

**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