

Chapter 8

Palace of Westminster

Around 960 in the reign of King Edgar, Dunstan who was Bishop of London founded a Benedictine Monastery in Westminster. This was situated alongside the River Thames on a raised area known as Thorney Island situated in an area of marsh land. There had previously been a church there since the 7th century but attacks by invading Danes had led to it being abandoned. On its revival the Monastery became known as West Minster given its position to the west of the City of London. The current Abbey represents alterations and additions over many years, following major building work commenced by Henry III in 1245.

King Canute may have had a Palace near the Abbey, but it was Edward the Confessor who established his Royal Palace there around 1052. It remains a Royal Palace to this day despite other sites having taken on the principle role subsequently. William the Conqueror took up residence in the Palace on Thorney Island after his coronation on Christmas Day in 1066. Royalty remained there until Henry VIII left to set up Court in York Place after a fire in 1512. This became known as Whitehall and remained a Royal Palace until 1698.

Following its foundation the Abbey and then Westminster Hall was used as a meeting place for the King and his Council. The Palace thereafter evolved to become the work place of today's modern Parliament, although the estate still in practice remains part of the Royal Estate. A great fire destroyed most of the buildings on the night of 16 October 1834. All that remained were Westminster Hall, parts of the 1520s cloisters and the lower level of St Stephen's Chapel, now the Chapel of St Mary Undercroft. The recommissioned building seen today is the work of the architect Charles Barry with internal decoration by Augustus Pugin.

These parliamentary buildings have only ever held chimed bells although the current hour bell, known as 'Big Ben', is most probably the best known bell in the world.

Great Tom of Westminster

For many centuries a clock striking the hour on a bell was a feature of the Palace of Westminster. The original clock tower stood on the northern side of New Palace Yard near to where the current clock tower housing 'Big Ben' stands. The history of the bell is that Sir Ralph-de-Hengham, when Chief Justice of the Kings Bench, caused a court roll to be erased and reduced a fine. For this action he was himself fined 800 marks by Edward I. The money paid was used between 1288 and 1290 to erect a tower containing a clock and bell, which struck the hour to remind the judges who sat in the adjacent courts of Westminster Hall of the offence of one of their predecessors. We know this tower (described by some writers as *'the clock tower opposite Westminster Hall gate'*) later contained a large bell cast in the reign of Edward III.



Original Bell Tower opposite Westminster Hall. Taken from Hollar, Wenceslaus, *Sala Regalis cum Curia West-monasterij, Westminster haall*. London circ. 1665 (33.0cm by 14.0cm)

Henry III, who was instrumental in building the fabric of Westminster Abbey, appears to have taken an interest in bells. An instruction in the Close Rolls, dated 1230, asks Edward of Westminster to make a bell larger than any he had previously made for the Abbey. Edward of Westminster is otherwise unknown as a bell-founder, and it seems likely that he may simply have been the contractor who put the work in hand.

Later references in 1249 concern the commissioning of two great bells for Westminster Abbey. It would appear that too much metal had been ordered, for in February 1250 Edward of Westminster was ordered to arrange for Master John-de-Seynt to cast four bells for Windsor Castle chapel *'out of the metal which remained from the great bell of Westminster'*. Two years later in 1252, he was ordered to make immediate arrangements for *'the hanging of the great bell so that it can be sounded on the vigil of St Edward'*.

Around the same time the building of a separate bell-tower, or clochard, was begun. This stood at some distance from the Abbey, in what is now Broad Sanctuary, on the site now occupied by the Supreme Court (in what was the former Middlesex Guildhall building). This tower was demolished in 1750. Although the Sacrist's rolls show that the Abbey spent money on the repair of *'the great campanile'* at various dates in the 14th and 15th centuries, there is also reference to bells *'in the little campanile'*. The accounts for 1478/9 show a payment to John Freeman for work undertaken *'in various parts of the Church, in the bell-tower (Campanile) of the Church and in the great bell-tower in the Sanctuary'*. This suggests that the bell-tower in the Sanctuary might have been built as an appurtenance to the royal chapel of St Stephen's in Westminster Palace. This was the view taken by John Stow (Survey of London: 1598) — *'He (Edward III) also built to the use of this chapel (though out of the palace court), some distance west, in the little Sanctuary, a strong clochard of stone and timber, covered with lead, and placed therein three great bells, since usually rung at coronations, triumphs, funerals of princes and their obits'*. Although suggesting that the clochard was built in about

1347, we know it was already a hundred years old by then. Edward III may therefore have simply had it repaired.

An entry in the Sacrist's rolls for 1428/29 probably refers to bells in the clochard. At that time, a founder named Vincent cast (or possibly recast) a *'bell called Jesus'* at a cost of £11, and repairs were carried out to *'the great bell named Edward'*. An entry for 1478/49 is more definite, and seems to imply that at the time there were more than three bells in the clochard: *'For the making of a clapper for the second of the three smaller bells in the great campanile in the Sanctuary, xs'*. Another entry for 1495/96 speaks of two bells in the great campanile, called Holy Trinity and Edward. The last entry in the Sacrist's rolls referring to bells is for 1516/17 when one of the bells was recast.

It is possible that there is some confusion here, which has certainly existed in later writings, with the clock tower of Westminster Palace. Whether a large bell had been transferred from either the Abbey or clochard in Broad Sanctuary to replace an earlier bell in the clock tower in New Palace Yard is unknown. The large bell in the clock tower was originally known as *'Edward of Westminster'* (possibly after Edward the Confessor), but later came known as *'Great Tom'* or *'Westminster Tom'*.

The inscription on Great Tom of Westminster, if accurately transcribed on later castings, suggests that the original bell was cast as a clock bell:

*Tercius aptavit me rex Edwardque vocavit
Sancti decore Edwardi signantur ut horae*

This translates as:

*King Edward III made and named me
So that by the grace of St Edward the hours may be marked*

However, as St Edward is genitive and the grace/beauty is ablative, the second line may have been intended as a pun with the alternative inference 'So that the hours of St Edward [presumably the Confessor, but possibly Edward of Westminster the original contractor] may be marked with grace/beauty'.

With the arrival of clocks many hour bells became redundant. In the course of time the tower itself fell into disrepair causing William III in 1698 to give the tower and bells to the parish of St Margaret's Westminster. The tower was pulled down in 1707 after the great bell had been sold to St Paul's Cathedral. Great Tom was found to weigh 82cwt. 2qrs. 21lbs, and was bought for 10d (i.e. 4.16p) per pound weight giving a total price of £385.17s.6d (i.e. £385.88). It is interesting that in 1706, however, that the Treasury received a petition asking for *'a good large sundial'* to take the place of the demolished clock and bell.

It appears that as Great Tom was being conveyed to St Paul's on New Year's Day, 1699, it fell off its carriage just by Temple Bar, and was cracked. It is said that this event gave Bell Yard its

name. The fragments remain in a shed at St Paul's until 1708 when the cracked bell was recast by Philip Wightman to serve as the hour bell for the clock in the south-west tower of St Paul's. The founder reproduced on it the old inscription, adding information of his own:

*TERCIUS APTAVIT ME REX EDWARDQUE VOCAVIT
SANCTI DECORE EDWARDI SIGNANTUR UT HORAE.
MADE BY PHILIP WIGHTMAN 1708
BROUGHT FROM THE RVINES OF WESTMINSTER*

Many of Wightman's bells were much admired, and there are still some good bells by him in existence in the Home Counties, but evidently his recasting of Great Tom was a failure. It is reported to have weighed nearly 9cwt less than the original bell and lasted only about a year before it was replaced. This time the casting was entrusted to Richard Phelps of the Whitechapel Foundry, who supplied a new bell in 1709. This bell was delivered to the Cathedral before the old one was taken away.

However, Phelps' bell of 1709 was also not a success, and nine years later he was given the job of recasting it into the present fine bell, which bears the inscription:

RCHARD PHELPS MADE ME. 1716.

Although the full inscription is not visible on the print of Great Tom (see illustration), it suggests a slightly different form for the old inscription. The print shows an inscription of:

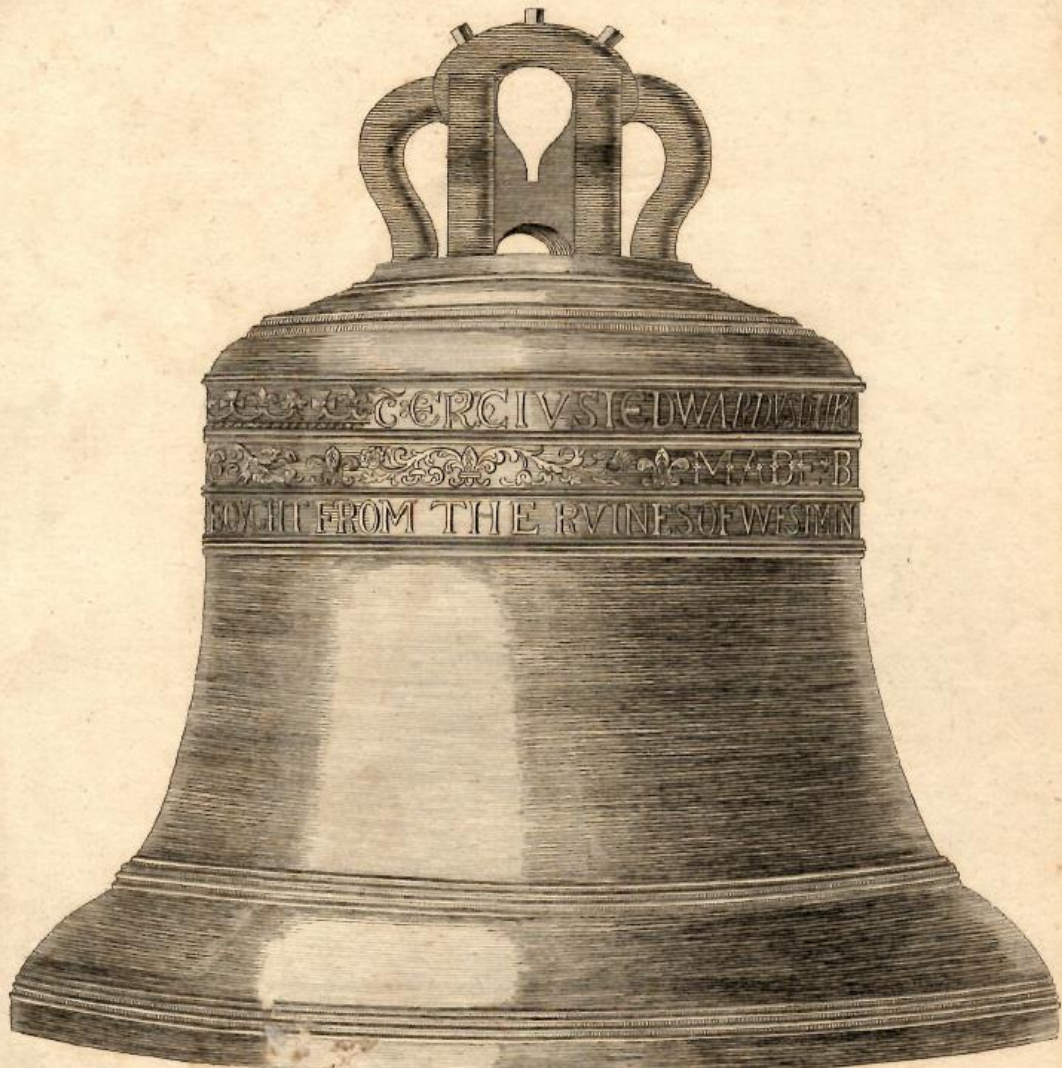
*TERCIVS EDWARDVSD IR.....
MADE BY.....
BOUGHT FROM THE RVINES OF WESTMINSTER.....*

Whilst the latter two lines are similar to the inscription quoted earlier, except that it clearly states that it was 'bought' rather than 'brought' from the ruins of Westminster, the first line is less clear. If it was copied correctly then it suggests:

*Edward III who by the Grace of God
(i.e. Tercius Edwardus D/G Rex.....)*

The legend at the top of the print is unusual in appearing to be a mix of letters (some filled in) and roman numerals. Other copies of the print contain the same filled in letters showing this to be original rather than added later. The most likely explanation for the legend is as a print reference to the original publication from which it was taken.

REGIM L



THE Old Bell, called Great Tom of Westminster, that did hang in the Clock Tower, opposite Westminster-hall Gate, was bought for the use of St. Paul's, London, but being crackt, was new cast, with an addition of metal, Anno XII. Guli. III. weighing 4 ton 400lb. (8,400lb.) and in this form made by Philip Wightman, Dec. 15, 1708.—J. Talman, del.

The clapper was broke by announcing the death of the late Princess Dowager of Wales, Feb. 8, 1772, and a new one, weight 186 lb. placed in its stead, which was first used at her funeral.

From *The Antiquarian Repertory: A Miscellaneous Assemblage of Topography, History, Biography* printed and published for Edward Jeffery 1807-1809 in 4 volumes (20.5cm by 24.0cm)

A footnote to the print, which appears to have been taken from another related page, further suggests that metal was added to the original cracked bell (i.e. around 82cwts) to create a bell

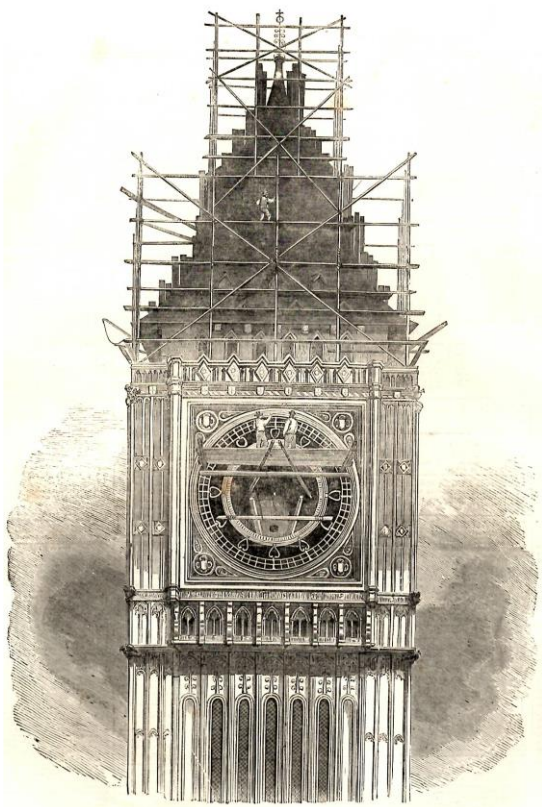
weighing around 84cwts in 1708. The assertion that it was 9cwts lighter in weight is therefore contradicted by this account if it is correct (i.e. 8,400lbs is equal to 83.6cwts). It is also interesting that the diameter of the bell at its lip is shown to be six feet (i.e. nearly 2 metres).

Finally, the footnote further suggests that the bell was still in use in 1772. Is this a misunderstanding, a reference to the later recast bell, or did the 1708 Great Tom find another use after being replaced at the Cathedral in 1709?

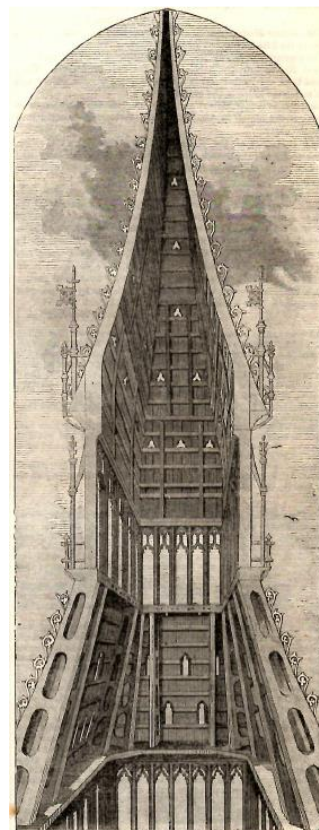
The history of Great Tom of Westminster follows a number of turns that still do not appear to be fully understood. It now hangs in the South West Tower of the Cathedral.

New Clock Tower

The rebuilding of the Palace of Westminster was overseen by a Select Committee of the House of Commons who agreed in April 1836 to include a northern clock tower with an hour bell weighing 14 tons and eight quarter bells. But it was not until 1843, after a delay of more than seven years that work commenced on the construction of the tower.



Present State of the Clock Tower of the Palace of Parliament, Westminster: *The Illustrated London News*, 2 August 1856, page 123 (15.0cm by 23.0cm)



Structural View of the Clock Tower : *The Illustrated London News*, 16 October 1858, page 350 (7.5cm by 20.0cm)

This structure was known as the Clock Tower, to distinguish it from the larger Victoria Tower at the southern end of the Palace of Westminster, before being renamed the Elizabeth Tower in 2012 to mark the Diamond Jubilee of Elizabeth II.

Bells for the Clock Mechanism

Big Ben is the nickname for the Great Bell of the clock mechanism and is often erroneously used to describe both the clock and tower itself. The origin of the nickname Big Ben is the subject of some debate - it may have been named after Sir Benjamin Hall who oversaw the installation of the Great Bell, or after English heavyweight boxing champion Benjamin Caunt. Along with the Great Bell are four quarter bells which play the Westminster Chimes.

Charles Barry initially invited just one clockmaker to produce a design and quotation for the new great bell. The rest of the trade objected to this, demanding the job be put out to competitive tender. The Astronomer Royal, George Airy was appointed to draft a specification for the clock. One of his requirements was that:

"the first stroke of the hour bell should register the time, correct to within one second per day, and furthermore that it should telegraph its performance twice a day to Greenwich Observatory, where a record would be kept."

Most clockmakers of the day considered the specification to be too demanding for such a large clock, especially as the heavy clock hands would be exposed to wind and weather. However, Airy was adamant that the specification must be adhered to. Due to this impasse, Parliament appointed barrister Edmund Beckett Denison as co-referee with Airy. Edmund Beckett Denison, later Sir Edmund Beckett, the first Baron Grimthorpe, was a difficult man. He was described by one writer as:

"zealous but unpopular, self-accredited expert on clocks, locks, bells, buildings, as well as many branches of law, Denison was one of those people who are almost impossible as colleagues, being perfectly convinced that they know more than anybody about everything - as unhappily they often do."

Denison decided to apply himself to the problem of the clock. It was 1851 before he came up with a design which could meet the exacting specification. The clock Denison designed was built by Messrs E.J. Dent & Co., and completed in 1854. The tower was not ready until 1859, so the clock was kept on test at Dent's works for over five years. During that time, Denison invented a new gravity escapement and a trial clock was tested and approved by the Astronomer Royal. This trial clock is believed to be now in use as the church clock at St. Dunstan's, at Cranbrook in Kent.

When completed in 1859, the clock was the largest and most accurate four-faced striking and chiming clock in the world. The tower is 96 metres tall and the climb from ground level to the belfry is 334 steps. Its base is square, measuring 12 metres on each side and the dials of the clock are 7 metres in diameter.

New Great Bell

Denison discovered that Barry, by now Sir Charles Barry, had specified a 14 ton hour bell but had made no provision for its production or for that of the four smaller quarter chime bells. Denison's studies of clocks had included bells and he had developed his own ideas as to how they should be designed and made.

The largest bell ever cast in Britain up to that time had been 'Great Peter' at York Minster. This weighed just 10¾ tons, so it is not surprising the bell founders were wary of bidding for the contract to produce the new bell, particularly since Denison insisted on his own design for the shape of the bell as well as his own recipe for the bell metal to be used. In both respects his requirements varied significantly from traditional custom and practice. Eventually, a bell was made to his specification, albeit somewhat oversize at 16 tons, by John Warner & Sons at Stockton-on-Tees on 6th August 1856, but this cracked irreparably while under test in the Palace Yard at Westminster.

The crack was directly opposite where the bell was struck with the 12cwt hammer located on the side. Although the fracture was clean the metal had a coarse dull appearance and was full of numerous very tiny holes. These were found to appear throughout the bell when it was broken up afterwards. The bell was also much thicker in the waist than Denison had intended, which he thought was why the bell was heavier than originally expected and need such a heavy hammer to bring out the full note when struck. It is likely the cope of the bell during casting was distorted by the weight of the metal inside. The quarter bells also cast by the Warner foundry were satisfactory and retained.

It was now that Denison turned to the Whitechapel bell foundry in London. George Mears, then the owner of the Whitechapel Bell Foundry, undertook the casting. According to foundry records, Mears originally quoted a price of £2,401 for casting the bell, but this was offset to the sum of £1,829 by the metal he was able to reclaim from the first bell so that the actual invoice tendered, on 28th May 1858, was in the sum of £572. It took a week to break up the old bell, three furnaces were required to melt the metal, and the mould was heated all day before the actual casting, the first time this had been done in British bell-founding. It took 20 minutes to fill the mould with molten metal, and 20 days for the metal to solidify and cool.

Transporting the bell the few miles from the foundry to the Houses of Parliament was a major event. Traffic stopped as the bell, mounted on a trolley drawn by sixteen brightly decorated

horses, made its way over London Bridge, along Borough Road, and over Westminster Bridge. The streets had also been decorated for the occasion and enthusiastic crowds cheered the bell along the route.

The bells of the Great Clock of Westminster rang across London for the first time on 31st May 1859. In September, a mere two months after it officially went into service, Big Ben cracked. Once again Denison's belief that he knew more about bells than the experts was to blame for he had used a hammer more than twice the maximum weight specified by George Mears. Big Ben was taken out of service and for the next three years the hours were struck on the largest of the quarter-bells. Eventually, a lighter hammer was fitted, a square piece of metal chipped out of the sound bow, and the bell given an eighth of a turn to present an undamaged section to the hammer. This is the bell as we hear it today, the crack giving it its distinctive but less-than-perfect tone.

Not prepared to admit any error on his part, Denison befriended one of the Foundry's moulders, plied him with drink, and got him to bear false witness that it was poor casting, disguised with filler, that had caused the cracking. (A close examination of Big Ben in 2002 failed to find a trace of filler). With reputations at stake this led to a court case which Denison rightly lost. Nor was this the end of the story. Denison, obviously aggrieved at having lost the court case, continued to bad mouth the Foundry. Twenty years later he was unwise enough to do so in print and this led to a second libel trial which he also lost.

Big Ben remains the largest bell ever cast at the Whitechapel bell foundry. Prior to its closure visitors to the foundry passed through a full size profile of the bell that framed the main entrance as they entered the building. The original moulding gauge employed to form the mould used to cast Big Ben could also be found hanging on an end wall of the foundry above the furnaces.

Details of the Bells

(i) Trial bells

A number of trial bells were cast by to try Denison's bell profile and metal composition. The outcome of these trial bells cast by Warner's were as follows:

Weight	Diameter	Cast	Fate
Not known	6"	1856	Sold to E B Denison for his lectures.
3-3-20	26½"	1856	Believed to have gone to St Thomas, near Portman Square. Was a half size model of the proposed 3rd quarter bell.
7-0-12	33¾"	1856	Destination unknown.
12-0-16	40⅞"	1856	Sold to Rohde Hawkins, architect, for St James Church, Birstwith, Yorkshire, the tenor of a ring of five (recast and augmented to 8 in 1933 by John Taylor & Co.

(ii) Rejected bells

A number of bells cast were also found to be unsatisfactory and were rejected as follows:

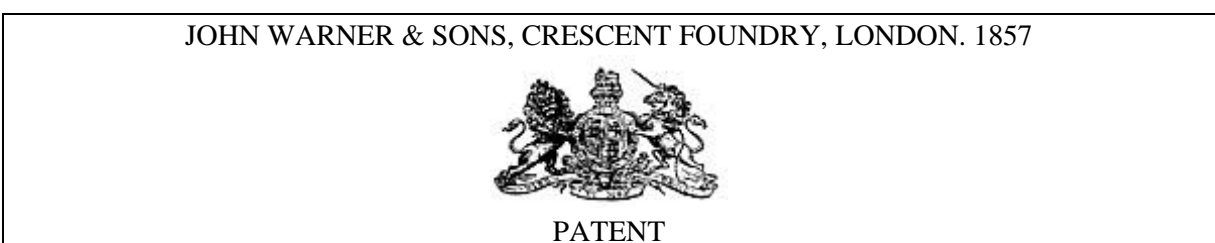
Bell	Weight	Diameter	Cast	Fate	Invoiced
Quarter 1	21-0-16	46"	1857	Came out wrong note.	10th Feb 1857
Quarter 1	20-2-6	45½"	1857	Rejected as unsound.	6th May 1857
Quarter 3	35-1-6	54"	1857	Rejected as unsound.	23rd July 1857
Big Ben I	318-1-22	113½"	1856	Cracked while under testing.	

The inscription on the first Great Bell being:



(ii) Final installation

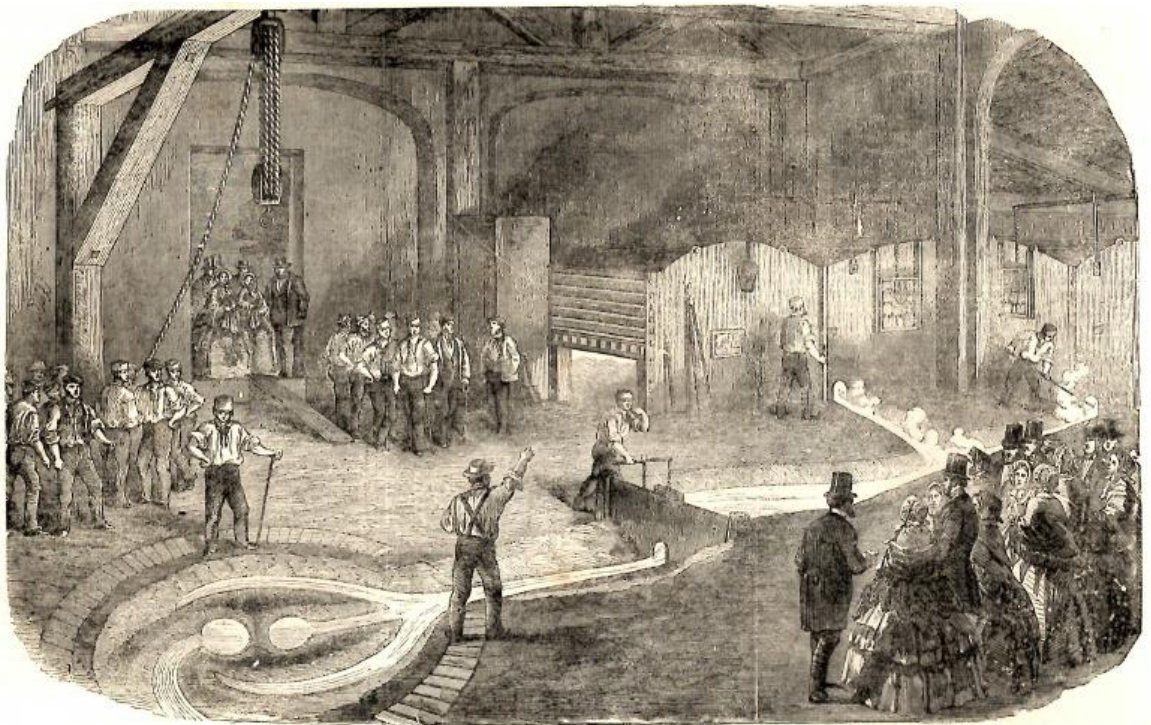
Bell	Weight	Thickness	Diameter	Note	Cast	Founder
Quarter 1	21-0-23	4"	44¾"	G sharp	1857	John Warner & Sons
Quarter 2	25-1-2	4⅞"	48 ¹ / ₁₆ "	F sharp	1857	John Warner & Sons
Quarter 3	33-2-13	4 ⁷ / ₁₆ "	53 ¹ / ₁₆ "	E	1858	John Warner & Sons
Quarter 4	77-2-13	6 ¹ / ₁₆ "	72½"	B	1857	John Warner & Sons
Hour Bell "Big Ben"	270-3-15	8¾"	108"	E	1858	George Mears & Co.



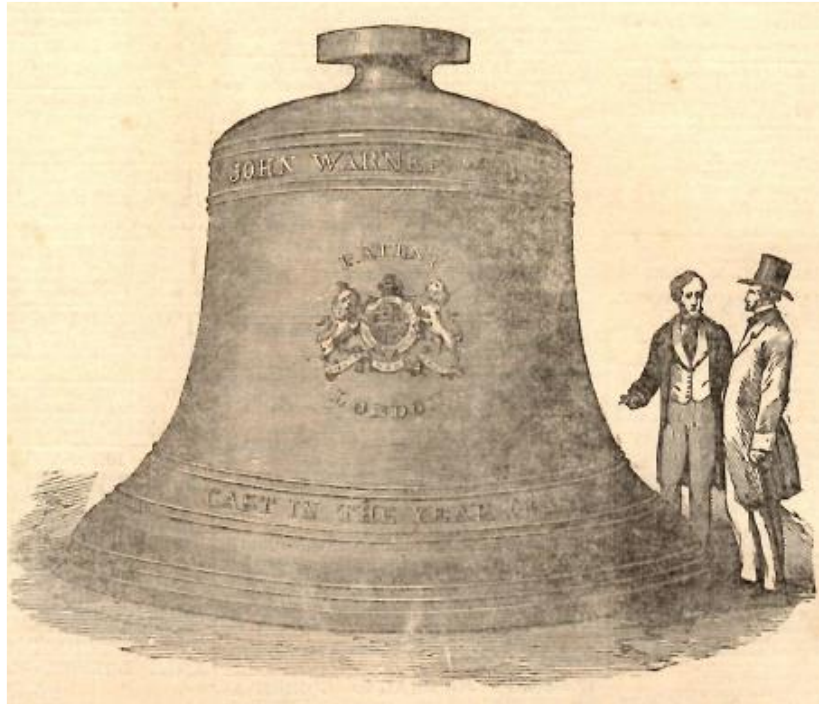
Prints of the Warner bells



The Casting of the Bell, for the Great Clock of Westminster Palace, at Norton, Stockton-on-Tees from *The Illustrated London News*, 23 August 1856, page 194 (8.0cm by 15.0cm)

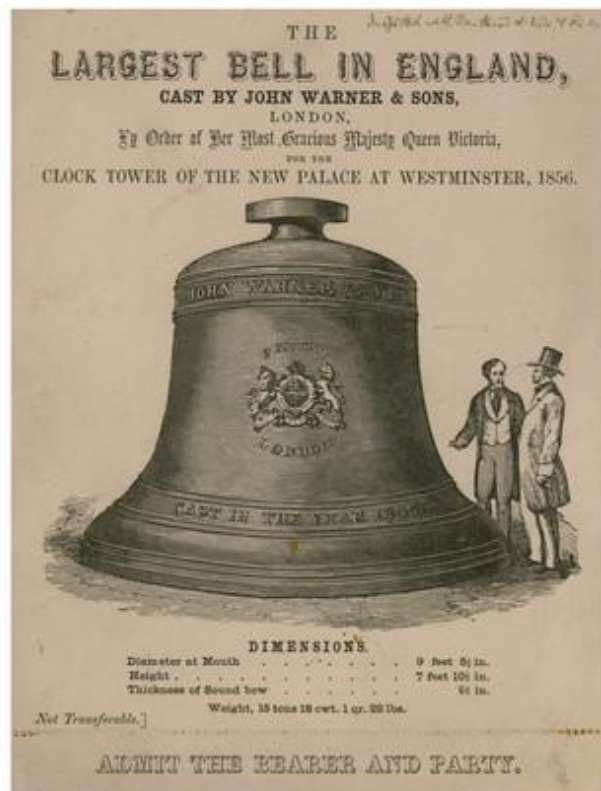


The Casting of the Bell, for the Great Clock of Westminster Palace, at Norton, Stockton-on-Tees from *The Illustrated London News*, 23 August 1856, page 194 (23.5cm by 15.0cm)




The Westminster Clock Bell from *The Illustrated London News*, 13 September 1856, page 285 (12.5cm by 10.0cm)

Souvenir poster with the same image as the newspaper extract:




BIG BEN
THE LARGEST BELL EVER CAST IN ENGLAND
AND THE FOUR QUARTER BELLS
FOR THE CLOCK TOWER OF THE NEW HOUSES
OF PARLIAMENT.


1st QUARTER



3 ft. 9 in. DIAMETER. NOTE A. Natural.
Weight. 1 Ton. 1 Cwt.



2nd QUARTER



4 ft. DIAMETER. NOTE. G. Natural.
Weight. 1 Ton. 5 Cwts.

NOTE E NATURAL, AS
CAST BY JOHN WARNER & SONS,
BELL & BRASS FOUNDERS TO HER MAJESTY, CRESCENT FOUNDRY, LONDON.


3rd QUARTER



4 ft. 0 in. DIAMETER. NOTE, F Natural.
Weight. 1 Ton. 15 Cwts. 1 Qn. 6 lbs.

DIAMETER AT MOUTH. 9 ft. 5 1/2 in. HEIGHT. 7 ft. 10 1/2 in. THICKNESS OF SOUND BOW. 9 1/2 in. WEIGHT WITH CLAPPER. 16 tons. 11 cwt. 2 qrs. 20 lbs.

THE ABOVE ILLUSTRATION REPRESENTS "BIG BEN" AS SUSPENDED FOR THE VARIOUS SEVERE TESTS TO WHICH THE EXPERTS SUBJECTS THE BELL. ON THE LEFT IS SHOWN THE EXPERIMENTAL CLOCK HAMMER, WEIGHING 13 Cwt. RAISED BY MACHINERY, AND ALLOWED TO FALL ON THE BELL WITH A WEIGHT AND FORCE EQUAL TO ONE AND A QUARTER TONS. ON THE RIGHT IS REPRESENTED THE MEN, WHOSE COMBINED POWER PULLED "BIG BEN'S" MONSTER CLAPPER, AND CAUSED SO MUCH NOISE AT TIMES THAT THE BELL OFTEN STRUCK THE FIXED EXPERIMENTAL HAMMER.




THE CLAPPER WEIGHS 13 Cwt., BEING TWICE THE USUAL WEIGHT IN PROPORTION TO THE BELL. "THE TRUTH IS THAT THE DIFFERENCE IN THE SIZE OF THE CLAPPER IS THE CONSEQUENCE OF THE BELL HAVING A MUCH GREATER POWER, BOTH OF BEARING BLOWS AND GIVING OUT SOUND, THAN USUAL." - Vide Lecture at the Royal Institution, March 6th, 1857.

OPINIONS ARE COMPARED, AND WE ARE HAPPY TO SAY, IT IS UNIVERSALLY ACKNOWLEDGED, THE BELL IS WITHOUT FLAW OR CRACK.

IT WAS FOUND, AS WE RECEDDED FROM THE TOWER, THAT THE VOICE OF "BIG BEN" ASSUMED, IN SPITE OF ITS ENORMOUS VOLUME, A SOFT MELLODIOUS SOUND, UNTIL, WHEN WE REACHED THE MIDDLE OF ST. MARGARET'S CHURCHYARD, IT WAS PERCEIVED TO BE THE VOICE OF A "SOUND TOWER". - Vide "Times," Nov. 14, 1856.

4th QUARTER



6 ft. DIAMETER. NOTE, G Natural.
Weight. 3 Tons 17 Cwts. 3 Qrs. 24 lbs.

Large poster (size 78.0cm by 63cm) - date unknown. Produced by Edward Lewis & Co publisher, colour lithograph on paper.

'BIG BEN' the great bell of Westminster.

Cast at the Whitechapel foundry April 10, 1858.

DIMENSIONS.
 Diameter at mouth 9 feet.
 Total height 7 ft. 6 in.
 Thickness of sound-bow 3 1/2 in.
 Key 6.

Bells cast by Messrs. Mears

	Weight in lbs.	Height in ins.	Weight in lbs.
Westminster	13,234	78	11,111
Metropolitan	5,78	78	11,111
York	5,26	78	10,111
Gloucester	4,000	6	5,800
Canterbury	3,11	28	5,100

Messrs. Mears were first established in 1786 & have cast 171 Bells, containing 588 Tons & Single Bells from 4 Cwt. upwards about 200,000 in number.

THE NEW WESTMINSTER BELL.

INSCRIPTION
 "This Bell weighing 13 tons, 10 cwt. 2 lbs. 10 lbs. was cast by George Mears, at Whitechapel, for the Clerk of the House of Parliament, under the direction of Edward Beckett Denton, Q.C. in the Twenty first year of the reign of Queen Victoria, and in the Year of Our Lord, MDCCLXIII."
 The Craymerston was designed by Arthur J. P. S. A., but in consequence of the Clock having never being intended to strike on the outside, the lower tracery is omitted.

Other commemorative images from the period - date unknown



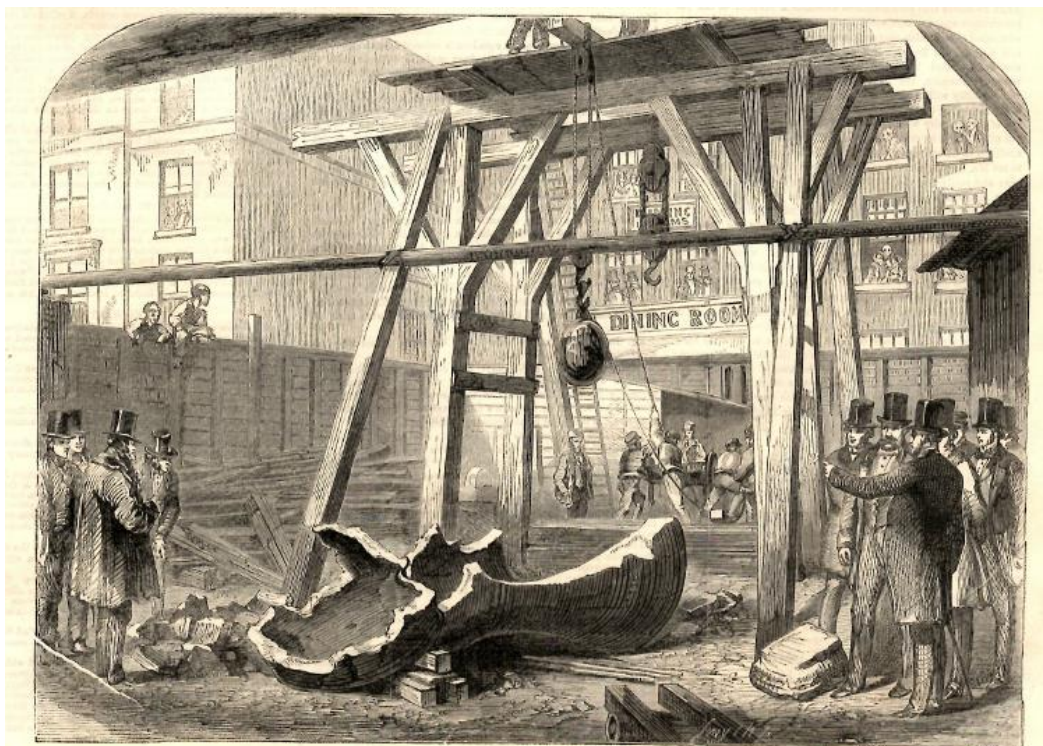
Unloading Big Ben at Maudsley's Wharf at Lambeth from *The Illustrated London News*, date unknown



Removal of the Bell for the Great Clock of Westminster from *The Illustrated London News*, 1 November 1856, page 443 (23.5cm by 15.0cm)



Experiment with the Hammer upon the Great Bell for the Westminster Clock from *The Illustrated London News*, 27 December 1856, page 639 (23.5cm by 18.5cm)

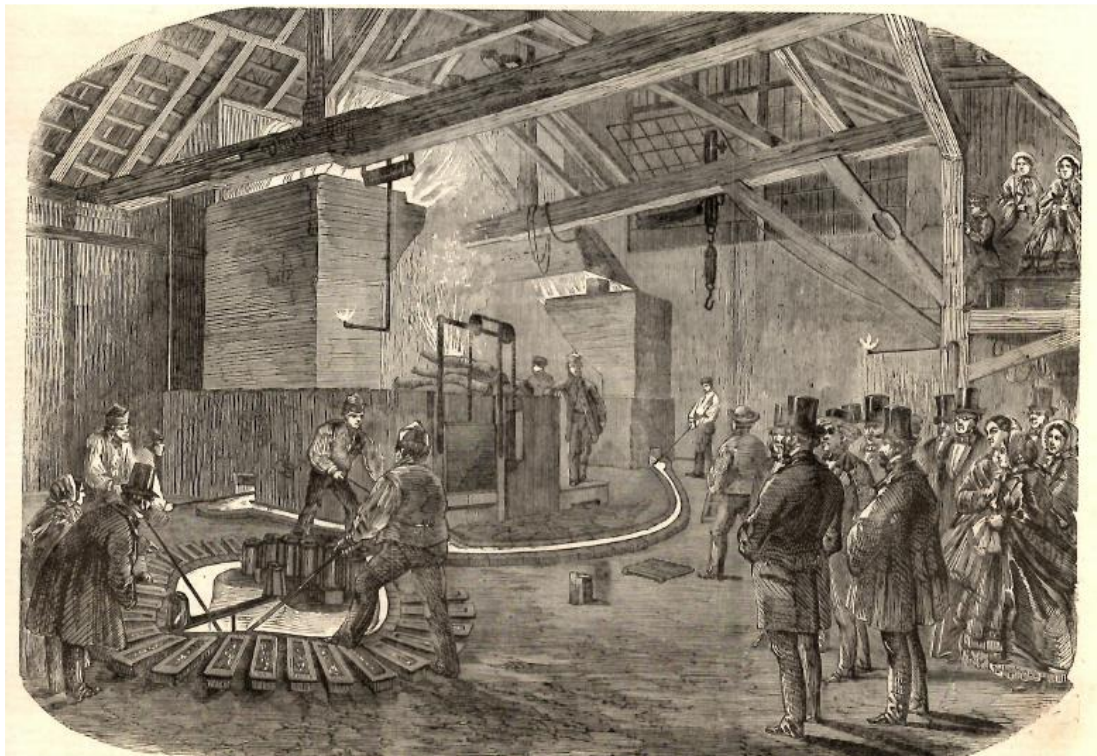


Clock Bells for the New Palace of Westminster – Breaking Up 'Big Ben' from *The Illustrated London News*, 6 March 1858, page 225 (22.0cm by 16.5cm)

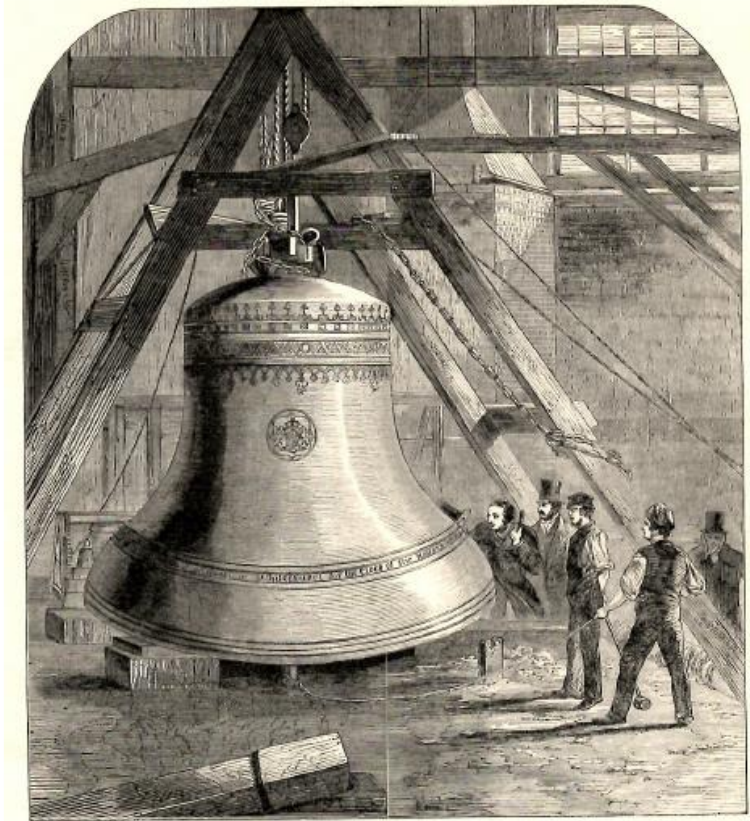


The Quarter-Bells for the Great Clock at Westminster from *The Illustrated London News*, 26 December 1857, page 637 (15.5cm by 10.0cm)

Prints for the Whitechapel bell



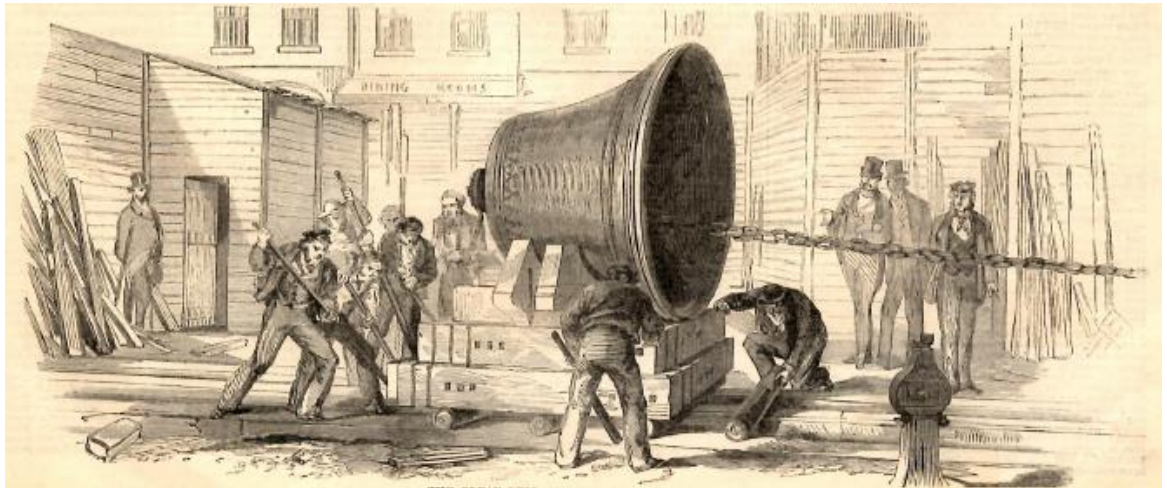
Recasting the Great Bell for the Clock Tower, New Houses of Parliament from *The illustrated London News*, 17 April 1858, page 401 (23.5cm by 16.7cm)



The Great Bell of Westminster from *The Illustrated News of the World*, 29 May 1858, page 269 (15.5cm by 17.5cm)



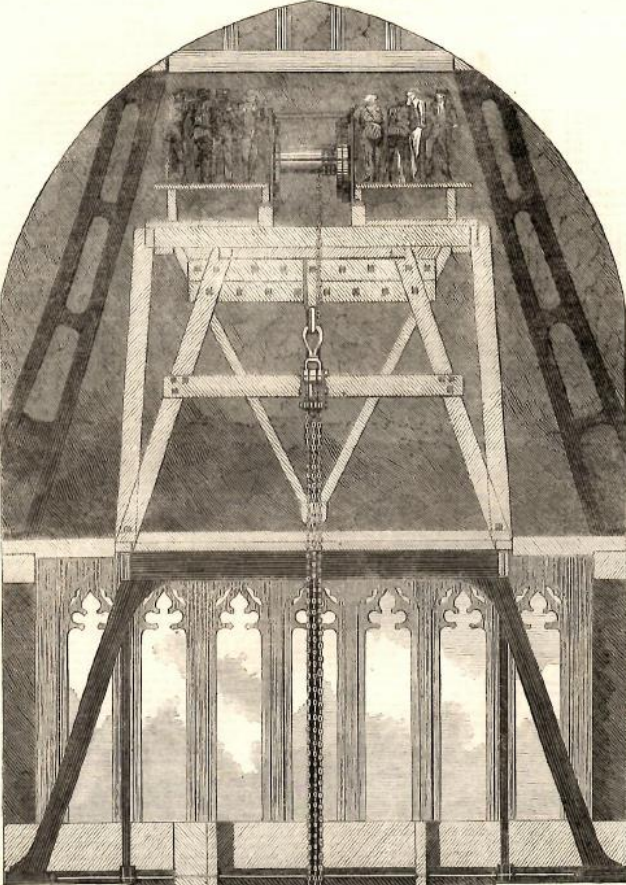
Arrival of the New Bell 'Victoria' at the Clock Tower, New Palace of Westminster from *The Illustrated London News*, 5 June 1858, page 557 (34.5cm by 23.5cm)



The Great Bell at the Base of the Tower from *Illustrated Times*, 16 October 1858, page 269 (23.0cm by 9.5cm)



Moving the Great Bell from *The Illustrated London News*, 16 October 1858, page 350 (8.0cm by 8.0cm)



of the shaft. All being completed, and the centre of gravity found, the cradle was then raised by means of a fine new crab, made for the purpose, placed immediately over the aperture of the shaft. Eight men, four to each handle, then drew it up. As the drum of the crab revolved and drew up its burden, the chain which accumulated upon it was passed from the drum to a smaller crab behind, so as to prevent any possible jerk arising from the slipping of the links, and also to avoid accumulation of weight. The cradle had attached to its sides four friction-wheels, which played upon the guide-limbs—as seen in the diagram—to ease the ascent. The chain was made expressly for the work, and was tested link by link. It is nearly 1200 feet long. It was made at Newcastle, by Messrs. Crawshaw, and tested under the superintendence of Mr. Thomas Quarm, the clerk of the works to the new Palace of Westminster, and Mr. James, of Broadwall, Blackfriars. We believe we are right in saying that Mr. Quarm arranged the whole of the plan for the raising; and Mr. James has carried it out with his usual ability, aided by his able superintendent, Mr. Hart. Our large illustration will explain the mode used for the ascent better than our description. The bell is seen just entering the clock-room, where it rested the first time: it was then turned mouth downwards and drawn up to the bell-chamber, seen in our sketch. The work of hoisting has been an arduous and anxious affair for all engaged, and we hope their labours will be appreciated.

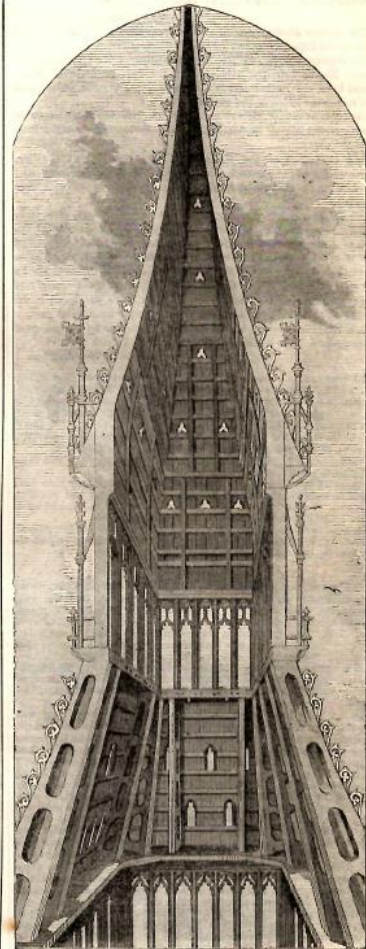
The quarter bells of the Clock Tower were raised to their places last week, awaiting the ascent of their ponderous chief to commence active duties. The crab which was constructed to hoist the great bell gives 110 lb. of power for every pound of force applied to the handle. As each handle is turned by four men, and as each man applies a force of 15 lb. without overexerting himself, an aggregate power of 22,000 lb. in round numbers is obtained at each turn of the handle. This force would seem tremendous; but then it takes

MODE OF RAISING THE GREAT BELL.

ten revolutions of the handles to wind up one foot of the chain, and fifty revolutions to complete one complete round of the drum. Five hundred revolutions cover the latter with chain, when it has to be cleared, and the chain that has been hauled up transferred to another windlass. When the bell was raised from the ground to the clock-room (a distance of 190 feet) it had to be restored to an upright position, fresh arrangements to be made, and a further haulage of forty feet accomplished to the bell-chamber.

The exact dimensions of the bells are—great bell, 7 ft. 6 in. in height, 9 ft. diameter at the mouth; weight, 13 tons 10 cwt. 3 qrs. 15 lb. Of the quarters: 1st quarter: weight, 1 ton 1 cwt. and 23 lb.; 2nd: 1 ton 5 cwt. 1 qr. 2 lb.; 3rd: 1 ton 13 cwt. 2 qrs. 13 lb.; 4th: 4 tons 13 cwt. 2 qrs. 13 lb. The notes of the bells are respectively—great bell, E sharp; 1st quarter, G; 2nd, F; 3rd, E (octave to great bell); 4th, B; and the ringing of the chimes is, taking the notes as represented by the above figures—1st quarter: 1, 2, 3, 4; half-hour: 3, 1, 2, 4—3, 2, 1, 3; 3rd quarter: 1, 3, 2, 4—4, 2, 1, 3—1, 2, 3, 4; hour: 3, 1, 2, 4—3, 2, 1, 3—1, 3, 2, 4—4, 2, 1, 3, when the great bell will strike the hour. The latter will be struck on ordinary occasions with a hammer, but the clapper will be available for the announcement of great events, such as every loyal Englishman deprecates. It is expected that in calm weather the sound will be distinctly heard throughout a radius of five miles, measuring from the tower.

Mr. Walsby, of Waterloo-place, writes thus concerning the quarter bells:—"The four bells for indicating the quarters of each hour at the new House of Parliament are, it appears, to be of such notes that we may say they would be respectively the first, second, third, and sixth of a psal of ten; or, in musical notation, G sharp (first bell), F sharp (second), E (third), B (sixth); the hour bell being the tenth, or E, an octave below the third bell. So far so good, provided that each proves satisfactory as regards quality of tone, relative pitch, &c. But, with the utmost deference to the

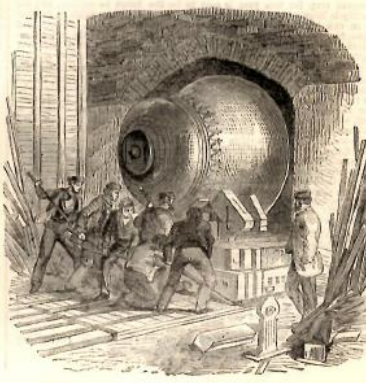


SECTIONAL VIEW OF THE CLOCK TOWER.

gentlemen intrusted with the superintendence of these matters, I think their arrangement a very tedious and inappropriate one for such very large bells, the notes of which will be so grave as to render it necessary to strike each bell in considerably slower succession than is usual with any other chimes in this Kingdom. The following brief and simple composition, if performed upon the bells in very slow time, would, in my opinion, protract the quarters in a more intelligible and melodious manner:—

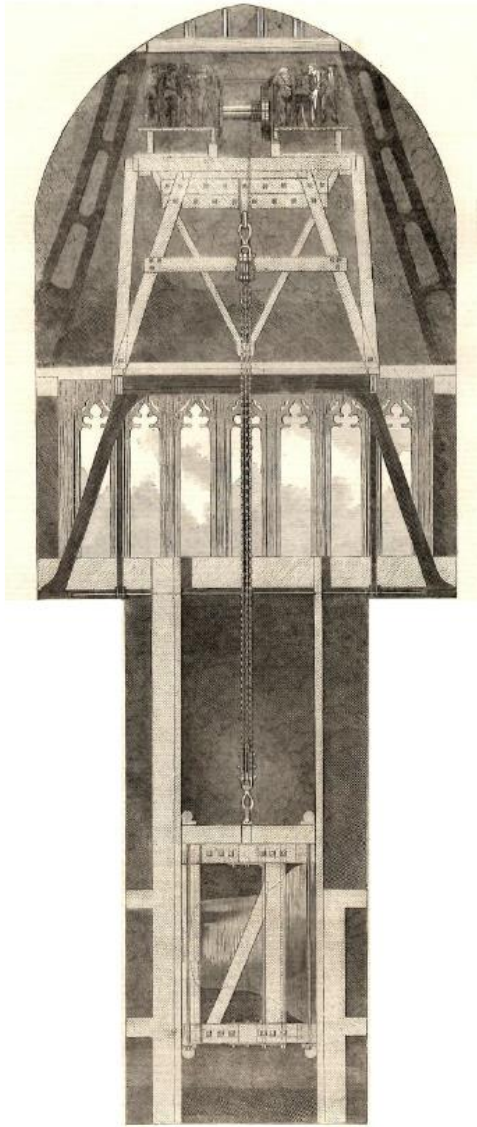
	To be indicated by bells.
1st quarter	1 2 3
2nd quarter, or half-hour	1 2 3
3rd quarter	3 2 1 3
4th quarter, or hour	1 2 3 4—10

In order that all persons whenever they hear the chimes may clearly understand which quarter is indicated without becoming impatient of listening, I have, it will be perceived, inserted only two notes for the first quarter, three for the second, and four for the third, concluding in each instance with the third bell (E, the keynote), thus affording repose to the musical ear. There are also four notes for the fourth quarter, which, however, is distinguished from any other by the introduction of the sixth bell (B, the dominant note), which calls for and is followed by the tenth, or hour bell (E, the fundamental note), with grand effect."

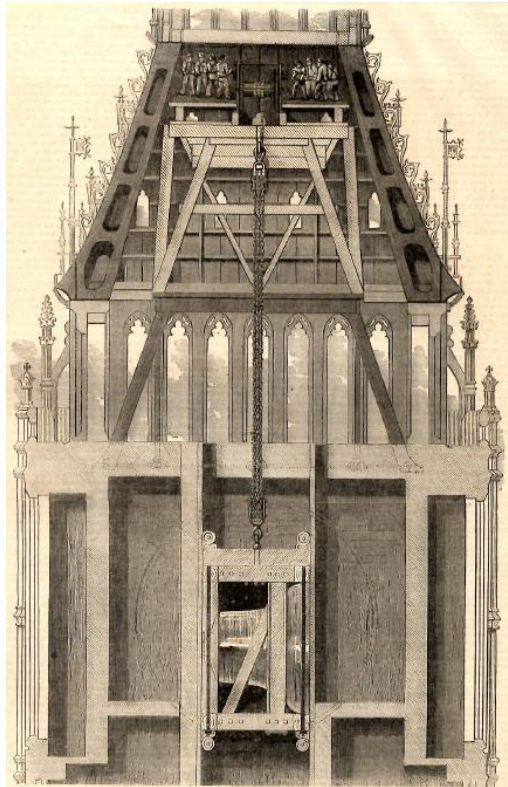


MOVING THE GREAT BELL.

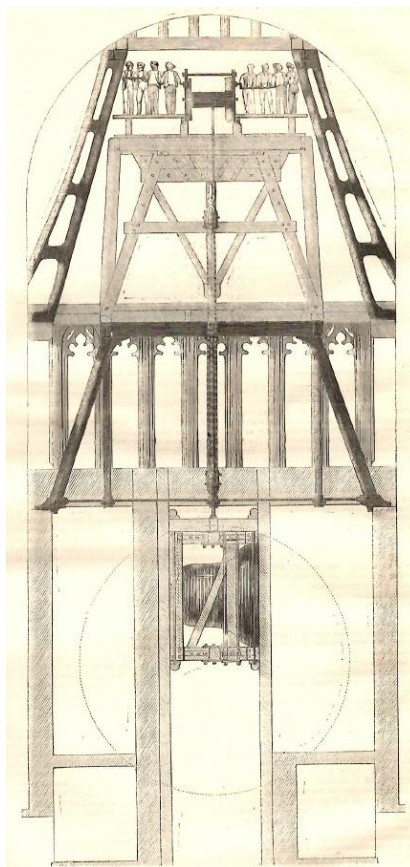
Raising the Great Bell from *The Illustrated London News*, 16 October 1858, page 350 (25.0cm by 37.0cm)



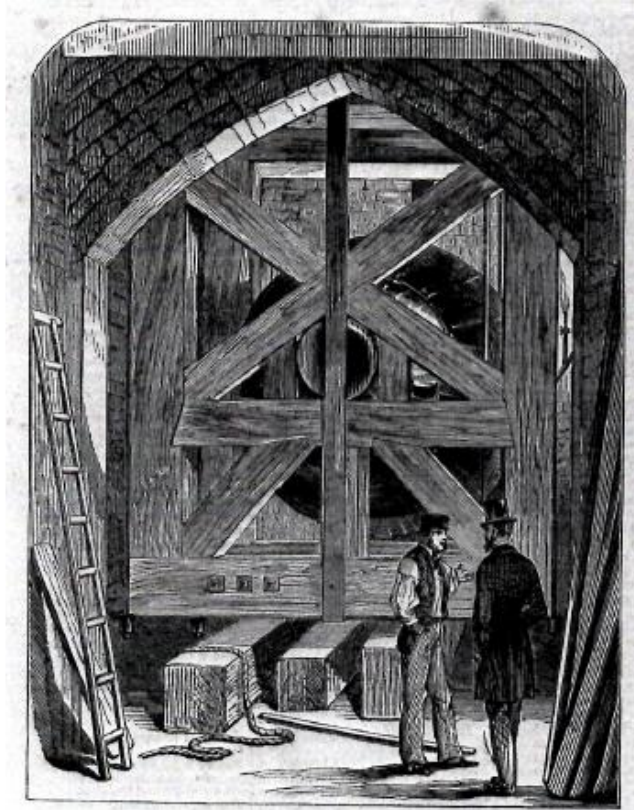
Mode of Raising the Great Bell from *The Illustrated London News*, 16 October 1858, page 350 (13.5cm by 35.0cm)



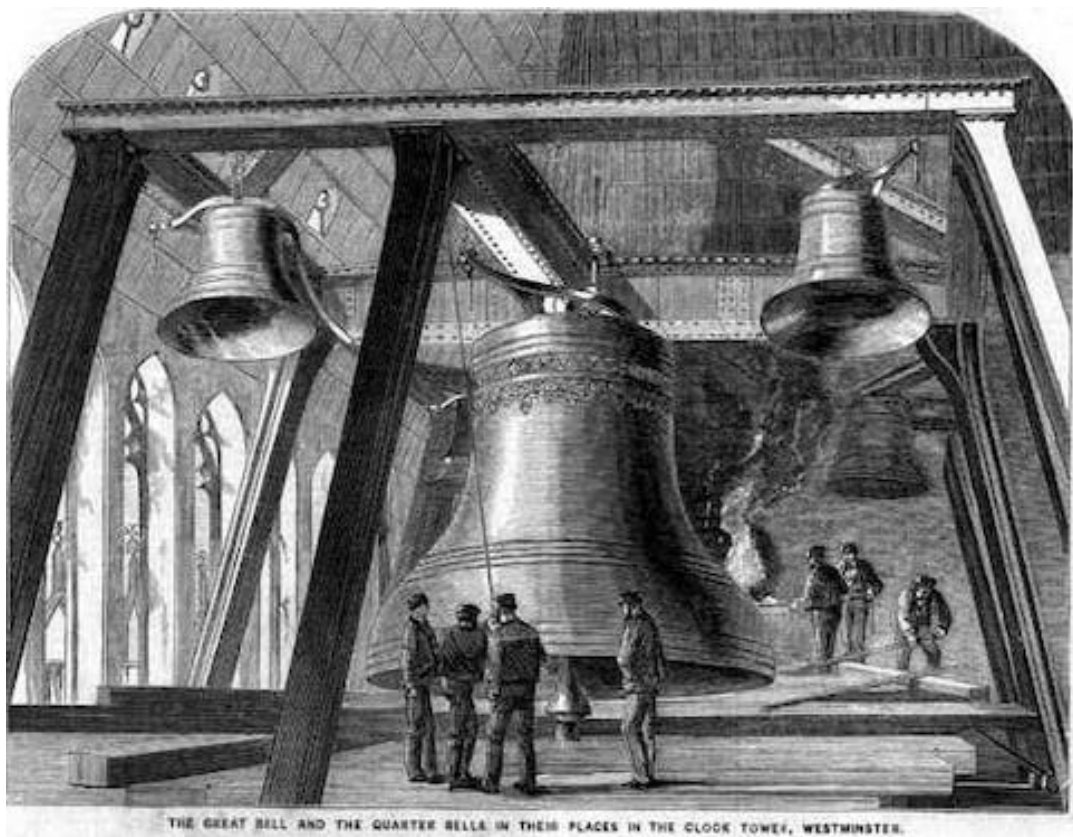
Raising the Great Bell for the Westminster Clock Tower from *Illustrated Times*, 16 October 1858, page 269 (15.0cm by 23.5cm)



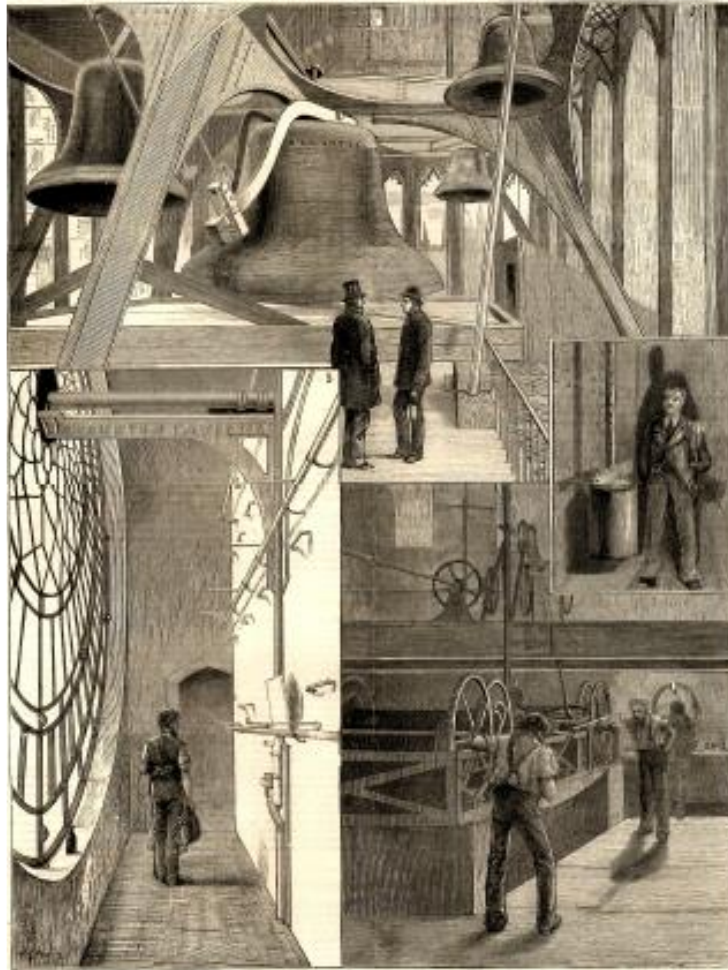
Arrangements for Raising the Westminster Bell from *The Builder*, 16 October 1858, page 687 (12.0cm by 26.0cm)



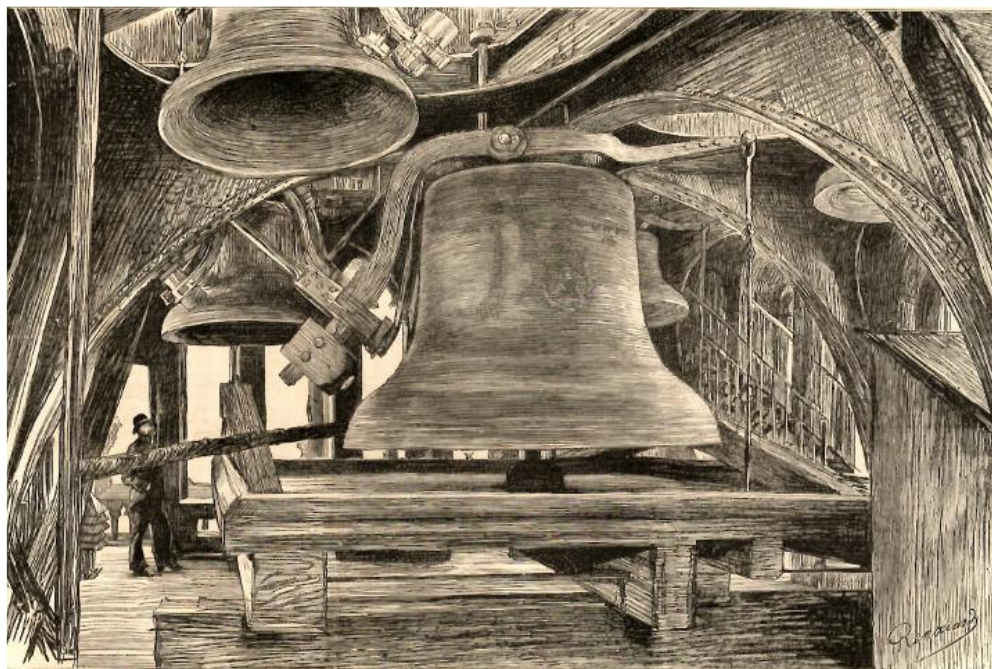
Raising the Great Bell to the Great Clock Tower, Westminster from *The Illustrated News of the World*, 4 December 1858, page 356



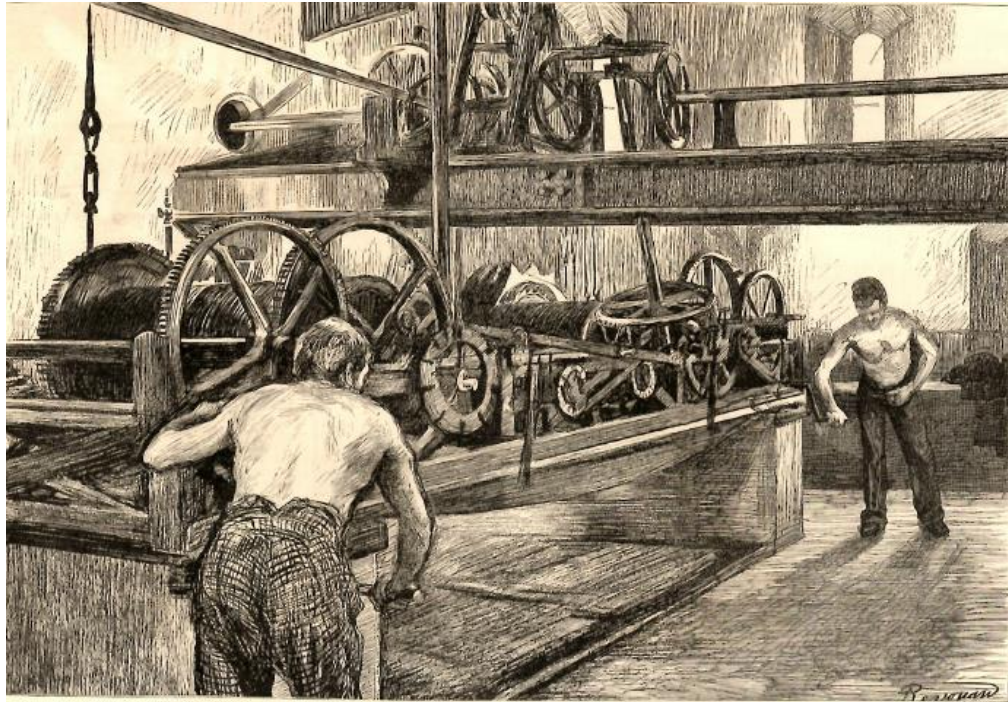
The Great Bell and Quarter Bells in their places in the Great Clock Tower, Westminster from *The Illustrated News of the World*, 4 December 1858, page 356



Interior of the Westminster Clock Tower – 1. The Belfry: Big Ben and his little Brothers; 2. The Pendulum; 3. Behind the Dial; 4. Winding up the Machinery from *The Graphic*, 4 March 1876, page 232 (22.5cm by 30.0cm)



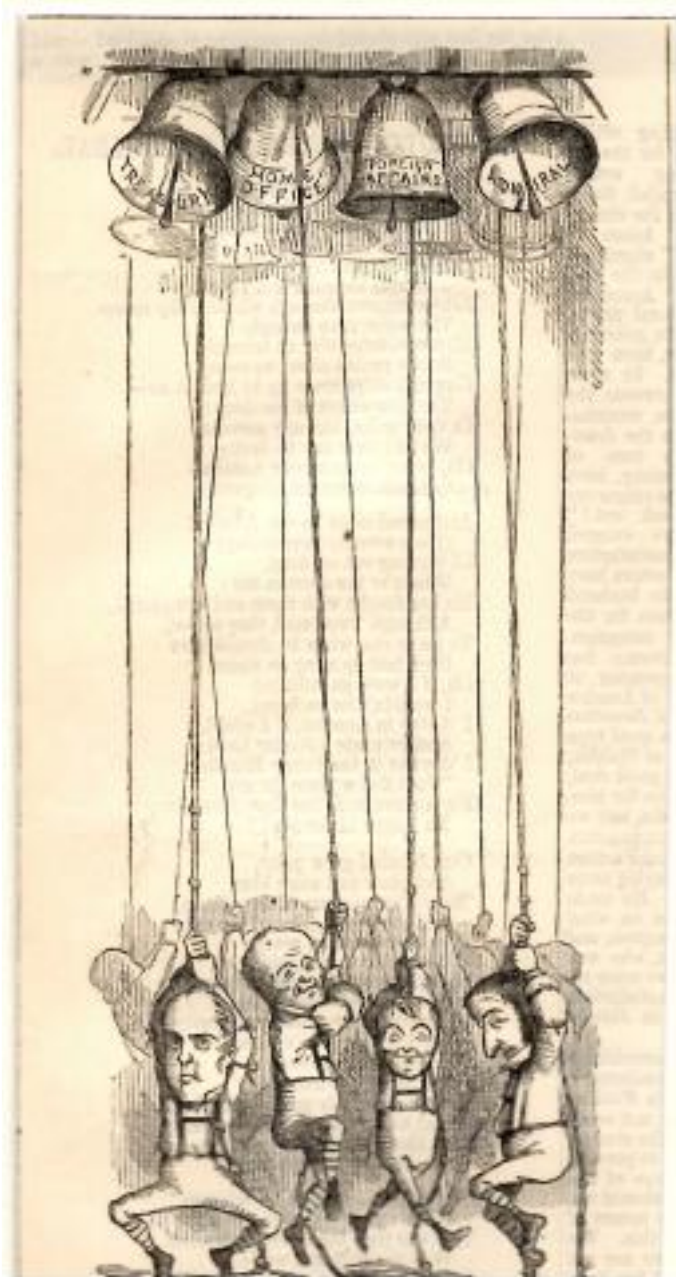
The Chimes – Big Ben and his little Brothers from *The Graphic*, 29 October 1887, page 477; also *Harper's Bazar Supplement*, date not known, page 790 (22.5cm by 15.0cm)



Winding the Clock Mechanism from *The Graphic*, 29 October 1887 p477; also *Harper's Bazar Supplement*, date not known, page 790 (21.5cm by 15.0cm)



Source unknown (9.0cm by 10.0cm)



Ring the New Year in at St Stephen's: Source unknown, but political satire circ 1866 possibly taken from *Punch* (18.0cm by 9.0cm)