

ECLA EUROPEAN 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 [B23P9/04](#); compacting surfaces by blasting with particulate material [B24C1/10](#); general features of presses, presses for consolidating scrap B30B; furnace in general F27) [C9611]
- B21J1/00 Preparing metal stock [N: or similar ancillary operations prior, during or post forging, e.g. heating or cooling (pretreatment for rolling B21B1/02, B21B15/00F)]** [N1204]
- B21J1/00B . [N: Selecting material] [N1204]
- B21J1/00B2 . . [N: Amorphous metal] [N1204]
- B21J1/02 . 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 [C21D7/00](#), [C22F1/00](#))
- B21J1/02B . . [N: affecting grain orientation] [N1204]
- B21J1/04 . Shaping in the rough solely by forging or pressing
- B21J1/06 . Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations [N: ([B21J5/06B](#) takes precedence)] [C0902]
- B21J3/00 Lubricating during forging or pressing** (lubricating in general [F16N](#))
- B21J5/00 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**
- B21J5/00B . [N: Hybrid process, e.g. forging following casting] [N1204]
- B21J5/00C . [N: Thixotropic process, i.e. forging at semi-solid state] [N1204]
- B21J5/00D . [N: using ultrasonic waves] [N1204]
- B21J5/00J . [N: Incremental forging] [N1204]
- B21J5/02 . Die forging; Trimming by making use of special dies; [N: Punching during forging] [N1204]
- B21J5/02B . . [N: Open die forging] [N1204]
- B21J5/02D . . [N: Closed die forging] [N1204]
- B21J5/02F . . [N: Trimming] [N1204]
- B21J5/04 . by directly applied fluid pressure or explosive action
- B21J5/06 . for performing particular operations

- B21J5/06B . . [N: Friction heat forging (friction heat riveting [B21J15/02F](#))] [N0902]
- B21J5/06B2 . . . [N: Flow drilling] [N0902]
- B21J5/08 . . Upsetting
- B21J5/10 . . Piercing billets (in combination with extrusion [B21C23/00](#))
- B21J5/12 . . Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering [B21K](#))

B21J7/00 Hammers; Forging machines with hammers or die jaws acting by impact (hand hammers [B25D](#); electrical features in section H)

- B21J7/02 . Special design or construction
- B21J7/04 . . Power hammers
- B21J7/06 . . Drop hammers
- B21J7/08 . . . with rigidly-guided hammer
- B21J7/10 . . with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers
- B21J7/12 . . . the lever being a spring, i.e. spring hammers
- B21J7/14 . . Forging machines working with several hammers
- B21J7/14B . . . [N: the hammers being driven by a rotating annular driving member]
- B21J7/16 . . . in rotary arrangements
- B21J7/18 . . Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction e.g. for swaging
- B21J7/20 . Drives for hammers; Transmission means therefor
- B21J7/22 . . for power hammers
- B21J7/24 . . . operated by steam, air, or other gaseous pressure
- B21J7/26 operated by internal combustion
- B21J7/28 operated by hydraulic or liquid pressure
- B21J7/30 operated by electro-magnets
- B21J7/32 operated by rotary drive, e.g. by electric motor
- B21J7/34 operating both the hammer and the anvil, so-called counter-tup
- B21J7/36 . . for drop hammers
- B21J7/38 driven by steam, air, or other gaseous pressure
- B21J7/40 driven by hydraulic or liquid pressure
- B21J7/42 operated by rotary drive, e.g. electric motors
- B21J7/44 equipped with belts, ropes, cables, chains
- B21J7/46 . . Control devices specially adapted to forging hammers, not restricted to one of the preceding sub-groups

B21J9/00 Forging presses

- B21J9/02 . Special design or construction
- B21J9/02B . . [N: multi-stage forging presses (handling devices [B21K27/00](#))] [N0207]
- B21J9/02R . . [N: with rolling or wobbling dies]
- B21J9/02T . . [N: with punches moving along auxiliary lateral directions (B21J13/02B takes

- precedence)] [N1204]
- B21J9/04 . . Piercing presses
- B21J9/06 . . Swaging presses; Upsetting presses
- B21J9/08 . . . equipped with devices for heating the work-piece (electric heating elements H05B)
- B21J9/10 . Drives for forging presses
- B21J9/12 . . operated by hydraulic or liquid pressure
- B21J9/14 . . . in conjunction with electric power
- B21J9/16 . . . in conjunction with steam or gas power
- B21J9/18 . . operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars
- B21J9/20 . . Control devices specially adapted to forging presses not restricted to one of the preceding sub-groups

B21J11/00 Forging hammers combined with forging presses; Forging machines with provision for hammering and pressing

B21J13/00 Details of machines for forging, pressing, or hammering

- B21J13/02 . Dies or mountings therefor
- B21J13/02B . . [N: Dies with parts moving along auxiliary lateral directions] [N1204]
- B21J13/03 . . Die mountings
- B21J13/04 . Frames; Guides
- B21J13/06 . Hammers tups; Anvils; Anvil blocks
- B21J13/08 . Accessories for handling work or tools
- B21J13/08B . . [N: handling of tools]
- B21J13/10 . . Manipulators (in general B25J)
- B21J13/12 . . . Turning means
- B21J13/14 . . Ejecting devices

B21J15/00 Riveting

- B21J15/02 . Riveting procedures
- B21J15/02B . . [N: Setting rivets by means of swaged-on locking collars, e.g. lockbolts]
- B21J15/02D . . [N: Setting self-piercing rivets] [N0011]
- B21J15/02F . . [N: Setting rivets by friction heating] [N0902]
- B21J15/04 . . Riveting hollow rivets mechanically
- B21J15/04A . . . [N: by pushing a drive-pin] [N1202]
- B21J15/04B . . . [N: by pulling a mandrel] [C1012]
- B21J15/04B2 [N: and swaging locking means, i.e. locking the broken off mandrel head to the hollow rivet] [N1202]

- B21J15/04C . . . [N: by edge-curling]
- B21J15/04D . . . [N: Setting self-drilling hollow rivets] [C1012]
- B21J15/06 . . [N: Riveting hollow rivets by means of hydraulic, liquid, or gas pressure (portable riveters [B21J15/10B](#))] [M1202]
- B21J15/08 . . riveting by applying heat [N: , e.g.] to the end parts of the rivets to enable heads to be formed [N: (B21J15/02F takes precedence)] [N1204]

- B21J15/10 . Riveting machines (electric heating elements [H05B](#))
- B21J15/10B . . [N: Portable riveters (pliers for riveting [B21J15/38P](#))] [N1202]
- B21J15/12 . . with tools or tool parts having a movement additional to the feed movement, e.g. spin [N: ([B21J15/02F](#) takes precedence)] [C0902]
- B21J15/14 . . specially adapted for riveting specific articles, e.g. brake lining machines
- B21J15/14A . . . [N: Aerospace structures] [N1204]
- B21J15/14B . . . [N: Turbines] [N1204]
- B21J15/14C . . . [N: Composite articles] [N1204]
- B21J15/16 . . Drives for riveting machines; Transmission means therefor
- B21J15/18 . . . operated by air pressure or other gas pressure, e.g. explosion pressure
- B21J15/18B [N: by explosion pressure]
- B21J15/20 . . . operated by hydraulic or liquid pressure
- B21J15/20B [N: Riveting tools having hand operated pumps for building up the hydraulic pressure] [N9611]
- B21J15/22 . . . operated by both hydraulic or liquid pressure and gas pressure
- B21J15/24 . . . operated by electro-magnets
- B21J15/26 . . . operated by rotary drive, e.g. by electric motor
- B21J15/28 . . Control devices specially adapted to riveting machines not restricted to one of the preceding sub-groups
- B21J15/28B . . . [N: for controlling the rivet upset cycle] [N0512]
- B21J15/30 . . Particular elements, e.g. supports; Suspension equipment specially adapted for portable riveters
- B21J15/32 . . . Devices for inserting or holding rivets in position with or without feeding arrangements
- B21J15/32H [N: using a carrier strip] [N1202]
- B21J15/32R [N: Broken-off mandrel collection] [N1202]
- B21J15/34 for installing [N: multiple-type] tubular rivets [N1204]
- B21J15/36 . . Rivet sets, i.e. tools for forming heads; Mandrels for expanding parts of hollow rivets
- B21J15/36M . . . [N: Mandrels for expanding parts of hollow rivets]

- B21J15/38 . Accessories for use in connection with riveting, e.g. pliers for upsetting; Hand tools for riveting
- B21J15/38H . . [N: Hand tools for riveting] [N1202]
- B21J15/38P . . [N: Pliers for riveting] [M1202]
- B21J15/40 . . for forming rivet heads
- B21J15/42 . . Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
- B21J15/44 . . Rivet hole positioners

- B21J15/46 . . Positioners for rivets for making tube joints
- B21J15/48 . . Devices for caulking rivets
- B21J15/50 . . Removing or cutting devices for rivets

- B21J17/00** **Forge furnaces** (furnaces for heat treatment [C21D9/00](#); furnaces in general [F27](#))

- B21J17/02 . electrically heated (electric heating elements [H05B](#))

- B21J19/00** **Blacksmiths requisites not otherwise provided for**

- B21J19/02 . Hearths; Air supply arrangements specially adapted therefor
- B21J19/02B . . [\[N: Tyre heaters\]](#)

- B21J19/04 . Anvils; Associated items