

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