

HISTORIC DETAILS: SASH PULLEYS

In the third in his series on Georgian windows, **Charles Brooking**, architectural historian and historic building consultant, looks at the development of the sash-pulley and the impact of technology on its design and evolution



A small selection of the sash boxes, pulleys and weights in Charles Brooking's Teaching Gallery

Visitors to my Teaching Gallery are often intrigued by the detailed sash-pulley displays which illustrate the innovation in the evolution of what at first appears a simple mechanism.

I first became aware of this interesting and informative ironmongery fitting as a child in 1961 when my interest in sash windows began. I realised a few years later than when taken into account with other features, such as joinery details and mouldings, they can prove to be a helpful dating guide, particularly in

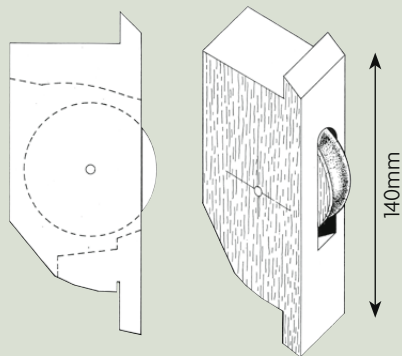
situations where alterations have been made to the building or, indeed, to the window itself.

The earliest pulleys consisted of brass wheels, similar to those found in clock mechanisms, or were constructed of boxwood or oak, being turned on a lathe. These were either set directly into the pulley-stile or fitted in a separate oak block that could be removed when the pulley became worn. Recent research has indicated that metal cases constructed of wrought-iron possibly developed as early as the 1730s, with cast-iron being introduced as early as the 1760s and largely superseding earlier varieties by the late eighteenth/early nineteenth centuries. This was made possible by improved sand-casting techniques in the foundry industry, part of the industrial revolution.

On the following pages, I have shown the most important sash-pulleys in terms of improvement and innovation. Like other fixtures and fittings, sash-pulleys were strongly affected by social hierarchy in terms of their design and placement within a building. For instance, until the 1780s at least, a house might contain three or four different varieties; the 'piano nobile' floor being fitted with the best wrought- or cast-iron types with brass wheels and face-plates, while secondary areas, such as attics and basements, were fitted with traditional wooden pulleys with wooden cases or with cast-iron frame-pulleys. In the North Wing of Somerset House, designed by William Chambers and built 1776–80, the best brass and cast-iron axle-pulleys were fitted on the principal floors, while the secondary rooms and basements were supplied with wooden pulleys. I discovered at least four different types during the 1988 conversion work undertaken for the Courtauld Institute.

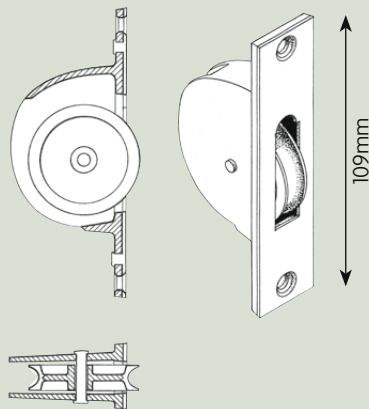
Until the c.1830s, and much later in many cases, the inside pulley-stiles of sash windows were left unpainted and waxed in order to maintain the easy movement of the lower sash. Therefore, the quality

6 Bedford Row

**Wooden sash pulley**

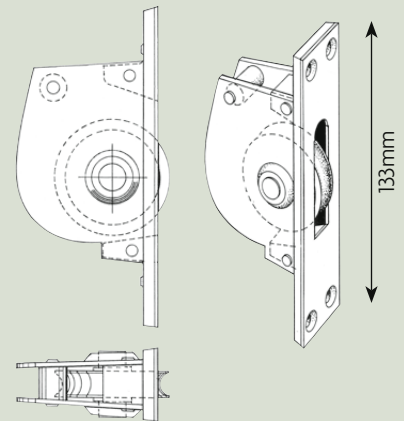
An early eighteenth-century timber sash-pulley with oak case and oak wheel, from 6 Bedford Row, London, built c.1718.

Royal Pavilion

**Frame-pulley**

From the c.1820s portion of Brighton Pavilion, produced by Archibald Kenrick. This section illustrates the construction of a frame-pulley, showing bearing pivot running through the pulley and case.

Buckingham Palace

**Axle-pulley**

A high-quality axle-pulley produced by Archibald Kenrick of West Bromwich, from the Nash portion of Buckingham Palace, London, c.1825–30. This drawing clearly shows the wheel with projecting axles – the superior sash-pulley type, probably developed during the 1760s–70s.

of the sash-pulley was much more visible than today; they are often now covered in layers of paint which cover any detail. In the Norwich area there is a local tradition still followed of leaving the outside pulley-stile unpainted, whereas in the Worcester area many pulley-stiles were constructed of oak and were left unpainted internally.

By 1770–75 there were three principal forms of sash-pulley: frame-pulleys made of wood, those made of wrought-iron or cast-iron, and axle-pulleys. Frame-pulleys had a spindle running through the centre of the wheel, but these did not have the longevity of the newly-introduced axle-pulleys and I have found examples where the spindle has entirely worn through. Axle-pulleys were constructed of five separate pieces riveted together; the wheel itself was cast with its own axle bearings, which had a much longer life than frame-pulleys.

Until the 1850s axle-pulleys were generally reserved for the 'polite' areas of the house, frame-pulleys usually being employed elsewhere. By the 1770s cheaper frame-pulleys constructed entirely of cast-iron were available, better quality varieties having brass face-plates and wheels.



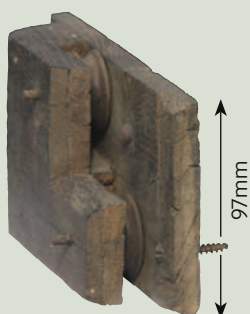
Section of sash-frame, c.1751–55, from The White Lodge, Middlesex. A high-quality sash-frame construction of the 1740s–50s. The large lathe-turned sash-pulley is set directly into the pulley-stile without a separate pulley-block. The addition of a brass-faced axle-pulley, c.1860s–70 allowed the upper sash to open.



Section of a pulley-stile, from 'Quakers Orchard', Surrey, c.1750–60. Note the beech pulley-case, oak pulley-wheel and fixing method, (right) one of several variants used to house the pulley-block. The left-hand pulley was fitted c.1927–30 to enable the fixed upper sash to be operational. The parting-bead was also added at this time, probably when Sir Adrian Boulton purchased the house.



Oak sash-pulley, c.1723–26, from The Admiralty, Whitehall, London, designed by Thomas Ripley. Early timber sash-pulleys were often set in separate blocks to enable repairs, but some were fixed in the pulley-stile. This is a good example of an early eighteenth-century variant. Oak and boxwood were most commonly used.



Complex two-wheeled sash-pulley, from Stoke Park, Surrey, c.1765–75. This unusual concealed pulley-block was employed in conjunction with a hidden patented sash-cord mechanism, the pulley-block being invisibly mounted to the rear of the pulley-stile. Note hand-cut screws.



Frame-pulley with wrought-iron case and brass wheel, from Holkham Hall, Norfolk, c.1740s. An early example of a metal sash-pulley case with dove-tailed joints. Interestingly, William Kent continued to use wooden sash-pulleys in other buildings he designed.



Brass and wrought-iron frame-pulley, c.1760–65 from Thomas Ripley's Admiralty Building, London. The face-plate and wheel are of brass, the cheeks being formed from wrought-iron. This distinctive case design was also used at Harewood House, Yorkshire. Note hand-cut screws.



Wrought-iron and brass frame-pulley, from the Grand Salon windows, Somerset House, Yorkshire, designed by John Carr, and built c.1766. This pulley has a lathe-turned brass wheel with a wrought-iron case riveted together. It is one of several types introduced over the period c.1740–75.



Frame-pulley made entirely of cast-brass, from 16 Queen Anne's Gate, London, built in 1775–78, and designed by Samuel Wyatt. The extended face-plate indicates it was possibly made to replace an earlier wooden pulley, however its design suggests it was contemporary with the build. The lower section of the face-plate is missing.



Unique brass frame-pulley, designed to be fitted to the rear of the pulley-stile, from Claremont, Surrey, c.1775–78. There is a strong possibility that Henry Holland designed these pulleys specifically. Note early lathe-turned screws. I have never encountered this design elsewhere.



Frame-pulley with cast-iron case and brass face-plate and wheel, from 56–58 Bloomsbury Street, London, c.1775–80. Developments in casting technology enabled the mass production of cast-iron sash-pulleys. This face-plate is riveted to the case; later versions were cast in one piece. Note hand-cut screws, tinned to prevent corrosion.



Frame-pulley with cast-iron case and brass wheel, from the c.1775 extension to The White Lion Hotel, Surrey. This example was cast in one piece with a lathe-turned brass wheel. It is possible that the fine sand-casting technology required to produce such an example developed as early as the late 1760s.



'State-of-the-Art' axle-pulley design, from the front elevation of Home House, London, c.1776, designed by James Wyatt and Robert Adam. This first-rate sash-pulley design has a brass wheel and face-plate. The bushes to the axle are also of brass. These high-quality pulleys were reserved for the 'polite' areas of the house.



Expensive cast-iron and brass axle-pulley, from the front elevation of the North Wing of Somerset House, London, built 1776–80, designed by Sir William Chambers. The face-plate is a separate cast-brass element riveted to the cheeks. Variations of this design remained in use until the 1930s. By the 1790s the axle-bearings had become larger.



Cheap cast-iron frame-pulley manufactured by Archibald Kenrick of West Bromwich, from 193 Vauxhall Bridge Road, London, c.1822–25. The pulley retains its original painted face-plate and was covered by a stopping-piece on the inside vertically-sliding counter-balanced shutters, thus preserving the original painted finish. Archibald Kenrick founded his company in 1791; by the early 1800s they were producing a wide range of sash-pulleys.



Bespoke brass and wrought-iron axle-pulley, from Sir Jeffry Wyatville's reconstruction of Windsor Castle, c.1825–30. This is one of several bespoke designs employed by Wyatville in his buildings. In this example the face-plate and wheel-rim are of brass, along with the bushes to the axles and the core of the wheel, the cheeks being constructed of iron.



Brass and cast-iron frame-pulley, from the West Strand Improvements, London, designed by John Nash and built by William Herbert, c.1830–32. This pulley was produced by William Bullock of Birmingham. The cast-iron face-plate has a thin brass plate riveted to it; this was a high quality product, the wheel also having a brass rim. Note the 'U'-shaped reinforcement, introduced in the late 1820s to prevent cracking when the pivot-pin was riveted.



Large high-quality axle-pulley, from 36 Sussex Square, Brighton, c.1835. This is a good example of a high-quality axle-pulley of the early nineteenth century, also produced by William Bullock of Birmingham. Note the larger axle to pulley. Similar types were used in Nash's conservatory at Buckingham Palace, c.1825. The casting consists of four separate pieces riveted together. Note the large axle – these increased in size during the 1790s, thus improving the longevity of the pulley.

Sash-pulleys were made in various sizes to cater for larger windows with thicker pulley-stiles, the wheel being large enough to enable the sash-weight to move freely in the sash-box without rubbing on the back of the pulley-stile, which could be a problem when smaller pulleys were used on large windows.

By c.1825 there were several ironmongery companies producing ranges of sash-pulleys of different qualities and sizes, including James Collins of Birmingham, Archibald Kenrick of West Bromwich, and W. Bullock of Birmingham. Their products were unmarked until the 1830s; however by comparing the case design and other features, it has been possible to recognise some of these manufacturers' products.

The Brooking ironmongery archive, which is complemented by a library of early trade catalogues dating

from the c.1840s to the present day, now contains over 30,000 examples of sash-pulleys collected from across the U.K. This archive was instituted in 1968 and will shortly be the subject of an in-depth refining process which will identify several important aspects, including the geographical spread of certain manufacturers and their evolution, including economies made to speed-up production; it will also illustrate the various quality products produced by the leading manufacturers.

This work will proceed in tandem with the refining process of the entire ironmongery archive, which is apparently unique in its coverage of every form of door and window ironmongery, in some cases dating from the seventeenth century to the present day.