

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