

# CPC COOPERATIVE PATENT CLASSIFICATION

## 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

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 stok 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 operation 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}

**9/00 Cooling, heating or lubricating drawing material** ([B21C 3/14 takes precedence](#))

- 9/005
  - {Cold application of the lubricant ([when combined with heating steps B21C 9/00](#))}
- 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 [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 or sequences}
- 23/004
  - {using vibratory energy}
- 23/005
  - {Continuous extrusion starting from solid state material ([B21C 23/008 takes precedence](#))}
- 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	29/006	. {Gas treatment of work, e.g. to prevent oxidation or to create surface effects}
23/06	. . . Making sheets	29/02	. {Cooling or heating} of containers for metal to be extruded
23/08	. . . Making wire, bars, tubes	29/04	. {Cooling or heating} of press heads, dies or mandrels
23/085	. . . . {Making tubes ( <a href="#">B21C 23/10</a> take precedence)}		
23/10	. . . . Making finned tubes	<b>31/00</b>	<b>Control devices, e.g. for regulating the pressing speed or temperature of metal (<a href="#">B21C 25/08</a> 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 <a href="#">B21C</a>, see group <a href="#">B21C 51/00</a>)</b>
23/12	. . . . Extruding bent tubes or rods		
23/14	. . . Making other products	<b>33/00</b>	<b>Feeding extrusion presses with metal to be extruded; {Loading the dummy block}</b>
23/142	. . . . {Making profiles}	33/002	. {Encapsulated billet (manufacturing wires or fine wires <a href="#">B21C 37/045</a> , <a href="#">B21C 37/047</a> )}
23/145	. . . . . {Interlocking profiles}	33/004	. {Composite billet}
23/147	. . . . {Making drill blanks (making twist-drills <a href="#">B23P 15/32</a> )}	33/006	. {Consecutive billets, e.g. billet profiles allowing air expulsion or bonding of billets}
23/16	. . . . Making turbo blades or propellers	33/008	. {Scalping billets, e.g. for removing oxide layers prior or during extrusion}
23/18	. . by impact extrusion	33/02	. the metal being in liquid form
23/183	. . . {by forward extrusion}	<b>35/00</b>	<b>Removing work or waste from extruding presses; Drawing-off extruded work (in connection with the extruding of bent tubes or rods <a href="#">B21C 23/12</a>); Cleaning dies, ducts, containers, or mandrels</b>
23/186	. . . {by backward extrusion}	35/02	. Removing or drawing-off work {(linear motor pulling devices <a href="#">B21C 1/305</a> )}
23/20	. . by backward extrusion	35/023	. . {Work treatment directly following extrusion, e.g. further deformation or surface treatment ( <a href="#">B21C 35/03</a> takes precedence; gas treatment <a href="#">B21C 29/006</a> )}
23/205	. . . {Making products of generally elongated shape}	35/026	. . . {Removing sections from the extruded work, e.g. removing a strip to create an open profile}
23/21	. Presses specially adapted for extruding metal (extrusion presses in general <a href="#">B30B 11/22</a> )	35/03	. . Straightening the work (metal straightening in general <a href="#">B21D</a> )
23/211	. . {Press driving devices}	35/04	. Cutting-off or removing waste
23/212	. . {Details ( <a href="#">B21C 23/217</a> , <a href="#">B21C 23/218</a> take precedence)}	35/06	. Cleaning dies, ducts, containers or mandrels
23/214	. . . {Devices for changing die or container}	<b>37/00</b>	<b>Manufacture of metal sheets, bars, wire, tubes or like semi-manufactured products, not otherwise provided for (by rolling <a href="#">B21B</a>; by working or processing semi-finished sheet metal, profiles, tubes, or wire <a href="#">B21D</a> or <a href="#">B21F</a>; by casting <a href="#">B22</a>; by material-removing machine tools <a href="#">B23</a>; by welding, e.g. cladding or plating <a href="#">B23K</a>; by grinding or polishing <a href="#">B24</a>; by electroforming <a href="#">C25D 1/00</a>; by drawing or extruding, see the relevant groups); Manufacture of tubes of special shape</b>
23/215	. . . {Devices for positioning or centering press components, e.g. die or container}	37/02	. of sheets
23/217	. . {Tube extrusion presses ( <a href="#">B21C 23/218</a> takes precedence)}	37/04	. of bars or wire {(wire-like electrical connectors in or for semiconductor devices <a href="#">H01L 24/42</a> )}
23/218	. . {Indirect extrusion presses}	37/042	. . {Manufacture of coated wire or bars}
23/22	. Making metal-coated products; Making products from two or more metals	37/045	. . {Manufacture of wire or bars with particular section or properties}
23/24	. . Covering indefinite lengths of metal or non-metal material with a metal coating	37/047	. . {of fine wires}
23/26	. . . Applying metal coats to cables, e.g. to insulated electric cables	37/06	. of tubes or metal hoses; Combined procedures for making tubes, e.g. for making multi-wall tubes (bending sheets for making tubes <a href="#">B21D 5/00</a> ; seaming by folding <a href="#">B21D 39/02</a> )
23/28	. . . . on intermittently-operating extrusion presses	37/065	. . {starting from a specific blank, e.g. tailored blank}
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)		
<b>25/00</b>	<b>Profiling tools for metal extruding</b>		
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		
<b>26/00</b>	<b>Rams or plungers; Discs therefor</b>		
<b>27/00</b>	<b>Containers for metal to be extruded (<a href="#">B21C 29/02</a> takes precedence)</b>		
27/02	. for making coated work		
27/04	. Venting metal-container chamber		
<b>29/00</b>	<b>Cooling or heating work or parts of the extrusion press; {Gas treatment of work}</b>		
29/003	. {Cooling or heating of work}		

- 37/08 . . Making tubes with welded or soldered seams  
(involving only a soldering or welding operation [B23K](#) {with helically arranged seams [B21C 37/122](#)})
- 37/0803 . . . {the tubes having a special shape, e.g. polygonal tubes}
- 37/0807 . . . {Tube treating or manipulating combined with, or specially adapted for use in connection with tube making machines, e.g. drawing-off devices, cutting-off}
- 37/0811 . . . . {removing or treating the weld bead}
- 37/0815 . . . {without continuous longitudinal movement of the sheet during the bending operation (sheet bending in general [B21D](#))}
- 37/0818 . . . {Manufacture of tubes by drawing of strip material through dies}
- 37/0822 . . . {Guiding or aligning the edges of the bent sheet}
- 37/0826 . . . {Preparing the edges of the metal sheet with the aim of having some effect on the weld}
- 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; {Making multi-wall tubes}
- 37/10 . . Making tubes with riveted seams {or with non-welded and non-soldered seams}
- 37/101 . . . {Making of the seams}
- 37/102 . . . {of coated strip material (making multi-wall tubes)}
- 37/104 . . . {the tubes having a special shape, e.g. polygonal tubes}
- 37/105 . . . {Supply, or operations combined with supply, of strip material}
- 37/107 . . . {Tube treating or manipulating combined with or specially adapted for use in connection with tube-making machines, e.g. drawing-off devices, cutting-off}
- 37/108 . . . {without continuous longitudinal movement of the sheet during the bending operation (sheet bending in general [B21D](#))}
- 37/12 . . Making tubes or metal hoses with helically arranged seams
- 37/121 . . . {with non-welded and non-soldered seams}
- 37/122 . . . {with welded or soldered seams (welding and soldering helically arranged seams, [per se B23K](#))}
- 37/123 . . . {of coated strip material; Making multi-wall tubes}
- 37/124 . . . {the tubes having a special shape, e.g. with corrugated wall, flexible tubes}
- 37/125 . . . . {curved section, e.g. elbow}
- 37/126 . . . {Supply, or operations combined with supply, of strip material}
- 37/127 . . . {Tube treating or manipulating combined with or specially adapted for use in connection with tube making machines, e.g. drawing-off devices, cutting-off}
- 37/128 . . . {Control or regulating devices}
- 37/14 . . Making tubes from double flat material
- 37/15 . . Making tubes of special shape; Making tube fittings {([B21C 37/0803](#), [B21C 37/104](#), [B21C 37/124](#), take precedence)}
- 37/151 . . . {Making tubes with multiple passages}
- 37/152 . . . . {Making rifle and gunbarrels}
- 37/153 . . . . {Making tubes with inner- and/or outer guides}
- 37/154 . . . . {Making multi-wall tubes}
- 37/155 . . . . {Making tubes with non circular section ([B21C 37/151](#), [B21C 37/154](#) take precedence)}
- 37/156 . . . . {Making tubes with wall irregularities ([B21C 37/20](#), [B21C 37/22](#) take precedence)}
- 37/157 . . . . {Perforations}
- 37/158 . . . . {Protrusions, e.g. dimples}
- 37/16 . . . Making tubes with varying diameter in longitudinal direction
- 37/18 . . . . conical tubes
- 37/185 . . . . . {starting from sheet material}
- 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; {Making tubes with angled walls, ribbed tubes and tubes with decorated walls}
- 37/202 . . . . {with guides parallel to the tube axis}
- 37/205 . . . . {with annular guides}
- 37/207 . . . . {with helical guides}
- 37/22 . . . Making finned or ribbed tubes by fixing strip or like material to tubes (making heat exchangers [B21D 53/02](#))
- 37/225 . . . . {longitudinally-ribbed tubes}
- 37/24 . . . . annularly-ribbed tubes
- 37/26 . . . . helically-ribbed tubes
- 37/28 . . . Making tube fittings for connecting pipes, e.g. U-pieces
- 37/283 . . . . {Making U-pieces ([B21C 37/286](#) takes precedence)}
- 37/286 . . . . {starting from sheet material}
- 37/29 . . . . Making branched pieces, e.g. T-pieces
- 37/292 . . . . . {Forming collars by drawing or pushing a rigid forming tool through an opening in the tube wall}
- 37/294 . . . . . {Forming collars by compressing a fluid or a yieldable or resilient mass in the tube}
- 37/296 . . . . . {Making branched pieces starting from strip material; Making branched tubes by securing a secondary tube in an opening in the undeformed wall of a principal tube}
- 37/298 . . . . . {Forming collars by flow-drilling ([flow drilling B21J 5/066](#))}
- 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 operation used in connection with metal working without essentially removing material**
- 45/00** **Separating mandrels from work or vice versa**

<b>47/00</b>	<b>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 form <a href="#">B21F 3/00</a>; hot coilers in connection with heat-treatment apparatus <a href="#">C21D 9/68</a>)</b>	47/3425	. . . {without lateral edge contact}
47/003	. {Regulation of tension or speed; Braking}	47/3433	. . {for guiding the leading end of the material, e.g. from or to a coiler}
47/006	. {winding-up or winding-off several parallel metal bands}	47/3441	. . . {Diverting the leading end, e.g. from main flow to a coiling device}
47/02	. Winding-up or coiling	47/345	. . {for monitoring the tension or advance of the material}
47/04	. . on or in reels or drums, without using a moving guide ( <a href="#">reels or drums B21C 47/28</a> )	47/3458	. . . {Endlessly revolving chain systems ( <a href="#">metal drawing B21C 1/30</a> )}
47/045	. . . {in rotating drums}	47/3466	. . {by using specific means}
47/06	. . . with loaded rollers, bolts, or equivalent means holding the material on the reel or drum	47/3475	. . . {Fluid pressure or vacuum}
47/063	. . . . {with pressure rollers only}	47/3483	. . . {Magnetic field}
47/066	. . . . {with belt wrappers only}	47/3491	. . . {Brushes}
47/08	. . without making use of a reel or drum, the first turn being formed by a stationary guide	<b>49/00</b>	<b>Devices for temporarily accumulating material</b>
47/10	. . by means of a moving guide	<b>51/00</b>	<b>Measuring, gauging, indicating, counting, or marking devices specially adapted for use in the production or manipulation of material in accordance with subclasses <a href="#">B21B</a> - <a href="#">B21F</a></b>
47/12	. . . the guide moving parallel to the axis of the coil ( <a href="#">B21C 47/14</a> takes precedence)	51/005	. {Marking devices}
47/14	. . . by means of a rotating guide, e.g. laying the material around a stationary reel or drum	<b>99/00</b>	<b>Subject matter not provided for in other groups of this subclass</b>
47/143	. . . . {the guide being a tube}		
47/146	. . . . {Controlling or influencing the laying pattern of the coils}		
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		
47/242	. . {Devices for swinging the coil from horizontal to vertical, or <i>vice versa</i> }		
47/245	. . {Devices for the replacement of full reels by empty reels or <i>vice versa</i> , 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 ( <a href="#">gripping means B21C 47/32</a> )		
47/30	. . expandible or contractible		
47/32	. Tongs or gripping means specially adapted for reeling operations		
47/323	. . {Slits or pincers 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}		