

**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

<b>G04C 3/00</b>	<b>Electromechanical clocks or watches independent of other time-pieces and in which the movement is maintained by electric means</b> { <a href="#">Synchronisation G04C 11/00</a> }
G04C 3/001	. { Electromechanical switches for setting or display (in general <a href="#">H01H</a> )}
G04C 3/002	.. { Position, e.g. inclination dependent switches }
	<b><u>WARNING</u></b>
	Not complete. See also <a href="#">G04C 3/001</a>
G04C 3/004	.. { Magnetically controlled }
	<b><u>WARNING</u></b>
	Not complete. See also <a href="#">G04C 3/001</a> , <a href="#">G04C 3/005</a>
G04C 3/005	.. { Multiple switches ( <a href="#">G04C 3/004</a> 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 <a href="#">G04C 3/025</a> ; using torsion pendulums <a href="#">G04C 3/033</a> ; using conical pendulums <a href="#">G04C 3/0335</a> )}
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 <a href="#">G04C 13/028</a> )}
G04C 3/027	.. using electro-magnetic coupling between electric power source and pendulum ( <a href="#">G04C 3/033</a> takes precedence)
G04C 3/0271	... { the pendulum controlling contacts and mechanically driving the gear-train (constructional details of contact devices <a href="#">G04C 13/06</a> , <a href="#">G04C 23/06</a> )}
G04C 3/0273	... { the pendulum controlling contacts, thereby electromagnetically driving the gear-train or several gear-trains (generating driving pulses in master-clocks <a href="#">G04C 13/0463</a> )}
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 <a href="#">G04B 17/00</a> )
G04C 3/0335	... { using conical pendulums (construction thereof <a href="#">G04B 17/30</a> )}

- 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 [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 31/36](#) }
- 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**