

**CPC****COOPERATIVE PATENT CLASSIFICATION****B21F**

**WORKING AND PROCESSING OF WIRE** ({ reducing diameter by} rolling of metal [B21B](#); by drawing, auxiliary operations used in connection with metal working without essentially removing material [B21C](#))

**Wire working characterised by operations performed****B21F 1/00****Bending wire other than coiling; Straightening wire**

- B21F 1/002 . {by means of manually operated devices, e.g. pliers}
- B21F 1/004 . {by means of press-type tooling}
- B21F 1/006 . {in 3D with means to rotate the tools about the wire axis}
- B21F 1/008 . {in 3D with means to rotate the wire about its axis}
- B21F 1/02 . Straightening
- B21F 1/023 . . {in a device rotating about the wire axis}
- B21F 1/026 . . {Straightening and cutting}
- B21F 1/04 . Undulating
- B21F 1/06 . Bending wire-eyes

**B21F 3/00****Coiling wire into particular forms**

- B21F 3/02 . helically
- B21F 3/027 . . with extended ends formed in a special shape, e.g. for clothes-pegs
- B21F 3/04 . . externally on a mandrel or the like
- B21F 3/06 . . internally on a hollow form
- B21F 3/08 . to flat spiral
- B21F 3/10 . to spirals other than flat, e.g. conical
- B21F 3/12 . of interconnected helical springs

**B21F 5/00****Upsetting wire { or pressing operations affecting the wire cross-section }(in the manufacture of nails or pins [B21G 3/12](#))**

- B21F 5/005 . {Upsetting wire}

**B21F 7/00****Twisting wire; Twisting wire together (for connections of limited size [B21F 15/04](#))****B21F 9/00****Straining wire (straining pre-stressing wires for concrete [E04G 21/12](#); connections or attachments adapted for straining [F16G 11/00](#); {bundling machines or tools [B65B 13/00](#)})**

- B21F 9/002 . {to maintain tension in the wire, e.g. to pull the wire taut}
- B21F 9/005 . {to affect the material properties of the wire}
- B21F 9/007 . {to induce a plastic deformation of the wire}
- B21F 9/02 . by tools adapted also for making connections

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| <b>B21F 11/00</b> | <b>Cutting wire</b> (hand cutting tools <a href="#">B26B</a> )   |
| B21F 11/005       | . {springs}  |
| <b>B21F 13/00</b> | <b>Splitting wire</b>  |
| <b>B21F 15/00</b> | <b>Connecting wire to wire or other metallic material or objects; Connecting parts by means of wire</b> (tools for both straining and connecting <a href="#">B21F 9/00</a> ; jacketing or reinforcing <a href="#">B21F 17/00</a> ; manufacture of wire network <a href="#">B21F 27/00</a> ; in making bands <a href="#">B21F 43/00</a> ) { <b>bundling machines or tools</b> <a href="#">B65B 13/00</a> ; for <b>semiconductors</b> <a href="#">H01L 24/85</a> } |
| B21F 15/02        | . wire with wire   |
| B21F 15/04        | . . without additional connecting elements or material, e.g. by twisting   |
| B21F 15/06        | . . with additional connecting elements or material {( <a href="#">B21F 27/08</a> takes precedence)}   |
| B21F 15/08        | . . . making use of soldering or welding {( <a href="#">B21F 27/10</a> takes precedence)}  |
| B21F 15/10        | . wire with sheet metal  |
| <b>B21F 17/00</b> | <b>Jacketing or reinforcing articles with wire</b> (by winding <a href="#">B65H 54/00</a> , <a href="#">B65H 81/00</a> ; by braiding <a href="#">D04C</a> )  |
| <b>B21F 19/00</b> | <b>Metallic coating of wire</b> (by extruding <a href="#">B21C 23/24</a> ; by soldering or welding, e.g. cladding or plating <a href="#">B23K</a> ; by other non-mechanical means <a href="#">C23</a> ; electroplating <a href="#">C25D</a> )  |
| <b>B21F 23/00</b> | <b>Feeding wire in wire-working machines or apparatus</b> (applicable also to feeding rods or strips <a href="#">B21D 43/00</a> )  |
| B21F 23/002       | . {Feeding means specially adapted for handling various diameters of wire or rod}  |
| B21F 23/005       | . {Feeding discrete lengths of wire or rod}  |
| B21F 23/007       | . . {using pick-up means, e.g. for isolating a predefined number of wires from a bundle}   |

#### **Wire working characterised by the particular articles produced**

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| <b>B21F 25/00</b> | <b>Making barbed wire</b>  |
| <b>B21F 27/00</b> | <b>Making wire network, i.e. wire nets</b> (meshed-ring network <a href="#">B21F 31/00</a> ; in making bands <a href="#">B21F 43/00</a> ; using looms <a href="#">D03D</a> ) |
| B21F 27/005       | . {Wire network per se}  |
| B21F 27/02        | . without additional connecting elements or material at crossings, e.g. connected by knitting  |
| B21F 27/04        | . . Manufacturing on machines with rotating blades or formers  |
| B21F 27/06        | . . Manufacturing on twister-gear machines   |
| B21F 27/08        | . with additional connecting elements or material at crossings   |
| B21F 27/10        | . . with soldered or welded crossings {(resistance spot welding machines for manufacturing of metallic grids or mats <a href="#">B23K 11/008</a> )}                          |
| B21F 27/12        | . Making special types or portions of network by methods or means specially adapted therefor   |

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| B21F 27/121       | .. {of tubular form, e.g. as reinforcements for pipes or pillars}   |
| B21F 27/122       | ... {by attaching a continuous stirrup to longitudinal wires}   |
| B21F 27/124       | .... {applied by rotation}  |
| B21F 27/125       | ... {by attaching individual stirrups to longitudinal wires}  |
| B21F 27/127       | ... {by bending preformed mesh}   |
| B21F 27/128       | .. {of three-dimensional form by connecting wire networks, e.g. by projecting wires through an insulating layer}                      |
| B21F 27/14        | .. Specially bending or deforming free wire ends  |
| B21F 27/16        | .. for spring mattresses  |
| B21F 27/18        | .. of meshed work for filters or sieves   |
| B21F 27/20        | .. of plaster-carrying network  |
| B21F 27/22        | .. of network for wire-reinforced glass or the like   |
| <b>B21F 29/00</b> | <b>Making fencing or like material made partly of wire</b> ( <a href="#">B21F 25/00</a> , <a href="#">B21F 27/00</a> take precedence) |
| B21F 29/02        | . comprising bars or the like connected by wires  |
| <b>B21F 31/00</b> | <b>Making meshed-ring network from wire</b>   |
| <b>B21F 33/00</b> | <b>Tools or devices specially designed for handling or processing wire fabrics or the like</b>  |
| B21F 33/002       | . {Coiling or packing wire network}   |
| B21F 33/005       | . {Cutting wire network}  |
| B21F 33/007       | . {Connecting wire network}   |
| B21F 33/02        | . Mounting of wire network on frames  |
| B21F 33/025       | .. {Mounting of mattress innersprings on borderframes}  |
| B21F 33/04        | . Connecting ends of helical springs for mattresses   |
| <b>B21F 35/00</b> | <b>Making springs from wire</b> (by coiling wire <a href="#">B21F 3/00</a> ; making resilient rings <a href="#">B21F 37/02</a> )      |
| B21F 35/003       | . {Multi-filament springs, e.g. made of stranded, braided, cable or multi-filament material}  |
| B21F 35/006       | . {Double twist coil springs}   |
| B21F 35/02        | . Bending or deforming ends of coil springs to special shape  |
| B21F 35/04        | . Making flat springs, e.g. sinus springs   |
| <b>B21F 37/00</b> | <b>Manufacture of rings from wire</b> (in chain making <a href="#">B21L</a> ; making of tyre beads <a href="#">B29D 30/48</a> )       |
| B21F 37/02        | . of resilient rings, e.g. key-rings  |
| B21F 37/04        | . of washers ( <a href="#">B21F 37/02</a> takes precedence)   |
| <b>B21F 39/00</b> | <b>Making wheel spokes from wire</b>  |
| <b>B21F 41/00</b> | <b>Making umbrella frames or members from wire</b>  |

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| <b>B21F 43/00</b>           | <b>Making bands, e.g. bracelets, or wire</b> (making chains <a href="#">B21L</a> ; using looms <a href="#">D03D</a> )  |
| <b>B21F 45/00</b>           | <b>Wire-working in the manufacture of other particular articles</b> (of pins, needles, nails, hairpins <a href="#">B21G</a> ; of chains <a href="#">B21L</a> ; { for semiconductor devices <a href="#">H01L 24/42</a> }) |
| <a href="#">B21F 45/002</a> | . {of frames for spectacles}   |
| <a href="#">B21F 45/004</a> | . {Mounting bails on containers}   |
| <a href="#">B21F 45/006</a> | . {of concrete reinforcement fibres}   |
| <a href="#">B21F 45/008</a> | . {of medical instruments, e.g. stents, corneal rings (medical science <a href="#">A61</a> )}  |
| <a href="#">B21F 45/02</a>  | . of clothes hangers   |
| <a href="#">B21F 45/04</a>  | . of elements, e.g. levers or links, for bottle stoppers   |
| <a href="#">B21F 45/06</a>  | . of flexible shafts or hollow conduits, e.g. for Bowden mechanisms  |
| <a href="#">B21F 45/08</a>  | . of loom heddles  |
| <a href="#">B21F 45/10</a>  | . of cards for fabric-napping machines   |
| <a href="#">B21F 45/12</a>  | . of fishing hooks   |
| <a href="#">B21F 45/14</a>  | . of end-pieces for laces or ropes   |
| <a href="#">B21F 45/16</a>  | . of devices for fastening or securing purposes  |
| <a href="#">B21F 45/18</a>  | . . of slide fastener elements   |
| <a href="#">B21F 45/20</a>  | . . of springs hooks; of spring safety hooks   |
| <a href="#">B21F 45/22</a>  | . . of paper fasteners or clips ( <a href="#">staples B21F 45/24</a> )   |
| <a href="#">B21F 45/24</a>  | . . of staples; of belt-fastening elements   |
| <a href="#">B21F 45/26</a>  | . . of buttons   |
| <a href="#">B21F 45/28</a>  | . . . of "patent-fastener" or press-button type  |
| <b>B21F 99/00</b>           | <b>Subject matter not provided for in other groups of this subclass</b>  |