

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING (NOTES omitted)

### SHAPING

## B21 MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL (NOTES omitted)

## B21J FORGING; HAMMERING; PRESSING METAL; RIVETING; FORGE FURNACES (rolling of metal [B21B](#); making particular products by forging or pressing [B21K](#); cladding or plating [B23K](#); finishing surfaces by hammering [B23P 9/04](#); compacting surfaces by blasting with particulate material [B24C 1/10](#); general features of presses, presses for consolidating scrap [B30B](#); furnaces in general [F27](#))

### 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.

<b>1/00</b>	<b>Preparing metal stock {or similar ancillary operations prior, during or post forging, e.g. heating or cooling (pretreatment for rolling <a href="#">B21B 1/02</a>, <a href="#">B21B 15/0035</a>)}</b>	5/08	. . Upsetting
1/003	. {Selecting material}	5/10	. . Piercing billets (in combination with extrusion <a href="#">B21C 23/00</a> )
1/006	. . {Amorphous metal}	5/12	. . Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering <a href="#">B21K</a> )
1/02	. Preliminary treatment of metal stock without particular shaping, e.g. salvaging segregated zones, forging or pressing in the rough (modifying the physical properties by deformation <a href="#">C21D 7/00</a> , <a href="#">C22F 1/00</a> )	<b>7/00</b>	<b>Hammers; Forging machines with hammers or die jaws acting by impact (hand hammers <a href="#">B25D</a>; electrical features in section H)</b>
1/025	. . {affecting grain orientation}	7/02	. Special design or construction
1/04	. Shaping in the rough solely by forging or pressing	7/04	. . Power hammers
1/06	. Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations {( <a href="#">B21J 5/063</a> takes precedence)}	7/06	. . Drop hammers
<b>3/00</b>	<b>Lubricating during forging or pressing (lubricating in general <a href="#">F16N</a>)</b>	7/08	. . . with rigidly-guided hammer
<b>5/00</b>	<b>Methods for forging, hammering, or pressing (for working sheet-metal or metal tubes, rods, or profiles <a href="#">B21D</a>; for working wire <a href="#">B21F</a>); Special equipment or accessories therefor</b>	7/10	. . with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers
5/002	. {Hybrid process, e.g. forging following casting}	7/12	. . . the lever being a spring, i.e. spring hammers
5/004	. {Thixotropic process, i.e. forging at semi-solid state}	7/14	. . Forging machines working with several hammers
5/006	. {using ultrasonic waves}	7/145	. . . {the hammers being driven by a rotating annular driving member}
5/008	. {Incremental forging}	7/16	. . . in rotary arrangements
5/02	. Die forging; Trimming by making use of special dies {; Punching during forging}	7/18	. . Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction, e.g. for swaging
5/022	. . {Open die forging}	7/20	. Drives for hammers; Transmission means therefor
5/025	. . {Closed die forging}	7/22	. . for power hammers
5/027	. . {Trimming}	7/24	. . . operated by steam, air, or other gaseous pressure
5/04	. by directly applied fluid pressure or explosive action	7/26	. . . . operated by internal combustion
5/06	. for performing particular operations	7/28	. . . operated by hydraulic or liquid pressure
5/063	. . {Friction heat forging (friction heat riveting <a href="#">B21J 15/027</a> )}	7/30	. . . operated by electro-magnets
5/066	. . . {Flow drilling}	7/32	. . . operated by rotary drive, e.g. by electric motor
		7/34	. . . operating both the hammer and the anvil, so-called counter-tup
		7/36	. . for drop hammers
		7/38	. . . driven by steam, air, or other gaseous pressure
		7/40	. . . driven by hydraulic or liquid pressure
		7/42	. . . operated by rotary drive, e.g. electric motors

7/44	. . . . equipped with belts, ropes, cables, chains	15/105	. . { <a href="#">Portable riveters (pliers for riveting B21J 15/386)</a> }
7/46	. . Control devices specially adapted to forging hammers, not restricted to one of the preceding subgroups	15/12	. . with tools or tool parts having a movement additional to the feed movement, e.g. spin {( <a href="#">B21J 15/027 takes precedence</a> )}
<b>9/00</b>	<b>Forging presses</b>	15/14	. . specially adapted for riveting specific articles, e.g. brake lining machines
9/02	. Special design or construction	15/142	. . . { <a href="#">Aerospace structures</a> }
9/022	. . { <a href="#">multi-stage forging presses (handling devices B21K 27/00)</a> }	15/145	. . . { <a href="#">Turbines</a> }
9/025	. . { <a href="#">with rolling or wobbling dies</a> }	15/147	. . . { <a href="#">Composite articles</a> }
9/027	. . { <a href="#">with punches moving along auxiliary lateral directions (B21J 13/025 takes precedence)</a> }	15/16	. . Drives for riveting machines; Transmission means therefor
9/04	. . Piercing presses	15/18	. . . operated by air pressure or other gas pressure, e.g. explosion pressure
9/06	. . Swaging presses; Upsetting presses	15/185	. . . . { <a href="#">by explosion pressure</a> }
9/08	. . . equipped with devices for heating the work-piece ( <a href="#">electric heating elements H05B</a> )	15/20	. . . operated by hydraulic or liquid pressure
9/10	. Drives for forging presses	15/205	. . . . { <a href="#">Riveting tools having hand operated pumps for building up the hydraulic pressure</a> }
9/12	. . operated by hydraulic or liquid pressure	15/22	. . . operated by both hydraulic or liquid pressure and gas pressure
9/14	. . . in conjunction with electric power	15/24	. . . operated by electro-magnets
9/16	. . . in conjunction with steam or gas power	15/26	. . . operated by rotary drive, e.g. by electric motor
9/18	. . operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars	15/28	. . Control devices specially adapted to riveting machines not restricted to one of the preceding subgroups
9/20	. . Control devices specially adapted to forging presses not restricted to one of the preceding subgroups	15/285	. . . { <a href="#">for controlling the rivet upset cycle</a> }
<b>11/00</b>	<b>Forging hammers combined with forging presses; Forging machines with provision for hammering and pressing</b>	15/30	. . Particular elements, e.g. supports; Suspension equipment specially adapted for portable riveters
<b>13/00</b>	<b>Details of machines for forging, pressing, or hammering</b>	15/32	. . . Devices for inserting or holding rivets in position with or without feeding arrangements
13/02	. Dies or mountings therefor	15/323	. . . . { <a href="#">using a carrier strip</a> }
13/025	. . { <a href="#">Dies with parts moving along auxiliary lateral directions</a> }	15/326	. . . . { <a href="#">Broken-off mandrel collection</a> }
13/03	. . Die mountings	15/34	. . . . for installing { <a href="#">multiple-type</a> } tubular rivets
13/04	. Frames; Guides	15/36	. . Rivet sets, i.e. tools for forming heads; Mandrels for expanding parts of hollow rivets
13/06	. Hammers tups; Anvils; Anvil blocks	15/365	. . . { <a href="#">Mandrels for expanding parts of hollow rivets</a> }
13/08	. Accessories for handling work or tools	15/38	. Accessories for use in connection with riveting, e.g. pliers for upsetting; Hand tools for riveting
13/085	. . { <a href="#">handling of tools</a> }	15/383	. . { <a href="#">Hand tools for riveting</a> }
13/10	. . Manipulators ( <a href="#">in general B25J</a> )	15/386	. . { <a href="#">Pliers for riveting</a> }
13/12	. . . Turning means	15/40	. . for forming rivet heads
13/14	. . Ejecting devices	15/42	. . Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
<b>15/00</b>	<b>Riveting</b>	15/44	. . Rivet hole positioners
15/02	. Riveting procedures	15/46	. . Positioners for rivets for making tube joints
15/022	. . { <a href="#">Setting rivets by means of swaged-on locking collars, e.g. lockbolts</a> }	15/48	. . Devices for caulking rivets
15/025	. . { <a href="#">Setting self-piercing rivets</a> }	15/50	. . Removing or cutting devices for rivets
15/027	. . { <a href="#">Setting rivets by friction heating</a> }	<b>17/00</b>	<b>Forge furnaces (<a href="#">furnaces for heat treatment C21D 9/00; furnaces in general F27</a>)</b>
15/04	. . Riveting hollow rivets mechanically	17/02	. . electrically heated ( <a href="#">electric heating elements H05B</a> )
15/041	. . . { <a href="#">by pushing a drive-pin</a> }	<b>19/00</b>	<b>Blacksmiths requisites not otherwise provided for</b>
15/043	. . . { <a href="#">by pulling a mandrel</a> }	19/02	. Hearths; Air supply arrangements specially adapted therefor
15/045	. . . . { <a href="#">and swaging locking means, i.e. locking the broken off mandrel head to the hollow rivet</a> }	19/025	. . { <a href="#">Tyre heaters</a> }
15/046	. . . { <a href="#">by edge-curling</a> }	19/04	. Anvils; Associated items
15/048	. . . { <a href="#">Setting self-drilling hollow rivets</a> }		
15/06	. . Riveting hollow rivets by means of hydraulic, liquid, or gas pressure {( <a href="#">portable riveters B21J 15/105</a> )}		
15/08	. . Riveting by applying heat {, e.g.} to the end parts of the rivets to enable heads to be formed {( <a href="#">B21J 15/027 takes precedence</a> )}		
15/10	. Riveting machines ( <a href="#">electric heating elements H05B</a> )		