CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS
(NOTES omitted)

INSTRUMENTS

G01 MEASURING (counting G06M); TESTING
(NOTES omitted)

G01P MEASURING LINEAR OR ANGULAR SPEED, ACCELERATION, DECELERATION, OR SHOCK; INDICATING PRESENCE, ABSENCE, OR DIRECTION, OF MOVEMENT (measuring or recording blood flow A61B 5/02, A61B 8/06; monitoring speed or deceleration of electrically-propelled vehicles B60L 3/00; vehicle lighting systems adapted to indicate speed B60Q 1/54; determining position or course in navigation, measuring ground distance in geodesy or surveying G01C; combined measuring devices for measuring two or more variables of movement G01C 23/00; measuring velocity of sound G01H; measuring velocity of light G01J 7/00; measuring direction or velocity of solid objects by reception or emission of radiowaves or other waves and based on propagation effects, e.g. Doppler effect, propagation time, direction of propagation, G01S; measuring speed of nuclear radiation G01T; measuring acceleration of gravity G01V; {measuring or recording the speed of trains B61L 23/00; speed indicators incorporated in motor vehicles B60K 35/00; measuring frequency or phase G01R; traffic control G08G})

NOTES

1. This subclass covers measuring direction or velocity of flowing fluids using propagation effects of radiowaves or other waves caused in the fluid itself, e.g. by laser anemometer, by ultrasonic flowmeter with "sing-around-system".
2. Attention is drawn to the Notes following the title of class G01.

1/00 Details of instruments

1/003 . {used for damping}
1/006 . {used for thermal compensation}
1/02 . Housings
1/023 . . {for acceleration measuring devices}
1/026 . . {for speed measuring devices, e.g. pulse generator}
1/04 . Special adaptations of driving means
1/06 . {Indicating or recording devices, e.g. for remote indication (indicating or recording in general G01D; registering or indicating working conditions of vehicles G07C 5/00)}
1/07 . Indicating devices, e.g. for remote indication (indicating working conditions of vehicles G07C 5/00)
1/08 . . Arrangements of scales, pointers, lamps or acoustic indicators, e.g. in automobile speedometers
1/10 . . . for indicating predetermined speeds
1/103 . . . . {by comparing the value of the measured signal with one or several reference values (in general G01R 17/00)}
1/106 . . . . {by comparing the time duration between two impulses with a reference time}
1/11 . . . . by the detection of the position of the indicator needle
1/12 . Recording devices (indicating working conditions of vehicles G07C 5/00)
1/122 . . {Speed recorders}
1/125 . . . {with recording discs}
1/127 . . {for acceleration values}
1/14 . . for permanent recording {(G01P 1/125 takes precedence)}
1/16 . . for erasable recording, e.g. magnetic recording

3/00 Measuring linear or angular speed; Measuring differences of linear or angular speeds (G01P 5/00 - G01P 11/00 take precedence; {direction and speed indication G01P 13/045}; counting mechanisms G06M)

NOTE

The sub-groups of this group are distinguished by the method of measurement which is of major importance. Thus the mere application of other methods for giving a final indication does not affect the classification.

3/02 . Devices characterised by the use of mechanical means
3/04 . . by comparing two speeds
3/06 . . . using a friction gear
3/08 . . . using differential gearing
3/10 . . by actuating an indicating element, e.g. pointer, for a fixed time
3/12 . . by making use of a system excited by impact

3/14 . . by exciting one or more mechanical resonance systems
3/16 . . by using centrifugal forces of solid masses {(governors G05D 13/10)}
3/18 . . . transferred to the indicator by mechanical means
3/20 . . . transferred to the indicator by fluid means
3/22 . . . transferred to the indicator by electric or magnetic means
3/24 . . by using friction effects (G01P 3/06 takes precedence)
3/26 . Devices characterised by the use of fluids
3/263 . . {by using fluidic impulse generators}
3/266 . . {by using a vortex chamber}
3/28 . . by using pumps
3/30 . . by using centrifugal forces of fluids
3/32 . . . in a rotary container communicating with a fixed container
3/34 . . by using friction effects
3/36 . Devices characterised by the use of optical means, e.g. using infra-red, visible, or ultra-violet light (G01P 3/68 takes precedence; gyrometers using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams G01C 19/64)
3/363 . . {by using a ring laser (ring lasers in general H01S 3/083)}
3/366 . . {by using diffraction of light (for measuring speed of fluids G01P 5/26)}
3/38 . . using photographic means
3/40 . . using stroboscopic means
3/42 . Devices characterised by the use of electric or magnetic means (G01P 3/66 takes precedence; measuring electric or magnetic values in general G01R)
3/44 . . for measuring angular speed (G01P 3/56 takes precedence)
3/443 . . . {mounted in bearings (bearings F16C)}
3/446 . . . . {mounted between two axially spaced rows of rolling elements}
3/46 . . . by measuring amplitude of generated current or voltage {(in general G01R 19/00)}
3/465 . . . . {by using dynamo-electro tachometers or electric generator}
3/48 . . . by measuring frequency of generated current or voltage {(in general G01R 23/00)}
3/4802 . . . . {by using electronic circuits in general}
3/4805 . . . . . {by using circuits for the electrical integration of the generated pulses (measuring impulse frequency by integration G01R 23/09)}
3/4807 . . . . . {by using circuits for the detection of the pulses delivered by the ignition system of an internal combustion engine}
3/481 . . . . of pulse signals
3/4815 . . . . . {using a pulse wire sensor, e.g. Wiegand wire}
3/482 . . . . . delivered by nuclear radiation detectors
3/483 . . . . . delivered by variable capacitance detectors
3/484 . . . . . delivered by contact-making switches
3/486 . . . . . delivered by photo-electric detectors
3/487 . . . . . delivered by rotating magnets
3/488 . . . . . delivered by variable reluctance detectors
3/489 . . . . . Digital circuits therefor
3/49 . . . using eddy currents
3/495 . . . . where the indicating means responds to forces produced by the eddy currents and the generating magnetic field
3/4953 . . . . . {with a counter for the covered distance incorporated (measuring the covered distance G01C 22/00)}
3/4956 . . . . . {with thermal compensation}
3/50 . . for measuring linear speed (G01P 3/56 takes precedence)
3/505 . . . {by using eddy currents}
3/52 . . . by measuring amplitude of generated current or voltage
3/54 . . . by measuring frequency of generated current or voltage
3/56 . . for comparing two speeds
3/565 . . . {by measuring or by comparing the phase of generated current or voltage (phase comparators per se H03D 13/00; phase measurement G01R 25/00)}
3/58 . . . by measuring or comparing amplitudes of generated currents or voltage {(amplitude comparators H03K 5/24)}
3/60 . . . by measuring or comparing frequency of generated currents or voltages {(frequency comparators H03K 5/26)}
3/62 . Devices characterised by the determination or the variation of atmospheric pressure with height to measure the vertical components of speed (measuring pressure in general G01L)
3/64 . Devices characterised by the determination of the time taken to traverse a fixed distance
3/66 . . using electric or magnetic means (G01P 3/80 takes precedence; measuring short time intervals G04F 8/00, G04F 10/00)
3/665 . . . {for projectile velocity measurements}
3/68 . . using optical means, i.e. using infra-red, visible, or ultra-violet light (G01P 3/80 takes precedence {; by reflection of waves G01S 17/58})
3/685 . . . {for projectile velocity measurements}
3/80 . . using auto-correlation or cross-correlation detection means
3/803 . . . {in devices of the type to be classified in G01P 3/66}
3/806 . . . {in devices of the type to be classified in G01P 3/68}

5/00 **Measuring speed of fluids, e.g. of air stream; Measuring speed of bodies relative to fluids, e.g. of ship, of aircraft** (application of speed-measuring devices for measuring volume of fluid G01F)
5/001 . {Full-field flow measurement, e.g. determining flow velocity and direction in a whole region at the same time, flow visualisation}
5/003 . {by measuring fluid level in front of an obstacle}
5/005 . {by using a jet directed into the fluid}
5/006 . . {the jet used is composed of ionised or radioactive particles}
5/008 . {by using an electrolyte added to the fluid}
5/01 . by using swirlflowmeter
5/02 . by measuring forces exerted by the fluid on solid bodies, e.g. anemometer
5/04 . . using deflection of baffle-plates

5/06 . . using rotation of vanes (measuring speed of rotating shafts G01P 3/00)
5/065 . . . {with mechanical coupling to the indicating device}
5/07 . . . with electrical coupling to the indicating device
5/08 . by measuring variation of an electric variable directly affected by the flow, e.g. by using dynamo-electric effect
5/083 . . {by using electronic circuits for measuring the dynamoelectric effect}
5/086 . . {by using special arrangements and constructions for measuring the dynamo-electric effect}
5/10 . by measuring thermal variables
5/12 . . using variation of resistance of a heated conductor
5/14 . by measuring differences of pressure in the fluid
5/16 . . using Pitot tubes {, e.g. Machmeter}
5/165 . . . Arrangements or constructions of Pitot tubes
5/17 . . . Coupling arrangements to the indicating device
5/175 . . . . with the determination of Mach number (analogue computers therefor G06G 7/57)
5/18 . by measuring the time taken to traverse a fixed distance
5/20 . . using particles entrained by a fluid stream (G01P 5/22 takes precedence)
5/22 . . using auto-correlation or cross-correlation detection means
5/24 . by measuring the direct influence of the streaming fluid on the properties of a detecting acoustical wave
5/241 . . {by using reflection of acoustical waves, i.e. Doppler-effect}
5/242 . . . {involving continuous, e.g. modulated or unmodulated, waves (G01P 5/244 takes precedence)}
5/244 . . . {involving pulsed waves}
5/245 . . {by measuring transit time of acoustical waves (measuring propagation velocity of acoustical waves per se G01H 5/00)}
5/247 . . . {Sing-around-systems}
5/248 . . . {by measuring phase differences}
5/26 . by measuring the direct influence of the streaming fluid on the properties of a detecting optical wave

7/00 **Measuring speed by integrating acceleration** (measuring travelled distance by double integration of acceleration G01C 21/16)

9/00 **{Measuring speed by using gyroscopic effect, e.g. using gas, using electron beam** (gyroscopes or turn-sensitive devices per se G01C 19/00)**}**

NOTE

Absolute angular speed sensors are classified under G01C 9/00 and s.gr.

9/02 . {using rotary gyroscopes}
9/04 . {using turn-sensitive devices with vibrating masses, e.g. tuning-fork}

11/00 **Measuring average value of speed** (by determining time taken to traverse a fixed distance G01P 3/64, G01P 5/18)
11/02 . Measuring average speed of number of bodies, e.g. of vehicles for traffic control

13/00 **Indicating or recording presence, absence, or direction, of movement** (electric switches H01H; counting moving objects G06M 7/00)
13/0006 . {of fluids or of granulous or powder-like substances}
13/0013 . . {by using a solid body which is shifted by the action of the fluid}
13/002 . . . {with electrical coupling to the indicating devices}
13/0026 . . {by using deflection of baffle-plates}
13/0033 . . . {with electrical coupling to the indicating device}
13/004 . . {by using the rotation of vanes}
13/0046 . . . {with electrical coupling to the indicating device}
13/0053 . . {by using dynamo-electric effect}
13/006 . . {by using thermal variables}
13/0066 . . {by using differences of pressure in the fluid}
13/0073 . . {by using vibrations generated by the fluid}
13/008 . {by using a window mounted in the fluid carrying tube (G01P 13/0013, G01P 13/0026, G01P 13/004 take precedence)}
13/0086 . . {with photo-electric detection}
13/0093 . {by making use of products, e.g. chemical products added to the fluid in order to make the fluid flow visible}
13/02 . Indicating direction only, e.g. by weather vane
13/025 . . {indicating air data, i.e. flight variables of an aircraft, e.g. angle of attack, side slip, shear, yaw}
13/04 . . Indicating positive or negative direction of a linear movement or clockwise or anti-clockwise direction of a rotational movement
13/045 . . . {with speed indication}

15/00 **Measuring acceleration; Measuring deceleration; Measuring shock, i.e. sudden change of acceleration**
15/001 . {by measuring acceleration changes by making use of a triple differentiation of a displacement signal}
15/003 . {Kinematic accelerometers, i.e. measuring acceleration in relation to an external reference frame, e.g. Ferratis accelerometers (G01P 15/001, G01P 15/16, G01P 15/165 take precedence)}
15/005 . . {measuring translational acceleration}
15/006 . {by making use of fluid seismic masses}
15/008 . . {by using thermal pick-up}
15/02 . by making use of inertia forces {using solid seismic masses} (G01P 15/14 takes precedence)
15/03 . . by using non-electrical means
15/032 . . . {by measuring the displacement of a movable inertial mass}
15/034 . . . . {for indicating angular accelerations (G01P 15/036 takes precedence)}
15/036 . . . . {for indicating predetermined acceleration values}
15/038 . . . {by using fluidic means}
15/04 . . for indicating maximum value
15/06 . . . using members subjected to a permanent deformation
15/08 . . with conversion into electric or magnetic values
15/0802 . . . {Details}

2015/0805 . . . {being provided with a particular type of spring-mass-system for defining the displacement of a seismic mass due to an external acceleration}
2015/0808 . . . . {for defining in-plane movement of the mass, i.e. movement of the mass in the plane of the substrate}
2015/0811 . . . . . {for one single degree of freedom of movement of the mass}
2015/0814 . . . . . {for translational movement of the mass, e.g. shuttle type}
2015/0817 . . . . . {for pivoting movement of the mass, e.g. in-plane pendulum}
2015/082 . . . . . {for two degrees of freedom of movement of a single mass}
2015/0822 . . . . {for defining out-of-plane movement of the mass}
2015/0825 . . . . . {for one single degree of freedom of movement of the mass}
2015/0828 . . . . . {the mass being of the paddle type being suspended at one of its longitudinal ends}
2015/0831 . . . . . {the mass being of the paddle type having the pivot axis between the longitudinal ends of the mass, e.g. see-saw configuration}
2015/0834 . . . . . {the mass constituting a pendulum having the pivot axis disposed symmetrically between the longitudinal ends, the center of mass being shifted away from the plane of the pendulum which includes the pivot axis}
2015/0837 . . . . . {the mass being suspended so as to only allow movement perpendicular to the plane of the substrate, i.e. z-axis sensor}
2015/084 . . . . . {the mass being suspended at more than one of its sides, e.g. membrane-type suspension, so as to permit multi-axis movement of the mass}
2015/0842 . . . . . {the mass being of clover leaf shape}
2015/0845 . . . . {using a plurality of spring-mass systems being arranged on one common planar substrate, the systems not being mechanically coupled and the sensitive direction of each system being different}
2015/0848 . . . . {using a plurality of mechanically coupled spring-mass systems, the sensitive direction of each system being different}
2015/0851 . . . . {using a plurality of spring-mass systems, each system having a different range of sensitivity to acceleration}
2015/0854 . . . . {using a particular shape of the mass, e.g. annular}
2015/0857 . . . . {using a particular shape of the suspension spring}
2015/086 . . . . . {using a torsional suspension spring}
2015/0862 . . . {being provided with particular means being integrated into a MEMS accelerometer structure for providing particular additional functionalities to those of a spring mass system}
2015/0865 . . . . {using integrated signal processing circuitry}
2015/0868 . . . . {using self-test structures integrated into the microstructure}
2015/0871 . . . . {using stopper structures for limiting the travel of the seismic mass}
2015/0874 . . . . {using means for preventing stiction of the seismic mass to the substrate}
2015/0877 . . . . {using integrated interconnect structures}
2015/088 . . . . {for providing wafer-level encapsulation}
2015/0882 . . . . {for providing damping of vibrations}
15/0885 . . . {by magnetostrictive pick-up}
15/0888 . . . {for indicating angular acceleration}
15/0891 . . . {with indication of predetermined acceleration values (G01P 15/135 takes precedence)}
15/0894 . . . {by non-contact electron transfer, i.e. electron tunneling}
15/0897 . . . {by thermal pick-up (G01P 15/008 takes precedence)}
15/09 . . . by piezo-electric pick-up
15/0907 . . . . {of the compression mode type}
15/0915 . . . . {of the shear mode type}
15/0922 . . . . {of the bending or flexing mode type}
15/093 . . . by photoelectric pick-up
15/097 . . . by vibratory elements
15/0975 . . . . {by acoustic surface wave resonators or delay lines}
15/10 . . . . by vibratory strings
15/105 . . . by magnetically sensitive devices
15/11 . . . by inductive pick-up
15/12 . . . by alteration of electrical resistance {(G01P 15/0897, G01P 15/105 take precedence)}
15/121 . . . . {by potentiometers}
15/122 . . . . {by metal resistance strain gauges, e.g. wire resistance strain gauges}
15/123 . . . . {by piezo-resistive elements, e.g. semiconductor strain gauges}
15/124 . . . . {by semiconductor devices comprising at least one PN junction, e.g. transistors}
15/125 . . . by capacitive pick-up
15/13 . . . by measuring the force required to restore a proofmass subjected to inertial forces to a null position
15/131 . . . . {with electrostatic counterbalancing means}
15/132 . . . . {with electromagnetic counterbalancing means}
15/133 . . . . {with piezo-electric counterbalancing means}
15/135 . . . by making use of contacts which are actuated by a movable inertial mass
15/14 . by making use of gyroscopes (gyroscopes per se G01C 19/00)
15/16 . by evaluating the time-derivative of a measured speed signal
15/165 . . {for measuring angular accelerations}
15/18 . in two or more dimensions

21/00 Testing or calibrating of apparatus or devices covered by the preceding groups

21/02 . of speedometers
21/025 . . {for measuring speed of fluids; for measuring speed of bodies relative to fluids (for measuring volume flow G01F 25/0007)}