

SECTION B — PERFORMING OPERATIONS; TRANSPORTING

B21 MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL

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

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Metal drawing

	1/20	• • from stock of essentially unlimited length (B21C 1/22 takes precedence)
1/00 Manufacture of metal sheets, wire, rods, tubes or like semi-manufactured products by drawing	1/22	• • specially adapted for making tubular articles (bending sheet metal into tubular form by drawing B21D 5/10)
1/02 • Drawing metal wire or like flexible metallic material by drawing machines or apparatus in which the drawing action is effected by drums	1/24	• • • by means of mandrels (mandrels B21C 3/16)
1/04 • • with two or more dies operating in series	1/26	• • • • Push-bench drawing
1/06 • • • in which the material slips on the drums	1/27	• • Carriages; Drives
1/08 • • • in which the material does not slip on the drums	1/28	• • • Carriages; Connections of grippers thereto; Grippers (for drawing machines of the drum type B21C 1/14)
1/10 • • • • with accumulation of material between consecutively-arranged dies	1/30	• • • Drives, e.g. carriage-traversing mechanisms; Driving elements, e.g. drawing chains; Controlling the drive
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, <u>see</u> the relevant classes)	1/32	• • Feeding or discharging the material or mandrels
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	1/34	• • Guiding or supporting the material or mandrels
1/16 • Metal drawing by machines or apparatus in which the drawing action is effected by means other than drums, e.g. by a longitudinally-moved carriage pulling or pushing the work or stock for making metal sheets, rods or tubes	3/00 Profiling tools for metal drawing; Combinations of dies and mandrels for metal drawing	
1/18 • • from stock of limited length (B21C 1/22 takes precedence)	3/02	• Dies; Selection of material therefor; Cleaning thereof
	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

B21C

- 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 or push-pointing drawn work or drawing material**
- 9/00 **Cooling, heating or lubricating drawing material** (B21C 3/14 takes precedence)
- 9/02 • Selection of compositions therefor

19/00 Devices for straightening wire or like work combined with or specially adapted for use in connection with drawing or winding machines or apparatus

Metal extruding

23/00 Extruding metal; Impact 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
- 23/04 • • by direct extrusion
- 23/06 • • • Making sheets
- 23/08 • • • Making wire, rods or tubes
- 23/10 • • • • Making finned tubes
- 23/12 • • • • Extruding bent tubes or rods
- 23/14 • • • Making other products
- 23/16 • • • • Making turbo blades or propellers
- 23/18 • • by impact extrusion [2]
- 23/20 • • by backward extrusion
- 23/21 • Presses specially adapted for extruding metal (extrusion presses in general B30B 11/22)
- 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)

25/00 Profiling tools for metal extruding

- 25/02 • Dies
- 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 for metal extruding; Discs therefor [2]

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 extruded work or parts of the extrusion press

- 29/02 • of containers for metal to be extruded
- 29/04 • of press heads, dies, or mandrels

31/00 Control devices for metal extruding, 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

- 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); Cleaning dies, ducts, containers, or mandrels for metal extruding [2]

- 35/02 • Removing or drawing-off work
- 35/03 • • Straightening the work (metal straightening in general B21D)
- 35/04 • Cutting-off or removing waste
- 35/06 • Cleaning dies, ducts, containers or mandrels [2]

37/00 Manufacture of metal sheets, rods, wire, tubes, profiles or like semi-manufactured products, not otherwise provided for (by rolling B21B; by working or processing semi-finished sheet metal, profiles, tubes, or wire B21D, B21F; by casting B22; by material-removing machine tools B23; by welding, e.g. cladding or plating, B23K; by grinding or polishing B24; by electroforming C25D 1/00); Manufacture of tubes of special shape [2]

- 37/02 • of sheets
- 37/04 • of rods or wire
- 37/06 • of tubes or metal hoses; Combined procedures for making tubes, e.g. for making multi-wall tubes (bending sheets for making tubes B21D 5/00; seaming by folding B21D 39/02)
- 37/08 • • Making tubes with welded or soldered seams (involving only a soldering or welding operation B23K)
- 37/083 • • • Supply, or operations combined with supply, of strip material
- 37/087 • • • using rods or strips of soldering material
- 37/09 • • • of coated strip material
- 37/10 • • Making tubes with riveted seams
- 37/12 • • Making tubes or metal hoses with helically arranged seams
- 37/14 • • Making tubes from doubled flat material
- 37/15 • • Making tubes of special shape; Making the fittings
- 37/16 • • • Making tubes with varying diameter in longitudinal direction
- 37/18 • • • • conical tubes
- 37/20 • • • Making helical or similar guides in or on tubes without removing material, e.g. by drawing same over mandrels, by pushing same through dies

- 37/22 • • • Making finned or ribbed tubes by fixing strip or like material to tubes (making heat exchangers B21D 53/02)
- 37/24 • • • • annularly-ribbed tubes
- 37/26 • • • • helically-ribbed tubes
- 37/28 • • • Making tube fittings for connecting pipes, e.g. U-pieces
- 37/29 • • • • Making branched pieces, e.g. T-pieces
- 37/30 • • Finishing tubes, e.g. sizing, burnishing
- 43/00 Devices for cleaning metal products combined with or specially adapted for use with machines or apparatus provided for in this subclass**
- 43/02 • combined with or specially adapted for use in connection with drawing or winding machines or apparatus
- 43/04 • • Devices for de-scaling wire or like flexible work
- Auxiliary operations used in connection with metal working without essentially removing material**
- 45/00 Separating mandrels from work or vice versa**
- 47/00 Winding-up, coiling or winding-off metal wire, metal band or other flexible metal material characterised by features relevant to metal processing only** (coiling wire into particular forms B21F 3/00; hot coilers in connection with heat-treatment apparatus C21D 9/68)
- 47/02 • Winding-up or coiling
- 47/04 • • on or in reels or drums, without using a moving guide (reels or drums B21C 47/28)
- 47/06 • • • with loaded rollers, bolts, or equivalent means holding the material on the reel or drum
- 47/08 • • without making use of a reel or drum, the first turn being formed by a stationary guide
- 47/10 • • by means of a moving guide
- 47/12 • • • the guide moving parallel to the axis of the coil (B21C 47/14 takes precedence)
- 47/14 • • • by means of a rotating guide, e.g. laying the material around a stationary reel or drum
- 47/16 • Unwinding or uncoiling
- 47/18 • • from reels or drums
- 47/20 • • • the unreeled material moving transversely to the tangent line of the drum, e.g. axially, radially
- 47/22 • • Unwinding coils without reels or drums
- 47/24 • Transferring coils to or from winding apparatus or to or from operative position therein; Preventing uncoiling during transfer
- 47/26 • Special arrangements with regard to simultaneous or subsequent treatment of the material
- 47/28 • Drums or other coil-holders (gripping means B21C 47/32)
- 47/30 • • expandible or contractible
- 47/32 • Tongs or gripping means specially adapted for reeling operations
- 47/34 • Feeding or guiding devices not specially adapted to a particular type of apparatus
- 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**
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- 99/00 Subject matter not provided for in other groups of this subclass [2009.01]**