WINDING THE CHURCH CLOCK

First written in 2016, this article has now been updated and some new photographs added

Like so many of its ecclesiastical contemporaries, St. Mary's Church in Church Lane was comprehensively restored by the Victorians, and we are fortunate that here their work seems to have been thoughtfully undertaken – something that was by no means always the case. At Chaddesden the project was carried out in two distinct phases. To begin with, work commenced on the chancel restoration in 1857, followed a year later by substantial repairs to the nave and aisles.

The most prominent external feature of St. Mary's Church, its fifteenth-century tower, was omitted from the Victorians' programme of repairs presumably on the grounds of cost, but by the time the Rev. Arthur Ellerton became vicar of the parish in 1902, it was apparent that the tower was in urgent need of remedial work. In the summer of 1903 fundraising to pay for repointing the tower and western front of the church, a new tower roof, and repairs to the tower parapet got off to an excellent start with a bazaar and garden fete held in the grounds of Chaddesden Hall. Fortunately the weather on this occasion was ideal and the good turnout helped raise a substantial part of the estimated cost of £500. A few months later, a sale of work held at Chaddesden School in late October brought in the welcome sum of £30 towards the £150 which was still then needed to complete the project.

To mark the restoration, the date of 1903 was cut into the face of the massive new main roof beam of the tower as a reminder to future generations, although admittedly the numerals can only be read from below in the bell chamber with the aid of a powerful torch! While all the work was taking place, Rev. Ellerton evidently suggested this would be an appropriate time to replace the ageing clock movement. An early drawing of the church made in November 1825 [Note 1] clearly shows a clock face on the south side of the tower, so presumably by 1903 the machinery that had kept it functioning down the years must have been giving cause for concern. The vicar duly commissioned a new cast-iron 'flatbed' movement for the clock from the well-known local firm of John Smith & Sons of Derby and this was seemingly installed in 1904, the year being inscribed on the setting dial (Figs. 1 & 2). The adjacent name-plate on the clock, which gives the manufacturer's address as 'Midland Steam Clock Works, Derby', is a useful reminder of the type of technology that Smiths were then using to manufacture their clock mechanisms.

Fig. 1: St. Mary's Church, Chaddesden ~ Clock name-plate and setting dial

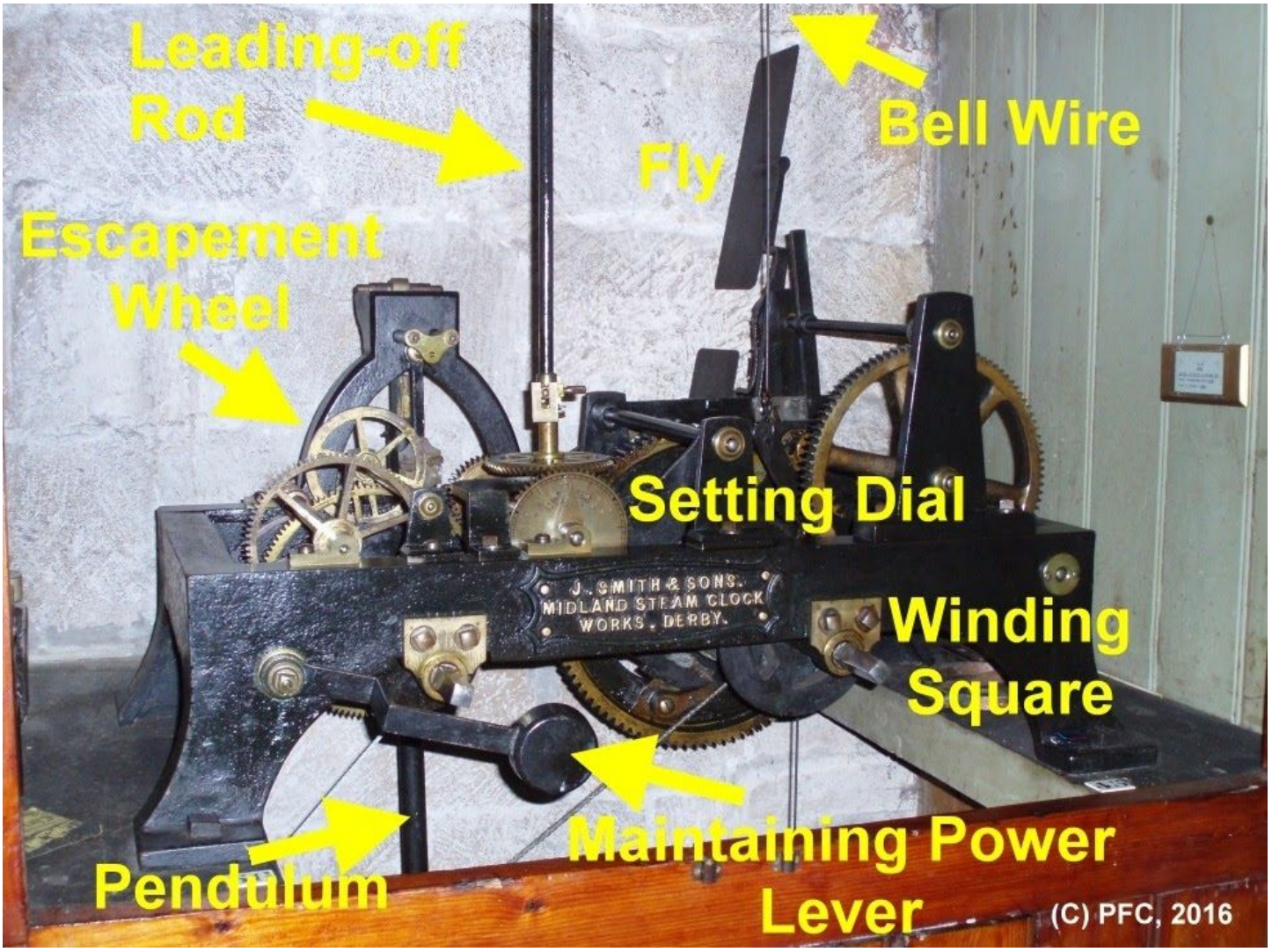

Fig. 2: St. Mary's Church, Chaddesden ~ The clock mechanism

Technically speaking, the clock in St. Mary's church tower, with a movement separate from the dials, is usually described as a 'turret-clock' [Note 2]. My own involvement with the clock goes back to September 1979 when I was asked if I would be willing to take on the duty of winding it each week. I said 'yes', little thinking that I would still be winding it until July 2017 when I eventually relinquished the job! To get to the clock mechanism it is first necessary to climb the 39 narrow and somewhat uneven steps in the spiral staircase (Fig. 3) which provides access to the ringing chamber on the first floor of the tower. For many years the only light in the stairway was supplied by four tiny, narrow windows, but thankfully electric light was installed in 2007.

Fig. 3: Looking down the spiral staircase

Once inside the ringing chamber, the clock mechanism can be seen over on the north wall, protected by a large cabinet of pitch pine some 7 feet tall (Fig. 4). A door at the bottom of the cabinet provides access to the pendulum.

Fig. 4: The large cabinet which protects the clock mechanism

Care has to be taken not to begin the winding process once the loud warning click has sounded about three minutes before the hour, for this means that the mechanism is preparing to strike. To wind the clock, a removable crank handle has to be applied to each of the two winding squares (Fig. 2) in turn to raise the two weights (formed of cylindrical blocks of stone attached to pulley wheels) a vertical distance of some 30 feet up from ground level just inside the main door of the church.

The smaller of the two weights powers the ‘going-train’, the assemblage of gears which drives the hands on the clock dials and requires 56 complete revolutions of the handle. Prior to winding the going train, the maintaining power lever has to be lifted up out of the way; as its name implies this device keeps the clock counting the time accurately while it is being wound and also ensures the escapement wheel (Figs. 2 & 7) is not damaged during the winding process.

The other, much heavier, weight (7 inches diameter, 33 inches long and surely in the region of 100 lbs) needs 45 revolutions of the handle to wind it fully and supplies the power for the ‘striking-train’ which operates the heavy hammer (Fig. 5) that strikes the hours on the largest of the church’s three bells up on the second floor of the tower – this hammer is activated by the bell wire that can be seen in Figs. 2 & 5. Back in the days when the church bells were rung, it was first essential to lift the hammer out of the way of the swinging bells by means of a special pull-off wire.

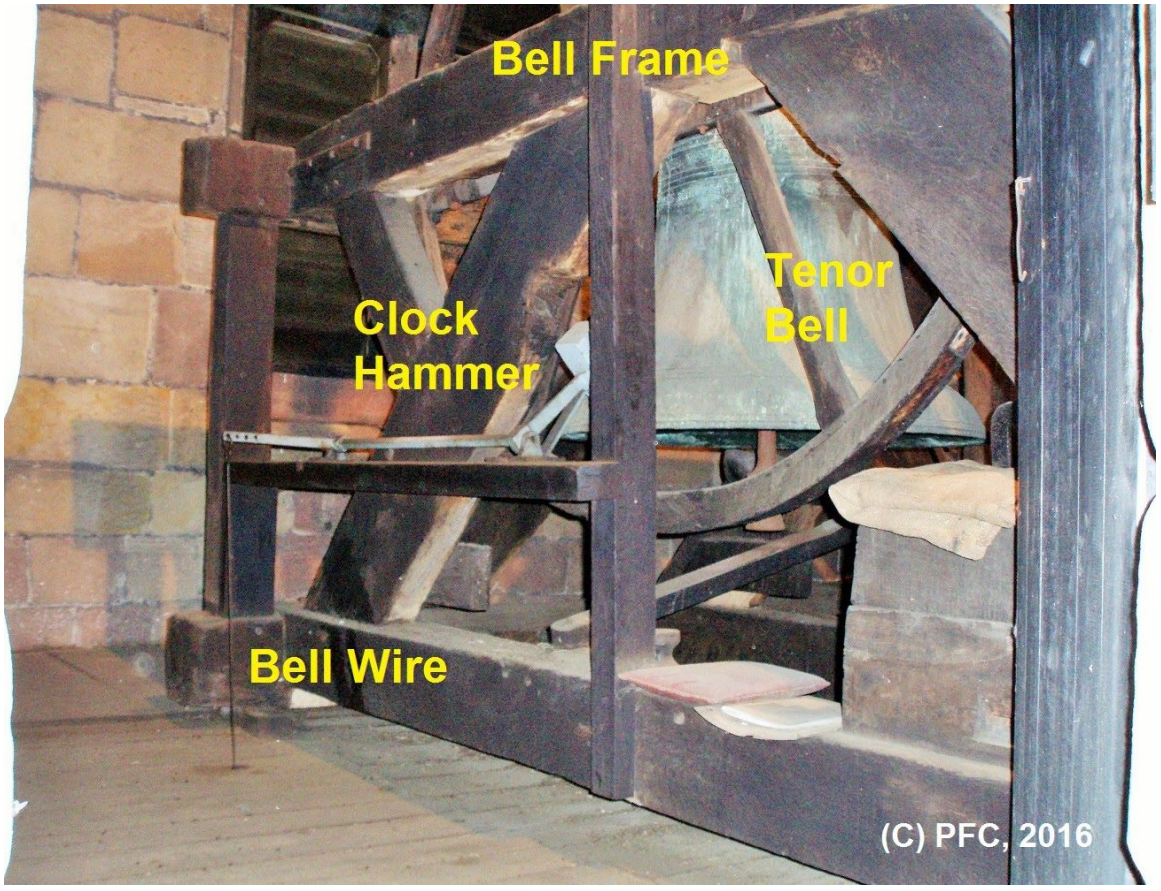

Fig. 5: The bell-chamber showing the bell-frame, clock hammer and bell

When the clock strikes the hours, the two fan blades of the fly (Fig. 2) spin round rapidly in order to control the actual speed of striking. I always tried to take great care to ensure that I did not over-wind the weights, since on the rare occasions when my concentration wandered, the pulley wheel of the weight invariably embedded itself in one of the ceiling joists from which it could then only be freed by much judicious hammering. For reasons of safety, the lowest part of the weights' travel is through a wooden chute constructed inside the church porch, thus ensuring that if a weight became detached from its wire it would (hopefully) not present a danger to anyone inside the church.

Fig. 6: The pendulum 'bob'

Perhaps the most essential part of the going train is the escapement wheel (Figs. 2 & 7) which rotates once every 80 seconds and is linked to the pendulum by means of the escapement, an ingenious device which performs two vital tasks, firstly it permits one tooth of the wheel to move forward ('escape') every time the pendulum swings; this movement is then transmitted to the centre wheel which turns once every hour; secondly the escapement gives the pendulum a little nudge to keep it swinging, thereby giving rise to the familiar 'tick-tock' sound in the process.

As Fig. 6 shows, the pendulum which is made of a long iron rod with a massive weight or 'bob' at the end can be seen by opening the bottom door in the clock cabinet.

Fig. 7: The escapement wheel as seen from the back of the clock cabinet

From the centre wheel located just behind the setting dial (Figs. 2 & 7) the leading-off rod rises vertically up to the ceiling of the ringing chamber, from where two tracks of gears and rods provide the means by which the hands are moved on the clock dials situated on the west and south faces of the church tower.

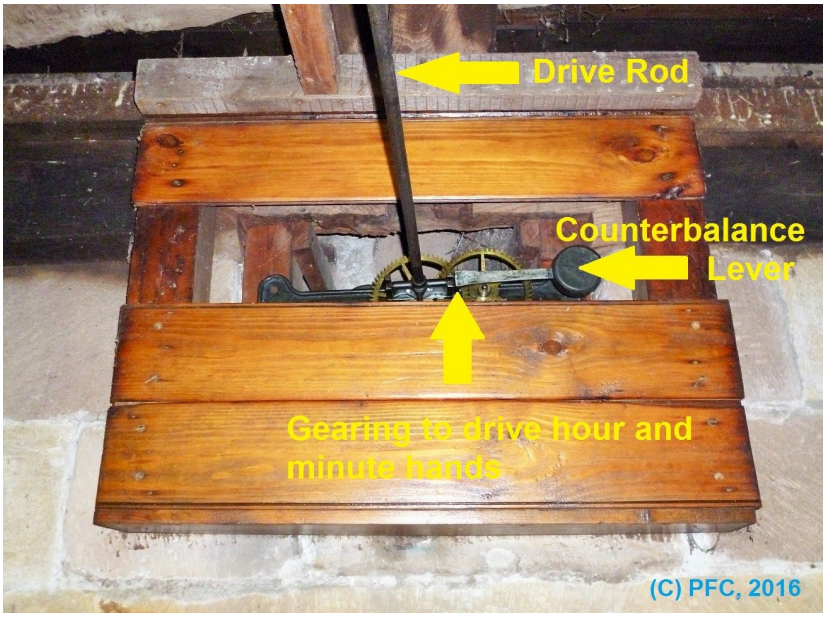

Fig. 8: Gears & counterbalance behind the clock dial

Although not apparent from the ground, the hands of the clock are quite sizable and are fitted with counterbalances (visible inside the ringing chamber) to provide stability (Fig. 8).

The clock keeps excellent time and typically only loses approximately 30 seconds or so a week under ordinary weather conditions. Fine adjustments to the time are made by two methods: if the clock is slow, the setting dial can be rotated forwards clockwise to the appropriate minute; however, if the clock is running fast, the mechanism cannot be moved backwards, so it is then necessary to halt the movement of the pendulum for the desired period of time. Unlike a conventional clock-face, the setting dial does not have any moving hands, just a single pointer for the minutes (Fig. 1), and so this

means the only way to know what hour the church clock dial is showing on the outside of the building is to visually check it before climbing up to wind the mechanism. Severe winds sometimes cause problems and I recall that on one particularly windy day the clock was blown more than 20 minutes off the correct time. Putting the clock one hour forward in spring is quite simple since all that needs to be done is to advance the setting dial through one full hour, however, things are rather more awkward in late autumn when the clocks change again. Unfortunately, as mentioned above, the mechanism cannot be reversed, so in order to turn the clock back it has to be either stopped for one hour and then restarted or, alternatively, advanced through 11 hours. Whenever possible I always tried to avoid the latter method, which was a tedious process involving the fiddly job of muffling the striking hammer on the bell.

When Rev. Arthur Ellerton left St. Mary's Church in 1906, Chaddesden was still a small village with a population of around 580 people. Little could he have foreseen that the church clock he commissioned in 1904 would still be ticking away and striking the hours to a greatly changed Chaddesden well over a century later!

NOTES:

1. A copy of the drawing may be seen in Cholerton, P. F., *The Church of St. Mary the Virgin, Chaddesden – A Guide and History*, Chaddesden, 1997, p.56.
2. C. McKay, *The Turret Clock Keeper's Handbook* (various editions, e.g. 1998 & 2013) is an excellent source of information on this type of clock mechanism.