

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

**WORKING OR PROCESSING OF METAL WIRE** ({reducing diameter by} rolling of metal [B21B](#); by drawing, auxiliary operations used in connection with metal-working without essentially removing material [B21C](#); bundling articles [B65B 13/00](#))

**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

<b>B21F 11/00</b>	<b>Cutting wire</b> (hand cutting tools <a href="#">B26B</a> )
B21F 11/005	<ul style="list-style-type: none"> <li>• {springs}</li> </ul>
<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> {bundling machines or tools <a href="#">B65B 13/00</a> ; for semiconductors <a href="#">H01L 24/85</a> })
B21F 15/02	<ul style="list-style-type: none"> <li>• wire with wire</li> </ul>
B21F 15/04	<ul style="list-style-type: none"> <li>• . without additional connecting elements or material, e.g. by twisting</li> </ul>
B21F 15/06	<ul style="list-style-type: none"> <li>• . with additional connecting elements or material {(<a href="#">B21F 27/08</a> takes precedence)}</li> </ul>
B21F 15/08	<ul style="list-style-type: none"> <li>• . . making use of soldering or welding {(<a href="#">B21F 27/10</a> takes precedence)}</li> </ul>
B21F 15/10	<ul style="list-style-type: none"> <li>• wire with sheet metal</li> </ul>
<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	<ul style="list-style-type: none"> <li>• {Feeding means specially adapted for handling various diameters of wire or rod}</li> </ul>
B21F 23/005	<ul style="list-style-type: none"> <li>• {Feeding discrete lengths of wire or rod}</li> </ul>
B21F 23/007	<ul style="list-style-type: none"> <li>• . {using pick-up means, e.g. for isolating a predefined number of wires from a bundle}</li> </ul>

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

<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	<ul style="list-style-type: none"> <li>• {Wire network per se}</li> </ul>
B21F 27/02	<ul style="list-style-type: none"> <li>• without additional connecting elements or material at crossings, e.g. connected by knitting</li> </ul>
B21F 27/04	<ul style="list-style-type: none"> <li>• . Manufacturing on machines with rotating blades or formers</li> </ul>
B21F 27/06	<ul style="list-style-type: none"> <li>• . Manufacturing on twister-gear machines</li> </ul>
B21F 27/08	<ul style="list-style-type: none"> <li>• with additional connecting elements or material at crossings</li> </ul>
B21F 27/10	<ul style="list-style-type: none"> <li>• . with soldered or welded crossings {(resistance spot welding machines for manufacturing of metallic grids or mats <a href="#">B23K 11/008</a>)}</li> </ul>

- B21F 27/12
  - Making special types or portions of network by methods or means specially adapted therefor
- 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
- B21F 29/00**
**Making fencing or like material made partly of wire** ([B21F 25/00](#), [B21F 27/00](#) take precedence)
- B21F 29/02
  - comprising bars or the like connected by wires
- B21F 31/00**
**Making meshed-ring network from wire**
- B21F 33/00**
**Tools or devices specially designed for handling or processing wire fabrics or the like**
- 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
- B21F 35/00**
**Making springs from wire** (by coiling wire [B21F 3/00](#); making resilient rings [B21F 37/02](#))
- 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
- B21F 37/00**
**Manufacture of rings from wire** (in chain making [B21L](#); making of tyre beads [B29D 30/48](#))
- B21F 37/02
  - of resilient rings, e.g. key-rings
- B21F 37/04
  - of washers ([B21F 37/02](#) takes precedence)
- B21F 39/00**
**Making wheel spokes from wire**

<b>B21F 41/00</b>	<b>Making umbrella frames or members from wire</b>
<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>