

**CPC****COOPERATIVE PATENT CLASSIFICATION****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](#)).

**B22D 1/00**

**Treatment of fused masses in the ladle or the supply runners before casting** {(for continuous casting [B22D 11/10](#); metallurgical processing, e.g. refining of iron or other metal [C21](#), [C22](#), [C25C](#))}

## B22D 1/002

. { Treatment with gases ([C21C 7/072](#), [C22B 9/05](#) take precedence)}

## B22D 1/005

. . { Injection assemblies therefor (features relating to gas injection, provided on closures of the sliding gate type [B22D 41/42](#); provided on pouring nozzles [B22D 41/58](#); provided on closures of the stopper-rod type [B22D 41/186](#))}

## B22D 1/007

. { Treatment of the fused masses in the supply runners ([B22D 1/002](#), [B22D 1/005](#) take precedence)}

**B22D 2/00**

**Arrangement of indicating or measuring devices, e.g. for temperature or viscosity of the fused mass.**

## B22D 2/001

. { for the slag appearance in a molten metal stream }

## B22D 2/003

. { for the level of the molten metal ([B22D 11/181](#) and [B22D 11/201](#) take precedence; level indicators in general [G01F 23/00](#))}

## B22D 2/005

. { for the thickness of a frozen shell ([B22D 11/188](#) and [B22D 11/207](#) take precedence)}

## B22D 2/006

. { for the temperature of the molten metal (measuring temperature in general [G01K](#))}

## B22D 2/008

. { for the viscosity of the molten metal (measuring viscosity in general [G01N 11/00](#))}

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

**B22D 3/00**

**Pig or like casting** (equipment for conveying molten metal [B22D 35/00](#))

## B22D 3/02

. Moulding of beds

**B22D 5/00**

**Machines or plants for pig or like casting**

## B22D 5/005

. { Devices for stacking pigs; Pigforms to be stacked }

## B22D 5/02

. with rotary casting tables

B22D 5/04 . with endless casting conveyers

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

**B22D 7/00** **Casting ingots, { e.g. from ferrous metals }** (equipment for conveying molten metal [B22D 35/00](#)).

B22D 7/005 . { from non-ferrous metals }

B22D 7/02 . Casting compound ingots of two or more different metals in the molten state, i.e. integrally cast

B22D 7/04 . Casting hollow ingots

B22D 7/06 . Ingot moulds or their manufacture

B22D 7/062 .. { Stools for ingot moulds }

B22D 7/064 .. { Cooling the ingot moulds }

B22D 7/066 .. { Manufacturing, repairing or reinforcing ingot moulds }

B22D 7/068 ... { characterised by the materials used therefor }

B22D 7/08 .. Divided ingot moulds

B22D 7/10 .. Hot tops therefor { heating the top discard of ingots [B22D 27/06](#) } 06]

B22D 7/102 ... { from refractorial material only }

B22D 7/104 ... { from exothermic material only }

B22D 7/106 ... { Configuration of hot tops }

B22D 7/108 ... { Devices for making or fixing hot tops }

B22D 7/12 . Appurtenances, e.g. for sintering, for preventing splashing

**B22D 9/00** **Machines or plants for casting ingots**

B22D 9/003 . { for top casting }

B22D 9/006 . { for bottom casting }

**Guidance heading:** Particular casting processes; Machines or apparatus therefor

**B22D 11/00** **Continuous casting of metals, i.e. casting in indefinite lengths** (metal drawing, metal extruding [B21C](#))

B22D 11/001 . { of specific alloys }

B22D 11/002 .. { Stainless steels }

B22D 11/003 .. { Aluminium alloys }

B22D 11/004 .. { Copper alloys }

- B22D 11/005 . { of wire (casting on wire [B22D 19/14](#))}
- B22D 11/006 . { of tubes }
- B22D 11/007 . { 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 [B22D 7/02](#))}
- B22D 11/008 . { of clad ingots, i.e. the molten metal being cast against a continuous strip forming part of the cast product }
- B22D 11/009 . { of work of special cross-section, e.g. I-beams, U-profiles }
- B22D 11/01 . without moulds, e.g. on molten surfaces
- B22D 11/015 . . { using magnetic field for conformation, i.e. the metal is not in contact with a mould }
- B22D 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](#))
- B22D 11/0401 . . { Moulds provided with a feed head }
- B22D 11/0403 . . { Multiple moulds }
- B22D 11/0405 . . { Rotating moulds }
- B22D 11/0406 . . { Moulds with special profile }
- B22D 11/0408 . . { Moulds for casting thin slabs }
- B22D 11/041 . . for vertical casting ([B22D 11/043](#), [B22D 11/049](#) to [B22D 11/059](#) take precedence)
- B22D 11/043 . . Curved moulds ([B22D 11/049](#) to [B22D 11/059](#) take precedence)
- B22D 11/045 . . for horizontal casting ([B22D 11/049](#) to [B22D 11/059](#) take precedence)
- B22D 11/0455 . . . { Bidirectional horizontal casting }
- B22D 11/047 . . . Means for joining tundish to mould
- B22D 11/0475 . . . . { characterised by use of a break ring }
- B22D 11/049 . . for direct chill casting, e.g. electromagnetic casting
- B22D 11/05 . . into moulds having adjustable walls
- B22D 11/051 . . into moulds having oscillating walls
- B22D 11/053 . . Means for oscillating the moulds
- B22D 11/0535 . . . { in a horizontal plane }
- B22D 11/055 . . Cooling the moulds ({ [B22D 11/04](#) takes precedence })
- B22D 11/057 . . Manufacturing or calibrating the moulds
- B22D 11/059 . . Mould materials or platings
- B22D 11/06 . into moulds with travelling walls, e.g. with rolls, plates, belts, caterpillars
- B22D 11/0602 . . { formed by a casting wheel and belt, e.g. Properzi-process }
- B22D 11/0605 . . { formed by two belts, e.g. Hazelett-process }
- B22D 11/0608 . . { formed by caterpillars }

B22D 11/0611	..	{ formed by a single casting wheel, e.g. for casting amorphous metal strips or wires }
B22D 11/0614	...	{ the casting wheel being immersed in a molten metal bath, and drawing out upwardly the casting strip }
B22D 11/0617	...	{ the casting wheel having its axis vertical and a casting strip formed in a peripheral groove of the wheel }
B22D 11/062	...	{ the metal being cast on the inside surface of the casting wheel }
B22D 11/0622	..	{ formed by two casting wheels }
B22D 11/0625	...	{ the two casting wheels being immersed in a molten metal bath and drawing out upwardly the casting strip }
B22D 11/0628	..	{ formed by more than two casting wheels }
B22D 11/0631	..	{ formed by a travelling straight surface, e.g. through-like moulds, a belt }
B22D 11/0634	..	{ formed by a casting wheel and a co-operating shoe }
B22D 11/0637	..	{ Accessories therefor }
B22D 11/064	...	{ for supplying molten metal (supplying molten metal to open-ended moulds <a href="#">B22D 11/10</a> ) }
B22D 11/0642	....	{ Nozzles (nozzles used in open-ended moulds <a href="#">B22D 41/50</a> ) }
B22D 11/0645	....	{ Sealing means for the nozzle between the travelling surfaces }
B22D 11/0648	...	{ Casting surfaces }
B22D 11/0651	....	{ Casting wheels ( <a href="#">B22D 11/0682</a> takes precedence) }
B22D 11/0654	....	{ Casting belts ( <a href="#">B22D 11/0685</a> takes precedence) }
B22D 11/0657	....	{ Caterpillars ( <a href="#">B22D 11/0688</a> takes precedence) }
B22D 11/066	....	{ Side dams ( <a href="#">B22D 11/0691</a> takes precedence) }
B22D 11/0662	.....	{ having electromagnetic confining means }
B22D 11/0665	...	{ for treating the casting surfaces, e.g. calibrating, cleaning, dressing, preheating }
B22D 11/0668	....	{ for dressing, coating or lubricating }
B22D 11/0671	....	{ for heating or drying }
B22D 11/0674	....	{ for machining }
B22D 11/0677	...	{ for guiding, supporting or tensioning the casting belts }
B22D 11/068	...	{ for cooling the cast product during its passage through the mould surfaces (cooling open-ended moulds <a href="#">B22D 11/04</a> ; secondary cooling <a href="#">B22D 11/124</a> ) }
B22D 11/0682	....	{ by cooling the casting wheel }
B22D 11/0685	....	{ by cooling the casting belts ( <a href="#">B22D 11/0677</a> takes precedence) }
B22D 11/0688	....	{ by cooling the caterpillars }
B22D 11/0691	....	{ by cooling the side dams }
B22D 11/0694	...	{ for peeling-off or removing the cast product }
B22D 11/0697	...	{ for casting in a protected atmosphere }
B22D 11/07	.	Lubricating the moulds
B22D 11/08	.	Accessories for starting the casting procedure
B22D 11/081	..	{ Starter bars }

B22D 11/083	...	{ Starter bar head; Means for connecting or detaching starter bars and ingots }
B22D 11/085	..	{ Means for storing or introducing the starter bars in the moulds }
B22D 11/086	..	{ Means for connecting cast ingots of different sizes or compositions }
B22D 11/088	..	{ Means for sealing the starter bar head in the moulds }
B22D 11/10	.	Supplying or treating molten metal ( <a href="#">B22D 41/00</a> takes precedence)
B22D 11/103	..	Distributing the molten metal, e.g. using runners, floats, distributors
B22D 11/106	..	Shielding the molten jet ({ <a href="#">B22D 41/50</a> takes precedence })
B22D 11/108	..	Feeding additives, powders, or the like
B22D 11/11	..	Treating the molten metal
B22D 11/111	...	by using protecting powders
B22D 11/112	...	by accelerated cooling
B22D 11/113	...	by vacuum treating
B22D 11/114	...	by using agitating or vibrating means ( <a href="#">B22D 11/117</a> takes precedence)
B22D 11/115	....	by using magnetic fields
B22D 11/116	...	Refining the metal
B22D 11/117	....	by treating with gases ( <a href="#">B22D 11/118</a> , <a href="#">B22D 11/119</a> take precedence)
B22D 11/118	....	by circulating the metal under, over or around weirs ( <a href="#">B22D 11/119</a> takes precedence)
B22D 11/119	....	by filtering
B22D 11/12	.	Accessories for subsequent treating or working cast stock <u>in situ</u> ( <a href="#">rolling immediately subsequent to continuous casting</a> <a href="#">B21B 1/46</a> , <a href="#">B21B 13/22</a> )
B22D 11/1206	..	{ for plastic shaping of strands ( <a href="#">rolling mills</a> <a href="#">B21B 1/46</a> ) }
B22D 11/1213	..	{ for heating or insulating strands }
B22D 11/122	..	{ using magnetic fields }
B22D 11/1226	..	{ for straightening strands }
B22D 11/1233	..	{ for marking strands }
B22D 11/124	..	for cooling
B22D 11/1241	...	{ by transporting the cast stock through a liquid medium bath or a fluidized bed }
B22D 11/1243	...	{ by using cooling grids or cooling plates }
B22D 11/1245	...	{ using specific cooling agents }
B22D 11/1246	...	{ Nozzles; Spray heads }
B22D 11/1248	...	{ Means for removing cooling agent from the surface of the cast stock }
B22D 11/126	..	for cutting
B22D 11/1265	...	{ having auxiliary devices for deburring }
B22D 11/128	..	for removing
B22D 11/1281	...	{ Vertical removing }
B22D 11/1282	...	{ Vertical casting and curving the cast stock to the horizontal }
B22D 11/1284	...	{ Horizontal removing }
B22D 11/1285	...	{ Segment changing devices for supporting or guiding frames }

B22D 11/1287	...	{ Rolls; Lubricating, cooling or heating rolls while in use }
B22D 11/1288	...	{ Walking bar members }
B22D 11/14	.	Plants for continuous casting
B22D 11/141	..	{ for vertical casting }
B22D 11/142	..	{ for curved casting }
B22D 11/143	..	{ for horizontal casting }
B22D 11/144	..	{ with a rotating mould }
B22D 11/145	..	{ for upward casting }
B22D 11/146	..	{ for inclined casting }
B22D 11/147	..	{ Multi-strand plants }
B22D 11/148	..	{ Safety arrangements }
B22D 11/16	.	Controlling or regulating processes or operations
B22D 11/161	..	{ for automatic starting the casting process }
B22D 11/163	..	{ for cutting cast stock }
B22D 11/165	..	{ for the supply of casting powder }
B22D 11/166	..	{ for mould oscillation }
B22D 11/168	..	{ for adjusting the mould size or mould taper }
B22D 11/18	..	for pouring ( <a href="#">B22D 11/20</a> takes precedence)
B22D 11/181	...	{ responsive to molten metal level or slag level }
B22D 11/182	....	{ by measuring temperature }
B22D 11/183	....	{ by measuring molten metal weight }
B22D 11/185	....	{ by using optical means }
B22D 11/186	....	{ by using electric, magnetic, sonic or ultrasonic means }
B22D 11/187	....	{ by using X-rays or nuclear radiation }
B22D 11/188	...	{ responsive to thickness of solidified shell }
B22D 11/20	..	for removing cast stock
B22D 11/201	...	{ responsive to molten metal level or slag level }
B22D 11/202	....	{ by measuring temperature }
B22D 11/203	....	{ by measuring molten metal weight }
B22D 11/204	....	{ by using optical means }
B22D 11/205	....	{ by using electric, magnetic, sonic or ultrasonic means }
B22D 11/206	....	{ by using X-rays or nuclear radiation }
B22D 11/207	...	{ responsive to thickness of solidified shell }
B22D 11/208	...	{ for aligning the guide rolls }
B22D 11/22	..	for cooling cast stock or mould
B22D 11/225	...	{ for secondary cooling }
<b>B22D 13/00</b>		<b>Centrifugal casting; Casting by using centrifugal force</b>

- B22D 13/02
  - . of elongated solid or hollow bodies, e.g. pipes, in moulds rotating around their longitudinal axis
- B22D 13/023
  - .. { the longitudinal axis being horizontal }
- B22D 13/026
  - .. { the longitudinal axis being vertical }
- B22D 13/04
  - . of shallow solid or hollow bodies, e.g. wheels or rings, in moulds rotating around their axis of symmetry
- B22D 13/06
  - . of solid or hollow bodies in moulds rotating around an axis arranged outside the mould
- B22D 13/063
  - .. { for dentistry or jewellery }
- B22D 13/066
  - .. { several moulds being disposed in a circle }
- B22D 13/08
  - . in which a stationary mould is fed from a rotating mass of liquid metal
- B22D 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](#))
- B22D 13/101
  - .. { Moulds }
- B22D 13/102
  - ... { Linings for moulds ([making or lining moulds B22C](#))}
- B22D 13/104
  - ... { Cores }
- B22D 13/105
  - ... { Cooling for moulds or cores }
- B22D 13/107
  - .. { Means for feeding molten metal }
- B22D 13/108
  - .. { Removing of casting }
- B22D 13/12
  - . Controlling, supervising, specially adapted to centrifugal casting, e.g. for safety reasons ([controlling or regulating in general G05](#))
- B22D 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**
- B22D 15/005
  - . { of rolls, wheels or the like ([B22D 19/16 takes precedence](#))}
- B22D 15/02
  - . of cylinders, pistons, bearing shells or like thin-walled objects
- B22D 15/04
  - . Machines or apparatus for chill casting ({ [B22D 15/005](#) }, [B22D 15/02 take precedence](#))
- B22D 17/00**

**Pressure die casting or injection die casting, i.e. casting in which the metal is forced into a mould under high pressure**
- B22D 17/002
  - . { using movable moulds (for plastics [B29C 45/04](#))}
- B22D 17/005
  - . { using two or more fixed moulds (for plastics [B29C 45/12](#))}
- B22D 17/007
  - . { Semi-solid pressure die casting }

- B22D 17/02 . Hot chamber machines, i.e. with heated press chamber in which metal is melted
- B22D 17/04 .. Plunger machines
- B22D 17/06 .. air injection machines
- B22D 17/08 . Cold chamber machines, i.e. with unheated press chamber into which molten metal is ladled
- B22D 17/10 .. with horizontal press motion
- B22D 17/12 .. with vertical press motion
- B22D 17/14 . Machines with evacuated die cavity
- B22D 17/145 .. { Venting means therefor (for permanent moulds [B22C 9/067](#))}
- B22D 17/16 . specially adapted for casting slide fasteners or elements therefor
- B22D 17/18 . Machines built up from units providing for different combinations
- B22D 17/20 . Accessories: Details
- B22D 17/2007 .. { Methods or apparatus for cleaning or lubricating moulds }
- B22D 17/2015 .. { Means for forcing the molten metal into the die (for plastics [B29C 45/46](#))}
- B22D 17/2023 ... { Nozzles or shot sleeves }
- B22D 17/203 ... { Injection pistons ([B22D 17/2053](#) takes precedence; for plastics [B29C 45/53](#))}
- B22D 17/2038 ... { Heating, cooling or lubricating the injection unit (for plastics [B29C 45/74](#), [B29C 45/83](#))}
- B22D 17/2046 ... { with provisions for damping the pressure peak }
- B22D 17/2053 ... { using two or more cooperating injection pistons }
- B22D 17/2061 ... { using screws }
- B22D 17/2069 ... { Exerting after-pressure on the moulding material }
- B22D 17/2076 .. { Cutting-off equipment for sprues or ingates (for plastics [B29C 45/38](#))}
- B22D 17/2084 .. { Manipulating or transferring devices for evacuating cast pieces }
- B22D 17/2092 .. { Safety devices (for plastics [B29C 45/84](#))}
- B22D 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
- B22D 17/2209 ... { Selection of die materials (for permanent moulds [B22C 9/061](#))}
- B22D 17/2218 ... { Cooling or heating equipment for dies (for permanent moulds [B22C 9/065](#); for plastics [B29C 45/73](#))}
- B22D 17/2227 ... { Die seals (for plastics [B29C 45/2608](#))}
- B22D 17/2236 ... { Equipment for loosening or ejecting castings from dies (for plastics [B29C 45/40](#))}
- B22D 17/2245 ... { having walls provided with means for marking or patterning }
- B22D 17/2254 ... { having screw-threaded die walls }
- B22D 17/2263 ... { having tubular die cavities }
- B22D 17/2272 ... { Sprue channels }



- B22D 17/2281 . . . . { closure devices therefor }
- B22D 17/229 . . . { with exchangeable die part ([B22D 17/2245](#) takes precedence)}
- B22D 17/24 . . . Accessories for locating and holding cores or inserts
- B22D 17/26 . . Mechanisms or devices for locking or opening dies
- B22D 17/263 . . . { mechanically }
- B22D 17/266 . . . { hydraulically }
- B22D 17/28 . . Melting pots
- B22D 17/30 . . Accessories for supplying molten metal, e.g. in rations ([supplying molten metal in ration in general B22D 39/00](#))
- B22D 17/32 . . Controlling equipment
  
- B22D 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](#))
  
- B22D 18/02 . Pressure casting making use of mechanical pressure devices, e.g. cast-forging ([B22D 18/04](#) takes precedence)
- B22D 18/04 . Low pressure casting, i.e. making use of pressures up to a few bars to fill the mould
- B22D 18/06 . Vacuum casting, i.e. making use of vacuum to fill the mould
- B22D 18/08 . Controlling, supervising, e.g. for safety reasons ([controlling or regulating in general G05](#))
  
- B22D 19/00** **Casting in, on, or around objects which form part of the product** ([B22D 23/04](#) takes precedence; alumino-thermic welding [B23K 23/00](#); coating by casting molten material on the substrate [C23C 6/00](#))
  
- B22D 19/0009 . { Cylinders, pistons }
- B22D 19/0018 . . { cylinders with fins }
- B22D 19/0027 . . { pistons }
  
- B22D 19/0036 . { gears }
- B22D 19/0045 . { household utensils }
- B22D 19/0054 . { rotors, stators for electrical motors }
- B22D 19/0063 . { finned exchangers ([cylinders B22D 19/0018](#))}
- B22D 19/0072 . { for making objects with integrated channels }
- B22D 19/0081 . { pretreatment of the insert, e.g. for enhancing the bonding between insert and surrounding cast metal }
- B22D 19/009 . { for casting objects the members of which can be separated afterwards }

- B22D 19/02 . for making reinforced articles ([B22D 19/14](#) takes precedence)
- B22D 19/04 . for joining parts
- B22D 19/045 . . { for joining tubes }
- B22D 19/06 . for manufacturing or repairing tools
- B22D 19/08 . for building-up linings or coverings, e.g. of anti-frictional metal
- B22D 19/085 . . { of anti-frictional metal }
- B22D 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)
- B22D 19/12 . for making objects, e.g. hinges, with parts which are movable relatively to one another
- B22D 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](#))
- B22D 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](#))
  
- B22D 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](#))}
- B22D 21/002 . { Castings of light metals }
- B22D 21/005 . . { with high melting point, e.g. Be 1280 degrees C, Ti 1725 degrees C }
- B22D 21/007 . . { with low melting point, e.g. Al 659 degrees C, Mg 650 degrees C }
- B22D 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](#))
- B22D 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 }
- B22D 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 }
- B22D 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 }
- B22D 21/04 . . Casting aluminium or magnesium { no material; see [B22D 21/007](#) }
- B22D 21/06 . Casting non-ferrous metals with a high melting point, e.g. metallic carbides ([B22D 21/02](#) takes precedence)
  
- B22D 23/00** **Casting processes not provided for in groups [B22D 1/00](#) to [B22D 21/00](#)** (making metallic powder by casting [B22F 9/08](#); alumino-thermic welding [B23K 23/00](#); remelting metals [C22B 9/16](#))

- B22D 23/003 . { Moulding by spraying metal on a surface }
- B22D 23/006 . { Casting by filling the mould through rotation of the mould together with a molten metal holding recipient, about a common axis }
- B22D 23/02 . Top casting
- B22D 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](#))
- B22D 23/06 . Melting-down metal, e.g. metal particles, in the mould
- B22D 23/10 .. Electroslag casting {(electroslag remelting [C22B 9/18](#))}
  
- B22D 25/00** **Special casting characterised by the nature of the product** ([B22D 15/02](#), [B22D 17/16](#), [B22D 19/00](#) take precedence; casting stereotype plates [B41D 3/00](#))
- B22D 25/005 . { Casting metal foams }
- B22D 25/02 . by its peculiarity of shape; of works of art {(cylinders, pistons [B22D 15/02](#))}
- B22D 25/023 .. { Casting chains or the like }
- B22D 25/026 .. { Casting jewelry articles ([B22D 13/063](#) takes precedence)}
- B22D 25/04 .. Casting metal electric battery plates or the like (manufacture thereof by multi-step processes [H01M 4/82](#))
- B22D 25/06 . by its physical properties ([B22D 27/00](#) takes precedence)
- B22D 25/08 .. by uniform hardness ([B22D 15/00](#) takes precedence)
  
- B22D 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)}
- B22D 27/003 . { by using inert gases }
- B22D 27/006 . { by using reactive gases }
- B22D 27/02 . Use of electric or magnetic effects {(for continuous casting [B22D 11/015](#), [B22D 11/11](#))}
- B22D 27/04 . Influencing the temperature of the metal, e.g. by heating or cooling the mould
- B22D 27/045 .. { Directionally solidified castings }
- B22D 27/06 .. Heating the top discard of ingots (hot tops for ingot moulds [B22D 7/10](#))
- B22D 27/08 . Shaking, vibrating, or turning of moulds
- B22D 27/09 . by using pressure
- B22D 27/11 .. making use of mechanical pressing devices

- B22D 27/13 . . making use of gas pressure
- B22D 27/15 . by using vacuum
- B22D 27/18 . Measures for using chemical processes for influencing the surface composition of castings, e.g. for increasing resistance to acid attack
- B22D 27/20 . Measures not previously mentioned for influencing the grain structure or texture; Selection of compositions therefor

**Guidance heading:** Final measures after casting (cleaning of castings by sand-blasting [B24C](#))

**B22D 29/00** **Removing castings from moulds, not restricted to casting processes covered by a single main group; Removing cores; Handling ingots** {([B22D 13/10](#), [B22D 11/124](#), [B22D 17/00](#) take precedence)}

- B22D 29/001 . { Removing cores }
- B22D 29/002 . . { by leaching, washing or dissolving }
- B22D 29/003 . . { using heat }
- B22D 29/005 . . { by vibrating or hammering }
- B22D 29/006 . . { by abrasive, water or air blasting }
- B22D 29/007 . . { by using explosive shock waves }
- B22D 29/008 . . . { in a liquid medium }
- B22D 29/02 . Vibratory apparatus specially designed for shaking out flasks
- B22D 29/04 . Handling or stripping castings or ingots (grippers in general, see the relevant subclasses, e.g. [B66C](#))
- B22D 29/06 . . Strippers actuated by fluid pressure
- B22D 29/08 . . Strippers actuated mechanically

**B22D 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 11/124](#); 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](#))

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

- B22D 31/002 . { Cleaning, working on castings }
- B22D 31/005 . . { Sealing or impregnating porous castings }
- B22D 31/007 . . { Tumbling mills }

**Guidance heading:** Other equipment for casting (arrangement of indicating or measuring devices [B22D 2/00](#))

**B22D 33/00**      **Equipment for handling moulds**

B22D 33/005      .    { [Transporting flaskless moulds](#) }

B22D 33/02      .    Turning or transposing moulds

B22D 33/04      .    Bringing together or separating moulds

B22D 33/06      .    Burdening or relieving moulds

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

B22D 35/02      .    into beds

B22D 35/04      .    into moulds, e.g. base plates, runners

B22D 35/045      . .    { [Runner base plates for bottom casting ingots](#) }

B22D 35/06      .    Heating or cooling equipment

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

B22D 37/005      .    { [Shielding the molten metal stream](#) ([B22D 11/106](#), [B22D 41/50](#) take precedence) }

**B22D 39/00**      **Equipment for supplying molten metal in rations** (specially adapted to particular processes or machines, see the relevant groups of this subclass)

B22D 39/003      .    { [using electromagnetic field](#) }

B22D 39/006      . .    { [Electromagnetic conveyers](#) }

B22D 39/02      .    having means for controlling the amount of molten metal by volume

B22D 39/023      . .    { [using a displacement member](#) }

B22D 39/026      . .    { [using a ladler](#) }

B22D 39/04      .    having means for controlling the amount of molten metal by weight

B22D 39/06      .    having means for controlling the amount of molten metal by controlling the pressure above the molten metal

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

- B22D 41/001 . { devices for cleaning ladles (cleaning in general [B08B](#))}
- B22D 41/003 . { with impact pads }
- B22D 41/005 . with heating or cooling means
- B22D 41/01 . . Heating means
- B22D 41/015 . . . with external heating, i.e. the heat source not being a part of the ladle
- B22D 41/02 . Linings
- B22D 41/023 . . { Apparatus used for making or repairing linings (equipment used for making or repairing converter linings [C21C 5/441](#))}
- B22D 41/026 . . { Apparatus used for fracturing and removing of linings }
- B22D 41/04 . tiltable
- B22D 41/05 . . Tea-pot spout ladles
- B22D 41/06 . Equipment for tilting
- B22D 41/08 . for bottom pouring ([B22D 41/14](#), [B22D 41/50](#) take precedence)
- B22D 41/12 . Travelling ladles or similar containers; Cars for ladles (casting cranes [B66C](#))
- B22D 41/13 . . Ladle turrets
- B22D 41/14 . Closures
- B22D 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
- B22D 41/18 . . . Stopper-rods therefor
- B22D 41/183 . . . . { with cooling means }
- B22D 41/186 . . . . { with means for injecting a fluid into the melt }
- B22D 41/20 . . . Stopper-rod operating equipment
- B22D 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
- B22D 41/24 . . . characterised by a rectilinearly movable plate ([B22D 41/38](#) to [B22D 41/42](#) take precedence)
- B22D 41/26 . . . characterised by a rotatively movable plate ([B22D 41/38](#) to [B22D 41/42](#) take precedence)
- B22D 41/28 . . . Plates therefor ([B22D 41/38](#) to [B22D 41/42](#) take precedence)
- B22D 41/30 . . . . Manufacturing or repairing thereof
- B22D 41/32 . . . . . characterised by the materials used therefor
- B22D 41/34 . . . . Supporting, fixing or centering means therefor
- B22D 41/36 . . . . Treating the plates, e.g. lubricating, heating (ladles, cups or the like with heating means [B22D 41/01](#))
- B22D 41/38 . . . Means for operating the sliding gate
- B22D 41/40 . . . Means for pressing the plates together

B22D 41/42	...	Features relating to gas injection
B22D 41/44	..	Consumable closure means, i.e. closure means being used only once
B22D 41/46	...	Refractory plugging masses
B22D 41/465	....	{ Unplugging a vessel discharge port }
B22D 41/48	...	Meltable closures
B22D 41/50	.	Pouring-nozzles
B22D 41/502	..	{ Connection arrangements; Sealing means therefor }
B22D 41/505	..	{ Rings, inserts or other means preventing external nozzle erosion by the slag }
B22D 41/507	..	{ giving a rotating motion to the issuing molten metal }
B22D 41/52	..	Manufacturing or repairing thereof
B22D 41/54	...	characterised by the materials used therefor
B22D 41/56	..	Means for supporting, manipulating or changing a pouring-nozzle
B22D 41/58	..	with gas injecting means
B22D 41/60	..	with heating or cooling means
B22D 41/62	..	with stirring or vibrating means
<b>B22D 43/00</b>		<b>Mechanical cleaning, e.g. skimming of molten metals</b>
B22D 43/001	.	{ Retaining slag during pouring molten metal }
B22D 43/002	..	{ by using floating means }
B22D 43/004	..	{ by using filtering means ( <a href="#">B22C 9/086</a> takes precedence)}
B22D 43/005	.	{ Removing slag from a molten metal surface }
B22D 43/007	..	{ by using scrapers }
B22D 43/008	..	{ by suction }
<b>B22D 45/00</b>		<b>Equipment for casting, not otherwise provided for</b>
B22D 45/005	.	{ Evacuation of fumes, dust or waste gases during manipulations in the foundry (during steel manufacture <a href="#">C21C 5/38</a> ; evacuation from furnaces <a href="#">F27D 17/001</a> ) }
<b>B22D 46/00</b>		<b>Controlling, supervising, not restricted to casting covered by a single main group, e.g. for safety reasons</b> ( <a href="#">controlling or regulating in general G05</a> )
<b>B22D 47/00</b>		<b>Casting plants</b>
B22D 47/02	.	for both moulding and casting