

CPC COOPERATIVE PATENT CLASSIFICATION

B05B **SPRAYING APPARATUS; ATOMISING APPARATUS; NOZZLES** ({sprayers or atomisers specially adapted for therapeutic purposes [A61M 11/00](#)}; spray-mixers with nozzles [B01F 5/20](#); processes for applying liquids or other fluent materials to surfaces by spraying [B05D](#); {nozzles specially adapted for injection moulding of plastics or substances in a plastic state [B29C 45/1603](#), [B29C 45/20](#); nozzles specially adapted for windscreen washers [B60S 1/52](#)}; means for pumping fluids [F04](#); valves, e.g. water-taps, [F16K](#))

NOTES

1. This subclass covers particularly apparatus for the release or projection of drops or droplets into the atmosphere or into a chamber to form a mist or the like. For this purpose, the materials to be projected may be suspended in a stream of gas or vapour.
2. Attention is drawn to the Note following the title of class [B05](#).
3. In this subclass, "means for controlling volume of flow" is used in the most general meaning and includes also means allowing only starting and stopping the flow
4. In this subclass, the meaning of the expression "apparatus carried on or by a person" includes all apparatus comprising at least one container for the material to be sprayed carried on or by a person during use
5. In this subclass, the word "container" is to be understood as the innermost enclosure containing the material to be sprayed

1/00	Nozzles, spray heads or other outlets, with or without auxiliary devices such as valves, heating means (B05B 3/00 , B05B 5/00 , B05B 7/00 take precedence; {nozzles for baths with water or gas jets A61H 33/00 , e.g. A61H 33/6063 , A61H 33/6021 , A61H 33/026 or A61H 33/027 ; Nozzles specially adapted for fire-extinguishing A62C 31/02 ; Nozzles for generating high velocity abrasive fluid jets B24C 5/04 }; {nozzles for jet-ink printing mechanisms B41J 2/135 ; {Nozzles for filling containers B65B 39/00 ; } nozzles for liquid-dispensing, e.g. in vehicle service stations B67D 7/42)	1/083	. . . {the pulsating mechanism comprising movable parts (liquid driven rotating elements, e.g. turbines, arranged upstream the outlet B05B 3/04)}
		1/086	. . . {with a resiliently deformable element, e.g. sleeve}
		1/10	. . in the form of a fine jet, e.g. for use in wind-screen washers
		1/12	. capable of producing different kinds of discharge, e.g. either jet or spray (B05B 1/16 takes precedence)
		1/14	. with multiple outlet openings (B05B 1/02 , B05B 1/26 take precedence); with strainers in or outside the outlet opening
1/005	. {Nozzles or other outlets specially adapted for discharging one or more gases}	1/16	. . having selectively- effective outlets
1/02	. designed to produce a jet, spray, or other discharge of particular shape or nature, e.g. in single drops, {or having an outlet of particular shape} (B05B 1/26 , B05B 1/28 , B05B 1/34 take precedence)	1/1609	. . . {with a selecting mechanism comprising a lift valve (B05B 1/1681 takes precedence; lift valves in general F16K 1/00)}
1/04	. . in flat form, e.g. fan-like, sheet-like	1/1618	. . . . {where said valve is a double-seat lift valve}
1/042	. . . {Outlets having two planes of symmetry perpendicular to each other, one of them defining the plane of the jet (B05B 1/044 , B05B 1/046 take precedence)}	1/1627	. . . {with a selecting mechanism comprising a gate valve, a sliding valve or a cock (B05B 1/1681 takes precedence; gate valves or sliding valves in general F16K 3/00 ; cocks in general F16K 5/00)}
1/044	. . . {Slits, i.e. narrow openings defined by two straight and parallel lips; Elongated outlets for producing very wide discharges, e.g. fluid curtains (B05B 1/046 takes precedence)}	1/1636	. . . . {by relative rotative movement of the valve elements (B05B 1/1672 takes precedence)}
1/046	. . . {Outlets formed, e.g. cut, in the circumference of tubular or spherical elements}	1/1645	. . . . . {the outlets being rotated during selection}
1/048	. . . {having a flow conduit with, immediately behind the outlet orifice, an elongated cross section, e.g. of oval or elliptic form, of which the major axis is perpendicular to the plane of the jet}	1/1654	. . . . . {about an axis parallel to the liquid passage in the stationary valve element}
1/06	. . in annular, tubular or hollow conical form	1/1663	. . . . {by relative translatory movement of the valve elements (B05B 1/1672 takes precedence)}
1/08	. . of pulsating nature, e.g. delivering liquid in successive separate quantities; {Fluidic oscillators}	1/1672	. . . . {the selectively-effective outlets being arranged on a tube or pipe}
		1/1681	. . . {with a selecting mechanism comprising a gate valve, sliding valve or cock and a lift valve}
		1/169	. . . {having three or more selectively effective outlets}
		1/18	. . Roses; Shower heads {(with means for adding soap or the like E03C 1/046 ; jet regulators E03C 1/08)}

- 1/185 . . . {characterised by their outlet element; Mounting arrangements therefor}
- 1/20 . . {Arrangements of several outlets along elongated bodies, e.g.} perforated pipes or troughs, e.g. spray booms {(spray booms for agricultural uses [A01M 7/0071](#); spray bars for treating roads [E01C 19/176](#)); Outlet elements therefor}
- 1/202 . . . {comprising inserted outlet elements ([B05B 1/205](#) takes precedence)}
- 1/205 . . . {characterised by the longitudinal shape of the elongated body}
- 1/207 {the elongated body being a closed loop}
- 1/22 . Spouts (anti-splash devices for water-taps [E03C 1/08](#))
- 1/24 . incorporating means for heating the liquid or other fluent material, e.g. electrically
- 1/26 . with means for mechanically breaking-up or deflecting the jet after discharge, e.g. with fixed deflectors; Breaking-up the discharged liquid or other fluent material by impinging jets
- 1/262 . . {with fixed deflectors}
- 1/265 . . . {the liquid or other fluent material being symmetrically deflected about the axis of the nozzle}
- 1/267 . . . {the liquid or other fluent material being deflected in determined directions}
- 1/28 . with integral means for shielding the discharged liquid or other fluent material, e.g. to limit area of spray; with integral means for catching drips or collecting surplus liquid or other fluent material (means for any of these purposes, [per se](#), [B05B 15/04](#))
- 1/30 . designed to control volume of flow, e.g. with adjustable passages
- 1/3006 . . {the controlling element being actuated by the pressure of the fluid to be sprayed ([B05B 11/0062](#) takes precedence)}
- 1/3013 . . {the controlling element being a lift valve ([B05B 1/3006](#), [B05B 1/3033](#) take precedence; lift valves in general [F16K 1/00](#))}
- 1/302 . . . {with a ball-shaped valve member (ball valves in general [F16K 1/14](#))}
- 1/3026 . . {the controlling element being a gate valve, a sliding valve or a cock ([B05B 1/3006](#), [B05B 1/326](#) take precedence; gate valves or sliding valves in general [F16K 3/00](#); cocks in general [F16K 5/00](#))}
- 1/3033 . . {the control being effected by relative coaxial longitudinal movement of the controlling element and the spray head ([B05B 1/3026](#) takes precedence)}
- 1/304 . . . {the controlling element being a lift valve}
- 1/3046 {the valve element, e.g. a needle, co-operating with a valve seat located downstream of the valve element and its actuating means, generally in the proximity of the outlet orifice ([B05B 1/308](#) takes precedence)}
- 1/3053 {the actuating means being a solenoid}
- 1/306 {the actuating means being a fluid}
- WARNING**
Not complete, see [B05B 1/3046](#)
- 1/3066 {the valve element being at least partially hollow and liquid passing through it when the valve is opened}
- 1/3073 . . . {the controlling element being a deflector acting as a valve in co-operation with the outlet orifice ([B05B 1/308](#) takes precedence; deflectors [per se](#) [B05B 1/262](#))}
- 1/308 . . . {the controlling element comprising both a lift valve and a deflector}
- 1/3086 . . . {the controlling element being a grooved body, which is movable in the outlet orifice}
- 1/3093 . . {Recirculation valves, i.e. the valve element opens a passage to the nozzle and simultaneously closes at least partially a return passage the feeding means}
- 1/32 . . in which a valve member forms part of the outlet opening {([B05B 1/3033](#) takes precedence)}
- 1/323 . . . {the valve member being actuated by the pressure of the fluid to be sprayed ([B05B 11/0062](#) takes precedence)}
- 1/326 . . . {the valve being a gate valve, a sliding valve or a cock}
- 1/34 . . designed to influence the nature of flow of the liquid or other fluent material, e.g. to produce swirl ([B05B 1/30](#) takes precedence)
- 1/3405 . . {to produce swirl}
- 1/341 . . . {before discharging the liquid or other fluent material, e.g. in a swirl chamber upstream the spray outlet}
- 1/3415 {with swirl imparting inserts upstream of the swirl chamber}
- 1/3421 {with channels emerging substantially tangentially in the swirl chamber}
- 1/3426 {the channels emerging in the swirl chamber perpendicularly to the outlet axis ([B05B 1/3436](#) takes precedence)}
- 1/3431 {the channels being formed at the interface of cooperating elements, e.g. by means of grooves}
- 1/3436 {the interface being a plane perpendicular to the outlet axis}
- 1/3442 {the interface being a cone having the same axis as the outlet}
- 1/3447 {the interface being a cylinder having the same axis as the outlet}
- 1/3452 {the cooperating elements being movable, e.g. adjustable relative to one another}
- 1/3457 {in response to liquid pressure}
- 1/3463 {the channels extending outwardly, e.g. radially from the inside to the outside}
- 1/3468 {with means for controlling the flow of liquid entering or leaving the swirl chamber ([B05B 1/3452](#) takes precedence)}
- 1/3473 {in response to liquid pressure}
- 1/3478 {the liquid flowing at least two different courses before reaching the swirl chamber}
- 1/3484 {with a by-pass conduit extending from the swirl chamber}
- 1/3489 {Nozzles having concentric outlets}
- 1/3494 {the discharge outlet being not on the axis of the swirl chamber}
- 1/36 . Outlets for discharging by overflow

3/00	Spraying or sprinkling apparatus with moving outlet elements or moving deflecting elements; {Spraying or sprinkling heads with rotating elements located upstream the outlet}	3/0445	. . . . . {the movement of the outlet elements being a combination of two movements, one being rotational}
3/001	. {incorporating means for heating or cooling, e.g. the material to be sprayed}	3/045	. . . . . {with automatic means for regulating the jet (B05B 3/0445 takes precedence)}
	WARNING Not complete pending reclassification; see also B05B 3/00 and subgroups	3/0454	. . . . . {relative to the angular position of the outlet or to the direction of rotation of the outlet, e.g. for spraying non circular areas}
3/002	. {comprising a moving member supported by a fluid cushion}	3/0459	. . . . . {the rotor axis not being parallel to the rotation axis of the outlet, e.g. being perpendicular thereto}
3/003	. {with braking means, e.g. friction rings designed to provide a substantially constant revolution speed}	3/0463	. . . . {Rotor nozzles, i.e. nozzles consisting of an element having an upstream part rotated by the liquid flow, and a downstream part connected to the apparatus by a universal joint}
3/005	. . {using viscous dissipation, e.g. a rotor movable in a chamber filled with oil}	3/0468	. . . . {the liquid actuating a motor after passing the spray outlet (B05B 3/0472 takes precedence)}
3/006	. . {using induced currents; using magnetic means}	3/0472	. . . . {the spray jet actuating a movable deflector which is successively moved out of the jet by jet action and brought back into the jet by spring action}
3/007	. {with friction clutch means}	3/0477	. . . . . {the spray outlet having a reversible rotative movement, e.g. for covering angular sector smaller than 360°}
3/008	. {comprising a wobbling or nutating element, i.e. rotating about an axis describing a cone during spraying (B05B 3/0463 takes precedence)}	3/0481	. . . . . {Impact motive means}
3/02	. with rotating elements	3/0486	. . . . {the spray jet being generated by a rotary deflector rotated by liquid discharged onto it in a direction substantially parallel its rotation axis}
3/021	. . {with means for regulating the jet relative to the horizontal angular position of the nozzle, e.g. for spraying non circular areas by changing the elevation of the nozzle or by varying the nozzle flow-rate (B05B 3/0454 takes precedence)}	3/049	. . . . {comprising mechanical means for preventing a rotor from rotating despite being submerged in a streaming fluid}
3/022	. . {the rotating deflecting element being a ventilator or a fan (B05B 3/105 takes precedence ; A01M 7/0003)}	3/0495	. . . . {the liquid or other fluent material discharged powering several motors, e.g. several turbines}
3/023	. . {comprising a pneumatic motor actuated by a depression created by the liquid flow}	3/06	. . . . by jet reaction, {i.e. creating a spinning torque due to a tangential component of the jet}
3/025	. . {Rotational joints}	3/063	. . . . {using a member, e.g. a deflector, for creating the tangential component of the jet}
3/026	. . . {the fluid passing axially from one joint element to another}	3/066	. . . . {the movement of the outlet elements being a combination of two movements, one being rotational}
3/027	. . . {with radial fluid passages}	3/08	. . . in association with stationary outlet or deflecting elements
3/028	. . {the rotation being orbital (B05B 3/0445 and B05B 3/066 take precedence)}	3/082	. . . . {the spraying being effected by centrifugal forces}
3/04	. . driven by the liquid or other fluent material discharged, e.g. the liquid actuating a motor before passing to the outlet {(B05B 3/023 takes precedence)}	3/085	. . . . {in association with sectorial deflectors}
3/0404	. . . {the motor comprising a movable ball}	3/087	. . . . . {Spray guns comprising this arrangement}
3/0409	. . . {with moving, e.g. rotating, outlet elements (B05B 3/0486, B05B 3/06 take precedence)}	3/10	. . . discharging over substantially the whole periphery of the rotating member, {i.e. the spraying being effected by centrifugal forces (B05B 3/082 takes precedence)}
3/0413	. . . . {comprising a liquid driven piston motor}	3/1007	. . . . {characterised by the rotating member (B05B 3/105 takes precedence)}
3/0418	. . . . {comprising a liquid driven rotor, e.g. a turbine (B05B 3/0463, B05B 3/0468 take precedence)}	3/1014	. . . . {with a spraying edge, e.g. like a cup or a bell}
3/0422	. . . . . {with rotating outlet elements}	3/1021	. . . . {with individual passages at its periphery}
3/0427	. . . . . {the outlet elements being directly attached to the rotor or being an integral part of it}	3/1028	. . . . . {the passages comprising an insert}
3/0431	. . . . . {the rotative movement of the outlet elements being reversible (B05B 3/0445 takes precedence)}	3/1035	. . . . {Driving means; Parts thereof, e.g. turbine, shaft, bearings}
3/0436	. . . . . {by reversing the direction of rotation of the rotor itself}	3/1042	. . . . {Means for connecting, e.g. reversibly, the rotating spray member to its driving shaft}
3/044	. . . . . {Tubular elements holding several outlets, e.g. apertured tubes, oscillating about an axis substantially parallel to the tubular element}		

- 3/105 . . . {Fan or ventilator arrangements therefor}
 - 3/1057 . . . {with at least two outlets, other than gas and cleaning fluid outlets, for discharging, selectively or not, different or identical liquids or other fluent materials on the rotating element}
 - 3/1064 . . . {the liquid or other fluent material to be sprayed being axially supplied to the rotating member through a hollow rotating shaft}
 - 3/1071 . . . {with two rotating members rotating at different speeds}
 - 3/1078 {the rotating members rotating in opposite directions}
 - 3/1085 . . . {with means for detecting or controlling the rotational speed}
 - 3/1092 . . . {Means for supplying shaping gas}
- WARNING**
not complete, see [B05B 3/10](#) and subgroups
- 3/12 . . with spray booms or the like rotating around an axis by means independent of the liquid or other fluent material discharged
 - 3/14 . with oscillating elements; with intermittent operation
 - 3/16 . . driven or controlled by the liquid or other fluent material discharged, e.g. the liquid actuating a motor before passing to the outlet {(B05B 3/0431, B05B 3/0468, B05B 3/0472 take precedence)}
 - 3/18 . with elements moving in a straight line, e.g. along a track; Mobile sprinklers {(watering arrangements making use of movable installations A01G 25/09)}
- 5/00 Electrostatic spraying apparatus; Spraying apparatus with means for charging the spray electrically; Apparatus for spraying liquids or other fluent materials by other electric means**
- 5/001 . {incorporating means for heating or cooling, e.g. the material to be sprayed}
- WARNING**
Not complete pending reclassification; see also [B05B 5/00](#) and subgroups
- 5/002 . {comprising means for neutralising the spray of charged droplets or particles}
 - 5/003 . . {by mixing two sprays of opposite polarity}
 - 5/004 . . {by alternating the polarity of the spray}
 - 5/005 . {the high voltage supplied to an electrostatic spraying apparatus being adjustable during spraying operation, e.g. for modifying spray width, droplet size}
 - 5/006 . . {the adjustment of high voltage is responsive to a condition, e.g. a condition of material discharged, of ambient medium or of target}
 - 5/007 . {the high voltage supplied to an electrostatic spraying apparatus during spraying operation being periodical or in time, e.g. sinusoidal}
 - 5/008 . . {with periodical change of polarity}
 - 5/025 . Discharge apparatus, e.g. electrostatic spray guns
 - 5/0255 . . {spraying and depositing by electrostatic forces only}
 - 5/03 . . characterised by the use of gas, {e.g. electrostatically assisted pneumatic spraying (B05B 5/04, B05B 5/043, B05B 5/047 take precedence)}
 - 5/032 . . . {for spraying particulate materials}
 - 5/035 . . characterised by gasless spraying, {e.g. electrostatically assisted airless spraying (B05B 5/04, B05B 5/043, B05B 5/047 take precedence)}
 - 5/04 . . characterised by having rotary outlet or deflecting elements, {i.e. spraying being also effected by centrifugal forces}
 - 5/0403 . . . {characterised by the rotating member}
 - 5/0407 {with a spraying edge, e.g. like a cup or a bell}
 - 5/0411 {with individual passages at its periphery}
 - 5/0415 . . . {Driving means; Parts thereof, e.g. turbine, shaft, bearings}
 - 5/0418 . . . {designed for spraying particulate material}
 - 5/0422 . . . {comprising means for controlling speed of rotation}
 - 5/0426 . . . {Means for supplying shaping gas}
- WARNING**
not complete, see [B05B 5/04](#) and subgroups
- 5/043 . . using induction-charging
 - 5/047 . . using tribo-charging
 - 5/053 . . Arrangements for supplying power, e.g. charging power
 - 5/0531 . . . {Power generators}
 - 5/0532 {driven by a gas turbine}
 - 5/0533 . . . {Electrodes specially adapted therefor; Arrangements of electrodes}
 - 5/0535 {at least two electrodes having different potentials being held on the discharge apparatus, one of them being a charging electrode of the corona type located in the spray or close to it, and another being of the non-corona type located outside of the path for the material}
 - 5/0536 {Dimensional characteristics of electrodes, e.g. diameter or radius of curvature of a needle-like corona electrode}
 - 5/0537 . . . {comprising a charge return path between the target and the spraying apparatus which is not the "true" earth, i.e. using a direct charge return path like a wire or the like, e.g. "floating earth"}
 - 5/0538 . . . {the operator being part of a charge return path between target and apparatus}
 - 5/057 . . Arrangements for discharging liquids or other fluent material without using a gun or nozzle
 - 5/06 . using electric arc
 - 5/08 . Plant for applying liquids or other fluent materials to objects
 - 5/081 . . {specially adapted for treating particulate materials}
 - 5/082 . . {characterised by means for supporting, holding or conveying the objects}
 - 5/084 . . . {the objects lying on, or being supported above conveying means, e.g. conveyor belts}
- WARNING**
not complete, see [B05B 5/08](#) and subgroups
- 5/085 . . {the plant being provided on a vehicle}

- 5/087 . . {Arrangements of electrodes, e.g. of charging, shielding, collecting electrodes ([B05B 5/12](#), [B05B 5/14](#) take precedence; Arrangements of electrodes on the discharge apparatus [B05B 5/0533](#))}
- 5/088 . . . {for creating electric field curtains}
- 5/10 . . Arrangements for supplying power, e.g. charging power ([B05B 5/053](#) takes precedence)
- 5/12 . . specially adapted for coating the interior of hollow bodies
- 5/14 . . specially adapted for coating continuously moving elongated bodies, e.g. wires, strips, pipes
- 5/16 . Arrangements for supplying liquids or other fluent material
- 5/1608 . . {the liquid or other fluent material being electrically conductive}
- 5/1616 . . . {and the arrangement comprising means for insulating a grounded material source from high voltage applied to the material}
- 5/1625 {the insulating means comprising an intermediate container alternately connected to the grounded material source for filling, and then disconnected and electrically insulated therefrom}
- 5/1633 {the arrangement comprising several supply lines arranged in parallel, each comprising such an intermediate container}
- 5/1641 {an additional container being provided downstream the intermediate container}
- 5/165 {by dividing the material into discrete quantities, e.g. droplets}
- 5/1658 {Details}
- 5/1666 {Voltage blocking valves, e.g. with axially separable coupling elements}
- 5/1675 . . . {the supply means comprising a piston, e.g. a piston pump}
- 5/1683 . . {specially adapted for particulate materials}
- 5/1691 . . {Apparatus to be carried on or by a person or with a container fixed to the discharge device}
- 7/00 Spraying apparatus for discharge of liquids or other fluent materials from two or more sources, e.g. of liquid and air, of powder and gas ([B05B 3/00](#), [B05B 5/00](#) [B05B 11/06](#) take precedence; outlets not specially modified for two media [B05B 1/00](#))**
- 7/0006 . {Spraying by means of explosions}
- 7/0012 . {Apparatus for achieving spraying before discharge from the apparatus}
- 7/0018 . {with devices for making foam}
- 7/0025 . . {with a compressed gas supply}
- 7/0031 . . . {with disturbing means promoting mixing, e.g. balls, crowns}
- 7/0037 {including sieves, porous members or the like}
- 7/0043 {including a plurality of individual elements, e.g. needles, baffles, rotatable blades}
- 7/005 . . {wherein ambient air is aspirated by a liquid flow}
- 7/0056 . . . {with disturbing means promoting mixing, e.g. balls, crowns}
- 7/0062 {including sieves, porous members or the like}
- 7/0068 {including a plurality of individual elements, e.g. needles, baffles, rotatable blades}
- 7/0075 . {Nozzle arrangements in gas streams}
- 7/0081 . {Apparatus supplied with low pressure gas, e.g. "hvlp"-guns; air supplied by a fan}
- 7/0087 . . {Atmospheric air being sucked by a gas stream, generally flowing through a venturi, at a location upstream or inside the spraying apparatus}
- 7/0093 . {At least a part of the apparatus, e.g. a container, being provided with means, e.g. wheels or casters for allowing its displacement relative to the ground}
- 7/02 . Spray pistols; Apparatus for discharge ([B05B 7/14](#), [B05B 7/16](#), [B05B 7/24](#) take precedence)
- 7/025 . . {Nozzles having elongated outlets, e.g. slots, for the material to be sprayed}
- 7/04 . . with arrangements for mixing liquids or other fluent materials before discharge ([mixing in general \[B01F\]\(#\)](#), e.g. [B01F 5/00](#); [mixing valves \[F16K 11/00\]\(#\)](#))}
- 7/0408 . . . {with arrangements for mixing two or more liquids}
- 7/0416 . . . {with arrangements for mixing one gas and one liquid}
- 7/0425 {without any source of compressed gas, e.g. the air being sucked by the pressurised liquid}
- 7/0433 {with one inner conduit of gas surrounded by an external conduit of liquid upstream the mixing chamber}
- 7/0441 {with one inner conduit of liquid surrounded by an external conduit of gas upstream the mixing chamber}
- 7/045 {the gas and liquid flows being parallel just upstream the mixing chamber ([B05B 7/0458](#), [B05B 7/0466](#) take precedence)}
- 7/0458 {the gas and liquid flows being perpendicular just upstream the mixing chamber}
- 7/0466 {with means for deflecting the central liquid flow towards the peripheral gas flow}
- 7/0475 {with means for deflecting the peripheral gas flow towards the central liquid flow ([B05B 7/0458](#) takes precedence)}
- 7/0483 {with gas and liquid jets intersecting in the mixing chamber}
- 7/0491 {the liquid and the gas being mixed at least twice along the flow path of the liquid}
- 7/06 . . with {at least} one outlet orifice surrounding another approximately in the same plane
- 7/061 . . . {with several liquid outlets discharging one or several liquids}
- 7/062 . . . {with only one liquid outlet and at least one gas outlet}
- 7/063 {one fluid being sucked by the other}
- 7/064 {the liquid being sucked by the gas}
- 7/065 {an inner gas outlet being surrounded by an annular adjacent liquid outlet}
- 7/066 {with an inner liquid outlet surrounded by at least one annular gas outlet}
- 7/067 {the liquid outlet being annular}

- 7/068 {the annular gas outlet being supplied by a gas conduit having an axially concave curved internal surface just upstream said outlet}
- 7/08 . . with separate outlet orifices, e.g. to form parallel jets, {i.e. the axis of the jets being parallel}, to form intersecting jets, {i.e. the axis of the jets converging but not necessarily intersecting at a point}
- 7/0807 . . . {to form intersecting jets}
- 7/0815 {with at least one gas jet intersecting a jet constituted by a liquid or a mixture containing a liquid for controlling the shape of the latter}
- 7/0823 {comprising a rotatable spray pattern adjusting plate controlling the flow rate of the spray shaping gas jets}
- 7/083 {comprising rotatable spray shaping gas jet outlets}
- 7/0838 {comprising a single means controlling simultaneously the flow rates of shaping and spraying gas jets}
- 7/0846 {with jets being only jets constituted by a liquid or a mixture containing a liquid}
- 7/0853 {with one single gas jet and several jets constituted by a liquid or a mixture containing a liquid ([B05B 7/0815 takes precedence](#))}
- 7/0861 {with one single jet constituted by a liquid or a mixture containing a liquid and several gas jets ([B05B 7/0815 takes precedence](#))}
- 7/0869 . . . {the liquid or other fluent material being sucked or aspirated from an outlet orifice by another fluid, e.g. a gas, coming from another outlet orifice}
- 7/0876 . . . {to form parallel jets constituted by a liquid or a mixture containing a liquid ([B05B 7/0884](#), [B05B 7/0892 take precedence](#))}
- 7/0884 . . . {the outlet orifices for jets constituted by a liquid or a mixture containing a liquid being aligned}
- 7/0892 . . . {the outlet orifices for jets constituted by a liquid or a mixture containing a liquid being disposed on a circle}
- 7/10 . . producing a swirling discharge
- 7/12 . . designed to control volume of flow, e.g. with adjustable passages
- 7/1209 . . . {the controlling means for each liquid or other fluent material being manual and interdependent}
- 7/1218 {With means for adjusting or modifying the action of the controlling means}
- 7/1227 {Non linear relationship between the controlling means displacement and the valve element displacement}
- 7/1236 {with three or more interdependent valves}
- 7/1245 {A gas valve being opened before a liquid valve}
- 7/1254 . . . {the controlling means being fluid actuated}
- 7/1263 {pneumatically actuated}

WARNING

Not complete, see [B05B 7/1254](#)

- 7/1272 {actuated by gas involved in spraying, i.e. exiting the nozzle, e.g. as a spraying or jet shaping gas}

WARNING

Not complete, see [B05B 7/1254](#)

- 7/1281 {Serial arrangement, i.e. a single gas stream acting on the controlling means first and flowing downstream thereof to the nozzle}

WARNING

Not complete, see [B05B 7/1254](#)

- 7/129 . . . {Hand guns comprising a gas valve located at the bottom of the handle ([B05B 7/0087 takes precedence](#))}
- 7/14 . . designed for spraying particulate materials ([B05B 7/16 takes precedence](#))
- 7/1404 . . {Arrangements for supplying particulate material}
- 7/1409 . . . {specially adapted for short fibres or chips ([B05B 7/145 takes precedence](#))}
- 7/1413 . . . {Apparatus to be carried on or by a person, e.g. by hand; Apparatus comprising a container fixed to the discharge device}
- 7/1418 {comprising means for supplying an additional liquid}
- 7/1422 {the means for supplying particulate material comprising moving mechanical means, e.g. to impart vibration}
- WARNING**
- Not complete, see [B05B 7/1418](#)
- 7/1427 {Apparatus to be carried on the back of the user}
- 7/1431 . . . {comprising means for supplying an additional liquid ([B05B 7/1418 takes precedence](#))}
- 7/1436 {to a container where the particulate material and the additional liquid are brought together ([Mixing in general B01F](#))}
- 7/144 . . . {the means for supplying particulate material comprising moving mechanical means ([B05B 7/1422](#), [B05B 7/1459 take precedence](#))}
- 7/1445 {involving vibrations ([B05B 7/145 takes precedence](#))}
- 7/145 {specially adapted for short fibres or chips}
- 7/1454 . . . {comprising means for supplying collected oversprayed particulate material ([spray booth with arrangements for collecting oversprayed material B05B 15/1225](#))}
- 7/1459 . . . {comprising a chamber, inlet and outlet valves upstream and downstream the chamber and means for alternately sucking particulate material into and removing particulate material from the chamber through the valves ([conveying material in bulk by using a combination of gas pressure and suction B65G 53/28](#); pumps in general [F04B](#); apparatus for repeatedly measuring and separating a predetermined volume of fluent solid material from a supply or container [G01F 11/00](#))}

- 7/1463 . . . {the means for supplying particulate material comprising a gas inlet for pressurising or avoiding depressurisation of a powder container}
- 7/1468 . . . {the means for supplying particulate material comprising a recirculation loop}
- 7/1472 . . . {Powder extracted from a powder container in a direction substantially opposite to gravity by a suction device dipped into the powder}
- 7/1477 . . . {means for supplying to several spray apparatus}
- 7/1481 . . {Spray pistols or apparatus for discharging particulate material}
- 7/1486 . . . {for spraying particulate material in dry state}
- 7/149 . . . {with separate inlets for a particulate material and a liquid to be sprayed}
- 7/1495 {and with separate outlets for the particulate material and the liquid}
- 7/16 . . incorporating means for heating {or cooling} the material to be sprayed {(spraying by means of explosions [B05B 7/0006](#))}
- 7/1606 . . {the spraying of the material involving the use of an atomising fluid, e.g. air ([B05B 7/168](#), [B05B 7/1686](#), [B05B 7/20](#), [B05B 7/22](#) take precedence)}
- 7/1613 . . . {comprising means for heating the atomising fluid before mixing with the material to be sprayed}
- 7/162 {and heat being transferred from the atomising fluid to the material to be sprayed}
- 7/1626 {at the moment of mixing}
- 7/1633 {and heat being transferred from the material to be sprayed to the atomising fluid}
- 7/164 {the material to be sprayed and the atomising fluid being heated by independent sources of heat, without transfer of heat between atomising fluid and material to be sprayed}
- 7/1646 {the material to be sprayed and the atomising fluid being heated by the same source of heat, without transfer of heat between atomising fluid and material to be sprayed}
- 7/1653 {the source of heat being a heat conductive fluid}
- 7/166 . . {the material to be sprayed being heated in a container ([B05B 7/208](#) takes precedence)}
- 7/1666 . . . {fixed to the discharge device}
- 7/1673 . . {heat being transferred to the material to be sprayed by a heat transfer conductive fluid ([B05B 7/162](#), [B05B 7/1653](#) take precedence)}
- 7/168 . . {with means for heating or cooling after mixing ([B05B 7/201](#), [B05B 7/22](#) take precedence)}
- 7/1686 . . {involving vaporisation of the material to be sprayed or of an atomising-fluid-generating product}
- 7/1693 . . {with means for heating the material to be sprayed or an atomizing fluid in a supply hose or the like}
- 7/18 . . the material having originally the shape of a wire, rod or the like {([B05B 7/203](#), [B05B 7/224](#) take precedence)}
- 7/20 . . by flame or combustion
- 7/201 . . . {downstream of the nozzle}
- 7/203 {the material to be sprayed having originally the shape of a wire, rod or the like}
- 7/205 {the material to be sprayed being originally a particulate material}
- 7/206 {in a container fixed to the discharge device}
- 7/208 . . . {the material to be sprayed being heated in a container}
- 7/22 . . electrically, {magnetically or electromagnetically}, e.g. by arc {([B05B 7/20](#) takes precedence)}
- 7/222 . . . {using an arc}
- 7/224 {the material having originally the shape of a wire, rod or the like}
- 7/226 {the material being originally a particulate material}
- 7/228 . . . {using electromagnetic radiation, e.g. laser}
- 7/24 . . with means, e.g. a container, for supplying liquid or other fluent material to a discharge device ([B05B 7/14](#), [B05B 7/16](#), [B05B 11/00](#) take precedence)
- 7/2402 . . {Apparatus to be carried on or by a person, e.g. by hand; Apparatus comprising containers fixed to the discharge device ([B05B 7/0012](#) takes precedence)}
- 7/2405 . . . {using an atomising fluid as carrying fluid for feeding, e.g. by suction or pressure, a carried liquid from the container to the nozzle ([B05B 7/2459](#) - [B05B 7/247](#) take precedence)}
- 7/2408 {characterised by the container or its attachment means to the spray apparatus}
- 7/241 {the container being pressurised}
- 7/2413 {with means for changing the position or the orientation of the container relative to the spray apparatus}
- 7/2416 {characterised by the means for producing or supplying the atomising fluid, e.g. air hoses, air pumps, gas containers, compressors, fans, ventilators, their drives}
- 7/2418 {Air pumps actuated by the operator, e.g. manually actuated}
- 7/2421 {Gas containers}
- 7/2424 {the carried liquid and the main stream of atomising fluid being brought together downstream of the container before discharge ([B05B 7/2435](#) takes precedence)}
- 7/2427 {and a secondary stream of atomising fluid being brought together in the container or putting the carried liquid under pressure in the container}
- 7/2429 {the carried liquid and the main stream of atomising fluid being brought together after discharge ([B05B 7/2435](#) takes precedence)}
- 7/2432 {and a secondary stream of atomising fluid being brought together in the container or putting the carried liquid under pressure in the container}
- 7/2435 {the carried liquid and the main stream of atomising fluid being brought together by parallel conduits placed one inside the other}
- 7/2437 {and a secondary stream of atomising fluid being brought together in the container or putting the carried fluid under pressure in the container}

- 7/244 . . . {using carrying liquid for feeding, e.g. by suction, pressure or dissolution, a carried liquid from the container to the nozzle ([B05B 7/2459](#) - [B05B 7/247](#) take precedence)}
- 7/2443 {the carried liquid and the main stream of carrying liquid being brought together downstream of the container before discharge ([B05B 7/2454](#) takes precedence)}
- 7/2445 {and a secondary stream of carrying liquid being brought together in the container or putting the carried liquid under pressure in the container}
- 7/2448 {the carried liquid and the main stream of carrying liquid being brought together after discharge ([B05B 7/2454](#) takes precedence)}
- 7/2451 {and a secondary stream of carrying liquid being brought together in the container or putting the carried liquid in the container}
- 7/2454 {the carried liquid and the main stream of carrying liquid being brought together by parallel conduits, one conduit being in the other}
- 7/2456 {and a secondary stream of carrying liquid being brought together in the container or putting the carried liquid under pressure in the container}
- 7/2459 . . . {a liquid being fed by capillarity from the container to the nozzle}
- 7/2462 . . . {using a carrying liquid flowing through the container for dissolving a block of solid material}
- 7/2464 . . . {a liquid being fed by mechanical pumping from the container to the nozzle}
- 7/2467 . . . {a liquid being fed by a pressure generated in the container, which is not produced by a carrying fluid}
- 7/247 . . . {a liquid being fed by gravity only from the container to the nozzle}
- 7/2472 . . . {comprising several containers}
- 7/2475 . . . {comprising a container carried on the back of the user}
- 7/2478 . . . {Gun with a container which, in normal use, is located above the gun}
- 7/2481 . . . {with a flexible container for liquid or other fluent material}
- 7/2483 . . {the supplying means involving no pressure or aspiration, e.g. means involving gravity or capillarity ([B05B 7/2459](#), [B05B 7/247](#) take precedence)}
- 7/2486 . . {with means for supplying liquid or other fluent material to several discharge devices}
- 7/2489 . . {an atomising fluid, e.g. a gas, being supplied to the discharge device ([B05B 7/2402](#), [B05B 7/2483](#), [B05B 7/262](#) take precedence)}
- 7/2491 . . . {characterised by the means for producing or supplying the atomising fluid, e.g. air hoses, air pumps, gas containers, compressors, fans, ventilators, their drives}
- 7/2494 . . . {a liquid being supplied from a pressurized or compressible container to the discharge device}
- 7/2497 . . . {several liquids from different sources being supplied to the discharge device}
- 7/26 . . . Apparatus in which liquids or other fluent materials from different sources are brought together before entering the discharge device {([B05B 7/2402](#) takes precedence)}
- 7/262 . . . {a liquid and a gas being brought together before entering the discharge device}
- 7/265 {the liquid being fed by gravity, or sucked into the gas}
- 7/267 {the liquid and the gas being both under pressure}
- 7/28 . . . in which one liquid or other fluent material is fed or drawn through an orifice into a stream of a carrying fluid {([B05B 7/262](#) takes precedence)}
- 7/30 the first liquid or other fluent material being fed by gravity, or sucked into the carrying fluid
- 7/32 the fed liquid or other fluent material being under pressure
- 9/00 Spraying apparatus for discharge of liquids or other fluent material, without essentially mixing with gas or vapour ([B05B 11/00](#) takes precedence)**
- 9/002 . {incorporating means for heating or cooling, e.g. the material to be sprayed}
- 9/005 . {the liquid or other fluent material being a fluid close to a change of phase}
- 9/007 . {At least a part of the apparatus, e.g. a container, being provided with means, e.g. wheels, for allowing its displacement relative to the ground}
- 9/01 . Spray pistols, {discharge devices} ([B05B 9/03](#) takes precedence)
- 9/03 . characterised by means for supplying liquid or other fluent material {([B05B 9/002](#) takes precedence)}
- 9/035 . . {to several spraying apparatus ([B05B 9/0423](#) takes precedence)}
- 9/04 . . with pressurised or compressible container ([aerosol containers B65D 83/14](#)); with pump
- 9/0403 . . . {with pumps for liquids or other fluent material ([B05B 9/043](#) takes precedence)}
- 9/0406 {with several pumps}
- 9/0409 {the pumps being driven by a hydraulic or a pneumatic fluid}
- 9/0413 {with reciprocating pumps, e.g. membrane pump, piston pump, bellows pump ([B05B 9/0409](#) takes precedence)}
- 9/0416 {with pumps comprising rotating pumping parts, e.g. gear pump, centrifugal pump, screw-type pump ([B05B 9/042](#) takes precedence)}
- 9/042 {with peristaltic pumps}
- 9/0423 {for supplying liquid or other fluent material to several spraying apparatus}
- 9/0426 {with a pump attached to the spray gun or discharge device ([single-units hand-held apparatus in which the flow is effected by a pump B05B 11/30](#))}
- 9/043 . . . having pump readily separable from container
- 9/047 . . . supply being effected by follower in container, e.g. membrane or floating piston, {or by deformation of container ([B05B 9/0838](#) takes precedence)}
- 9/06 . . . the delivery being related to the movement of a vehicle, e.g. the pump being driven by a vehicle wheel

- 9/08 . . . Apparatus to be carried on or by a person, e.g. of knapsack type ([B05B 9/0426](#), [B05B 11/00](#) take precedence) ; details or components, e.g. casings, bodies of portable power-driven tools not particularly related to the operation performed [B25F 5/00](#))
- 9/0805 {comprising a pressurised or compressible container for liquid or other fluent material ([B05B 9/085](#) takes precedence)}
- 9/0811 {comprising air supplying means actuated by the operator to pressurise or compress the container}
- 9/0816 {the air supplying means being a manually actuated air pump}
- 9/0822 {a discharge device being fixed to the container}
- 9/0827 {the air pump being actuated by shaking}
- 9/0833 {comprising a compressed gas container, e.g. a nitrogen cartridge}
- 9/0838 {supply being effected by follower in container, e.g. membrane or floating piston, or by deformation of container}
- 9/0844 {the container being pressurised or compressed by a gas generated by a chemical reaction}
- 9/085 {with a liquid pump}
- 9/0855 {the pump being motor-driven ([B05B 9/0866](#), [B05B 9/0872](#) take precedence)}
- 9/0861 {the motor being electric}
- 9/0866 {the pump being a gear, centrifugal or screw-type pump}
- 9/0872 {the pump being a peristaltic pump}
- 9/0877 {the pump being of pressure-accumulation type or being connected to a pressure accumulation chamber}
- 9/0883 {having a discharge device fixed to the container}
- 9/0888 {Carrying means for knapsack sprayers}
- 9/0894 {Gun with a container which, in normal use, is located above the gun}
- 11/00 Single-unit, i.e. unitary, hand-held apparatus {comprising a container and a discharge nozzle attached thereto}, in which flow of liquid or other fluent material is produced by {the muscular energy of} the operator at the moment of use {or by an equivalent manipulator independent from the apparatus (apparatus with an external source or the possibility of permanent accumulation of pressure for discharging the liquid or fluid material [B05B 7/00](#), [B05B 9/00](#))}**
- 11/0002 . {incorporating means for heating or cooling, e.g. the material to be sprayed}
- WARNING**
Not complete pending reclassification; see also [B05B 11/00](#) and subgroups
- 11/0005 . {Components or details (of single units wherein the flow is effected by a pump [B05B 11/3042](#))}
- 11/0008 . . {Sealing or attachment arrangements between sprayer and container (between pump and container [B05B 11/3043](#))}
- 11/001 . . . {Snap-on-twist-off type connections}
- 11/0013 . . . {Attachment arrangements comprising means cooperating with the inner surface of the container}
- 11/0016 . . {Venting means (for deformable containers [B05B 11/047](#))}
- 11/0018 . . . {actuated by the pressure difference between the ambient pressure and the pressure in the inner space of the container for liquid or other fluent material}
- 11/0021 . . . {comprising means for filtering or cleaning the air flow drawn into the container}
- 11/0024 . . . {located in the bottom wall of the container or of an enclosure surrounding the container}
- 11/0027 . . {Means for neutralising the actuation of the sprayer (pump locking means [B05B 11/3059](#)); Means for preventing access to the sprayer actuation means}
- 11/0029 . . . {Valves not actuated by pressure (automatically opened during actuation of a spray pump [B05B 11/3053](#); [B05B 11/0032](#), [B05B 11/0094](#) take precedence)}
- 11/0032 . . . {Manually actuated means located downstream the discharge nozzle for closing or covering it, e.g. shutters, (automatically removed during actuation of a spray pump [B05B 11/3053](#))}
- 11/0035 . . {Pen-like sprayers}
- 11/0037 . . {Containers (for several components [B05B 11/0078](#); Containers in general [B65D](#))}
- 11/004 . . . {with means for compensating for the underpressure created by evacuating the container (venting means [B05B 11/0016](#))}
- 11/0043 {the container being a collapsible or foldable bag}
- 11/0045 {the bag or membrane being inverted during emptying of the container}
- 11/0048 {the container comprising a movable piston or the like}
- 11/0051 {located above the liquid or other fluent material}
- 11/0054 . . . {Cartridges, i.e. containers specially designed for easy attachment to or easy removal from the rest of the sprayer (Attachment arrangements between pump and container [B05B 11/3043](#))}
- 11/0056 . . . {with an additional opening for filling or refilling}
- 11/0059 . . {Arrangements for use in other positions than upright}
- 11/0062 . . {Outlet valves actuated by the pressure of the fluid to be sprayed (fluid-actuated pump outlet valve arrangements [B05B 11/3016](#), [B05B 11/3022](#), [B05B 11/3097](#), [B05B 11/3033](#), [B05B 11/3036](#), [B05B 11/304](#), [B05B 11/3064](#))}
- 11/0064 . . . {Lift valves ([B05B 11/007](#) takes precedence)}
- 11/0067 {having a valve seat located downstream the valve element}
- 11/007 . . . {being opened by deformation of a sealing element made of resiliently deformable material, e.g. flaps, skirts, duck-bill valves}
- 11/0072 . . . {A valve member forming part of an outlet opening}
- 11/0075 . . . {Two outlet valves being placed in a delivery conduit, one downstream the other}

- 11/0078 . . {Arrangements for separately storing several components (Arrangements for pumping several liquids or other fluent materials from several containers [B05B 11/3081](#))}
- 11/0081 . . . {and for mixing the components in a common container as a mixture ready for use before discharging the latter}
- 11/0083 {one of the components being in powder form}
- 11/0086 . . {Arrangements for allowing spraying and pouring}
- 11/0089 . . {Dispensing tubes}
- 11/0091 . . . {movable, e.g. articulated on the sprayer}
- 11/0094 {movement of the dispensing tube controlling a valve}
- 11/0097 . . {Means for filling or refilling the sprayer (through additional openings in the container [B05B 11/0056](#))}
- 11/02 . the flow being effected by a follower, e.g. membrane, floating piston, in container for liquid or other fluent material
- 11/025 . . {with stepwise advancement of the follower, e.g. for spraying a predetermined quantity of the liquid or other fluid material}
- 11/04 . the flow being effected by deformation of container for liquid or other fluent material
- 11/041 . . {designed for spraying particulate material ([B05B 11/045](#) takes precedence)}
- 11/042 . . {the spray being effected by a gas or vapour flow in the nozzle, spray head, outlet or dip tube}
- 11/043 . . . {designed for spraying a liquid ([B05B 11/046](#) takes precedence)}
- 11/045 . . . {designed for spraying particulate material ([B05B 11/046](#) takes precedence)}
- 11/046 . . . {the gas or vapour flow coming from a source where the gas or vapour is not in contact with the liquid or other fluent material to be sprayed, e.g. from a compressive bulb, an air pump or an enclosure surrounding the container}
- 11/047 . . {characterised by the outlet or venting means ([B05B 11/041](#) and [B05B 11/042](#) take precedence; venting means for single-units in general [B05B 11/0016](#))}
- 11/048 . . {characterised by the container, e.g. this latter being surrounded by an enclosure, or the means for deforming it ([B05B 11/041](#), [B05B 11/046](#) take precedence)}
- 11/06 . the spray being effected by a gas or vapour flow {from a source where the gas or vapour is not in contact with the liquid or other fluent material to be sprayed}, e.g. from a compressible bulb, {an air pump or an enclosure surrounding the container ([B05B 11/046](#) and [B05B 11/3087](#) take precedence)}
- 11/061 . . {characterised by the means producing the gas or vapour pressure}
- 11/062 . . {designed for spraying particulate material}
- 11/064 . . . {the particulate material being stored in several discrete quantities delivered one at a time}
- 11/065 . . . {the particulate material being separated from a main storage in discrete quantities delivered one at a time}
- 11/067 {the particulate material being separated from the main storage by a dosing device}
- 11/068 . . {comprising a liquid-absorbent material}
- 11/30 . {the flow being effected by a pump}
- 11/3001 . . {Piston pumps ([B05B 11/3087](#), [B05B 11/3088](#), [B05B 11/309](#) take precedence)}
- 11/3002 . . . {the direction of the pressure stroke being substantially perpendicular to the major axis of the container ([B05B 11/3009](#), [B05B 11/3015](#) take precedence)}
- 11/3004 . . . {comprising a movable cylinder and a stationary piston}
- 11/3005 . . . {with means for adjusting or modifying pump stroke}
- 11/3007 {by adjusting or modifying the pump end-of-sucking-stroke position}
- 11/3008 {by adjusting or modifying the pump end-of-dispensing-stroke position}
- 11/3009 . . . {actuated by a lever}
- 11/3011 {without substantial movement of the nozzle in the direction of the pressure stroke}
- 11/3012 {the pump chamber being arranged substantially coaxially to the neck of the container ([B05B 11/3011](#) takes precedence)}
- 11/3014 {the pump chamber being arranged substantially coaxially to the container}
- 11/3015 . . . {actuated without substantial movement of the nozzle in the direction of the pressure stroke ([B05B 11/3011](#) takes precedence)}
- 11/3016 . . . {the outlet valve having a valve seat located downstream a movable valve element controlled by a pressure actuated controlling element ([B05B 11/3022](#), [B05B 11/3023](#) take precedence)}
- 11/3018 {and the controlling element cooperating with means for opening or closing the inlet valve ([B05B 11/3019](#) takes precedence)}
- 11/3019 {the inlet valve moving concurrently with the controlling element during whole pressure and aspiration strokes, e.g. a cage for an inlet valve ball being part of the controlling element}
- 11/3021 . . . {having an outlet valve which is a gate valve ([B05B 11/3023](#), [B05B 11/3038](#) take precedence)}
- WARNING**
Not complete, see [B05B 11/3001](#) and sub-groups
- 11/3022 {actuated by pressure}
- 11/3023 . . . {having an outlet valve opened by deformation or displacement of the piston relative to its actuating stem}
- 11/3025 {a spring urging the outlet valve in its closed position ([B05B 11/3026](#) takes precedence)}
- 11/3026 {the piston being deformable and its deformation allowing opening of the outlet}
- 11/3028 . . {Pumps having a pumping chamber with a deformable wall ([B05B 11/3087](#) take precedence)}
- 11/3029 . . . {actuated by a lever}
- 11/303 {without substantial movement of the nozzle in the direction of the pressure stroke}
- 11/3032 . . . {actuated without substantial movement of the nozzle in the direction of the pressure stroke ([B05B 11/303](#) takes precedence)}

- 11/3033 . . . {the deformable wall, the inlet and outlet valve elements being integrally formed, e.g. moulded}
- 11/3035 . . . {the pumping chamber being a bellow}
- 11/3036 . . . {the outlet valve being opened in the direction opposite to the fluid flow downstream the outlet valve by the pressure acting on a valve controlling element}
- 11/3038 . . {Pressure accumulation pumps, i.e. pumps comprising a pressure accumulation chamber}
- 11/3039 . . . {the outlet valve being mechanically opened after a defined accumulation stroke}
- 11/304 . . . {the outlet valve being opened by pressure after a defined accumulation stroke}
- 11/3042 . . {Components or details}
- 11/3043 . . . {Sealing or attachment arrangements between pump and container ([Sealing arrangements around pump actuating stem B05B 11/305](#))}
- 11/3045 {the pump being preassembled as an independent unit before being mounted on the container ([B05B 11/3047](#), [B05B 11/3049 take precedence](#))}
- 11/3046 {the pump chamber being arranged substantially coaxially to the neck of the container ([B05B 11/3049 takes precedence](#))}
- 11/3047 {the pump being preassembled as an independent unit before being mounted on the container}
- WARNING**
- Not complete, see [B05B 11/3042](#), [B05B 11/3043](#) and subgroups
- 11/3049 {Attachment arrangements comprising a deformable or resilient ferrule clamped or locked onto the neck of the container by displacing, e.g. sliding, a sleeve surrounding the ferrule}
- 11/305 . . . {Sealing arrangements around pump actuating stem}
- 11/3052 . . . {Actuation means ([locking means therefor B05B 11/3059](#); [B05B 11/309 takes precedence](#))}
- 11/3053 {Manually actuated means located downstream the discharge nozzle for closing or covering it, e.g. shutters, ([automatically removed during actuation of a spray pump B05B 11/3053](#))}
- 11/3054 {the valve being located upstream of an outlet valve}
- 11/3056 {comprising rotatable or articulated levers ([lever actuated piston pumps B05B 11/3009](#), [lever actuated pumps with deformable chamber B05B 11/3029](#); [B05B 11/3053 take precedence](#))}
- WARNING**
- Not complete, see [B05B 11/3052](#)
- 11/3057 {Triggers, i.e. actuation means consisting of a single lever having one end rotating or pivoting around an axis or a hinge fixedly attached to the container, and another end directly actuated by the user}
- 11/3059 {Means for locking a pump or its actuation means in a fixed position ([B05B 11/3091 takes precedence](#))}
- 11/306 {in a retracted position, e.g. in an end-of-dispensing-stroke position}
- 11/3061 . . . {Pump priming means}
- 11/3063 {Air exhausted from the pump chamber being discharged into the container during priming}
- WARNING**
- Not complete, see [B05B 11/3061](#)
- 11/3064 . . . {Pump inlet and outlet valve elements integrally formed of a deformable material ([Pump chambers having a deformable wall integrally formed with inlet and outlet valve elements B05B 11/3033](#))}
- 11/3066 . . . {Pump inlet valves ([B05B 11/3018](#), [B05B 11/3019](#), [B05B 11/3064 take precedence](#))}
- 11/3067 {actuated by pressure}
- 11/3069 {the valve being made of a resiliently deformable material or being urged in a closed position by a spring}
- WARNING**
- Not complete, see [B05B 11/3067](#)
- 11/307 {Gate valves; Sliding valves}
- 11/3071 {Two inlet valves being placed in a supply conduit one upstream of the other}
- 11/3073 . . . {Springs}
- 11/3074 {located outside pump chambers}
- 11/3076 {Traction springs, e.g. stretchable sleeve}
- 11/3077 {characterized by a particular shape or material ([B05B 11/3076 takes precedence](#))}
- 11/3078 {Vacuum chambers acting like springs}
- 11/308 . . . {Means for counting the number of dispensing strokes}
- 11/3081 . . {Arrangements for pumping several liquids or other fluent materials from several containers, e.g. for mixing them at the moment of pumping}
- 11/3083 . . . {in adjustable proportion}
- 11/3084 . . . {each liquid or other fluent material being pumped by a separate pump}
- 11/3085 {the pumps being coaxial}
- 11/3087 . . {Combination of liquid and air pumps}
- 11/3088 . . {the pump being a double-acting pump}
- 11/309 . . {the dispensing stroke being effected by the stored energy of a spring ([B05B 11/3088 takes precedence](#))}
- 11/3091 . . . {being first hold in a loaded state by locking means or the like, then released ([B05B 11/3092 takes precedence](#))}
- 11/3092 . . . {automatically released from a loaded state at the end of the loading stroke}
- 11/3094 . . {having inlet or outlet valves not being actuated by pressure or having no inlet or outlet valve}
- 11/3095 . . {with movable suction side}
- 11/3097 . . {with means for sucking back the liquid or other fluent material in the nozzle after a dispensing stroke}
- 11/3098 . . {Air being permanently entrapped or sucked into the liquid pump chamber}

- 12/00 Arrangements or special adaptations of delivery controlling means in spraying systems** ([controlling in general G05](#) (; valves in spray head or nozzles [B05B 1/30](#) and sub-groups))
- 12/002 . {Manually-actuated controlling means, e.g. push buttons, levers, triggers ([B05B 11/00](#) takes precedence; [Manually-actuated control mechanisms in general G05G 7/00 - G05G 13/00](#))}
- 12/004 . {comprising sensors for monitoring the delivery, e.g. by displaying the sensed value or generating an alarm ([B05B 12/08](#) takes precedence; [Registering or indicating the condition or the working of machines or other apparatus in general G07C 3/00](#))}
- 12/006 . . {Pressure or flow rate sensors}
- WARNING**
not complete, see [B05B 12/004](#)
- 12/008 . . . {integrated in or attached to a discharge apparatus, e.g. a spray gun}
- WARNING**
not complete, see [B05B 12/004](#)
- 12/02 . for controlling time, or sequence, of delivery
- 12/04 . . for sequential operation or multiple outlets
- 12/06 . . for effecting pulsating flow {(Nozzles, spray head or outlet with means for generating a discharge of pulsating nature [B05B 1/08](#))}
- 12/08 . responsive to condition of liquid or other fluent material {to be} discharged, of ambient medium or of target (; responsive to condition of spray devices or of supply means, e.g. pipes, pumps or their drive means}
- 12/081 . . {responsive to the weight of a reservoir or container for liquid or other fluent material; responsive to level or volume of liquid or other fluent material in a reservoir or container}
- WARNING**
Not complete pending reclassification; see also [B05B 12/08](#) and subgroups
- 12/082 . . {responsive to a condition of the discharged jet or spray, e.g. to jet shape, spray pattern or droplet size}
- WARNING**
not complete, see [B05B 12/08](#), [B05B 12/12](#)
- 12/084 . . {responsive to condition of liquid or other fluent material already sprayed on the target, e.g. coating thickness, weight or pattern}
- WARNING**
not complete, see [B05B 12/08](#), [B05B 12/12](#)
- 12/085 . . {responsive to flow or pressure of liquid or other fluent material to be discharged ([B05B 1/3006](#), [B05B 1/323](#), [B05B 7/1254](#) take precedence)}
- 12/087 . . . {Flow or pressure regulators, i.e. non-electric unitary devices comprising a sensing element, e.g. a piston or a membrane, and a controlling element, e.g. a valve}
- WARNING**
not complete, see also [B05B 12/085](#)
- 12/088 {the sensing element being a flexible member, e.g. membrane, diaphragm, bellows}
- 12/10 . . responsive to temperature or viscosity of liquid or other fluent material discharged
- 12/12 . . responsive to conditions of ambient medium or target, e.g. humidity, temperature {position or movement of the target relative to the spray apparatus ([B05B 12/082](#), [B05B 12/084](#) take precedence)}
- 12/122 . . . {responsive to presence or shape of target ([B05B 12/124](#) takes precedence)}
- 12/124 . . . {responsive to distance between spray apparatus and target}
- WARNING**
not complete, see [B05B 12/12](#)
- 12/126 . . . {responsive to target velocity, e.g. to relative velocity between spray apparatus and target ([B05B 9/06](#) takes precedence)}
- WARNING**
not complete, see [B05B 12/12](#)
- 12/14 . for supplying a selected one of a plurality of liquids or other fluent materials {or several in selected proportions} to a {spray apparatus, e.g. to a} single spray outlet
- 12/1409 . . {the selection means being part of the discharge apparatus, e.g. part of the spray gun}
- 12/1418 . . {for supplying several liquids or other fluent materials in selected proportions to a single spray outlet ([Controlling ratio of two or more flows of fluid G05D 11/02](#))}
- WARNING**
not complete, see also [B05B 12/14](#)
- 12/1427 . . . {a condition of a first liquid or other fluent material in a first supply line controlling a condition of a second one in a second supply line}
- WARNINGS**
1. not complete, see also [B05B 12/14](#)
2. not complete, see [B05B 7/32](#), [B05B 12/14](#)
- 12/1436 {the controlling condition of the first liquid or other fluent material in the first supply line being its flow rate or its pressure}
- WARNINGS**
1. not complete, see also [B05B 12/14](#)
2. WARNING not complete, see [B05B 7/32](#), [B05B 12/14](#)
- 12/1445 . . . {pumping means for the liquids or other fluent materials being mechanically linked, e.g. master and slave pumps}
- WARNING**
not complete, see [B05B 7/32](#), [B05B 12/14](#)

- 12/1454 . . {separate units comprising both a material container and a spray device permanently connected thereto being removably attached to a part of the spray apparatus, e.g. to a robot arm}

WARNING

not complete, see [B05B 12/14](#)

- 12/1463 . . {separate containers for different materials to be sprayed being moved from a first location, e.g. a filling station, where they are fluidically disconnected from the spraying apparatus, to a second location, generally close to the spraying apparatus, where they are fluidically connected to the latter ([B05B 12/1454](#) takes precedence)}

- 12/1472 . . {separate supply lines supplying different materials to separate outlets of the spraying apparatus ([B05B 12/1454](#) takes precedence)}

- 12/1481 . . {comprising pigs, i.e. movable elements sealingly received in supply pipes, for separating different fluids, e.g. liquid coating materials from solvent or air (cleaning pipes with pigs [B08B 9/0557](#), pigs per se [F16L 55/26](#))}

- 12/149 . . {characterised by colour change manifolds or valves therefor ([B05B 12/1409](#) takes precedence)}

13/00 **Machines or plants for applying liquids or other fluent materials to surfaces of objects or other work by spraying, not covered by groups [B05B 1/00](#) - [B05B 11/00](#) ([B05B 5/08](#) takes precedence) ; means for supplying or discharging liquid or other fluent material for this purpose, see the relevant preceding groups; processes for applying liquids or other fluent materials to surfaces in general [B05D](#))**

- 13/005 . {mounted on vehicles or designed to apply a liquid on a very large surface, e.g. on the road, on the surface of large containers}

- 13/02 . Means for supporting work; Arrangement or mounting of spray heads; Adaptation or arrangement of means for feeding work ([B05B 13/06](#) takes precedence)

- 13/0207 . . {the work being an elongated body, e.g. wire or pipe ([B05B 13/0436](#), [B05B 13/0463](#) take precedence)}

- 13/0214 . . . {the liquid or other fluent material being applied to the whole periphery of the cross section of the elongated body}

- 13/0221 . . {characterised by the means for moving or conveying the objects or other work, e.g. conveyor belts ([B05B 13/0207](#) takes precedence; conveyors in general [B65G](#))}

- 13/0228 . . . {the movement of the objects being rotative ([B05B 13/0242](#) takes precedence)}

- 13/0235 . . . {the movement of the objects being a combination of rotation and linear displacement ([B05B 13/0242](#) takes precedence)}

- 13/0242 . . . {the objects being individually presented to the spray heads by a rotating element, e.g. turntable}

- 13/025 . . . {the objects or work being present in bulk}

- 13/0257 {in a moving container, e.g. a rotatable foraminous drum}

- 13/0264 . . . {Overhead conveying means, i.e. the object or other work being suspended from the conveying means; Details thereof, e.g. hanging hooks}

WARNING

not complete, see [B05B 13/0221](#)

- 13/0271 . . . {the object or work standing still during the spraying operation}

- 13/0278 . . {Arrangement or mounting of spray heads ([B05B 13/0207](#) takes precedence)}

- 13/0285 . . {Stands for supporting individual articles to be sprayed, e.g. doors, vehicle body parts}

- 13/0292 . . {devices for holding several workpieces to be sprayed in a spaced relationship, e.g. vehicle doors spacers}

- 13/04 . . the spray heads being moved during {spraying} operation

- 13/0405 . . . {with reciprocating or oscillating spray heads ([B05B 13/0436](#), [B05B 13/0442](#), [B05B 13/0447](#), [B05B 13/0468](#) take precedence)}

- 13/041 {with spray heads reciprocating along a straight line}

- 13/0415 {the angular position of the spray heads relative to the straight line being modified during the reciprocating movement}

WARNING

Not complete, see [B05B 13/041](#)

- 13/0421 . . . {with rotating spray heads}

- 13/0426 . . . {with spray heads moved along a closed path ([B05B 13/0421](#) takes precedence)}

- 13/0431 . . . {with spray heads moved by robots or articulated arms, e.g. for applying liquid or other fluent material to 3D-surfaces ([B05B 13/0436](#), [B05B 13/0442](#), [B05B 13/0447](#), [B05B 13/0463](#) take precedence)}

- 13/0436 . . . {Installations or apparatus for applying liquid or other fluent material to elongated bodies, e.g. light poles, pipes ([B05B 13/0442](#), [B05B 13/0463](#) take precedence)}

- 13/0442 . . . {Installation or apparatus for applying liquid or other fluent material to separate articles rotated during spraying operation}

- 13/0447 . . . {Installation or apparatus for applying liquid or other fluent material to conveyed separate articles ([B05B 13/0442](#) takes precedence)}

- 13/0452 {the conveyed articles being vehicle bodies}

- 13/0457 {specially designed for applying liquid or other fluent material to 3D-surfaces of the articles, e.g. by using several moving spray heads ([B05B 13/0452](#) takes precedence)}

- 13/0463 . . . {Installation or apparatus for applying liquid or other fluent material to moving work of indefinite length}

WARNING

Not complete pending reclassification; see also groups [B05B 13/0421](#), [B05B 13/0426](#)

- 13/0468 {with reciprocating or oscillating spray heads}

- 13/0473 {with spray heads reciprocating along a straight line}
WARNING
Not complete, see [B05B 13/0468](#)
- 13/0478 {the angular position of the spray heads relative to the straight line being modified during the reciprocating movement}
WARNING
Not complete, see [B05B 13/0473](#)
- 13/0484 {with spray heads having a circular motion, e.g. being attached to a rotating supporting element ([B05B 13/0468](#) takes precedence)}
WARNING
Not complete, see [B05B 13/0421](#)
- 13/0489 {around the moving work}
- 13/0494 {with spray heads being moved along a closed path ([B05B 13/0484](#) takes precedence)}
WARNING
Not complete, see [B05B 13/0426](#)
- 13/06 . . . specially designed for treating the inside of hollow bodies (spray heads [B05B 1/00](#) - [B05B 7/00](#); {devices for covering leaks in pipes or hoses, e.g. hose-menders, from inside the pipe [F16L 55/162](#); sprayed layers of rubber or plastics for internal protection of pipes or pipe fittings against corrosion or incrustation [F16L 58/1027](#))}
13/0609 . . {the hollow bodies being automatically fed to, or removed from, the machine}
13/0618 . . {only a part of the inside of the hollow bodies being treated}
13/0627 . . {Arrangements of nozzles or spray heads specially adapted for treating the inside of hollow bodies ([B05B 13/0645](#) takes precedence)}
13/0636 . . . {by means of rotatable spray heads or nozzles}
13/0645 . . {the hollow bodies being rotated during treatment operation ([B05B 13/0618](#) takes precedence)}
13/0654 . . . {and a treating nozzles being translated through the hollow bodies in a direction essentially parallel to the rotational axis ([B05B 13/0681](#) takes precedence)}
13/0663 . . . {and the hollow bodies being translated in a direction parallel to the rotational axis ([B05B 13/0681](#) takes precedence)}
13/0672 . . . {and the inclination or the distance of a treating nozzle being modified relative to the rotation axis, e.g. for treating irregular internal surfaces}
13/0681 . . . {the hollow bodies comprising a closed end to be treated ([B05B 13/0672](#) takes precedence)}
13/069 . . {the hollow bodies having a closed end}
- 15/00 Details of spraying plant or apparatus not otherwise provided for; Accessories** (accessories applicable to other methods of applying liquids or other fluent materials to surfaces [B05C](#))
- 15/001 . {Devices for preventing non-intended contact of spray heads or nozzles with foreign bodies, e.g. sprinkler or nozzle guards}
15/002 . {Means for stirring, mixing or homogenising the material in a container to be sprayed}
15/003 . . {comprising a moving element, e.g. a rotating blade}
15/005 . {Dip tubes}
15/006 . . {Weighted dip tubes}
15/007 . . {with decorative elements}
15/008 . {Filters specially adapted for spraying plants or apparatus}
15/02 . Arrangements or devices for cleaning discharge openings, {nozzles, spraying heads or spraying apparatus; Arrangements or devices for preventing discharge openings, nozzles, spraying heads or spraying apparatus from becoming dirty or clogged; Devices for detecting presence of foreign matter in discharge openings}
15/0208 . . {Means for cleaning or allowing removal of clogging particles ([B05B 15/025](#), [B05B 15/0291](#) take precedence)}
15/0216 . . . {a cleaning element extending through a discharge opening at least during the cleaning operation}
15/0225 {the cleaning element, e.g. a needle, and the discharge opening being movable relative to each other in a direction substantially parallel to the flow of liquid or other fluent material through said opening}
15/0233 {the cleaning element being located upstream of the discharge opening or being actuated upstream therefrom}
15/0241 . . . {Means for increasing the cross section of a discharge orifice}
15/025 . . {Cleaning means involving the use of a cleaning fluid ([B05B 15/0275](#) takes precedence)}
15/0258 . . . {discharged by cleaning nozzles (cleaning by the force of jets or sprays in general [B08B 3/02](#))}
WARNING
Not complete, see [B05B 15/025](#)
- 15/0266 . . . {the cleaning fluid being a mixture of gas and liquid}
15/0275 . . {the liquid or other fluent material flowing during cleaning operation through a discharge opening in a direction opposite to the spraying flow direction through said discharge opening}
15/0283 . . . {the discharge opening being reversed relative to a supply conduit located just upstream of the former}
15/0291 . . {by resilient deformation of the nozzle}
15/04 . Control of spray area, e.g. masking, side shields; Means for collection or re-use of excess material ([B05B 1/28](#) takes precedence)
15/0406 . . {Means for collecting or recycling surplus material ([B05B 15/1225](#) takes precedence)}
15/0412 . . . {the surplus material being particulate material}
15/0418 . . . {from a moving belt, e.g. a filtering belt or a conveying belt for the objects to be sprayed}

- 15/0425 . . . {comprising an enclosure surrounding the spray, said enclosure having an open end contacting or being placed in close proximity to the surface to be sprayed, defining therewith a containment}
- 15/0431 . . {using a gas stream}
- 15/0437 . . {Shielding or masking elements being displaced relative to the sprayed area during spraying}
- WARNING**
Not complete, see [B05B 15/04](#)
- 15/0443 . . {Side shields, i.e. extending in a direction substantially parallel to the spray jet ([B05B 15/0431](#), [B05B 15/0437](#) take precedence)}
- WARNING**
Not complete, see [B05B 15/04](#)
- 15/045 . . {Masking elements ([B05B 15/0487](#) takes precedence)}
- 15/0456 . . . {made at least partly of soft flexible material, e.g. sheets or strips of paper, fabric or soft plastics}
- 15/0462 . . . {for masking cavities}
- 15/0468 {between a door and a post, e.g. foam strips}
- 15/0475 . . . {generating border lines between coated and uncoated surfaces where one is not enclosed in the other ([B05B 15/0456](#) takes precedence)}
- 15/0481 . . . {being dimensionally adjustable}
- 15/0487 . . {for vehicle wheels}
- 15/0493 . . {Devices for making a normally hidden area accessible for the spray material}
- 15/06 . . Mountings, supporting or holding means, or rests for spray heads or other outlets {or for the whole spraying apparatus} when in use or out of use ([B05B 13/005](#), [B05B 15/1225](#) take precedence)}
- 15/061 . . {Supporting means, e.g. suction cups, handgrips, hooks for the discharge apparatus}
- 15/062 . . . {of the ground-penetrating type}
- 15/063 . . . {designed to lie on the ground}
- 15/064 . . . {Supports of variable length; Actioning means mounted thereon}
- 15/065 . . {Mounting arrangements for fluidically connecting the spray apparatus, spray heads or other outlets to a flow conduit ([joints in general F16L 13/00 - F16L 37/00](#))}
- 15/066 . . . {allowing the orientation of the jet}
- 15/067 {using a universal joint type}
- 15/068 . . . {allowing changing the length of the flow conduit}
- 15/069 . . . {the axis of the spray apparatus, spray heads or other outlets being perpendicular to the flow conduit}
- 15/08 . . Means for adjusting position of spray heads {with indexing means provided therefor}
- 15/10 . . Arrangements for moving spray heads automatically to or from the working position ({[nozzles for cleaning vehicle windscreens](#) or optical devices moved between a rest position and a working position [B60S 1/528](#))}
- 15/12 . . Spray booths
- 15/1203 . . {Spray tables, stands or hoods}
- 15/1207 . . {Arrangements of booths, e.g. plural booths, specially adapted for effecting several operations, e.g. spraying and drying, or several spraying actions}
- 15/1211 . . . {for both automatic and manual spraying}
- 15/1214 . . {characterised by their construction, e.g. floor, walls, ceiling ([filtering ceilings for the air inlet B05B 15/1222](#))}
- 15/1218 . . . {Partly or totally cylindrical walls; Round floors}
- 15/1222 . . {characterised by their ventilation ([B05B 15/1225](#) takes precedence)}
- 15/1225 . . {Arrangements for collecting, recovering, recycling or eliminating the surplus material}
- 15/1229 . . . {the surplus material being particulate material ([B05B 15/1237 - B05B 15/1262](#) take precedence)}
- 15/1233 . . . {Recovering or eliminating solvents ([B05B 15/1237 - B05B 15/1262](#) take precedence)}
- 15/1237 . . . {by cleaning the walls of the booth ([filtering walls B05B 15/1248](#))}
- 15/124 {comprising perforated or porous walls cleaned or prevented from being contacted by oversprayed material by a flow of fluid, e.g. air or water, directed into the booth}
- 15/1244 . . . {using electrostatic means}
- 15/1248 . . . {by filtering the exhaust air of the booth}
- 15/1251 {Filters cleaned by a gas flow, e.g. a blast of air applied to the clean side of the filters}
- 15/1255 {A special additive material being introduced in the exhaust flow upstream the filter for preventing clogging of the latter}
- 15/1259 . . . {using special wall constructions, e.g. baffle plates promoting separation of the surplus material from the exhaust air of the booth}
- 15/1262 . . . {by washing the exhaust air of the booth}
- 15/1266 {Recovering or eliminating the paint sludge from the washing liquid}
- 15/127 {by using ultrafiltration}
- 15/1274 {the washing liquid being the liquid to be sprayed}
- 15/1277 {Opened booths; Booths in which a liquid curtain or a substantially vertical wetted wall is located behind the object to be sprayed}
- 15/1281 {Underfloor scrubbing means}
- 15/1285 . . . {comprising a cyclone separator}
- 15/1288 . . {comprising conveying means for moving objects or other work in and out of the booth, e.g. through the booth}
- 15/1292 . . . {the objects or other work lying on, or being held above the conveying means, i.e. not hanging from the conveying means}
- 15/1296 . . {Movable spray booths}
- 17/00 Apparatus for spraying or atomising liquids or other fluent materials, not covered by the preceding groups ([dropping or releasing powdered, liquid or gaseous matter in flight B64D 1/16](#))**
- 17/04 . . operating with special methods
- 17/06 . . using ultrasonic {or other kinds of} vibrations
- 17/0607 . . . {generated by electrical means, e.g. piezoelectric transducers}

B05B

- 17/0615 {spray being produced at the free surface of the liquid or other fluent material in a container and subjected to the vibrations}
- 17/0623 {coupled with a vibrating horn}
- 17/063 {having an internal channel for supplying the liquid or other fluent material}
- 17/0638 {spray being produced by discharging the liquid or other fluent material through a plate comprising a plurality of orifices}
- 17/0646 {Vibrating plates, i.e. plates being directly subjected to the vibrations, e.g. having a piezoelectric transducer attached thereto}
- 17/0653 {Details}
- 17/0661 {Transducer materials}
- 17/0669 {Excitation frequencies}
- 17/0676 {Feeding means}
- 17/0684 {Wicks or the like}
- 17/0692 . . . {generated by a fluid ([B05B 17/0607](#) takes precedence)}
- 17/08 . Fountains ([drinking fountains E03B 9/20](#); [wash fountains E03C 1/16](#))
- 17/085 . . {designed to produce sheets or curtains of liquid, e.g. water walls}