

**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](#) }

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