Restoration of a Jack

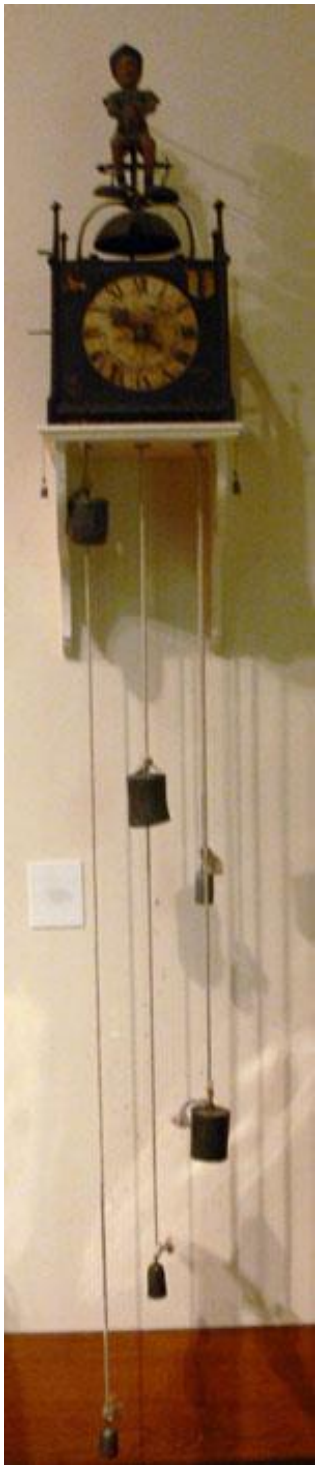
Kenneth Chapelle restored a 16th century Jack clock for the keepers of the Burrell Collection in Glasgow. Here he gives details of several important questions raised by the restoration.

As far as I am aware, the Jack clock currently on display at the Burrell Collection, Pollok Park, Glasgow, is quite unique in that in addition to hammering the hour bell with his arms, the Jack kicks the quarter bells with his heels giving a visual attraction to the familiar ting-tang effect.

The clock is probably German, dating from around 1560, with a posted iron frame and three trains for gong, quarter chime and hour strike. The latter tow trains are released by a 'stag's head', and are controlled by a count-wheel. The pendulum added at a later date, swings at the side of the clock. The trains are weight driven, and the dial has a single hour hand. The dial bears the crest of the Avery Family of Tillingly in Warwickshire, as well as the more familiar scythe and hour glass.

The clock is illustrated in Brittain's Old Clocks and Watches and Their Makers where it is incorrectly described as portable, and also featured in the December 1982 edition of Clocks.

In 1982, I was asked by the keeper of The Burrell Collection to restore the Jack clock to lull working order. The clock was ready for the museum opening in March 1983, and has proved to be of great interest to the public.



The restoration of the clock raised, as I see it, several points of interest and debate. These were as follows:

Should a clock of this age be kept running? It cannot be denied that moving parts do wear, and the wear of the pinions in particular means that there is considerable engaging friction. There is also the visual effect of a room full of clocks all swinging pendulums can be a bit much, especially around noon.

It was interesting to note on a recent tour round German clock museums that only a very few of the clocks on display were kept running. At the Burrell however the clock is located in the Elizabethan Room, and is kept running. It is true to say that it is the only item in the Burrell which moves, and, as mentioned earlier as it chimes the quarters by a visual swing of leg (with not a little whirring culminating in a ting-tang) the clock has proved to be a great crowd puller. At present there is only one other clock in display.

Should the clock be reconverted from anchor recoil to pendulum to verge and foloit escapement? In my opinion, the conversion of escapement was quite early - possibly over 250 years ago. To restore it to the original would have meant making up a new foliot, crown wheel, contrate wheel, suspension bracket, bottom potence and so on, and would therefore mean that a substantial part of the clock would be manufactured in the 1980s. I regard the shape of the pallets and sold brass escape wheel as early and as part of the history of the clock, and therefore worthy of retention. What I did do in fact was to reface the pallets, hard solder the pendulum crutch in position, make up a new pendulum and suspension, and was pleasantly surprised when the clock kept very good time. A train count revealed the following:

	teeth / leaves
Great wheel	64
Second wheel	54 / 8
Escape wheel	24 / 6

It can therefore be calculated that the clock will beat:

$$\frac{64 \times 54 \times 2}{8 \times 6}$$

= 3456 per hour
57.6 per minutes
0.96 per second

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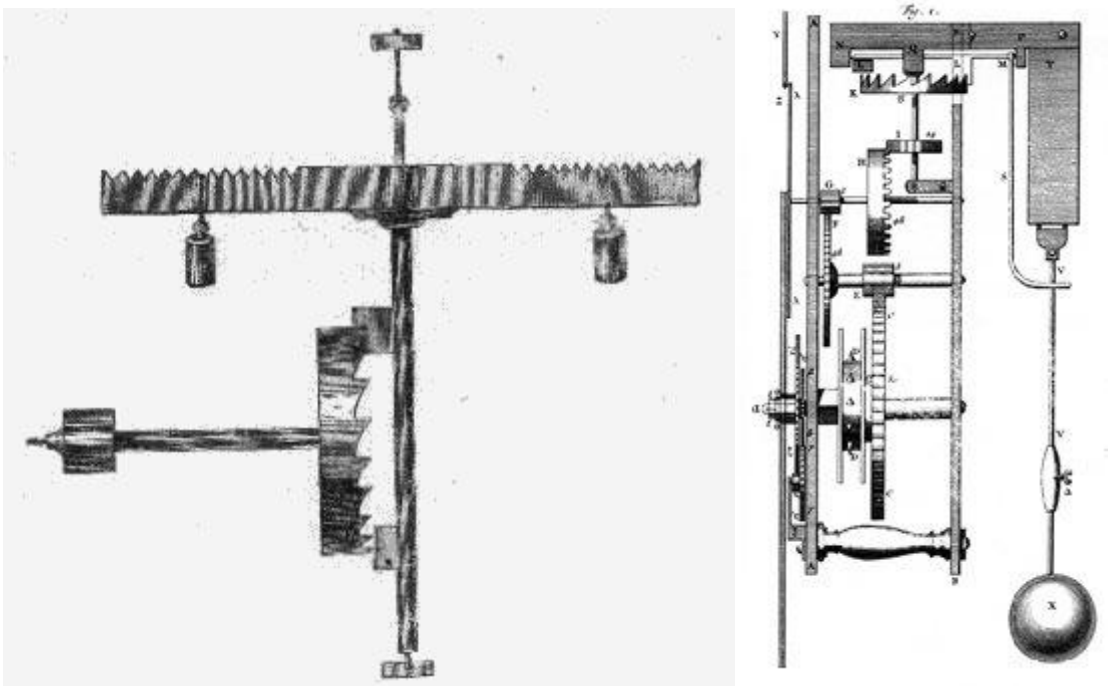
The problems of wear: It has already been stated that there is considerable wear in the pinions. I did have to resort to reforming some of the teeth on the great wheel of the going train to make the clock run. Virtually every wheel performs a secondary function such as releasing or locking trains and it was not therefore possible to utilise unworn working surfaces by moving a wheel or pinion, or even turning a wheel round without substantially altering the nature of the clock. As it is the clock is running in spite of the wear, with only the pivots having been polished, and pivot holes bushed.

I suppose there must come a time when some museum administrator will have to make the decision to leave the clock stopped as to have the clock running will mean too much of the original is lost. In view of the clock's popularity and unique visual attraction, that will not be an easy decision to make.

What is Verge and Foliot escapement?



Verge and foliot escapement from De Vick clock, built Paris, 1379, by Henri de Vick. From Pierre Dubois, Historie de l' Horlogerie 1849

One of the first verge pendulum clocks built by Christian Huygens, inventor of the pendulum. From Opera Varia,vol.1 1724. In a pendulum clock, the verge escapement is turned 90 degrees so that the crown wheel faces up.

The verge escapement consists of a wheel shaped like a crown, with sawtooth-shaped teeth protruding from the front. In front of it is a vertical rod, the verge, with two metal plates, the pallets, that engage the teeth at opposite sides of the crown wheel. The foliot (or the pendulum) is attached to the verge. The pallets are positioned so only one catches the teeth at a time. As the clock's gears turn the crown wheel, it pushes the first pallet, rotating the verge one way, until the tooth drops off the pallet and a tooth on the wheel's opposite side catches the second pallet, turning the verge back the other way, and the cycle repeats. The result is to change the rotary motion of the wheel to an oscillating motion of the foliot. Each stroke of the foliot or pendulum thus advances the wheel train of the clock, moving the hands forward at a constant rate.