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)

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)**}**

1/003 . {Selecting material}

1/006 . . {Amorphous metal}

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)

1/025 . . {affecting grain orientation}

1/04 . Shaping in the rough solely by forging or pressing

1/06 . Heating or cooling methods or arrangements specially adapted for performing forging or pressing operations {(B21J 5/063 takes precedence)}

3/00 **Lubricating during forging or pressing** (lubricating in general F16N)

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**

5/002 . {Hybrid process, e.g. forging following casting}

5/004 . {Thixotropic process, i.e. forging at semi-solid state}

5/006 . {using ultrasonic waves}

5/008 . {Incremental forging}

5/02 . Die forging; Trimming by making use of special dies; {Punching during forging}

5/022 . . {Open die forging}

5/025 . . {Closed die forging}

5/027 . . {Trimming}

5/04 . by directly applied fluid pressure or explosive action

5/06 . for performing particular operations

5/063 . . {Friction heat forging (friction heat riveting B21J 15/027)}

5/066 . . . {Flow drilling}

5/08 . . Upsetting

5/10 . . Piercing billets (in combination with extrusion B21C 23/00)

5/12 . . Forming profiles on internal or external surfaces (making screw-thread by forging, pressing, or hammering B21K)

7/00 **Hammers; Forging machines with hammers or die jaws acting by impact** (hand hammers B25D; electrical features in section H)

7/02 . Special design or construction

7/04 . . Power hammers

7/06 . . Drop hammers

7/08 . . . with rigidly-guided hammer

7/10 . . with both drive and hammer connected to a fulcrumed lever, e.g. tail hammers

7/12 . . . the lever being a spring, i.e. spring hammers

7/14 . . Forging machines working with several hammers

7/145 . . . {the hammers being driven by a rotating annular driving member}

7/16 . . . in rotary arrangements

7/18 . . Forging machines working with die jaws, e.g. pivoted, movable laterally of the forging or pressing direction, e.g. for swaging

7/20 . Drives for hammers; Transmission means therefor

7/22 . . for power hammers

7/24 . . . operated by steam, air, or other gaseous pressure

7/26 . . . . operated by internal combustion

7/28 . . . operated by hydraulic or liquid pressure

7/30 . . . operated by electro-magnets

7/32 . . . operated by rotary drive, e.g. by electric motor

7/34 . . . operating both the hammer and the anvil, so-called counter-tup

7/36 . . for drop hammers

7/38 . . . driven by steam, air, or other gaseous pressure

7/40 . . . driven by hydraulic or liquid pressure

7/42 . . . operated by rotary drive, e.g. electric motors

7/44 . . . . equipped with belts, ropes, cables, chains

7/46 . . Control devices specially adapted to forging hammers, not restricted to one of the preceding sub-groups

9/00 **Forging presses**

9/02 . Special design or construction

9/022 . . {multi-stage forging presses (handling devices B21K 27/00)}

9/025 . . {with rolling or wobbling dies}

9/027 . . {with punches moving along auxiliary lateral directions (B21J 13/025 takes precedence)}

9/04 . . Piercing presses

9/06 . . Swaging presses; Upsetting presses

9/08 . . . equipped with devices for heating the work-piece (electric heating elements H05B)

9/10 . Drives for forging presses

9/12 . . operated by hydraulic or liquid pressure

9/14 . . . in conjunction with electric power

9/16 . . . in conjunction with steam or gas power

9/18 . . operated by making use of gearing mechanisms, e.g. levers, spindles, crankshafts, eccentrics, toggle-levers, rack bars

9/20 . . Control devices specially adapted to forging presses not restricted to one of the preceding sub-groups

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

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

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

15/00 **Riveting**

15/02 . Riveting procedures
15/022 . . {Setting rivets by means of swaged-on locking collars, e.g. lockbolts}
15/025 . . {Setting self-piercing rivets}
15/027 . . {Setting rivets by friction heating}
15/04 . . Riveting hollow rivets mechanically
15/041 . . . {by pushing a drive-pin}
15/043 . . . {by pulling a mandrel}
15/045 . . . . {and swaging locking means, i.e. locking the broken off mandrel head to the hollow rivet}
15/046 . . . {by edge-curling}
15/048 . . . {Setting self-drilling hollow rivets}
15/06 . . Riveting hollow rivets by means of hydraulic, liquid, or gas pressure {(portable riveters B21J 15/105)}
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)}
15/10 . Riveting machines (electric heating elements H05B)
15/105 . . {Portable riveters (pliers for riveting B21J 15/386)}
15/12 . . with tools or tool parts having a movement additional to the feed movement, e.g. spin {(B21J 15/027 takes precedence)}
15/14 . . specially adapted for riveting specific articles, e.g. brake lining machines
15/142 . . . {Aerospace structures}
15/145 . . . {Turbines}
15/147 . . . {Composite articles}
15/16 . . Drives for riveting machines; Transmission means therefor
15/18 . . . operated by air pressure or other gas pressure, e.g. explosion pressure
15/185 . . . . {by explosion pressure}
15/20 . . . operated by hydraulic or liquid pressure
15/205 . . . . {Riveting tools having hand operated pumps for building up the hydraulic pressure}
15/22 . . . operated by both hydraulic or liquid pressure and gas pressure
15/24 . . . operated by electro-magnets
15/26 . . . operated by rotary drive, e.g. by electric motor
15/28 . . Control devices specially adapted to riveting machines not restricted to one of the preceding sub-groups
15/285 . . . {for controlling the rivet upset cycle}
15/30 . . Particular elements, e.g. supports; Suspension equipment specially adapted for portable riveters
15/32 . . . Devices for inserting or holding rivets in position with or without feeding arrangements
15/323 . . . . {using a carrier strip}
15/326 . . . . {Broken-off mandrel collection}
15/34 . . . . for installing {multiple-type} tubular rivets
15/36 . . Rivet sets, i.e. tools for forming heads; Mandrels for expanding parts of hollow rivets
15/365 . . . {Mandrels for expanding parts of hollow rivets}
15/38 . Accessories for use in connection with riveting, e.g. pliers for upsetting; Hand tools for riveting
15/383 . . {Hand tools for riveting}
15/386 . . {Pliers for riveting}
15/40 . . for forming rivet heads
15/42 . . Special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes
15/44 . . Rivet hole positioners
15/46 . . Positioners for rivets for making tube joints
15/48 . . Devices for caulking rivets
15/50 . . Removing or cutting devices for rivets

17/00 **Forge furnaces** (furnaces for heat treatment C21D 9/00; furnaces in general F27)

17/02 . electrically heated (electric heating elements H05B)

19/00 **Blacksmiths requisites not otherwise provided for**

19/02 . Hearths; Air supply arrangements specially adapted therefor
19/025 . . {Tyre heaters}
19/04 . Anvils; Associated items