufacture of casks for holding liquids, it was considered the most highly skilled, and it was wet coopering that was practised in the cooperage at Guinness.

### **Sizes of Cask**

Wooden casks are frequently referred to as 'barrels' but the word 'barrel' actually refers to a specific size of cask.

Sizes of cask include:

**Firkin**, with 8 gallon capacity

**Kilderkin**, with 16 gallon capacity

**Barrel**, with 32 gallon capacity

**Hogshead**, with 52 gallon capacity

**Butt**, with 104 gallon capacity

### **The Skill of the Cooper**

Different sizes of cask require different sized staves and hoops. The staves and hoops remain in place purely because they are very precisely fashioned. The cooper might have used upwards of thirty different types of tool in making a cask.

Coopering demanded great skill and precision. This skill was only learned through a rigorous apprenticeship, which might take from five to seven years. In addition the trade was a 'closed' one so that it was passed down from generation to generation within the same family.

The cooper did not rely on written measurement or patterns to make a cask of specific size. Everything was gauged by the eye and perfection was required since each cask must be airtight, strong enough to withhold the force of fermenting beer, and sufficiently durable to withstand years of rough handling.

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Guinness was the dominant employer in Dublin. In the 1920s about 300 coopers (half the city's total) worked here. These coopers were highly paid tradesmen within the brewery.

In addition to making the casks the coopers were called upon to conduct repairs and clean any returned casks which might have been damaged in transit or acquired a foul smell by being left lying empty for too long. Some coopers were specially appointed as 'smellers' to weed out these foul smelling casks for treatment in the cask repair shop. The majority of coopers were engaged in the making and repairing of casks.

A cooper could be paid for each cask he made and repaired instead of a weekly wage, this was known as 'piecework'. Those coopers who could combine speed with quality profited handsomely. Coopers on piecework could earn four times as much as a cooper on wages and work less hours to do so.

### **Coopering at the St. James's Gate Brewery**

Guinness had its own team of coopers working on site producing all the wooden casks which carried GUINNESS® to its customers in Ireland and around the world. These coopers were highly paid tradesmen within the brewery.

Wooden casks were used by Guinness for almost two hundred years. In 1946 aluminium kegs were introduced and began to replace the wooden cask. There was a period of transition during which wooden casks were used alongside the new metal casks for some years before they were discontinued. The aluminium keg was replaced by stainless steel in the late 1980s. Three hundred coopers were employed at Guinness but by 1961 this number had declined to only 70. The last wooden cask was filled at St. James's Gate brewery in March 1963.

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## The Process

The process of making a cask might involve the use of over thirty different types of tool, mostly used for cutting and paring the wood. Many stages were involved and a cooper might have several casks on the go at once rather than following one through, at a time, from beginning to end. A brief account is given below of the process outlining the main stages and noting some of the tools used. The account is followed by twelve photographs which illustrate parts of the process.

### Stave Preparation

Casks for GUINNESS® were traditionally made using Prime American White Oak. The wood required 'seasoning' or drying. The timbers for making the 'staves' were stacked in large piles under cover outside allowing for the free passage of air between them, and were left for a minimum of two years. Then the coopers would carefully select timbers for making the staves and the cask making process could begin.

A cooper first prepared the individual wooden staves which joined together to form the cask. This stage of preparation was known as '**dressing**'. It involved the use of a variety of sharp paring tools, including an '**axe**' and several differently shaped curved blades (see photograph 1). Using these tools a cooper would first cut the stave roughly to size then carefully hone it down to its exact size, and slightly curved shape, using a number of different knives. Then finally the stave was passed over a '**jointer**' (a free-standing plane) angling its edges so it would join smoothly with the other staves when brought together to form a watertight seal (see photograph 2). This process would be repeated with each of the staves until there were enough to form a cask.

### Forming the cask shape

The staves were then brought together in the next stage known as '**raising up**'. Here staves were gathered and placed standing upright inside a metal hoop forming

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the cask shape (see photograph 3). The cooper then fixed the staves roughly together by hammering a hoop down over their top end.

The staves then had to be bent into the characteristic cask shape with tapering ends and a central outward bulge. To bend the staves a special machine known as a '**steam bell**' was used. Shaped like a large bell this machine would be lowered down over the staves and subjected them to high steam pressure which softened the wood (see photograph 4). When the cask was removed from the steam bell coopers would bring together the splayed ends using a rope (see photograph 5) and then quickly hammer down more temporary hoops over the staves, forcing them to bend together into the curved cask shape (see photograph 6).

The cask was then placed over a pile of wood shavings which were set alight to char the inside of the cask drying it out, setting its shape and sealing the wood (see photograph 7).

### **Preparing for the 'Heads'**

The cask ends were then prepared to receive their two lids, known as '**heads**'. Using more paring and cutting tools the two top edges of the cask at either end were cut away into a bevel with the very top edge flattened to ensure the casks would stand steady. Then a groove was cut below the sloping edge with a '**croze**' where the heads would fit (see photograph 8). Now the cask was ready for its heads.

Before the heads were made and slotted into the grooves at either end of the cask the inside and outside of the cask had to be pared down until very smooth. Finally a hole was bored into the side where the wooden bung or cork would fit. This hole was fitted with a brass '**bush**', a brass ring which lined and reinforced the hole. It was through this '**bung hole**' that the beer could be tapped out.

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### **Fitting the 'Heads', the 'Hoops' and Finishing Off**

Now finally the heads could be made and fitted. To make the circular head, comprised of several individual planks slotted together, the cooper used a compass to measure the inside of the top of the cask ends. Then he would cut out the right sized circle, using a '**bow saw**', from the roughly shaped circular head he had made (see photograph 9). This was the only time in the whole of the cask making process that a cooper would use such a measuring tool, all other measurements being made with the coopers' skilled and experienced eye. Once cut to shape all the head surfaces were made smooth using specially shaped paring tools, and the edges were bevelled to fit into the thin groove inside the cask ends (see photograph 10). Now the two heads were slotted into the grooves at either end of the casks, a piece of '**flag**' (rush) being placed on the inside of the groove first to ensure a watertight seal.

With both heads in place the cooper might make final adjustments by smoothing down the surfaces again and would make a fresh set of hoops which were hammered down into place over the staves (see photographs 11 and 12). Finally the heads of the casks were branded with an individual identification number and the name of 'Guinness'. Now the cask was finished and ready to be filled with GUINNESS® and transported around Ireland and the world.

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## The Process Illustrated



**1. Roughly shaping the stave with the 'axe'** GDB/DB06/0005.06



**2. Smoothing stave edges with the 'jointer'** GDB/DB06/0005.09



**3. 'Raising up' the cask**  
GDB/DB06/0005.21



**4. 'Steam bell' being lowered over the cask** GDB/BR14/0003.14



**5. Placing the rope over the stave ends** GDB/BR14/0003.15



**6. Bending the stave ends together**  
GDB/BR14/0003.17



**7. Charring the inside of the cask**  
GDB/BR14/0003.18



**8. Cutting the groove with the  
'croze'** GDB/DB06/0010.08



**9. Using the 'compass' to measure  
the head**  
GDB/DB06/0011.05



**10. Bevelling the edges of the head**  
GDB/DB06/0011.07



**11. Making a fresh set of hoops**  
GDB/DB06/0009.03



**12. Fitting the hoops onto the  
finished cask** GDB/DB06/0009.05