

The Automatic Watch

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I. Definition

An automatic watch is a timepiece that uses mechanical movement to keep time without the need for manual winding. Unlike traditional watches that require manual winding or a battery, automatic watches are powered by the motion of the wearer's wrist. Automatic watches can be considered to be self-winding watches. The core function of an automatic watch is to accurately measure time by keeping track of the passing hours, minutes, and seconds. This is achieved through a complex system of gears, springs, and oscillators that work together to regulate the motion of the watch's hands. In addition to its timekeeping function, an automatic watch can also include additional features such as a calendar, stopwatch, and moon phase indicator. These additional features can add to the complexity of the watch's internal mechanisms and require additional parts and components to function properly. Overall, an automatic watch represents a fusion of traditional watchmaking techniques and modern engineering. Its intricate mechanisms and attention to detail make it a highly sought-after accessory for those who appreciate fine craftsmanship and precision timekeeping.



Figure 1: Front and Back view of a Frederic Jouvnot Automatic Watch (A Blog to Watch)

II. Overview

The overall appearance of the automatic watch can be described as a small, sophisticated piece of machinery that fits comfortably on the wrist. It usually consists of a circular dial, also known as the watch face, which displays the time using hands or digital displays, along with various markings and indicators to indicate the date, day of the week, and other information. The watch is enclosed in a case, which can be made from various materials such as stainless steel, gold, titanium, or even ceramic, and is designed to protect the delicate mechanisms inside from damage due to external forces, water, or dust. The case can be round, square, rectangular, or have various other shapes, depending on the brand and model of the watch. The watch band is another component of the automatic watch that plays a crucial role in its overall appearance. It is usually made from leather, rubber, metal, or other materials, and is designed to hold the watch securely on the wrist. The band can be plain or decorated, with various patterns or textures, and can be adjusted to fit different wrist sizes.

III. Components

The main components of an automatic watch include the following:

Case: The case is the outer shell of the watch that holds all the other components. It can be made of various materials, including stainless steel, titanium, gold, and ceramic.

Dial: The dial is the watch face, where the hands indicate the time. It can be made of various materials, including metal, enamel, and mother-of-pearl.

Hands: The hands are the small, pointed indicators on the watch face that show the time. There are typically three hands on a watch - hour, minute, and second.

Crown: The crown is a small knob on the side of the case that is used to set the time and wind the watch.



Figure 2: Diagram of exterior components of an automatic watch (Automatic Watches for Men)

Movement: The movement is the heart of the watch and the most complex part. It includes the main spring, gears, escapement, and balance wheel. The movement is responsible for powering the watch and ensuring its accuracy.

Rotor: The rotor is a metal weight that rotates as the wearer moves their arm. The rotor powers the automatic winding mechanism, which winds the watch's mainspring.

Mainspring: The mainspring is a long, coiled spring that stores the energy needed to power the watch. It is wound up either manually or automatically and slowly unwinds overtime to power the watch.

Escapement: The escapement is a device that controls the release of energy from the mainspring and regulates the speed at which the watch runs.

Balance wheel: The balance wheel is a small wheel with a hairspring that oscillates back and forth at a steady rate, regulating the watch's accuracy.

Jewels: Jewels are small, smooth bearings that reduce friction between the gears in the watch movement, improving their accuracy and durability.

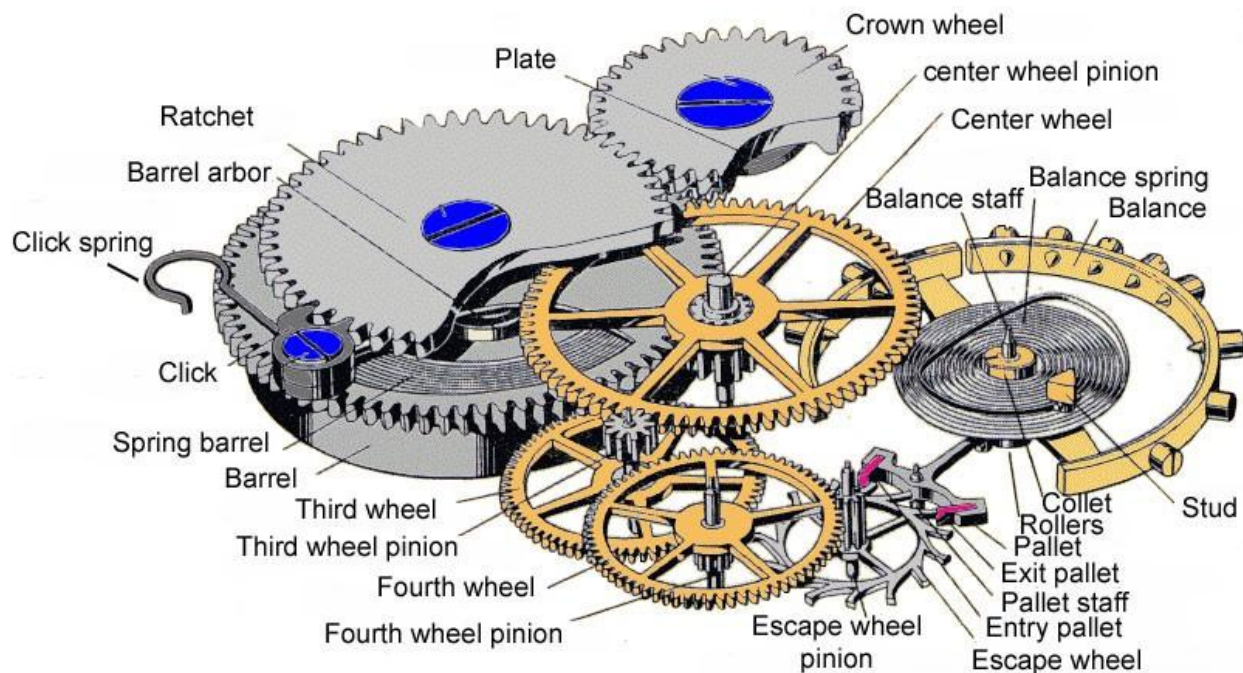


Figure 3: Diagram of the internal components of an Automatic Watch (Ermitage Chronicles)

IV. Explanation

The automatic watch is a self-winding timepiece that operates without requiring manual winding. The watch uses the energy generated by the wearer's movements to power the watch's mechanical movement. The energy is then stored in a mainspring that drives the watch's

movement. The mainspring is the power source for the watch and is located inside the watch's barrel.

The mainspring is coiled tightly when the watch is manually wound or when the watch is shaken. As the mainspring uncoils, it releases energy that is used to power the watch's movement. The movement consists of a series of gears, levers, and springs that work together to measure time accurately. The energy from the mainspring is transmitted to the escapement, which regulates the release of energy and provides the watch with its accuracy. The escapement consists of a balance wheel, a hairspring, and an escapement wheel.

The balance wheel oscillates back and forth, and the hairspring controls its motion. The escapement wheel releases the energy in regular intervals, which controls the watch's timekeeping. The automatic watch's timekeeping accuracy is also influenced by several other factors, including temperature, position, and shock.

The watch's accuracy can be affected by changes in temperature, and the watch may run faster or slower depending on the ambient temperature. The watch's position also affects its accuracy, and the watch will run differently when placed in different positions. The watch is also susceptible to shocks and vibrations, which can cause the watch to run fast or slow.

V. Conclusion

The history of automatic watches is a long and storied one, dating back to the 18th century when Abraham-Louis Perrelet invented the self-winding mechanism. Since then, these watches have become synonymous with luxury and precision, and have seen a recent resurgence of interest as consumers seek out the craftsmanship and durability that they represent. As

technology continues to advance, it is likely that automatic watches will continue to be a popular choice for those seeking a timepiece that is both functional and stylish.

One of the benefits of automatic watches is their wide availability, with options ranging from affordable to high-end luxury models. Consumers can find these watches in retail stores as well as online, and many manufacturers offer direct-to-consumer sales through their websites. While some models may be in high demand and difficult to find, the broad availability of automatic watches ensures that there is a model to fit every taste and budget.

The manufacturing of automatic watches requires a high level of skill and precision. Components are produced using computer-aided design and then machined to exacting specifications. The assembly of the watch movement is a labor-intensive process that requires experienced watchmakers, who carefully fit each component together to ensure optimal performance. This process represents a significant investment of time and resources, and the resulting product is a testament to the skill and dedication of those involved in its manufacture.

The cost of an automatic watch can vary greatly depending on various factors, including the brand, model, and features. Entry-level models can be found for under \$100, while high-end luxury models can cost tens of thousands of dollars. The cost is influenced by the quality of materials, the complexity of the movement, and the prestige of the brand. While automatic watches may be more expensive than their quartz counterparts, they offer a level of craftsmanship and prestige that is unmatched by other types of watches.

While automatic watches are generally durable and reliable, they do require regular maintenance to ensure optimal performance. Lubricants used in the movement can break down over time, causing wear and tear on the components. To prevent this, automatic watches should be serviced every 3-5 years by an experienced watchmaker. Additionally, it is essential to protect

automatic watches from extreme temperatures and shocks, as these can cause damage to the movement. With proper care and maintenance, an automatic watch can provide a lifetime of reliable service.

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