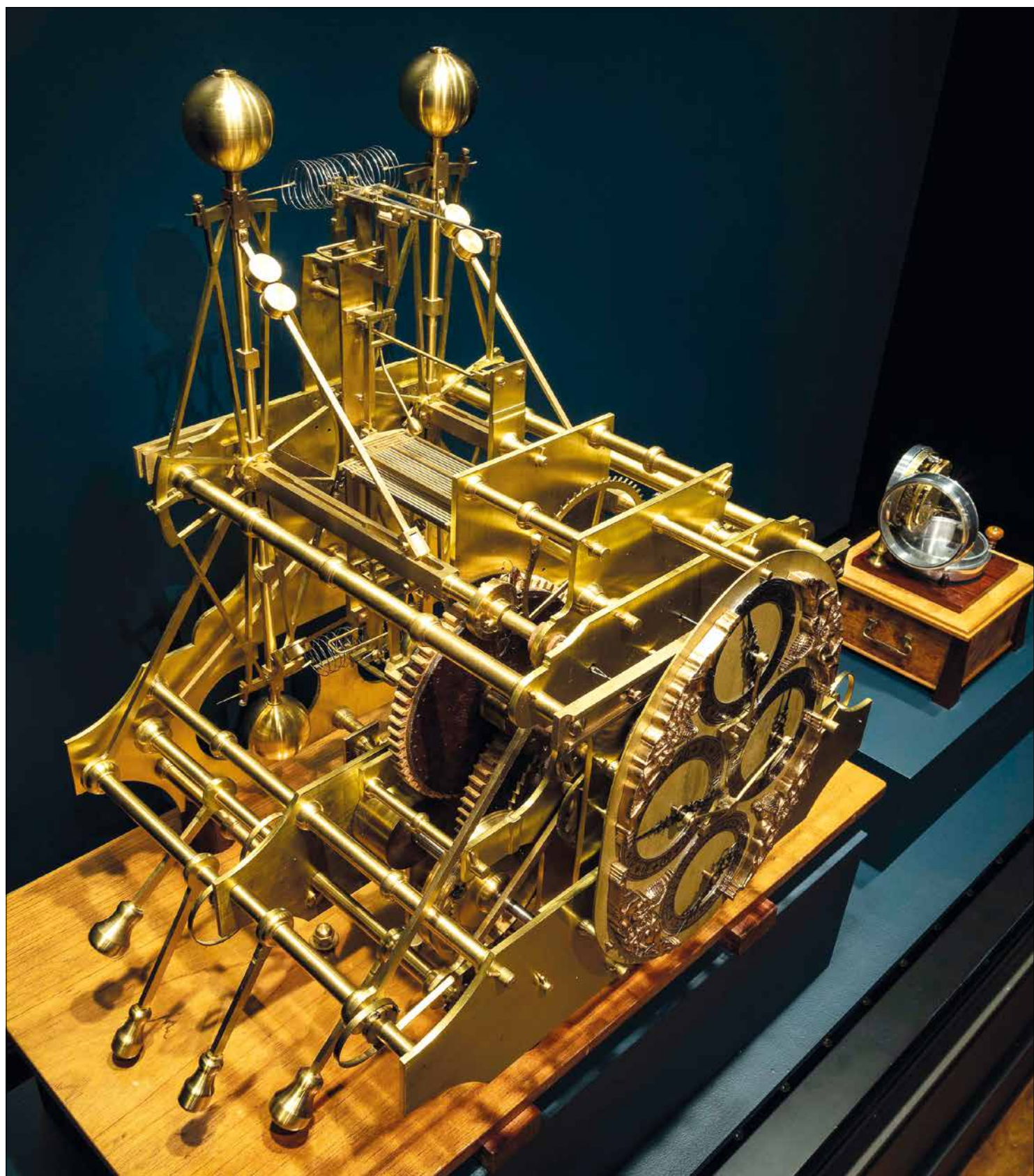


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Forming Holes in Suspension Springs

Best Practical Methods

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Quite recently, the pendulum suspension spring in the church clock in my village of Lurgashall in Chichester, West Sussex, broke and I was invited to attend to the matter.

Despite the enormous weight which these springs carry in the case of turret clocks, a breakage is a comparatively rare occurrence, provided the spring is not subjected to careless handling in the form of twisting. If it is necessary to adjust the rating nut, the bob itself must be firmly held by an assistant to prevent this happening.

Fortunately, in the case of Lurgashall the pendulum had to fall only a few inches to the floor of the clock room and as the crutch pins are spring-loaded, no damage was caused to this component by the breakage.

The broken suspension spring is illustrated at the bottom of **Figure 1** and, as can be seen, contains a number of fixing holes. The thickness of the spring strip measured 0.015 inches and the width 1 1/4 inches. Spring steel strip is readily available, but may be difficult to obtain in short lengths such as this.

Forming the Holes

There are various ways of doing this.

I have frequently read of the method whereby the spring is dented with a centre punch and then turned the other way up so that the pip can be filed away, which will produce a hole; it will, however, be ragged and I don't recommend this procedure. It is not easy to drill the hole and if this method is used then great care must be taken to see that the spring is properly clamped for the drilling operation with a firm backing underneath and preferably a locating jig of some sort to steady the drill initially.

The simplest and best method of making holes in springs is to punch them. This process can be applied to any normal size of suspension spring and the simple tools can be quickly made in the small workshop. However, the holding jigs and punches illustrated in **Figure 2** have all been made by the author over a period of years and proved perfectly satisfactory.

As can be seen, the holding jigs for the spring can be made by bending 1/32 inch brass strip into a tight 'U' bend and then drilling a hole through it to the required size. The punches are turned from silver steel and can be given a slight back taper as depicted in **Figure 3**. They are then hardened right out and tempered to 'dark straw'. The sizes in **Figure 2** range from 1mm up to 9/32 inch which is the large one at the back in this illustration. It was made from a discarded worm drive taken from a small turret clock movement driven by a synchronous motor. The worm had worn out and I had to machine a new one so I converted the old one into a hole punch.

In use, the spring is slipped between the tight bend of the brass strip and centralised so that the hole is formed in the

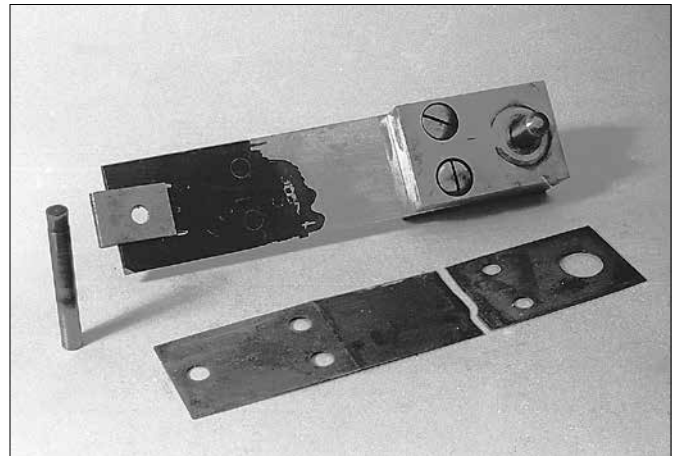


Figure 1. The broken suspension spring (below) and the new spring secured in the top block, with one of the hole punches and holding jigs.

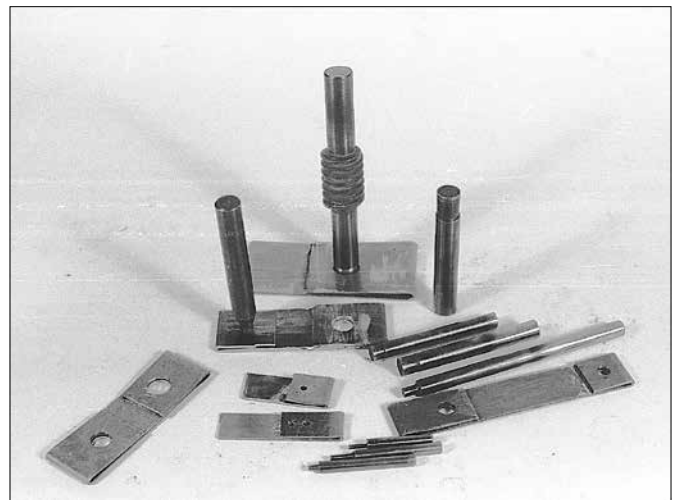


Figure 2. A group of hole punches and holding jigs from the author's workshop.

correct position and then placed on a solid steel stake. The punch is struck with a hammer, and in the larger sizes the hammer head can be 3/4 lb weight. The neat discs of metal removed in this operation can be seen in **Figure 4**. The set-up for punching one of the holes in this particular suspension spring is shown in **Figure 5**. The large hole, which is some 1/2 inch in diameter, was formed by punching initially and then enlarged by filing.

A further example of the jig and punch in use is given in

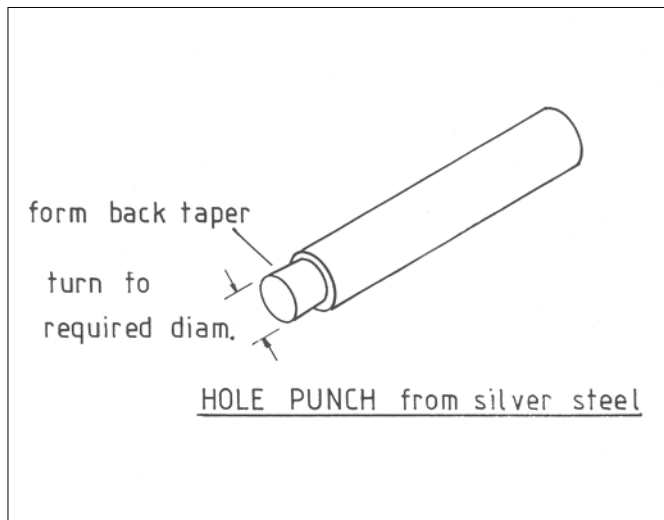


Figure 3. The punches are turned from silver steel and can be given a slight back taper as depicted here.

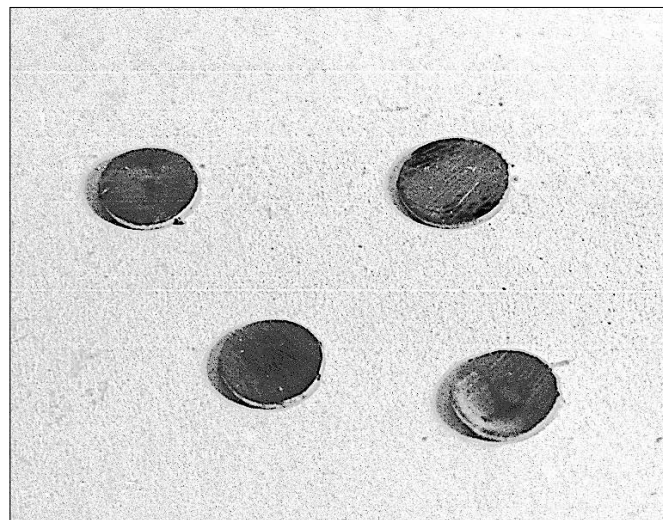


Figure 4. The neat discs of spring removed by the punch.

Figure 1. If the strip has to be cut with tin snips as mine did, the edge can be finally sized on the belt finisher.

The spring, together with the securing screws, should be well greased before assembly and when the pendulum is ready for rehanging, great care must be taken to ensure that the spring is not damaged during the process. The bob may weigh 1 1/2 cwt (76 kg) or even more and an assistant will be needed to take the weight while the cross-pin in the top block is lowered carefully into the vee notches on the suspension post.

Regulation will almost certainly be required as it is most unlikely that the new exposed length of spring between the top and bottom blocks will be exactly the same as before. As already mentioned, with a bob of this weight an assistant will be required to hold the bob firmly while the rating nut is turned. The clock should be brought to a slight losing rate and the final regulation carried out by the addition of small weights on the bob. This particular clock at Lurgashall has a number of U-shaped lead shims which locate round the pendulum rod on top of the bob.

While in the clock room, I noticed other matters requiring attention. The chimes had been silenced because, as I found out, the bell crank levers had jammed due to lack of lubrication. General lubrication and maintenance of the

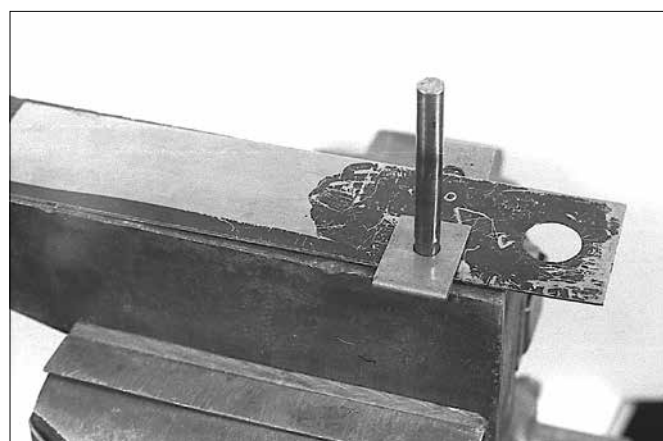


Figure 5. The set-up for punching one of the holes in this spring.

movement was overdue and at my suggestion, a working party is to be organised to remedy all these matters. I have described this work in my book *Notes on Tower Clocks*. This is available from my publisher, Rite Time Publishing, on sales@ritetimepublishing.com

Sadly, John Wilding passed away as the *HJ* went to press. We are glad to have been able to publish this article of his, and we send our condolences to his family and friends. A tribute will appear in a forthcoming issue.