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
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- Auxiliary operations....5/00, 9/00
- Equipment....3/00, 19/00

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Metal drawing

1/00 Manufacture of metal sheets, wire, rods, tubes or like semi-manufactured products by drawing

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 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

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

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 for metal drawing

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

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 • • expansible 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

99/00 Subject matter not provided for in other groups of this subclass [2009.01]