**B22D** CASTING OF METALS; CASTING OF OTHER SUBSTANCES BY THE SAME PROCESSES OR DEVICES (shaping of plastics or substances in a plastic state **B29C**; metallurgical processing, selection of substances to be added to metal **C21, C22**)

**WARNING**

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

<table>
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<th>Treatment of fused masses in the ladle or the supply runners before casting</th>
<th>7/005</th>
<th>[from non-ferrous metals]</th>
</tr>
</thead>
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<td>[Treatment with gases (<strong>C21C 7/072, C22B 9/05</strong> take precedence)]</td>
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<td>Casting compound ingots of two or more different metals in the molten state, i.e. integrally cast</td>
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<tr>
<td>1/005</td>
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<td>7/004</td>
<td>Casting hollow ingots</td>
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<tr>
<td>1/007</td>
<td>[Treatment of the fused masses in the supply runners (<strong>B22D 1/002, B22D 1/005</strong> take precedence)]</td>
<td>7/006</td>
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<tr>
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<td>7/0062</td>
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<td>7/0064</td>
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<td>2/001</td>
<td>[for the slag appearance in a molten metal stream]</td>
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<td>[Manufacturing, repairing or reinforcing ingot moulds]</td>
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<tr>
<td>2/003</td>
<td>[for the level of the molten metal (<strong>B22D 11/181 and B22D 11/201</strong> take precedence; level indicators in general <strong>G01F 23/00</strong>)]</td>
<td>7/008</td>
<td>Divided ingot moulds</td>
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<tr>
<td>2/005</td>
<td>[for the thickness of a frozen shell (<strong>B22D 11/188 and B22D 11/207</strong> take precedence)]</td>
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<td>7/102</td>
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<td>2/008</td>
<td>[for the viscosity of the molten metal (measuring viscosity in general <strong>G01N 11/00</strong>)]</td>
<td>7/104</td>
<td>[from exothermic material only]</td>
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</tbody>
</table>

**Casting of pigs, i.e. metal castings suitable for subsequently melting; similar casting**

<table>
<thead>
<tr>
<th>3/00</th>
<th>Pig or like casting (equipment for conveying molten metal <strong>B22D 35/00</strong>)</th>
<th>11/001</th>
<th>[of specific alloys]</th>
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<tbody>
<tr>
<td>3/02</td>
<td>Moulding of beds</td>
<td>11/002</td>
<td>[Stainless steels]</td>
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<tr>
<td>5/00</td>
<td>Machines or plants for pig or like casting</td>
<td>11/003</td>
<td>[Aluminium alloys]</td>
</tr>
<tr>
<td>5/005</td>
<td>[Devices for stacking pigs; Pigforms to be stacked]</td>
<td>11/004</td>
<td>[Copper alloys]</td>
</tr>
<tr>
<td>5/02</td>
<td>with rotary casting tables</td>
<td>11/005</td>
<td>[of wire (casting on wire <strong>B22D 19/14</strong>)]</td>
</tr>
<tr>
<td>5/04</td>
<td>with endless casting conveyors</td>
<td>11/006</td>
<td>[of tubes]</td>
</tr>
</tbody>
</table>

**Casting of ingots, i.e. metal castings suitable for subsequently rolling or forging**

<table>
<thead>
<tr>
<th>7/00</th>
<th>Casting ingots, [e.g. from ferrous metals] (equipment for conveying molten metal <strong>B22D 35/00</strong>)</th>
<th>11/007</th>
<th>[of composite ingots, i.e. two or more molten metals of different compositions being used to integrally cast the ingots (casting of composite ingots in definite lengths <strong>B22D 7/021</strong>)]</th>
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</thead>
<tbody>
<tr>
<td>7/005</td>
<td>[of clad ingots, i.e. the molten metal being cast against a continuous strip forming part of the cast product]</td>
<td>11/008</td>
<td>[of clad ingots, i.e. the molten metal being cast against a continuous strip forming part of the cast product]</td>
</tr>
</tbody>
</table>
Particular casting processes; Machines or apparatus therefor

B22D

11/009 . . . [of work of special cross-section, e.g. I-beams, U-profiles]
11/01 . . . without moulds, e.g. on molten surfaces
11/015 . . . [using magnetic field for conformation, i.e. the metal is not in contact with a mould]
11/04 . . . into open-ended moulds (B22D 11/06, B22D 11/07 take precedence; plants for continuous casting, e.g. for upwardly drawing the strand B22D 11/14)
11/0401 . . . [Moulds provided with a feed head]
11/0403 . . . [Multiple moulds]
11/0405 . . . [Rotating moulds]
11/0406 . . . [Moulds with special profile]
11/0408 . . . [Moulds for casting thin slabs]
11/041 . . . for vertical casting (B22D 11/043, B22D 11/049 - B22D 11/059 take precedence)
11/043 . . . Curved moulds (B22D 11/049 - B22D 11/059 take precedence)
11/045 . . . for horizontal casting (B22D 11/049 - B22D 11/059 take precedence)
11/0455 . . . [Bidirectional horizontal casting]
11/047 . . . Means for joining tundish to mould
11/0475 . . . [characterised by use of a break ring]
11/049 . . . for direct chill casting, e.g. electromagnetic casting
11/05 . . . into moulds having adjustable walls
11/051 . . . into moulds having oscillating walls
11/053 . . . Means for oscillating the moulds
11/0535 . . . [in a horizontal plane]
11/055 . . . Cooling the moulds ([B22D 11/04 takes precedence])
11/057 . . . Manufacturing or calibrating the moulds
11/059 . . . Mould materials or platings
11/06 . . . into moulds with travelling walls, e.g. with rolls, plates, belts, caterpillars
11/0602 . . . [formed by a casting wheel and belt, e.g. Properzi-process]
11/0605 . . . [formed by two belts, e.g. Hazelett-process]
11/0608 . . . [formed by caterpillars]
11/0611 . . . [formed by a single casting wheel, e.g. for casting amorphous metal strips or wires]
11/0614 . . . [the casting wheel being immersed in a molten metal bath, and drawing out upwardly the casting strip]
11/0617 . . . [the casting wheel having its axis vertical and a casting strip formed in a peripheral groove of the wheel]
11/062 . . . [the metal being cast on the inside surface of the casting wheel]
11/0622 . . . [formed by two casting wheels]
11/0625 . . . [the two casting wheels being immersed in a molten metal bath and drawing out upwardly the casting strip]
11/0628 . . . [formed by more than two casting wheels]
11/0631 . . . [formed by a travelling straight surface, e.g. through-like moulds, a belt]
11/0634 . . . [formed by a casting wheel and a co-operating shoe]
11/0637 . . . [Accessories thereto]
11/064 . . . [for supplying molten metal (supplying molten metal to open-ended moulds B22D 11/10)]
11/0642 . . . [Nozzles (nozzles used in open-ended moulds B22D 41/50)]
11/0645 . . . [Sealing means for the nozzle between the travelling surfaces]
11/0648 . . . [Casting surfaces]
11/0651 . . . [Casting wheels (B22D 11/0682 takes precedence)]
11/0654 . . . [Casting belts (B22D 11/0685 takes precedence)]
11/0657 . . . [Caterpillars (B22D 11/0688 takes precedence)]
11/066 . . . [Side dams (B22D 11/0691 takes precedence)]
11/0662 . . . [having electromagnetic confining means]
11/0665 . . . [for treating the casting surfaces, e.g. calibrating, cleaning, dressing, preheating]
11/0668 . . . [for dressing, coating or lubricating]
11/0671 . . . [for heating or drying]
11/0674 . . . [for machining]
11/0677 . . . [for guiding, supporting or tensioning the casting belts]
11/068 . . . [for cooling the cast product during its passage through the mould surfaces (cooling open-ended moulds B22D 11/04; secondary cooling B22D 11/124)]
11/0682 . . . [by cooling the casting wheel]
11/0685 . . . [by cooling the casting belts (B22D 11/0677 takes precedence)]
11/0688 . . . [by cooling the caterpillars]
11/0691 . . . [by cooling the side dams]
11/0694 . . . [for peeling-off or removing the cast product]
11/0697 . . . [for casting in a protected atmosphere]
11/07 . . . Lubricating the moulds
11/08 . . . Accessories for starting the casting procedure
11/081 . . . [Starter bars]
11/083 . . . [Starter bar head; Means for connecting or detaching starter bars and ingots]
11/085 . . . [Means for storing or introducing the starter bars in the moulds]
11/086 . . . [Means for connecting cast ingots of different sizes or compositions]
11/088 . . . [Means for sealing the starter bar head in the moulds]
11/10 . . . Supplying or treating molten metal (B22D 41/00 takes precedence)
11/103 . . . Distributing the molten metal, e.g. using runners, floats, distributors
11/106 . . . Shielding the molten jet (B22D 41/50 takes precedence)
11/108 . . . Feeding additives, powders, or the like
11/11 . . . Treating the molten metal
11/111 . . . by using protecting powders
11/112 . . . by accelerated cooling
11/113 . . . by vacuum treating
11/114 . . . by using agitating or vibrating means (B22D 11/117 takes precedence)
11/115 . . . by using magnetic fields
11/116 . . . Refining the metal
11/117 . . . by treating with gases (B22D 11/118, B22D 11/119 takes precedence)
11/118 . . . by circulating the metal under, over or around weirs (B22D 11/119 takes precedence)
11/119 . . . by filtering
Particular casting processes; Machines or apparatus therefor

11/12 . . . (for plastic shaping of strands (rolling mills B21B 1/46))
11/1206 . . . (for heating or insulating strands)
11/1213 . . . (for marking strands)
11/122 . . . (for cooling)
11/1226 . . . (by using cooling grids or cooling plates)
11/1233 . . . (using specific cooling agents)
11/1246 . . . (Nozzles; Spray heads)
11/1248 . . . (Means for removing cooling agent from the surface of the cast stock)
11/126 . . . (for cutting)
11/1265 . . . (having auxiliary devices for deburring)
11/128 . . . (for removing)
11/1281 . . . (Vertical removing)
11/1282 . . . (Vertical casting and curving the cast stock to the horizontal)
11/1284 . . . (Horizontal removing)
11/1285 . . . (Segment changing devices for supporting or guiding frames)
11/1287 . . . (Rolls; Lubricating, cooling or heating rolls while in use)
11/1288 . . . (Walking bar members)
11/14 . . . (Plants for continuous casting)
11/141 . . . (for vertical casting)
11/142 . . . (for curved casting)
11/143 . . . (for horizontal casting)
11/144 . . . (with a rotating mould)
11/145 . . . (for upward casting)
11/146 . . . (for inclined casting)
11/147 . . . (Multi-strand plants)
11/148 . . . (Safety arrangements)
11/16 . . . (Controlling or regulating processes or operations)
11/161 . . . (for automatic starting the casting process)
11/163 . . . (for cutting cast stock)
11/165 . . . (for the supply of casting powder)
11/166 . . . (for mould oscillation)
11/168 . . . (for adjusting the mould size or mould taper)
11/18 . . . (for pouring (B22D 11/20 takes precedence))
11/181 . . . (responsive to molten metal level or slag level)
11/182 . . . (by measuring temperature)
11/183 . . . (by measuring molten metal weight)
11/185 . . . (by using optical means)
11/186 . . . (by using electric, magnetic, sonic or ultrasonic means)
11/187 . . . (by using X-rays or nuclear radiation)
11/188 . . . (responsive to thickness of solidified shell)
11/20 . . . (for removing cast stock)
11/201 . . . (responsive to molten metal level or slag level)
11/202 . . . (by measuring temperature)
11/203 . . . (by measuring molten metal weight)
11/204 . . . (by using optical means)
11/205 . . . (by using electric, magnetic, sonic or ultrasonic means)
11/206 . . . (by using X-rays or nuclear radiation)
11/207 . . . (responsive to thickness of solidified shell)
11/208 . . . (for aligning the guide rolls)
11/22 . . . (for cooling cast stock or mould)
11/225 . . . (for secondary cooling)

13/00 Centrifugal casting; Casting by using centrifugal force
13/02 . . . (of elongated solid or hollow bodies, e.g. pipes, in moulds rotating around their longitudinal axis)
13/023 . . . (the longitudinal axis being horizontal)
13/026 . . . (the longitudinal axis being vertical)
13/04 . . . (of shallow solid or hollow bodies, e.g. wheels or rings, in moulds rotating around their axis of symmetry)
13/06 . . . (of solid or hollow bodies in moulds rotating around an axis arranged outside the mould)
13/063 . . . (for dentistry or jewellery)
13/066 . . . (several moulds being disposed in a circle)
13/08 . . . (in which a stationary mould is fed from a rotating mass of liquid metal)
13/10 . . . (Accessories for centrifugal casting apparatus, e.g. moulds, linings therefor, means for feeding molten metal, cleansing moulds, removing castings (making or lining moulds B22C))
13/101 . . . (Moulds)
13/102 . . . (Linings for moulds (making or lining moulds B22C))
13/104 . . . (Cores)
13/105 . . . (Cooling for moulds or cores)
13/107 . . . (Means for feeding molten metal)
13/108 . . . (Removing of casting)
13/12 . . . (Controlling, supervising, specially adapted to centrifugal casting, e.g. for safety reasons (controlling or regulating in general G05))

15/00 Casting using a mould or core of which a part significant to the process is of high thermal conductivity, e.g. chill casting; Moulds or accessories specially adapted therefor
15/005 . . . (of rolls, wheels or the like (B22D 19/16 takes precedence))
15/02 . . . (of cylinders, pistons, bearing shells or like thin-walled objects)
15/04 . . . (Machines or apparatus for chill casting ((B22D 15/005). B22D 15/02 take precedence))

17/00 Pressure die casting or injection die casting, i.e. casting in which the metal is forced into a mould under high pressure
17/002 . . . (using movable moulds (for plastics B29C 45/04))
17/005 . . . (using two or more fixed moulds (for plastics B29C 45/12))
17/007 . . . (Semi-solid pressure die casting)
17/02 . . . (Hot chamber machines, i.e. with heated press chamber in which metal is melted)
17/04 . . . (Plunger machines)
17/06 . . . (Air injection machines)
17/08 . . . (Cold chamber machines, i.e. with unheated press chamber into which molten metal is ladled)
17/10 . . . (with horizontal press motion)
17/12 . . . (with vertical press motion)
17/14 . . . (Machines with evacuated die cavity)
17/145 . . . (Venting means therefor (for permanent moulds B29C 9/067))
17/16 . . . (specially adapted for casting slide fasteners or elements therefor)
Particular casting processes; Machines or apparatus therefor

17/18 . Machines built up from units providing for different combinations
17/20 . Accessories: Details
17/2007 . [Methods or apparatus for cleaning or lubricating moulds]
17/2015 . [Means for forcing the molten metal into the die (for plastics B29C 45/46)]
17/2023 . [Nozzles or shot sleeves]
17/203 . [Injection pistons (B22D 17/053 takes precedence; for plastics B29C 45/53)]
17/2038 . [Heating, cooling or lubricating the injection unit (for plastics B29C 45/74, B29C 45/83)]
17/2046 . [with provisions for damping the pressure peak]
17/2053 . [using two or more cooperating injection pistons]
17/2061 . [using screws]
17/2069 . [Exerting after-pressure on the moulding material]
17/2076 . [Cutting-off equipment for sprues or ingates (for plastics B29C 45/38)]
17/2084 . [Manipulating or transferring devices for evacuating cast pieces]
17/2092 . [Safety devices (for plastics B29C 45/84)]
17/22 . [Dies (manufacture, see the appropriate class, e.g. B23P 15/24); Die plates; Die supports; Cooling equipment for dies; Accessories for loosening and ejecting castings from dies]
17/2209 . [Selection of die materials (for permanent moulds B22C 9/061)]
17/2218 . [Cooling or heating equipment for dies (for permanent moulds B22C 9/065; for plastics B29C 45/73)]
17/2227 . [Die seals (for plastics B29C 45/2608)]
17/2236 . [Equipment for loosening or ejecting castings from dies (for plastics B29C 45/40)]
17/2245 . [having walls provided with means for marking or patterning]
17/2254 . [having screw-threaded die walls]
17/2263 . [having tubular die cavities]
17/2272 . [Sprue channels]
17/2281 . [closure devices therefor]
17/229 . [with exchangeable die part (B22D 17/2245 takes precedence)]
17/24 . Accessories for locating and holding cores or inserts
17/26 . Mechanisms or devices for locating or opening dies
17/263 . [mechanically]
17/266 . [hydraulically]
17/28 . Melting pots
17/30 . Accessories for supplying molten metal, e.g. in rations (supplying molten metal in ration in general B22D 39/00)
17/32 . Controlling equipment

18/00 Pressure casting; Vacuum casting (B22D 17/00 takes precedence; treating the metal in the mould by using pressure or vacuum B22D 27/00)
18/02 . Pressure casting making use of mechanical pressure devices, e.g. cast-forging (B22D 18/04 takes precedence)
18/04 . Low pressure casting, i.e. making use of pressures up to a few bars to fill the mould

18/06 . Vacuum casting, i.e. making use of vacuum to fill the mould
18/08 . Controlling, supervising, e.g. for safety reasons (controlling or regulating in general G05)

19/00 Casting in, on, or around objects which form part of the product (B22D 23/04 takes precedence; aluminothermic welding B22K 23/00; coating by casting molten metal on the substrate C23C 6/00)
19/0009 . [Cylinders, pistons]
19/0018 . [cylinders with fins]
19/0027 . [pistons]
19/0036 . [gears]
19/0045 . [household utensils]
19/0054 . [rotors, stators for electrical motors]
19/0063 . [finned exchangers (cylinders B22D 19/0018)]
19/0072 . [for making objects with integrated channels]
19/0081 . [pretreatment of the insert, e.g. for enhancing the bonding between insert and surrounding cast metal]
19/009 . [for casting objects the members of which can be separated afterwards]
19/02 . [for making reinforced articles (B22D 19/14 takes precedence)]
19/04 . [for joining parts]
19/045 . [for joining tubes]
19/06 . [for manufacturing or repairing tools]
19/08 . [for building-up linings or coverings, e.g. of anti-frictional metal]
19/085 . [of anti-frictional metal]
19/10 . Repairing defective or damaged objects by metal casting procedures (by other procedures B23P 6/04; ingot mould B22D 7/06; B22D 19/06 takes precedence)
19/12 . [for making objects, e.g. hinges, with parts which are movable relatively to one another]
19/14 . the objects being filamentary or particulate in form (making alloys containing fibres or filaments by contacting the fibres or filaments with molten metal C22C 47/08)
19/16 . for making compound objects cast of two or more different metals, e.g. for making rolls for rolling mills (casting compound ingots B22D 7/02)

21/00 Casting non-ferrous metals or metallic compounds so far as their metallurgical properties are of importance for the casting procedure; Selection of compositions therefor ([non-ferrous ingots B22D 7/005])
21/002 . [Castings of light metals]
21/005 . [with high melting point, e.g. Be 1280 degrees C, Ti 1725 degrees C]
21/007 . [with low melting point, e.g. Al 659 degrees C, Mg 650 degrees C]
21/02 . Casting exceedingly oxidisable non-ferrous metals, e.g. in inert atmosphere (use of inert atmosphere in casting metals in general B22D 23/00; apparatus for vacuum casting B22D 27/15)
21/022 . [Casting heavy metals, with exceedingly high melting points, i.e. more than 1600 degrees C, e.g. W 3380 degrees C, Ta 3000 degrees C, Mo 2620 degrees C, Zr 1860 degrees C, Cr 1765 degrees C, V 1715 degrees C]
Particular casting processes; Machines or apparatus therefor

21/025 . . . (Casting heavy metals with high melting point, i.e. 1000 - 1600 degrees C, e.g. Co 1490 degrees C, Ni 1450 degrees C, Mn 1240 degrees C, Cu 1083 degrees C)

21/027 . . . (Casting heavy metals with low melting point, i.e. less than 1000 degrees C, e.g. Zn 419 degrees C, Pb 327 degrees C, Sn 232 degrees C)

21/04 . . . Casting aluminium or magnesium (no material; see B22D 21/007)

21/06 . . . Casting non-ferrous metals with a high melting point, e.g. metallic carbides (B22D 21/02 takes precedence)

23/00 Casting processes not provided for in groups B22D 1/00 - B22D 21/00 (making metallic powder by casting B22F 9/08; aluminio-thermic welding B23K 23/00; remelting metals C22B 9/16)

23/03 . . . (Moulding by spraying metal on a surface)

23/06 . . . (Casting by filling the mould through rotation of the mould together with a molten metal holding recipient, about a common axis)

23/02 . . . Top casting

23/04 . . . Casting by dipping (hot-dipping or immersion processes for applying coating material in the molten state without affecting the shape C23C 2/00)

23/06 . . . Melting-down metal, e.g. metal particles, in the mould

23/10 . . . Electroslag casting ([electroslag remelting C22B 9/18])

25/00 Special casting characterised by the nature of the product (B22D 15/02, B22D 17/10, B22D 19/00 take precedence; casting stereotype plates B41D 3/00)

25/03 . . . (Casting metal foams)

25/02 . . . by its peculiarity of shape; of works of art (cylinders, pistons B22D 15/02)

25/023 . . . (Casting chains or the like)

25/026 . . . (Casting jewelry articles (B22D 13/063 takes precedence))

25/04 . . . (Casting metal electric battery plates or the like (manufacture thereof by multi-step processes H01M 4/82))

25/06 . . . by its physical properties (B22D 27/00 takes precedence)

25/08 . . . by uniform hardness (B22D 15/00 takes precedence)

27/00 Treating the metal in the mould while it is molten or ductile (B22D 7/12, B22D 11/10, B22D 43/00 take precedence); {Pressure or vacuum casting (B22D 17/00 takes precedence)}

27/03 . . . (by using inert gases)

27/06 . . . (by using reactive gases)

27/02 . . . Use of electric or magnetic effects (for continuous casting B22D 11/015, B22D 11/11)

27/04 . . . Influencing the temperature of the metal, e.g. by heating or cooling the mould

27/045 . . . (Directionally solidified castings)

27/06 . . . Heating the top discard of ingots (hot tops for ingot moulds B22D 7/10)

27/08 . . . Shaking, vibrating, or turning of moulds

27/09 . . . by using pressure

27/11 . . . making use of mechanical pressing devices

27/13 . . . making use of gas pressure

27/15 . . . by using vacuum

27/18 . . . Measures for using chemical processes for influencing the surface composition of castings, e.g. for increasing resistance to acid attack

27/20 . . . Measures not previously mentioned for influencing the grain structure or texture; Selection of compositions therefor

Final measures after casting (cleaning of castings by sand-blasting B24C)

29/00 Removing castings from moulds, not restricted to casting processes covered by a single main group;

29/001 . . . {Removing cores; Handling ingots (B22D 13/10, B22D 11/24, B22D 17/00) take precedence)}

29/002 . . . (by leaching, washing or dissolving)

29/003 . . . (by using heat)

29/005 . . . (by vibrating or hammering)

29/006 . . . (by abrasive, water or air blasting)

29/007 . . . (by using explosive shock waves)

29/008 . . . (in a liquid medium)

29/02 . . . Vibratory apparatus specially designed for shaking out flasks

29/04 . . . Handling or stripping castings or ingots (gippers in general, see the relevant subclasses, e.g. B66C)

29/06 . . . Strippers actuated by fluid pressure

29/08 . . . Strippers actuated mechanically

30/00 Cooling castings, not restricted to casting processes covered by a single main group (accessories for cooling cast stock in continuous casting of metals B22D 11/24; controlling or regulating processes or operations for cooling cast stock or mould in continuous casting of metals B22D 11/22; chill casting B22D 15/00)

31/00 Cutting-off surplus material, e.g. gates; {Cleaning and working on castings (B22D 17/2076 takes precedence)}

31/002 . . . (Cleaning, working on castings)

31/005 . . . (Sealing or impregnating porous castings)

31/007 . . . (Tumbling mills)

Other equipment for casting (arrangement of indicating or measuring devices B22D 2/00)

33/00 Equipment for handling moulds

33/005 . . . (Transporting flaskless moulds)

33/02 . . . Turning or transposing moulds

33/04 . . . Bringing together or separating moulds

33/06 . . . Burdening or relieving moulds

35/00 Equipment for conveying molten metal into beds or moulds (B22D 37/00 - B22D 41/00 take precedence; specially adapted to particular processes or machines, see the relevant groups)

35/02 . . . into beds

35/04 . . . into moulds, e.g. base plates, runners

35/045 . . . (Runner base plates for bottom casting ingots)

35/06 . . . Heating or cooling equipment

37/00 Controlling or regulating the pouring of molten metal from a casting melt-holding vessel (B22D 11/18 takes precedence) B22D 39/00, B22D 41/00 take precedence; specially adapted to particular processes or machines, see the relevant groups of this subclass)
Other equipment for casting

B22D

41/00 Casting melt-holding vessels, e.g. ladles, tundishes, cups or the like (B22D 39/00, B22D 43/00 take precedence)

41/001 devices for cleaning ladles (cleaning in general B08B)

41/003 [with impact pads]

41/005 with heating or cooling means

41/01 Heating means

41/015 with external heating, i.e. the heat source not being a part of the ladle

41/02 Linings

41/023 [Apparatus used for making or repairing linings (equipment used for making or repairing converter linings C21C 5/44)]

41/026 [Apparatus used for fracturing and removing of linings]

41/04 tiltable

41/05 Tea-pot spout ladles

41/06 Equipment for tilting

41/08 for bottom pouring (B22D 41/14, B22D 41/50 take precedence)

41/12 Travelling ladles or similar containers; Cars for ladles (casting cranes B66C)

41/13 Ladle turrets

41/14 Closures

41/16 stopper-rod type, i.e. a stopper-rod being positioned downwardly through the vessel and the metal therein, for selective registry with the pouring opening

41/18 Stopper-rods therefor

41/183 [with cooling means]

41/186 [with means for injecting a fluid into the melt]

41/20 Stopper-rod operating equipment

41/22 sliding-gate type, i.e. having a fixed plate and a movable plate in sliding contact with each other for selective registry of their openings

41/24 characterised by a rectilinearly movable plate (B22D 41/38 - B22D 41/42 take precedence)

41/26 characterised by a rotatively movable plate (B22D 41/38 - B22D 41/42 take precedence)

41/28 Plates therefor (B22D 41/38 - B22D 41/42 take precedence)

41/30 Manufacturing or repairing thereof

41/32 characterised by the materials used therefor

41/34 Supporting, fixing or centering means therefor

41/36 Treating the plates, e.g. lubricating, heating (lades, cups or the like with heating means B22D 41/01)

41/38 Means for operating the sliding gate

41/40 Means for pressing the plates together

41/42 Features relating to gas injection

41/44 Consumable closure means, i.e. closure means being used only once

41/46 Refractory plugging masses

41/465 [Unplugging a vessel discharge port]

41/48 Meltifiable closures

41/50 Pouring-nozzles

41/502 [Connection arrangements; Sealing means therefor]

41/505 [Rings, inserts or other means preventing external nozzle erosion by the slag]

41/507 [giving a rotating motion to the issuing molten metal]

41/52 Manufacturing or repairing thereof

41/54 characterised by the materials used therefor

41/56 Means for supporting, manipulating or changing a pouring-nozzle

41/58 with gas injecting means

41/60 with heating or cooling means

41/62 with stirring or vibrating means

43/00 Mechanical cleaning, e.g. skimming of molten metals

43/001 Retaining slag during pouring molten metal

43/002 by using floating means

43/004 by using filtering means (B22C 9/086 takes precedence)

43/005 Removing slag from a molten metal surface

43/007 by using scrapers

43/008 by suction

45/00 Equipment for casting, not otherwise provided for

45/005 Evacuation of fumes, dust or waste gases during manipulations in the foundry (during steel manufacture C21C 5/38; evacuation from furnaces F27D 17/001)

46/00 Controlling, supervising, not restricted to casting covered by a single main group, e.g. for safety reasons (controlling or regulating in general G05)

47/00 Casting plants

47/02 for both moulding and casting