

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.

Electric winding of mechanical clocks; Independent electric clocks or watches

- 1/00** **Winding mechanical clocks electrically** (winding mechanically G04B 3/00 {electrical winding of spring driven arrangements for grammophones G11B 19/20})
 - 1/003 . {by electro-thermal or electro-pneumatic arrangements}
 - 1/006 . {for clocksystems (G04C 1/02 - G04C 1/04 take precedence)}
 - 1/02 . by electromagnets
 - 1/022 . . {with snap-acting armature}
 - 1/024 . . . {winding-up springs}
 - 1/026 . . {having unipolar rotating armature (two-pole or multi-pole arrangements G04C 1/04, G04C 1/06, G04C 1/08)}
 - 1/028 . . {with linearly moving armature}
 - 1/04 . by electric motors with rotating or with reciprocating movement {(in general H02K 33/00)}
 - 1/06 . . winding-up springs
 - 1/062 . . . {by oscillating movement}
 - 1/065 . . . {by continuous rotating movement}
 - 1/067 . . . {by stepping rotating movement}
 - 1/08 . . raising weights
 - 1/082 . . . {by oscillating movement}
 - 1/085 . . . {by continuously rotating movement}
 - 1/087 . . . {by stepping rotating movement}
 - 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})
 - 1/12 . . of the spring
 - 1/14 . . of the weights
- 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)}
 - 3/001 . {Electromechanical switches for setting or display (in general H01H)}
 - 3/002 . . {Position, e.g. inclination dependent switches}
 - 3/004 . . {Magnetically controlled}
 - 3/005 . . {Multiple switches (G04C 3/004 takes precedence)}
 - 3/007 . . {Electromechanical contact-making and breaking devices acting as pulse generators for setting}
 - 3/008 . {Mounting, assembling of components}
 - 3/02 . wherein movement is regulated by a pendulum
 - 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)}

- 3/022 . . . {with constant impulses}
- 3/024 . . {using other coupling means, e.g. electrostrictive, magnetostrictive}
- 3/025 . . {using more than one pendulum (synchronisation between master and slave pendulums G04C 13/028)}
- 3/027 . . using electro-magnetic coupling between electric power source and pendulum (G04C 3/033 takes precedence)
- 3/0271 . . . {the pendulum controlling contacts and mechanically driving the gear-train (constructional details of contact devices G04C 13/06, G04C 23/06)}
- 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)}
- 3/0275 . . . {the pendulum controlling contacts, the pendulum driving electro-magnet simultaneously driving the gear-train}
- 3/0276 . . . {the pendulum controlling indirectly, i.e. without mechanical connection, contacts, e.g. by magnetic or optic means}
- 3/0278 . . . {the pendulum controlling the gear-train by means of static switches, e.g. transistor circuits}
- 3/033 . . using torsion pendulums; using conical pendulums (construction thereof G04B 17/00)
- 3/0335 . . . {using conical pendulums (construction thereof G04B 17/30)}
- 3/04 . wherein movement is regulated by a balance {(construction thereof G04B 17/063)}
- 3/042 . . {using mechanical coupling}
- 3/045 . . . {with constant impulses}
- 3/047 . . {using other coupling means, e.g. electrostrictive, magnetostrictive}
- 3/06 . . using electro-magnetic coupling between electric power source and balance
- 3/061 . . . {the balance controlling contacts and mechanically driving the gear-train}
- 3/062 . . . {the balance controlling contacts, the gear-train or several gear-trains being driven electro-magnetically thereby}
- 3/063 . . . {the balance controlling contacts, the balance driving electro-magnet simultaneously driving the gear-train}
- 3/064 . . . {the balance controlling indirectly, i.e. without mechanical connection, contacts, e.g. by magnetic or optic means}
- 3/065 . . . {the balance controlling gear-train by means of static switches, e.g. transistor circuits (synchronisation of balance G04C 11/084)}

- 3/066 {Constructional details, e.g. disposition of coils}
- 3/067 {Driving circuits with distinct detecting and driving coils}
- 3/068 {provided with automatic control}
- 3/069 {Driving circuits using a single coil for detection and driving purposes}
- 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}
- 3/10 . . driven by electro-magnetic means
- 3/101 . . . {constructional details}
- 3/102 {of the mechanical oscillator or of the coil}
- 3/104 {of the pawl or the ratched-wheel (in general [G04B 11/04](#), [G04C 11/005](#))}
- 3/105 {pawl and ratched-wheel being magnetically coupled}
- 3/107 {Controlling frequency or amplitude of the oscillating system (circuits [G04C 3/108](#))}
- 3/108 . . . {Driving circuits}
- 3/12 . . driven by piezo-electric means; driven by magneto-strictive means
- 3/125 . . . {driven by magneto-strictive means}
- 3/14 . incorporating a stepping motor
([G04C 3/02](#) - [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](#)})
- 3/143 . . {Means to reduce power consumption by
reducing pulse width or amplitude and related
problems, e.g. detection of unwanted or missing
step}
- 3/146 . . {incorporating two or more stepping motors or
rotors}
- 3/16 . incorporating an electro-dynamic continuously
rotating motor ([G04C 3/02](#) - [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](#)})
- 3/165 . . {comprising a mechanical regulating device
influencing the electromotor (constructional
details of the mechanical regulating device
[G04B 17/00](#))}
- 3/18 . incorporating electro-thermal or electro-pneumatic
driving means
- 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](#))**
- 5/005 . {Magnetic or electromagnetic means}
- 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](#))**
- 9/02 . {brought into action by radio transmission}
- 9/04 . by blocking the driving means {(see provisionally
[G04C 9/00](#))}
- 9/06 . by decoupling the driving means (combined with
blocking means [G04C 9/04](#) {see provisionally
[G04C 9/00](#)})
- 9/08 . by electric drive, {(i.e. for mechanical clocks; see
provisionally [G04C 9/00](#))}
- 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](#))}**
- 10/02 . the power supply being a radioactive {or
photovoltaic} source
- 10/04 . with means for indicating the condition of the power
supply {(in general [G01R 31/36](#))}
- Electric clock installations; Master-and-slave clock systems;
Synchronous-motor clocks**
- 11/00 Synchronisation of independently-driven clocks
(radio-controlled time-pieces [G04R](#))**
- 11/002 . {by changing the driving speed}
- 11/005 . {by changing the ratio of the driving-gear}
- 11/007 . {by positioning of the index or by regulating the
length of the pendulum in dependance on the time
difference with a standard}
- 11/02 . {by radio (time setting brought into action by radio
[G04C 9/02](#))}
- 11/023 . . {provided with arrangements to prevent
synchronisation by interfering signals}
- 11/026 . . {the time-piece preparing itself on set times on
the reception of the synchronising signal}
- 11/04 . over a line (transmitting time signals over telephone
networks [H04M 11/06](#) {time setting [G04C 9/00](#)})
- 11/043 . . {provided with arrangements to prevent
synchronisation by interfering signals}
- 11/046 . . {the time-piece preparing itself on set time on the
reception of the synchronising signal}
- 11/06 . with direct mechanical action on the time-indicating
means {(time setting [G04C 9/00](#))}
- 11/08 . using an electro-magnet or-motor {for oscillation
correction}
- 11/081 . . {using an electro-magnet}
- 11/082 . . . {acting on the pendulum (mutual
synchronisation of pendulums [G04C 13/028](#))}
- 11/084 . . . {acting on the balance}
- 11/085 . . {using an electro-motor}
- 11/087 . . . {acting on the pendulum (mutual
synchronisation of pendulums [G04C 13/028](#))}
- 11/088 . . . {acting on the balance}
- 13/00 Driving mechanisms for clocks by master-clocks**
- 13/02 . Circuit arrangements; Electric clock installations
- 13/021 . . {master-slave systems using transmission of
singular pulses for driving directly slave-clocks
step by step ([G04C 13/03](#) takes precedence)}
- 13/022 . . . {via existing power distribution lines}
- 13/023 . . . {via existing transmission lines (transmitting
time signals over telephone networks
[H04M 11/06](#))}
- 13/025 . . . {via special lines}
- 13/026 . . . {by radio}
- 13/027 . . {master-slave systems using transmission of other
driving signals, e.g. coded signals}

- 13/028 . . {transmission systems for synchronisation of pendulum of slave-clocks by pendulums of master-clocks}
- 13/03 . . Pulse transmission systems with additional means for setting the time indication of slave-clocks {[G04C 13/028](#) takes precedence}
- 13/04 . . Master-clocks
- 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}
- 13/0418 {by using devices similar to slave-clocks}
- 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](#))}
- 13/0436 . . . {provided with supplementary means for setting or changing the time indication of the slave-clocks}
- 13/0445 {for automatically correcting of or compensating for disturbances}
- 13/0454 {for automatically setting of slave-clocks after correction or after setting of master-clock}
- 13/0463 . . . {Arrangements for generating normal driving pulses}
- 13/0472 {by starting an independent mechanical driving devices, e.g. motor controlling the contacts}
- 13/0481 {by switching on an electromagnetic driving device, e.g. electro-motor, controlling the contacts}
- 13/049 {by using current generating driving device}
- 13/06 . . . Contact devices (for simultaneously winding several clocks [G04C 1/00](#))
- 13/065 {controlled by a pendulum or a balance}
- 13/08 . Slave-clocks actuated intermittently
- 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](#)}
- 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](#))}
- 13/11 . . . with rotating armature
- 13/12 . . by continuously-rotating electric motors {[independent clocks G04C 3/16](#); clocks driven by synchronous motors [G04C 15/00](#)}
- 13/14 . . by electrically-released mechanical driving mechanisms

15/00 Clocks driven by synchronous motors

- 15/0009 . {without power-reserve}
- 15/0018 . . {provided with hand-actuated starting device}
- 15/0027 . . {provided with automatic-starting device}
- 15/0036 . . {provided with means for indicating disturbance}
- 15/0045 . . {provided with means for checking sense of rotation}
- 15/0054 . {with power-reserve}
- 15/0063 . {Synchronous clock systems, e.g. provided with radiolink or using transmission of alternating current via existing power distribution lines}

- 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}
- 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}
- 15/009 . {Lubricating}

Indicating the time or producing time signals electrically**17/00 indicating the time optically by electric means**

[G04C 19/00](#) takes precedence; by mechanical means [G04B 19/00](#), [G04B 19/20](#))

- 17/0008 . {by bands}
- 17/0016 . . {with date indication}
- 17/0025 . {by flaps}
- 17/0033 . . {with date indication}
- 17/0041 . {by a combination of different types of indicating devices, e.g. flaps and drums}
- 17/005 . {by discs ([by drums G04C 17/0075](#))}
- 17/0058 . . {with date indication}
- 17/0066 . . . {electromagnetically driven, e.g. intermittently ([clocks incorporating a stepping motor G04C 3/14](#))}
- 17/0075 . {by drums or drum-like devices}
- 17/0083 . . {with date indication}
- 17/0091 . {Combined electro-optical and electro-mechanical displays ([see provisionally also G04G 9/0082](#))}
- 17/02 . by electric lamps

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

- 19/02 . by electric lamps
- 19/04 . by indicating members moved electrically, e.g. flap, band

21/00 Producing acoustic time signals by electrical means {[\(for mechanical clocks or watches G04B 21/08, G04B 25/00\)](#)}

- 21/02 . Constructional details ([G04C 21/04](#), [G04C 21/16](#) take precedence {sound producing devices in general [G10K](#), e.g. [G10K 1/00](#)})
- 21/04 . Indicating the time of the day ([acoustic indication of time G04B 21/00](#))
- 21/06 . . by striking mechanism
- 21/08 . . . with snail
- 21/10 . . . with locking plate
- 21/12 . . by electro-acoustic means
- 21/14 . . . Electro-acoustic time announcement, i.e. spoken
- 21/16 . producing the signals at adjustable fixed times
- 21/18 . . by mechanically unlocking an electro-mechanical vibrator, e.g. actuated by the leakage flux of the electric driving means
- 21/185 . . . {provided with means for sheeting off or temporarily stopping the signal}
- 21/20 . . by closing a contact to ring an electro-mechanical alarm
- 21/205 . . . {by the hand(s) or handlike members closing the contact}
- 21/22 . . . put into action by the arbor of a mechanical alarm work

- 21/24 . . . put into action by the spring of a mechanical alarm work
- 21/26 . . . put into action by the vibrations caused by the operation of a mechanical alarm work
- 21/28 . . by closing a contact to put into action electro-acoustic means, e.g. awakening by music
- 21/30 . . with provision for a number of operations at different times, e.g. ringing the bells in a school
- 21/305 . . . {by the hand(s) or handlike members closing the contacts}
- 21/32 . . . giving indications at a number of places each at a different time, e.g. system of alarms in a hotel
- 21/323 {by the hand(s) or handlike members closing the contacts}
- 21/326 {adjustable from the different places themselves}
- 21/34 . . Devices on watches or similar portable timepieces
- 21/36 . . Signal repeating devices
- 21/38 . . Adjusting the duration of signals

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](#))

- 23/02 . Constructional details
- 23/04 . . Housings, supports, shielding, or similar stationary parts
- 23/06 . . Driving or regulating means
- 23/08 . . Programming means
- 23/10 . . for actuating any element which operates, or initiates the operation of, the device concerned
- 23/12 . . Electric circuitry
- 23/14 . Mechanisms continuously running to relate the operation(s) to the time of day
- 23/16 . . acting only at one preselected time or during one adjustable time interval
- 23/18 . . for operating one device at a number of different times
- 23/20 . . . with contacts operated, or formed by clock hands or elements of similar form
- 23/22 . . . with the actuating element carried by a disc
- 23/24 the actuating element controlling another element mechanically
- 23/26 . . for operating a number of devices at different times
- 23/28 . . . with contacts operated, or formed, by clock hands or elements of similar form
- 23/30 . . . with the actuating element carried by a disc
- 23/32 the actuating element controlling another element mechanically
- 23/34 . . with provision for automatic modification of the programme, e.g. on Sunday
- 23/342 . . . {some operations being performed at another time}
- 23/345 . . . {another programme being carried out}
- 23/347 . . . {some operations being overridden}
- 23/36 . . . by external influences

- 23/38 . Mechanisms measuring a chosen time interval independently of the time of day at which interval starts
- 23/40 . . using continuously-running mechanism
- 23/42 . . acting only at the end of a single time interval
- 23/44 . . . with provision for selection from a number of preset intervals
- 23/46 . . . with provision for adjustment of the interval ([G04C 23/44 takes precedence](#))
- 23/48 . . acting at the ends of successive time intervals
- 23/50 . . with provision for modification of the interval(s) by external influences

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