

SECTION G — PHYSICS

G04 HOROLOGY

G04B MECHANICALLY-DRIVEN CLOCKS OR WATCHES; MECHANICAL PARTS OF CLOCKS OR WATCHES IN GENERAL; TIME-PIECES USING THE POSITION OF THE SUN, MOON, OR STARS (spring- or weight-driven mechanisms in general F03G; electromechanical clocks or watches G04C; electromechanical clocks with attached or built-in means operating any device at preselected times or after predetermined time intervals G04C 23/00; clocks or watches with stop devices G04F 7/08; structural details or housings specially adapted for electronic time-pieces with no moving parts G04G 17/00)

Note(s)

This subclass covers mechanically-driven calendar clocks or clockwork calendars, and the mechanical part of such clocks or calendars.

Subclass index

DRIVING MECHANISM.....	1/00
WINDING	
Normal; automatic; combined.....	3/00, 5/00, 7/00
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SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....	99/00

Driving mechanisms

1/00	Driving mechanisms
1/02	• with driving weight
1/04	• • Mechanisms in which the clockwork acts as the driving weight
1/06	• • with several weights
1/08	• • Driving weights; Chains; Chain wheels; Arbors for chain wheels
1/10	• with mainspring
1/12	• • with several mainsprings
1/14	• • Mainsprings; Bridles therefor (mainsprings with bridles G04B 1/18; alloys C22C; springs in general F16F)
1/16	• • Barrels; Arbors; Barrel axles (arrangements facilitating the removal of the mainspring G04B 33/14)
1/18	• • Constructions for connecting the ends of mainsprings with the barrel or the arbor
1/20	• • • Protecting arrangements against rupture or overwinding of the mainspring located in the barrel or attached to the barrel (in connection with keys or the like G04B 3/06, G04B 3/10; in connection with automatic winding devices G04B 5/24)

- 1/22 • • Compensation of changes in the motive power of the mainspring (by mechanical shaping of the mainspring G04B 1/14)
- 1/24 • with both mainsprings and driving weights
- 1/26 • driven by liquids or gases; Liquid or gaseous drives for mechanically-controlled secondary clocks

Winding

- 3/00 Normal winding of clockworks by hand or mechanically; Winding-up several mainsprings or driving weights simultaneously**
- 3/02 • Removably-mounted keys or the like
- 3/04 • Rigidly-mounted keys, knobs, or crowns (divided winding stems G04B 37/06)
- 3/06 • Keys or the like with means preventing overwinding (protecting devices arranged in, or attached to, the barrel G04B 1/20; in connection with automatic winding devices G04B 5/24)
- 3/08 • by parts of the cases
- 3/10 • • Protecting means preventing overwinding (arranged in, or attached to, the barrel G04B 1/20; in connection with keys G04B 3/06; in connection with automatic winding devices G04B 5/24)
- 3/12 • by mechanical means, e.g. pneumatic motor (winding-up with electric or electromechanical means G04C)

5/00 Automatic winding-up

- 5/02 • by self-winding caused by movement of the watch
- 5/04 • • by oscillating weights the movement of which is limited
- 5/06 • • • acting in one direction only
- 5/08 • • • acting in both directions
- 5/10 • • by oscillating weights the movement of which is not limited
- 5/12 • • • acting in one direction only
- 5/14 • • • acting in both directions
- 5/16 • • Construction of the weights
- 5/18 • • Supports, suspensions, or guide arrangements, for oscillating weights
- 5/19 • • • Suspension of the oscillating weight at its centre of rotation [3]
- 5/20 • by movements of other objects, e.g. by opening hand-bag, by opening case, by opening door; Winding-up by wind power
- 5/22 • by thermometric, barometric, or like effects or alterations
- 5/24 • Protecting means preventing overwinding (arranged in, or attached to, the barrel G04B 1/20; in connection with keys or the like G04B 3/06; in connection with parts of the cases G04B 3/10)

7/00 Combined normal and automatic winding-up**9/00 Supervision of the state of winding, e.g. indicating the amount of winding**

- 9/02 • Devices controlled by such state, e.g. device affording protection against overwinding (protecting means preventing overwinding arranged in or on the barrel G04B 1/20; protecting means in connection with keys or the like G04B 3/06; in connection with parts of the cases G04B 3/10; in connection with automatic winding devices G04B 5/24)

11/00 Click devices, stop clicks or clutches for winding

- 11/02 • Devices allowing the motion of a rotatable part in only one direction [3]
- 11/04 • • Pawl constructions therefor, e.g. pawl secured to an oscillating member actuating a ratchet [3]

13/00 Gearwork

- 13/02 • Wheels; Pinions; Spindles; Pivots (bearings G04B 31/00)

15/00 Escapements (electric or magnetic means for converting oscillatory to rotary motion in electromechanical time-pieces G04C 5/00)

- 15/02 • permanently in contact with the regulating mechanism
- 15/04 • • Cylinder escapements
- 15/06 • Free escapements
- 15/08 • • Lever escapements
- 15/10 • with constant impulses for the regulating mechanism
- 15/12 • Adjusting (tools therefor G04D 1/02); Restricting the amplitude of the lever or the like
- 15/14 • Component parts or constructional details, e.g. construction of the lever or the escape wheel

17/00 Mechanisms for stabilising frequency [3]

- 17/02 • Oscillators acting by gravity, e.g. pendulum swinging in a plane
- 17/04 • Oscillators acting by spring tension
- 17/06 • • Oscillators with hairsprings, e.g. balance

- 17/08 • • Oscillators with coil springs stretched and unstretched axially
- 17/10 • • Oscillators with torsion strips or with springs acting in the same manner as torsion strips, e.g. weight oscillating in a horizontal plane
- 17/20 • Compensation of mechanisms for stabilizing frequency
- 17/22 • • for the effect of variations of temperature (alloys independent of variations of temperature C22C)
- 17/24 • • for the effect of variations of atmospheric pressure
- 17/26 • • for the effect of variations of the impulses
- 17/28 • • for the effect of unbalance of the weights, e.g. tourbillon
- 17/30 • Rotating governors, e.g. centrifugal governors, fan governors (for striking mechanism G04B 21/06)
- 17/32 • Component parts or constructional details, e.g. collet, stud
- 17/34 • • for fastening the hairspring onto the balance [3]
- 18/00 Mechanisms for setting frequency [3]**
- 18/02 • Regulator devices; Indexing devices [3]
- 18/04 • Adjusting the beat of the pendulum, balance, or the like, e.g. putting into beat [3]
- 18/06 • • by setting the collet or the stud of a hairspring [3]
- 18/08 • Component parts or constructional details [3]

Time indicating**19/00 Indicating the time by visual means** (by electric lamps G04C 17/02; display arrangements in general G09)

- 19/02 • Back-gearing arrangements between gear train and hands
- 19/04 • Hands; Discs with a single mark or the like
- 19/06 • Dials (for time-pieces without clockwork G04B 49/04)
- 19/08 • • Geometrical arrangement of the graduations
- 19/10 • • Ornamental shape of the graduations or the surface of the dial; Attachment of graduations to the dial
- 19/12 • • Selection of materials for dials or graduations
- 19/14 • • Fastening the dials to the clock or the watch plates
- 19/16 • • Shiftable dials, e.g. indicating alternately from 1 to 12 and from 13 to 24
- 19/18 • • Graduations on the crystal or glass, on the bezel, or on the rim
- 19/20 • Indicating by numbered bands, drums, discs, or sheets
- 19/21 • • Drums [3]
- 19/22 • Arrangements for indicating different local apparent times; Universal time-pieces
- 19/23 • • by means of additional hands or additional pairs of hands [3]
- 19/24 • Clocks or watches with date indicators; Clockwork calendars
- 19/243 • • characterised by the shape of the date indicator [3]
- 19/247 • • • disc-shaped [3]
- 19/25 • • • Devices for setting the date indicators manually [3]
- 19/253 • • • Driving or releasing mechanisms [3]
- 19/257 • • • drum-shaped [3]
- 19/26 • Clocks or watches with indicators for tides, for the phases of the moon, or the like
- 19/28 • Adjustable guide marks or pointers for indicating determined points of time
- 19/30 • Illumination of dials or hands
- 19/32 • • by luminescent substances

- 19/34 • Position of the hands projected optically
- 21/00 Indicating the time by acoustic means** (at preselected times G04B 23/00; by electro-acoustic means G04C 21/04; sound-producing apparatus *per se* G10)
- 21/02 • Regular striking mechanisms giving the full hour, half hour, or quarter hour
- 21/04 • • Hour wheels; Racks or rakes; Snails or similar control mechanisms
- 21/06 • • Details of striking mechanisms, e.g. hammer, fan governor
- 21/08 • • Sounding bodies; Whistles; Musical apparatus (with electro-acoustic transmitters G04C 21/00)
- 21/10 • • Releasing or locking the regular stroke, e.g. for silence during the night
- 21/12 • • Reiterating watches or clocks
- 21/14 • • Winding-up the striking mechanism by the clockwork; Winding-up the clockwork by the striking mechanism
- 23/00 Arrangements producing acoustic signals at preselected times** (electrically-released alarm signals G04C 21/00; metronomes G04F 5/02; sound-producing apparatus *per se* G10)
- 23/02 • Alarm clocks
- 23/03 • • Alarm signal stop arrangements [3]
- 23/04 • • with coarse and fine setting of the preselected time
- 23/06 • • adjustable for several preselected times with automatic stopping of the signal
- 23/08 • • operating on successive days without resetting; operating only once in each 24 hours
- 23/10 • • with presignal; with repeated signal; with changeable intensity of sound
- 23/12 • • Alarm watches to be worn in pockets or on the wrist (giving signals by stimulating the skin G04B 25/04)
- 25/00 Indicating the time by other means or by combined means** (electric or electromechanical indicating G04C)
- 25/02 • by feeling; Clocks or watches for blind persons
- 25/04 • • Alarm clocks or watches with devices stimulating the skin
- 25/06 • by moving figures, e.g. cuckoo-clock, trumpet clock
- 27/00 Mechanical devices for setting the time-indicating means**
- 27/02 • by making use of the winding means
- 27/04 • • with clutch wheel
- 27/06 • • with rocking bar
- 27/08 • by using parts of the case

Frameworks, supports, or arrangements of the clockwork parts in relation to each other, so-called "calibers"

- 29/00 Frameworks**
- 29/02 • Plates; Bridges; Cocks
- 29/04 • Connecting or supporting parts
- 31/00 Bearings; Point suspensions or counter-point suspensions; Pivot bearings; Single parts therefor** (bearings in general F16C)
- 31/004 • characterised by the material used [3]
- 31/008 • • Jewel bearings (G04B 31/04 takes precedence) [3]
- 31/012 • • Metallic bearings [3]
- 31/016 • • Plastic bearings [3]
- 31/02 • Shock-damping bearings
- 31/04 • • with jewel hole and cap jewel [3]

- 31/06 • Manufacture or mounting processes [3]
- 31/08 • Lubrication [3]
- 33/00 Calibers**
- 33/02 • Circular calibers
- 33/04 • Non-circular calibers
- 33/06 • of extremely flat shape
- 33/08 • in which the gear train is arranged in different planes, e.g. parallel or inclined to each other (G04B 33/10 takes precedence)
- 33/10 • with seconds hand arranged in the centre of the dial
- 33/12 • for extremely-long running times
- 33/14 • Calibers of which the mainsprings or barrels are easily removable (mainsprings G04B 1/14; barrels, arbors G04B 1/16)
- 33/16 • with arrangements affording protection of the clockwork against damage as a consequence of a rupture of the mainspring
- 35/00 Adjusting the gear train, e.g. the backlash of the arbors, depth of meshing of the gears**

Protection of the clockwork against damage from outside

- 37/00 Cases**
- 37/02 • Evacuated cases; Cases filled with gases or liquids; Cases containing substances for absorbing or binding moisture or dust
- 37/04 • Mounting the clockwork in the case; Shock-absorbing mountings
- 37/05 • • Fixed mountings for pocket or wrist watches [3]
- 37/06 • Forming the passage for the winding stem through the case; Divided winding stems
- 37/08 • Hermetic sealing of openings, joints, passages, or slits
- 37/10 • • of winding stems
- 37/11 • • of the back cover of pocket or wrist watches [3]
- 37/12 • Cases for special purposes, e.g. watch combined with ring, watch combined with button (watch guards or protectors A45C 11/10, A45C 11/12; watches combined with cosmetic powder containers A45D 33/30)
- 37/14 • Suspending devices, supports, or stands for time-pieces in so far as they form part of the case (wrist-watch straps, fastening means therefor A44C 5/00)
- 37/16 • • Fastening the case to the bracelet [3]
- 37/18 • for pocket or wrist watches (G04B 37/02-G04B 37/16 takes precedence) [3]
- 37/20 • • with hinged covers or backs [3]
- 37/22 • Materials or processes of manufacturing pocket watch or wrist watch cases [3]
- 39/00 Watch crystals; Fastening or sealing crystals; Clock glasses**
- 39/02 • Sealing crystals or glasses [3]
- 41/00 Locking or holding devices for pendulums, chimes, or the like, for use during transport**
- 43/00 Protecting clockworks by shields or other means against external influences, e.g. magnetic fields**
- Clocks with unusual features**
- 45/00 Time-pieces of which the indicating means or cases provoke special effects, e.g. aesthetic effect** (ornamental shaping of dials G04B 19/10)

G04B

- 45/02 • Time-pieces of which the clockwork is visible partly or wholly
- 45/04 • Time-pieces with invisible drive, e.g. with hands attached to rotating glass disc

- 47/00 Time-pieces combined with other articles which do not interfere with the running or the time-keeping of the time-piece** (G04B 37/12 takes precedence; writing or drawing implements with devices for indicating time B43K 29/087; combinations with vehicle mirror assemblies B60R 1/12; combined with cameras, projectors, or photographic printing apparatus G03B 29/00)
- 47/02 • Installations within mirrors, pictures, furniture, or other household articles

- 47/04 • with attached ornaments or amusement apparatus
- 47/06 • with attached measuring instruments, e.g. pedometer, barometer, thermometer, compass

49/00 Time-pieces using the position of the sun, moon, or stars

- 49/02 • Sundials
- 49/04 • • Graduation or shaping of dials

99/00 Subject matter not provided for in other groups of this subclass [2006.01]

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(s)

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.

Subclass index

ELECTRIC WINDING OF MECHANICAL CLOCKS.....	1/00
ELECTROMECHANICAL CLOCK MOVEMENTS; ELECTRIC OR MAGNETIC ESCAPEMENTS.....	3/00, 5/00
TIME INDICATING	
Optical; acoustical means.....	17/00, 19/00, 21/00
TIME SETTING.....	9/00
POWER SUPPLIES.....	10/00
SYNCHRONISATION; MASTER-AND-SLAVE CLOCK SYSTEM; SYNCHRONOUS-MOTOR CLOCKS.....	11/00, 13/00, 15/00
CLOCKS FOR OPERATING A DEVICE AT A PRESELECTED TIME.....	23/00
SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....	99/00

Electric winding of mechanical clocks; Independent electric clocks or watches

- 1/00 Winding mechanical clocks electrically** (winding mechanically G04B 3/00)
 - 1/02 • by electromagnets
 - 1/04 • by electric motors with rotating or with reciprocating movement
 - 1/06 • • winding-up springs
 - 1/08 • • raising weights
 - 1/10 • Protection against overwinding (in mechanical clocks or watches G04B 1/20, G04B 3/06, G04B 3/10)
 - 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** (clocks driven by synchronous motors G04C 15/00)
 - 3/02 • wherein movement is regulated by a pendulum
 - 3/027 • • using electromagnetic coupling between electric power source and pendulum (G04C 3/033 takes precedence) [3]
 - 3/033 • • using torsion pendulums; using conical pendulums (construction thereof G04B 17/00) [3]
 - 3/04 • wherein movement is regulated by a balance

- 3/06 • • using electromagnetic coupling between electric power source and balance [3]
- 3/08 • wherein movement is regulated by a mechanical oscillator other than a pendulum or balance, e.g. by a tuning fork [3]
- 3/10 • • driven by electromagnetic means [3]
- 3/12 • • driven by piezo-electric means; driven by magneto-strictive means [3]
- 3/14 • incorporating a stepping motor (G04C 3/02-G04C 3/12 take precedence) [3]
- 3/16 • incorporating an electro-dynamic continuously rotating motor (G04C 3/02-G04C 3/12 take precedence) [3]
- 3/18 • incorporating electro-thermal or electro-pneumatic driving means [3]
- 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) [3]
- 9/00 Electrically-actuated devices for setting the time-indicating means** (of slave clocks G04C 13/03; radio-controlled time-pieces G04R) [3]
 - 9/04 • by blocking the driving means [3]
 - 9/06 • by decoupling the driving means (combined with blocking means G04C 9/04) [3]
 - 9/08 • by electric drive [3]

10/00 Arrangements of electric power supplies in time-pieces [3]

- 10/02 • the power supply being a radioactive source [3]
- 10/04 • with means for indicating the condition of the power supply [3]

Electric clock installations; Master-and-slave clock systems; Synchronous-motor clocks**11/00 Synchronisation of independently-driven clocks (radio-controlled time-pieces G04R)**

- 11/04 • over a line (transmitting time signals over telephone networks H04M 11/06)
- 11/06 • with direct mechanical action on the time-indicating means [3]
- 11/08 • using an electric magnet or motor [3]

13/00 Driving mechanisms for clocks by master clocks

- 13/02 • Circuit arrangements; Electric clock installations
- 13/03 • • Pulse transmission systems with additional means for setting the time indication of slave clocks [3]
- 13/04 • • Master clocks
- 13/06 • • • Contact devices (for simultaneously winding several clocks G04C 1/00)
- 13/08 • Slave clocks actuated intermittently
- 13/10 • • by electromechanical step-advancing mechanisms
- 13/11 • • • with rotating armature [3]
- 13/12 • • by continuously-rotating electric motors [3]
- 13/14 • • by electrically-released mechanical driving mechanisms

15/00 Clocks driven by synchronous motors**Indicating the time or producing time signals electrically****17/00 Indicating the time optically by electric means**

(G04C 19/00 takes precedence; liquid crystal materials C09K 19/00; by mechanical means G04B 19/00, G04B 19/20) [3]

- 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

- 21/02 • Constructional details (G04C 21/04, G04C 21/16 take precedence)
- 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 electromechanical vibrator, e.g. actuated by the leakage flux of the electric driving means
- 21/20 • • by closing a contact to ring an electromechanical alarm
- 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
- 21/32 • • • giving indications at a number of places, each at a different time, e.g. system of alarms in a hotel
- 21/34 • • Devices on watches or similar portable time-pieces
- 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
- 23/36 • • • by external influences
- 23/38 • Mechanisms measuring a chosen time interval independently of the time of day at which the 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

G04C

- 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 [2006.01]

G04D APPARATUS OR TOOLS SPECIALLY DESIGNED FOR MAKING OR MAINTAINING CLOCKS OR WATCHES (machine tools in general B23, B24; hand tools in general B25)

Subclass index

HAND AND MACHINE TOOLS.....	1/00, 3/00
LUBRICATING DEVICES.....	5/00
MEASURING AND TESTING APPARATUS.....	7/00
DEMAGNETISING DEVICES.....	9/00
SUBJECT MATTER NOT PROVIDED FOR IN OTHER GROUPS OF THIS SUBCLASS.....	99/00

1/00 Gripping, holding, or supporting devices

- 1/02 • Tweezers; Vice clamps or other special hand tools for watchmakers
- 1/04 • Tools for setting springs
- 1/06 • Supporting devices for clockworks or parts of time-pieces
- 1/08 • Tools for setting or removing hands
- 1/10 • Devices for opening or closing watch bottoms or covers

3/00 Watchmakers' or watch-repairers' machines or tools for working materials

- 3/02 • Lathes, with one or more supports; Burnishing machines, with one or more supports
- 3/04 • Devices for placing bearing jewels, bearing sleeves, or the like in position
- 3/06 • Devices for shaping or setting watch glasses
- 3/08 • Machines or apparatus for cleaning

5/00 Oiling devices; Special lubricant containers for watchmakers

7/00 Measuring, counting, calibrating, testing, or regulating apparatus

- 7/02 • for mainsprings
- 7/04 • for gearwork
- 7/06 • for escapements
- 7/08 • for balance wheels
- 7/10 • for hairsprings
- 7/12 • Timing devices for clocks or watches for comparing the rate of the oscillating member with a standard

9/00 Demagnetising devices (demagnetising in general H01F 13/00)

99/00 Subject matter not provided for in other groups of this subclass [2006.01]

G04F TIME-INTERVAL MEASURING (measuring pulse characteristics G01R, e.g. G01R 29/02; in radar or like systems G01S; masers H01S 1/00; generation of oscillations H03B; generation or counting of pulses, frequency dividing H03K; analogue/digital conversion in general H03M 1/00) [2]

Note(s)

This subclass covers:

- apparatus for measuring-off predetermined time intervals;
- apparatus for producing such intervals as timing standards, e.g. metronomes;
- apparatus for measuring unknown intervals, e.g. precision systems for short-time-interval measurement.

Subclass index

MEASURING PREDETERMINED TIME INTERVALS

Producing time standards.....	5/00
Apparatus: without driving mechanisms; with driving mechanisms.....	1/00, 3/00

MEASURING UNKNOWN TIME INTERVALS

Mechanically; electromechanically; electrically; otherwise.....	7/00, 8/00, 10/00, 13/00
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1/00 Apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals without driving mechanisms, e.g. egg timer (time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)

- 1/02 • by consuming prefixed quantities of materials, e.g. by burning candle
- 1/04 • by movement or acceleration due to gravity

- 1/06 • • by flowing-away of a prefixed quantity of fine-granular or liquid materials, e.g. sand-glass, water-clock
- 1/08 • • by a body falling a prefixed distance in air or in a viscous material

- 3/00 Apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals with driving mechanisms, e.g. dosimeter with clockwork** (time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)
- 3/02 • with mechanical driving mechanisms
- 3/04 • • Additional arrangements in connection with ordinary non-electric clocks for this purpose
- 3/06 • with electric driving mechanisms
- 3/08 • • Additional arrangements in connection with ordinary electric clocks for this purpose
- 5/00 Apparatus for producing preselected time intervals for use as timing standards** (generating clock signals for electric digital computers G06F 1/04; automatic frequency control or stabilisation of generators in general H03L)
- 5/02 • Metronomes
- 5/04 • using oscillators with electromechanical resonators [2]
- 5/06 • • using piezo-electric resonators [2]
- 5/08 • • using magnetostrictive resonators [2]
- 5/10 • using electric or electronic resonators (G04F 5/14 takes precedence) [2]
- 5/12 • using fluidic devices [2]
- 5/14 • using atomic clocks [2]
- 5/16 • using pulses produced by radio-isotopes [2]
- 7/00 Apparatus for measuring unknown time intervals by non-electric means** (G04F 13/06 takes precedence) [2]
- 7/02 • by measuring the distance of fall or the final velocity of a falling body
- 7/04 • using a mechanical oscillator [2]
- 7/06 • • running only during the time interval to be measured, e.g. stop-watch
- 7/08 • • Watches or clocks with stop devices, e.g. chronograph
- 7/10 • Means used apart from the time-piece for starting or stopping same [2]
- 8/00 Apparatus for measuring unknown time intervals by electromechanical means** [2]
- 8/02 • using an electromechanical oscillator [2]
- 8/04 • • using a piezo-electric oscillator [2]
- 8/06 • • using a magnetostrictive oscillator [2]
- 8/08 • Means used apart from the time-piece for starting or stopping same [2]
- 10/00 Apparatus for measuring unknown time intervals by electric means** [2]
- 10/02 • using oscillators with passive electric resonator, e.g. lumped LC [2]
- 10/04 • by counting pulses or half-cycles of an ac [2]
- 10/06 • by measuring phase [2]
- 10/08 • using pulses produced by radio-isotopes [2]
- 10/10 • by measuring electric or magnetic quantities changing in proportion to time [2]
- 13/00 Apparatus for measuring unknown time intervals by means not provided for in groups G04F 5/00-G04F 10/00** [2]
- 13/02 • using optical means [2]
- 13/04 • using electrochemical means [2]
- 13/06 • using fluidic means [2]

G04G ELECTRONIC TIME-PIECES [3]

Note(s)

- This subclass covers:
 - electronic time-pieces with no moving parts;
 - electronic circuitry for producing timing pulses irrespective of the nature of the time-indicating means utilised.
- This subclass does not cover electronic time-pieces with moving parts, which are covered by subclass G04C.

Subclass index

PRODUCING TIMING PULSES.....	3/00
TIME-SETTING; SYNCHRONISING.....	5/00, 7/00
TIME- OR DATE-INDICATING	
Visual; optical signals.....	9/00, 11/00, 13/00
OPERATING A DEVICE AT PRESELECTED TIMES.....	15/00
STRUCTURAL DETAILS; HOUSINGS.....	17/00
ELECTRIC POWER SUPPLY CIRCUITS.....	19/00
INPUT OR OUTPUT DEVICES INTEGRATED IN TIME-PIECES.....	21/00
OTHER SUBJECTS.....	99/00

- 3/00 Producing timing pulses** (driving circuits for stepping motors G04C 3/14; producing preselected time intervals for use as timing standards G04F 5/00; pulse technique in general H03K; control, synchronisation, or stabilisation of generators in general H03L) [3]
- 3/02 • Circuits for deriving low frequency timing pulses from pulses of higher frequency (pulse frequency dividers in general H03K 23/00-H03K 29/00) [3]
- 3/04 • Temperature-compensating arrangements [7]
- 5/00 Setting, i.e. correcting or changing, the time-indication (radio-controlled time-pieces G04R) [3, 2013.01]**
- 5/02 • by temporarily changing the number of pulses per unit time, e.g. quick-feed method [3]
- 5/04 • by setting each of the displayed values, e.g. date, hour, independently [3]
- 7/00 Synchronisation** (radio-controlled time-pieces G04R) [3]

G04G

- 9/00 Visual time or date indication means [3]**
- 9/02 • by selecting desired characters out of a number of characters or by selecting indicating elements the position of which represent the time, e.g. by using multiplexing techniques [3]
- 9/04 • • by controlling light sources, e.g. electroluminescent diodes [3]
- 9/06 • • using light valves, e.g. liquid crystals [3]
- 9/08 • by building-up characters using a combination of indicating elements, e.g. by using multiplexing techniques [3]
- 9/10 • • by controlling light sources, e.g. electroluminescent diodes [3]
- 9/12 • • using light valves, e.g. liquid crystals [3]
- 11/00 Producing optical signals at preselected times [3]**
- 13/00 Producing acoustic time signals [3]**
- 13/02 • at preselected times, e.g. alarm clocks [3]
- 15/00 Time-pieces comprising means to be operated at preselected times or after preselected time intervals (G04G 11/00, G04G 13/00 take precedence; pulse delay circuits H03K 5/13; electronic time-delay switches H03K 17/28; electronic time-programme switches which automatically terminate their operation after the programme is completed H03K 17/296; time programming for television signal recording H04N 5/761) [3]**

G04R RADIO-CONTROLLED TIME-PIECES [2013.01]

- 20/00 Setting the time according to the time information carried or implied by the radio signal [2013.01]**
- 20/02 • the radio signal being sent by a satellite, e.g. GPS [2013.01]
- 20/04 • • Tuning or receiving; Circuits therefor [2013.01]
- 20/06 • • Decoding time data; Circuits therefor [2013.01]
- 20/08 • the radio signal being broadcast from a long-wave call sign, e.g. DCF77, JJY40, JJY60, MSF60 or WWVB [2013.01]
- 20/10 • • Tuning or receiving; Circuits therefor [2013.01]
- 20/12 • • Decoding time data; Circuits therefor [2013.01]
- 20/14 • the radio signal being a telecommunication standard signal, e.g. GSM, UMTS or 3G [2013.01]
- 20/16 • • Tuning or receiving; Circuits therefor [2013.01]
- 20/18 • • Decoding time data; Circuits therefor [2013.01]
- 20/20 • the radio signal being an AM/FM standard signal, e.g. RDS [2013.01]
- 20/22 • • Tuning or receiving; Circuits therefor [2013.01]
- 20/24 • • Decoding time data; Circuits therefor [2013.01]
- 20/26 • the radio signal being a near-field communication signal [2013.01]

- 17/00 Structural details; Housings (constructional details of radio-controlled time-pieces, e.g. antennas G04R 60/00) [7, 2013.01]**
- 17/02 • Component assemblies [7]
- 17/04 • • Mounting of electronic components [7]
- 17/06 • • Electric connectors, e.g. conductive elastomers [7]
- 17/08 • Housings [7]
- 19/00 Electric power supply circuits specially adapted for use in electronic time-pieces [7]**
- 19/02 • Conversion or regulation of current or voltage [7]
- 19/04 • • Capacitive voltage division or multiplication [7]
- 19/06 • • Regulation [7]
- 19/08 • Arrangements for preventing voltage drop due to overloading the power supply [7]
- 19/10 • Arrangements for supplying back-up power [7]
- 19/12 • Arrangements for reducing power consumption during storage [7]
- 21/00 Input or output devices integrated in time-pieces [2010.01]**
- 21/02 • Detectors of external physical values, e.g. temperature [2010.01]
- 21/04 • using radio waves (radio-controlled time-pieces G04R) [2010.01, 2013.01]
- 21/06 • using voice [2010.01]
- 21/08 • Touch switches specially adapted for time-pieces [2010.01]
- 99/00 Subject matter not provided for in other groups of this subclass [2010.01]**

- 20/28 • • Tuning or receiving; Circuits therefor [2013.01]
- 20/30 • • Decoding time data; Circuits therefor [2013.01]

- 40/00 Correcting the clock frequency [2013.01]**
- 40/02 • by phase locking [2013.01]
- 40/04 • by detecting the radio signal frequency [2013.01]
- 40/06 • by computing the time value implied by the radio signal [2013.01]

- 60/00 Constructional details [2013.01]**
- 60/02 • Antennas also serving as components of clocks or watches, e.g. motor coils [2013.01]
- 60/04 • Antennas attached to or integrated in watch bracelets [2013.01]
- 60/06 • Antennas attached to or integrated in clock or watch bodies [2013.01]
- 60/08 • • inside bezels [2013.01]
- 60/10 • • inside cases [2013.01]
- 60/12 • • • inside metal cases [2013.01]
- 60/14 • specific to electromechanical timepieces, e.g. moving parts thereof [2013.01]