CPC  COOPERATIVE PATENT CLASSIFICATION

B  PERFORMING OPERATIONS; TRANSPORTING
(NOTES omitted)

SHAPING

B21  MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL
(NOTES omitted)

B21C  MANUFACTURE OF METAL SHEETS, WIRE, RODS, TUBES OR PROFILES, OTHERWISE THAN BY ROLLING; AUXILIARY OPERATIONS USED IN CONNECTION WITH METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL

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.

Metal-drawing (continuous casting B22D 11/00; pressure welding by means of a rolling mill B23K 20/04)

1/00  Manufacture of metal sheets, metal wire, metal rods, metal tubes by drawing

1/003  . [Drawing materials of special alloys so far as the composition of the alloy requires or permits special drawing methods or sequences]

1/006  . [using vibratory energy]

1/02  . Drawing metal wire or like flexible metallic material by drawing machines or apparatus in which the drawing action is effected by drums

1/04  . . with two or more dies operating in series

1/06  . . in which the material slips on the drums

1/08  . . in which the material does not slip on the drums

1/10  . . . . . with accumulation of material between consecutively-arranged dies

1/12  . . Regulating or controlling speed of drawing drums, e.g. to influence tension; Drives; Stop or relief mechanisms (couplings for drums B21C 1/14; design or construction of electrical equipment, see the relevant classes)

1/14  . . Drums, e.g. capstans (capstans or winches in general B66D); Connection of grippers thereto; Grippers specially adapted for drawing machines or apparatus of the drum type; Couplings specially adapted for these drums

1/16  . . Metal drawing by machines or apparatus in which the drawing action is effected by other means than drums, e.g. by a longitudinally-moved carriage pulling or pushing the work or stock for making metal sheets, bars, or tubes

1/18  . . from stock of limited length (B21C 1/22 takes precedence)

1/20  . . from stock of essentially unlimited length (B21C 1/22 takes precedence)

1/22  . . specially adapted for making tubular articles (bending sheet metal into tubular form by drawing B21D 5/10)

1/24  . . . . by means of mandrels (mandrels B21C 3/16)

1/26  . . . . Push-bench drawing

1/27  . . Carriages; Drives

1/28  . . Carriages; Connections of grippers thereto; Grippers (for drawing machines of the drum type B21C 1/14)

1/30  . . Drives, e.g. carriage-traversing mechanisms; Driving elements, e.g. drawing chains; Controlling the drive (endlessly revolving chain systems for metal coiling: B21C 47/3458)

1/305  . . . . [Linear motor pulling devices]

1/32  . . Feeding or discharging the material or mandrels

1/34  . . Guiding or supporting the material or mandrels

3/00  Profiling tools for metal drawing; Combinations of dies and mandrels

3/02  . . Dies; Selection of material therefor; Cleaning thereof

3/025  . . . [comprising diamond parts]

3/04  . . with non-adjustable section (B21C 3/08 takes precedence)

3/06  . . with adjustable section (B21C 3/08 takes precedence)

3/08  . . with section defined by rollers, balls, or the like

3/10  . . with hydraulic forces acting immediately on work

3/12  . . Die holders; Rotating dies

3/14  . . Die holders combined with devices for guiding the drawing material or combined with devices for cooling heating, or lubricating

3/16  . . Mandrels (separating mandrels from work B21C 45/00); Mounting or adjusting same

3/18  . . Making tools by operations not covered by a single other subclass; Repairing

5/00  Pointing; Push-pointing

5/003  . . [of hollow material, e.g. tube]

5/006  . . [of solid material, e.g. wire or profiles]
Metal extruding (continuous casting B22D 11/00)

23/00 Extruding metal; Impact extrusion

23/001 . [to improve the material properties, e.g. lateral extrusion]

23/002 . [Extruding materials of special alloys so far as the composition of the alloy requires or permits special extruding methods of sequences]

23/004 . [using vibratory energy]

23/005 . [Continuous extrusion starting from solid state material (B21C 23/008 takes precedence; heat treatment or combinations thereof with mechanical treatments, see appropriate classes)]

23/007 . [Hydrostatic extrusion]

23/008 . [Continuous extrusion]

23/01 starting from material of particular form or shape, e.g. mechanically pre-treated (B21C 23/22 takes precedence; heat treatment or combinations thereof with mechanical treatments, see appropriate classes)

23/02 . Making uncoated products

23/03 . by both direct and backward extrusion

23/035 . [Making products of generally elongated shape]

23/04 . by direct extrusion

23/06 . Making sheets

23/08 . Making wire, bars, tubes

23/085 . [Making tubes (B21C 23/10 take precedence)]

23/10 . Making finned tubes

23/12 . Extruding bent tubes or rods

23/14 . Making other products

23/142 . [Making profiles]

23/145 . . . . [Interlocking profiles]

23/147 . [Making drill blanks (making twist-drills B23P 15/32)]

23/16 . Making turbo blades or propellers

23/18 . by impact extrusion

23/183 . [by forward extrusion]

23/186 . [by backward extrusion]

23/20 . by backward extrusion

23/205 . [Making products of generally elongated shape]

23/21 . Presses specially adapted for extruding metal (extrusion presses in general B30B 11/22)

23/211 . [Press driving devices]

23/212 . [Details (B21C 23/217, B21C 23/218 take precedence)]

23/214 . [Devices for changing die or container]

23/215 . [Devices for positioning or centering press components, e.g. die or container]

23/217 . [Tube extrusion presses (B21C 23/218 takes precedence)]

23/218 . [Indirect extrusion presses]

23/22 . Making metal-coated products; Making products from two or more metals

23/24 . . . Covering indefinite lengths of metal or non-metal material with a metal coating

23/26 . . . Applying metal coats to cables, e.g. to insulated electric cables

23/28 . . . . on intermittently-operating extrusion presses

23/30 . . . . on continuously-operating extrusion presses

23/32 . . . Lubrication of metal being extruded or of dies, or the like, e.g. physical state of lubricant, location where lubricant is applied (chemical composition, see appropriate classes)

23/40 . Making metal-coated products of different materials:

25/00 Profiling tools for metal extruding

25/02 . Dies

25/025 . [Selection of materials therefor]

25/04 . Mandrels

25/06 . Press heads, dies, or mandrels for coating work

25/08 . Dies or mandrels with section variable during extruding, e.g. for making tapered work; Controlling variation

25/10 . Making tools by operations not covered by a single other subclass

26/00 Rams or plungers; Discs therefor

27/00 Containers for metal to be extruded (B21C 29/02 takes precedence)

27/02 . For making coated work

27/04 . Venting metal-container chamber

29/00 Cooling or heating work or parts of the extrusion press; (Gas treatment of work)

29/003 . [Cooling or heating of work]

29/006 . [Gas treatment of work, e.g. to prevent oxidation or to create surface effects]

29/02 . [Cooling or heating] of containers for metal to be extruded

29/04 . [Cooling or heating] of press heads, dies or mandrels

31/00 Control devices, e.g. for regulating the pressing speed or temperature of metal (B21C 25/08 takes precedence); Measuring devices, e.g. for temperature of metal, combined with or specially adapted for use in connection with extrusion presses (measuring devices of more general interest within subclass B21C; see group B21C 51/00)

33/00 Feeding extrusion presses with metal to be extruded [:Loading the dummy block]

33/002 . [Encapsulated billet (manufacturing wires or fine wires B21C 37/045, B21C 37/047)]

33/004 . [Composite billet]

33/006 . [Consecutive billets, e.g. billet profiles allowing air expulsion or bonding of billets]

33/008 . [Scalping billets, e.g. for removing oxide layers prior or during extrusion]

33/02 . the metal being in liquid form

35/00 Removing work or waste from extruding presses; Drawing-off extruded work (in connection with the extruding of bent tubes or rods B21C 23/12)

35/02 . Removing or drawing-off work ([linear motor pulling devices B21C 1/305])
Metal extruding
47/24 . Transferring coils to or from winding apparatus or to or from operative position therein; Preventing uncoiling during transfer
47/242 . [Devices for swinging the coil from horizontal to vertical, or vice versa]
47/245 . [Devices for the replacement of full reels by empty reels or vice versa, without considerable loss of time]
47/247 . [Joining wire or band ends]
47/26 . Special arrangements with regard to simultaneous or subsequent treatment of the material
47/262 . [Treatment of a wire, while in the form of overlapping non-concentric rings]
47/265 . (“helicofil” systems]
47/267 . [Scrap treatment]
47/28 . Drums or other coil-holders (gripping means

B21C 47/32)
47/30 . expansible or contractible
47/32 . Tongs or gripping means specially adapted for reeling operations
47/323 . [Slits or pinces on the cylindrical wall of a reel or bobbin, adapted to grip the end of the material being wound]
47/326 . [Devices for pressing the end of the material being wound against the cylindrical wall of the reel or bobbin]
47/34 . Feeding or guiding devices not specially adapted to a particular type of apparatus
47/3408 . [for monitoring the lateral position of the material]
47/3416 . [with lateral edge contact]
47/3425 . [without lateral edge contact]
47/3433 . [for guiding the leading end of the material, e.g. from or to a coiler]
47/3441 . [Diverting the leading end, e.g. from main flow to a coiling device]
47/345 . [for monitoring the tension or advance of the material]
47/3458 . [Endlessly revolving chain systems (metal drawing B21C 1/30)]
47/3466 . [by using specific means]
47/3475 . [Fluid pressure or vacuum]
47/3483 . [Magnetic field]
47/3491 . [Brushes]

49/00 . Devices for temporarily accumulating material
51/00 . Measuring, gauging, indicating, counting, or marking devices specially adapted for use in the production or manipulation of material in accordance with subclasses B21B - B21F
51/005 . [Marking devices]

99/00 . Subject matter not provided for in other groups of this subclass