

# GOD SAVE THE KING

## THE AUTOMATON SHIP AND SILVER SHAGREEN CASE

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*The West Dean College Conservation of Clocks and Related Dynamic Objects Department received a small musical automaton movement for conservation work in October 2011. The owner requested a case be made for it and the mechanism be restored to working order. Consultation with English and European conservators, museums and collectors, and a literature review, revealed no knowledge of any other object of this type.*



Fig. 1. The mechanism as received

The small mechanism (Fig. 1) controls a three dimensional nautical scene containing a gilt lighthouse set on cliffs of green and brown painted wood, and a gilded ship resting on a painted sea in front of the cliffs. The ship rocks to and fro, as though in a storm, while a tune plays on a plucked comb.

It's likely that the mechanism can be dated by the music component, which appears to have been made between 1810 and 1815. This type of mechanism preceded the more compact flat disc and individual tooth comb arrangement used in pocket watches.<sup>1</sup>

The musical component of the mechanism was not in operational order. There were many compounding faults that resulted in a lack of resonance from the comb when plucked by the pins on the musical barrel. The movement was previously separated from its case and no records remain of its former arrangement. Therefore, the design and construction of a case for the mechanism could not be guided by other examples. After discussions with the owner, silversmith John Norgate, and clocks department tutor Matthew Read, a case was designed to suit the period during which the object was made, as well as the needs of the owner. It would be made of silver, in a size and shape comfortable for one's pocket.

Restoring the mechanism to working order was by far the most challenging aspect of the project, and discussion with assistant clocks tutor Malcolm Archer aided in the development of a plan for conservation treatment. The movement has four cylindrical pinned pillars and rectangular brass plates that enclose a five-

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1. J. and H. Hoke, *Music Boxes their Charm and Lure* (Hawthorne Books, New York, 1957), pp. 15-30.

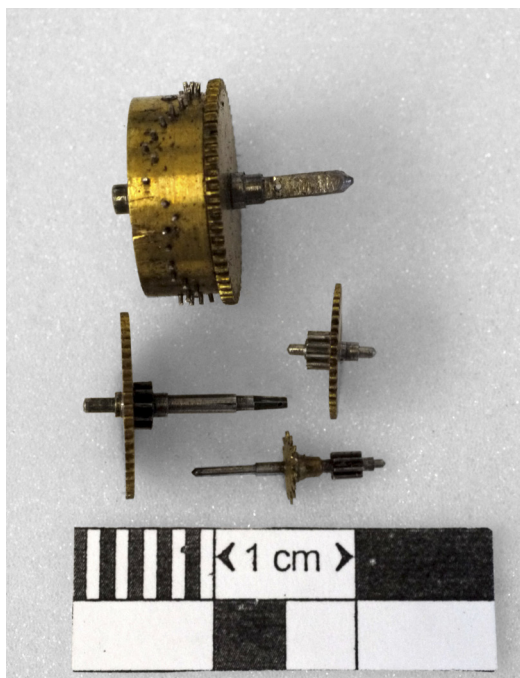


Fig. 2. The train

Train Count	Teeth	Pinion Leaves
Barrel	50	
Intermediate wheel	50	10
Second intermediate wheel	40	10
Worm gear	16	8

component train, governed by a fly and worm gear (Fig. 2 and table).

Recesses for the gear train and oil sinks are reminiscent of those seen in watch manufacture. There is a series of plugged and empty holes, indicating that the plates may have been adapted from an earlier purpose, or perhaps that things were moved around (Figs 3 and 4).

Among the many faults in the mechanism, the mainspring was slipping inside the barrel, and the hook had to be filed away underneath to provide a surface on which the eye could catch. The barrel cap and body, as well as the top and bottom barrel main plate bearings, were worn, making the barrel run out of true. This caused a misalignment between the music pins on the barrel and the teeth of the comb.

Tolerances for the barrel, due to the position of the pins in relation to the comb, are very small. After the barrel and bearings were bushed (Fig. 5), the position of the comb had not



Fig. 3. Plugged holes

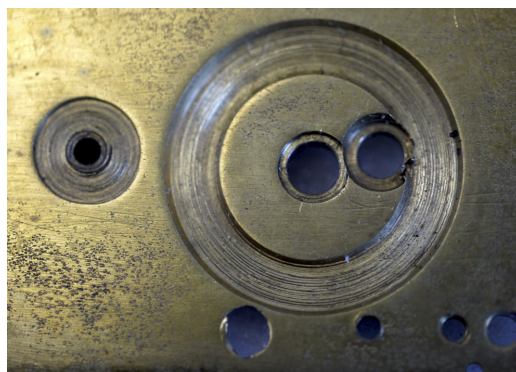


Fig. 4. Watch work recess



Fig. 5. Barrel bushing

improved enough for the pins to run in line with the comb teeth. The comb did not sit flat, but at an angle. Minimal material was removed from the base block by filing it flat and a brass spacer was made to raise the comb teeth level with the pins.

Further problems with the music component included the fact that the comb had lost its resonance due to two teeth rubbing at the base. The tone of each was restored by the fractional removal of material at the base of the two teeth. The comb was tested for resonance separate from the mechanism and each note rang out clearly, but the comb remained silent when plucked by the barrel. This could have been the result of numerous factors such as the angle at which

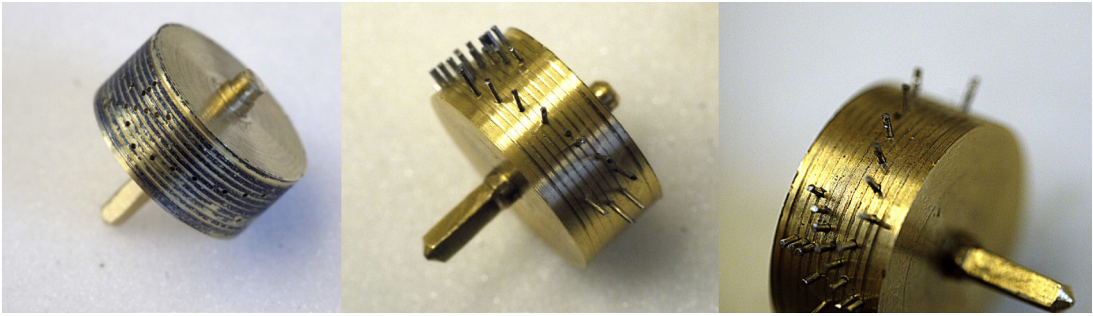


Fig. 6. Test barrel

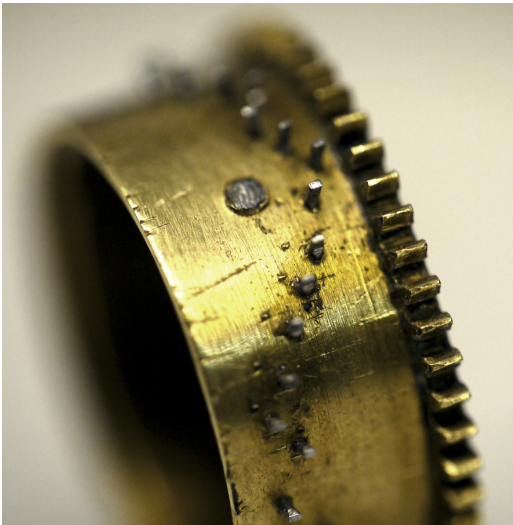


Fig. 7. Pins filed

the pins on the barrel engaged the comb, or the shape and height of the pins. A test barrel was made with different types of pins, varying in height, angle, and shape. (Fig. 6)

When the test barrel was placed into the mechanism, a set of long, flat-topped pins played most clearly and resonantly by comparison with others that were tested. In light of this, repinning the barrel was considered, but the risk seemed too high to justify the procedure, and plans to make a new barrel developed. A music map of the tune was prepared and, entering the map into a music-making programme along with the specific tones of the comb, the tune on the barrel was revealed to be 'God Save the King'.

If the mechanism were made during the reign of George III, a version of the tune from that period would be necessary for verification. As each monarch came to power small variations

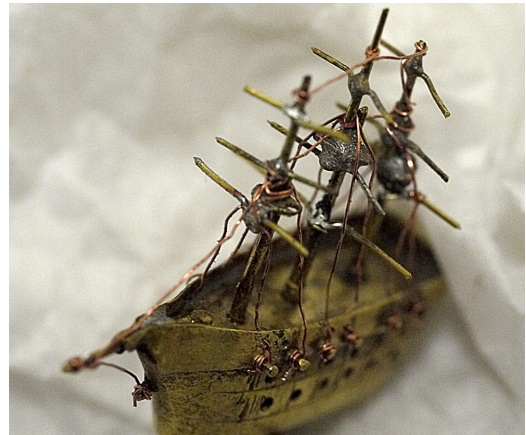


Fig. 8. Repaired rigging and mast

in the melody were made, such as an added harmonic note, or a momentary tempo change.<sup>2</sup> A copy of an original 1810 manuscript of the song from the British Library was obtained and the tune and date of make were confirmed. The subtle changes in the tune from 1810 were present in the rendition programmed on the music barrel. The importance of the music barrel and the rarity of the object were reinforced by this discovery and a last effort to preserve the original barrel and restore it to working order was made. Each pin profile was carefully filed with an angled relief, just the same as the pins made for the test barrel (Fig. 7).

This was successful and a faint tune was finally achieved from the barrel, so it was left intact and a new barrel was not made. The replacement of a missing pin on the barrel with steel guitar string wire restored the tune to full working order.

After other issues in the mechanism were resolved, elements of the scene were repaired.

2. P. Scholes, *God save the Queen! : the history and romance of the world's first national anthem* (Oxford University Press: London, 1954).



Fig. 9. The ship after restoration.



Fig. 10. The sea underneath



Fig. 11. New sea

Sections of the masts and wire rigging on the ship were missing, so brass wire was drawn down to the appropriate size in order to replace the missing masts. The wire rigging was then redone with fine copper wire. The ship, new masts, and rigging were gilded (Figs 8 and 9).

Half of the original sea material was missing, having been comprised of isinglass, dried fish bladder that is used for a variety of purposes

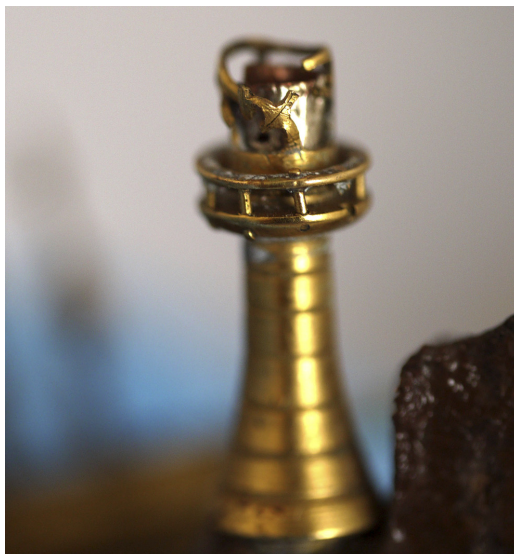


Fig. 12. Lighthouse foil and break



Fig 13. Lighthouse and top

including confectionary and brewing. This was replaced with new isinglass and painted to resemble the sea from a traditional ship in a bottle. Techniques were borrowed from art conservation practice and Paraloid B-72 Retouching Gels<sup>3</sup> were used to paint the new isinglass sea. The B-72 based paint is removable with acetone and should not affect the brass over time on which the sea is secured (Figs. 10 and 11).

3. For further information on B-72 Retouching Gels: <http://www.artcare.org/> [Accessed 10 July 2012].



Fig. 14. Retouching the cliffs



Fig. 15. Lighthouse and cliffs after restoration

The fine gold fretwork on the lighthouse was straightened, as much of it had caved in and a replacement top for the lighthouse was turned from brass to match designs of the period. The fine silver foil that gives the lighthouse the effect of luminosity was reinserted under the fretwork. Both the new top and lighthouse were gilded (Figs 12 and 13).

The later brown lead paint from the wooden scenery was removed and the earlier dark green paint was preserved using the Retouching Gels. The original green paint was left uncovered and can be distinguished from the new Paraloid based paint, as the original is darker in colour (Figs 14 and 15).

It became apparent that the lighthouse was originally located in the central recess and had been moved to the higher position on the cliff. The screw at the bottom of the lighthouse is the exact same length as the screw that was used to hold the plates together, the base of the lighthouse fits snugly in the central recess, and the nut used to secure the plates fits the lighthouse. It was decided the safest place for the



Fig. 16. The lighthouse disassembled



Fig. 17. Screw evidence

lighthouse is the central recess, as the later hole is a loose fit and the lighthouse is not secured to the wood. The later hole was painted over with the Retouching Gels (removable with a touch of acetone) and the lighthouse was returned to its central location (Figs 16 and 17).

A cushion shaped case was handmade from sterling silver sheet and covered in shagreen, its lid lined with nineteenth-century blue silk provided by the owner. The nine-piece joint was designed to be internal to a reeded wire that would frame the lid of the case. Once the case was polished and finished, collaboration with the West Dean Conservation of Books and Library Materials Department made it possible to cover the case in shagreen. Cases of 1810 were researched and a shagreen distributor was identified in London.<sup>4</sup> Traditional shagreen was chosen and books student Abigail Uhteg covered

4. Ed Tanner. For further details: <http://www.edtanner.co.uk/> [Accessed 10 July 2012].



Fig. 18. Silver case



Fig. 19. Shagreen case

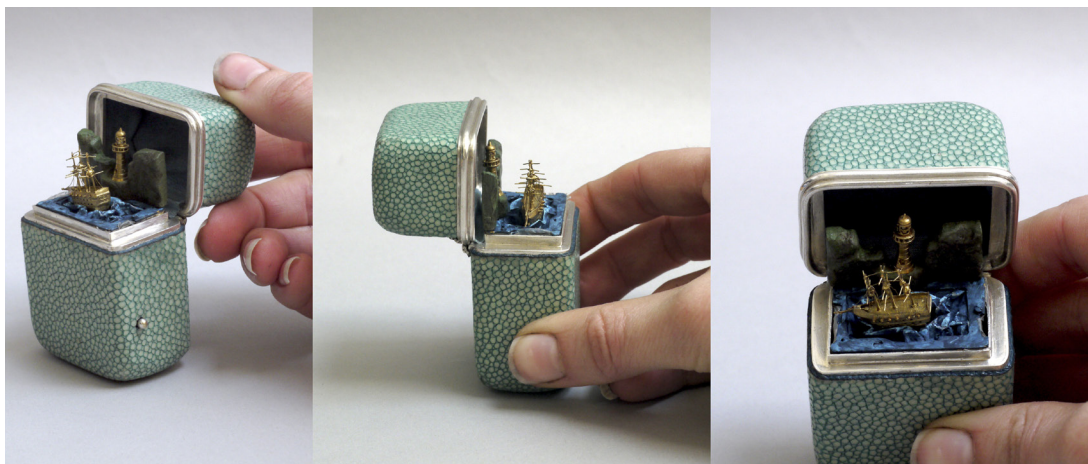


Fig. 20. The ship in the case

the case. The case was made to suit existing screw holes in the mechanism. The mechanism was fitted into the case after the addition of a start/stop button and spring, winding bezel, and hinge safety lock (Figs 18, 19 and 20).

The project altogether proved to be both very demanding and thoroughly rewarding, ending the Academic year on a high note. 'God Save the King' will forever be a favourite memento of time well spent in England.

To watch the ship and hear its rendition of God Save the King: <http://www.youtube.com/watch?v=KWVJwuCKJmI>. To see it in motion before restoration: <http://www.youtube.com/watch?v=wWTYH65610>.

This article is published with permission of the owner of the automaton ship and silver shagreen case: Michael Start, The House of Automata, proprietor.

#### ACKNOWLEDGEMENTS

I would like to thank my tutors Matthew Read and Malcolm Archer for their tireless efforts and dedication to our programme, and John Norgate whose guidance and encouragement never faltered throughout the project. I would also like to thank David Thompson, Tessa Murdoch, Ian Fraser, Rory McEvoy, Richard Higgins, Alan Godier, Luc Van Cauwenbergh, and the staff of Museum Speelklok for their aid in researching this unique object.

Last, but not least, I want to extend my sincere gratitude to the Antiquarian Horological Society for their generous award and making such a valued contribution to my future.