

CPC**COOPERATIVE PATENT CLASSIFICATION****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](#))

B21J 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](#))

[B21J 1/003](#)

- {Selecting material}

[B21J 1/006](#)

- • {Amorphous metal}

[B21J 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](#))

[B21J 1/025](#)

- • {affecting grain orientation}

[B21J 1/04](#)

- Shaping in the rough solely by forging or pressing

[B21J 1/06](#)

- Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations {(B21J 5/063 takes precedence)}

B21J 3/00

Lubricating during forging or pressing (lubricating in general [F16N](#))

B21J 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**

[B21J 5/002](#)

- {Hybrid process, e.g. forging following casting}

[B21J 5/004](#)

- {Thixotropic process, i.e. forging at semi-solid state}

[B21J 5/006](#)

- {using ultrasonic waves}

[B21J 5/008](#)

- {Incremental forging}

[B21J 5/02](#)

- Die forging; Trimming by making use of special dies; {Punching during forging}

[B21J 5/022](#)

- • {Open die forging}

[B21J 5/025](#)

- • {Closed die forging}

[B21J 5/027](#)

- • {Trimming}

[B21J 5/04](#)

- by directly applied fluid pressure or explosive action

[B21J 5/06](#)

- for performing particular operations

[B21J 5/063](#)

- • {Friction heat forging (friction heat riveting [B21J 15/027](#))}

[B21J 5/066](#)

- • • {Flow drilling}

[B21J 5/08](#)

- • Upsetting

[B21J 5/10](#)

- • Piercing billets (in combination with extrusion [B21C 23/00](#))

[B21J 5/12](#)

- • Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering [B21K](#))

B21J 7/00	Hammers; Forging machines with hammers or die jaws acting by impact (hand hammers B25D ; electrical features in section H)
B21J 7/02	. Special design or construction
B21J 7/04	. . Power hammers
B21J 7/06	. . Drop hammers
B21J 7/08	. . . with rigidly-guided hammer
B21J 7/10	. . with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers
B21J 7/12	. . . the lever being a spring, i.e. spring hammers
B21J 7/14	. . Forging machines working with several hammers
B21J 7/145	. . . {the hammers being driven by a rotating annular driving member}
B21J 7/16	. . . in rotary arrangements
B21J 7/18	. . Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction e.g. for swaging
B21J 7/20	. Drives for hammers; Transmission means therefor
B21J 7/22	. . for power hammers
B21J 7/24	. . . operated by steam, air, or other gaseous pressure
B21J 7/26 operated by internal combustion
B21J 7/28 operated by hydraulic or liquid pressure
B21J 7/30 operated by electro-magnets
B21J 7/32 operated by rotary drive, e.g. by electric motor
B21J 7/34 operating both the hammer and the anvil, so-called counter-tup
B21J 7/36	. . for drop hammers
B21J 7/38	. . . driven by steam, air, or other gaseous pressure
B21J 7/40	. . . driven by hydraulic or liquid pressure
B21J 7/42 operated by rotary drive, e.g. electric motors
B21J 7/44 equipped with belts, ropes, cables, chains
B21J 7/46	. . Control devices specially adapted to forging hammers, not restricted to one of the preceding sub-groups
B21J 9/00	Forging presses
B21J 9/02	. Special design or construction
B21J 9/022	. . {multi-stage forging presses (handling devices B21K 27/00)}
B21J 9/025	. . {with rolling or wobbling dies}
B21J 9/027	. . {with punches moving along auxiliary lateral directions (B21J 13/025 takes precedence)}
B21J 9/04	. . Piercing presses
B21J 9/06	. . Swaging presses; Upsetting presses
B21J 9/08	. . . equipped with devices for heating the work-piece (electric heating elements H05B)
B21J 9/10	. Drives for forging presses

- B21J 9/12 . . . operated by hydraulic or liquid pressure
- B21J 9/14 in conjunction with electric power
- B21J 9/16 in conjunction with steam or gas power
- B21J 9/18 . . . operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars
- B21J 9/20 . . . Control devices specially adapted to forging presses not restricted to one of the preceding sub-groups

B21J 11/00 Forging hammers combined with forging presses; Forging machines with provision for hammering and pressing

B21J 13/00 Details of machines for forging, pressing, or hammering

- B21J 13/02 . Dies or mountings therefor
- B21J 13/025 . . {Dies with parts moving along auxiliary lateral directions}
- B21J 13/03 . . Die mountings
- B21J 13/04 . Frames; Guides
- B21J 13/06 . Hammers tups; Anvils; Anvil blocks
- B21J 13/08 . Accessories for handling work or tools
- B21J 13/085 . . {handling of tools}
- B21J 13/10 . . Manipulators (in general B25J)
- B21J 13/12 . . . Turning means
- B21J 13/14 . . Ejecting devices

B21J 15/00 Riveting

- B21J 15/02 . Riveting procedures
- B21J 15/022 . . {Setting rivets by means of swaged-on locking collars, e.g. lockbolts}
- B21J 15/025 . . {Setting self-piercing rivets}
- B21J 15/027 . . {Setting rivets by friction heating}
- B21J 15/04 . . Riveting hollow rivets mechanically
- B21J 15/041 . . . {by pushing a drive-pin}
- B21J 15/043 . . . {by pulling a mandrel}
- B21J 15/045 {and swaging locking means, i.e. locking the broken off mandrel head to the hollow rivet}
- B21J 15/046 . . . {by edge-curling}
- B21J 15/048 . . . {Setting self-drilling hollow rivets}
- B21J 15/06 . . Riveting hollow rivets by means of hydraulic, liquid, or gas pressure {(portable riveters B21J 15/105)}
- B21J 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)}
- B21J 15/10 . Riveting machines (electric heating elements H05B)
- B21J 15/105 . . {Portable riveters (pliers for riveting B21J 15/386)}
- B21J 15/12 . . with tools or tool parts having a movement additional to the feed movement, e.g. spin {(B21J 15/027 takes precedence)}

B21J 15/14	• . specially adapted for riveting specific articles, e.g. brake lining machines
B21J 15/142	• . . {Aerospace structures}
B21J 15/145	• . . {Turbines}
B21J 15/147	• . . {Composite articles}
B21J 15/16	• . Drives for riveting machines; Transmission means therefor
B21J 15/18	• . . operated by air pressure or other gas pressure, e.g. explosion pressure
B21J 15/185	• . . . {by explosion pressure}
B21J 15/20	• . . operated by hydraulic or liquid pressure
B21J 15/205	• . . . {Riveting tools having hand operated pumps for building up the hydraulic pressure}
B21J 15/22	• . . operated by both hydraulic or liquid pressure and gas pressure
B21J 15/24	• . . operated by electro-magnets
B21J 15/26	• . . operated by rotary drive, e.g. by electric motor
B21J 15/28	• . Control devices specially adapted to riveting machines not restricted to one of the preceding sub-groups
B21J 15/285	• . . {for controlling the rivet upset cycle}
B21J 15/30	• . Particular elements, e.g. supports; Suspension equipment specially adapted for portable riveters
B21J 15/32	• . . Devices for inserting or holding rivets in position with or without feeding arrangements
B21J 15/323	• . . . {using a carrier strip}
B21J 15/326	• . . . {Broken-off mandrel collection}
B21J 15/34	• . . . for installing {multiple-type} tubular rivets
B21J 15/36	• . Rivet sets, i.e. tools for forming heads; Mandrels for expanding parts of hollow rivets
B21J 15/365	• . . {Mandrels for expanding parts of hollow rivets}
B21J 15/38	• Accessories for use in connection with riveting, e.g. pliers for upsetting; Hand tools for riveting
B21J 15/383	• . {Hand tools for riveting}
B21J 15/386	• . {Pliers for riveting}
B21J 15/40	• . for forming rivet heads
B21J 15/42	• . Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
B21J 15/44	• . Rivet hole positioners
B21J 15/46	• . Positioners for rivets for making tube joints
B21J 15/48	• . Devices for caulking rivets
B21J 15/50	• . Removing or cutting devices for rivets
B21J 17/00	Forge furnaces (furnaces for heat treatment C21D 9/00 ; furnaces in general F27)
B21J 17/02	• electrically heated (electric heating elements H05B)
B21J 19/00	Blacksmiths requisites not otherwise provided for
B21J 19/02	• Hearths; Air supply arrangements specially adapted therefor

B21J 19/025

- • {Tyre heaters}

B21J 19/04

- Anvils; Associated items