60 Governors for power engines; servomotors for general use and their circuits

60 (IPC: F15) Fluid-pressure actuators; Hydraulics or pneumatics in general

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60 Governors for power engines; servomotors for general use and their circuits

60a (IPC: F15B) Systems acting by means of fluids in general; Fluid-pressure actuators; Details of fluid-pressure systems not otherwise provided for

60b (IPC: F15C) Fluid-circuit elements predominantly used for computing or control purposes

60c (IPC: F15D) Fluid dynamics

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60 **Governors for power engines** (position governors for general use 42q; 42r)**; servomotors [control motors] for general use and their circuits**

60-1 Transmission devices, adjusting mechanism, cataracts, throttling and governing devices for engines

60-2 Spring-loaded governors for engines

60-3 Weight-loaded governors for engines

60-4 Governors for engines with weights shiftable upon the ball arms

60-5 Ball head governors for engines without special loads

60-6 Special forms of pendulum ball head governors for engines, balls, centrifugal rings, fluid centrifugal masses, etc.

60-7 Output governors for engines

60-8 Resistance governors for engines (46e-7; 51d-18; 83a-62)

60-9 Brake governors for engines

60-10 Engine governors with releasing device

60-11 Engine governors with weights operated by inertia

60-12 Governors for marine engines, insofar as they are as not affected by the ship's motion (65f2-4

60-13 Differential governors and dynamometric governors for engines

60-14 Engine governors comprising pump mechanisms also combined with quantity or pressure control

60-15 Transmission and driving mechanism employing auxiliary motors, so-called servomotors, for engine governors

60-16 Governors for hydraulic motors

60-17 Indirect engine governors comprising pawl and ratchet mechanisms

60-18 Indirect engine governors with reversing gear and clutch-shifting mechanisms

60-19 Special indirect governors for engines

60-20 Electric governors and transmission devices for engines (21d1-43; 21d1-44)

60-21 Shaft governors for engines

60-22 Miscellaneous special constructions of governors for engines

60-30 Servomotors (control motors) for general use (liquid or air pressure column with rod-like effect as drives 47h-22; servomotors insofar as influenced by construction of governors 42r-4)

60-35 Servomotor circuits (circuits for automatic governors for general use 42q, 42r)

60a **(IPC: F15B) Systems acting by means of fluids in general; Fluid-pressure actuators, e.g. servomotors; Details of fluid-pressure systems not otherwise provided for** (motors, turbines, compressors, blowers, pumps 14, 27, 46, 59; fluid dynamics 60c; fluid clutches or brakes 47c; fluid springs 47a3; fluid gearing 47h; pistons, cylinders, packing 47f2; valves, taps, cocks, actuating-floats 47g1; safety valves with auxiliary fluid operation of the main valve 47g1-17/10; fluid-operating means for valves 47g1-31/12; pipes, pipe joints 47f1; lubricating 47e)

Note:
In this subclass, the following terms are used with the meaning stated:
(a) "Telemotor" means a system or device in which a substantially constant amount of fluid is trapped between an input member and an output member to act as a fluid link.
(b) "Servomotor" means a fluid-pressure actuator, e.g. a piston and cylinder, directly controlled by a valve or other device which is responsive to operation of an initial controlling member; "Servomotor" does not cover a telemotor. The initial controlling member may be adjacent to the servomotor or at a distance, and may be, for example, a hand lever.

60a-1/00 **Installations for supplying fluid under pressure; Sumps**
60a-1/02 . Accumulator installations
60a-1/04 . . Accumulators
60a-1/06 . Supply reservoir or sump assemblies

60a-3/00 **Intensifiers or fluid-pressure converters, e.g. pressure exchangers; Conveying pressure from one fluid system to another, without contact between the fluids**

60a-5/00 **Transducers converting variations of physical quantities, e.g. expressed by variations in positions of members, into fluid-pressure variations or vice-versa; Varying fluid pressure as a function of variations of a plurality of fluid pressures or variations of other quantities** (60a-9/00 takes precedence; for measuring or controlling 42)

Fluid-pressure actuator systems (distribution devices 60a-13/02; systems peculiar to the control of a particular machine or apparatus covered in a single other class, see the class for such machine or apparatus)

Note:
This heading relates to moving members into one or more definite positions by means of fluid pressure. Pump, motor, and control features so far as not peculiar to this purpose are classified in the relevant classes.

60a-7/00 **Systems in which the movement produced is definitely related to the output of a volumetric pump; Telemotors**
60a-7/02 . Systems with continuously-operating input and output apparatus
60a-7/04 . in which the ratio between pump stroke and motor stroke varies with the resistance against the motor (in brake-actuating systems for motor vehicles 63c)
60a-7/06 . Details (60a-15/00 takes precedence)
60a-7/08 . . Input units; Master units
60a-7/10 . . Compensation of the liquid content in a system (60a-7/08 takes precedence)

60a-9/00 **Servomotors with follow-up action, i.e. in which the position of the actuated member conforms with that of the controlling member**
60a-9/02 . with servomotors of the reciprocatable or oscillatable type

60a-9/03 . . with electrical control means
60a-9/04 . . controlled by varying the output of a pump with variable capacity
60a-9/06 . . controlled by means using a fluid jet
60a-9/07 . . . with electrical control means
60a-9/08 . . controlled by valves affecting the fluid feed or the fluid outlet of the servomotor (9/06 takes precedence)
60a-9/09 . . . with electrical control means
60a-9/10 . . . in which the controlling element and the servomotor each controls a separate member, these members influencing different fluid passages or the same passage
60a-9/12 . . . in which both the controlling element and the servomotor control the same member influencing a fluid passage and are connected to that member by means of a differential gearing
60a-9/14 . with rotary servomotors
60a-9/16 . Systems essentially having two or more interacting servomotors
60a-9/17 . . with electrical control means

60a-11/00 Servomotor systems without provision for follow-up action (60a-3/00 takes precedence)

60a-11/02 . Systems essentially incorporating special features for controlling the speed or actuating force of an output member
60a-11/04 . . for controlling the speed
60a-11/05 . . . specially adapted to maintain constant speed
60a-11/06 . involving features specific to the use of a compressible medium, e.g. air, steam
60a-11/08 . with only one servomotor
60a-11/10 . . in which the servomotor position is a function of the pressure
60a-11/12 . . providing distinct intermediate positions; with step-by-step action
60a-11/14 . . without special provision for intermediate position
60a-11/15 . . with special provision for automatic return
60a-11/16 . with two or more servomotors
60a-11/18 . . used in combination for obtaining stepwise operation of a single controlled member
60a-11/20 . . controlling several interacting or sequentially-operating members
60a-11/22 . . Synchronisation of the movement of two or more servomotors

60a-13/00 Details of servomotor systems (60a-15/00 takes precedence)

60a-13/01 . Locking-valves or other detent devices (associated with the actuator 60a-15/26)
60a-13/02 . Fluid distribution or supply devices characterised by their adaptation to the control of servomotors (multiple-way valves 47g1-11/00)
60a-13/04 . . for use with a single servomotor
60a-13/042 . . . operated by fluid pressure
60a-13/043 . . . . with electrically-controlled pilot valves
60a-13/044 . . . operated by electrically-controlled means, e.g. solenoids, torque-motors
60a-13/06 . . for use with two or more servomotors
60a-13/07 . . . in distinct sequence
60a-13/08 . . . Assemblies of units, each for the control of a single servomotor only
60a-13/09 . . for use with two or more pumps
60a-13/10 . Special arrangements for operating the actuated device without using fluid pressure, e.g. for emergency use
60a-13/12 . Special measures for increasing the sensitivity of the system
60a-13/14 . Special measures for giving the operating person a "feeling" of the response of the actuated device
60a-13/16 . Special measures for feedback

60a-15/00 Fluid-actuated devices for displacing a member from one position to another (motors for continuous movement 14)**; Gearing associated therewith** (gearings per se 47h)

60a-15/02 . Mechanical layout characterised by the means for converting the movement of the fluid-actuated element into movement of the finally-operated member
60a-15/04 . . with oscillating cylinder
60a-15/06 . . for mechanically converting rectilinear movement into non-rectilinear movement

60a-15/08 . characterised by the construction of the motor unit (pistons, cylinders, packing 47f2)
60a-15/10 . . the motor being of diaphragm type (diaphragms, bellows 47f2-3/00)
60a-15/12 . . of the oscillating-vane or curved-cylinder type
60a-15/14 . . of the straight-cylinder type
60a-15/16 . . . of the telescopic type
60a-15/17 . . . of differential-piston type
60a-15/18 . Combined units comprising both motor and pump
60a-15/20 . Other details
60a-15/22 . . for accelerating or decelerating the stroke
60a-15/24 . . for restricting the stroke
60a-15/26 . . Locking mechanisms

60a-17/00 Combinations of telemotor and servomotor systems
60a-17/02 . in which a telemotor operates the control member of a servomotor

60a-18/00 Parallel arrangements of independent servomotor systems

60a-19/00 Testing fluid-pressure systems or apparatus, so far as not provided for elsewhere

60a-20/00 Safety arrangements; Applications of safety devices (safety devices in general 47a4)**; Emergency measures**

60a-21/00 Common features; Fluid-pressure systems, or details thereof, not covered by any preceding group
60a-21/02 . Servomotor systems with programme control derived from a store or timing device; Control devices therefor (programme control in general 42r1-19/00)
60a-21/04 . Special measures taken in connection with the properties of the fluid, e.g. for venting, compensating for changes of viscosity, cooling, filtering, preventing churning
60a-21/06 . Use of special fluids, e.g. liquid metal; Special adaptations of fluid-pressure systems, or control of elements therefor, to the use of such fluids
60a-21/08 . Servomotor systems incorporating electrically-operated control means (60a-21/02 takes precedence)
60a-21/10 . Delay devices or arrangements (associated with fluid motors or actuators 60a-15/22)
60a-21/12 . Fluid oscillators or pulse generators

60b (IPC: F15C) Fluid-circuit elements predominantly used for computing or control purposes (transducers 60a-5/00; fluid dynamics in general 60c; computers comprising fluid elements 42m2, 42m4)

60b-1/00 Circuit elements having no moving parts
60b-1/02 . Details
60b-1/04 . . Means for controlling fluid streams to fluid devices, e.g. by electric signals
60b-1/06 . . Constructional details; Selection of specified materials
60b-1/08 . Boundary-layer devices, e.g. wall-attachment amplifiers, oscillators
60b-1/10 . . for digital operation, e.g. to form a logical flip-flop, OR-gate, NOR-gate
60b-1/12 . . . Multiple arrangements thereof
60b-1/14 . Stream-interaction devices; Momentum-exchange devices, e.g. operating by exchange between two orthogonal fluid jets
60b-1/16 . Vortex devices, i.e. devices in which use is made of the pressure drop associated with vortex motion in a fluid
60b-1/18 . Turbulence devices, i.e. devices in which a controlling stream will cause a laminar flow to become turbulent
60b-1/20 . Direct-impact devices, i.e. devices in which two collinear opposing power streams are impacted

60b-3/00 Circuit elements having moving parts (valves, construction of valves 47g1)
60b-3/02 . using spool valves
60b-3/04 . using diaphragms
60b-3/06 . using balls
60b-3/08 . using reeds

60b-3/10	. using nozzles or jet pipes
60b-3/12	. . the nozzle or jet pipe being movable
60b-3/14	. . the jet from the nozzle being intercepted by a flap
60b-4/00	**Circuit elements characterised by their special functions**
60b-5/00	**Manufacture of fluid-circuit elements; Manufacture of assemblages of such elements**
60c	**(IPC: F15D) Fluid dynamics, i.e. methods or means for influencing the flow of gases or liquids** (fluid-circuit elements 60b)
	Note: **This subclass comprises boundary-layer control and other arrangements and methods, not provided for in other classes, for influencing the flow of fluids relative to constraining surfaces and after leaving these surfaces, e.g. producing or removing turbulence, deflecting jets, guiding flow through bends in conduits, affecting distribution of fluid in a conduit, reducing fluid friction.**
60c-1/00	**Influencing the flow of fluids**
60c-1/02	. in pipes or conduits
60c-1/04	. . Arrangements of guide vanes in pipe elbows or duct bends; Construction of pipe conduit elements or elbows with respect to flow, specially for reducing losses of flow
60c-1/06	. . by influencing the boundary layer
60c-1/08	. of jets leaving an orifice (nozzles or outlets with means for mechanically breaking-up or deflecting the jet 85g-3)
60c-1/10	. around bodies of solid material
60c-1/12	. . by influencing the boundary layer
60c-1/14	. Diverting flow into alternative channels (in hydraulic engineering 84a)