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

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**; **Clutches**

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 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 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 to 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

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 [8]

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.

Subclass Index

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 to G04C 3/12 take precedence) **[3]**
3/16 . incorporating an electro-dynamic continuously rotating motor (G04C 3/02 to 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 [8]

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 [8]

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

This subclass covers:
- apparatus for measuring-off predetermined time intervals; **[2]**
- apparatus for producing such intervals as timing standards, e.g. metronomes; **[2]**
- apparatus for measuring unknown intervals, e.g. precision systems for short-time-interval measurement. **[2]**

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 to 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]

Notes

(1) This subclass covers:
- electronic time-pieces with no moving parts; **[3]**
- electronic circuitry for producing timing pulses irrespective of the nature of the time-indicating means utilised. **[3]**

(2) This subclass does not cover electronic time-pieces with moving parts, which are covered by subclass G04C. **[3]**

Subclass Index

1/00 **Subject matter not provided for in groups G04G 3/00 to G04G 19/00 [3,7]**

1/02 . Input or output devices integrated in time-pieces **[7]**

1/04 . . Detectors of external physical values, e.g. temperature **[7]**

1/06 . . using radio waves **[7]**

1/08 . . using voice **[7]**

1/10 . . Touch switches specially adapted for time-pieces **[7]**

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 to 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]**