Jean-Eugène Robert-Houdin (1805–1871). From mechanical to electrical horology

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Robert-Houdin was an important maker of automata and clocks, mainly known for his mystery clocks. This article presents a short biography and description of the objects he made, before focusing on his contribution to the beginnings of electrical horology. After a first start in horology, he turned to show business and built up a Europe-wide career as a conjuror. In 1852, he decided to retire and devote himself to researching the applications of electricity. First, he developed a variety of practical inventions for safety and security, before focusing on electrical horology. His main interest was to design a master and slave electric system which could be used for domestic purposes and be accessible at a low price. The different projects that he developed on that topic between 1855 and 1858 and the success he met with them are described. A version of this paper was presented on 23 March 2013 at the 60th anniversary meeting of the AHS, held at Keble College in Oxford.

Figs 1a and b. Two clocks by J.E. Robert-Houdin. Left: Mechanical mystery clock (picture Kenneth Cobb) and right: Electric master clock (The Clockworks).

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Introduction

Clockmaker, automaton maker, magician and scientist, Robert-Houdin wove several careers into one life. Born during the First Empire, which ended in 1815, he died six months after the fall of the Second Empire in 1870, at the beginnings of the first stable République instituted in France. He saw revolutions, political as well as industrial. He travelled throughout Europe and built up his own legend, from a modest watch making apprentice to the world famous inventor of modern conjuring, so famous that magicians stole his name or transformed it, as did a certain Harry Houdini.

Robert-Houdin's biography has been thoroughly researched over the last thirty years.[1] However, many things still need to be said about his involvement in the beginnings of electrical horology. The present text aims to present a brief account of his life before focusing on the story of one of the first commercially successful attempts to create an electric clock for domestic use.

A short biography

Jean-Eugène Robert was born in Blois, a city south-west of Paris and an important centre for clockmaking during the sixteenth and seventeenth centuries. He was the son of a clockmaker, called Prosper Robert (1767–1844) and trained as a watch- and clockmaker.

However, his dream was of a different nature: he wanted to be a magician. Self-taught in the subject, which was far from being considered a serious one, he developed in parallel his skills as an automaton maker and as an engineer.

In July 1830, he married Eglantine Houdin (1811–1843), the daughter of Jacques Houdin (1784–1860). His father-in-law was one of the best clockmakers of the time, having been trained by Abraham-Louis Breguet and owning an important shop for precision instruments in Paris. Jacques Houdin took such an important place in Jean-Eugène's life that he decided to add his name to his original surname: Robert-Houdin was born.

During the 1830s, Robert-Houdin invented automata and mystery clocks and experimented on many subjects which enabled him to embrace his second career. In 1844, he won a silver medal for his automaton writer at a National Industrial Exhibition, with two consequences:

First, he sold his automaton to the showman Phineas T. Barnum, who toured it all over the world for twenty years. Secondly he found a sponsor, who helped him to make his dream come true. In the summer of 1845, he opened a theatre in the Palais Royal: *Les Soirées Fantastiques Robert-Houdin*.

During the following ten years, Robert-Houdin met with tremendous success as a conjuror. His shows allied traditional tricks with a gallery of beautifully built automata and machines. He brought elegance and technical innovation to a genre which used to be linked to outdoor performance and fairs. This opened the door for him to a more select public.

In 1848, political troubles in Paris encouraged him to accept an invitation to perform in London at the St James's theatre. He returned to the United Kingdom on several occasions and gave performances to Queen Victoria and her family. Some posters advertising his shows still exist and are in private hands. By 1852, he had gained a Europe-wide reputation for his art and toured thoughout northern Europe. He then decided to retire from the public scene, although it was to be another three years before his touring commitments were completed. Once public success and comfortable wealth were achieved, our magician needed a new challenge.

Since the 1830s, he had worked and experimented with the use of electricity in his magical tricks. What had been the secret source of his wealth could now be turned into more serious applications. He bought a comfortable house near Blois and focused on new experiments.

Between 1855 and his death, Robert-Houdin took out patents on several inventions, wrote articles, memoirs and

1. Christian Fechner, magician and collector, has published two sets of books on his life, with a strong focus on his magic career. *La Magie de Robert-Houdin. Essai biographique* (Boulogne: FCF, 2002), also in English, and *La Magie de Robert-Houdin. Les secrets des Soirées fantastiques* (Boulogne: FCF, 2005).

conjuring books, and participated actively in the development of electric devices.[2]

After 1858, he took an interest in ophthalmology and developed several tools to examine the eyes. He applied for patents and presented his work at ophthalmologic congresses, where his inventions were acknowledged as important innovations.

In 1870, the war with Prussia reached Blois. Robert-Houdin's house was occupied and partly devastated and one of his sons, Eugène, was killed on the battlefield. These events were bitterly painful for him, and he died some months afterwards from pneumonia.

Through his career as a conjuror and also through his interest in science, Robert-Houdin occupies a very particular place in nineteenth-century history. His many travels led him from Blois to London, Brussels and Berlin. He toured everywhere and performed for a good number of the European royal families, as well as for more popular audiences.

He was a showman and always kept a deep concern for his public. His memoirs, which do not hesitate to romanticise the truth about his career, turned out to be a very powerful tool for keeping contact with his aficionados.[3]

In England, he kept personal links all his life. His wife took an interest in a young girl, Henrietta Knight, whom they brought up in France until 1859.[4] He also became friends with William Manning, a young boy he met in 1849, who wrote to him until his death, giving news about conjuring in London—a useful thing, as his reputation was such that many conjurors in London as well as in the United States tried to use his name and steal his tricks.[5]

His taste for experiments also encouraged him to seek the company of other inventors and scientists. At a time when International Exhibitions and a specialist press in science and engineering appeared, he contributed to the blossoming knowledge and innovation which transformed Europe. His electric inventions were known in Germany.[6] His house was open to the best scientists, such as the physicist Leon Foucault (1819–1868), famous for his pendulum, still demonstrated in many science museums around the world, but also for his work on electric light and many other subjects.[7] His electric systems were commercialized in France and abroad by Breguet and Detouche, and his clocks were bought by Paul Garnier and Charles Wheatstone.[8] He was as successful an inventor as a magician.

The mechanical objects

Robert-Houdin made objects throughout his career. However, his signature is not often seen. From 1830 onward, he divided his actitivy between commercial works of restoration and making, between personal projects and working to demand. The main objects known to be from his workshop are:

Automata and toys: His first commercial success was the alarm-lighter, for which he took out a patent in 1837. This ingenious device lights a match when the alarm rings, allowing one to reach for it and light a

2. André Keime Robert-Houdin, *Robert-Houdin, le magicien de la Science* (Paris-Genève: Champio-Slatkine, 1986), pp. 81–82. The author doesn't distinguish the patents taken by Robert-Houdin and those taken by his son Emile, who actually developed some of his father's ideas, such as the striking systems or the clocks for street lamps. This last system, commercialized by Detouche and Emile, was briefly protected in England, see *Abridgments of the Specifications relating to Watches, clocks and other Timekeepers* (London, 1858), 23 July 1856.

3. J.E. Robert-Houdin, *Une vie d'artiste. Confidences d'un prestidigitateur* (Paris: Librairie Nouvelle, 1858).

4. Fechner, *Essai biographique*, pp. 319–320.

5. William Manning, *Recollections of Robert-Houdin* (London, 1891) This text was published by the Sette of Odd Volumes, a society to which Manning belonged.

6. C. Kuhn, *Handbuch der Angewandten Elektricitätslehre* (Leipzig: Voss, 1866), pp. 1146–1151; A. Merling, *Die Elektrischen Uhren* (Braunschweig: Vieweg, 1884), pp. 43–53; Dr. Schellen, *Der Elektromagnetische Telegraph, ein Handbuch* (Braunschweig: Vieweg, 1870), pp. 843–853.

7. Keime Robert-Houdin, *Robert-Houdin*, pp. 34–38.

8. Keime, *Robert-Houdin*, p. 55.

Fig. 2. Robert-Houdin, *Singing Lesson*, Toulouse, Musée Paul-Dupuy.

Fig. 3. Flying clock, prop used by Robert-Houdin in his conjuring show. Collection Alain Maignan-Maison de la Magie-Robert-Houdin, Blois.

candle. He also made more elaborate automata like the *Singing Lesson* (Fig. 2), which shows a character teaching a tune to a bird, and restored important eighteenth-century pieces like the *Duck and the Spinet Player* by Vaucanson, now in Paris, in the Musée des Arts et Métiers.

Props for conjuring: a series of big automata were used in his shows and later on, in his successors' shows, until the beginning of the twentieth century.[9]

Mechanical clocks: The most famous is the mystery clock, which he invented between 1831 and 1844, developing five different types through the period.[10] He made and sold them for the rest of his life and one of his sons continued to produce them for some years after his death.

From 1855 he focused on his research into electricity and timekeeping.

Robert-Houdin and electricity

Robert-Houdin always worked on several projects at the same time, developing them in parallel but also mixing them together sometimes. His research to elaborate conjuring shows spurred his production of mechanical objects, and his knowledge of clocks and automata enabled him to develop a new form of conjuring. His use of clocks as conjuring props illustrates the point.

Electricity in conjuring

Between 1845 and 1855, Robert-Houdin performed on stage with a 'flying clock' (Fig. 3). This was a glass dial that the magician drove through an electro-magnetic device hidden in his costume. Looking like the dial of a mystery clock, floating in the air, it indicated any time requested by a

9. Robert-Houdin's theatre in Paris remained opened until the 1920s, and some of his automata were sold with the place. It had moved from Palais-Royal to 8 boulevard des Italiens, where Jacques Méliès, one of the first film makers in the history of cinema, showed his production after 1895. See Jean Chavigny, *Le Roman d'un artiste, Robert-Houdin, rénovateur de la magie blanche* (Blois: Chavigny, 1943), pp. 160–169.

10. See mainly Richard Chavigny, 'Jean-Eugène Robert-Houdin horloger', *Horlogerie ancienne*, n. 58, 22–24 and Derek Roberts, *Mystery, Novely and Fantasy clocks* (Atglen: Schiffer, 1999), pp. 224–231.

member of the public. This was inspired by the traditional use of magnetism in magic. In the first books written about conjuring at the end of 18th century, chapters were dedicated to magnetism, part of what was called natural magic.[11]

This appealed to Robert-Houdin's taste for experiments and he developed as a magician a series of new tricks based on electro-mechanical devices which contributed significantly to his fame. An example of these illusions is the 'light and heavy chest', in which he asked a child to lift a chest, which he did without effort. Then he asked several adults, who would fail, as he was controlling the chest with his mind... and a strong electromagnet located under the stage and controlled by a switch of his invention.

Domestic uses and experiments

After he decided to retire from conjuring and bought his house near Blois, Robert-Houdin started to work on other applications of electricity.

He designed several systems and, following his habit, took out a patent for some of them, used others for himself or gave them to other people, including his son Emile, to commercialize.[12]

One of if his foremost motivations in designing objects remained the same: having fun. His garden in Blois employed several systems to surprise visitors—automata, sliding benches and other shocks which greatly contributed to his reputation as a true magician in the area.[13]

He also produced safety and security devices, for example a system to detect flooding in ships, and house alarms activated when a window or a door was opened after midnight.[14] Home automation occupied him, with systems of bells and electric doors, like his own gate in Blois.

And finally objects of more general use, such as electric switches and a distributor. He presented this last invention at the Universal Exhibition in 1855 in Paris, where it was widely acknowledged. Sir Charles Wheatstone described it as a major step towards inventing the electric motor.[15] His system was to compensate for changes in magnetism caused by an increase in distance by the interaction of bent levers. The system was used by his friend, Leon Foucault in his tests to create electric light, and was discussed in the Académie des Sciences.[16]

However, his main project in the 1850s and 60s was electrical horology. In his house, a system of time distribution was installed, driven by a master clock in his office, showing time on a massive dial at the front of the gardener's house but also on several dials inside the house (Fig. 4). His system was inspired by earlier examples created for public use, as we will discuss in the next section.

Robert-Houdin and electrical horology

The first attempt to connect a pendulum clock to electric power was made rather early in the nineteenth century, around 1815. Such clocks can still be seen in Italy.[17]

11. Keime Robert-Houdin, *Robert-Houdin*, pp. 17–18

12. Robert-Houdin had a workshop with employees until he moved to Blois in 1852. After that date, he seems to have mostly done research and special orders and delegated the main production either to Emile, settled as a clockmaker in Paris, or other clockmakers.

13. Jean-Eugène Robert-Houdin, *Le Prieuré, organisations mystérieuses pour le confort et l'agrément d'une demeure* (1858, reprint Paris, Omnibus 2006).

14. Patent FR22648 (3 March 1855), archives of the Institut National de la Protection Industrielle, Paris –hereafter INPI (findable using the number index at http://bases-brevets19e.inpi.fr/ under 22648, or searching by name).

15. Keime Robert-Houdin, *Robert-Houdin*, pp. 38 (quoting the journal *Cosmos*, 1864)

16. Académie des Sciences, report of the first semester 1855, pp. 1141; Second trimester 1855, Theodore du Montcel, 'La manière de tracer les courbes du répartiteur de Mr Robert-Houdin'.

17. Massimo Tinazzi, 'The Correspondence between Alessandro Volta and Giuseppe Zamboni about the Realization of the "Dry Pile"', in Fabio Bevilacqua and Lucio Fregonese (eds.) *Nuova Voltiana* (Università degli studi di Pavia, 2003), pp. 91–103.

Designed by scientists as experiments, they predate clockmakers' interest in the subject but without any commercial objective.

Electrical horology between 1840 and 1850
The next important step was taken in the 1840s in several European countries: in England, Alexander Bain patented his first electric clock in 1841, followed by Charles Wheatstone and Charles Shepherd;[18] in France, Breguet, Froment and Garnier worked on different projects, which were presented in national industry exhibitions.[19]

In Switzerland, Matthaus Hipp and other clockmakers and engineers in the new technique of telegraphy also researched the subject with success. From the start, these projects were linked to a vision of time transmission and time distribution, of which Robert-Houdin was aware.

In this buzzing atmosphere, the Great Exhibition of 1851 brought together in the same place at the same time many of these inventors.

Detouche and the Great Exhibition of 1851
For electrical horology, this exhibition was important, as many pioneering systems were presented: Charles Shepherd showed his master and slave system in the Great Transept. Bain demonstrated his electric clocks.[20] Wheatstone, presenting musical instruments and several French engineers or clockmakers, who came to exhibit mechanical clocks, were also working on projects using electricity. The quick development of the application of electricity to all kind of domains was visible.

A French clockmaker, Constantin Detouche (1810–1889), won a gold medal for a mechanical astronomical clock. Owner of an important workshop in Paris, he also employed Jacques-Francois Houdin, Robert-Houdin's father-in-law, who was in charge of the precision clock department.[21] Detouche was a talented clockmaker but also a brilliant dealer. The London exhibition seems to have given him the idea that electrical horology could offer a new business. In 1852, he created a partnership with a clockmaker called Brisbart-Gobert, who patented an electric clock.[22] Though this met with no success, Detouche stuck with the idea and tried a new partnership in 1855 with Robert-Houdin. Their objective

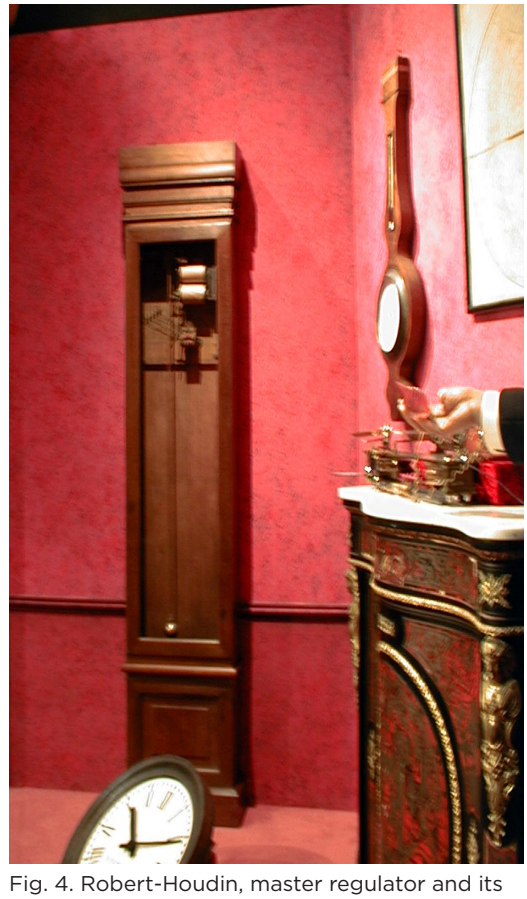


Fig. 4. Robert-Houdin, master regulator and its slave dial for his house in St-Gervais, near Blois. Collection de la Maison de la Magie-Robert-Houdin, Blois.

18. Charles Aked, 'A short history of electric timekeeping' in *Electrifying Time* (Ticehurst: AHS, 1976).

19. Louis Figuier, *Les applications nouvelles de la science et de l'industrie aux arts en 1855* (Paris: Langlois et Leclercq, 1856), pp.143, 145.

20. K.G. Beauchamp, *Exhibiting Electricity* (London: Institution of Electrical Engineers, 1997), pp. 87–88.

21. A letter written by Detouche shows his letter headings, which detailed the departments of his business with the names of the person in charge: letter of 29 November 1855, Paris, archives of the Musée National des Arts et Métiers, linked to inv.6356 and 6357.

22. Patent FR1BB13100 (26 February 1852), INPI.

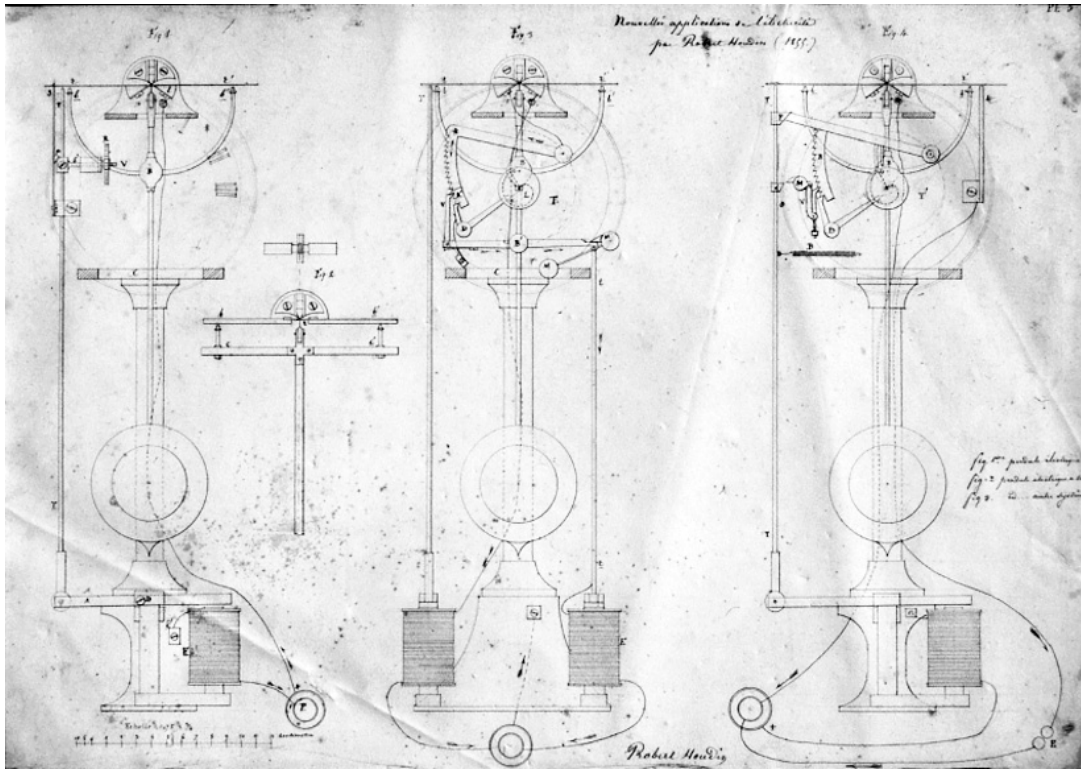


Fig. 5. Robert-Houdin's first drawing for the 1855 patent n.22648. Collection de la Maison de la Magie - Robert-Houdin, Blois, inv 5818-736.

was clearly the Paris Universal Exhibition the same year.

1855: The Paris Universal Exhibition

On 16 February 1855, Robert-Houdin and Detouche presented their electric clock to the journal *Cosmos*, which foretold that it would be the sensation of the Universal Exhibition.[23] In March, Robert-Houdin took a patent on several applications of electricity, amongst which were an electric regulator and a mantel electric clock with three variations: simple, striking with one electric coil, or with two coils.[24]

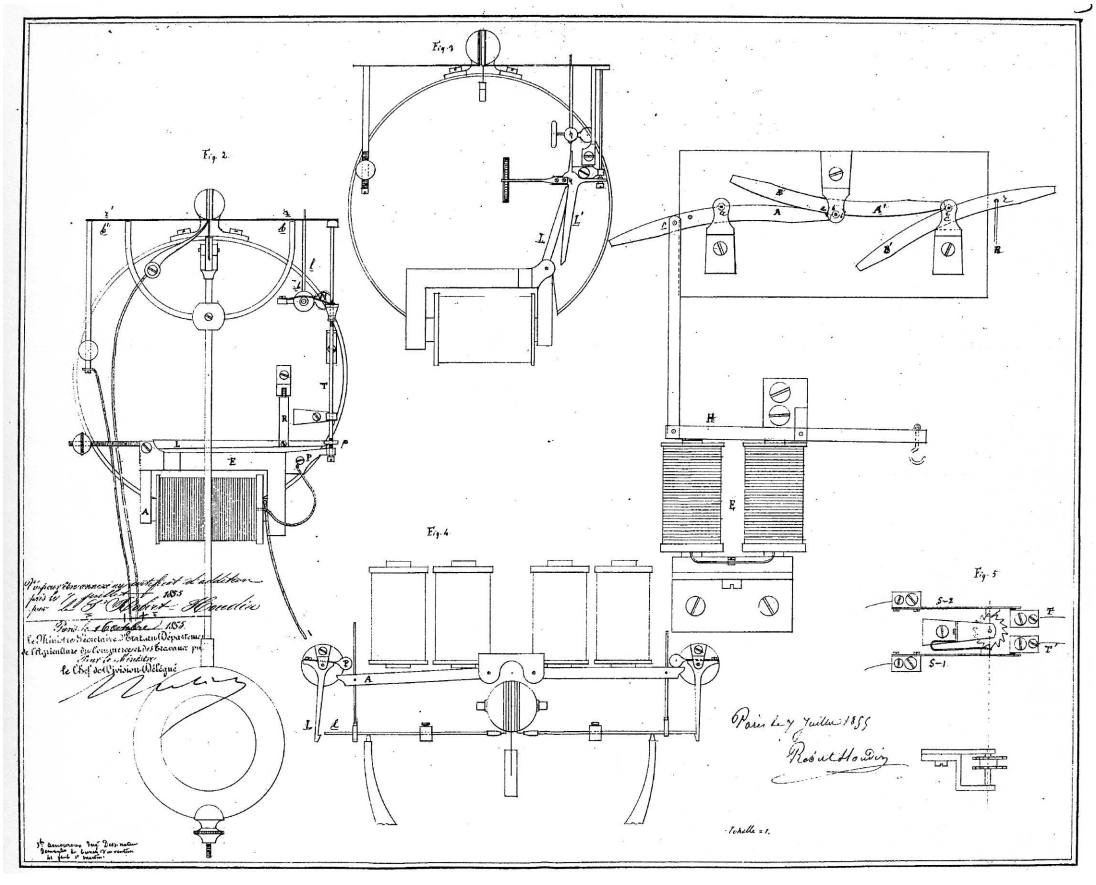
The drawing (Fig. 5) linked to the patent shows a design following the line of his mystery clocks: the movement is hidden as much as possible, and partly concealed in the base. This is an electric version of the mystery clock, still along the lines of Robert-Houdin's production as a conjuror.

The exhibition was held from 15 May to 31 October 1855, during which, in July, Robert-Houdin added modifications to his patent, withdrawing the drawing shown here and providing a new one, changing the shape of the clock drastically. It was now closer to a skeleton clock (Fig. 6). Early electric clocks by other makers were also described as skeleton clocks—for example, both Bain and Shepherd presented clocks of this form in the London Exhibition.[25]

23. Fechner, *Soirées fantastiques*, pp. 28–30

24. Patent FR22648 (3 March 1855), INPI; original drawing in Blois, Musée de la Magie, inv.81.25.125.

25. *Official, Descriptive and Illustrated Catalogue of the Great Exhibition* (London, 1851) , Class X, entry 128 by Charles Shepherd; on-line: http://www.gracesguide.co.uk/1851_Great_Exhibition:_Official_Catalogue:_Class_X.:_Charles_Shepherd. Also Alexander Bain, *A short history of the electric clocks* (London: Chapman & Hall, 1852), engraving showing his models.



Figs 6a and b. Robert-Houdin's second drawing for the 1855 patent n.22648 (detail of the master clock), Paris, Institut National de la Propriété intellectuelle; and Robert-Houdin's master clock from this drawing, London, The Clockworks.

In his new model, Robert-Houdin abandoned the idea of hiding the coils and the movement. All the pieces were mounted on a single plate and everything was visible, at least at the back. In this way, the clock changed into an object for demonstration, closer to being a scientific instrument than a magician's trick. A model was required for the Conservatoire des Arts et Métiers in Paris and was provided by Detouche as a master and slave system (Fig. 7).

A last surprise appeared during the exhibition: the price of the clock. Whereas Robert-Houdin was selling his mystery clocks for several hundred Francs, it seems that during the Universal Exhibition, a low price was advertised for the electric clock, just 60 Francs.[26] It was a surprising sum, as

Figs 7a and b. Robert-Houdin and Detouche, master clock and slave dial ordered by the Conservatoire des Arts et Métiers after Paris Great Exhibition in 1855, Paris, Musée National des Arts et Métiers.

the clock used platinum contacts, ivory insulation and pieces which needed to be specially made in the workshop.

1858: the last version? The 1858 patent

Robert-Houdin persisted with this line. In his memoirs, published in 1858, his final chapter described his retirement from theatre to dedicate his research to the making of a 'pendule populaire', meant to be affordable to the greatest number.[27]

In fact, on 20 January of the preceding year, he had patented a new electric clock prototype.[28] This time, the system was meant to be simpler, with a limited number of pieces and the replacement of part of the ivory insulation with wood. The general aspect of the clock was very different, more like a small wall clock, well protected in a simple wooden case, ready for mass-production (Fig. 8).

Once again, Robert-Houdin didn't wish to commercialise his production personally. However, it seems that he made the first one to be sold by his son Emile. Then, he signed a contract with Billoret-Moras, clockmakers in Paris, faubourg Saint-Denis, in 1869.[29]

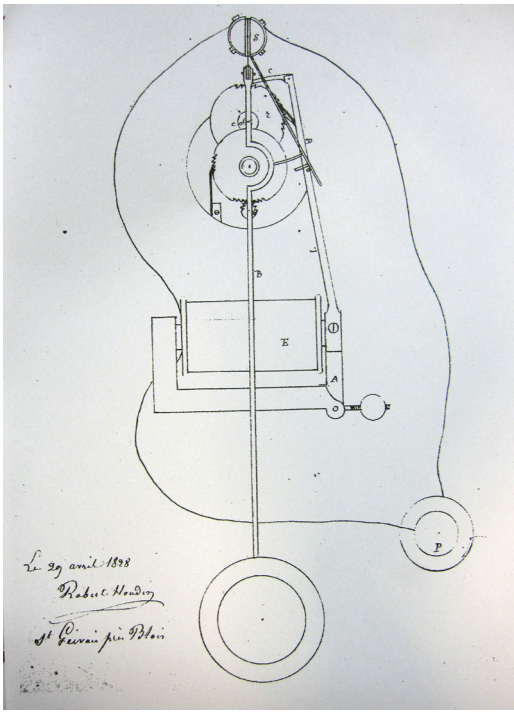
In spite of this, it was the clocks he presented in 1855 which long remained in

26. Fechner, *Essai biographique*, pp. 147; Figuier, *Applications nouvelles*, pp. 143: 'Ce qu'il faut remarquer surtout dans les horloges électriques de MM. Detouche et Robert-Houdin, c'est la modicité de leur prix. Le modèle d'horloge électrique présenté à l'Exposition par M.Detouche ne coûte que 60 francs. Il est vraiment curieux de voir livrer pour un tel prix une horloge qui fonctionne avec une régularité suffisante, en fin de compte, qui n'a jamais besoin d'être remontée, qui peut marcher des années entières, à la seule condition que l'on ajoute, chaque semaine, quelques cristaux de sulfate de cuivre à la pile voltaïque qui la met en action. Il est hors de doute que les appareils de M.Detouche auront pour résultat de répandre et de populariser en France l'emploi de l'horlogerie électrique.'

27. Robert-Houdin, *Vie d'artiste*, p. 426.

28. Patent FR30651 (20 January 1857) with addition (8 May 1858), INPI.

29. Fechner, *Soirées fantastiques*, p. 229.



Figs 8a and b. Robert-Houdin's drawing for the 1858 patent, Paris, Institut National de la Propriété intellectuelle and Robert-Houdin, and electric master clock, 1858 model, sold by Billoret-Moras, private collection.

engineers' minds, and the books published during the 1870s and 1880s about electricity continued to reproduce views and details of the earlier models.[30]

Between 1855 and 1858, Robert-Houdin drastically changed his way of looking at clocks. From a mysterious and entertaining object, electric clocks turned into a research project with the philanthropic objective of providing good and cheap timekeeping for the wider public. From a show business entrepreneur, he turned into a 'notable', a classical character of the second half of the nineteenth century in France, living comfortably off his private income and working for free for the welfare of the general public. An example of this was that he adapted his systems to turret clocks and offered one for Blois City Hall, where it worked until 1876.

Robert-Houdin remained a truly innovative figure, able to constantly improve and develop his creations. The large scale of his talents and his generosity in giving some of his research and support to others probably worked against him and in the end his contribution to the subjects he researched was often underestimated.

Robert-Houdin's electric clocks: catalogue

The following table describes the electric clocks after Robert-Houdin's designs, so far discovered. Only two of the last type of mantel clock are indicated as 'système Robert-Houdin'. All the others are marked by Detouche alone and it is the patents and the contemporary records which restore his true place to Robert-Houdin.

30. See note 6 for German publications; in French: Théodore Du Moncel, *Exposé des applications de l'électricité, tome quatrième, applications mécaniques de l'électricité* (Paris: Hachette, 1880), pp. 127–135 and pl. II.

Despite several of them looking similar, all these clocks are in fact different from one another, an indication of a production which was never large scale. However, the mantel clock type seems to have been popular enough as nine have been recorded. They have generally lost their slave dials, except for one, given by Detouche to the Conservatoire des Arts et Métiers after the success of the 1855 Universal Exhibition in Paris (Fig.7).

Type	Description	Date	No.	Location	Reference
Mantel clock	Master clock, gilded brass feet, enamelled ring dial, 'Peyrot horloger breveté à Saint-Etienne' on the dial; 'C.Detouche/ 223 St Martin 230/17428/ brevete SGDG' on the back plate	c.1855	17428	UK, West Norwood, The Clockworks	Figs.1 and 6.
Mantel clock	Electric master clock, gilded brass feet, enamelled full dial, 'C.Detouche/*Fournisseur de l'Empereur*/ rue St Martin nos 228&230 Paris'	c.1855	17643	Oxford, Museum of the History of Science	*Electrifying Time* (1976), 6, pp. 50–51.
Mantel clock	Horloge électrique mère émétrice, inv. 6356, full enamelled dial, 'C.Detouche/*Fournisseur de l'Empereur*/ rue St Martin nos 228&230 Paris'	c.1855	17745	France, Paris, Musée des Arts et Métiers	Entered the Conservatoire des Arts et Métiers in 1855 with its associated slave dial (see below). Fig.7.
Slave dial	Horloge réceptrice, inv. 6357, full enamelled dial, 'C.Detouche/*Fournisseur de l'Empereur*/ rue St Martin nos 228&230 Paris'	c.1855	17884	France, Paris, Musée des Arts et Métiers	Given to the Conservatoire des Arts et Métiers in 1855 with its master clock (see above). Fig.7.
Mantel clock	Electric master clock with black painted wooden feet. Similar in aspect to the one in Paris, MNAM, but with a movement design identical to the clock at The Clockworks.	c.1855	176?1	USA, private collection	
Mantel clock	Electric master clock with 2 coils and S-shaped gilded brass feet. Sole mantel clock known of this type.	c. 1855	none	Formerly France, Villers-Le-Lac, musée de la montre	Joseph Flores, 'Pendule électromagnétique Detouche à Paris', *Horlogerie ancienne*, n.48, pp. 127-140.
Longcase regulator	Regulator with gridiron pendulum	c.1855	none	UK, private collection; formerly in Paul Garnier's collection	Sold at Christie's London, 15/09/2004
Mantel clock	Master clock, last type, in a wooden case with a painted dial on the front glass	1858–1869		Germany, private collection	Fechner, *Soirées fantastiques*, p.30.
Mantel clock	Master clock, last type, in a wooden case with enamelled ring dial 'horloge electrique systeme Robert-Houdin/ AB&CM breveté SGDG'	After 1869		France, private collection	Fechner, *Soirées fantastiques*, pl.XIII. AB&CM for A. Biloret and C. Moras
Mantel clock	Master clock, last type, in a wooden case with an enamelled dial 'horloge electrique systeme Robert-Houdin/ A.Biloret & C. Moras constructeurs brevetés SGDG Paris'	After 1869		Private collection	http://www.electricclock-archive.org/ClockGallery.aspx?aid=2012; Similar to the model engraved in Biloret-Moras sale catalogue reproduced in Fechner, *Soirées fantastiques*, Fig.333.
Mantel clock	Master clock, last type, in a wooden case, with cardboard dial and poor condition	After 1869		Seen at a fair in Germany around 2005–2006	
Mantel clock	Master clock, last type, in a wooden case, with front plate of a Paris movement	After 1869		Private collection	Fig.8.
Mantel clock	Master clock, last type, in a wooden case, with front plate of a Paris movement	After 1869		Private collection	
Longcase clock	Electric regulator in a long wooden case, master clock used in Le Prieuré	After 1855		France, Blois, Maison de la Magie	Fig.4
Slave dial	Slave dial, large dimensions, probably used in Le Prieuré	After 1855		France, Blois, Maison de la Magie	Fig.4.
Wall clock	Wall clock with four coils mounted in the pendulum			Private collection	http://www.electricclock-archive.org/ClockGallery.aspx?aid=1587: given as a Robert-Houdin on the website.