

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### TRANSPORTING

#### B60 VEHICLES IN GENERAL

(NOTE omitted)

#### B60C VEHICLE TYRES; TYRE INFLATION; TYRE CHANGING; CONNECTING VALVES TO INFLATABLE ELASTIC BODIES IN GENERAL; DEVICES OR ARRANGEMENTS RELATED TO TYRES

##### NOTES

1. In this subclass, the term "tyre" is to be understood as a separate ground-engaging, continuous element outside the periphery of the wheel rim and includes the tyre casing, cover, or jacket and any insert, e.g. inner tube. In the groups relating to repair or connection of valves, the term "tyre" is to be understood to include also inflatable elastic bodies other than tyres or inner tubes
2. Attention is drawn to the note following the title of class [B60](#).

##### WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:  
[B60C 11/113](#) covered by [B60C 11/0311](#)  
[B60C 11/117](#) covered by [B60C 11/032](#)
2. {In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.}

#### 1/00 Tyres characterised by the chemical composition or the physical arrangement or mixture of the composition

##### NOTE

Tyres characterised by compositions only, i.e. having no significant tyre structure, are classified only with the compositions, e.g. [C08K](#), [C08L](#)

- 1/0008 . {Compositions of the inner liner}
- 1/0016 . {Compositions of the tread}
- 1/0025 . {Compositions of the sidewalls}
- 2001/0033 . {Compositions of the sidewall inserts, e.g. for runflat}
- 1/0041 . {Compositions of the carcass layers}
- 2001/005 . {Compositions of the bead portions, e.g. clinch or chafer rubber or cushion rubber}
- 2001/0058 . . {Compositions of the bead apexes}
- 2001/0066 . {Compositions of the belt layers}
- 2001/0075 . {Compositions of belt cushioning layers}
- 2001/0083 . {Compositions of the cap ply layers}
- 2001/0091 . {Compositions of non-inflatable or solid tyres}

#### 3/00 Tyres characterised by the transverse section

- 2003/005 . {Twin tyres}
- 3/02 . Closed, e.g. toroidal, tyres
- 3/04 . characterised by the relative dimensions of the section, e.g. low profile ([B60C 3/06](#) takes precedence)
- 3/06 . asymmetric
- 3/08 . collapsible into storage or non-use condition, e.g. space-saving spare tyres

#### 5/00 Inflatable pneumatic tyres or inner tubes ([B60C 1/00](#), [B60C 9/00](#) - [B60C 17/00](#) take precedence)

- 5/001 . {filled with gas other than air}
- 5/002 . {filled at least partially with foam material}

##### WARNING

Group [B60C 5/002](#) is impacted by reclassification into groups [B60C 7/101](#), [B60C 7/1015](#) and [B60C 7/121](#).

Groups [B60C 5/002](#), [B60C 7/101](#), [B60C 7/1015](#) and [B60C 7/121](#) should be considered in order to perform a complete search.

- 5/004 . {filled at least partially with liquid ([B60C 19/12](#) takes precedence)}
- 5/005 . . {Ballast tyres}
- 5/007 . {made from other material than rubber}
- 5/008 . {Low pressure tyres, e.g. for all terrain vehicles}
- 5/01 . without substantial cord reinforcement, e.g. cordless tyres, cast tyres
- 5/02 . having separate inflatable inserts, e.g. with inner tubes; Means for lubricating, venting, preventing relative movement between tyre and inner tube ([B60C 5/20](#) takes precedence)
- 5/025 . . {separated by a part of the tyre (inflatable inserts with several inflatable chambers [B60C 5/20](#))}
- 5/04 . . Shape or construction of inflatable inserts ([B60C 5/10](#) takes precedence)
- 5/08 . . . having reinforcing means
- 5/10 . formed as a single discontinuous ring with contiguous ends which may be connected together

|          |  |       |  |
|----------|--|-------|--|
| 5/12     | <ul style="list-style-type: none"> <li>without separate inflatable inserts, e.g. tubeless tyres with transverse section open to the rim (<a href="#">B60C 5/20</a> takes precedence)</li> </ul>  | 7/102 | <ul style="list-style-type: none"> <li>{Tyres built-up with separate rubber parts}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/102</a> is impacted by reclassification into groups <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a>.</p> <p>Groups <a href="#">B60C 7/102</a>, <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a> should be considered in order to perform a complete search.</p>   |
| 5/14     | <ul style="list-style-type: none"> <li>with impervious liner or coating on the inner wall of the tyre</li> </ul>   |       |  |
| 5/142    | <ul style="list-style-type: none"> <li>{provided partially, i.e. not covering the whole inner wall}</li> </ul>   |       |  |
| 2005/145 | <ul style="list-style-type: none"> <li>{made of laminated layers}</li> </ul>   |       |  |
| 2005/147 | <ul style="list-style-type: none"> <li>{characterised by the joint or splice}</li> </ul>   |       |  |
| 5/16     | <ul style="list-style-type: none"> <li>Sealing means between beads and rims, e.g. bands</li> </ul>   | 7/105 | <ul style="list-style-type: none"> <li>{using foam material (<a href="#">B60C 7/1015</a> takes precedence)}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/105</a> is impacted by reclassification into group <a href="#">B60C 7/1015</a>.</p> <p>Groups <a href="#">B60C 7/105</a> and <a href="#">B60C 7/1015</a> should be considered in order to perform a complete search.</p>  |
| 5/18     | <ul style="list-style-type: none"> <li>Sectional casings, e.g. comprising replaceable arcuate parts</li> </ul>   |       |  |
| 5/20     | <ul style="list-style-type: none"> <li>having multiple separate inflatable chambers</li> </ul>   |       |  |
| 5/22     | <ul style="list-style-type: none"> <li>the chambers being annular</li> </ul>   |       |  |
| 5/24     | <ul style="list-style-type: none"> <li>the walls of the chambers extending transversely of the tyre</li> </ul>   |       |  |
| 7/00     | <p><b>Non-inflatable or solid tyres (<a href="#">B60C 1/00</a> takes precedence)</b></p>   |       |  |
| 2007/005 | <ul style="list-style-type: none"> <li>{made by casting, e.g. of polyurethane}</li> </ul>  | 7/107 | <ul style="list-style-type: none"> <li>{comprising lateral openings}</li> </ul>  |
| 7/02     | <ul style="list-style-type: none"> <li>made from ropes or bristles</li> </ul>  | 7/12  | <ul style="list-style-type: none"> <li>using enclosed chambers, e.g. gas-filled</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/12</a> is impacted by reclassification into groups <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a>.</p> <p>Groups <a href="#">B60C 7/12</a>, <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a> should be considered in order to perform a complete search.</p>  |
| 7/04     | <ul style="list-style-type: none"> <li>made of wood or leather</li> </ul>  |       |  |
| 7/06     | <ul style="list-style-type: none"> <li>made of metal</li> </ul>  |       |  |
| 7/08     | <ul style="list-style-type: none"> <li>built-up from a plurality of arcuate parts</li> </ul>   |       |  |
| 7/10     | <ul style="list-style-type: none"> <li>characterised by means for increasing resiliency</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/10</a> is impacted by reclassification into groups <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a>.</p> <p>Groups <a href="#">B60C 7/10</a>, <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a> should be considered in order to perform a complete search.</p>  | 7/121 | <ul style="list-style-type: none"> <li>{enclosed chambers defined by a distinct core}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/121</a> is incomplete pending reclassification of documents from groups <a href="#">B60C 5/002</a>, <a href="#">B60C 7/10</a>, <a href="#">B60C 7/102</a>, <a href="#">B60C 7/12</a> and <a href="#">B60C 7/125</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p> |
| 7/101    | <ul style="list-style-type: none"> <li>{Tyre casings enclosing a distinct core, e.g. foam (enclosed chambers defined by a distinct core <a href="#">B60C 7/121</a>)}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/101</a> is incomplete pending reclassification of documents from groups <a href="#">B60C 5/002</a>, <a href="#">B60C 7/10</a>, <a href="#">B60C 7/102</a>, <a href="#">B60C 7/12</a>, <a href="#">B60C 7/125</a> and <a href="#">B60C 17/065</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p> |       |  |
| 7/1015   | <ul style="list-style-type: none"> <li>{using foam material}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/1015</a> is incomplete pending reclassification of documents from groups <a href="#">B60C 5/002</a> and <a href="#">B60C 7/105</a>.</p> <p>Groups <a href="#">B60C 5/002</a>, <a href="#">B60C 7/105</a> and <a href="#">B60C 7/1015</a> should be considered in order to perform a complete search.</p>   | 7/125 | <ul style="list-style-type: none"> <li>{enclosed chambers defined between rim and tread}</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60C 7/125</a> is impacted by reclassification into groups <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a>.</p> <p>Groups <a href="#">B60C 7/125</a>, <a href="#">B60C 7/101</a> and <a href="#">B60C 7/121</a> should be considered in order to perform a complete search.</p>   |
|          |  | 7/14  | <ul style="list-style-type: none"> <li>using springs</li> </ul>  |
|          |  | 7/143 | <ul style="list-style-type: none"> <li>{having a lateral extension disposed in a plane parallel to the wheel axis}</li> </ul>  |
|          |  | 7/146 | <ul style="list-style-type: none"> <li>{extending substantially radially, e.g. like spokes}</li> </ul>   |
|          |  | 7/16  | <ul style="list-style-type: none"> <li>of helical or flat coil form</li> </ul>   |
|          |  | 7/18  | <ul style="list-style-type: none"> <li>disposed radially relative to wheel axis</li> </ul>   |
|          |  | 7/20  | <ul style="list-style-type: none"> <li>disposed circumferentially relative to wheel axis</li> </ul>  |
|          |  | 7/22  | <ul style="list-style-type: none"> <li>having inlays other than for increasing resiliency, e.g. for armouring</li> </ul>   |
|          |  | 7/24  | <ul style="list-style-type: none"> <li>characterised by means for securing tyres on rim or wheel body</li> </ul>   |

|           |   |           |   |
|-----------|---|-----------|---|
| 7/26      | . . using bolts   | 2009/0433 | . . . . {Modulus}   |
| 7/28      | . . using straps or the like, e.g. vulcanised into the tyre   | 2009/0441 | . . . . {Density in width direction}  |
| 9/00      | <b>Reinforcements or ply arrangement of pneumatic tyres (inserts having reinforcing means <a href="#">B60C 5/08</a>; bead structure, e.g. turnup or overlap construction, <a href="#">B60C 15/00</a>)</b>     | 2009/045  | . . . . {Tensile strength}  |
|           | <b>NOTE</b>   | 2009/0458 | . . . . {Elongation of the reinforcements at break point}   |
|           | When classifying in this group, classification is also made in subclass <a href="#">B32B</a> insofar as any layered product is concerned  | 2009/0466 | . . . . {Twist structures}  |
| 9/0007    | . {Reinforcements made of metallic elements, e.g. cords, yarns, filaments or fibres made from metal}  | 2009/0475 | . . . {Particular materials of the carcass cords}   |
| 2009/0014 | . . {Surface treatments of steel cords}   | 2009/0483 | . . . {Different cords in the same layer}   |
| 2009/0021 | . . {Coating rubbers for steel cords}   | 2009/0491 | . . . {with special path of the carcass cords, e.g. sinusoidal}   |
| 9/0028    | . {Reinforcements comprising mineral fibres, e.g. glass or carbon fibres}   | 9/06      | . . . the cords extend diagonally from bead to bead and run in opposite directions in each successive carcass ply, i.e. bias angle ply ( <a href="#">B60C 9/07</a> , <a href="#">B60C 9/09</a> take precedence) |
| 2009/0035 | . {Reinforcements made of organic materials, e.g. rayon, cotton or silk}  | 9/07      | . . . the cords curve from bead to bead in plural planes, e.g. S-shaped cords   |
| 9/0042    | . {Reinforcements made of synthetic materials}  | 9/08      | . . . the cords extend transversely from bead to bead, i.e. radial ply ( <a href="#">B60C 9/07</a> takes precedence)  |
| 9/005     | . {Reinforcements made of different materials, e.g. hybrid or composite cords}  | 9/09      | . . . . combined with other carcass plies having cords extending diagonally from bead to bead, i.e. combined radial ply and bias angle ply  |
| 9/0057    | . {Reinforcements comprising preshaped elements, e.g. undulated or zig-zag filaments}   | 9/10      | . . the reinforcing cords within each carcass ply arranged in a crossing relationship   |
| 9/0064    | . {Reinforcements comprising monofilaments}   | 9/11      | . . . Woven, braided, or knitted plies  |
| 2009/0071 | . {characterised by special physical properties of the reinforcements}  | 9/12      | . . built-up with rubberised layers of discrete fibres or filaments   |
| 2009/0078 | . . {Modulus}   | 9/13      | . . . with two or more differing cord materials   |
| 2009/0085 | . . {Tensile strength}  | 9/14      | . . built-up with sheets, webs, or films of homogeneous material, e.g. synthetics, sheet metal, rubber  |
| 2009/0092 | . . {Twist structure}   | 2009/145  | . . . {at the inner side of the carcass structure}  |
| 9/02      | . Carcasses   | 9/16      | . . built-up with metallic reinforcing inlays   |
| 9/0207    | . . {Carcasses comprising an interrupted ply, i.e. where the carcass ply does not continuously extend from bead to bead but is interrupted, e.g. at the belt area, into two or more portions of the same ply} | 9/17      | . . asymmetric to the midcircumferential plane of the tyre  |
| 2009/0215 | . . {Partial carcass reinforcing plies, i.e. the plies neither crossing the equatorial plane nor folded around the bead core}   | 9/18      | . Structure or arrangement of belts or breakers, crown-reinforcing or cushioning layers   |
| 2009/0223 | . . {comprising a cushion layer between adjacent carcass plies}   | 9/1807    | . . {comprising fabric reinforcements}  |
| 9/023     | . . {built up from narrow strips, individual cords or filaments, e.g. using filament winding}   | 2009/1814 | . . . {square woven}  |
| 9/0238    | . . {characterised by special physical properties of the carcass ply}   | 9/1821    | . . {comprising discrete fibres or filaments}   |
| 2009/0246 | . . . {Modulus of the ply}  | 2009/1828 | . . {characterised by special physical properties of the belt ply}  |
| 2009/0253 | . . . . {being different between adjacent plies}  | 9/1835    | . . {Rubber strips or cushions at the belt edges}   |
| 2009/0261 | . . . . {being different within the same ply}   | 2009/1842 | . . . {Width or thickness of the strips or cushions}  |
| 2009/0269 | . . {Physical properties or dimensions of the carcass coating rubber}   | 9/185     | . . . {between adjacent or radially below the belt plies}   |
| 2009/0276 | . . . {Modulus; Hardness; Loss modulus or "tangens delta"}  | 2009/1857 | . . . {radially above the belt plies}   |
| 2009/0284 | . . . {Thickness}   | 2009/1864 | . . . {wrapped around the edges of the belt}  |
| 9/0292    | . . {Carcass ply curvature ( <a href="#">sidewall curvature B60C 13/003</a> )}  | 2009/1871 | . . {with flat cushions or shear layers between belt layers}  |
| 9/04      | . . the reinforcing cords of each carcass ply arranged in a substantially parallel relationship   | 2009/1878 | . . {with flat cushions or shear layers between the carcass and the belt}   |
| 2009/0408 | . . . {Carcass joints or splices}   | 2009/1885 | . . {with belt ply between adjacent carcass plies}  |
| 2009/0416 | . . . {Physical properties or dimensions of the carcass cords}  | 2009/1892 | . . {with belt ply radial inside the carcass structure}   |
| 2009/0425 | . . . . {Diameters of the cords; Linear density thereof}  | 9/20      | . . built-up from rubberised plies each having all cords arranged substantially parallel  |
|           |   | 9/2003    | . . . {characterised by the materials of the belt cords}  |
|           |   | 9/2006    | . . . . {consisting of steel cord plies only}   |
|           |   | 9/2009    | . . . . {comprising plies of different materials}   |
|           |   | 2009/2012 | . . . {with particular configuration of the belt cords in the respective belt layers}   |

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| 2009/2016 | . . . .   | {comprising cords at an angle of 10 to 30 degrees to the circumferential direction}         | 2009/2257    | . . . . . | {Diameters of the cords; Linear density thereof}   |
| 2009/2019 | . . . .   | {comprising cords at an angle of 30 to 60 degrees to the circumferential direction}         | 2009/2261    | . . . . . | {Modulus of the cords}   |
| 2009/2022 | . . . .   | {comprising cords at an angle of 60 to 90 degrees to the circumferential direction}         | 2009/2266    | . . . . . | {Density of the cords in width direction}  |
| 2009/2025 | . . . .   | {with angle different or variable in the same layer}  | 2009/2271    | . . . . . | {with variable density}  |
| 2009/2029 | . . . .   | {with different cords in the same layer, i.e. cords with different materials or dimensions} | 2009/2276    | . . . . . | {Tensile strength}   |
| 2009/2032 | . . . .   | {characterised by the course of the belt cords, e.g. undulated or sinusoidal}               | 2009/228     | . . . . . | {Elongation of the reinforcements at break point}  |
| 2009/2035 | . . .     | {built-up by narrow strips}   | 2009/2285    | . . . . . | {Twist structures}   |
| 2009/2038 | . . .     | {using lateral belt strips at belt edges, e.g. edge bands}                                  | 2009/229     | . . . . . | {characterised by the course of the cords, e.g. undulated or sinusoidal}   |
| 2009/2041 | . . .     | {with an interrupted belt ply, e.g. using two or more portions of the same ply}             | 2009/2295    | . . . . . | {with different cords in the same layer}   |
| 2009/2045 | . . .     | {with belt joints or splices}   | 9/24         | . .       | built-up of arcuate parts  |
| 2009/2048 | . . .     | {characterised by special physical properties of the belt plies}                            | 9/26         | . .       | Folded plies   |
| 2009/2051 | . . . .   | {Modulus of the ply}  | 9/263        | . . .     | {further characterised by an endless zigzag configuration in at least one belt ply, i.e. no cut edge being present}            |
| 2009/2054 | . . . . . | {being different within the same ply}   | 2009/266     | . . . . . | {combined with non folded cut-belt plies}  |
| 2009/2058 | . . . . . | {being different between adjacent plies}  | 9/28         | . .       | characterised by the belt or breaker dimensions or curvature relative to carcass ( <a href="#">B60C 9/30</a> takes precedence) |
| 2009/2061 | . . .     | {Physical properties or dimensions of the belt coating rubber}                              | 2009/283     | . . .     | {characterised by belt curvature}  |
| 2009/2064 | . . . .   | {Modulus; Hardness; Loss modulus or "tangens delta"}  | 2009/286     | . . . .   | {being substantially flat}   |
| 2009/2067 | . . . .   | {Thickness}   | 9/30         | . .       | asymmetric to the midcircumferential plane of the tyre   |
| 2009/207  | . . . .   | {Double layers, e.g. using different rubbers in the same belt ply}                          | <b>11/00</b> |           | <b>Tyre tread bands; Tread patterns; Anti-skid inserts</b>   |
| 2009/2074 | . . .     | {Physical properties or dimension of the belt cord}   | 11/0008      | . .       | {characterised by the tread rubber}  |
| 2009/2077 | . . . .   | {Diameters of the cords; Linear density thereof}  | 2011/0016    | . .       | {Physical properties or dimensions}  |
| 2009/208  | . . . .   | {Modulus of the cords}  | 2011/0025    | . . .     | {Modulus or tan delta}   |
| 2009/2083 | . . . .   | {Density in width direction}  | 2011/0033    | . . .     | {Thickness of the tread}   |
| 2009/2087 | . . . . . | {with variable density in the same layer}   | 11/0041      | . .       | {comprising different tread rubber layers}   |
| 2009/209  | . . . .   | {Tensile strength}  | 11/005       | . .       | {with cap and base layers}   |
| 2009/2093 | . . . .   | {Elongation of the reinforcements at break point}   | 11/0058      | . . .     | {with different cap rubber layers in the axial direction}  |
| 2009/2096 | . . . .   | {Twist structures}  | 11/0066      | . . . .   | {having an asymmetric arrangement}   |
| 9/22      | . . .     | the plies being arranged with all cords disposed along the circumference of the tyre        | 11/0075      | . . .     | {with different base rubber layers in the axial direction}   |
| 9/2204    | . . . .   | {obtained by circumferentially narrow strip winding}  | 11/0083      | . .       | {characterised by the curvature of the tyre tread}   |
| 2009/2209 | . . . . . | {characterised by tension of the cord during winding}                                       | 2011/0091    | . .       | {built-up by narrow strip winding}   |
| 2009/2214 | . . . .   | {characterised by the materials of the zero degree ply cords}                               | 11/01        | . .       | Shape of the shoulders between tread and sidewall, e.g. rounded, stepped or cantilevered                                       |
| 2009/2219 | . . . .   | {with a partial zero degree ply at the belt edges - edge band}                              | 2011/013     | . .       | {provided with a recessed portion}   |
| 2009/2223 | . . . .   | {with an interrupted zero degree ply, e.g. using two or more portions for the same ply}     | 2011/016     | . .       | {different rubber for tread wings}   |
| 2009/2228 | . . . .   | {characterised by special physical properties of the zero degree plies}                     | 11/02        | . .       | Replaceable treads   |
| 2009/2233 | . . . . . | {Modulus of the zero degree ply}  | 11/03        | . .       | Tread patterns   |
| 2009/2238 | . . . .   | {Physical properties or dimensions of the ply coating rubber}                               | 11/0302      | . .       | {directional pattern, i.e. with main rolling direction}  |
| 2009/2242 | . . . . . | {Modulus; Hardness; Loss modulus or "tangens delta"}  | 11/0304      | . .       | {Asymmetric patterns}  |
| 2009/2247 | . . . . . | {Thickness}   | 11/0306      | . .       | {Patterns comprising block rows or discontinuous ribs}   |
| 2009/2252 | . . . .   | {Physical properties or dimension of the zero degree ply cords}                             | 11/0309      | . . .     | {further characterised by the groove cross-section}  |
|           |           |   | 11/0311      | . .       | {Patterns comprising tread lugs arranged parallel or oblique to the axis of rotation}  |
|           |           |   | 2011/0313    | . . .     | {directional type}   |
|           |           |   | 11/0316      | . . .     | {further characterised by the groove cross-section}  |
|           |           |   | 11/0318      | . .       | {irregular patterns with particular pitch sequence}  |
|           |           |   | 11/032       | . .       | {Patterns comprising isolated recesses}  |
|           |           |   | 11/0323      | . . .     | {tread comprising channels under the tread surface, e.g. for draining water}   |



|           |  |           |  |
|-----------|--|-----------|--|
| 11/0327   | . . . {characterised by special properties of the tread pattern}   | 2011/1227 | . . . . {having different shape within the pattern}  |
| 11/033    | . . . {by the void or net-to-gross ratios of the patterns}   | 2011/1231 | . . . . {being shallow, i.e. sipe depth of less than 3 mm}   |
| 11/0332   | . . . {by the footprint-ground contacting area of the tyre tread}  | 11/1236   | . . . {with special arrangements in the tread pattern}   |
| 2011/0334 | . . . {Stiffness}  | 11/124    | . . . . {inclined with regard to a plane normal to the tread surface}                                    |
| 2011/0337 | . . {characterised by particular design features of the pattern}   | 2011/1245 | . . . . {being arranged in crossing relation, e.g. sipe mesh}  |
| 2011/0339 | . . . {Grooves}  | 11/125    | . . . . {arranged at the groove bottom}  |
| 2011/0341 | . . . . {Circumferential grooves}  | 2011/1254 | . . . . {with closed sipe, i.e. not extending to a groove}   |
| 2011/0344 | . . . . . {provided at the equatorial plane}   | 11/1259   | . . . {Depth of the sipe}  |
| 2011/0346 | . . . . . {with zigzag shape}  | 11/1263   | . . . . {different within the same sipe}   |
| 2011/0348 | . . . . . {Narrow grooves, i.e. having a width of less than 4 mm}  | 2011/1268 | . . . . {being different from sipe to sipe}  |
| 2011/0351 | . . . . . {Shallow grooves, i.e. having a depth of less than 50% of other grooves}   | 11/1272   | . . . {Width of the sipe}  |
| 2011/0353 | . . . . . {characterised by width}   | 2011/1277 | . . . . {being narrow, i.e. less than 0.3 mm}  |
| 2011/0355 | . . . . . {characterised by depth}   | 11/1281   | . . . . {different within the same sipe, i.e. enlarged width portion at sipe bottom or along its length} |
| 2011/0358 | . . . . {Lateral grooves, i.e. having an angle of 45 to 90 degrees to the equatorial plane}  | 2011/1286 | . . . . {being different from sipe to sipe}  |
| 2011/036  | . . . . . {Narrow grooves, i.e. having a width of less than 3 mm}  | 2011/129  | . . . {Sipe density, i.e. the distance between the sipes within the pattern}                             |
| 2011/0362 | . . . . . {Shallow grooves, i.e. having a depth of less than 50% of other grooves}   | 2011/1295 | . . . . {variable}   |
| 2011/0365 | . . . . . {characterised by width}   | 11/13     | . . characterised by the groove cross-section, e.g. for buttressing or preventing stone-trapping         |
| 2011/0367 | . . . . . {characterised by depth}   | 11/1307   | . . . {with special features of the groove walls}  |
| 2011/0369 | . . . . . {with varying depth of the groove}   | 11/1315   | . . . . {having variable inclination angles, e.g. warped groove walls}                                   |
| 2011/0372 | . . . . . {with particular inclination angles}   | 11/1323   | . . . . {asymmetric}   |
| 2011/0374 | . . . . . {Slant grooves, i.e. having an angle of about 5 to 35 degrees to the equatorial plane}   | 2011/133  | . . . . {comprising recesses}  |
| 2011/0376 | . . . . . {characterised by width}   | 2011/1338 | . . . . {comprising protrusions}   |
| 2011/0379 | . . . . . {characterised by depth}   | 11/1346   | . . . . {covered by a rubber different from the tread rubber}  |
| 2011/0381 | . . . . {Blind or isolated grooves}  | 11/1353   | . . . {with special features of the groove bottom}   |
| 2011/0383 | . . . . . {at the centre of the tread}   | 2011/1361 | . . . . {with protrusions extending from the groove bottom}  |
| 2011/0386 | . . . {Continuous ribs}  | 11/1369   | . . . {Tie bars for linking block elements and bridging the groove}                                      |
| 2011/0388 | . . . . {provided at the equatorial plane}   | 11/1376   | . . . {Three dimensional block surfaces departing from the enveloping tread contour}                     |
| 2011/039  | . . . . {provided at the shoulder portion}   | 11/1384   | . . . . {with chamfered block corners}   |
| 2011/0393 | . . . . {Narrow ribs, i.e. having a rib width of less than 8 mm}   | 11/1392   | . . . . {with chamfered block edges}   |
| 2011/0395 | . . . . . {for linking shoulder blocks}  | 11/14     | . Anti-skid inserts, e.g. vulcanised into the tread band   |
| 2011/0397 | . . . . {Sacrificial ribs, i.e. ribs recessed from outer tread contour}  | 2011/142  | . . {Granular particles, e.g. hard granules}   |
| 11/04     | . . in which the raised area of the pattern consists only of continuous circumferential ribs, e.g. zigzag (B60C 11/12, B60C 11/13 take precedence) | 2011/145  | . . {Discontinuous fibres}   |
| 11/042    | . . . {further characterised by the groove cross-section}  | 2011/147  | . . {Foamed rubber or sponge rubber on the tread band}   |
| 11/045    | . . . . {the groove walls having a three-dimensional shape}  | 11/16     | . . of plug form, e.g. made from metal, textile  |
| 11/047    | . . . . {the groove bottom comprising stone trapping protection elements, e.g. ribs}   | 11/1606   | . . . {retractable plug}   |
| 11/11     | . . in which the raised area of the pattern consists only of isolated elements, e.g. blocks (B60C 11/12, B60C 11/13 take precedence)               | 11/1612   | . . . . {actuated by fluid, e.g. using fluid pressure difference}  |
| 11/12     | . . characterised by the use of narrow slits or incisions, e.g. sipes  | 11/1618   | . . . . {actuated by temperature, e.g. by means of temperature sensitive elements}                       |
| 11/1204   | . . . {with special shape of the sipe}   | 11/1625   | . . . {Arrangements thereof in the tread patterns, e.g. irregular}                                       |
| 2011/1209 | . . . . {straight at the tread surface}  | 11/1631   | . . . {inclined with regard to the radial direction}   |
| 2011/1213 | . . . . {sinusoidal or zigzag at the tread surface}  | 11/1637   | . . . {Attachment of the plugs into the tread, e.g. screwed}   |
| 11/1218   | . . . . {Three-dimensional shape with regard to depth and extending direction}   | 11/1643   | . . . {with special shape of the plug-body portion, i.e. not cylindrical}                                |
| 11/1222   | . . . . {Twisted or warped shape in the sipe plane}  | 11/165    | . . . . {conical}  |
|           |  | 11/1656   | . . . . {concave or convex, e.g. barrel-shaped}  |
|           |  | 11/1662   | . . . . {helical-shaped}   |

- 11/1668 . . . . {with an additional collar}
- 11/1675 . . . {with special shape of the plug- tip}
- 11/1681 . . . . {Spherical top portions}
- 11/1687 . . . . {Multiple tips}
- 11/1693 . . . {Attachment of the plug-tip within the plug-body}
- 11/18 . . of strip form, e.g. metallic combs, rubber strips of different wear resistance ([B60C 11/20 takes precedence](#))
- 11/185 . . . {of metal comb form, lamellar shaped or blade-like}
- 11/20 . . in coiled form
- 11/22 . Tread rings between dual tyres
- 11/24 . Wear-indicating arrangements
- 11/243 . . {Tread wear sensors, e.g. electronic sensors}
- 11/246 . . {Tread wear monitoring systems}
- 13/00 Tyre sidewalls; Protecting, decorating, marking, or the like, thereof ([B60C 17/08 takes precedence](#); tyre shoulders [B60C 11/01](#); removable tyre sidewall trim rings [B60B 7/01](#))**
  - 13/001 . {Decorating, marking or the like}
  - 13/002 . {Protection against exterior elements}
  - 13/003 . {characterised by sidewall curvature}
  - 13/004 . . {of the internal side of the tyre}
  - 2013/005 . {Physical properties of the sidewall rubber}
  - 2013/006 . . {Modulus; Hardness; Loss modulus or "tangens delta"}
  - 2013/007 . . {Thickness}
  - 2013/008 . {built-up by narrow strip winding}
  - 13/009 . {comprising additional bead cores in the sidewall}
  - 13/02 . Arrangement of grooves or ribs
  - 13/023 . . {preventing watersplash}
  - 2013/026 . . {provided at the interior side only}
  - 13/04 . having annular inlays or covers, e.g. white sidewalls
  - 2013/045 . . {comprising different sidewall rubber layers}
- 15/00 Tyre beads, e.g. ply turn-up or overlap**
  - 15/0009 . {features of the carcass terminal portion}
  - 15/0018 . . {not folded around the bead core, e.g. floating or down ply}
  - 15/0027 . . {with low ply turn-up, i.e. folded around the bead core and terminating at the bead core}
  - 15/0036 . . {with high ply turn-up, i.e. folded around the bead core and terminating radially above the point of maximum section width}
  - 15/0045 . . . {with ply turn-up up to the belt edges, i.e. folded around the bead core and extending to the belt edges}
  - 15/0054 . . {with ply turn-up portion parallel and adjacent to carcass main portion}
  - 15/0063 . . {with ply turn-up portion diverging from carcass main portion}
  - 15/0072 . . {with ply reverse folding, i.e. carcass layer folded around the bead core from the outside to the inside}
  - 15/0081 . . {the carcass plies folded around or between more than one bead core}
  - 2015/009 . . {Height of the carcass terminal portion defined in terms of a numerical value or ratio in proportion to section height}
- 15/02 . Seating or securing beads on rims ([sealing means between beads and rims of tubeless tyres \[B60C 5/16\]\(#\); means for securing solid tyres on rims \[B60C 7/24\]\(#\)](#))
- 15/0203 . . {using axially extending bead seating, i.e. the bead and the lower sidewall portion extend in the axial direction ([B60C 15/0206 takes precedence](#))}
- 15/0206 . . {using inside rim bead seating, i.e. the bead being seated at a radially inner side of the rim}
- 15/0209 . . {Supplementary means for securing the bead}
- 15/0213 . . . {the bead being clamped by rings, cables, rim flanges or other parts of the rim}
- 15/0216 . . . {the bead being pierced by bolts, rivets, clips or other elements}
- 15/022 . . . {the bead being secured by turned-in rim flanges, e.g. rim of the clincher type}
- 15/0223 . . . {the bead being secured by clip-hook elements not forming part of the rim flange}
- 15/0226 . . . {the bead being secured by protrusions of the rim extending from the bead seat, e.g. hump or serrations}
- 15/023 . . . {the bead being secured by bead extensions which extend over and wrap around the rim flange}
- 15/0233 . . {Securing tyres without beads; Securing closed torus or tubular tyres}
- 15/0236 . . {Asymmetric bead seats, e.g. different bead diameter or inclination angle ([asymmetric transverse section \[B60C 3/06\]\(#\)](#))}
- 15/024 . . Bead contour, e.g. lips, grooves, or ribs
- 15/0242 . . . {with bead extensions located radially outside the rim flange position, e.g. rim flange protectors}
- 2015/0245 . . . {Bead lips at the bead toe portion, i.e. the axially and radially inner end of the bead}
- 15/0247 . . . {with reverse bead seat inclination, i.e. the axially inner diameter of the bead seat is bigger than the axially outer diameter thereof}
- 15/028 . . Spacers between beads ([emergency load-supporting means \[B60C 17/00\]\(#\)](#))
- 15/032 . . . inflatable
- 15/036 . . Tyres permanently fixed to the rim, e.g. by adhesive, by vulcanisation
- 15/04 . Bead cores
- 2015/042 . . {characterised by the material of the core, e.g. alloy}
- 2015/044 . . {characterised by a wrapping layer}
- 2015/046 . . {Cable cores, i.e. cores made-up of twisted wires}
- 2015/048 . . {Polygonal cores characterised by the winding sequence}
- 15/05 . . multiple, i.e. with two or more cores in each bead
- 15/06 . Flipper strips, fillers, or chafing strips {and reinforcing layers for the construction of the bead}
- 15/0603 . . {characterised by features of the bead filler or apex}
- 15/0607 . . . {comprising several parts, e.g. made of different rubbers}
- 2015/061 . . . {Dimensions of the bead filler in terms of numerical values or ratio in proportion to section height}
- 2015/0614 . . {characterised by features of the chafer or clinch portion, i.e. the part of the bead contacting the rim}

|              |  |   |  |
|--------------|--|---|--|
| 2015/0617    | . . {comprising a cushion rubber other than the chafer or clinch rubber}   | 17/01   | . utilising additional inflatable supports which become load-supporting in emergency                     |
| 2015/0621    | . . . {adjacent to the carcass turnup portion}   | 17/02   | . . inflated or expanded in emergency only   |
| 2015/0625    | . . . {provided at the terminal edge portion of a carcass or reinforcing layer}  | 17/04   | . utilising additional non-inflatable supports which become load-supporting in emergency                 |
| 15/0628      | . . {comprising a bead reinforcing layer}  | 17/041  | . . {characterised by coupling or locking means between rim and support}                                 |
| 15/0632      | . . . {using flippers in contact with and wrapped around the bead core and, at least partially, in contact with the bead filler} | 17/042  | . . . {preventing sliding or rotation between support and rim}   |
| 15/0635      | . . . {using chippers between the carcass layer and chafer rubber wrapped around the bead}                                       | 17/043  | . . {made-up of an annular metallic shell}   |
| 2015/0639    | . . . {between carcass main portion and bead filler not wrapped around the bead core}  | 17/044  | . . {Expandable supports}  |
| 2015/0642    | . . . {between carcass turn-up and bead filler not wrapped around the bead core}   | 17/045  | . . {Rotatable supports relative to the rim}   |
| 2015/0646    | . . . {at the axially inner side of the carcass main portion not wrapped around the bead core}                                   | 17/046  | . . . {by means of ball bearings}  |
| 2015/065     | . . . {at the axially outer side of the carcass turn-up portion not wrapped around the bead core}                                | 17/047  | . . {comprising circumferential ribs}  |
| 15/0653      | . . . {with particular configuration of the cords in the respective bead reinforcing layer}                                      | 17/048  | . . {comprising transverse ribs}   |
| 2015/0657    | . . . . {comprising cords at an angle of maximal 10 degrees to the circumferential direction}                                    | 17/06   | . . resilient  |
| 2015/066     | . . . . {comprising cords at an angle of 10 to 30 degrees to the circumferential direction}                                      | 17/061  | . . . {comprising lateral openings}  |
| 2015/0664    | . . . . {comprising cords at an angle of 30 to 60 degrees to the circumferential direction}                                      | 2017/063  | . . . {comprising circumferentially extending reinforcements}  |
| 2015/0667    | . . . . {comprising cords at an angle of 60 to 90 degrees to the circumferential direction}                                      | 17/065  | . . . {made-up of foam inserts (tyres filled with foam <a href="#">B60C 5/002</a> )}                     |
| 2015/0671    | . . . . {the cord angle being different or variable within the same layer}   | <b>WARNING</b>  |  |
| 2015/0675    | . . . . {characterised by the course of the cords, e.g. undulated or sinusoidal}   | Group <a href="#">B60C 17/065</a> is impacted by reclassification into group <a href="#">B60C 7/101</a> .                     |  |
| 2015/0678    | . . . {Physical properties of the bead reinforcing layer, e.g. modulus of the ply}   | Groups <a href="#">B60C 17/065</a> and <a href="#">B60C 7/101</a> should be considered in order to perform a complete search. |  |
| 2015/0682    | . . . {Physical properties or dimensions of the coating rubber}  | 17/066  | . . . {made-up of plural spherical elements provided in the tyre chamber}                                |
| 2015/0685    | . . . {Physical properties or dimensions of the cords, e.g. modulus of the cords}  | 2017/068  | . . . {comprising springs, e.g. helical springs}   |
| 2015/0689    | . . . . {Cord density in width direction}  | 17/08   | . Means facilitating folding of sidewalls, e.g. run-flat sidewalls                                       |
| 2015/0692    | . . . {characterised by particular materials of the cords}   | 17/10   | . Internal lubrication   |
| 2015/0696    | . . {Asymmetric bead reinforcement, e.g. arrangement of bead reinforcing layer or apex}  | 17/103  | . . {by means of surface coating, e.g. PTFE}   |
| <b>17/00</b> | <b>Tyres characterised by means enabling restricted operation in damaged or deflated condition; Accessories therefor</b>         | 17/106  | . . {Composition of the lubricant}   |
| 17/0009      | . {comprising sidewall rubber inserts, e.g. crescent shaped inserts}   | <b>19/00</b>  | <b>Tyre parts or constructions not otherwise provided for</b>  |
| 17/0018      | . . {two or more inserts in each sidewall portion}   | 19/001  | . {Tyres requiring an asymmetric or a special mounting}  |
| 17/0027      | . . {comprising portions of different rubbers in a single insert}  | 19/002  | . {Noise damping elements provided in the tyre structure or attached thereto, e.g. in the tyre interior} |
| 17/0036      | . . {comprising additional reinforcements}   | 19/003  | . {Balancing means attached to the tyre}   |
| 17/0045      | . . {comprising grooves or ribs, e.g. at the inner side of the insert}   | 2019/004  | . {Tyre sensors other than for detecting tyre pressure}  |
| 2017/0054    | . . {Physical properties or dimensions of the inserts}   | 2019/005  | . {Magnets integrated within the tyre structure}   |
| 2017/0063    | . . . {Modulus; Hardness; Loss modulus or "tangens delta"}   | 2019/006  | . {Warning devices, e.g. devices generating noise due to flat or worn tyres}                             |
| 2017/0072    | . . . {Thickness}  | 2019/007  | . . {triggered by sensors}   |
| 2017/0081    | . {comprising special reinforcing means in the crown area}   | 2019/008  | . {Venting means, e.g. for expelling entrapped air}  |
| 17/009       | . {comprising annular protrusions projecting into the tyre cavity}   | 19/04   | . Tyre with openings closeable by means other than the rim; Closing means therefor                       |
|              |  | 19/08   | . Electric-charge-dissipating arrangements   |
|              |  | 19/082  | . . {comprising a conductive tread insert}   |
|              |  | 19/084  | . . {using conductive carcasses}   |
|              |  | 19/086  | . . {using conductive sidewalls}   |
|              |  | 19/088  | . . {using conductive beads}   |
|              |  | 19/12   | . Puncture preventing arrangements   |
|              |  | 19/122  | . . {disposed inside of the inner liner}   |
|              |  | 19/125  | . . {disposed removably on the tyre}   |
|              |  | 19/127  | . . {for inner tubes}  |

**23/00 Devices for measuring, signalling, controlling, or distributing tyre pressure or temperature, specially adapted for mounting on vehicles; Arrangement of tyre inflating devices on vehicles, e.g. of pumps or of tanks; Tyre cooling arrangements**

- 23/001 . {Devices for manually or automatically controlling or distributing tyre pressure whilst the vehicle is moving}
- 23/002 . . {by monitoring conditions other than tyre pressure or deformation}
- 23/003 . . {comprising rotational joints between vehicle-mounted pressure sources and the tyres}

**WARNING**

Group [B60C 23/003](#) is impacted by reclassification into groups [B60C 23/00305](#) - [B60C 23/0039](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 23/00305 . . . {Wheel circumventing supply lines, e.g. not through or about the axles}

**WARNING**

Group [B60C 23/00305](#) is incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/003](#) and [B60C 23/00305](#) should be considered in order to perform a complete search.

- 23/00309 . . . {characterised by the location of the components, e.g. valves, sealings, conduits or sensors}

**WARNING**

Groups [B60C 23/00309](#) – [B60C 23/00336](#) are incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/00309](#) – [B60C 23/00336](#) should be considered in order to perform a complete search.

- 23/00318 . . . . {on the wheels or the hubs}
- 23/00327 . . . . {integrally with the hub caps}
- 23/00336 . . . . {on the axles}
- 23/00345 . . . {Details of the rotational joints}

**WARNING**

Groups [B60C 23/00345](#) and [B60C 23/00347](#) are incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/00345](#), [B60C 23/00347](#) and [B60C 23/003](#) should be considered in order to perform a complete search.

- 23/00347 . . . . {comprising two or more feedthrough}

- 23/00354 . . . {Details of valves}

**WARNING**

Group [B60C 23/00354](#) is incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/00354](#) and [B60C 23/003](#) should be considered in order to perform a complete search.

- 23/00363 . . . {Details of sealings}

**WARNING**

Group [B60C 23/00363](#) is incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/00363](#) and [B60C 23/003](#) should be considered in order to perform a complete search.

- 23/00372 . . . {characterised by fluid diagrams}

**WARNING**

Group [B60C 23/00372](#) is incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/00372](#) and [B60C 23/003](#) should be considered in order to perform a complete search.

- 23/00381 . . . {specially adapted for steerable wheels}

**WARNING**

Group [B60C 23/00381](#) is incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/00381](#) and [B60C 23/003](#) should be considered in order to perform a complete search.

- 23/0039 . . . {specially adapted for driven wheels}

**WARNING**

Group [B60C 23/0039](#) is incomplete pending reclassification of documents from group [B60C 23/003](#).

Groups [B60C 23/0039](#) and [B60C 23/003](#) should be considered in order to perform a complete search.

- 23/004 . . {the control being done on the wheel, e.g. using a wheel-mounted reservoir}

- 23/005 . {Devices specially adapted for special wheel arrangements}

**NOTE**

[B60C 23/001](#), [B60C 23/02](#), [B60C 23/04](#), [B60C 23/06](#) or [B60C 23/08](#)

- 23/006 . . {having two wheels only}
- 23/007 . . {having multiple wheels arranged side by side}
- 23/008 . . {having wheels on more than two axles}
- 23/009 . . {having wheels on a trailer}
- 23/02 . Signalling devices actuated by tyre pressure {(hand-held tyre pressure gauges [G01L 17/00](#))}
- 23/04 . . mounted on the wheel or tyre
- 23/0401 . . . {characterised by the type of alarm}



|         |           |  |         |           |   |
|---------|-----------|--|---------|-----------|---|
| 23/0403 | . . . .   | {Mechanically generated audible signals, e.g. by buzzer or whistle signals}  | 23/0445 | . . . . . | {Means for changing operating mode, e.g. sleep mode, factory mode or energy saving mode}  |
| 23/0405 | . . . .   | {Mechanically generated visible signals, e.g. by using a gauge needle}   | 23/0447 | . . . . . | {Wheel or tyre mounted circuits}  |
| 23/0406 | . . . .   | {Alarms noticeable from outside the vehicle, e.g. indication in side mirror, front light or audible alarms ( <a href="#">B60C 23/0403</a> , <a href="#">B60C 23/0405</a> take precedence)} | 23/0449 | . . . . . | {Passive transducers, e.g. using surface acoustic waves, backscatter technology or pressure sensitive resonators ( <a href="#">near field passive transducers B60C 23/0428</a> )} |
| 23/0408 | . . .     | {transmitting the signals by non-mechanical means from the wheel or tyre to a vehicle body mounted receiver}   | 23/045  | . . . . . | {Means for detecting electromagnetic field changes being not part of the signal transmission <u>per se</u> , e.g. strength, direction, propagation or masking}                    |
| 23/041  | . . . .   | {Means for supplying power to the signal-transmitting means on the wheel}  | 23/0452 | . . . . . | {Antenna structure, control or arrangement ( <a href="#">vehicle tyre mounted antennas H01Q 1/2241</a> )}   |
| 23/0411 | . . . . . | {Piezo-electric generators}  | 23/0454 | . . . . . | {Means for changing operation mode, e.g. sleep mode, factory mode or energy save mode}  |
| 23/0413 | . . . . . | {Wireless charging of active radio frequency circuits}   | 23/0455 | . . . . . | {Transmission control of wireless signals}  |
| 23/0415 | . . . .   | {Automatically identifying wheel mounted units, e.g. after replacement or exchange of wheels}  | 23/0457 | . . . . . | {self triggered by timer}   |
| 23/0416 | . . . . . | {allocating a corresponding wheel position on vehicle, e.g. front/left or rear/right}  | 23/0459 | . . . . . | {self triggered by motion sensor}   |
| 23/0418 | . . . .   | {Sharing hardware components like housing, antenna, receiver or signal transmission line with other vehicle systems like keyless entry or brake control units}                             | 23/0461 | . . . . . | {externally triggered, e.g. by wireless request signal, magnet or manual switch}  |
| 23/042  | . . . . . | {cooperating with wheel hub mounted speed sensors}   | 23/0462 | . . . . . | {Structure of transmission protocol}  |
| 23/0422 | . . . .   | {characterised by the type of signal transmission means}   | 23/0464 | . . . . . | {to avoid signal interference}  |
| 23/0423 | . . . . . | {Photo-electric, infra-red or visible light means}   | 23/0466 | . . . . . | {with signals sent by transmitters mounted on adjacent vehicles}  |
| 23/0425 | . . . . . | {Means comprising permanent magnets, e.g. Hall-effect or Reed-switches}  | 23/0467 | . . . . . | {Electric contact means, e.g. slip-rings, rollers, brushes}   |
| 23/0427 | . . . . . | {Near field transmission with inductive or capacitive coupling means}  | 23/0469 | . . . . . | {Transmission by sound, e.g. ultra-sound}   |
| 23/0428 | . . . . . | {using passive wheel mounted resonance circuits}   | 23/0471 | . . . .   | {System initialisation, e.g. upload or calibration of operating parameters}   |
| 23/043  | . . . . . | {using transformer type signal transducers, e.g. rotary transformers}  | 23/0472 | . . . . . | {to manually allocate ID codes or mounting positions, e.g. by service technicians}  |
| 23/0432 | . . . . . | {using vehicle structural parts as signal path, e.g. chassis, axle or fender}  | 23/0474 | . . . .   | {Measurement control, e.g. setting measurement rate or calibrating of sensors; Further processing of measured values, e.g. filtering, compensating or slope monitoring}           |
| 23/0433 | . . . . . | {Radio signals}  | 23/0476 | . . . . . | {Temperature compensation of measured pressure values}  |
| 23/0435 | . . . . . | {Vehicle body mounted circuits, e.g. transceiver or antenna fixed to central console, door, roof, mirror or fender}  | 23/0477 | . . . . . | {Evaluating waveform of pressure readings}  |
| 23/0437 | . . . . . | {Means for detecting electromagnetic field changes not being part of the signal transmission <u>per se</u> , e.g. strength, direction, propagation or masking}                             | 23/0479 | . . . .   | {Communicating with external units being not part of the vehicle, e.g. tools for diagnostic, mobile phones, electronic keys or service stations}                                  |
| 23/0438 | . . . . . | {comprising signal transmission means, e.g. for a bidirectional communication with a corresponding wheel mounted receiver}   | 23/0481 | . . . .   | {System diagnostic, e.g. monitoring battery voltage, detecting hardware detachments or identifying wireless transmission failures}  |
| 23/044  | . . . . . | {Near field triggers, e.g. magnets or triggers with 125 KHz}   | 23/0483 | . . . .   | {Wireless routers between wheel mounted transmitters and chassis mounted receivers}   |
| 23/0442 | . . . . . | {the transmitted signal comprises further information, e.g. instruction codes, sensor characteristics or identification data}  | 23/0484 | . . . .   | {Detecting an ongoing tyre inflation}   |
| 23/0444 | . . . . . | {Antenna structures, control or arrangements thereof, e.g. for directional antennas, diversity antenna, antenna multiplexing or antennas integrated in fenders}                            | 23/0486 | . . .     | {comprising additional sensors in the wheel or tyre mounted monitoring device, e.g. movement sensors, microphones or earth magnetic field sensors}                                |
|         |           |  | 23/0488 | . . . .   | {Movement sensor, e.g. for sensing angular speed, acceleration or centripetal force}  |

- 23/0489 . . . . {for detecting the actual angular position of the monitoring device while the wheel is turning}
- 23/0491 . . . {Constructional details of means for attaching the control device}
- 23/0493 . . . . {for attachment on the tyre}
- 23/0494 . . . . {Valve stem attachments positioned inside the tyre chamber}
- 23/0496 . . . . {Valve stem attachments positioned outside of the tyre chamber}
- 23/0498 . . . . {for rim attachments ([B60C 23/0494](#), [B60C 23/0496](#) take precedence)}

**WARNING**

Group [B60C 23/0498](#) is impacted by reclassification into group [B60C 23/04985](#).

Groups [B60C 23/0498](#) and [B60C 23/04985](#) should be considered in order to perform a complete search.

- 23/04985 . . . . . {using straps surrounding the rims}

**WARNING**

Group [B60C 23/04985](#) is incomplete pending reclassification of documents from group [B60C 23/0498](#).

Groups [B60C 23/04985](#) and [B60C 23/0498](#) should be considered in order to perform a complete search.

- 23/06 . . Signalling devices actuated by deformation of the tyre {, e.g. tyre mounted deformation sensors or indirect determination of tyre deformation based on wheel speed, wheel-centre to ground distance or inclination of wheel axle}
- 23/061 . . {by monitoring wheel speed (measuring distance traversed on the ground by vehicles [G01C 22/00](#))}
- 23/062 . . . {Frequency spectrum analysis of wheel speed signals, e.g. using Fourier transformation}
- 23/063 . . {Generating directly an audible signal by deformation of the tyre (by touching the ground [B60C 23/085](#))}
- 23/064 . . {comprising tyre mounted deformation sensors, e.g. to determine road contact area}
- 23/065 . . {by monitoring vibrations in tyres or suspensions ([B60C 23/062](#) takes precedence)}
- 23/066 . . {by monitoring wheel-centre to ground distance}
- 23/067 . . {by monitoring chassis to ground distance}
- 23/068 . . {by monitoring chassis to tyre distance}
- 23/08 . . by touching the ground
- 23/085 . . . {putting directly into action an audible signal}
- 23/10 . . Arrangement of tyre-inflating pumps mounted on vehicles
- 23/105 . . {the pump being mounted in the saddle-pillar of a bicycle}

- 23/12 . . . operated by a running wheel

**WARNING**

Group [B60C 23/12](#) is impacted by reclassification into groups [B60C 23/121](#) - [B60C 23/137](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 23/121 . . . {the pumps being mounted on the tyres}

**WARNING**

Groups [B60C 23/121](#) – [B60C 23/124](#) are incomplete pending reclassification of documents from group [B60C 23/12](#).

Groups [B60C 23/121](#) – [B60C 23/124](#) and [B60C 23/12](#) should be considered in order to perform a complete search.

- 23/123 . . . . {Elongate peristaltic pumps}

- 23/124 . . . . {Bladders}

- 23/126 . . . {the pumps being mounted on the wheel rims}

**WARNING**

Group [B60C 23/126](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).

Groups [B60C 23/126](#) and [B60C 23/12](#) should be considered in order to perform a complete search.

- 23/127 . . . {the pumps being mounted on the hubs}

**WARNING**

Group [B60C 23/127](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).

Groups [B60C 23/127](#) and [B60C 23/12](#) should be considered in order to perform a complete search.

- 23/129 . . . {the pumps being mounted on wheel spokes}

**WARNING**

Group [B60C 23/129](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).

Groups [B60C 23/129](#) and [B60C 23/12](#) and [B60C 23/129](#) should be considered in order to perform a complete search.

- 23/131 . . . {activated by force of gravity}

**WARNING**

Group [B60C 23/131](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).

Groups [B60C 23/131](#) and [B60C 23/12](#) should be considered in order to perform a complete search.

- 23/133 . . . {activated by centrifugal force}
- WARNING**
- Group [B60C 23/133](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).
- Groups [B60C 23/133](#) and [B60C 23/12](#) should be considered in order to perform a complete search.
- 23/135 . . . {activated due to tyre deformation}
- WARNING**
- Group [B60C 23/135](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).
- Groups [B60C 23/135](#) and [B60C 23/12](#) should be considered in order to perform a complete search.
- 23/137 . . . {comprising cam driven pistons}
- WARNING**
- Group [B60C 23/137](#) is incomplete pending reclassification of documents from group [B60C 23/12](#).
- Groups [B60C 23/137](#) and [B60C 23/12](#) should be considered in order to perform a complete search.
- 23/14 . . operated by the prime mover of the vehicle
- 23/16 . Arrangement of air tanks mounted on vehicles
- 23/18 . Tyre cooling arrangements {, e.g. heat shields ([wheels with cooling fins B60B 19/10](#))}
- 23/19 . . for dissipating heat
- 23/20 . Devices for measuring or signalling tyre temperature {only}
- 25/00 Apparatus or tools adapted for mounting, removing or inspecting tyres (testing of tyres G01M 17/02)**
- 25/002 . {Inspecting tyres}
- NOTE**
- When classifying in this group, classification is also made in the appropriate subgroups of [B60C 25/0548](#)
- 25/005 . . {inside surface}
- 25/007 . . {outside surface ([measuring profile depth G01B 11/22](#))}
- 25/01 . for removing tyres from or mounting tyres on wheels
- 25/015 . . {for only breaking the beads}
- 25/02 . . Tyre levers or the like, e.g. hand-held
- 25/025 . . . {with a jack}
- 25/04 . . . pivotal about the wheel axis, or movable along the rim edge, e.g. rollable
- 25/05 . . Machines
- 25/0503 . . . {for mounting only}
- 25/0506 . . . {for demounting only}
- 25/0509 . . . {for inserting additional parts, e.g. support rings, sensors}
- 25/0512 . . . {Integrated systems performing multiple operations, e.g. assembly lines}
- 25/0515 . . . {Automated devices, e.g. mounting robots}
- 25/0518 . . . {Horizontal wheel axis in working position}
- 25/0521 . . . {Handling of rim or tyre, e.g. lifting and positioning devices}
- 25/0524 . . . {Separating tyres from rims, e.g. by destroying}
- 25/0527 . . . {Adapting to different wheel diameters, i.e. distance between support and tool}
- 25/053 . . . {Support of wheel parts during machine operation}
- 25/0533 . . . . {Fixing the tyre only, e.g. gripping the tread portion for inserting the rim}
- 25/0536 . . . . {axially fixing the rim, e.g. pulling devices}
- 25/0539 . . . . {radially fixing the rim, e.g. with gripping claws}
- 25/0542 . . . . {with self-centering means, e.g. cones}
- 25/0545 . . . . {with rotary motion of tool or tyre support, e.g. turntables}
- 25/0548 . . . {equipped with sensing means, e.g. for positioning, measuring or controlling}
- 25/0551 . . . . {mechanical}
- 25/0554 . . . . {optical, e.g. cameras}
- 25/0557 . . . . {thermal}
- 25/056 . . . . {measuring speed, acceleration or forces}
- 25/0563 . . . {Tools interacting with the tyre and moved in relation to the tyre during operation}
- 25/0566 . . . . {rolling only}
- 25/0569 . . . . {gliding only}
- 25/0572 . . . . {pressing only}
- 25/0575 . . . . {levering only}
- 25/0578 . . . . {hooking only}
- 25/0581 . . . . {Translational tool trajectory only}
- 25/0584 . . . . {Predetermined tool path, e.g. coulisse, multi-link}
- 25/0587 . . . . {Programmed tool path, e.g. robot arm with multiple degrees of freedom}
- 25/059 . . . . {Conjoint tool operations, i.e. at least two tools cooperating simultaneously}
- 25/0593 . . . . {Multi-functional tools for performing at least two operations, e.g. bead breaking and bead seeking}
- 25/0596 . . . {Soaping devices}
- 25/12 . . . for only seating the beads
- 25/122 . . . . acting on the tyre tread
- 25/125 . . . for only breaking the beads
- 25/128 . . . . acting axially on the whole circumference of the bead or side wall
- 25/13 . . . . acting axially on a part of the bead or side wall only at localised regions of the bead or side wall
- 25/132 . . . for removing and mounting tyres ([for only seating the beads B60C 25/12; for only breaking the beads B60C 25/125](#) ; [for locating provisionally the beads of tubeless tyres against the sealing surfaces of the rims B60C 25/145](#)))
- 25/135 . . . . having a tyre support or a tool, movable along wheel axis
- 25/138 . . . . . with rotary motion of tool or tyre support
- 25/14 . Apparatus or tools for spreading {or locating} tyre beads
- 25/142 . . {Devices for tightening or expanding the felly, devices for spreading the tyres}

|              |  |                |  |
|--------------|--|----------------|--|
| 25/145       | . . {for locating provisionally the beads of tubeless tyres against the sealing surfaces of the rims, e.g. air filling bell}                         | 27/08          | . . involving lugs or rings taking up wear {, e.g. chain links, chain connectors }   |
| 25/147       | . . {Safety cages for inflation}   | 27/083         | . . . {Profiled links, i.e. cross-section other than round, e.g. hexagonal}  |
| 25/15        | . . with means for inverting the tyre  | 27/086         | . . . {Studded links, i.e. traction enhancing parts located on the link or inserted into the link}   |
| 25/16        | . {Tools for repairing damaged tyres}  | 27/10          | . . having tensioning means  |
| 25/18        | . Tools for mounting or demounting air valves  | 27/12          | . . . resilient {pretension}   |
| 25/185       | . . {Automated devices, e.g. robots}   | 27/125         | . . . . {Centrifugal forces for tensioning while driving}  |
| 25/20        | . Tools for attaching metallic tyres, e.g. iron tyres upon wooden rims   | 27/14          | . . automatically attachable   |
| <b>27/00</b> | <b>Non-skid devices temporarily attachable to resilient tyres or resiliently-tyred wheels</b>  | 27/145         | . . . {the anti-skid device being wound around the wheel by its rotation from a point connected to the body frame of the vehicle}  |
| 27/003       | . {Mounting aids, e.g. auxiliary tensioning tools, slotted ramps}  | 27/16          | . . formed of close material, e.g. leather {or synthetic mats}   |
| 27/006       | . {provided with protective parts, e.g. rubber elements to protect the rim portion}  | 27/18          | . . . the material being fabric, e.g. woven wire {or textile}  |
| 27/02        | . extending over restricted arcuate part of tread (B60C 27/20 takes precedence)  | 27/20          | . having ground-engaging plate-like elements   |
| 27/0207      | . . {involving lugs or rings taking up wear, e.g. chain links, chain connectors (chain couplings for, e.g. hoisting F16G 15/00)}                     | 27/22          | . for tandem tyres   |
| 27/0215      | . . . {Profiled links, e.g. cross-section other than round}  | <b>29/00</b>   | <b>Arrangements of tyre-inflating valves to tyres or rims; Accessories for tyre-inflating valves, not otherwise provided for (tools for mounting or demounting valves B60C 25/18)</b>  |
| 27/0223      | . . . {Studded links, i.e. traction enhancing parts located on the link or inserted into the link}   | 29/002         | . {characterised by particular features of the valve core}   |
| 27/023       | . . {provided with radial arms for supporting the ground engaging parts on the wheel}  | 29/005         | . {characterised by particular features of the valve stem}   |
| 27/0238      | . . {provided with tensioning means}   | 29/007         | . {for tyres with segmental sections or for multi-chamber tyres}   |
| 27/0246      | . . . {Resilient pretension}   | 29/02          | . Connection to rims   |
| 27/0253      | . . . {Centrifugal forces for tensioning while driving}  | 29/04          | . Connection to tyres {or inner tubes}   |
| 27/0261      | . . {provided with fastening means}  | 29/06          | . Accessories for tyre-inflating valves, e.g. housings, guards, covers for valve caps, locks, not otherwise provided for {(B60C 23/0496 takes precedence; tools for screwing and unscrewing valve caps B25B 27/0057; pump connectors F04B 33/005)} |
| 27/0269      | . . . {acting on the wheel, e.g. on the rim or wheel bolts}  | 29/062         | . . {for filling a tyre with particular materials, e.g. liquids (B60C 5/004, B60C 5/005 take precedence)}  |
| 27/0276      | . . . . {through apertures in the rim, e.g. fastening from one lateral side to the other lateral side of the rim; extending axially through the rim} | 29/064         | . . {Hose connections for pneumatic tyres, e.g. to spare wheels}   |
| 27/0284      | . . . {acting on the tread portion, e.g. special fixing agents, fastened in the groove of the tyre}  | 29/066         | . . {Valve caps}   |
| 27/0292      | . . . {acting on the sidewall of the tyre}   | 29/068         | . . {Pressure relief devices, i.e. safety devices for overpressure}  |
| 27/04        | . . the ground-engaging part being rigid   | <b>99/00</b>   | <b>Subject matter not provided for in other groups of this subclass</b>  |
| 27/045       | . . . {involving retractable devices (fixing of spade lugs B60B 15/00)}  | 99/003         | . {Tyre heating arrangements}  |
| 27/06        | . extending over the complete circumference of the tread, e.g. made of chains {or cables} (B60C 27/20 takes precedence)                              | 99/006         | . {Computer aided tyre design or simulation}   |
| 27/061       | . . {provided with radial arms for supporting the ground engaging parts on the tread}  | <b>2200/00</b> | <b>Tyres specially adapted for particular applications</b>   |
| 27/062       | . . {provided with fastening means}  | 2200/02        | . for aircrafts  |
| 27/063       | . . . {acting on the wheel, e.g. on the rim or wheel bolts}  | 2200/04        | . for road vehicles, e.g. passenger cars   |
| 27/064       | . . . {through apertures in the rim, e.g. fastening from one lateral side to the other lateral side of the rim; extending axially through the rim}   | 2200/06        | . for heavy duty vehicles  |
| 27/065       | . . . {acting on the tread portion, e.g. special fixing agents, fastened in the groove of the tyre}  | 2200/065       | . . for construction vehicles  |
| 27/066       | . . . {acting on the sidewall of the tyre}   | 2200/08        | . for agricultural vehicles  |
| 27/067       | . . {Special chain layout, i.e. distribution of chain portions over the tread, e.g. arranged in polygon pattern}                                     | 2200/10        | . for motorcycles, scooters or the like  |
| 27/068       | . . {the ground-engaging part being rigid}   | 2200/12        | . for bicycles   |
|              |  | 2200/14        | . for off-road use   |