HARK! THE HERAL

A 30-hour iron cl

The iron clock discussed here is typical of many of those made in the rural areas of southern Germany, the Austrian Tirol and the German-speaking region of Switzerland. It differs markedly from an English posted-frame 30-hour clock, with over 17 significant differences being noted. While clocks of this type are commonly found in these regions they are virtually unknown to British collectors and have never been considered in *Clocks* magazine before. It is these differences with English clocks that will be featured here.

The 11½in (292mm) wide iron dial is naïvely painted in yellow and black on a deep-blue ground, with scrolls in the corners and the date 1748 prominently displayed in the arch, **figure 1**. The date is very unusual, but appears to be original, though the dial has been cleaned and some minor damage restored. Many clocks of this type have smaller dials, sometimes only half this width, but while collectors now prefer small items it should be realised that at the time they were made 'bigger was beautiful'.

What seems odd to us is that the very sturdy iron minute hand is shorter than the hour hand and indicates against an inner circle marked only with quarter hours. This is seen on some clocks from the Alpine regions, while a common earlier alternative arrangement is a separate small minute ring below the hour ring, again marked only in quarters, and with a small minute hand. The alarm disc is a restoration, although the missing alarm mechanism has not been replaced. The movement is enclosed by sheet-iron doors and top and bottom plates to provide a box-like case, all painted with red iron oxide primer. A hanging hook and spikes are fixed to the back of the case.

The bob of the front-swinging ('cowtail') pendulum is in the form of an angel blowing a trumpet (hence the title of this article) and slides on its rod for rating, just held by friction and with no adjusting screw. This same Herald Angel design of bob has been seen on an iron clock with a different type of movement, as well as another clock with a Dove of Peace, so they were probably available from specialist suppliers for clockmakers to fit to their clocks at the request of the customer. Religious depictions often occur on clocks from areas with a Catholic population, this often taking the

Figure 1. The painted dial with the minute hand shorter than the hour hand and the pendulum bob in the form of a Herald Angel.

form of a painting of Mary and Child, a saint or just 'IHS' in the arch. The very muted Catholic symbolism here suggests that the owner was not particularly devout, but wanted to give the right impression when the local priest called. The commonest type of bob on these cowtail pendulums is a small brass disc, often decorated with turned circles.

The straight pillars of the movement are of square section, with the plates 5½in (140mm) wide by 4in (102mm) deep, held by nuts at the bottom, and similarly at the top with the addition of tubular spacers, **figures 4** to **9**. This allows the case top, to which the bell stand is fixed, to sit above the verge escapement. Recesses are cut in the front and rear edges of the plates to leave lugs or tenons which fit into slots near

D ANGEL SWINGS
lock dated 1748

Figure 2. Rear of dial and case showing the hanging hoop and spikes, with the bell fitted to the top of the case.

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the ends of the front and rear movement bars, and are held firmly by taper pins. This is significantly different to English, French or Dutch practice, where two round lugs filed into the ends of the bars fit into small holes, while wedges secure the bars at the top. The lower end of the centre bar is held in the 'English' manner, but its top is secured by the 'German' method.

The bars do not have the English style of horizontal arms for the hammer and strikework arbors, instead these components pivot in the pillars. French lantern clocks often use screw-in pivots at one end of the arbors, but the Germanic practice is to fit the pivots at both ends directly into the pillars. Hence the frame has to be dismantled for removal and assembly, although a slot in the top movement plate often allows the arbor of the strikework to be assembled more easily.

Similar movements to this made rather earlier have all the wheels made of iron, but by the middle of the eighteenth century brass wheels were usual, with the countwheel, fly and motionwork still being made of iron. The pivots run in brass bushes in the iron plates. The pinions of report are separate, not four prongs filed into the greatwheel arbors as was the earlier practice. The going train is shown in **figure 10**, together with the verge pendulum and pallets. The wheel counts are shown in the panel above.

WHEEL COUNT

Going train

Crownwheel	17	6
Contrate wheel	48	6
Second wheel	48	8
Greatwheel	64	8
Hour wheel	48	
Minute pinion	18	
Intermediate wheel	36	

The calculated beat is 0.436 seconds with a theoretical pendulum length of 6.7in (170mm). The layout of the verge escapement is clearly shown in **figures 7** to **8** and is of a distinctive South German construction.

A separate horizontal iron bar, **figure 9**, is held firmly on tenons formed from vertical extensions of the front and rear movement bars. Underneath is a top support for the crownwheel arbor together with front and rear supports for the pallet arbor. Since the pendulum swings in front of the dial it must avoid the hands, so the extended front of the horizontal bar narrows down and the dial can fit over it with the front verge support being removable. The pallet arbor is pivoted by quite a different method to that found on clocks from further west, such as northern Italy and France, where separate curved pallet cocks are screwed to the top plate, giving some degree of adjustment of the escapement.

The winding click is not the brutal English type (also used on some French posted-frame clocks) but a small click riveted to the greatwheel that acts on ratchet teeth filed into the thicker inner edge of each pulley. There is a completely different system of rope drive to that on English and French clocks—the sloping inner sides of the pulleys are serrated so that a hard braided rope jams in the tapered gap and there are no spikes. Provided that there are counterweights, this seemingly basic system is very reliable, and avoids problems of the movement filling with fluff from soft cotton ropes being damaged by sharp spikes. There are separate weights for each train.

Another almost obligatory requirement of British pull-wind clocks is the use of a single weight on the Huygens' loop system. Once this had been invented in the Netherlands, separate weights were abandoned and many lantern clocks were unnecessarily butchered to make use of its dubious 'advantages'.

There is no increase in duration (unless striking is disabled) and the same effort is necessary to pull up one heavy weight as two light ones. The clockmaker just avoided making one extra click. Admittedly the single weight does provide maintaining power, but this is of little benefit on clocks like these. Some French lantern clocks used separate weights into the eighteenth century, while others have separate winding clicks (so presumably separate ropes were used) with *both* weights on the same side. Having used both systems for some time now I can confirm that there is little advantage in having a single weight.

Turning to the striking side of this clock there are more fundamental differences

WHEEL COUNT

Striking train

Fly	6	
Locking wheel	54	6
Second wheel	60	10
Greatwheel	60	8
(12 hammer pins)		
Countwheel	54	

to note. The wheel count of the striking train, **figure 11**, is shown in the panel above.

Striking is let off by a nag's head, as usually found on Germanic clocks. A single arbor carries the lifting piece with a spring-loaded tip, while different steps on the locking detent also act as the countwheel detent and the overlift detent, **figure 13**. Overlift is provided by a

Figure 3. Front view with the dial removed.

Figure 6. Rear of the movement showing the method of securing the movement bars.

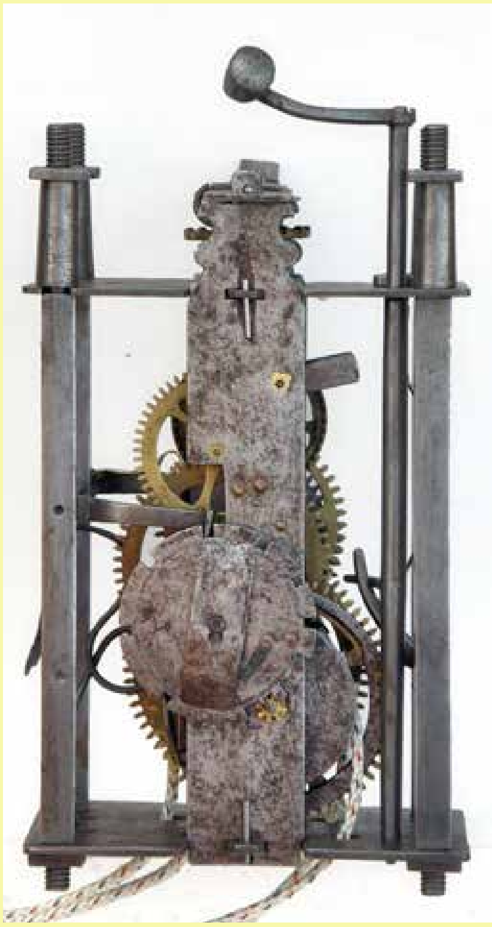

Figure 7. Right-hand side showing the single arbor for the strikework and the large decorative trip lever.

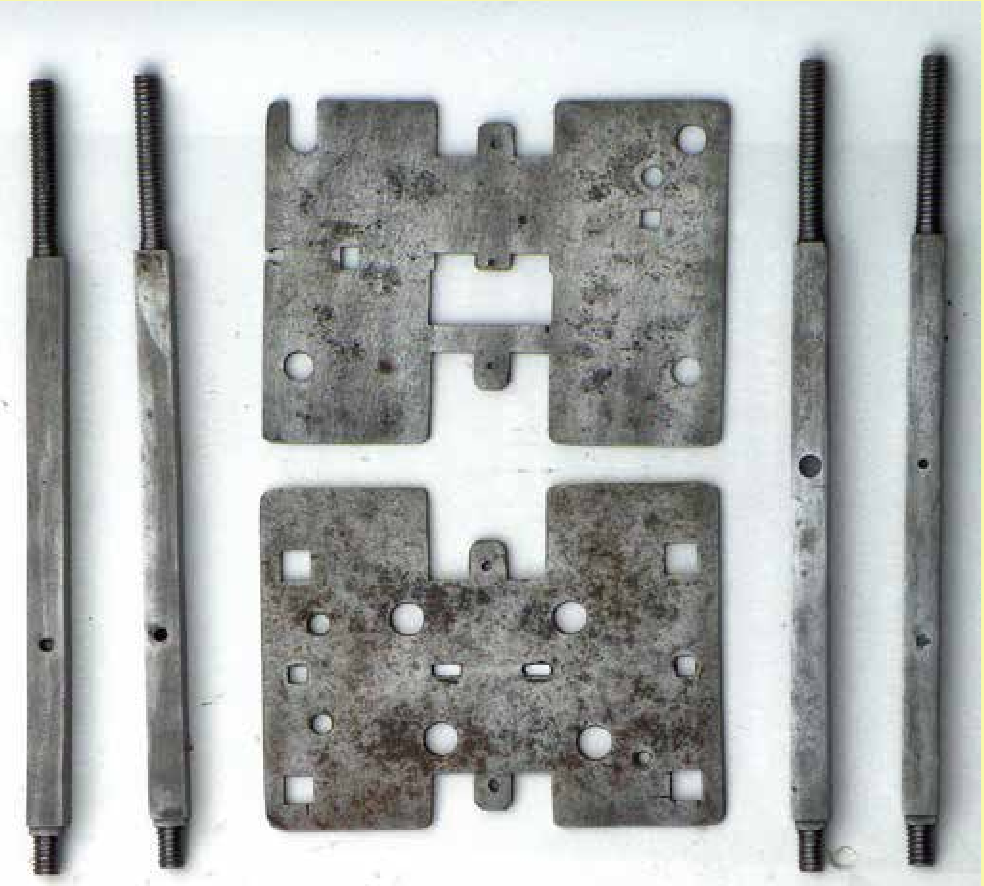

Figure 4. Top and bottom plates and corner pillars. Note the lugs that fit into slots in the movement bars.

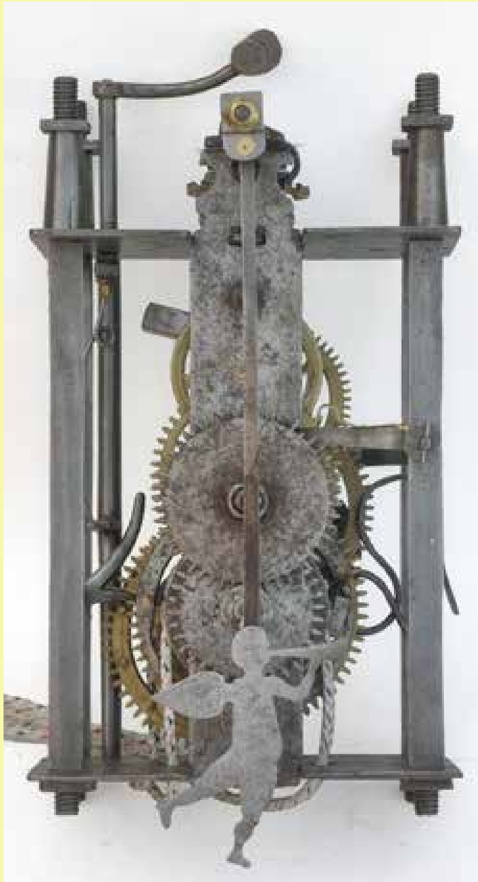

Figure 5. Movement from the front showing the vertical hammer shaft.

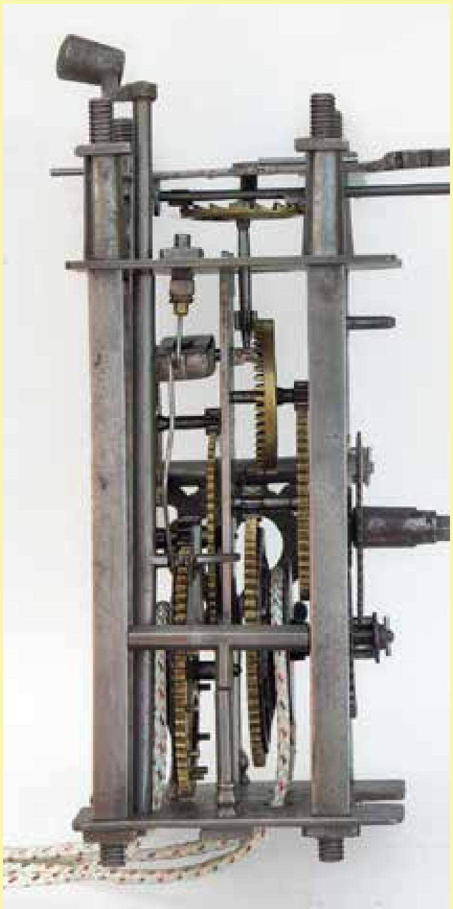

Figure 8. Movement from the left showing the verge escapement.

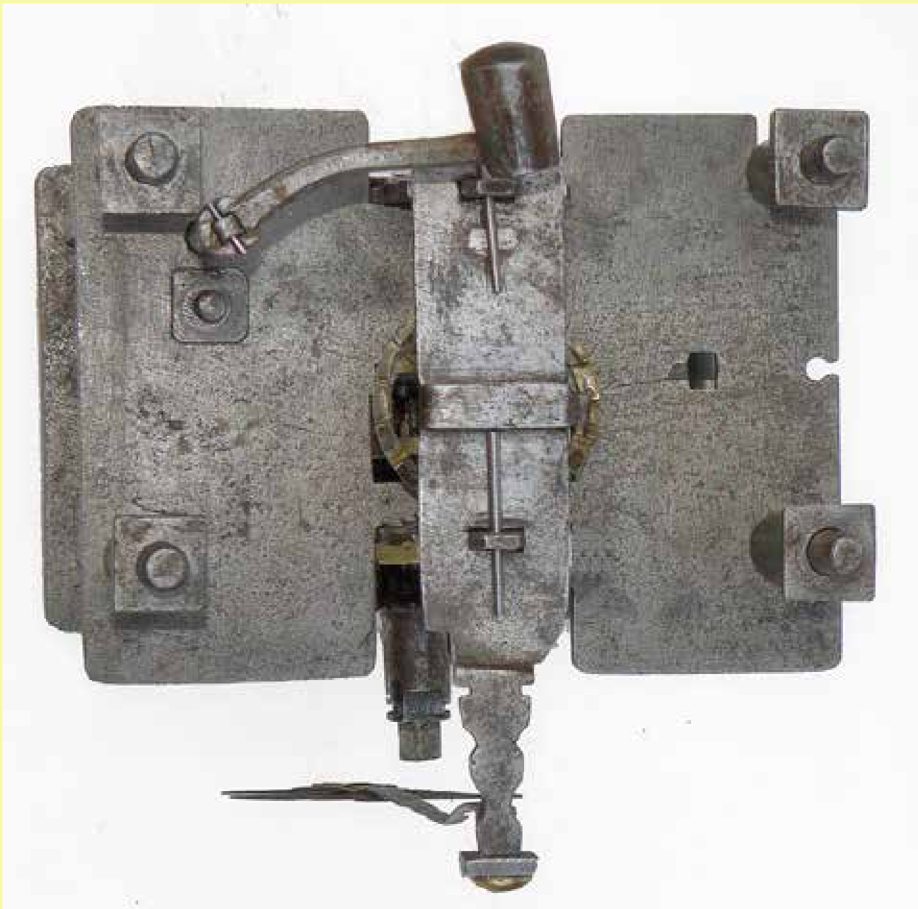

Figure 9. Top view showing the hammer and the top bar that supports the verge and the upper end of the crownwheel.

'double heart' cam on the second wheel, there being no warning. Locking is on the third wheel, while the fly is very thick and heavy. A large decoratively shaped spring-loaded trip lever allows manual let-off to synchronise the strike with the indicated hour. The hammer tail, on a horizontal arbor, is tripped by the usual pins on the greatwheel, but they rotate a vertical hammer shaft, via a curved link, to strike the inside of the bell.

Most readers of *Clocks* magazine are unlikely to be familiar with this type of striking system which, apart from being used on the earliest turret clocks, is virtually unknown in Britain, hence an explanation is necessary. So that striking performs satisfactorily there has to be a time delay of a few minutes between the start of lifting and the actual strike.

The system that most of us are familiar with uses warning to provide this time delay, with four detents located on two separate arbors. This method was first described by Leonardo de Vinci about 1495, but *not* invented by him. Before this time all four detents were on one arbor and were lifted and fell together. The detents on a clock with nag's head striking perform similar task to their warning equivalents, though the warn detent now provides overlift.

Essential to the correct operation of the system is a pivoted tip to the lifting piece, **figure 13**. In English this is known as the nag's head (referring to an old horse, not a crone), in Dutch as a deer's or goat's foot and in German as a stork's beak, sometimes a pelican's beak. The French apparently do not have a special term, simply calling it a 'swinging tip'. When these terms were introduced—and by whom—is not known, but the Germans in particular are very fond of calling clock parts by descriptive names. Also necessary is a good deal of free play on the nag's head.

The sequence is as follows: the lifting pin contacts the nag's head and once the free play is taken up the locking detent rises until the train is released and striking commences. Left to its own devices the bell would continue sounding without any control being possible. This is where overlift comes into play. As soon as the wheels start to turn a cam on the next arbor up from the locking wheel raises the overlift detent—and hence the nag's head—clear of the lifting pin so that when it drops down again the pivoted part swings back and it is now ready for the next sequence.

There are three different methods of raising the overlift detent: the hammer lifting pins (an early method), a slope on the locking face of a clock with hoop locking (used on French and Flemish clocks) and a cam with either one or two notches (used by the Dutch and the Germans, the latter calling it a simple or a double 'heart'—another example of their love of special terms). The higher up the train overlift is initiated the better, so a heart cam is better than a hoop, which is better than using the hammer pins.

The components of the strikework, including the hammer are shown in **figure 12**. The hammer shaft is pivoted vertically between the top and bottom plates, with a separate hammer tail pivoted horizontally between the left-hand corner posts. It operates in a similar manner to that on French carriage clocks and was used so that the shaft did not need to swing back outside the tightly-fitting case, nor swing inwards and hit the arbors or the fly. The single arbor of the strikework is dominated by the large decorative lever to reset the strike to the correct sequence.

There appears to be one arm at the front carrying the nag's head, with just one detent at the rear. In fact the rear arm combines three functions: locking against the end face, with one step of the detent riding on the edge of the overlift cam and another step acting as a countwheel detent. Locking can only occur when the detents fall into the notches of both the heart cam *and* the countwheel, and just as the wheels of warned striking have to be correctly positioned, the same is true for warnless striking and there are usually marks to ensure correct meshing of the wheels and pinions.

All this might seem rather complex, but it is actually very simple. Further articles are planned discussing clocks with this type of striking, but the description here will not be repeated every time. Those interested in seeing diagrams and photographs can read more in the November 2011 issue of *Horological Journal*.

This type of iron-framed clock is found throughout Central Europe and if you ever get the chance to take a peek at the movement of an early Renaissance clock in a fine gilt brass case, many construction features will be seen that are similar to those show here. Do not expect to see gilt brass wheels, but be prepared for forged ironwork and wheels. Comparisons have been made in this article to some of the major differences with English clocks, but there are many others that have not been mentioned. A more detailed comparison between this movement and an English 30-hour longcase posted-frame clock—this being the most comparable type—is given in the accompanying chart. This shows that while the basic concepts are similar, there are many detailed differences.

Readers wishing to read more about nag's head striking can receive a PDF computer file of the *Horological Journal* article by sending an email to the address at the beginning of this article.

Figure 10. The brass wheels of the going train, the iron

Figure 12. The components of the strikework, all of iron apart from the brass return spring of the nag's head.

n motionwork and verge pallets.

Figure 13. The front arm carries the nag's head, while the rear combines locking, overlift and the countwheel detent

Figure 11. The brass wheels of the striking train, the iron countwheel and its gear wheel, and the very thick iron fly.

Posted-frame clocks compared

	South German	English thirty-hour
Frame	forged iron	cast brass
Pillars	screwed	riveted
Movement bars	iron, straight	cast brass, cruciform
Escapement	verge	anchor
Pendulum	short, light cowtail	long, heavy
Movement bar fixings	mortice and tenon	lug and wedge
Dial	painted iron	brass + chapter ring
Hands	minute short	minute long
Winding clicks	teeth on pulleys	greatwheel crossings
Pulleys	serrated V-section	spikes
Rope	hard, jamming in V	soft, pierced by spikes
Weights	separate for time and strike	single with Huygens' loop
Striking	warnless with nag's head	warning
Strikework	single arbor, pivots in pillars	two arbors, pivot in side arms
Locking	pin on third wheel	hoop (usual) on second wheel
Hammer arbor	vertical, separate hammer tail	horizontal, integral tail
Hour, minute and count wheels	iron (others brass)	all wheels brass