

**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 [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](#)}

### **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

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