G05 CONTROLLING; REGULATING

Notes

(1) This class covers methods, systems, and apparatus for controlling, in general.
(2) In this class, the following terms or expressions are used with the meanings indicated:
– "controlling" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation;
– "regulation" means maintaining a variable automatically at a desired value or within a desired range of values. The desired value or range may be fixed, or manually varied, or may vary with time according to a predetermined "programme" or according to variation of another variable. Regulation is a form of control;
– "automatic control" is often used in the art as a synonym for "regulation".
(3) Attention is drawn to the Notes following the title of section G, especially as regards the definition of the term "variable".

G05B CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; characterised by mechanical features only G05G; sensitive elements, see the appropriate subclasses, e.g. G12B, subclasses of G01, H01; correcting units, see the appropriate subclasses, e.g. H02K)

Notes

(1) This subclass covers features of control systems or elements for regulating specific variables, which are clearly more generally applicable.
(2) This subclass does not cover: **[7]**
(a) systems for controlling or regulating non-electric variables in general, which are covered by subclass G05D; **[7]**
(b) systems for regulating electric or magnetic variables in general, which are covered by subclass G05F; **[7]**
(c) systems specially adapted for the control of particular machines or apparatus provided for in a single other subclass, which are classified in the relevant subclass for such machines or apparatus, provided that there is specific provision for control or regulation relevant to the special adaptation (see Note (5), below). Otherwise, classification is made in the most appropriate place in this subclass. **[7]**
(3) In this subclass, the following terms or expressions are used with the meanings indicated:
– "automatic controller" means a system, circuit, or device in which a signal from the detecting element is compared with a signal representing the desired value and which operates in such a way as to reduce the deviation. The automatic controller generally does not include the sensitive element, i.e. that element which measures the value of the condition to be corrected, or the correcting element, i.e. that element which adjusts the condition to be corrected;
– "electric" includes "electromechanical", "electrohydraulic" or "electropneumatic".
(4) In this subclass, details of specific control systems are classified in the group relevant to the system, if not otherwise provided for.
(5) This Note lists places in the IPC where there is specific provision of the kind referred to in Note (2)(c), above; where such provision is at a general level, the places are listed under the heading "General references"; where the provision is related to programme control, the places are listed under the heading "Places related to group G05B 19/00". **[7]**

General references **[7]**

A01K	73/04	Spreading or positioning of drawn nets for fishing
A61G	13/02	
A61G	15/02	Adjustable operating tables, operating chairs, or dental chairs
B01D	3/42	Distillation
B01D	24/48	
B01D	29/60	
B01D	37/04	
B01D	46/44	Filtration
B01D	53/30	Separation of gases or vapours by gas-analysis apparatus
B01D	61/00	Separation using semi-permeable membranes
B01J	4/00	Feed or outlet in chemical or physical processes
B01J	38/14	Oxygen content in oxidation gas for regeneration or reactivation of catalysts
B01J	47/14	Ion-exchange processes
B05B	12/02	Delivery in spraying systems
B21B	37/00	
B21B	39/00	Metal-rolling mills
B21K	31/00	Positioning tool carriers for forging, pressing or hammering
B22D	11/16	Continuous casting of metals
B22D	13/12	Centrifugal casting of metals
B22D	17/32	Pressure or injection die casting of metals
B22D	18/08	Pressure or vacuum casting of metals
B22D	46/00	Casting of metals in general
B23B	39/26	Tool or work positioning for boring or drilling
B23D	36/00	Machines for shearing or similar cutting stock travelling otherwise than in the direction of the cut
B23Q	5/00	Driving or feeding mechanisms of machine tools
B23Q	15/00	Feed movement, cutting velocity or position of machine tools
B23Q	35/00	Copying from a pattern or master model for machine tools

B24B	47/22	Position of grinding tool or work
B25J	13/00	Manipulators
B26D	5/02	Position of cutters in cutting machines
B29C	39/00	
B29C	51/00	Shaping techniques for plastic substances
B30B	15/14	
B30B	15/16	Presses
B41B	27/00	Composing machines
B41F	33/00	Printing machines or presses
B41J	11/42	Feeding sheets or webs in typewriters
B41L	39/00	Apparatus or devices for manifolding, duplicating or printing for commercial purposes
B41L	47/56	Addressing machines
B60G	17/00	
B60G	21/00	Vehicle suspension
B60T	7/00	
B60T	15/00	Vehicle brakes
B65B	57/00	Machines for packaging
B65G	43/00	Conveyers
E02F	3/43	Sequence of drive operations for dredging or soil-shifting
E21B	44/00	Earth drilling operations
F01K	1/12	
F01K	1/16	Steam accumulators
F01K	3/00	
F01K	7/00	
F01K	13/02	Steam engine plants
F02C	7/057	Air intakes for gas-turbine or jet-propulsion plants
F02C	9/00	Gas-turbine plants; Fuel supply in air-breathing jet-propulsion plants
F02D		Combustion engines
F02K	1/15	
F02K	1/76	Jet pipes or nozzles in jet-propulsion plants
F02K	7/00	
F02K	9/00	Jet-propulsion plants
F04B	1/00	
F04B	27/00	
F04B	49/00	Positive-displacement machines
F04D	15/00	
F04D	27/00	Non-positive-displacement pumps, pumping installations, or systems
F16D	43/00	
F16D	48/00	Clutches
F16F	15/027	Suppression of vibrations using fluid means
F16H	59/00	
F16H	63/00	Gearings
F22B	35/00	Steam boilers
F23G	5/50	Incineration of waste
F23N		Combustion in combustion apparatus
F24B	1/187	Combustion in open fires using solid fuel
F24J	2/40	Solar heating
F26B	25/22	Drying processes of solid materials or objects
F28B	11/00	Steam or vapour condensers
F28D	15/06	Heat-exchange apparatus with intermediate heat-transfer medium in closed tubes passing into or through conduit walls, in which the medium condenses and evaporates
F28F	27/00	Heat-exchanges or heat-transfer apparatus in general
G06F	11/00	Computers
G08G		Traffic
G09G		Indicating devices using static means to present variable information
G11B	15/00	
G11B	19/00	Driving, starting or stopping of record carriers
G21C	7/00	Nuclear reaction
G21D	3/00	Nuclear power plant
H01J	37/304	Electron-beam or ion-beam tubes used for localised treatment of objects
H02P		Electric motors, generators, or dynamo-electric converters

Places related to group G05B 19/00 (programme-control systems) **[7]**

A61J	7/04	Programmed medicine dispensers
A61L	2/24	Disinfection or sterilising
A61N	1/36	Heart pace-makers
A63H	17/395	Steering-mechanisms for toy vehicles
B04B	13/00	Centrifuges
B21B	37/24	Thickness of work produced by metal-rolling mills
B21D	7/12	Bending metal rods, profiles, or tubes
B23B	39/08	
B23B	39/24	Boring or drilling machines

B23H	7/20	Electrical discharge or electrochemical machining
B23P	21/00	Assembling of parts to compose units
B24B	51/00	Series of individual steps in grinding a workpiece
B25J	9/00	Manipulators
B30B	15/26	Presses
B41F	33/16	Sequence of operations in printing machines or presses
B41J	11/44	Feeding sheets or webs in typewriters
B41L	39/16	Sequence of operations in apparatus or devices for manifolding, duplicating or printing for commercial purposes
B41L	47/64	Selecting text or image to be printed in addressing machines
B60L	15/20	Traction-motor speed of electrically-propelled vehicles
B65H	31/24	Piling articles
B66C	13/48	
B66C	23/58	Crane drives
B67D	5/14	Dispensing, delivering, or transferring liquids
D05B	19/00	
D05B	21/00	Sewing machines
D05C	5/04	Embroidering machines
D06F	33/00	Operations in washing machines
F02D	27/02	
F02D	28/00	Combustion engines
F02D	41/26	Supply of combustible mixture or its constituents to combustion engines
F15B	21/02	Fluid-pressure actuator systems
F23N	5/20	
F23N	5/22	Combustion in combustion apparatus
G01G	19/38	Weighing apparatus
G04C	23/08	
G04C	23/34	Electromechanical clocks or watches
G06C	21/00	Mechanically operating digital computers
G06F	9/00	Control units for electric digital data processing
G06F	13/10	Peripheral devices for electric digital data processing
G06F	15/00	Electrically operating digital computers
G06G	7/06	Electrically or magnetically operating analogue computers
G09B	7/04	
G09B	7/08	
G09B	7/12	Electrically-operated teaching apparatus or devices
H01H	43/00	Electric switches
H01J	37/302	Electron-beam or ion-beam tubes used for localised treatment of objects
H03K	17/296	Electronic switching or gating
H04Q	3/54	
H04Q	7/18	Selecting arrangements in electric communication technique

Subclass Index

1/00 Comparing elements, i.e. elements for effecting comparison directly or indirectly between a desired value and existing or anticipated values (comparing phase or frequency of two electric signals H03D 13/00)

1/01 . electric **[2]**

1/02 . . for comparing analogue signals **[2]**

1/03 . . for comparing digital signals **[2]**

1/04 . . with sensing of the position of the pointer of a measuring instrument

1/06 . . . continuous sensing

1/08 . . . stepwise sensing

1/11 . fluidic **[2]**

5/00 Anti-hunting arrangements

5/01 . electric

5/04 . fluidic **[2]**

6/00 Internal feedback arrangements for obtaining particular characteristics, e.g. proportional, integral, differential (in automatic controllers G05B 11/00)

6/02 . electric

6/05 . fluidic **[2]**

7/00 **Arrangements for obtaining smooth engagement or disengagement of automatic control**

7/02 . electric **[2]**

7/04 . fluidic **[2]**

9/00 **Safety arrangements** (G05B 7/00 takes precedence; safety arrangements in programme-control systems G05B 19/048, G05B 19/406; safety valves F16K 17/00; emergency protective circuit arrangements in general H02H)

9/02 . electric

9/03 . . with multiple-channel loop, i.e. redundant control systems **[2]**

9/05 . fluidic **[2]**

11/00 **Automatic controllers** (G05B 13/00 takes precedence)

11/01 . electric

11/06 . . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers (G05B 11/26 takes precedence)

11/10 . . . the signal transmitted being dc

11/12 . . . the signal transmitted being modulated on an ac carrier

11/14 . . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers (G05B 11/26 takes precedence)

11/16 . . . Two-step controllers, e.g. with on/off action

11/18 . . . Multi-step controllers

11/26 . . in which the output signal is a pulse-train

11/28 . . . using pulse-height modulation; using pulse-width modulation

11/30 . . . using pulse-frequency modulation

11/32 . . with inputs from more than one sensing element; with outputs to more than one correcting element

11/36 . . with provision for obtaining particular characteristics, e.g. proportional, integral, differential

11/38 . . . for obtaining a proportional characteristic

11/40 . . . for obtaining an integral characteristic

11/42 . . . for obtaining a characteristic which is both proportional and time-dependent, e.g. P. I., P. I. D.

11/44 . pneumatic only

11/46 . . without auxiliary power

11/48 . . with auxiliary power

11/50 . . . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers

11/52 . . . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers

11/54 . . . . Two-step controllers, e.g. with on/off action

11/56 . . . . Multi-step controllers

11/58 . . with inputs from more than one sensing element; with outputs to more than one correcting element

11/60 . hydraulic only

13/00 **Adaptive control systems, i.e. systems automatically adjusting themselves to have a performance which is optimum according to some preassigned criterion** (G05B 19/00 takes precedence; details of the computer G06F 15/18) **[3]**

13/02 . electric

13/04 . . involving the use of models or simulators **[3]**

15/00 **Systems controlled by a computer** (G05B 13/00, G05B 19/00 take precedence; automatic controllers with particular characteristics G05B 11/00; computers per se G06) **[3]**

15/02 . electric

17/00 **Systems involving the use of models or simulators of said systems** (G05B 13/00, G05B 15/00, G05B 19/00 take precedence; analogue computers for specific processes, systems or devices, e.g. simulators, G06G 7/48) **[3]**

17/02 . electric

19/00 **Programme-control systems** (specific applications, see the relevant places, e.g. A47L 15/46; clocks with attached or built-in means operating any device at a preselected time interval G04C 23/00; marking or sensing record carriers with digital information G06K; information storage G11; time or time-programme switches which automatically terminate their operation after the programme is completed H01H 43/00)

19/02 . electric

19/04 . . Programme control other than numerical control, i.e. in sequence controllers or logic controllers (G05B 19/418 takes precedence; numerical control G05B 19/18)

19/042 . . . using digital processors (G05B 19/05 takes precedence) **[6]**

19/045 . . . using logic state machines, consisting only of a memory or a programmable logic device containing the logic for the controlled machine and in which the state of its outputs is dependent on the state of its inputs or part of its own output states, e.g. binary decision controllers, finite state controllers **[6]**

19/048 . . . Monitoring; Safety **[6]**

19/05 . . . Programmable logic controllers, e.g. simulating logic interconnections of signals according to ladder diagrams or function charts **[5]**

19/06 . . . using cams, discs, rods, drums, or the like (mechanical programme-control apparatus G05G 21/00)

19/07 . . . where the programme is defined in the fixed connection of electrical elements, e.g. potentiometers, counters, transistors **[6]**

19/08 . . . using plugboards, cross-bar distributors, matrix switches, or the like

19/10 . . . using selector switches

19/12 . . . using record carriers

19/14 . . . . using punched cards or tapes

19/16 . . . . using magnetic record carriers

19/18 . . Numerical control (NC), i.e. automatically operating machines, in particular machine tools, e.g. in a manufacturing environment, so as to execute positioning, movement or co-ordinated operations by means of programme data in numerical form (G05B 19/418 takes precedence) **[6]**

19/19 . . . characterised by positioning or contouring control systems, e.g. to control position from one programmed point to another or to control movement along a programmed continuous path **[3,6]**

Note

In this group, the measuring system for an axis is used to measure the displacement along that axis. This measurement is used as position-feedback in the servo-control system. **[6]**

19/21 . . . . using an incremental digital measuring device **[3]**
19/23 . . . . . for point-to-point control **[3]**
19/25 . . . . . for continuous-path control **[3]**
19/27 . . . . using an absolute digital measuring device **[3]**
19/29 . . . . . for point-to-point control **[3]**
19/31 . . . . . for continuous-path control **[3]**
19/33 . . . . using an analogue measuring device **[3]**
19/35 . . . . . for point-to-point control **[3]**
19/37 . . . . . for continuous-path control **[3]**
19/39 . . . . using a combination of the means covered by at least two of the preceding groups G05B 19/21, G05B 19/27 and G05B 19/33 **[3]**
19/40 . . . . Open loop systems, e.g. using stepping motor **[3]**
19/401 . . . characterised by control arrangements for measuring, e.g. calibration and initialisation, measuring workpiece for machining purposes (G05B 19/19 takes precedence) **[6]**
19/402 . . . characterised by control arrangements for positioning, e.g. centring a tool relative to a hole in the workpiece, additional detection means to correct position (G05B 19/19 takes precedence) **[6]**
19/404 . . . characterised by control arrangements for compensation, e.g. for backlash, overshoot, tool offset, tool wear, temperature, machine construction errors, load, inertia (G05B 19/19, G05B 19/41 take precedence) **[6]**
19/406 . . . characterised by monitoring or safety (G05B 19/19 takes precedence) **[6]**
19/4061 . . . . Avoiding collision or forbidden zones **[6]**
19/4062 . . . . Monitoring servoloop, e.g. overload of servomotor, loss of feedback or reference **[6]**
19/4063 . . . . Monitoring general control system (G05B 19/4062 takes precedence) **[6]**
19/4065 . . . . Monitoring tool breakage, life or condition **[6]**
19/4067 . . . . Restoring data or position after power failure or other interruption **[6]**
19/4068 . . . . Verifying part programme on screen, by drawing or other means **[6]**
19/4069 . . . . Simulating machining process on screen (G05B 19/4068 takes precedence) **[6]**
19/408 . . . characterised by data handling or data format, e.g. reading, buffering or conversion of data **[6]**
19/409 . . . characterised by using manual data input (MDI) or by using control panel, e.g. controlling functions with the panel; characterised by control panel details, by setting parameters (G05B 19/408, G05B 19/4093 take precedence) **[6]**
19/4093 . . . characterised by part programming, e.g. entry of geometrical information as taken from a technical drawing, combining this with machining and material information to obtain control information, named part programme, for the NC machine **[6]**
19/4097 . . . characterised by using design data to control NC machines, e.g. CAD/CAM (G05B 19/4093 takes precedence; CAD in general G06F 17/50) **[6]**
19/4099 . . . . Surface or curve machining, making 3D objects, e.g. desktop manufacturing **[6]**
19/41 . . . characterised by interpolation, e.g. the computation of intermediate points between programmed end points to define the path to be followed and the rate of travel along that path (G05B 19/25, G05B 19/31, G05B 19/37, G05B 19/39, G05B 19/40 take precedence) **[3,6]**
19/4103 . . . . Digital interpolation **[6]**
19/4105 . . . . Analog interpolation **[6]**
19/414 . . . Structure of the control system, e.g. common controller or multiprocessor systems, interface to servo, programmable interface controller **[6]**
19/4155 . . . characterised by programme execution, i.e. part programme or machine function execution, e.g. selection of a programme **[6]**
19/416 . . . characterised by control of velocity, acceleration or deceleration (G05B 19/19 takes precedence) **[6]**
19/418 . . Total factory control, i.e. centrally controlling a plurality of machines, e.g. direct or distributed numerical control (DNC), flexible manufacturing systems (FMS), integrated manufacturing systems (IMS), computer integrated manufacturing (CIM) **[6]**
19/42 . . Recording and playback systems, i.e. in which the programme is recorded from a cycle of operations, e.g. the cycle of operations being manually controlled, after which this record is played back on the same machine
19/421 . . . Teaching successive positions by mechanical means, e.g. by mechanically-coupled handwheels to position tool head or end effector (G05B 19/423 takes precedence) **[6]**
19/423 . . . Teaching successive positions by walk-through, i.e. the tool head or end effector being grasped and guided directly, with or without servo-assistance, to follow a path **[6]**
19/425 . . . Teaching successive positions by numerical control, i.e. commands being entered to control the positioning servo of the tool head or end effector **[6]**
19/427 . . . Teaching successive positions by tracking the position of a joystick or handle to control the positioning servo of the tool head, master-slave control (G05B 19/423 takes precedence) **[6]**
19/43 . fluidic **[3]**
19/44 . . pneumatic **[3]**
19/46 . . hydraulic **[3]**

21/00 **Systems involving sampling of the variable controlled** (G05B 13/00 to G05B 19/00 take precedence; transmission systems for measured values G08C; electronic switching or gating H03K 17/00)

21/02 . electric

23/00 **Testing or monitoring of control systems or parts thereof** (monitoring of programme-control systems G05B 19/048, G05B 19/406)

23/02 . Electric testing or monitoring

24/00 **Open-loop automatic control systems not otherwise provided for [2]**

24/02 . electric **[2]**

24/04 . fluidic **[2]**

99/00 **Subject matter not provided for in other groups of this subclass [8]**

G05D **SYSTEMS FOR CONTROLLING OR REGULATING NON-ELECTRIC VARIABLES** (for continuous casting of metals B22D 11/16; valves per se F16K; sensing non-electric variables, see the relevant subclasses of G01; for regulating electric or magnetic variables G05F)

Notes

(1) This subclass does not cover features of general applicability to regulating systems, e.g. anti-hunting arrangements, which are covered by subclass G05B.

(2) In this subclass, the following term is used with the meaning indicated:
– "systems" includes self-contained devices such as speed governors, pressure regulators.

(3) Control systems specially adapted for particular apparatus, machines or processes are classified in the subclasses for the apparatus, machines or processes, provided that there is specific provision for control or regulation relevant to the special adaptation, either at a detailed level (e.g. A21B 1/40: "for regulating temperature in bakers' ovens") or at a general level (e.g. B23K 9/095: "for automatic control of welding parameters in arc welding"). Otherwise, classification is made in the most appropriate place in this subclass.
The following are lists of places where there is specific provision of the kind referred to above. Where such provision is at a detailed level, the places have been grouped according to the main groups of this subclass. Where the provision is at a general level (e.g. of a kind appropriate to more than one of the main groups specified in the lists, or to main groups G05D 27/00 or G05D 29/00), the places are listed under the title "General References".

Places related to G05D 1/00

A01B	69/00	Agricultural machines or implements
A63H	17/36	Toy vehicles
B60V	1/11	Air-cushion vehicles
B60W	30/10	Road vehicle path control
B62D	1/00	Steering controls of motor vehicles or trailers, i.e. means for initiating a change of direction
B62D	6/00	Arrangements for automatically controlling the steering depending on driving conditions
B62D	55/116	Chassis of endless-tracked vehicles
B63H	25/00	Marine steering; control of waterborne vessels
B64C	13/00	Controlling aircraft
B64C	15/00	
B64D	25/11	Controlling attitude or direction of aircraft ejector seats
B64G	1/24	Cosmonautic vehicles
F41G	7/00	Self-propelled missiles
F42B	15/01	Guided missiles
F42B	19/01	Marine torpedoes

Places related to G05D 3/00

A43D	119/00	Footwear manufacture
B21K	31/00	Tool carriers in forging or pressing
B23B	39/26	Pattern-controlled boring or drilling tools
B23D	1/30,	Planing or slotting machines controlled by copying device
B23D	3/06,	
B23D	5/04	
B23H	7/18	Electrode to workpiece spacing in electric discharge and electrochemical machining
B23K	26/02	Workpiece in laser welding or cutting
B23K	37/04	Workpiece in welding
B23K	37/06	Molten metal in welding
B23Q	5/20	Spindles in machine tools
B23Q	15/00,	Tool or work position in machine tools
B23Q	16/00	
B23Q	35/00	Tools controlled by pattern or master model
B24B	17/00	Grinding controlled by patterns, drawings, magnetic tape or the like
B24B	47/22	Starting position in grinding
B30B	15/24	Actuating members in presses
B62D	55/116	Chassis of tracked vehicles
B65H	23/18	Web-advancing mechanisms
E02F	3/43	Dippers or buckets in dredgers
F15B	9/00	Fluid-pressure servomotors with follow-up action
F24J	2/38	Tracking of solar heat collectors
G03F	9/00	Photomechanical production of patterned or textured surfaces
G11B	5/588	Rotating heads in information storage systems
G21C	7/12	Movement of control elements in nuclear reactors

Places related to G05D 5/00

A24B	7/14	Tobacco cutting
B05C	11/02	Thickness of coating of fluent material on surface
B21B	37/16	Thickness, width, diameter or other transverse dimensions of the products of metal-rolling mills
C03B	18/04	Dimension of glass ribbon
D21F	7/06	Thickness of layer in paper making

Places related to G05D 7/00

A45D	20/26	Air in hair drying helmets
A61M	5/168	Flow of media to the human body
B03C	3/36	Gases or vapour in electrostatic separators
B05C	11/10	Fluent material in coating devices
B67D	1/12	Dispensing beverages on draught
B67D	5/28	Transferring liquids
C10K	1/28	Gas purifiers
E21B	21/08	Flushing boreholes
E21B	43/12	Obtaining liquids from wells
F01D	17/00	Flow in non-positive-displacement machines or systems
F01M	1/16	Lubrication arrangements
F01P	7/00	Coolant flow in cooling devices
F02C	9/16,	Gas-turbine working fluid
F02C	9/50	
F16L	55/027	Throttle passages in pipes
F24F	11/00	Air-flow or supply of heating or cooling fluids in air treatment arrangements
F26B	21/12	Air or gas flow in dryers
G01G	11/08	Continuous flow weighing apparatus
G21D	3/14	Coolant in nuclear power plant

Places related to G05D 9/00

B01D	21/34	Liquid level in sedimentation arrangements
B41L	27/04	Ink level in printing, manifolding or duplicating arrangements
F22D	5/00	Feed water for boilers
H01J	1/10,	Liquid pool electrodes in electric discharge tubes or lamps
H01J	13/14	

Places related to G05D 11/00

B01D	21/32	Density in sedimentation arrangements
B01F	15/04	Mixers
B24C	7/00	Abrasive blasts
B28C	7/00	Mixtures of clays or cements
B65G	53/66	Bulk material conveyers
F02K	3/075	Flow ratio in jet-propulsion plants

Places related to G05D 13/00

B21C	1/12	Drum speed in metal drawing
B23Q	15/00	Cutting velocity of tool or work
B30B	15/20	Ram speed in presses
B60K	31/00	Setting or limiting speed of vehicles
B60L	15/00	Electrically-propelled vehicles
B60W	30/14	Road vehicle cruise control
B64D	31/08	Cruising speed of aircraft
D01D	1/09	Feed rate in manufacture of artificial filaments, threads, fibres, bristles or ribbons
D01G	15/36	Carding machines
D02H	13/14	Warping, beaming or leasing machines
D03D	51/16	Cyclically varying speed of looms
G01N	30/32	Speed of fluid carrier in chemical analysis
G11B	15/46	Filamentary or web record carriers or heads for such carriers in information storage systems
G11B	19/28	Non-filamentary, non-web record carriers, or heads for such carriers in information storage systems

Places related to G05D 15/00

B25D	9/26	Portable percussive tools
B30B	15/22	Ram pressure in presses
B65H	59/00	Tension in filamentary material
B65H	77/00	Tension in webs, tapes, filamentary material
B66D	1/50	Rope, cable or chain tension
D03D	49/04	Tension in looms
D05B	47/04	Tension in sewing machines
D21F	3/06	Pressure in paper-making machines
F26B	13/12	Drying fabrics
F26B	21/10	Pressure in dryers
G11B	15/43	Record carrier tension in information storage arrangements

Places related to G05D 16/00

B60C	23/00	Tyre pressure
B63C	11/08	Air within diving suit
B64D	13/00	Aircraft air-pressure
B65G	53/66	Bulk material conveyers

D01D	1/09	Manufacture of artificial filaments, threads, fibres, bristles or ribbons
E21B	21/08	Flushing boreholes
F01M	1/16	Lubrication arrangements
G01N	30/32	Pressure of fluid carrier in chemical analysis
H01J	7/14	Pressure in electric discharge tubes or lamps
H01K	1/52	Pressure in electric incandescent lamps

Places related to G05D 19/00

B25D	9/26	Portable percussion tools
B65G	27/32	Jigging conveyers

Places related to G05D 21/00

B01D	21/32	Density in sedimentation arrangements
B01D	53/30	Treating gases or vapours
G01N	30/34	Composition of fluid carrier in chemical analysis

Places related to G05D 22/00

A01G	25/16	Watering gardens, fields, sports grounds or the like
A01K	41/04	Poultry incubators
A24B	9/00	Tobacco products
F24F	11/00	Air conditioning
F26B	21/08	Dryers

Places related to G05D 23/00

A21B	1/40	Bakers' ovens
A45D	6/20	Hair curlers
B21C	31/00	Metal extruding
B60C	23/00	Tyre temperature
B64G	1/50	Cosmonautic vehicles
C03B	18/18,	Float baths in glass making
C03B	18/22	
D01D	1/09	Manufacture of artificial filaments, threads, fibres, bristles or ribbons
D04B	35/30	Knitting machines
D06F	75/26	Hand irons
D21F	5/06	Paper-making machines
F01M	5/00	Lubricant in lubrication arrangements
F16N	7/08	Arrangements for supplying oil or unspecified lubricant from a reservoir
F22G	5/00	Steam superheat
F26B	21/10	Dryers
G01N	30/30	Temperature of fluid carrier in chemical analysis
H01M	10/50	Electric storage cells
H05B	6/06,	Dielectric, induction or microwave heating
H05B	6/50,	
H05B	6/68	
H05G	1/36	Anode of X-ray tube

Places related to G05D 25/00

B41B	21/08	Photographic composing machines
H01S	3/10,	Lasers and other light sources
H05B	33/08,	
H05B	35/00	
H05B	43/00	

General references

A01D	41/127	Combines
A01J	5/007	Milking machines
B23K	9/095	Welding parameters
B23Q	35/00	Copying
B24B	17/00,	Grinding or polishing
B24B	49/00	
B24C	7/00	Abrasive blasts
B67D	1/12	Dispensing beverages on draught
F23C	10/28	Combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles
G03G	21/20	Electrographic, electrophotographic or magnetographic processes
H02P	5/00	Dynamo-electric motors or generators
H02P	9/00	

Subclass Index

1/00 **Control of position, course, altitude, or attitude of land, water, air, or space vehicles, e.g. automatic pilot** (radio navigation systems or analogous systems using other waves G01S)

1/02 . Control of position or course in two dimensions **[2]**

1/03 . . using near-field transmission systems, e.g. inductive-loop type

1/04 . Control of altitude or depth

1/06 . . Rate of change of altitude or depth

1/08 . Control of attitude, i.e. control of roll, pitch, or yaw

1/10 . Simultaneous control of position or course in three dimensions (G05D 1/12 takes precedence)

1/12 . Target-seeking control

3/00 **Control of position or direction** (G05D 1/00 takes precedence; for numerical control G05B 19/18)

3/10 . without using feedback **[3]**

3/12 . using feedback **[3]**

3/14 . . using an analogue comparing device **[3]**

3/16 . . . whose output amplitude can only take a number of discrete values (G05D 3/18 takes precedence) **[3]**

3/18 . . . delivering a series of pulses **[3]**

3/20 . . using a digital comparing device **[3]**

5/00 **Control of dimensions of material**

5/02 . of thickness, e.g. of rolled material

5/03 . . characterised by the use of electric means

5/04 . of the size of items, e.g. of particles

5/06 . . characterised by the use of electric means

7/00 **Control of flow** (level control G05D 9/00; ratio control G05D 11/00; weighing apparatus G01G)

7/01 . without auxiliary power

7/03 . with auxiliary non-electric power **[2]**

7/06 . characterised by the use of electric means

9/00 **Level control, e.g. controlling quantity of material stored in vessel**

9/02 . without auxiliary power

9/04 . with auxiliary non-electric power **[2]**

9/12 . characterised by the use of electric means

11/00 **Ratio control** (control of chemical or physico-chemical variables, e.g. pH-value, G05D 21/00; humidity control G05D 22/00; control of viscosity G05D 24/00) **[3]**

11/02 . Controlling ratio of two or more flows of fluid or fluent material

11/03 . . without auxiliary power

11/035 . . with auxiliary non-electric power **[2]**

11/04 . . . by sensing weight of individual components, e.g. gravimetric procedure

11/06 . . . by sensing density of mixture, e.g. using aerometer

11/08 . . . by sensing concentration of mixture, e.g. by measuring pH-value **[3]**

11/10 . . . . by sensing moisture of non-aqueous liquids

11/12 . . . by sensing viscosity of mixture

11/13 . . characterised by the use of electric means

11/16 . Controlling mixing ratio of fluids having different temperatures, e.g. by sensing the temperature of a mixture of fluids having different viscosities

13/00 **Control of linear speed**; **Control of angular speed**; **Control of acceleration or deceleration, e.g. of a prime mover** (synchronising telegraph receiver and transmitter H04L 7/00)

13/02 . Details

13/04 . . providing for emergency tripping of an engine in case of exceeding maximum speed

13/06 . . providing for damping of erratic vibrations in governors

13/08 . without auxiliary power

13/10 . . Centrifugal governors with fly-weights

13/12 . . . Details

13/14 . . . . Fly-weights; Mountings thereof; Adjusting equipment for limits, e.g. temporarily

13/16 . . . . Risers; Transmission gear therefor; Restoring mechanisms therefor

13/18 . . . counterbalanced by spider springs acting immediately upon the fly-weights

13/20 . . . counterbalanced by spider springs acting upon the articulated riser

13/22 . . . counterbalanced by fluid pressure acting upon the articulated riser

13/24 . . . counterbalanced by two or more different appliances acting simultaneously upon the riser, e.g. with both spring force and fluid pressure, with both spring force and electromagnetic force

13/26 . . . with provision for modulating the degree of non-uniformity of speed

13/28 . . . with provision for performing braking effects in case of increased speed

13/30 . . Governors characterised by fluid features in which the speed of a shaft is converted into fluid pressure (transducers converting variations of physical quantities into fluid-pressure variations F15B 5/00)

13/32 . . . using a pump

13/34 . with auxiliary non-electric power (fluid-pressure converters F15B 3/00) **[2]**

13/36 . . using regulating devices with proportional band, i.e. P. regulating devices

13/38 . . . involving centrifugal governors of fly-weight type

13/40 . . . involving centrifugal governors of pump type

13/42 . . . involving fluid governors of flow-controller type, i.e. the width of liquid flow being controlled by fly-weights

13/44 . . . involving fluid governors of jet type

13/46 . . using regulating devices with proportional band and integral action, i.e. P.I. regulating devices

13/48 . . . involving resilient restoring mechanisms

13/50 . . . involving connecting means for superimposing a proportional regulating device and an integral regulating device

13/52 . . using regulating devices with proportional band and derivative action, i.e. P.D. regulating devices

13/54 . . . involving centrifugal governors of fly-weight type exerting an acceleratory effect

13/56 . . . involving restoring mechanisms exerting a delay effect

13/58 . . . involving means for connecting a speed-regulating device and an acceleration-regulating device
13/60 . . using regulating devices with proportional band, derivative, and integral action, i.e. P.I.D. regulating devices
13/62 . characterised by the use of electric means, e.g. use of a tachometric dynamo, use of a transducer converting an electric value into a displacement
13/64 . Compensating the speed difference between engines meshing by a differential gearing or the speed difference between a controlling shaft and a controlled shaft
13/66 . Governor units providing for co-operation with control dependent upon a variable other than speed

15/00 Control of mechanical force or stress; **Control of mechanical pressure**
15/01 . characterised by the use of electric means

16/00 Control of fluid pressure
16/02 . Modifications to reduce the effects of instability, e.g. due to vibrations, friction, abnormal temperature, overloading, unbalance (vibration-dampers F16F 7/00)
16/04 . without auxiliary power
16/06 . . the sensing element being a flexible member yielding to pressure, e.g. diaphragm, bellows, capsule
16/08 . . . Control of liquid pressure
16/10 . . the sensing element being a piston or plunger
16/12 . . the sensing element being a float
16/14 . with auxiliary non-electric power **[2]**
16/16 . . derived from the controlled fluid
16/18 . . derived from an external source
16/20 . characterised by the use of electric means

17/00 Control of torque; **Control of mechanical power**
17/02 . characterised by the use of electric means

19/00 Control of mechanical oscillations, e.g. of amplitude, of frequency, of phase
19/02 . characterised by the use of electric means

21/00 Control of chemical or physico-chemical variables, e.g. pH-value [3]
21/02 . characterised by the use of electric means

22/00 Control of humidity [2]
22/02 . characterised by the use of electric means

23/00 Control of temperature (automatic switching arrangements for electric heating apparatus H05B 1/02)
23/01 . without auxiliary power
23/02 . . with sensing element expanding and contracting in response to changes of temperature (G05D 23/13 takes precedence)
23/08 . . . with bimetallic element (arrangement of valves and flow lines specially adapted for mixing fluid F16K 11/00)
23/10 . . . . with snap-action elements (for valves F16K 31/56)
23/12 . . with sensing element responsive to pressure or volume changes in a confined fluid
23/13 . . by varying the mixing ratio of two fluids having different temperatures
23/185 . with auxiliary non-electric power **[2]**
23/19 . characterised by the use of electric means
23/20 . . with sensing elements having variation of electric or magnetic properties with change of temperature (G05D 23/13 takes precedence)
23/22 . . . the sensing element being a thermocouple
23/24 . . . the sensing element having a resistance varying with temperature, e.g. thermistor
23/26 . . . the sensing element having a permeability varying with temperature
23/27 . . with sensing element responsive to radiation
23/275 . . with sensing element expanding, contracting, or fusing in response to changes of temperature
23/30 . . Automatic controllers with an auxiliary heating device affecting the sensing element, e.g. for anticipating change of temperature (automatic controllers in general and not restricted to control of temperature G05B)
23/32 . . . with provision for adjustment of the effect of the auxiliary heating device, e.g. as a function of time

24/00 Control of viscosity
24/02 . characterised by the use of electric means

25/00 Control of light, e.g. intensity, colour, phase (mechanically operable parts of lighting devices for the control of light F21V; optical devices or arrangements using movable or deformable elements for controlling light independent of the light source G02B 26/00; devices or arrangements, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements for the control of light, circuit arrangements specially adapted therefor, control of light by electro-magnetic waves, electrons or other elementary particles G02F 1/00) **[4]**
25/02 . characterised by the use of electric means

27/00 Simultaneous control of variables covered by two or more of main groups G05D 1/00 to G05D 25/00
27/02 . characterised by the use of electric means

29/00 Simultaneous control of electric and non-electric variables

99/00 Subject matter not provided for in other groups of this subclass [8]

G05F **SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES** (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; regulation of current or voltage, specially adapted for use in electronic time-pieces G04G 19/02; closed-loop systems for regulating non-electric variables by electric means G05D; regulating power supply of digital computers G06F 1/26; for obtaining desired operating characteristics of electromagnets with armatures H01F 7/18; regulating electric power distribution networks H02J; regulating the charging of batteries H02J 7/00; regulating of the output of static converters, e.g. switching regulators, H02M; regulation of the output of electric generators H02N, H02P 9/00; controlling transformers, reactors or choke coils H02P 13/00; regulating frequency response, gain, maximum output, amplitude or bandwidth of amplifiers H03G; regulating tuning of resonant circuits H03J; controlling generators of electronic oscillations or pulses H03L; regulating characteristics of transmission lines H04B; controlling electric light sources H05B 37/02, H05B 39/04, H05B 41/36; electric control of X-ray apparatus H05G 1/30) **[4,5]**

Notes

(1) This subclass covers:
- systems only;
- use of hydraulic, pneumatic, mechanical, and electrical motors for varying electric characteristics of devices which restore the quantity regulated;
- the combination of static converters and current or voltage regulators, if the essential characteristic resides in the combination. **[4]**

(2) This subclass does not cover elements per se, which are covered by the relevant subclasses.

1/00 **Automatic systems in which deviations of an electric quantity from one or more predetermined values are detected at the output of the system and fed back to a device within the system to restore the detected quantity to its predetermined value or values, i.e. retroactive systems**

1/02 . Regulating electric characteristics of arcs (arrangements for feeding or moving of electrodes for spot or seam welding or cutting B23K 9/12; arrangements for feeding electrodes for electric heating or electric lighting H05B 7/109, H05B 31/18; automatic control of power for heating by discharge H05B 7/148) **[2]**

1/04 . . by means of saturable magnetic devices

1/06 . . by means of discharge tubes

1/08 . . by means of semiconductor devices

1/10 . Regulating voltage or current (G05F 1/02 takes precedence; for electric railways B60M 3/02)

1/12 . . wherein the variable is actually regulated by the final control device is ac (G05F 1/625 takes precedence) **[4]**

1/13 . . . using ferroresonant transformers as final control devices **[4]**

1/14 . . . using tap transformers or tap changing inductors as final control devices **[4]**

1/147 . . . . with motor driven tap switch **[4]**

1/153 . . . . . controlled by discharge tubes or semiconductor devices **[4]**

1/16 . . . . combined with discharge tubes or semiconductor devices

1/20 . . . . . semiconductor devices only

1/22 . . . . combined with separate magnetic control devices having a controllable degree of saturation

1/24 . . . using bucking or boosting transformers as final control devices

1/247 . . . . with motor in control circuit **[4]**

1/253 . . . . the transformers including plural windings in series between source and load (G05F 1/247 takes precedence) **[4]**

1/26 . . . . combined with discharge tubes or semiconductor devices

1/30 . . . . . semiconductor devices only

1/32 . . . using magnetic devices having a controllable degree of saturation as final control devices

1/325 . . . . with specific core structure, e.g. gap, aperture, slot, permanent magnet **[4]**

1/33 . . . . with plural windings through which current to be controlled is conducted **[4]**

1/335 . . . . . on different cores **[4]**

1/34 . . . . combined with discharge tubes or semiconductor devices

1/38 . . . . . semiconductor devices only

1/40 . . . using discharge tubes or semiconductor devices as final control devices

1/42 . . . . discharge tubes only

1/44 . . . . semiconductor devices only

1/445 . . . . . being transistors in series with the load **[3]**

1/45 . . . . . being controlled rectifiers in series with the load **[3]**

1/455 . . . . . with phase control **[3]**

1/46 . . wherein the variable actually regulated by the final control device is dc (G05F 1/625 takes precedence) **[4]**

1/52 . . . using discharge tubes in series with the load as final control devices

1/54 . . . . additionally controlled by the unregulated supply

1/56 . . . using semiconductor devices in series with the load as final control devices

1/563 . . . . including two stages of regulation, at least one of which is output level responsive, e.g. coarse and fine regulation **[4]**

1/565 . . . . sensing a condition of the system or its load in addition to means responsive to deviations in the output of the system, e.g. current, voltage, power factor (G05F 1/563 takes precedence) **[4]**

1/567 . . . . . for temperature compensation **[4]**

1/569 . . . . . for protection **[4]**

1/571 . . . . . with overvoltage detector **[4]**

1/573 . . . . . with overcurrent detector **[4]**

1/575 . . . . characterised by the feedback circuit **[4]**

1/577 . . . . for plural loads **[4]**

1/585 . . . . . providing voltages of opposite polarities **[4]**

1/59 . . . . including plural semiconductor devices as final control devices for a single load **[4]**

1/595 . . . . . semiconductor devices connected in series **[4]**
1/607 . . . using discharge tubes in parallel with the load as final control devices **[3]**
1/61 . . . . including two stages of regulation, at least one of which is output level responsive **[4]**
1/613 . . . using semiconductor devices in parallel with the load as final control devices **[3]**
1/614 . . . . including two stages of regulation, at least one of which is output level responsive **[4]**
1/618 . . . using semiconductor devices in series and in parallel with the load as final control devices **[4]**
1/62 . . . using bucking or boosting dc sources
1/625 . . wherein it is irrelevant whether the variable actually regulated is ac or dc **[4]**
1/63 . . . using variable impedances in series with the load as final control devices **[4]**
1/635 . . . . being Hall effect devices, magnetoresistors or thermistors **[4]**
1/644 . . . . being pressure-sensitive resistors **[4]**
1/648 . . . . being plural resistors among which a selection is made **[4]**
1/652 . . . using variable impedances in parallel with the load as final control devices **[4]**
1/656 . . . using variable impedances in series and in parallel with the load as final control devices **[4]**
1/66 . Regulating electric power
1/67 . . to the maximum power available from a generator, e.g. from solar cell **[4]**
1/70 . Regulating power factor; Regulating reactive current or power **[3]**

3/00 **Non-retroactive systems for regulating electric variables by using an uncontrolled element, or an uncontrolled combination of elements, such element or such combination having self-regulating properties**

3/02 . Regulating voltage or current
3/04 . . wherein the variable is ac
3/06 . . . using combinations of saturated and unsaturated inductive devices, e g. combined with resonant circuit
3/08 . . wherein the variable is dc
3/10 . . . using uncontrolled devices with non-linear characteristics **[4]**
3/12 . . . . being glow discharge tubes
3/16 . . . . being semiconductor devices **[3]**
3/18 . . . . . using Zener diodes **[3]**
3/20 . . . . . using diode-transistor combinations (G05F 3/18 takes precedence) **[3]**
3/22 . . . . . wherein the transistors are of the bipolar type only (G05F 3/26, G05F 3/30 take precedence) **[4]**
3/24 . . . . . wherein the transistors are of the field-effect type only (G05F 3/26, G05F 3/30 take precedence) **[4]**
3/26 . . . . . Current mirrors **[4]**
3/28 . . . . . combined with a non-linear current amplifier **[4]**
3/30 . . . . . Regulators using the difference between the base-emitter voltages of two bipolar transistors operating at different current densities (G05F 3/26 takes precedence) **[4]**

5/00 **Systems for regulating electric variables by detecting deviations in the electric input to the system and thereby controlling a device within the system to obtain a regulated output**

5/02 . Phase controlled switching using electronic tubes or three or more terminal semiconductive devices **[4]**
5/04 . using a transformer or inductor as the final control device **[4]**
5/06 . . saturable **[4]**
5/08 . using a linearly acting final control device **[4]**

7/00 **Regulating magnetic variables** (details of apparatus for measuring magnetic variables involving magnetic resonance G01R 33/28) **[5]**

G05G **CONTROL DEVICES OR SYSTEMS INSOFAR AS CHARACTERISED BY MECHANICAL FEATURES ONLY** ("Bowden" or like mechanisms F16C 1/10; gearings or mechanisms not peculiar to this purpose F16H; speed changing or reversing mechanisms for gearings conveying rotary motion F16H 59/00 to F16H 63/00)

Notes

(1) This subclass covers:
– members of general applicability for mechanical control;
– mechanical systems for moving members to one or more definite settings.

(2) Systems peculiar to the control of particular machines or apparatus provided for in a single other class are classified in the relevant class for such machines or apparatus, for example:

A61G	13/02	Controls for adjusting operating tables
A61G	15/02	Controls for adjusting operating chairs
A63F	13/02	Accessories for games using an electronically generated display
B25J		Manipulators, e.g. controls therefor
B60K	26/00	Arrangement or mounting of propulsion-unit control devices in vehicles
B60T	7/00	Vehicle brake-action initiating means
B62D	33/073	Adaptations of control devices for movable vehicle cabs
B62K	21/00	Cycle-steering devices
B62K	23/00	Rider-operated controls specially adapted for cycles
B62L	3/00	Brake-actuating mechanisms specially adapted for cycles
B63H	25/02	Marine steering initiating means
B66B	1/00	Controls for elevators
B66C	13/18	Control systems or devices for cranes
B66C	13/56	Arrangements of handles or pedals for crane operation

E02F	9/20		Control devices for dredging or soil shifting machines
F16C	3/28		Adjustable cranks or eccentrics
F16D	43/00		Automatic clutches
F16K	31/00,		Controls for valves
F16K	33/00		
F16P	3/00		Safety devices acting in conjunction with the control or operation of a machine
F16P	7/02		Stopping machines on occurrence of dangerous conditions therein
G02B	21/32		Micromanipulators structurally combined with microscopes
G04B	1/00	to	Driving mechanisms in clocks or watches
G04B	18/00		
G06C			Digital computers in which all the computation is effected mechanically
G06F	3/01		Manual computer input arrangements
G06K	11/00		Converting a pattern of mechanical parameters into electric signals
G21C	7/08		Displacement of solid control elements in nuclear reactors
H01H			Mechanisms for operating switch contacts
H03J	1/00		Mechanical control of resonant circuits.

Subclass Index

1/00 **Controlling members, e.g. knobs, handles**; **Assemblies or arrangements thereof**; **Indicating position of controlling members** (means for holding or locking them in position G05G 5/00; specially for programme control G05G 21/00)

- 1/02 . Controlling members for hand-actuation by linear movement, e.g. push buttons **[1,7]**
- 1/04 . Controlling members for hand-actuation by pivoting movement, e.g. levers **[1,7]**
- 1/06 . . Details of their grip parts **[1,7]**
- 1/08 . Controlling members for hand-actuation by rotary movement, e.g. hand wheels **[1,7]**
- 1/10 . . Details, e.g. of discs, knobs, wheels or handles
- 1/12 . . . Means for securing the members on rotatable spindles or the like
- 1/14 . Controlling members for foot-actuation, e.g. pedal; Foot rests or foot guides
- 1/16 . . Non-slip treads therefor; Pedal extension or like attachments
- 1/18 . . Foot rests or foot guides, not on the pedal
- 1/20 . Controlling members specially adapted for actuation by other parts of the human body than hand or foot
- 1/21 . Controlling members specially adapted for actuation by auxiliary operating members or extensions; Operating members or extensions therefor (G05G 1/16 takes precedence) **[5]**
- 1/22 . . Controlling members specially adapted for actuation by keys, screwdrivers or like tools **[5]**
- 1/24 . Arrangement of a number of controlling members with respect to one another
- 1/26 . Rests or guides for relevant parts of the operator's body (G05G 1/18 takes precedence) **[5]**
- 1/28 . Arrangements for indicating the position of the controlling member **[5]**

3/00 **Controlled members** (gear shifter yokes F16H 63/32); **Assemblies or arrangements thereof** (interlocking of controlled members G05G 5/08) **[1,7]**

5/00 **Means for preventing, limiting or returning the movements of parts of a control mechanism, e.g. locking controlling member** (G05G 17/00 takes precedence) **[5]**

- 5/02 . Means preventing undesired movements of a controlling member which can be moved in two or more separate steps or ways, e.g. restricting to a stepwise movement or to a particular sequence of movements (G05G 5/28 takes precedence)
- 5/03 . Means for enhancing the operator's awareness of arrival of the controlling member at a command or datum position, e.g. by feel (arrangements for indicating the position of the controlling member G05G 1/28) **[5]**
- 5/04 . Stops for limiting movement of members, e.g. adjustable stop (G05G 5/03, G05G 5/05, G05G 5/28 take precedence) **[5]**
- 5/05 . Means for returning or tending to return controlling members to an inoperative or neutral position, e.g. by providing return springs or resilient end-stops (G05G 5/28 takes precedence) **[5]**
- 5/06 . for holding members in one or a limited number of definite positions only (G05G 5/03, G05G 5/05, G05G 5/28 take precedence) **[5]**
- 5/08 . . Interlocking of members, e.g. locking a member in a particular position before or during the movement of another member
- 5/12 . for holding members in an indefinite number of positions, e.g. by a toothed quadrant (G05G 5/28 takes precedence) **[5]**
- 5/14 . . by locking a member with respect to a fixed quadrant, rod, or the like
- 5/16 . . . by friction
- 5/18 . . . by positive interengagement, e.g. by a pawl
- 5/20 . . by locking a quadrant, rod, or the like carried by the member
- 5/22 . . . by friction
- 5/24 . . . by positive interengagement, e.g. by a pawl

5/26 . . by other means than a quadrant, rod, or the like
5/28 . for preventing unauthorised access to the controlling member or its movement to a command position **[5]**

7/00 Manually-actuated control mechanisms provided with one single controlling member co-operating with one single controlled member; Details thereof (controlling members G05G 1/00)

7/02 . characterised by special provisions for conveying or converting motion, or for acting at a distance
7/04 . . altering the ratio of motion or force between controlling member and controlled member as a function of the position of the controlling member
7/06 . . in which repeated movement of the controlling member produces increments of movement of the controlled member (G05G 7/08 takes precedence)
7/08 . . in which repeated movement of the controlling member moves the controlled member through a cycle of distinct positions
7/10 . . specially adapted for remote control (G05G 7/04 to G05G 7/08 take precedence)
7/12 . specially adapted for actuating a member on a system in motion with respect to the controlling member, e.g. on a rotating shaft
7/14 . characterised by means for delaying initiation of, or making more gradual throughout, the movement of the controlled member in response to a given input from the controlling member, e.g. by providing lost motion in the command train
7/16 . Special provisions for reducing the effect of slight relative movement between supports of the mechanism, e.g. resulting from resilient mounting of a controlled mechanism

9/00 Manually-actuated control mechanisms provided with one single controlling member co-operating with two or more controlled members, e.g. selectively, simultaneously

9/02 . the controlling member being movable in different independent ways, movement in each individual way actuating one controlled member only
9/04 . . in which movement in two or more ways can occur simultaneously
9/047 . . . the controlling member being movable by hand about orthogonal axes, e.g. joysticks **[5]**
9/053 . . . . the controlling member comprising a ball **[5]**
9/06 . the controlled members being actuated successively by repeated movement of the controlling member
9/08 . the controlled members being actuated successively by progressive movement of the controlling member
9/10 . with preselection and subsequent movement of each controlled member by movement of the controlling member in two different ways, e.g. guided by a shift gate

11/00 Manually-actuated control mechanisms provided with two or more controlling members co-operating with one single controlled member

13/00 Manually-actuated control mechanisms provided with two or more controlling members and also two or more controlled members (interlocking G05G 5/08)

13/02 . with separate controlling members for preselection and shifting of controlled members

15/00 Mechanical devices for initiating a movement automatically due to a specific cause

15/02 . due to alteration of the sense of movement of a member
15/04 . due to distance or angle travelled by a member
15/06 . due to the speed of rotation or of bodily movement of a member, e.g. passing an upper or lower limit thereof (speedometers G01P)
15/08 . due to the load or torque on a member, e.g. if exceeding a predetermined value thereof

17/00 Mechanical devices for moving a member after being released; Trip or release mechanisms characterised thereby

19/00 Servo-mechanisms with follow-up action, e.g. occurring in steps

21/00 Mechanical apparatus for control of a series of operations, i.e. programme control, e.g. involving a set of cams (G05G 5/02 takes precedence)

23/00 Means for ensuring the correct positioning of parts of control mechanisms, e.g. for taking-up play

23/02 . self-adjusting

25/00 Other details or appurtenances of control mechanisms, e.g. supporting intermediate members elastically

25/02 . Inhibiting the generation or transmission of noise **[5]**
25/04 . Sealing against entry of dust, weather or the like **[5]**