

G04C

ELECTROMECHANICAL CLOCKS OR WATCHES

Definition statement

This place covers:

- The "electromechanical timepieces" in a strict sense, namely timepieces in which the time reference (signal) is obtained by electromechanical means, that is by the cooperation of mechanically moving parts and electric/electronic/electromagnetic elements (e.g. a mechanical oscillator whose frequency is regulated by the use of coils), and
- electronic timepieces comprising mechanically moving parts (see [G04G](#) for the definition of electronic timepiece).

One has, in any case, to bear in mind that in the recent decades, a distinction between an electronic and an electromechanical timepiece has become more and more pointless, in some case even useless. For this reason, [G04C](#) is nowadays used to classify electromechanical aspects of clocks or watches in general, without putting an excessive stress on the nature of the timepiece as a whole (for more info, see "Overlapping with external fields" below).

Relationships with other classification places

Although an explicit link to [G04B](#) is present in the title of [G04C](#), documents concerning mechanical parts of electromechanical timepieces could still be classified in [G04C](#), especially if these mechanical parts cooperate to actuate or implement electronic and/or electromechanical functions.

A typical example of such a document involves a setting crown wherein a mechanical rotation (of the crown) is transformed into a sequence of electronic pulses.

The major overlaps of [G04C](#) are found with [G04G](#). This depends on the fact that a clear distinction between the two has become less and less possible and also less and less important. To a certain extent, [G04C](#) and [G04G](#) should be regarded as two complementary classifications or like two sides of the same coin. For these reasons, some common aspects of these two subclasses shall be discussed here.

The following 1-to-1 correspondence between [G04C](#) and [G04G](#) subclasses is to be noted:

- [G04C 9/00](#) is defined in parallel with [G04G 5/00](#);
- [G04C 11/00](#) is defined in parallel with [G04G 7/00](#);
- [G04C 17/00](#) is defined in parallel with [G04G 9/00](#);
- [G04C 19/00](#) is defined in parallel with [G04G 11/00](#);
- [G04C 21/00](#) is defined in parallel with [G04G 13/00](#);
- [G04C 23/00](#) is defined in parallel with [G04G 15/00](#).

In all of the above groups, documents can be found which could belong to their corresponding parallel group. For example, documents could be found in [G04C 9/00](#) which could also be in [G04G 5/00](#) and vice-versa.

When classifying, a lot is left to the common sense of the classifier. If a document describes relevant electromechanical aspects of a timepiece, this document will usually receive at least a classification symbol in [G04C](#). The "real life" situation is such that most often documents receive a double classification (both in [G04C](#) and in [G04G](#)).

Definitely, in cases of doubt, giving a classification symbol in both [G04C](#) and [G04G](#) is a preferred solution to choosing only one of them.

A typical example is given by the pair [G04C 23/00](#), [G04G 15/00](#). Here, timed switches, e.g. devices to execute a timed programme of switching on/off the heating system of a household are typically

classified. A document showing mechanical jumpers to set the time-on and time-off, together with details concerning the mechanical connections of the jumpers with other parts of the mechanism is usually classified in [G04C 23/00](#). Similarly, a document showing a fully programmable CPU-based thermostat with wireless connection to the main heater is typically classified in [G04G 15/00](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mechanical parts of clocks or watches in general	G04B
Electronic time-pieces with no moving parts, electronic circuitry for producing timing pulses	G04G

G04C 1/00

Winding mechanical clocks electrically

Definition statement

This place covers:

Documents showing internal electric and/or electromechanical means to wind a mechanical energy source such as a mainspring or a (free-falling) weight. The typical device classified here is a wall clock, pendulum clock or the like. The field has not been particularly active in the last three decades.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Winding mechanically	G04B 3/00
Mechanical winding up; Winding up with special equipment	G04B 3/006
Testing apparatus for complete clockworks with regard to the functioning of the automatic winding-up device	G04D 7/009
Driving; Starting; Stopping record carriers not specifically of filamentary or web form; Control thereof	G11B 19/20

G04C 1/04

by electric motors with rotating or with reciprocating movement

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motors with reciprocating, oscillating or vibrating magnet, armature or coil system	H02K 33/00
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G04C 1/10**Protection against overwinding****References****Informative references**

Attention is drawn to the following places, which may be of interest for search:

Protecting arrangements against rupture or overwinding of the mainspring located in the barrel or attached to the barrel	G04B 1/20
Keys or the like with means preventing overwinding	G04B 3/06
Protecting means preventing overwinding in manual or mechanical winding arrangements	G04B 3/10
Protecting means preventing overwinding in automatic winding arrangements	G04B 5/24
Devices controlled by such state, e.g. device affording protection means against overwinding	G04B 9/02

G04C 3/00

Electromechanical clocks or watches independent of other time-pieces and in which the movement is maintained by electric means (clocks driven by synchronous motors [G04C 15/00](#))

Definition statement

This place covers:

- Position sensitive switches integrated in timepieces ([G04C 3/001](#)).
- Electrically driven timepieces comprising electromechanical regulators (up to [G04C 3/08](#)).

References**Limiting references**

This place does not cover:

Clocks driven by synchronous motors	G04C 15/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric or magnetic means for converting oscillatory to rotary motion in time-pieces	G04C 5/00
Electrically-actuated devices for setting the time-indicating means	G04C 9/00
Motors with reciprocating, oscillating or vibrating with polarised armatures moving in alternate directions by reversal or energisation of a single coil system	H02K 33/16
Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors	H02K 37/00

G04C 3/001**{Electromechanical switches for setting or display}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Electric switches; Relays; Selectors; Emergency protective devices	H01H
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G04C 3/033**using torsion pendulums; using conical pendulums****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Mechanisms for stabilising frequency in mechanically-driven clocks or watches, in mechanical parts of clocks or watches or in time-pieces using the position of the sun, moon or stars	G04B 17/00
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G04C 3/0335**{using conical pendulums}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Rotating governors, e.g. centrifugal governors, fan governors	G04B 17/30
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G04C 3/04**wherein movement is regulated by a balance****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Balance construction	G04B 17/063
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G04C 3/104**{of the pawl or the ratchet wheel}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Pawl-type clutch mechanisms with magnetic elements	G04B 11/005
Pawl constructions for devices allowing the motion of a rotatable part in only one direction	G04B 11/04

G04C 3/14**incorporating a stepping motor ([G04C 3/02](#) - [G04C 3/12](#) take precedence {; generating commutating pulses in primary clocks [G04C 13/0463](#))}****References****Limiting references***This place does not cover:*

Electromechanical clocks or watches wherein movement is regulated by a pendulum	G04C 3/02
Electromechanical clocks or watches wherein movement is regulated by a balance	G04C 3/04
Electromechanical clocks or watches wherein movement is regulated by a mechanical oscillator other than a pendulum or balance, e.g. by a tuning fork	G04C 3/08
Generating commutating pulses in primary clocks	G04C 13/0463

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Circuit arrangements; Electric clock installations	G04C 13/02
Secondary clocks actuated intermittently by electromechanical step advancing mechanisms	G04C 13/10
Apparatus for producing preselected time intervals for use as timing standards	G04F 5/00
Producing timing pulses	G04G 3/00
Setting, i.e. correcting or changing, the time-indication	G04G 5/00
Synchronisation	G04G 7/00
Control circuits for stepping motors in general	H02P 8/00

G04C 3/16

incorporating an electro-dynamic continuously rotating motor ([G04C 3/02](#) - [G04C 3/12](#) take precedence)

References**Limiting references**

This place does not cover:

Electromechanical clocks or watches wherein movement is regulated by a pendulum	G04C 3/02
Electromechanical clocks or watches wherein movement is regulated by a pendulum using electromagnetic coupling between electric power source and pendulum	G04C 3/027
Electromechanical clocks or watches wherein movement is regulated by a pendulum using torsion pendulum	G04C 3/033
Electromechanical clocks or watches wherein movement is regulated by a balance	G04C 3/04
Electromechanical clocks or watches wherein movement is regulated using electromagnetic coupling between electric power source and balance	G04C 3/06
Electromechanical clocks or watches wherein movement is regulated by a mechanical oscillator other than a pendulum or balance, e.g. by a tuning fork	G04C 3/08
Electromechanical clocks or watches wherein movement is driven by electromagnetic means	G04C 3/10
Electromechanical clocks or watches wherein movement is driven by piezoelectric means; Driven by magnetostrictive means	G04C 3/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Clocks driven by synchronous motors	G04C 15/00
Time-interval measuring with electric driving mechanisms	G04F 3/06
Additional arrangements in connection with ordinary electric clocks	G04F 3/08
Apparatus for measuring unknown time intervals by electromechanical means	G04F 8/00

G04C 3/165

{comprising a mechanical regulating device influencing the electromotor}

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Mechanisms for stabilising frequency in mechanically-driven clocks or watches, in mechanical parts of clocks or watches or in time-pieces using the position of the sun, moon or stars	G04B 17/00
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G04C 9/00

Electrically-actuated devices for setting the time-indicating means (of secondary clocks [G04C 13/03](#))

Definition statement

This place covers:

Documents dealing with setting the time (or the date) in an electromechanical timepiece or, by electromechanical means, in an electronic timepiece. With the exception of

[G04C 9/02](#)

, the key element of

[G04C 9/00](#)

is a setting crown.

References

Limiting references

This place does not cover:

Pulse transmission systems with additional means for setting the time indication of secondary clocks	G04C 13/03
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Radio-controlled time-pieces	G04R
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Special rules of classification

[G04C 9/02](#)

contains many radio-controlled timepieces (which are nevertheless all double classified and shall be soon removed from here) and, in addition, it contains documents showing systems allowing to test or correct the running precision of a timepiece by establishing a wireless communication between the timepiece and an external control device. Typically, these control devices are available on timepiece manufacturing sites or in retailer shops, to perform calibration or re-calibration of some (otherwise inaccessible) of the timepiece elements.

Documents classified in the rest of

[G04C 9/00](#)

should, as a general rule, contain details concerning the operations that a user needs to perform in order to set the time. On the contrary, if a document merely contains hardware details concerning the electromechanical setting element (the crown, most typically), then classification in

[G04C 3/001](#)

should be considered. In the past, this has not always been a strict policy, therefore an overlap still exists and should always be considered.

G04C 10/00

Arrangements of electric power supplies in time-pieces {(Mounting, assembling of components [G04C 3/008](#))}

Definition statement

This place covers:

Documents showing details of the power supply of timepieces. These details generally concern:

- The mechanical positioning of the power supply with respect to the remaining elements of the timepiece;
- mechanical modifications which other parts of the timepiece have to undergo in order to fit/cope with the power supply (e.g. special dials to cooperate with solar cells mounted there under);
- power supply details of "automatic electromechanical" (also known as Kinetic) watches.

References

Limiting references

This place does not cover:

Mounting, assembling of components	G04C 3/008
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural details; Housings	G04G 17/00
Electric power supply circuits specially adapted for use in electronic time-pieces	G04G 19/00

G04C 10/04

with means for indicating the condition of the power supply

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for testing, measuring or monitoring the electrical condition of accumulators or electric batteries, e.g. capacity or state of charges [SoC]	G01R 31/36
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G04C 11/00

Synchronisation of independently-driven clocks

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Radio-controlled time-pieces	G04R
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G04C 11/04**over a line****References****Limiting references***This place does not cover:*

Electrically-actuated devices for setting the time-indicating means	G04C 9/00
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Simultaneous speech and data transmission, e.g. telegraphic transmission over the same conductors	H04M 11/06
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G04C 13/00**Driving mechanisms for clocks by primary clocks****Definition statement***This place covers:*

Primary-secondary clock systems wherein, as a general rule, the secondary clocks are not autonomous clocks and they constantly need driving signals issued by the primary clock in order to deliver time information.

G04C 13/023**{via existing transmission lines}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Simultaneous speech and data transmission, e.g. telegraphic transmission over the same conductors	H04M 11/06
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G04C 13/04**Primary clocks****Definition statement***This place covers:*

Details of the primary clock part.

G04C 13/08**Secondary clocks actuated intermittently****Definition statement**

This place covers:

Details concerning secondary clocks.

G04C 13/10

by electromechanical step-advancing mechanisms {(independent clocks or watches incorporating a stepping motor [G04C 3/14](#))}

References**Limiting references**

This place does not cover:

Independent clocks or watches incorporating a stepping motor	G04C 3/14
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Motors with reciprocating, oscillating or vibrating magnet, armature or coil system	H02K 33/00
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G04C 17/00

Indicating the time optically by electric means ([G04C 19/00](#) takes precedence)

Definition statement

This place covers:

Documents showing electromechanical time displays. The groups/subgroups are defined in terms of the technical features used to display time (bands, flaps, drums).

References**Limiting references**

This place does not cover:

Producing optical time signals at prefixed times by electric means	G04C 19/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Liquid crystal materials	C09K 19/00
Indicating the time by visual means	G04B 19/00
Indicating the time by numbered bands, drums, discs or sheets	G04B 19/20

G04C 17/0091**{Combined electro-optical and electro-mechanical displays}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Visual time or date indication means by building-up characters using a combination of indicating elements and by selecting desired characters out of a number of characters or by selecting indicating elements the positions of which represents the time	G04G 9/0082
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G04C 19/00**Producing optical time signals at prefixed times by electric means****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

This means that countdown timers which would count-down a predetermined time interval independently on the time of the day	G04F 1/00 , G04F 3/00 .
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Special rules of classification

The title of this subclass contains the expression "at predetermined times".

This is an important aspect because this subclass contains documents describing timepieces producing a visual action at a predetermined time of the day.

This means that countdown timers which would count-down a predetermined time interval independently on the time of the day are not part of [G04C 19/00](#), but rather [G04F 1/00](#), [G04F 3/00](#).

See [G04C 23/00](#)

G04C 21/00**Producing acoustic time signals by electrical means****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Sounding bodies; Whistles; Musical apparatus	G04B 21/08
Indicating the time by other means or by combined means	G04B 25/00

G04C 21/02**Constructional details ([G04C 21/04](#), [G04C 21/16](#) take precedence)****References****Limiting references***This place does not cover:*

Indicating the time of the day	G04C 21/04
Producing the signals at adjustable fixed times	G04C 21/16

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Sound-producing devices	G10K
Devices in which sound is produced by striking a resonating body, e.g. bells, chimes or gongs	G10K 1/00

G04C 21/04**Indicating the time of the day****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Acoustic indication of time	G04B 21/00
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G04C 23/00**Clocks with attached or built-in means operating any device at preselected times or after preselected time-intervals (if restricted to producing acoustic time signals by electrical means [G04C 21/00](#))****Definition statement***This place covers:*

Documents related to timepieces providing an electromechanical action (non visual, nor acoustic) at predetermined times (of the day). It also extends to the possibility to act after the elapse of a predetermined time interval which is nevertheless counted starting from a predetermined time of the day.

References**Limiting references***This place does not cover:*

Producing acoustic time signals by electrical means	G04C 21/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Producing optical time signals at prefixed times by electric means	G04C 19/00
Mechanical alarm clocks	G04B 23/02
Apparatus which can be set and started to measure-off predetermined intervals	G04F 3/06
Time or time-programme switches which automatically terminate their operation after the programme is completed	H01H 43/00