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 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 orclutches 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)

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

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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; Independent electric clocks or watches

1/00 Winding mechanically 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; mechanical setting devices G04B 27/00) **[3]**

9/02 • brought into action by radio transmission

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

11/02 • by radio

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
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

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

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)

1. 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.
2. This subclass does not cover electronic time-pieces with moving parts, which are covered by subclass G04C.

Subclass index

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 [3]**

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 [3]**

7/02 • by radio **[3]**

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]**

17/00 Structural details; Housings [7]

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 **[2010.01]**

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]