

B 21 C 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

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METAL DRAWING

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METAL EXTRUDING

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DETAILS COMMON TO DRAWING AND

EXTRUDING OF METAL.....43/00

MANUFACTURING NOT OTHERWISE

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AUXILIARY AND ANCILLARY OPERATIONS USED IN CONNECTION WITH METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL

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Metal drawing (continuous casting [B 22 D 11/00](#); pressure welding by means of a rolling mill [B 23 K 20/04](#))

1/00 Manufacture of metal sheets, metal wire, metal rods, metal tubes 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 [1/14](#); design or construction of electrical equipment, see the relevant classes)
- 1/14 . . Drums, e.g. capstans (capstans or winches in general [B 66 D](#)); 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 ([1/22](#) takes precedence)
- 1/20 . . from stock of essentially unlimited length ([1/22](#) takes precedence)
- 1/22 . . specially adapted for making tubular articles (bending sheet metal into tubular form by drawing [B 21 D 5/10](#))
- 1/24 . . . by means of mandrels (mandrels [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 [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

- 3/02 . Dies; Selection of material therefor; Cleaning thereof
- 3/04 . . with non-adjustable section ([3/08](#) takes precedence)
- 3/06 . . with adjustable section ([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 [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

9/00 Cooling, heating or lubricating drawing material ([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 (continuous casting [B 22 D 11/00](#))

23/00 Extruding metal; Impact extrusion

- 23/01 . starting from material of particular form or shape, e.g. mechanically pre-treated ([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, bars, 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]

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- 23/20 . . . by backward extrusion
- 23/21 . Presses specially adapted for extruding metal (extrusion presses in general [B 30 B 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; Discs therefor [2]

27/00 Containers for metal to be extruded ([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

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

31/00 Control devices, e.g. for regulating the pressing speed or temperature of metal ([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 [B 21 C](#), [see](#) group [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 [23/12](#)); Cleaning dies, ducts, containers, or mandrels [2]

- 35/02 . Removing or drawing-off work
- 35/03 . . Straightening the work (metal straightening in general [B 21 D](#))
- 35/04 . Cutting-off or removing waste
- 35/06 . Cleaning dies, ducts, containers or mandrels [2]

37/00 Manufacture of metal sheets, bars, wire, tubes or like semi-manufactured products, not otherwise provided for (by rolling [B 21 B](#); by working or processing semi-finished sheet metal, profiles, tubes, or wire [B 21 D, F](#); by casting [B 22](#); by material-removing machine tools [B 23](#); by welding, e.g. cladding or plating, [B 23 K](#); by grinding or polishing [B 24](#); by electroforming [C 25 D 1/00](#); by drawing or extruding, [see](#) the relevant groups); Manufacture of tubes of special shape [2]

- 37/02 . of sheets
- 37/04 . of bars 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 [B 21 D 5/00](#); seaming by folding [B 21 D 39/02](#))
- 37/08 . . Making tubes with welded or soldered seams (involving only a soldering or welding operation [B 23 K](#))
- 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 [B 21 D 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 [B 21 F 3/00](#); hot coilers in connection with heat-treatment apparatus [C 21 D 9/68](#))

- 47/02 . Winding-up or coiling
- 47/04 . . on or in reels or drums, without using a moving guide (reels or drums [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 (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 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 B 21 B to F**
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