

CPC**COOPERATIVE PATENT CLASSIFICATION****B21J****FORGING; HAMMERING; PRESSING; 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](#); furnace 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