ERWIN SATTLER
MÜNCHEN

Content

Erwin Sattler GmbH & Co. KG

Großuhrenmanufaktur

Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

1. Philosophy

The small family business 'Erwin Sattler Stiluhren', founded in 1958, has grown into a globally operating company. Due to a permanent, general improvement in quality, mainly over the last 15 years, and the particularly carefully cultivated product segment of 'precision pendulum clocks', Sattler today has almost no competition.

Sattler doesn't just make clocks. They produce furnishings that may one day become the visual centrepiece of an office or living space.

That is why the workshops in Gräfelfing near Munich not only emphasise the finest workmanship and highest precision. The aesthetics of the fine timepieces are just as important.
A Sattler clock should not only display the exact time, but also be pleasing to the eye. That is why the long chain of development from the first draft of the movement to its completion in our workshops is characterised by a balanced synthesis of state-of-the-art manufacturing technologies and centuries-old craftsmanship.

This alone ensures that a Sattler clock fulfils our and, in particular, your high standards down to the last detail. We use the most modern computer-controlled production centres right from the manufacture of the so-called 'raw movement'. Their precision tools are accurate to a hundredth of a millimetre. Tolerances exceeding this are not accepted.

The rest of the precision finishing work is then characterised by the extensive skills and abilities of our experienced watchmakers.

With this credo Erwin Sattler's dream was fulfilled: the small series precision pendulum clocks lovingly manufactured by the Gräfelfing-based manufactory moved up in the hierarchy to become the best available in this category in the world.
With this in mind, Erwin Sattler München has now manufactured "clocks for generations" for more than 60 years, clocks that even the company's own managers and employees would buy.

ERWIN SATTLER
MÜNCHEN

1. History

1903 The watchmaker Heinrich Sattler, the grandfather of Erwin Sattler, received a German Imperial Patent for his design of a perpetual calendar.

1920 The sculptor Oscar Schönfeld founded a company in Munich, where he reproduced valuable clocks and realized artistic ideas.

1958 Founding of the company Erwin Sattler. The watchmaker Erwin Sattler acquired Oscar Schönfeld`s clock collection. He added many new clocks over the next 25 years. The high-quality table and wall clocks were partly carved and gold-plated, and then painted by hand in the highest skill by Viola Sattler, Erwin Sattler`s wife. At the end of the 1970s the first regulators were manufactured, which gained the company respect beyond the german borders.

1984 The first precision clocks with own Sattler movement realized in collaboration with the master watchmaker Robert Schleich. Special features were a complete jeweled movement with central second and gridiron pendulum.

1984 The watchmaker Richard Müller begins to work as a representative for Germany and Austria for the company of Erwin Sattler.

1989 Stephanie Sattler, the daughter of Erwin Sattler, joins the company as a business executive and starts managing buying and sales for the enterprise.

1990 Development of the manufactory: Under the direction of Richard Müller, who was responsible for the development and the quality of the movements from this time, the first computerized drilling and milling machines were purchased.

1992 The Company Erwin Sattler was converted into a KG (limited partnership). The owners were Erwin Sattler as general partner, Stephanie Sattler-Rick and Richard Müller as limited partners.

2002 Founding of the Erwin Sattler OHG (general partnership), clock manufactory. Owners of the company are Stephanie Sattler-Rick and Richard Müller. Meanwhile, over 20 Sattler movements are produced. The production depth for the movements is more than 90%.

2003 Founding of the subsidiary Müller & Sattler Clock Kit GmbH (Ltd).

2006 Production of the first precision watch winder for automatic watches complete by equipped with ball bearings, a precision pendulum movement and a unique electronic control system.

2006 Move to the own new Erwin Sattler manufactory building in Lohenstraße 6 in Gräfelfing near Munich

2008 Jubilee 50 years Erwin Sattler

2012 Floor addition at the Erwin Sattler manufactory with a second floor

2018 Jubilee 60 years Erwin Sattler

2020 Change in the management

Erwin Sattler GmbH & Co. KG

Großuhrenmanufaktur

Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

2. Product information and summary

2 a. Difference: Regulator pulley clock - Precision pendulum clock

Precision pendulum clocks	Regulator pulley clocks
Achievable accuracy: 1-2 seconds per month	Achievable accuracy: approx. 10 seconds per week
Pendulum rods made of Superinvar (special alloy)	Wooden pendulum rods
Precision pendulum with air pressure and temperature compensation	**No** air pressure and temperature compensation
Pendulum is tested in the measuring and testing laboratory in the manufactory	**No** test
(Mostly) 1 month power reserve	1 week or 1 month power reserve
Handmade, domed hands	
Maintaining power mechanism	Partly maintaining power mechanism
Escapement lever with agate pallets	Escapement lever with hardened steel pallets
Counter weight at the minute hand	**No** counter weight
Fine regulation table	**Only** rough regulation at the pendulum rod (knurled nuts)

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

2 b. Difference cases: Classica - Classica M - Opus

Classica case

- Rounded rim and base
- Bevelled mineral glass
- Not anti-reflective
- Door closure with small hooks

- Crank in a drawer hidden in the case

Classica M case

- Metal inlays in rim and base
- Anti-reflective mineral glass
- Door with magnetic closure

- Crank and the strike train silencer weight in a drawer hidden in the case

Opus case

- Metal inlays in rim and base
- U-shaped mineral glass, affixed on a mitre
- Anti-reflective mineral glass
- Door with magnetic closure

- Hidden compartment for the crank and the strike train silencer weight in the base

Erwin Sattler GmbH & Co. KG

Großuhrenmanufaktur

Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

2 c. Naming: Abbreviation Explanation

60, 70, 100, 130 = Height of the clock
Example: Classica 60 = 60 cm high

M behind the number = metal inlays/modern case
Example: Classica 60 M

S = Strike
Example: Classica S 70

K = Calendar (in German Kalender)
Example: Classica K 100

KS = Calendar (in German Kalender) and Strike
Example: Classica KS 100

P = Passing strike
Example: Classica P 70 M

M = Moon
Example:Opus P**M**D 70

D = Date
Example: Opus PM**D** 100

2 d. Types of wood: sample folder / Custom-made product

Inhaltsverzeichnis
Table of contents

Erwin Sattler GmbH & Co. KG

Großuhrenmanufaktur

Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

2 e. Watch winders: Special features

The purpose of a watch winder

An automatic watch will work at its best when it is kept permanently in motion. As a rule, a watch collector only wears one watch at a time; so all other watches in his collection would stop after 36 to 42 hours. In the event of complications and with »perpetual calendars« in particular, resetting can often be a very elaborate process.
Erwin Sattler watch winders assume this task effortlessly. Thanks to the modern, easy touse technology and software, each individual watch winder unit can be adapted to any automatic movement.

The advantages of the ERWIN SATTLER watch winders

- 100% Made in Germany
- Design, production and assembly in the manufactory in Gräfelfing near Munich
- Each single watch winder can be set individually to the respective movement using the integrated software/database
- The integrated database contains over 12,000 watch models, with the number of turns and direction of rotation exactly specified by the manufacturer
- The control simulates the daily routine of a wearer with a 16-hour active phase and an 8-hour sleeping phase
- The needed turns per day will be spread over the 16-hour active phase
- WLAN technology for individual programming
- The watches are always aligned exactly to 12 o'clock after the winding interval
- Watch holder variants for different strap lengths
- 6 stainless steel precision ball bearings per motor
- Precision motors made in Germany
- A separate motor for each watch winder
- LED illumination
- The own house alarm system can be connected (except Rotalis 3, Rotalis 6 Wood and Rotalis 10 Wood)
- Identification by a fingerprint reader (except Rotalis 3, Rotalis 6 Wood and Rotalis 10 Wood)

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

2 f. Sales promotion tools: catalogue, poster, website, inspiration

Catalogue

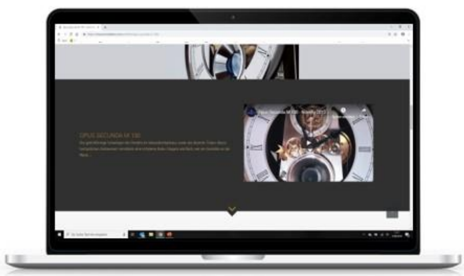
Poster

- in original size

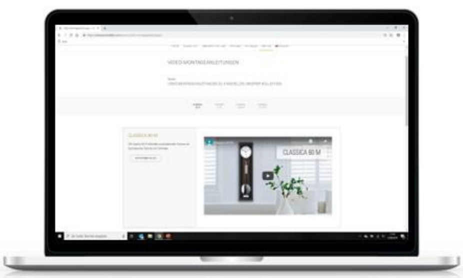
Website

Product categories at a glance

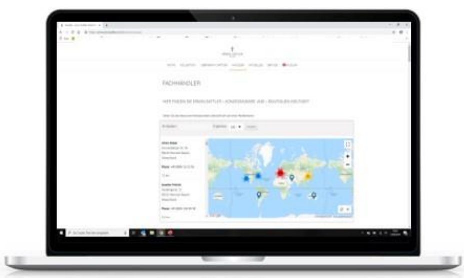
Videos about our products



Installation videos for regulator pulley clocks



Overview of our retailers on the world map



Erwin Sattler GmbH & Co. KG

Großuhrenmanufaktur

Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

2 f. Sales promotion tools: catalogue, poster, website, inspiration

Website

You can demonstrate product images/videos on a tablet or smartphone to your customers by simply operating them during the sales talk

Inspirations

- Co-operation with furniture stores, clocks must be looked after
- Co-operation with architects
- Co-operation with manufacturers of high-quality furniture
- Customer campaigns: Contact doctors or offices, clocks may be tax-deductible...
- Visit the Sattler manufactory with interested customers
- Campaigns/seminars with a clock kit (possibility that only the movement is provided by Sattler)
- Send customers by, short detour during business trips or holidays
- Install PPU movement + pendulum in furniture
- Install watch winder module
- Set new customer clocks and repairs according to Sattler PPU
- Advertising subsidy: 5% of the previous year's turnover, but only 50% maximum of the advertising costs
- Send newsletter by email

2. g. Why is a Erwin Sattler clock so precise?

The following descriptions are intended to give you an insight and the special design features of a precision clock. It is, of course, a demanding task to bring the complex interrelationships of pendulum, escapement and gear train closer to the interested clock enthusiast in relatively short and comprehensible texts. After all, we clockmakers have three years to learn the basics of this craft.

It is the fascinating interplay between the laws of nature and what at first glance appears to be simple mechanics that allows us to measure the passing of time with enormous precision. Over the last centuries, clockmakers have made great efforts to increase the accuracy of precision pendulum clocks with the means at their disposal.

Today, we are committed to this tradition and are therefore constantly striving to improve our purely mechanical clocks with the help of new materials, modern manufacturing methods and new clock design solutions.

The pendulum

The fascination of a precision pendulum clock today lies not only in its accuracy, but also, on closer inspection, in its simple and clear construction. Thus, we can observe and understand the effects of the laws of nature on the clock. The pendulum is still today’s most accurate mechanical oscillation device. It divides time into precisely defined units. These are defined by the length of the pendulum and the force of gravity. This time-keeping breakthrough was discovered by Galileo Galilei in 1585. According to his observations, a pendulum has always the same oscillation time (period) regardless of its amplitude. This principle is called 'isochronism'.

Strictly speaking it only holds at very small amplitudes. In conclusion one can say that the accuracy of a clock pendulum is determined by constant length, constant small amplitude and a constant force of gravity.

But the length of a pendulum is dependent on external influences like temperature. An increase in temperature results in the expansion of almost all solid materials. This means the pendulum rod becomes longer. When temperature falls the effect is reversed. The result is a longer period at higher temperatures and a shorter period at lower temperatures.

In order to keep the oscillation angle or amplitude of the pendulum constant, it is necessary to supply the energy, that is lost with every swing due to the resistance of the air and in the suspension spring.

The question now arises as to how the clockmakers have managed over the last 400 years to compensate for these influences, which prevented the pendulum clocks from running accurately.

To do this, we must first take a closer look at the construction of our pendulum.

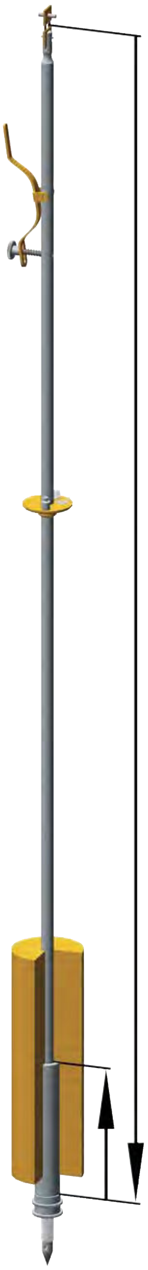
It consists of the pendulum rod, a compensation tube on which the pendulum weight rests, the regulating nut and its lock nut. The fine regulation table is located approximately in the middle of the pendulum rod and the beat adjuster at the upper end.

As we know, the pendulum rod expands as it heats up and our clock slows down.

Therefore the use of a material with very low thermal expansion is important. At the end of the 19th century the French scientist Charles Edouard Guillaume discovered a Iron-Nickel alloy whose expansion is 10 times less than normal steel and 5 times less than wood. It is called Invar*.

For normal clocks, excellent timekeeping results of a few seconds per week were already possible with the wooden rod pendulums used. However, to increase the accuracy to a few seconds deviation per month, it is not sufficient to simply use an invar rod, but it is also necessary to compensate for the already very small linear expansion of the invar rod.

ERWIN SATTLER
MÜNCHEN



This is why the so called 'compensation tube' sits on top of the regulation nut supporting the pendulum bob. This short tube is made of normal steel and has a precisely calculated length, so that its expansion is the same as the complete pendulum rod and suspension spring (see illustration on the left). Any change in the length of the rod is balanced by a similar change in the tube and the pendulum bob.This method of temperature compensation was invented by Siegmund Riefler in1896 and is used in a number of precision clocks.

Now that we have explained the subject of the constant pendulum length, or more precisely, the constant center of oscillation, we must go into the constant of gravity. In addition to the length of the pendulum, the force of gravity is decisive for the period of oscillation. This force, which we know all too well, is constant in one place, but changes when we move from north to south or change our altitude relative to sea level. For this reason, a pendulum clock must be adjusted at the respective installation place, i.e. we adjust the pendulum length to the local gravitational force.

To do this, we use the regulation nut and change the center of gravity of the pendulum by screwing it up or down. This procedure allows us to adjust the clock to a deviation of one to two seconds per day. However, in order to achieve a rate accuracy of two to three seconds per month, we now have to correct the center of oscillation of the pendulum with the help of fine adjustment weights weighing just a few milligrams. To do this, we place the weights on the fine regulation table in the center of the pendulum baton and thus achieve a minimal upward shift of the center of gravity and a small acceleration of the pendulum swing.

When we remove a weight, the oscillation time is longer and the clock runs slow.

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

The last unanswered requirement is the provision of a constant pendulum amplitude. This is not provided by the pendulum but is due to the power that is supplied to the pendulum to keep it oscillating.
This is delivered by the escapement which is the connection between the gear train and the oscillation system. However, we already know that this has the task of keeping the pendulum swinging. Since the friction of the air and the suspension system is almost constant, the force applied to the pendulum must also be kept as constant as possible. This is the task of the movement and its driving force.

At this point, it should only be mentioned that the driving force is achieved by means of an outgoing weight which exerts a constant force on the gear train due to the constant force of gravity at the place of installation.

Air pressure compensation by using the barometer instrument

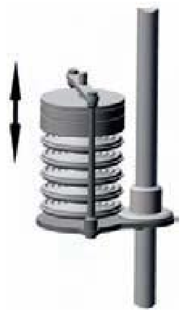
In addition to temperature changes, whose effects are counteracted by temperature compensation, air-pressure fluctuations also cause accuracy changes. This accuracy deviation, also known as the pendulum's airpressure constant, equates to approximately one to two hundredths of a second per mbar (millibar) per day, depending on the shape of the pendulum body and its specific weight. This error is caused by a change in air resistance and the pendulum's lift. The mean air pressure at sea level (NN) is 1013 mbar and varies between 930-1070 mbar (hPa, hectopascal).
As a result, in the event of extreme pressure changes of 100 mbar, a pendulum clock's accuracy can change by approximately one to two seconds per day, as shown by measurements on our own pendulum test stand.
To counterbalance these deviations, Riefler developed the concept of airpressure compensation using aneroid capsules*, as can already be seen in aneroid barometers and barometric altimeters. Air-pressure fluctuations are generally short lived. As these fluctuations may balance out, if the accuracy is monitored over an extended period of around a month, they have very little impact.
Nevertheless, using air-pressure compensation is worthwhile. We cannot assume that the air pressure has balanced out exactly between the times when the state of the clock is checked. However, a good precision pendulum clock is characterised by steady motion and is not affected by outside interferences.

The barometer instrument compensates for accuracy fluctuations that are caused by air-pressure changes. To be more precise, we are referring to changes in air density or air weight that are proportionally related to the air pressure. Accuracy fluctuations caused by increasing air density result from the pendulum's increased lift. Together with other influence factors, such as increased air resistance, this causes the pendulum swing to slow down. The impact this error has on the pendulum depends on the shape of the pendulum and its specific weight. This impact cannot be adequately calculated and must be determined using very time-consuming measurements on a pendulum test stand housed in a sealed glass tank and isolated from environmental influences.
The compensation function depends on changes to the pendulum's moment of inertia caused by moving a mass on the pendulum rod, and causes the period of oscillation to change. When using this kind of compensation, movement is caused by the five aneroid capsules or barometer capsules with the weight on them. Each of these capsules consists of two thin metal membranes that are soldered together in a vacuum. If the air pressure outside these capsules increases, they are pushed together and the counterweight lowers. This results in a total displacement of 1.5 mm with a pressure change of 100 mbar. Thanks to the capsule design, temperature influences do not affect the total stroke.
The instrument is fitted between the pendulum pivot (pendulum spring) and the centre of the pendulum rod. Comply with the position given in the assembly instructions, since the exact effect of the compensation depends on this.

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

MÜNCHEN

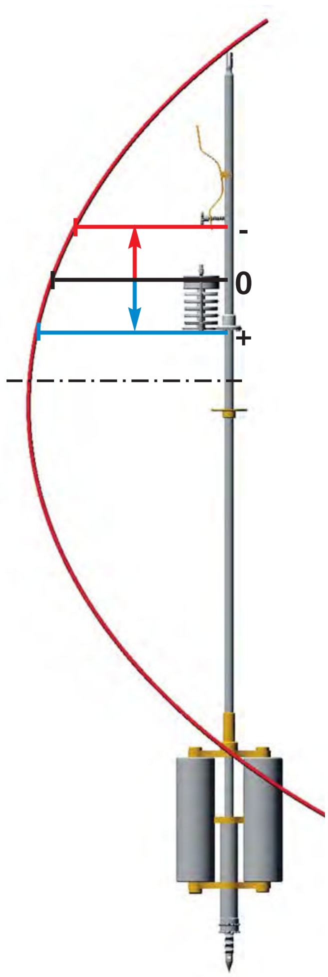
How barometer compensation works



When the air pressure increases, the pendulum has more lift and air resistance increases. Without compensation, the pendulum would swing more slowly and the clock would lose time. The aneroid capsules for the air-pressure compensation are pushed together.

As a result, the counterweight moves downwards and the pendulum speed increases. Attentive readers may ask themselves whether we have made an error here. After all, we are changing the pendulum's physical balance point and this must result in the movement slowing down!

Have we not done precisely that when setting a precision pendulum clock? When moving the pendulum bob downwards, the clock slows down.The same can be achieved by removing a fine adjustment weight from the support plate.To explain this slightly confusing fact, we can imagine a mathematical (ideal) pendulum, which consists of a massless pendulum rod and a point-shaped pendulum weight of any mass.



Increasing the mass of the pendulum weight on this pendulum has no influence on the period of oscillation. The same would happen if we were to add a mass to the pendulum's fulcrum point (suspension).

Neither influences the pendulum's moment of inertia, and nor, therefore, the period of oscillation. Adding a mass at any other point on the pendulum rod between the fulcrum point and the pendulum weight accelerates the period of oscillation. This effect is most noticeable in the centre between these two points. If we consider the extent of the effects in relation to the position on the pendulum rod, we will see the effect line illustrated by the parabola shown in the adjacent figure.

It crosses the pendulum rod at the fulcrum point on the pendulum spring and the balance point (central oscillation point) at the height of the pendulum body. The apex (maximum acceleration) is in the middle of the pendulum rod.

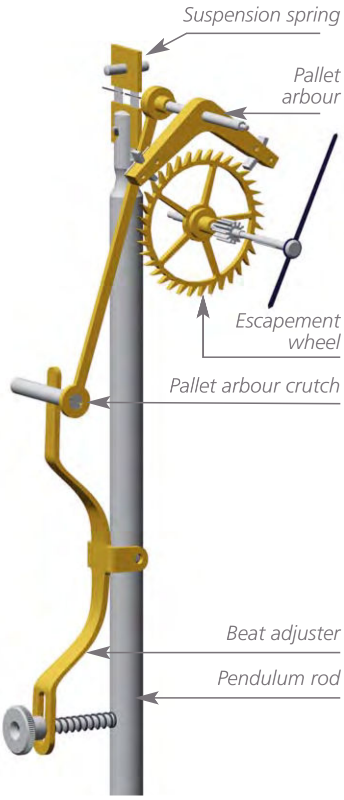
As shown in the schematic figure, this results in a mass above the middle that is being moved downwards causing the period of oscillation to accelerate. Your compensation system works in accordance with this principle . This also highlights the importance of the instrument's position.

Erwin Sattler GmbH & Co. KG

Großuhrenmanufaktur

Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

The escapement



The escapement has two important tasks:

1. It is the connection between gear train and oscillation system. It replaces the energy that the pendulum loses through friction.
2. In addition to this it controls the gear train.

The action of the escapement is controlled by the pendulum, making it possible to »count« the oscillations of the pendulum with the gear train and display them with the hands.

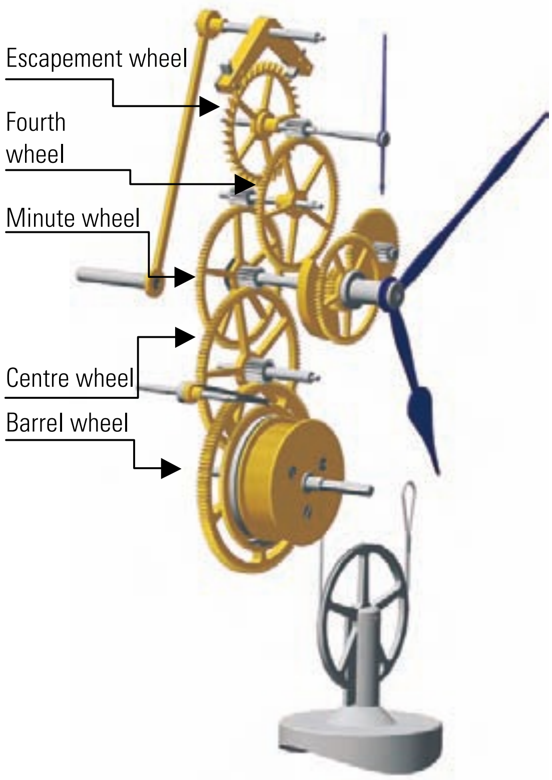
Since the discovery of the pendulum as an oscillation device for clocks, different escapement systems were developed which worked more or less satisfactorily. The so-called »dead beat« escapement invented by George Graham in 1720. This is why it is also called Graham* escapement.

This escapement evolved from the earlier escapements and its simplicity and reliability is unmatched. In some cases escapements were invented that work more precisely but they are much more complicated and difficult to set up.

The driving mechanism together with the gear train has to supply the escapement and the pendulum with energy. The gear train also drives the hands.

The driving mechanism

As mentioned in the chapter about the pendulum, we know that we have to drive the pendulum with a constant force to produce consistent oscillation of the pendulum.



This force comes from a weight which performs, thanks to gravity, a constant driving force on the barrel wheel.

In this way we give a constant force to the gear train, which is transmitted to the escapement and thus drives the pendulum.

The gear train must gear up the revolutions of the barrel wheel to the escapement wheel. The energy must be transmitted uniformly and without fluctuation for a constant drive of the pendulum. The driving force is reduced in the same ratio due to the transmission from the barrel wheel to the escapement wheel.

The weight is not suspended directly from the cable drum*, but works on the gear train via a pulley. Through this pulley, the weight force is divided equally between the attachment of the steel cable in the case and the cable drum, as with a pulley block.

This has the advantage that we reach, at the same height of fall, which is limited by the length of the case, the double winding period.

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

The maintaining power mechanism

While you are winding a precision pendulum clock, the steel cable is coiled onto the barrel, moving the weight upwards. Because the weight cannot act on the gear train during this time, the clock would not be driven during the winding process, so the time display would remain behind. This is prevented in every Sattler precision pendulum clock by a so-called maintaining power mechanism on the barrel arbor.

Das Räderwerk

This consideration results in the design specifications for a good gear train:
The gear train must transmit power evenly to the escapement with only small losses. In addition to this it should work for a long time without wear. The gear train of a precision pendulum clock, is a completely new development.
We put our more than 60 years experience building precision clocks into fulfilling the most demanding criteria for a perfect gear train. Wear in a clock is the result of friction.

Engagement is the mating of the teeth of a wheel with teeth of another wheel. In a gear train clockmakers call the bigger driving gear a »wheel« and the smaller driven gear a »pinion«.
But first, let's have a look at the friction.
Most of the friction occurs in the bearings of the wheels. In common clocks the thin pivots turns directly in holes of the front and back plate (most made of brass) and are lubricated with some oil. This type of bearing has proven itself for normal utility clocks, but has the disadvantage that over time the oil loses its lubricating properties due to contamination by metal abrasion and evaporation.
This increases the wear, the holes enlarge and there is a loss of driving force; the clock keeps stopping. However, the enlarged bearing holes alone are not the cause of the driving force losses, also the distances between the intermeshing wheels change and thus hinder the transmission of power.
For this reason some precision clocks have jewelled bearings, so called Chatons. These bearings show hardly any signs of wear even after decades.
To avoid friction however these bearings need oil. But every oil ages and the bearings must be cleaned and relubricated regularly (5-10 years), to avoid damage.
The friction of the bearings described up to this point is called sliding friction, since the pivot in the bearing hole slides along the wall of the hole during its rotation.
Erwin Sattler clocks are equipped with miniature ball bearings of stainless steel.
The friction of a ball bearing is called rolling friction because the inner bearing ring rolls along the outer bearing ring. The friction is very small and because of the small force the bearing needs no oil.
The maximum rotation speed of these bearings is 100 000 rpm (revolutions per minute).The fastest wheel of our clock, the escapement wheel*, makes one revolution per minute. We can be sure that our bearings don’t have too much load. Only dust can cause friction, but the movement is installed in a sealed case.
This bearing is excellent for clocks and enables us to work with less driving force, as the ball bearings produce less friction, resulting in reduced loss of power. Less driving force also means less strain on the teeth, which in turn increases the longevity of the gear train.

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

3. Handling and service

3. a. Practical section: Assembly

3. b. General maintenance

The previous sections should have proved to you that your new pendulum clock is a precision timepiece of the highest quality.
As every other instrument of this kind your regulator also requires careful handling and a certain degree of maintenance. We therefore advise you never to keep the clock case open over a long period of time, in order to prevent dust from depositing on the clockwork.
After 10 years the latest you should entrust your pendulum clock to a competent clockmaker's workshop in order to have the bearings cleaned and oiled anew.
This should be a matter of course for a pendulum clock that keeps precious time accurate to the second 24 hours a day for many years. It will then serve you tirelessly for decades and be proudly passed down from generation to generation as a valuable timepiece.

3. c. Recognising and resolving errors

Regulator 60 cm without striking mechanism

- Pendulum lense rubs against backwall-wall is not perpendicular
- Beat adjustment not correct
- Case shifted when opening
- Suspension spring damaged when regulating
- Cat-gut not wound properly
- Beat adjuster bent, rubs against movement plate or plate of pendulum rod
- Ticking sound unnormal - lubricate driving pin with thick grease

Regulator 70 cm with striking mechanism

- Sound is not good - adjust hammer or gong spring
- Clock strikes not correct hour - turn minute hand to 60 minutes, count number of strikes, turn hour hand to the depending hour while minute hand remains on 60
- Pendulum lens rubs against backwall-wall is not perpendicular
- Beat adjustment not correct
- Case shifted when opening
- Suspension spring damaged when regulating
- Cat-gut not wound properly
- Beat adjuster bent, rubs against movement plate or plate of pendulum rod

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

ERWIN SATTLER
MÜNCHEN

3. c. Recognising and resolving errors

Regulators 100 cm and 130 cm with calendar indication

- Pendulum lens rubs against backwall-wall is not perpendicular, for 130 models -adjust distance screws
- Beat adjustment not correct
- Case shifted when opening
- Suspension spring damaged when regulating
- Steel cable/Cat-gut not wound properly
- Beat adjuster bent, rubs against movement plate or plate of pendulum rod
- Hands touch each other or rub on dial
- Date does not change: check 24 hour setting, pin of date wheel bent caused by turning hands counterclockwise

Regulators 100 cm and 130 cm with striking mechanism

- Sound is not good--adjust hammer or gong spring
- Clock strikes not correct hour—turn minute hand to 60 minutes, count number of strikes, turn hour hand to the depending hour while minute hand remains on 60
- Pendulum lens rubs against backwall-wall is not perpendicular
- Beat adjustment not correct
- Case shifted when opening
- Suspension spring damaged when regulating
- Steel cable/Cat-gut not wound properly
- Beat adjuster bent, rubs against movement plate or plate of pendulum rod
- Grandfather clock Excelsia: case wobbles—adjust distance screws on top of the case

Regulators 100 cm and 130 cm with calendar indication and striking mechanism

- Pendulum lens rubs against backwall-wall is not perpendicular, for 130 models -adjust distance screws
- Beat adjustment not correct
- Case shifted when opening
- Suspension spring damaged when regulating
- Steel cable/Cat-gut not wound properly
- Beat adjuster bent, rubs against movement plate or plate of pendulum rod
- Hands touch each other or rub on dial
- Date does not change: check 24 hour setting, pin of date wheel bent caused by turning hands counter clockwise
- Sound is not good--adjust hammer or gong spring
- Clock strikes not correct hour—turn minute hand to 60 minutes, count number of strikes, turn hour hand to the depending hour while minute hand remains on 60

Erwin Sattler GmbH & Co. KG
Großuhrenmanufaktur
Lohenstraße 6 · D - 82166 Gräfelfing ·
Tel. +49 (0)89 / 89 55 806-0 · Fax +49 (0)89 / 89 55 806-28
e-mail: info@erwinsattler.de · www.erwinsattler.de

3. c. Recognising and resolving errors

Precision pendulum clocks

- Case not bolted firmly to the wall
- Beat adjuster bent, jammed, etc.
- Steel cable not wound properly
- Beat adjustment not correct
- Hands touch each other or rub on dial
- Counter ratchet not engaged
- Suspension spring damaged
- Beat adjuster not engaged
- Pendulum weight not parallel to back wall, can be turned

Table clocks

Your clock has been exactly adjusted in our workshop. Should you however notice a great deviation of your clock in the course of one week, please consult your **clockmaker**. He will then readjust your clock with the necessary care.

- Unruhspirale beim Regulieren beschädigt
- Datum schaltet nicht um Mitternacht – 24h Einstellung oder Stundenzeiger verdrehen

3. d. Movement packaging

- Request packaging for movement shipping

3 e. Download area

SCAN ME

On the website you will find in the service area:
- Download catalogue and manuals
- Assembly instructions videos
- Tips and tricks
- Calculating the moon phase

5. Digital marketing

General advantages for you as our official concessionaire

Often the faster way to get information
You are informed in real time.
Insights into the manufactory and our production processes.
Better understand and communicate our corporate philosophy.
Be informed about news immediately - newsletter!

Pinterest:

Erwin Sattler GmnH & Co. KG

LinkedIN:
Erwin Sattler GmbH & Co. KG

Instagram:

Erwinsattler.official

Facebook:

Erwin Sattler GmbH & Co. KG

Youtube:

Erwin Sattler GmbH & Co. KG

Themen

- ✓ Trade Fairs
- ✓ Novelties
- ✓ Promotions
- ✓ Blog topics (about the manufactory, production processes, etc.)
- ✓ Almost sold out products

ERWIN SATTLER
MÜNCHEN

6. Ansprechpartner

Stephanie Sattler-Rick
Management

- Pivotal point
- Incoming orders and processing
- Production
- Sales
- Etc.

CONTACT DETAILS:
info@erwinsattler.de
t.+49.(0)89. 89 55 806 - 0
f. +49.(0)89. 89 55 806 - 28

Markus Glöggler
Master Watchmaker - Workshop manager

- Technical questions
- Orders
- Assembly
- Sales
- Etc.

CONTACT DETAILS:
Markus.gloeggler@erwinsattler.de
t.+49.(0)89. 89 55 806 - 15
f. +49.(0)89. 89 55 806 - 28

Jürgen Kohler
Master Watchmaker - Design / Product Developer

- Technical questions
- Orders
- Assembly
- Construction
- Sales
- Etc.

CONTACT DETAILS:
Juergen.kohler@erwinsattler.de
t.+49.(0)89. 89 55 806 - 14
f. +49.(0)89. 89 55 806 - 28

ERWIN SATTLER
MÜNCHEN

7. Ansprechpartner

Sabine Müller
Marketing Manager

- Print enquiries
- Image & text material print
- Catalogues
- Orders

CONTACT DETAILS:
Sabine.mueller@erwinsattler.de
t.+49.(0)89. 89 55 806 - 12
f. +49.(0)89. 89 55 806 - 28

Julia Rick
Management Assistant

- Incoming orders
- Sales
- Orders
- Social Media

CONTACT DETAILS:
julia.rick@erwinsattler.de
t.+49.(0)89. 89 55 806 - 13
f. +49.(0)89. 89 55 806 - 28

Magdalena Wimmer
Online Marketing Manager

- Social Media
- Image & text material online
- Newsletter
- Etc.

CONTACT DETAILS:
magdalena.wimmer@erwinsattler.de M
obil +49 162 816 90 25
f. +49.(0)89. 89 55 806 - 28

ERWIN SATTLER
MÜNCHEN

7. Ansprechpartner

Michael Spänle
Product Specialist Watch Winder

- Production & consulting
  watch winders

CONTACT DETAILS:
michael.spaenle@erwinsattler.de
t.+49.(0)89. 89 55 806 - 16
f. +49.(0)89. 89 55 806 - 28

Adrian Franke
Shipping department

- Watch maker

CONTACT DETAILS:
adrian.franke@erwinsattler.de t.
+49.(0)89. 89 55 806 - 17
f. +49.(0)89. 89 55 806 - 28