

**Some notes on
Pierre-Frederic Ingold
and the work of
E. Haudenschild**

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This is a translation of *Quelque Notes sur Pierre-Frédéric Ingold et les travaux de E. Haudenschild*, Bienne: Ch. Rohr, 1932. Other than some doubt about Ingold's place of origin (Berne or Bienne) a few minor errors have been corrected without comment.

On a number of occasions I have contacted the Swiss Society for Chronometry seeking clarification of the copyright status of the original French text. I have received no replies to my requests. However, even if the original text is still covered by copyright I doubt if anyone will be perturbed by my distributing this translation free of charge.

Richard Watkins, August 2004

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Some notes on Pierre-Frederic Ingold and the work of E. Haudenschild.

P.-F. Ingold is well known, with George Leschot, as an innovator in the use of machines in horology. Jules F.-C. Jurgensen devoted an essay to him, read to the History Society at its annual meeting held in La Sagne on June 26, 1877. This study, from which we take some quotes, was published in Neuchâtel, but is currently very rare; only some collectors and one or two museums have it.

On December 1, 1874, 4 years before his death, P.-F. Ingold gave his manufacture of fraises to Mr. Ferdinand Bachschmid, who, through his friendship and business connections, also had various interesting documents on the activity of P.-F. Ingold. On the death of Mrs. Vve Bachschmid these documents were bequeathed to the School of Horology in Bienne which created in its Museum "an Ingold display". The occasion to assemble these various documents, at the same time as an exhibition in the Bürgerhaus of some work of Mr. E. Haudenschild, urged the Office of the Swiss Society for Chronometry to publish this study, a deserved homage to the memory of an artist and innovator who struggled all his life for the triumph of ideas and inventions considered to be dangerous by his contemporaries, in France and England as well as in Switzerland.

Mr. Ernest Haudenschild, who currently lives Berne, or more exactly Bumplitz a suburb of the federal city, belongs to that interesting phalange of horologists who, beside the exercise of their trade, have a passion for horological mechanics. At a time like ours, when mechanization and organization provide little support for individualism, it is useful to show the younger generations the patient and modest efforts of these horological craftsmen, who devote all their leisure hours to the realization of complicated or artistic constructions, for the unique satisfaction of creating something beautiful or ingenious.

G.-A. BERNER

President of the Swiss Society for Chronometry.

Pierre-Frederic Ingold

Pierre-Frederic Ingold was born in Bienne on July 6, 1787. His father died when he was 3 years old and after this loss he lived for a little while in Valanvron, near La Chaux-de-Fonds. It was his mother who led him to work in the horology industry. When 12 years old he manufactured pinions, wheels and escapements, by methods which required much manual skill. At this school, theoretical knowledge was quite rudimentary, but the young apprentice had the desire to learn and to improve. The ambition of the young horologists at that time was to seek for fortune abroad. He began his "tour of Europe" in 1809, with Strasbourg and Paris his first goals.

In 1812 it was likely he would be conscripted into the army of Napoleon and he decided to leave for America. But he did not get far. The boat on which he had embarked in Dunkirk was captured by the English and the young person from Berne was taken prisoner with a thousand French. After an imprisonment of several months, he was sent back to Paris with two companions, and the return on foot through Normandy remained for Ingold an lively and picturesque memory. Normandy was a country of very simple ways. They were accepted one evening by the family of the mayor of a small village. In addition to the members of the family, there were other boarders by their side ... dogs, pigs and hens. Their lodgings were unique. The table had holes dug in the wood which acted as plates. The knives and spoons were fixed to the table by means of chains. When the wife of the mayor broke eggs in her leather apron to make an omelette, Ingold said that they lost their appetite, at least for omelettes made in this way.



In Paris and then in London, Ingold, avid to augment his knowledge, started his remarkable work. In particular, he cut pinions from round steel, which gained him the admiration of his fellow-workers. He made at the house of Rentsch, supplier to the court in London, his first pendant wound watch, without a key. In 1815 he returned to La Chaux-de-Fonds. A gentleman living in that large town, Mr. de Claparède, bought a watch of a novel design from him. Not only was it wound by the bezel, but the hour setting offered this particularity, that the hands were moved by means of a set-hands bolt adapted to the pendant. Did Mr. de Claparède send this watch to Naples? "I do not know", writes Jules F.-U. Jurgensen, "but it appeared in that city in the possession of the Polish princess Jablonowiska, who

made a gift of it to the Imperial Marie-Louise, second wife of Napoleon I. The majestic princess carried this repeater for 30 years, then bequeathed it to the one of her servants, cousin of the horologist Sylvain Mairet. He bought it and resold it to Mr. Ingold, in whose hands we saw it”.



Watch wound by the bezel with time setting in the pendant, manufactured by Ingold in 1816 and once belonging to the Imperial Marie-Louise.

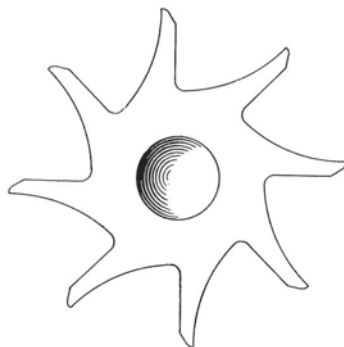
This watch, which Mr. Grossmann also describes in the “Notiz-Kalender für Uhrmacher pro 1878” in connection with a visit that he made to Ingold in 1872 is, according to him, one of the first wound without a key. He indicates, but in error, that it was carried for a long time by Joséphine, first wife of Napoleon I (Joséphine died in 1814 and date of 1816 proves it). There is also an error by J-F-U. Jurgensen, who writes about a repeater. It is a cylinder watch, whose cover carries the inscription *P.-F. Ingold at La Chaux-de-Fonds*. On the interior of the case is inscribed:

1816

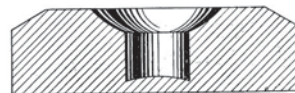
K18 5979 P.&S.

This watch, whose history is interesting, is currently the property of the Museum of the School of Horology in Bienne, and Mr. E. Hofmann, manufacturer in Bienne, was told by Mrs. Bachschmid that it returned in the possession of Mr. Ingold, from Sylvain Mairet. The winding of the mainspring is operated by the bezel which carries a steel ring with 72 interior teeth operating a ratchet. The hand setting takes place by the stem. When the crown is pushed against the pendant the pinion fixed on the stem turns in neutral. By drawing out the crown the pinion gears with the teeth of a crown wheel which moves the hands by an intermediary wheel.

The pinions are remarkably well cut. Ingold was always particularly interested in the problem of gearing; of all his inventions, that of the *Ingold fraise*, which he designed and developed from 1858 to 1874 at La Chaux-de-Fonds, was the one which absorbed him most because the difficulties of its execution.



Sapphire pinion
actual diameter 2.80 mm.



Jewel with closed hole.

It was on June 26 1856 that the inventor patented in France his machine “to improve the gearing of wheels by giving them the desired epicycloid shape”, his machine to “ingolder wheels” according to the terminology still used nowadays.

Jurgensen wrote about this process: “We saw many pocket chronometers gain about 45 degrees in the arc of the balance, driven by the same mainsprings, after the wheels transmitting the impulse were improved by the Ingold fraise. An astronomical clock with mercury compensation, running for 3 months and built 22 years ago, and driven by a weight of 7½ kg, oscillated 44 minutes of arc. Mr. Ingold manufactured all the cutters necessary to reshape the wheels of the clock. Afterwards its oscillations measured 55 minutes with the same driving weight. By removing 2½ kgs from the weight, a similar arc of oscillation was obtained to that which the pendulum did before the Ingold rounding.”

From 1817 to 1823 Ingold worked for Breguet in Paris, where he had as colleagues famous horologists such as Moinet and Kessel. He was a pupil of Breguet in jewel making, which is where he acquired his great skill. Some jewels cut by him reveal him as a consummate artist. We note in particular a hole and end-stone jewel made in one piece, and a pinion with 8 leaves cut in sapphire.

Here is the request, made according to the protocol of the time, which Ingold addressed to “the very honourable Lords, Magistrates and Council of State of the Republic and Canton of Geneva” on October 22, 1825.

“Very Honourable Lords,

Pierre-Frederic Ingold, horological jewel maker, has the honour to inform your Lordships, with the deepest respect: That he is a bourgeois of Loberswild, in the Canton of Berne, that his document of origin is deposited in the Chamber of Foreigners, together with other papers.

That being a student of the famous Breguet of Paris, he comes to Geneva to ply his trade here as a Master, and consequently he comes in accordance with the Law of April 5, 1819, to beg your Lordships to agree to authorize him by an Order.

He wishes for the prosperity of the Republic and in particular for each one of your Lordships.

Geneva, October 22, 1825.

P.-F. INGOLD,

Fontaine Maison Galland N° 87”.

Ingold’s head was full of vast projects, and he went far beyond his reputation of a skilful craftsman by the bold and ingenious plans in the field of the mechanical manufacture of the watch, which he proposed in his 40th year.

“I do not hesitate to say”, wrote J-F-U. Jurgensen, “that the opinion of mechanics, engineers, clock and watch makers and other specialists, in which number I place Mr. Jules Jurgensen, my father, is that Ingold is one of the finest artists of the century, perhaps the greatest innovator in the horology industry; in any case he, almost by himself, raised the manufacture of watches by means of powerful and ingenious machines to an unexpected point of perfection. ... His plans, by their audacity and his activity, attracted justly famous industrialists such as Japy. Ingold having presented his ideas to them, things went so quickly that a project for an association of continuation was outlined.

The corporate name was to be: Ingold, Berthoud, Monnin, Japy & Co, but there were immediate problems. How could it have been different? Japy quickly realized that the research and aspirations of Ingold pushed towards an ideal both difficult and very expensive to realize.

At all events, the association did not succeed and the company was not formed”.

“At La Chaux-de-Fonds, when Ingold spoke about his machines multiplying production by a hundred fold, some people reacted badly. “Eh what!” one said, “you want to ruin the workman, take his work from him ...”.

Discouraged by this failure and persuaded that if France is the country of ideas, England is that of their practical application, Ingold wanted to go to London. The notary Bouard, who had underwritten the Japy project and understood that the talent of Ingold was real, and that given time the implementation of his ideas could become very valuable for France, took up the idea again to found the Company d’Horlogerie Parisian, which included high-ranking persons of Paris”.

We found, amongst Ingold’s documents, the following curious estimate, which certainly dates from the time of the first projects of the Company. Ingold’s estimate, which goes back a century, makes it possible

to judge the proportions in which the mechanical manufacture of the watch has since developed. “When the day arrived for the first wheel punches, presses for bridges and perfected lathes, people rose up in revolt, so to speak, against the possible or alleged depreciation of an invaluable art. Ingold always fought, but spent much money to set up his tools. The shareholders, not receiving dividends, were impatient ... and one day it was proposed to move the seat of the company across the English Channel”.

Machines necessary to make 20 watches per day of 4 different sizes per day	For 20 watches	For 40
Machine for plates	6000	6000
Machine for barrels	1500	
6 machines to cross out wheels and balances	3500	
4 presses	1000	
1 trip hammer	2000	
2 machines, to make pinions	1000	500
3 machines cut teeth	1500	600
2 machines to make screws	500	500
2 machines to make barrel arbors	600	300
Universal lathe with accessories	1500	600
4 pivoting machines	2000	1000
3 tools to cut out escape wheels	900	
Various tools for escapements	600	600
Various tools	600	600
Tools to make jewels	1000	500
Mechanics' workshop	800	400
	25000	11600

This happened in 1839.

Here, by way of documentation, are some of the machines that Ingold successfully completed at that time.

One produced plates, finished with sinks and jewel seats, and holes for feet and screws. Punches produced admirably finished wheels. The two punches in our collection are invaluable witnesses to Ingold's mastery. The barrel lathe turned barrels ready to receive the mainspring. The pivoting lathes with grinding stones produced masterpieces.

Ingold also punched out balances with bi-metallic rims and various parts of the escapement. The compensation of the balance is a problem which appears to have worried Ingold, as various truly complicated examples in this collection testify.

Ingold had also drawn up plans for machines to turn watch cases, but he did not build any.

In London, our innovator raised storms of protest on all sides. The tradesmen incited some of the corporations of the City against Ingold, so that in 1842 Parliament refused to authorize the legal existence of the Company.

Bankruptcy was declared, but the unhappy inventor found some real and invaluable sympathy in the profession. Frodsham, among others, supported the valiant inventor, but with pain he saw his beautiful patented machines, his new and brilliant tools, threatened by an enforced sale.

In 1845, Ingold decided the United States was the only country which would understand and value his ideas.

How does it happen that after being brilliantly accepted, cherished, encouraged, questioned, incited to apply for American citizenship, which was granted to him, so little was achieved, like an eagle which one strips of his feathers?¹ Alas, history is repeated and people seem not to want to understand its lessons. The foreigner was a disappointing mirage for many clock and watch makers.

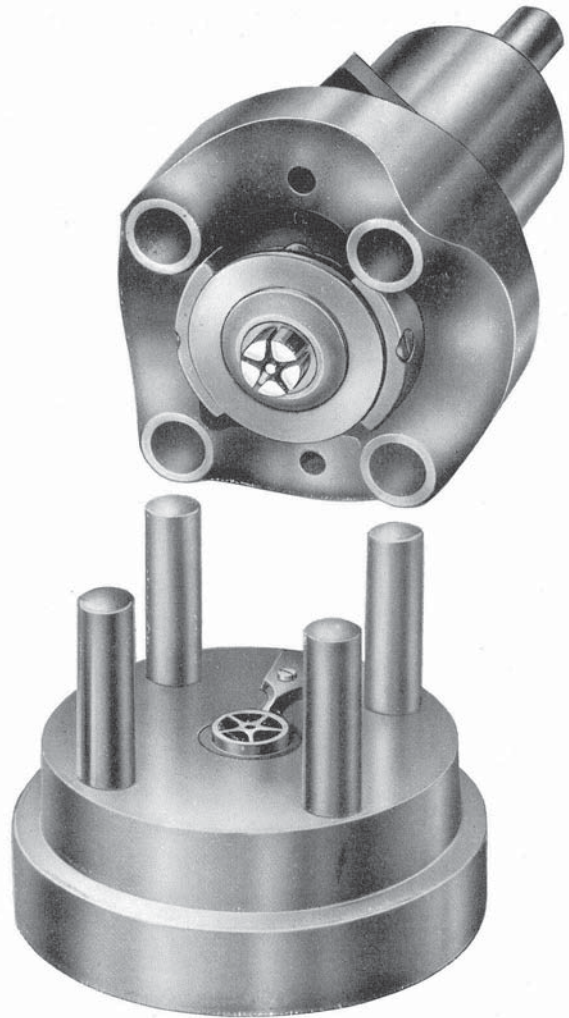
1 *comme un aigle on ravit ses plumes.*

What is certain is that in 1852 the first American factories started work in Boston with Ingold's tools. On his return to Switzerland and La Chaux-de-Fonds, he tried to spread a cry of warning ... but his voice was not heeded.

As the official reports of the Society of Horologists in Paris testify, the inventive spirit of Ingold was exerted in all the fields of horology. In the official report of the meeting of September 7 1857, a new detent escapement was announced, that Mr. Ingold presented as clearly better than the detent escapement in pocket watches. This escapement, briefly described by C. Saunier and an alternative to the duplex escapement, has an escape wheel with only one tooth.

Several drawings of machines were deposited with this society on October 5, 1857.

Thanks to the kindness of Mr. Paul Berner, past director of the horology school in La Chaux-de-Fonds, we have the pleasure of displaying some of these drawings in the Bürgerhaus. One will recognize in one of these a machine intended to bore and set the holes in the plate of the watch. A vertical platform, provided with divisions corresponding to the polar co-ordinates of the various pivoting points, holds the plate. The platform can be moved along an axis, by means of an indexed screw. All the holes are numbered and can by this device be centered on the machine for drilling. These very careful drawings do not leave any detail in doubt and the various tools assembled on the machines are all depicted. The examination of these drawings proves the methodical mind of the inventor and constitute a document of much interest for the history of the manufacture of watches by machinery.



Punch and die to cut out wheels, tool designed by P.-F Ingold.

From 1877 to 1879 the Swiss horology industry passed through a serious crisis, partly due to American competition.

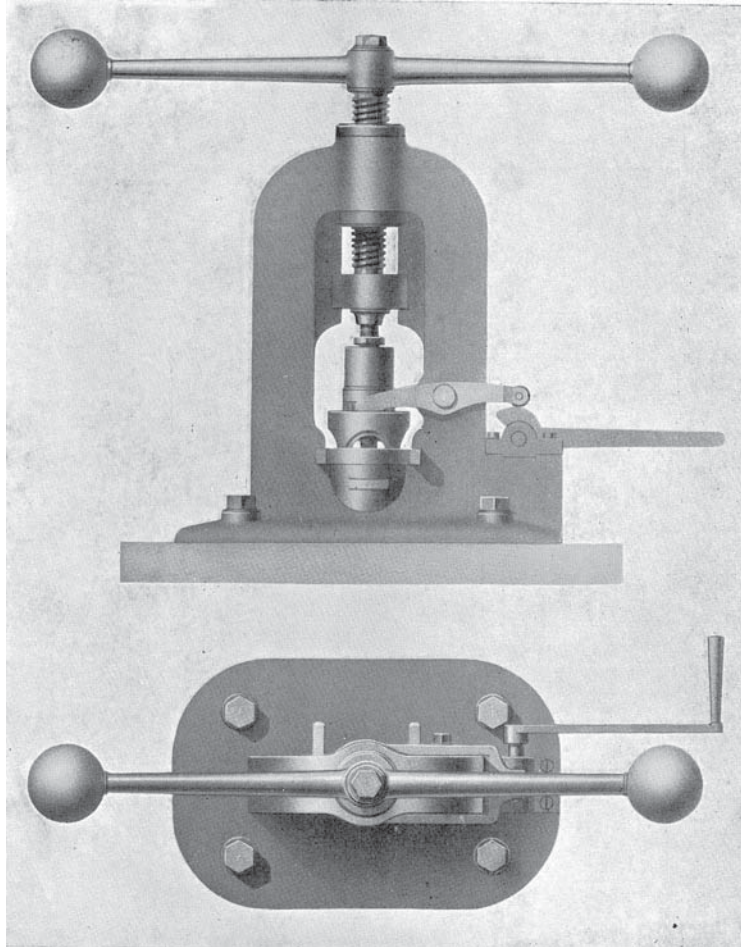
After the Philadelphia Exhibition in 1876, the reports of the official delegates from Switzerland (Messrs Édouard Bailly, Ed. Dubied*, Jacques David, Engineer from Longines), and the speeches of Mr. Favre-Perret, were needed to galvanize energy and to stimulate the admirable development of the Swiss horology industry, which is today, and we hope will remain, a power that will be eroded with difficulty.

Pierre-Frederic Ingold was an untiring fighter; like all innovators, he suffered the fate of being misunderstood and opposed. If his history is painful for other Swiss to read, let us contemplate it all the same to learn from it the lessons which it contains.

The tenacity and the audacity of Pierre-Frederic Ingold are not isolated phenomena in the history of the Swiss horology industry, and it is necessary to know how to preserve these energies for the good of the country.

Ingold died in 1878 when he was 91 years old. This robust old man with a strong jaw, preserved his clear ideas and sharp eye until his last days, and his passion for research in the field of machinery was only given up with his death.

* *Industry in the United States of North America, "Beware", an address to Swiss industrialists with regard to the Philadelphia Exhibition, by Édouard Bailly with an appendix by Ed. Dubied, 1877.*



Press to cut out wheels (reproduction of a drawing by Ingold).

“Until his end”, wrote J.-F.-U. Jurgensen, “Ingold worked with his mind and his fingers, with a dexterity of hand marvellously united with a perfect lucidity of spirit. We visited him last June, a short time before his death, and we found him at his bench finishing a new machine to cut out wheels, and he talked at length of his past and present work and his *plans for the future*”.

He said: “Yes, I left several of my machines and many plans in the United States, but the mechanics over there, my fellow citizens, would be astonished at the sight of what still remains in my portfolio.”

Ernest Haudenschild

For the first time, the Swiss Society for Chronometry holds its annual general meeting in a city which is not a center of horology manufacture. Although the federal city, which will receive many Swiss and foreign chronometer makers on Saturday, June 4, 1932, is a city without history from the point of view of chronometry, it should be noted that one of the curiosities of Berne is the Clock Tower. At each hour it plays out its mime, where the King, the Buffoon, Hans the jaquemart and naturally the Bear, without which nothing is Bernois, appear. Caspar Brunner, the supposed maker of this mechanical curiosity (1530), was a skilful master. “Various clock and watch makers of Berne”, wrote Mr. A. Chapuis in his *Monde des Automats* “often had to repair this remarkable clock”. In 1785, a report established that the mechanism would be “able” to be useful for many centuries. It was correct; they manufactured well and solid in those times. Berne preserved the taste for beautiful things and the city has a number of collectors who have superb clocks from Neuchâtel and France. If the construction of tower clocks with automats comes within the province of history, the taste for more modest, but no less interesting constructions is still quite alive. Mr. Ernest Haudenschild gives us proof by a few works displayed with those of P.-F. Ingold in the Bürgerhaus at the time of the 8th assembly of the S.S.C.

One sometimes finds in rural families, a child who shows a special interest, a very strong attraction towards this marvellous small machine, the watch or the clock. It was the case with Ernest Haudenschild who forsook the work of the countryside and entered into training in Bienne in 1882. The training at that time did not have the guarantees that the law requires today. But the young apprentice had a taste for study and work well done; the enthusiasm of youth is often the best master of training. The days were long; the 8 hours day, the Saturday afternoon, and even Sunday morning off were unknown then. The apprentice had to feed the workshop furnace in winter, to bring wood and water, and only those who had paid for training at a great price (the minimum was 100 francs for two years) had the right "to a break for bread" of 4 hours ... which was not even the privilege of the young Haudenschild. His training finished, Mr. Haudenschild, by his own effort, increased his professional knowledge in horology at La Chaux-de-Fonds, where he stayed for 12 years.



Mr. E. Haudenschild beside his main work.

He then set up a shop in Reinach, in the Argove, and it was about 1900 that he began the construction of his monumental clock, the most beautiful piece in his collection, which took him 5 years to make using all his spare time. This clock is 2.40 m. high and 1.50 m. wide. The top dial, in the middle of the case, indicates the hours and minutes. The minute hand carries two dials, one of which marks the seconds and the other the hours and the minutes, by an ingenious train using gravity as the driving force.

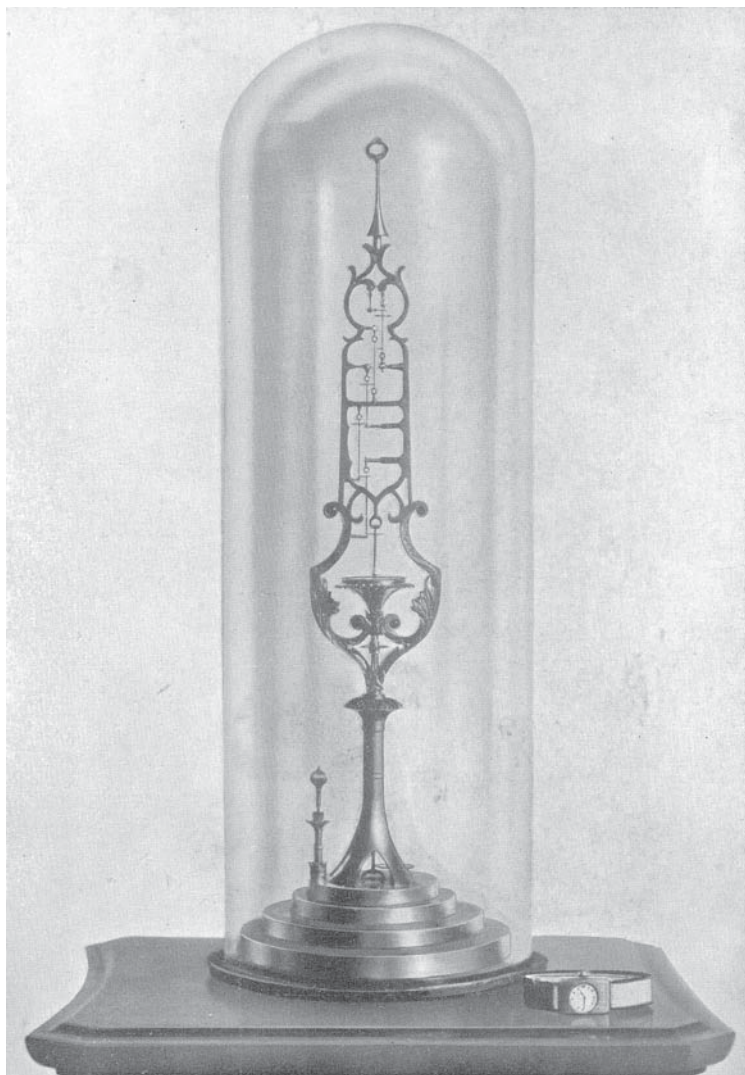
The hour hand also carries a small dial which indicates the hours by the same method.

On the left of the clock there is tableau in which the moon appears in its various phases; and on the right is an aneroid barometer.

Below these three dials the day of the week, the date and the month appear in openings. The calendar takes account of leap years. On December 31, during the ringing of midnight, the openings display

wishes for a happy new year. By pressing a button, the inscription disappears and another is displayed, reminding the owner of the need for winding the perpetual calendar.

This winding provides 18 months functioning of the indications for the days of the week and the date, and 25 years for the display of the months. The clock is provided with *grande sonnerie*. The whole case of this massive piece is in good taste, without unnecessary excesses. The dimensions and the weight of this remarkable piece prevented us transporting it, but the photograph with its constructor make it possible to assess this masterpiece.



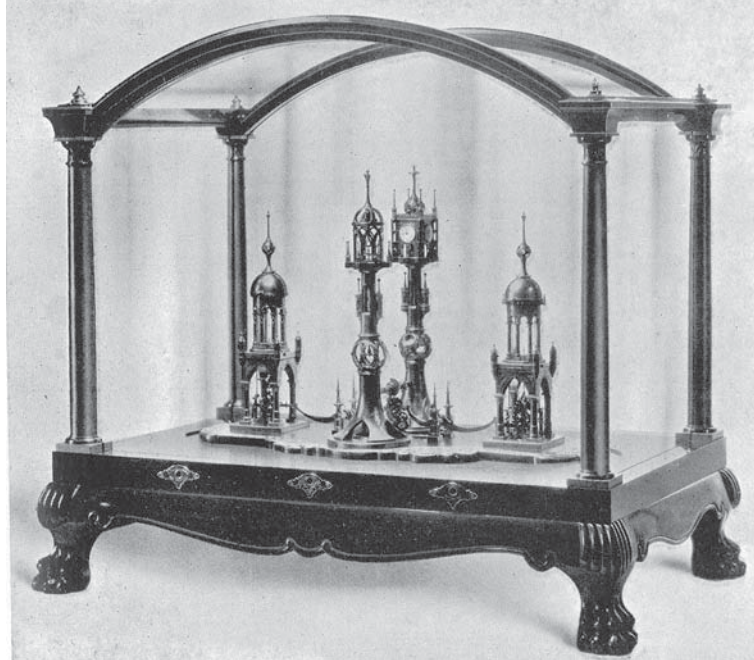
The Monstranzuhr

The “Monstranzuhr”, whose form calls to mind the monstrance of the catholic church, is the most curious in this collection. The bronze base contains the mainspring and the winding mechanism. The train, very curiously spread out to the balance, is set with jewels and the operation of setting them in this particular case was not the least difficulty of its delicate construction. Also the manufacturer considered it desirable to engrave one the bases of this small clock with a motto which is not useless and which, translated into French, means “never give this clock to a repairer for practice”.

The “Prunkuhr” or “parade clock” is a fantasy of clock-making mechanics which recalls, in a more modern form, the fairytale automats of the 18 century. But the fantasy is restricted here to highlight the functions of the going train and the *grande sonnerie*, within a framework of bell-towers and turrets, entirely carved by hand with a great preoccupation for perfection. There is a bronze base on which there are four towers. In the middle, one carries the escapement with its balance, the other has four dials and a fifth on the spire of the same tower.

The two outer towers are reserved for the *grande sonnerie*, driven from the center of the base by an ingenious combination of levers.

The gold balance has 24 white sapphires set in it and crowns the building. The ivory watch also represents a work of patience, full of difficulties². The middle of the case, the pendant and the plate are made from a single piece of ivory. The jewels of the train are set in chatons screwed to the bridges; the top jewel of the escapement is set directly in the ivory. The regulator and the bridge for the lever are made of gold, the balance has a cylindrical balance spring and the dial is made of ivory. This piece is not unique; a Hindu Maharajah, allured by the originality of this construction, acquired one of these watches a few years ago.



The Prunkuhr

Also, let us add a “mother-of-pearl box” with a perpetual calendar watch; and which includes, in a reduced size, a lighter, a knife, a screwdriver, tweezers and a mirror.

One should remember that these varied constructions were made by a craftsman occupied by the good running of his personal business, and it is necessary to pay homage to his work. Mr. Haudenschild has well deserved the 15 days’ holidays that he took in 1931 for the first time in his career as a skilful craftsman, which we give as an example to the younger generation.

2 Presumably the watch shown in the photograph of the Monstranzuhr.