

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.

1/00	Preparing metal stock {or similar ancillary operations prior, during or post forging, e.g. heating or cooling (pretreatment for rolling B21B 1/02, B21B 15/0035)}	5/068	. . {Shaving, skiving or scarifying for forming lifted portions, e.g. slices or barbs, on the surface of the material}
1/003	. {Selecting material}	5/08	. . Upsetting
1/006	. . {Amorphous metal}	5/10	. . Piercing billets (in combination with extrusion B21C 23/00)
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 C21D 7/00 , C22F 1/00)	5/12	. . Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering B21K)
1/025	. . {affecting grain orientation}	7/00	Hammers; Forging machines with hammers or die jaws acting by impact (hand hammers B25D; electrical features in section H)
1/04	. Shaping in the rough solely by forging or pressing	7/02	. Special design or construction
1/06	. Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations {(B21J 5/063 takes precedence)}	7/04	. . Power hammers
3/00	Lubricating during forging or pressing (lubricating in general F16N)	7/06	. . Drop hammers
5/00	Methods for forging, hammering, or pressing (for working sheet-metal or metal tubes, rods, or profiles B21D; for working wire B21F); Special equipment or accessories therefor	7/08	. . . with rigidly-guided hammer
5/002	. {Hybrid process, e.g. forging following casting}	7/10	. . with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers
5/004	. {Thixotropic process, i.e. forging at semi-solid state}	7/12	. . . the lever being a spring, i.e. spring hammers
5/006	. {using ultrasonic waves}	7/14	. . Forging machines working with several hammers
5/008	. {Incremental forging}	7/145	. . . {the hammers being driven by a rotating annular driving member}
5/02	. Die forging; Trimming by making use of special dies {; Punching during forging}	7/16	. . . in rotary arrangements
5/022	. . {Open die forging}	7/18	. . Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction, e.g. for swaging
5/025	. . {Closed die forging}	7/20	. Drives for hammers; Transmission means therefor
5/027	. . {Trimming}	7/22	. . for power hammers
5/04	. by directly applied fluid pressure or explosive action	7/24	. . . operated by steam, air, or other gaseous pressure
5/06	. for performing particular operations	7/26	. . . . operated by internal combustion
5/063	. . {Friction heat forging (friction heat riveting B21J 15/027)}	7/28	. . . . operated by hydraulic or liquid pressure
5/066	. . . {Flow drilling}	7/30	. . . . operated by electro-magnets
		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	15/08	. . Riveting by applying heat {, e.g.} to the end parts of the rivets to enable heads to be formed { (B21J 15/027 takes precedence) }
7/40	. . . driven by hydraulic or liquid pressure	15/10	. Riveting machines (electric heating elements H05B)
7/42	. . . operated by rotary drive, e.g. electric motors	15/105	. . { Portable riveters (pliers for riveting B21J 15/386) }
7/44	. . . . equipped with belts, ropes, cables, chains	15/12	. . with tools or tool parts having a movement additional to the feed movement, e.g. spin { (B21J 15/027 takes precedence) }
7/46	. . Control devices specially adapted to forging hammers, not restricted to one of the preceding subgroups	15/14	. . specially adapted for riveting specific articles, e.g. brake lining machines
9/00	Forging presses	15/142	. . . { Aerospace structures }
9/02	. Special design or construction	15/145	. . . { Turbines }
9/022	. . { multi-stage forging presses (handling devices B21K 27/00) }	15/147	. . . { Composite articles }
9/025	. . { with rolling or wobbling dies }	15/16	. . Drives for riveting machines; Transmission means therefor
9/027	. . { with punches moving along auxiliary lateral directions (B21J 13/025 takes precedence) }	15/18	. . . operated by air pressure or other gas pressure, e.g. explosion pressure
9/04	. . Piercing presses	15/185	. . . . {by explosion pressure }
9/06	. . Swaging presses; Upsetting presses	15/20	. . . operated by hydraulic or liquid pressure
9/08	. . . equipped with devices for heating the work-piece (electric heating elements H05B)	15/205	. . . . {Riveting tools having hand operated pumps for building up the hydraulic pressure }
9/10	. Drives for forging presses	15/22	. . . operated by both hydraulic or liquid pressure and gas pressure
9/12	. . operated by hydraulic or liquid pressure	15/24	. . . operated by electro-magnets
9/14	. . . in conjunction with electric power	15/26	. . . operated by rotary drive, e.g. by electric motor
9/16	. . . in conjunction with steam or gas power	15/28	. . Control devices specially adapted to riveting machines not restricted to one of the preceding subgroups
9/18	. . operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars	15/285	. . . { for controlling the rivet upset cycle }
9/20	. . Control devices specially adapted to forging presses not restricted to one of the preceding subgroups	15/30	. . Particular elements, e.g. supports; Suspension equipment specially adapted for portable riveters
11/00	Forging hammers combined with forging presses; Forging machines with provision for hammering and pressing	15/32	. . . Devices for inserting or holding rivets in position with or without feeding arrangements
13/00	Details of machines for forging, pressing, or hammering	15/323	. . . . {using a carrier strip }
13/02	. Dies or mountings therefor	15/326	. . . . {Broken-off mandrel collection }
13/025	. . { Dies with parts moving along auxiliary lateral directions }	15/34	. . . . for installing { multiple-type } tubular rivets
13/03	. . Die mountings	15/36	. . Rivet sets, i.e. tools for forming heads; Mandrels for expanding parts of hollow rivets
13/04	. Frames; Guides	15/365	. . . { Mandrels for expanding parts of hollow rivets }
13/06	. Hammers tups; Anvils; Anvil blocks	15/38	. Accessories for use in connection with riveting, e.g. pliers for upsetting; Hand tools for riveting
13/08	. Accessories for handling work or tools	15/383	. . { Hand tools for riveting }
13/085	. . { handling of tools }	15/386	. . { Pliers for riveting }
13/10	. . Manipulators (in general B25J)	15/40	. . for forming rivet heads
13/12	. . . Turning means	15/42	. . Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
13/14	. . Ejecting devices	15/44	. . Rivet hole positioners
15/00	Riveting	15/46	. . Positioners for rivets for making tube joints
15/02	. Riveting procedures	15/48	. . Devices for caulking rivets
15/022	. . { Setting rivets by means of swaged-on locking collars, e.g. lockbolts }	15/50	. . Removing or cutting devices for rivets
15/025	. . { Setting self-piercing rivets }	17/00	Forge furnaces (furnaces for heat treatment C21D 9/00; furnaces in general F27)
15/027	. . { Setting rivets by friction heating }	17/02	. electrically heated (electric heating elements H05B)
15/04	. . Riveting hollow rivets mechanically	19/00	Blacksmiths requisites not otherwise provided for
15/041	. . . { by pushing a drive-pin }	19/02	. Hearths; Air supply arrangements specially adapted therefor
15/043	. . . { by pulling a mandrel }	19/025	. . { Tyre heaters }
15/045	. . . . {and swaging locking means, i.e. locking the broken off mandrel head to the hollow rivet }	19/04	. Anvils; Associated items
15/046	. . . { by edge-curling }		
15/048	. . . { Setting self-drilling hollow rivets }		
15/06	. . Riveting hollow rivets by means of hydraulic, liquid, or gas pressure { (portable riveters B21J 15/105) }		