B21D WORKING OR PROCESSING OF SHEET METAL OR METAL TUBES, RODS OR PROFILES WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL (working or processing of wire B21F)

NOTES
1. This subclass covers cutting or perforating of sheet metal or other stock material
2. This subclass does not cover the working of metal foils in a manner analogous to the working of paper, which is covered by classes B26, B31.

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.

Straightening; Restoring form; Bending; Corrugating; Flanging

1/00 Straightening, restoring form or removing local distortions of sheet metal or specific articles made therefrom (B21D 3/00 takes precedence); Stretching sheet metal combined with rolling (working sheet metal of limited length by stretching B21D 25/00; by localised hammering B21D 31/06)

1/02 . by rollers (B21D 1/06 takes precedence)
1/05 . Stretching combined with rolling
1/06 . Removing local distortions
1/065 . [by hammering]
1/08 . of hollow bodies made from sheet metal (of substantially open bodies B21D 1/10 ; flattening hollow objects for transport and reforming B21D 51/14)

1/10 . of specific articles made from sheet metal, e.g. mudguards
1/12 . Straightening vehicle body parts or bodies (B21D 1/14 takes precedence)
1/14 . Straightening frame structures
1/145 . [Clamps therefor]

3/00 Straightening or restoring form of metal rods, metal tubes, metal profiles, or specific articles made therefrom, whether or not in combination with sheet metal parts (straightening of well casings in situ E21B: (straightening rails or rail joints E01B 31/08))

3/005 . [by eccentric turning members]
3/02 . by rollers
3/04 . arranged on axes skew to the path of the work
3/045 . [Workpiece feed channels therefor]
3/05 . arranged on axes rectangular to the path of the work

3/06 . . arranged inclined to a revolving flier rolling frame
3/08 . . which move in an orbit without rotating round the work
3/10 . between rams and anvils or abutments
3/12 . by stretching with or without twisting (by twisting only B21D 11/14)
3/14 . Recontouring
3/16 . of specific articles made from metal rods, tubes, or profiles, e.g. crankshafts, by specially adapted methods or means

5/00 Bending sheet metal along straight lines, e.g. to form simple curves (B21D 11/06 - B21D 11/18 take precedence; corrugating sheet metal B21D 13/00; as edge treatment B21D 19/00)

5/002 . [Positioning devices]
5/004 . [with program control]
5/006 . [combined with measuring of bends]
5/008 . [combined with heating or cooling of the bends]
5/01 . between rams and anvils or abutments
5/015 . [for making tubes]
5/02 . on press brakes without making use of clamping means

5/0209 . [Tools therefor]
5/0218 . . [Length adjustment of the punch]
5/0227 . . [Length adjustment of the die]
5/0236 . . [Tool clamping]
5/0245 . . . [Fluid operated]
5/0254 . . . [Tool exchanging]
5/0263 . . . [Die with two oscillating halves]
5/0272 . . . [Deflection compensating means]
5/0281 . . [Workpiece supporting devices]
5/029 . . [with shearing devices]
Straightening; Restoring form; Bending; Corrugating; Flanging

5/04 . . on brakes making use of clamping means on one side of the work 9/07 . . with one or more swinging forming members engaging tube ends only
5/042 . . [With a rotational movement of the bending blade] 9/073 . . . . [with one swinging forming member]
5/045 . . [With a wiping movement of the bending blade] 9/076 . . . . [with more swinging forming members]
5/047 . . [Length adjustment of the clamping means] 9/08 . in press brakes or between rams and anvils or abutments; Pliers with forming dies
5/06 . by drawing procedure making use of dies or forming-rollers, e.g. making profiles 9/085 . . . . [Pliers with forming dies]
5/08 . . making use of forming-rollers (B21D 5/12 takes precedence) 9/10 . by passing between rollers
5/083 . . . . [for obtaining profiles with changing cross-sectional configuration] 9/12 . by pushing over a curved mandrel; by pushing through a curved die
5/086 . . . . [for obtaining closed hollow profiles] 9/125 . . . . [by pushing through a curved die]
5/10 . . . . for making tubes 9/14 . Wrinkle-bending, i.e. bending by corrugating
5/12 . . . . making use of forming-rollers 9/15 . using filling material of indefinite shape, e.g. sand, plastic material (filling of tubes with such material B21D 9/16)
5/14 . by passing between rollers (B21D 5/06 takes precedence) 9/16 . Auxiliary equipment, e.g. machines for filling tubes with sand
5/143 . . . . [making use of a mandrel] 9/165 . . . . [Machines for filling tubes with sand]
5/146 . . . . [one roll being covered with deformable material] 9/18 . . . . for heating or cooling of bends
5/16 . . Folding; Pleating

7/00 Bending rods, profiles, or tubes
(B21D 11/02 - B21D 11/18 take precedence; using mandrels or the like B21D 9/00)
7/02 . . over a stationary forming member; by use of a swinging forming member or abutment
7/021 . . . . [Construction of forming members having more than one groove]
7/022 . . over a stationary forming member only
7/0225 . . . . [using pulling members]
7/024 . . by a swinging forming member
7/025 . . and pulling or pushing the ends of the work
7/028 . . . . and altering the profile at the same time, e.g. forming bumpers
7/03 . . . . Apparatus with means to keep the profile in shape
7/04 . . over a movably-arranged forming member (B21D 7/02 takes precedence)
7/06 . . in press brakes or between rams and anvils or abutments; Pliers with forming dies
7/063 . . . . [Pliers with forming dies]
7/066 . . . . [combined with oscillating members]
7/08 . . by passing between rollers or through a curved die
7/085 . . . . [by passing through a curved die]
7/10 . . by abutting members and flexible bending means, e.g. with chains, ropes
7/12 . . with programme control
7/14 . . combined with measuring of bends or lengths
7/16 . . Auxiliary equipment, e.g. for heating or cooling of bends
7/162 . . . . [Heating equipment]
7/165 . . . . [Cooling equipment]
7/167 . . . . [Greasing]

9/00 Bending tubes using mandrels or the like
(B21D 11/02 - B21D 11/18 take precedence)
9/01 . . the mandrel being flexible and engaging the entire tube length
9/03 . . . . and built-up from loose elements, e.g. series of balls
9/04 . . the mandrel being rigid
9/05 . . co-operating with forming members
9/055 . . . . [Construction of forming members having more than one groove]
9/07 . . with one or more swinging forming members engaging tube ends only
9/073 . . . . [with one swinging forming member]
9/076 . . . . [with more swinging forming members]
9/08 . in press brakes or between rams and anvils or abutments; Pliers with forming dies
9/085 . . . . [Pliers with forming dies]
9/10 . by passing between rollers
9/12 . by pushing over a curved mandrel; by pushing through a curved die
9/125 . . . . [by pushing through a curved die]
9/14 . Wrinkle-bending, i.e. bending by corrugating
9/15 . using filling material of indefinite shape, e.g. sand, plastic material (filling of tubes with such material B21D 9/16)
9/16 . Auxiliary equipment, e.g. machines for filling tubes with sand
9/165 . . . . [Machines for filling tubes with sand]
9/18 . . . . for heating or cooling of bends

11/00 Bending not restricted to forms of material mentioned in only one of groups B21D 5/00, B21D 7/00; B21D 9/00; Bending not provided for in groups B21D 5/00 - B21D 9/00 (corrugating or bending into wave form B21D 13/00, B21D 15/00; flanging B21D 19/00); Twisting
11/02 . . Bending by stretching or pulling over a die (working sheet metal of limited length by stretching B21D 25/00)
11/06 . . Bending into helical or spiral form; Forming a succession of return bends, e.g. serpentine form (making helically seamed tubing B21C 37/12)
11/07 . . Making serpentine-shaped articles by bending essentially in one plane
11/08 . . Bending by altering the thickness of part of the cross-section of the work (B21D 11/06 takes precedence)
11/085 . . . . [by locally stretching or upsetting]
11/10 . . Bending specially adapted to produce specific articles, e.g. leaf springs ([making or bending leaf springs B21D 53/867])
11/12 . . . . the articles being reinforcements for concrete
11/125 . . . . . {Bending wire nets}
11/14 . . . . Twisting
11/15 . . . . Reinforcing rods for concrete
11/16 . . . . Crankshafts
11/18 . . . . Joggling
11/20 . . . . Bending sheet metal, not otherwise provided for
11/203 . . . . . {Round bending}
11/206 . . . . . {Curving corrugated sheets}
11/22 . . . . Auxiliary equipment, e.g. positioning devices

13/00 Corrugating sheet metal, rods or profiles; Bending sheet metal, rods or profiles into wave form (tubes B21D 15/00)
13/02 . . . . by pressing
13/04 . . . . by rolling
13/045 . . . . . [the corrugations being parallel to the feeding movement]
13/06 . . . . by drawing
13/08 . . . . by combined methods
13/10 . . . . . into a peculiar profiling shape
15/00 Corrugating tubes (wrinkle-bending using mandrels or the like B21D 9/14)
Stamping, Spinning, Deep-drawing; Working sheet metal of limited length by stretching; Punching

22/00 Shaping without cutting, by stamping, spinning, or deep-drawing (otherwise than using rigid devices or tools or yieldable or resilient pads B21D 26/00)
22/02 Stamping using rigid devices or tools
22/022 [by heating the blank or stamping associated with heat treatment (C21D takes precedence)]
22/025 [for tubular articles]
22/027 [for flattening the ends of corrugated sheets]
22/04 [for dimpling (combined with perforating B21D 28/24)]
22/06 [having relatively-movable die parts]
22/08 [with die parts on rotating carriers]
22/10 Stamping using yieldable or resilient pads
22/105 [of tubular products]
22/12 Stamping using enclosed flexible chambers
22/125 [of tubular products]
22/14 Spinning
22/16 [over shaping mandrels or formers]
22/18 [using tools guided to produce the required profile]
22/185 [making bombed objects]
22/20 Deep-drawing (special deep-drawing arrangements in, or in connection with, presses B21D 24/00)

22/201 [Work-pieces; preparation of the work-pieces, e.g. lubricating, coating]
22/203 [of compound articles]
22/205 [Hydro-mechanical deep-drawing]
22/206 [articles from a strip in several steps, the articles being coherent with the strip during the operation]
22/208 [by heating the blank or deep-drawing associated with heat treatment (C21D takes precedence)]
22/21 [without fixing the border of the blank]
22/22 [with devices for holding the edge of the blanks (B21D 22/24 - B21D 22/30 take precedence; shaping over a die without external former B21D 11/02)]
22/225 [with members for radially pushing the blanks]
22/24 [involving two drawing operations having effects in opposite directions with respect to the blank]
22/26 [for making peculiarly, e.g. irregularly, shaped articles]
22/28 [of cylindrical articles using consecutive dies]
22/283 [with ram and dies aligning means]
22/286 [with lubricating or cooling means]
22/290 [to finish articles formed by deep-drawing]

24/00 Special deep-drawing arrangements in, or in connection with, presses
24/005 [Multi-stage presses]
24/02 Die-cushions
24/04 Blank holders; Mounting means therefor
24/06 Mechanically spring-loaded blank holders
24/08 Pneumatically or hydraulically loaded blank holders
24/10 Devices controlling or operating blank holders independently, or in conjunction with dies
24/12 Mechanically
24/14 Pneumatically or hydraulically
24/16 Additional equipment in association with the tools, e.g. for shearing, for trimming

25/00 Working sheet metal of limited length by stretching, e.g. for straightening
25/02 by pulling over a die
25/04 Clamping arrangements

26/00 Shaping without cutting otherwise than using rigid devices or tools or yieldable or resilient pads, i.e. applying fluid pressure or magnetic forces (stamping using resilient pads B21D 22/10)
26/02 by applying fluid pressure
26/021 Deforming sheet bodies
26/023...including an additional treatment performed by fluid pressure, e.g. perforating
26/025 Means for controlling the clamping or opening of the moulds
26/027 Means for controlling fluid parameters, e.g. pressure or temperature
26/029 Closing or sealing means
26/031 Mould construction (B21D 26/025 - B21D 26/029 take precedence)
26/033 Deforming tubular bodies (corrugating tubes by applying fluid pressure B21D 15/03, B21D 15/10)
26/035 including an additional treatment performed by fluid pressure, e.g. perforating
26/037 Forming branched tubes
Stamping, Spinning, Deep-drawing; Working sheet metal of limited length by stretching; Punching

31/00 Other methods for working sheet metal, metal tubes, metal profiles (deforming one surface of tubes helically by rolling B21H 3/00; upsetting B21J 5/08; working metal by removing material therefrom B23: embossing B44B)

31/005 . . . [Incremental shaping or bending, e.g. stepwise moving a shaping tool along the surface of the workpiece (B21D 22/14 takes precedence)]

31/02 . . . Stabbing or piercing, e.g. for making sieves (dimpling B21D 22/04; perforating by punching B21D 28/24)

31/04 . . . Expanding other than provided for in groups B21D 1/00 - B21D 28/00, e.g. for making expanded metal (B21D 47/00 takes precedence; enlarging tube ends B21D 41/02)

31/043 . . . [Making use of slitting discs or punch cutters]

31/046 . . . [making use of rotating cutters]

31/06 . . . Deforming sheet metal, tubes or profiles by sequential impacts, e.g. hammering, beating, peen forming (forging hammers B21J 7/00)

33/00 Special measures in connection with working metal foils, e.g. gold foils (cutting or perforating of metal foil analogous to paper B26)

35/00 Combined processes according to [or processes combined with] methods covered by groups B21D 1/00 - B21D 31/00 (B21D 21/00 takes precedence)

35/001 . . . [Shaping combined with punching, e.g. stamping and perforating]

35/002 . . . [Processes combined with methods covered by groups B21D 1/00 - B21D 31/00]

35/003 . . . [Simultaneous forming, e.g. making more than one part per stroke (B21D 26/06 takes precedence)]

35/005 . . . [characterized by the material of the blank or the workpiece (B21D 26/053 takes precedence)]

35/006 . . . [Blanks having varying thickness, e.g. tailored blanks]

35/007 . . . [Layered blanks (B21D 22/203 takes precedence; joining superposed plates B21D 39/031, B21D 39/034, B21D 39/035)]

35/008 . . . [involving vibration, e.g. ultrasonic]

37/00 Tools as parts of machines covered by this subclass (forms or constructions of tools uniquely adapted for particular operations, see the relevant groups for the operations)

37/001 . . . Selection of materials

37/002 . . . Die constructions enabling assembly of the die parts in different ways (B21D 37/06 takes precedence)

37/004 . . . Movable or exchangeable mountings for tools

37/006 . . . Pivoting or vertically-adjusted tools, e.g. disengagable (die sets with dies pivoted to one another B21D 37/12)

37/008 . . . Dies with different parts for several steps in a process

37/10 . . . Die sets; Pliers guides

37/12 . . . Special arrangements for interconnection or cooperation of dies
37/14 . . . Particular arrangements for handling and holding in place complete dies
37/142 . . . (Spotting presses)
37/145 . . . (Die storage magazines)
37/147 . . . (Tool exchange carts)
37/16 . . . Heating or cooling
37/18 . . . Lubricating [. . . e.g. lubricating tool and workpiece simultaneously (lubricating workpieces for deep-drawing B21D 22/2011)]
37/20 . . . Making tools by operations not covered by a single other subclass
37/205 . . . (Making cutting tools)
39/00 Application of procedures in order to connect objects or parts, e.g. coating with sheet metal otherwise than by plating (. . . [joining mitered profiles B21D 53/745; riveting B21F; uniting components by forging or pressing to form integral members B21K 25/00; welding B23K; press-fitting, force-fitting, or shrinking in general B23P 11/00, B21D 19/00; by adhesives F16B 11/00 (; Connections as such F16L, F16B)); Tube expanders
39/02 . . . of sheet metal by folding, e.g. connecting edges of a sheet to form a cylinder
39/021 . . . (for panels, e.g. vehicle doors)
39/023 . . . [using rollers]
39/025 . . . (Hand tools)
39/026 . . . (Reinforcing the connection by locally deforming)
39/028 . . . (Reinforcing the connection otherwise than by deforming, e.g. welding)
39/03 . . . of sheet metal otherwise than by folding
39/031 . . . (Joining superposed plates by locally deforming without slitting or piercing)
39/032 . . . (by fitting a projecting part integral with one plate in a hole of the other plate)
39/034 . . . (Joining superposed plates by piercing)
39/035 . . . (Joining superposed plates by slitting)
39/037 . . . (Interlocking butt joints)
39/038 . . . (Perpendicular plate connections)
39/04 . . . of tubes with tubes; of tubes with rods (. . . [crimped pipe joints as such F16L 13/14])
39/042 . . . (using explosives (by explosive welding B23K 2008))
39/044 . . . (perpendicular)
39/046 . . . (Connecting tubes to tube-like fittings)
39/048 . . . (using presses for radially crimping tubular elements)
39/06 . . . of tubes in openings, e.g. rolling-in
39/063 . . . (for assembling ladders)
39/066 . . . (using explosives)
39/08 . . . Tube expanders
39/10 . . . with rollers for expanding only
39/12 . . . with rollers for expanding and flanging
39/14 . . . with balls
39/16 . . . with torque limiting devices
39/18 . . . Rollers of special shape
39/20 . . . with mandrels, e.g. expandable
39/203 . . . (expandable by fluid or elastic material)
39/206 . . . (by axially compressing the elastic material)
41/00 Application of procedures in order to alter the diameter of tube ends (. . . [plastic tubes B29C 57/08])
41/02 . . . Enlarging
41/021 . . . (by means of tube-flaring hand tools)
41/023 . . . (comprising rolling elements)
41/025 . . . (by means of impact-type swaging hand tools)
41/026 . . . (by means of mandrels)
41/028 . . . (expandable mandrels)
41/04 . . . Reducing; Closing
41/045 . . . [Closing]
43/00 Feeding, positioning or storing devices combined with, or arranged in, or specially adapted for use in connection with, apparatus for working or processing sheet metal, metal tubes or metal profiles; Associations therewith of cutting devices (cutting devices associated with the tool, see the relevant group for the tool)
43/003 . . . (Positioning devices (B21D 28/04 and B21D 28/265 take precedence; stops B21D 43/26; centering moving strips B21D 43/023))
43/006 . . . (Feeding elongated articles, such as tubes, bars, or profiles)
43/02 . . . Advancing work in relation to the stroke of the die or tool
43/021 . . . [Control or correction devices in association with moving strips]
43/022 . . . . (Loop-control)
43/023 . . . . [Centering devices, e.g. edge guiding]
43/025 . . . . [Fault detection, e.g. misfeed detection]
43/026 . . . . (Combination of two or more feeding devices provided for in B21D 43/04 - B21D 43/18)
43/027 . . . . (Combined feeding and ejecting devices)
43/028 . . . . (Tools travelling with material, e.g. flying punching machines)
43/04 . . . by means in mechanical engagement with the work
43/05 . . . specially adapted for multi-stage presses (. . . [B21D 43/145 takes precedence])
43/052 . . . . [Devices having a cross bar]
43/055 . . . . (Devices comprising a pair of longitudinally and laterally movable parallel transfer bars)
43/057 . . . . (Devices for exchanging transfer bars or grippers; Idle stages, e.g. exchangeable)
43/06 . . . by positive or negative engaging parts cooperating with corresponding parts of the sheet or the like to be processed, e.g. carrier bolts or grooved section in the carriers
43/08 . . . by rollers (. . . [B21D 43/145 takes precedence])
43/09 . . . . by one or more pairs of rollers for feeding sheet or strip material
43/10 . . . by grippers (. . . [B21D 43/055, B21D 43/057, B21D 43/145 take precedence])
43/105 . . . . [Manipulators, i.e. mechanical arms carrying a gripper element having several degrees of freedom]
43/11 . . . . for feeding sheet or strip material
43/12 . . . . by chains or belts (. . . [B21D 43/145 takes precedence])
43/13 . . . . by linearly moving tables
43/14 . . . . by turning devices, e.g. turn-tables
43/145 . . . . [Turnover devices, i.e. by turning about a substantially horizontal axis]
34/16 . . by gravity, e.g. chutes
34/18 . . by means in pneumatic or magnetic engagement with the work
34/20 . . Storage arrangements; Piling or unpiling (in general B65G, B65H)
34/22 . . Devices for piling sheets
34/24 . . Devices for removing sheets from a stack
34/26 . . Stops
34/28 . . Associations of cutting devices therewith
34/282 . . (Discharging crop ends or the like)
34/285 . . (Devices for handling elongated articles, e.g. bars, tubes or profiles (B21D 43/282, B21D 43/287 take precedence))
34/287 . . (Devices for handling sheet or strip material (B21D 43/282 takes precedence))

45/00 Ejecting or stripping-off devices arranged in machines or tools dealt with in this subclass
45/003 . . (in punching machines or punching tools)
45/006 . . (Stripping-off devices)
45/02 . . Ejecting devices
45/04 . . interrelated with motion of tool
45/06 . . Stripping-off devices
45/065 . . (for deep-drawn cans, e.g. using stripping fingers)
45/08 . . interrelated with motion of tool
45/10 . . Combined ejecting and stripping-off devices

Processing sheet metal or metal tubes, or processing metal profiles according to any of groups B21D 1/00 - B21D 45/00, in the manufacture of finished or semi-finished articles

47/00 Making rigid structural elements or units, e.g. honeycomb structures
47/005 . . (Making gratings)
47/01 . . beams or pillars
47/02 . . by expanding
47/04 . . composite sheet metal profiles

49/00 Sheathing or stiffening objects (by winding wire or tape thereon B65H 54/00, B65H 81/00; specially adapted for manufacturing conductors or cables H01B 13/26)
49/005 . . (Hollow objects)

51/00 Making hollow objects (from thick-walled or non uniform tubes B21K 21/00)
51/02 . . characterised by the structure of the objects (B21D 51/26 takes precedence))

NOTE
Making hollow objects characterised both by their structure and by their use is classified only in group B21D 51/16

51/04 . . built-up objects, e.g. objects with rigidly-attached bottom or cover
51/06 . . folded objects
51/08 . . ball-shaped objects
51/10 . . conically or cylindrically shaped objects
51/12 . . objects with corrugated walls
51/14 . . Flattening hollow objects for transport or storage; Re-forming same (making tubes from doubled flat material B21C 37/14)
51/16 . . characterised by the use of the objects (making heat exchangers B21D 53/02)

51/18 . . vessels, e.g. tubs, vats, tanks, sinks, or the like
51/20 . . barrels
51/22 . . pots, e.g. for cooking
51/24 . . high-pressure containers, e.g. boilers, bottles
51/26 . . cans or tins; Closing same in a permanent manner (making outlet arrangements B21D 51/38; welding or soldering B23K)
51/2607 . . (Locally embossing the walls of formed can bodies (B44B 5/00, B44C 1/24, B44C 3/085 take precedence; bulging B21D 51/2646)
51/2615 . . (Edge treatment of cans or tins)
51/2623 . . . (Curling)
51/263 . . . (Flanging)
51/2638 . . . (Necking)
51/2646 . . . (Of particular non cylindrical shape, e.g. conical, rectangular, polygonal, bulged)
51/2653 . . . (Methods or machines for closing cans by applying caps or bottoms)
51/2661 . . . (Sealing or closing means therefor)
51/2669 . . . (Transforming the shape of formed can bodies; Forming can bodies from flattened tubular blanks; Flattening can bodies)
51/2676 . . . (Cans or tins having longitudinal or helical seams)
51/2684 . . . (Cans or tins having circumferential side seams)
51/2692 . . . (Manipulating, e.g. feeding and positioning devices; Control systems)
51/28 . . Folding the longitudinal seam
51/30 . . Folding the circumferential seam
51/32 . . . by rolling
51/34 . . . by pressing
51/36 . . . collapsible or like thin-walled tubes, e.g. for toothpaste
51/365 . . . (involving fixing closure members to the tubes, e.g. nozzles)
51/38 . . Making inlet or outlet arrangements of cans, tins, baths, bottles, or other vessels; Making can ends; Making closures
51/383 . . . (scoring lines, tear strips or pulling tabs)
51/386 . . . (on the side-wall of containers)
51/40 . . . Making outlet openings, e.g. bung holes
51/42 . . . Making or attaching spouts
51/44 . . . Making closures, e.g. caps (folded of thin metal foils in the way of making paper caps B31D 5/00; making closures in conjunction with applying same B67B)
51/443 . . . (easily removable closures, e.g. by means of tear strips)
51/446 . . . (Feeding or removal of material)
51/46 . . . Placing sealings or sealing material (moulding plastic sealing material into closure members B29C 70/80)
51/48 . . . Making crown caps
51/50 . . . Making screw caps
51/52 . . . boxes, cigarette cases, or the like
51/54 . . . cartridge cases, e.g. for ammunition, for letter carriers in pneumatic-tube plants

53/00 Making other particular articles (making wire fabrics B21F; making chains or chain parts B21L)
heat exchangers (or parts thereof), e.g. radiators, condensers (fins, headers) (making finned or ribbed tubes by fixing strip material or the like to tubes B21C 37/22)

(Making the fins)

{ Louvered fins }

{ by helically or spirally winding elongated elements }

of sheet metal

[by inflating partially united plates]

of both metal tubes and sheet metal (connecting tubes in openings B21D 39/06)

{ with fins places on zig-zag tubes or parallel tubes }

parts of bearings; sleeves; valve seats or the like

cages for bearings

belts, e.g. machine-gun belts

rings, e.g. barrel hoops

of hollow or C-shaped cross-section, e.g. for curtains, for eyelets

washers, e.g. for sealing

with means for preventing rotation

nuts or like thread-engaging members

wheels or the like

{ with inscriptions or the like, e.g. printing wheels }

{ with descriptions or the like, e.g. printing wheels }

{ blower wheels, i.e. wheels provided with fan elements }

{ wheels having spokes }

gear wheels

wheel rims

wheel covers

brake drums

clips, clamps, or like fastening or attaching devices, e.g. for electric installation

locksmith's goods, e.g. handles

hinges, e.g. door hinge plates

keys (making keys by combined operations B23P 15/005)

fancy goods, e.g. jewellery products

haberdashery, e.g. buckles, combs; pronged fasteners, e.g. staples

buttons, e.g. press-buttons, snap fasteners

metal slide-fastener parts

fastener elements; Attaching such elements so far as this procedure is combined with the process for making the elements

slides

stops

dressing or lacing parts for laces or ropes

cutlery wares; garden tools or the like

spoons; table forks

knives; scissors; cutting blades (B21D 53/72 takes precedence; handle portions B21D 53/70)

{ scissors }

safety razor blades

mower blades

spades; shovels (handle portions B21D 53/70)

rakes, garden forks, or the like (handle portions B21D 53/70)

handle portions (B21D 53/72 takes precedence)

clicks; scythes

frames for openings, e.g. for windows, doors, handbags

(Joining mitred profiles comprising punching the profiles on a corner-angle connecting piece)

writing or drawing instruments, e.g. writing pens, erasing pens

propeller blades; turbine blades

dustproof covers; safety covers

perforated music sheets; pattern sheets, e.g. for control purposes, stencils

other parts for engines, e.g. connecting-rods

(Making camshafts)

other parts for bicycles or motorcycles

other parts for vehicles, e.g. cowlings, mudguards

{ reflectors }

{ leaf springs }

axle-housings

other parts for aircraft

Safety devices protecting the machine or the operator, specially adapted for apparatus or machines dealt with in this subclass (for presses in general B30R; safety devices in general F16P)