

CPC**COOPERATIVE PATENT CLASSIFICATION****G04C**

ELECTROMECHANICAL CLOCKS OR WATCHES (mechanical parts of clocks or watches in general [G04B](#) ; electronic time-pieces with no moving parts, electronic circuitry for producing timing pulses [G04G](#))

NOTE

This subclass covers electric features of mechanically-driven clocks or watches, such as electric winding of such clocks or the provision of electric contacts thereon.

Guidance heading: Electric winding of mechanical clocks; Independent electric clocks or watches

G04C 1/00 **Winding mechanical clocks electrically** (winding mechanically [G04B 3/00](#) { electrical winding of spring driven arrangements for grammophones [G11B 19/20](#) })

[G04C 1/003](#) . {by electro-thermal or electro-pneumatic arrangements }

[G04C 1/006](#) . {for clocksystems ([G04C 1/02](#) to [G04C 1/04](#) take precedence) }

[G04C 1/02](#) . by electromagnets

[G04C 1/022](#) . . {with snap-acting armature }

[G04C 1/024](#) . . . {winding-up springs }

[G04C 1/026](#) . . {having unipolar rotating armature (two-pole or multi-pole arrangements [G04C 1/04](#), [G04C 1/06](#), [G04C 1/08](#)) }

[G04C 1/028](#) . . {with linearly moving armature }

[G04C 1/04](#) . by electric motors with rotating or with reciprocating movement { (in general [H02K 33/00](#)) }

[G04C 1/06](#) . . winding-up springs

[G04C 1/062](#) . . . {by oscillating movement }

[G04C 1/065](#) . . . {by continuous rotating movement }

[G04C 1/067](#) . . . {by stepping rotating movement }

[G04C 1/08](#) . . raising weights

[G04C 1/082](#) . . . {by oscillating movement }

[G04C 1/085](#) . . . {by continuously rotating movement }

[G04C 1/087](#) . . . {by stepping rotating movement }

[G04C 1/10](#) . Protection against overwinding (in mechanical clocks or watches [G04B 1/20](#), [G04B 3/06](#), [G04B 3/10](#); {[G04B 5/24](#), [G04B 9/02](#) })

[G04C 1/12](#) . . of the spring

[G04C 1/14](#) . . of the weights

G04C 3/00 **Electromechanical clocks or watches independent of other time-pieces and in which the movement is maintained by electric means** {Synchronisation [G04C 11/00](#) }

- G04C 3/001 . {Electromechanical switches for setting or display (in general [H01H](#)) }
- G04C 3/002 .. {Position, e.g. inclination dependent switches }
- WARNING**
- Not complete. See also [G04C 3/001](#)
- G04C 3/004 .. {Magnetically controlled }
- WARNING**
- Not complete. See also [G04C 3/001](#), [G04C 3/005](#)
- G04C 3/005 .. {Multiple switches ([G04C 3/004](#) takes precedence) }
- G04C 3/007 .. {Electromechanical contact-making and breaking devices acting as pulse generators for setting }
- G04C 3/008 . {Mounting, assembling of components }
- G04C 3/02 . wherein movement is regulated by a pendulum
- G04C 3/021 .. {using mechanical coupling (using more than one pendulum [G04C 3/025](#); using torsion pendulums [G04C 3/033](#); using conical pendulums [G04C 3/0335](#)) }
- G04C 3/022 ... {with constant impulses }
- G04C 3/024 .. {using other coupling means, e.g. electrostrictive, magnetostrictive }
- G04C 3/025 .. {using more than one pendulum (synchronisation between master and slave pendulums [G04C 13/028](#)) }
- G04C 3/027 .. using electro-magnetic coupling between electric power source and pendulum ([G04C 3/033](#) takes precedence)
- G04C 3/0271 ... {the pendulum controlling contacts and mechanically driving the gear-train (constructional details of contact devices [G04C 13/06](#), [G04C 23/06](#)) }
- G04C 3/0273 ... {the pendulum controlling contacts, thereby electromagnetically driving the gear-train or several gear-trains (generating driving pulses in master-clocks [G04C 13/0463](#)) }
- G04C 3/0275 ... {the pendulum controlling contacts, the pendulum driving electro-magnet simultaneously driving the gear-train }
- G04C 3/0276 ... {the pendulum controlling indirectly, i.e. without mechanical connection, contacts, e.g. by magnetic or optic means }
- G04C 3/0278 ... {the pendulum controlling the gear-train by means of static switches, e.g. transistor circuits }
- G04C 3/033 .. using torsion pendulums; using conical pendulums (construction thereof [G04B 17/00](#))
- G04C 3/0335 ... {using conical pendulums (construction thereof [G04B 17/30](#)) }
- G04C 3/04 . wherein movement is regulated by a balance {construction thereof [G04B 17/063](#) }
- G04C 3/042 .. {using mechanical coupling }
- G04C 3/045 ... {with constant impulses }
- G04C 3/047 .. {using other coupling means, e.g. electrostrictive, magnetostrictive }
- G04C 3/06 .. using electro-magnetic coupling between electric power source and balance
- G04C 3/061 ... {the balance controlling contacts and mechanically driving the gear-train }

- G04C 3/062 . . . {the balance controlling contacts, the gear-train or several gear-trains being driven electro-magnetically thereby }
- G04C 3/063 . . . {the balance controlling contacts, the balance driving electro-magnet simultaneously driving the gear-train }
- G04C 3/064 . . . {the balance controlling indirectly, i.e. without mechanical connection, contacts, e.g. by magnetic or optic means }
- G04C 3/065 . . . {the balance controlling gear-train by means of static switches, e.g. transistor circuits ([synchronisation of balance G04C 11/084](#)) }
- G04C 3/066 {Constructional details, e.g. disposition of coils }
- G04C 3/067 {Driving circuits with distinct detecting and driving coils }
- G04C 3/068 {provided with automatic control }
- G04C 3/069 {Driving circuits using a single coil for detection and driving purposes }

- G04C 3/08 . wherein movement is regulated by a mechanical oscillator other than a pendulum or balance, e.g. by a tuning fork, {e.g. [electrostatically](#) }
- G04C 3/10 . . driven by electro-magnetic means
- G04C 3/101 . . . {constructional details }
- G04C 3/102 {of the mechanical oscillator or of the coil }
- G04C 3/104 {of the pawl or the ratched-wheel ([in general G04B 11/04](#), [G04C 11/005](#)) }
- G04C 3/105 {pawl and ratched-wheel being magnetically coupled }
- G04C 3/107 {Controlling frequency or amplitude of the oscillating system ([circuits G04C 3/108](#)) }
- G04C 3/108 . . . {Driving circuits }
- G04C 3/12 . . driven by piezo-electric means; driven by magneto-strictive means
- G04C 3/125 . . . {driven by magneto-strictive means }

- G04C 3/14 . incorporating a stepping motor ([G04C 3/02 to G04C 3/12 take precedence](#) { generating timing pulses [G04F 5/00](#), [G04G 3/00](#); setting [G04G 5/00](#); synchronisation [G04C 11/00K](#), [G04G 7/00](#); generating commutating pulses in masterclocks [G04C 13/0463](#), [G04C 13/02](#); slave clocks actuated intermittently by electromechanical step advancing mechanisms [G04C 13/10](#); control circuits for stepping motors in general [H02P 8/00](#) })
- G04C 3/143 . . {Means to reduce power consumption by reducing pulse width or amplitude and related problems e.g. detection of unwanted or missing step }
- G04C 3/146 . . {incorporating two or more stepping motors or rotors }

- G04C 3/16 . incorporating an electro-dynamic continuously rotating motor ([G04C 3/02 to G04C 3/12 take precedence](#); clocks driven by synchronous motors [G04C 15/00](#); {apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals with electric driving means, e.g. incorporating clocks [G04F 3/06](#), [G04F 3/08](#); electromechanical stop watches [G04F 8/00](#) })
- G04C 3/165 . . {comprising a mechanical regulating device influencing the electromotor (constructional details of the mechanical regulating device [G04B 17/00](#)) }

- G04C 3/18 . incorporating electro-thermal or electro-pneumatic driving means

- G04C 5/00** **Electric or magnetic means for converting oscillatory to rotary motion in time-pieces, i.e. electric or magnetic escapements ([regulators G04C 3/00](#))**

- G04C 5/005 . {Magnetic or electromagnetic means }

G04C 9/00 **Electrically-actuated devices for setting the time-indicating means** (of slave clocks [G04C 13/03](#); mechanical setting devices [G04B 27/00](#); radio-controlled time-pieces [G04R](#))

G04C 9/02 . brought into action by radio transmission

WARNING

This group is no longer used for the classification of new documents as from September 1, 2012 The backlog of this group is being continuously reclassified to subgroups of [G04R](#)

G04C 9/04 . by blocking the driving means {see provisionally [G04C 9/00](#) }

G04C 9/06 . by decoupling the driving means (combined with blocking means [G04C 9/04](#)) {see provisionally [G04C 9/00](#) }

G04C 9/08 . by electric drive, {i.e. for mechanical clocks; see provisionally [G04C 9/00](#) }

G04C 10/00 **Arrangements of electric power supplies in time pieces** { (circuits [G04G 19/00](#); mounting, assembling of components of electromechanical watches [G04C 3/008](#), of electronic watches [G04G 17/00](#)) }

G04C 10/02 . the power supply being a radioactive {or photovoltaic } source

G04C 10/04 . with means for indicating the condition of the power supply {in general [G01R 31/00B](#) }

Guidance heading: **Electric clock installations; Master-and-slave clock systems; Synchronous-motor clocks**

G04C 11/00 **Synchronisation of independently-driven clocks** (radio-controlled time-pieces [G04R](#))

G04C 11/002 . {by changing the driving speed }

G04C 11/005 . {by changing the ratio of the driving-gear }

G04C 11/007 . {by positioning of the index or by regulating the length of the pendulum in dependance on the time difference with a standard }

G04C 11/02 . by radio { time setting brought into action by radio [G04C 9/02](#) }

WARNING

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G04C 11/023 .. {provided with arrangements to prevent synchronisation by interfering signals }

G04C 11/026 .. {the time-piece preparing itself on set times on the reception of the synchronising signal }

- G04C 11/04 . over a line (transmitting time signals over telephone networks [H04M 11/06](#)) {time setting [G04C 9/00](#) }
- G04C 11/043 .. {provided with arrangements to prevent synchronisation by interfering signals }
- G04C 11/046 .. {the time-piece preparing itself on set time on the reception of the synchronising signal }
- G04C 11/06 . with direct mechanical action on the time-indicating means {time setting [G04C 9/00](#) }
- G04C 11/08 . using an electro-magnet or-motor {for oscillation correction }
- G04C 11/081 .. {using an electro-magnet }
- G04C 11/082 ... {acting on the pendulum (mutual synchronisation of pendulums [G04C 13/028](#)) }
- G04C 11/084 ... {acting on the balance }
- G04C 11/085 .. {using an electro-motor }
- G04C 11/087 ... {acting on the pendulum (mutual synchronisation of pendulums [G04C 13/028](#)) }
- G04C 11/088 ... {acting on the balance }

G04C 13/00 Driving mechanisms for clocks by master-clocks

- G04C 13/02 . Circuit arrangements; Electric clock installations
- G04C 13/021 .. {master-slave systems using transmission of singular pulses for driving directly slave-clocks step by step ([G04C 13/03](#) takes precedence) }
- G04C 13/022 ... {via existing power distribution lines }
- G04C 13/023 ... {via existing transmission lines (transmitting time signals over telephone networks [H04M 11/06](#)) }
- G04C 13/025 ... {via special lines }
- G04C 13/026 ... {by radio }
- G04C 13/027 .. {master-slave systems using transmission of other driving signals, e.g. coded signals }
- G04C 13/028 .. {transmission systems for synchronisation of pendulum of slave-clocks by pendulums of master-clocks }
- G04C 13/03 .. Pulse transmission systems with additional means for setting the time indication of slave-clocks ([G04C 13/028](#) takes precedence) }
- G04C 13/04 .. Master-clocks
- G04C 13/0409 ... {monitoring or controlling master-clock or system with more than one master-clock, e.g. for switching-over to standby motor or power system }
- G04C 13/0418 {by using devices similar to slave-clocks }
- G04C 13/0427 {Systems in which slave-clocks function as master-clocks for other slave-clocks (synchronisation of independently-driven clocks [G04C 11/00](#), setting [G04C 9/00](#)) }
- G04C 13/0436 ... {provided with supplementary means for setting or changing the time indication of the slave-clocks }
- G04C 13/0445 {for automatically correcting of or compensating for disturbances }
- G04C 13/0454 {for automatically setting of slave-clocks after correction or after setting of master-clock }
- G04C 13/0463 ... {Arrangements for generating normal driving pulses }
- G04C 13/0472 {by starting an independent mechanical driving devices, e.g. motor }

- controlling the contacts }
- G04C 13/0481 {by switching on an electromagnetic driving device, e.g. electro-motor, controlling the contacts }
- G04C 13/049 {by using current generating driving device }
- G04C 13/06 . . . Contact devices (for simultaneously winding several clocks [G04C 1/00](#))
- G04C 13/065 {controlled by a pendulum or a balance }
- G04C 13/08 . Slave-clocks actuated intermittently
- G04C 13/10 . . by electromechanical step advancing mechanisms {independent clocks or watches incorporating a stepping motor [G04C 3/14](#); stepping motors in general [H02K 33/00](#) }
- G04C 13/105 . . . {setting the time-indicating means (master-slave systems with setting means [G04C 13/03](#); adjusting independently-driven clocks [G04C 9/00](#), [G04C 11/00](#)) }
- G04C 13/11 . . . with rotating armature
- G04C 13/12 . . by continuously-rotating electric motors {independent clocks [G04C 3/16](#); clocks driven by synchronous motors [G04C 15/00](#) }
- G04C 13/14 . . by electrically-released mechanical driving mechanisms

G04C 15/00 **Clocks driven by synchronous motors**

- G04C 15/0009 . {without power-reserve }
- G04C 15/0018 . . {provided with hand-actuated starting device }
- G04C 15/0027 . . {provided with automatic-starting device }
- G04C 15/0036 . . {provided with means for indicating disturbance }
- G04C 15/0045 . . {provided with means for checking sense of rotation }
- G04C 15/0054 . {with power-reserve }
- G04C 15/0063 . {Synchronous clock systems, e.g. provided with radiolink or using transmission of alternating current via existing power distribution lines }
- G04C 15/0072 . . {Setting the time-indicating means, e.g. by controlling the frequency or by changing the drive of the separate clocks by using an auxiliary motor }
- G04C 15/0081 . . {Automatic stabilisation of net frequency with regard to time, e.g. by comparing one of the clocks with an independent clock, means being provided for automatic compensation of disturbances }
- G04C 15/009 . {Lubricating }

Guidance heading: Indicating the time or producing time signals electrically

G04C 17/00 **indicating the time optically by electric means ([G04C 19/00](#) takes precedence; by mechanical means [G04B 19/00](#), [G04B 19/20](#))**

- G04C 17/0008 . {by bands }
- G04C 17/0016 . . {with date indication }
- G04C 17/0025 . {by flaps }

- G04C 17/0033 . . {with date indication }
- G04C 17/0041 . {by a combination of different types of indicating devices, e.g. flaps and drums }
- G04C 17/005 . {by discs (by drums [G04C 17/0075](#)) }
- G04C 17/0058 . . {with date indication }
- G04C 17/0066 . . . {electromagnetically driven, e.g. intermittently (clocks incorporating a stepping motor [G04C 3/14](#)) }
- G04C 17/0075 . {by drums or drum-like devices }
- G04C 17/0083 . . {with date indication }
- G04C 17/0091 . {Combined electro-optical and electro-mechanical displays (see provisionally also [G04G 9/0082](#)) }
- G04C 17/02 . by electric lamps
- G04C 19/00** **Producing optical time signals at prefixed times by electric means**
- G04C 19/02 . by electric lamps
- G04C 19/04 . by indicating members moved electrically, e.g. flap, band
- G04C 21/00** **Producing acoustic time signals by electrical means { (for mechanical clocks or watches [G04B 21/08](#), [G04B 25/00](#)) }**
- G04C 21/02 . Constructional details ([G04C 21/04](#), [G04C 21/16](#) take precedence) {sound producing devices in general [G10K](#) , e.g. [G10K 1/00](#) }
- G04C 21/04 . Indicating the time of the day (acoustic indication of time [G04B 21/00](#))
- G04C 21/06 . . by striking mechanism
- G04C 21/08 . . . with snail
- G04C 21/10 . . . with locking plate
- G04C 21/12 . . by electro-acoustic means
- G04C 21/14 . . . Electro-acoustic time announcement, i.e. spoken
- G04C 21/16 . producing the signals at adjustable fixed times
- G04C 21/18 . . by mechanically unlocking an electro-mechanical vibrator, e.g. actuated by the leakage flux of the electric driving means
- G04C 21/185 . . . {provided with means for sheeting off or temporarily stopping the signal }
- G04C 21/20 . . by closing a contact to ring an electro-mechanical alarm
- G04C 21/205 . . . {by the hand(s) or handlike members closing the contact }
- G04C 21/22 . . . put into action by the arbor of a mechanical alarm work
- G04C 21/24 . . . put into action by the spring of a mechanical alarm work
- G04C 21/26 . . . put into action by the vibrations caused by the operation of a mechanical alarm work
- G04C 21/28 . . by closing a contact to put into action electro-acoustic means, e.g. awakening by music

- G04C 21/30 . . with provision for a number of operations at different times, e.g. ringing the bells in a school
- G04C 21/305 . . . {by the hand(s) or handlike members closing the contacts }
- G04C 21/32 . . . giving indications at a number of places each at a different time, e.g. system of alarms in a hotel
- G04C 21/323 {by the hand(s) or handlike members closing the contacts }
- G04C 21/326 {adjustable from the different places themselves }
- G04C 21/34 . . Devices on watches or similar portable timepieces
- G04C 21/36 . . Signal repeating devices
- G04C 21/38 . . Adjusting the duration of signals

- 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](#); 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](#))

- G04C 23/02 . Constructional details
- G04C 23/04 . . Housings, supports, shielding, or similar stationary parts
- G04C 23/06 . . Driving or regulating means
- G04C 23/08 . . Programming means
- G04C 23/10 . . for actuating any element which operates, or initiates the operation of, the device concerned
- G04C 23/12 . . Electric circuitry

- G04C 23/14 . Mechanisms continuously running to relate the operation(s) to the time of day
- G04C 23/16 . . acting only at one preselected time or during one adjustable time interval
- G04C 23/18 . . for operating one device at a number of different times
- G04C 23/20 . . . with contacts operated, or formed by clock hands or elements of similar form
- G04C 23/22 . . . with the actuating element carried by a disc
- G04C 23/24 the actuating element controlling another element mechanically
- G04C 23/26 . . for operating a number of devices at different times
- G04C 23/28 . . . with contacts operated, or formed, by clock hands or elements of similar form
- G04C 23/30 . . . with the actuating element carried by a disc
- G04C 23/32 the actuating element controlling another element mechanically
- G04C 23/34 . . with provision for automatic modification of the programme, e.g. on Sunday
- G04C 23/342 . . . {some operations being performed at another time }
- G04C 23/345 . . . {another programme being carried out }
- G04C 23/347 . . . {some operations being overridden }
- G04C 23/36 . . . by external influences

- G04C 23/38 . Mechanisms measuring a chosen time interval independently of the time of day at which interval starts
- G04C 23/40 . . using continuously-running mechanism
- G04C 23/42 . . acting only at the end of a single time interval

- G04C 23/44 . . . with provision for selection from a number of preset intervals
- G04C 23/46 . . . with provision for adjustment of the interval ([G04C 23/44 takes precedence](#))
- G04C 23/48 . . acting at the ends of successive time intervals
- G04C 23/50 . . with provision for modification of the interval(s) by external influences

Guidance heading:

G04C 99/00 **Subject matter not provided for in other groups of this subclass**