

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

TRANSPORTING

B60 VEHICLES IN GENERAL

(NOTE omitted)

B60C VEHICLE TYRES ([manufacture B29](#)); TYRE INFLATION; TYRE CHANGING OR REPAIRING; REPAIRING, OR CONNECTING VALVES TO, INFLATABLE ELASTIC BODIES IN GENERAL; DEVICES OR ARRANGEMENTS RELATED TO TYRES ([testing of tyres G01M 17/02](#))

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 (characterised by rail-engaging elements [B60B 17/00](#))

- 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 {(asymmetric bead seats [B60C 15/0236](#); asymmetric bead reinforcement [B60C 2015/0696](#))}
- 3/08 . collapsible into storage or non-use condition, e.g. space-saving spare tyres ([run-flat tyres B60C 17/08](#))
- 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}
- 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 . without separate inflatable inserts, e.g. tubeless tyres with transverse section open to the rim ([B60C 5/20 takes precedence](#))
- 5/14 . . with impervious liner or coating on the inner wall of the tyre
- 5/142 . . . {provided partially, i.e. not covering the whole inner wall}
- 2005/145 . . . {made of laminated layers}
- 2005/147 . . . {characterised by the joint or splice}
- 5/16 . . Sealing means between beads and rims, e.g. bands
- 5/18 . Sectional casings, e.g. comprising replaceable arcuate parts
- 5/20 . having multiple separate inflatable chambers (with additional tubes which become load supporting in emergency [B60C 17/02](#))
- 5/22 . . the chambers being annular
- 5/24 . . the walls of the chambers extending transversely of the tyre
- 7/00 Non-inflatable or solid tyres ([B60C 1/00 takes precedence](#); tyres or rims characterised by rail engaging elements [B60B 17/00](#))**
 - 2007/005 . {made by casting, e.g. of polyurethane}
 - 7/02 . made from ropes or bristles
 - 7/04 . made of wood or leather
 - 7/06 . made of metal
 - 7/08 . built-up from a plurality of arcuate parts
 - 7/10 . characterised by means for increasing resiliency (highly resilient wheels [B60B 9/00](#))
 - 7/102 . . {Tyres built-up with separate rubber parts}
 - 7/105 . . {using foam material}
 - 2007/107 . . {comprising lateral openings}
 - 7/12 . . using enclosed chambers, e.g. gas-filled (inflatable tyres [B60C 5/00](#))
 - 7/125 . . . {enclosed chambers defined between rim and tread}
 - 7/14 . . using springs
 - 7/143 . . . {having a lateral extension disposed in a plane parallel to the wheel axis}
 - 2007/146 . . . {extending substantially radially, e.g. like spokes}
 - 7/16 . . . of helical or flat coil form
 - 7/18 disposed radially relative to wheel axis
 - 7/20 disposed circumferentially relative to wheel axis
 - 7/22 . having inlays other than for increasing resiliency, e.g. for armouring
 - 7/24 . characterised by means for securing tyres on rim or wheel body
 - 7/26 . . using bolts
 - 7/28 . . using straps or the like, e.g. vulcanised into the tyre

9/00

Reinforcements or ply arrangement of pneumatic tyres (inserts having reinforcing means [B60C 5/08](#); bead structure, e.g. turnup or overlap construction, [B60C 15/00](#); tyre cords per se [D02G 3/48](#); fabrics per se [D03D](#), [D04H](#); metal ropes or cables per se [D07B 1/06](#)) **{B}**

NOTE

When classifying in this group, classification is also made in subclass [B32B](#) insofar as any layered product is concerned

- 9/0007 . {Reinforcements made of metallic elements, e.g. cords, yarns, filaments or fibres made from metal}
- 2009/0014 . . {Surface treatments of steel cords}
- 2009/0021 . . {Coating rubbers for steel cords}
- 9/0028 . {Reinforcements comprising mineral fibres, e.g. glass or carbon fibres}
- 2009/0035 . {Reinforcements made of organic materials, e.g. rayon, cotton or silk}
- 9/0042 . {Reinforcements made of synthetic materials}
- 9/005 . {Reinforcements made of different materials, e.g. hybrid or composite cords}
- 9/0057 . {Reinforcements comprising preshaped elements, e.g. undulated or zig-zag filaments}
- 9/0064 . {Reinforcements comprising monofilaments}
- 2009/0071 . {characterised by special physical properties of the reinforcements}
 - 2009/0078 . . {Modulus}
 - 2009/0085 . . {Tensile strength}
 - 2009/0092 . . {Twist structure}
- 9/02 . Carcasses
 - 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}
- 2009/0215 . . {Partial carcass reinforcing plies, i.e. the plies neither crossing the equatorial plane nor folded around the bead core}
- 2009/0223 . . {comprising a cushion layer between adjacent carcass plies}
 - 9/023 . . {built up from narrow strips, individual cords or filaments, e.g. using filament winding}
 - 9/0238 . . {characterised by special physical properties of the carcass ply}
 - 2009/0246 . . . {Modulus of the ply}
 - 2009/0253 {being different between adjacent plies}
 - 2009/0261 {being different within the same ply}
 - 2009/0269 . . {Physical properties or dimensions of the carcass coating rubber}
 - 2009/0276 . . . {Modulus; Hardness; Loss modulus or "tangens delta"}
 - 2009/0284 . . . {Thickness}
 - 9/0292 . . {Carcass ply curvature ([sidewall curvature B60C 13/003](#))}
 - 9/04 . . the reinforcing cords of each carcass ply arranged in a substantially parallel relationship
- 2009/0408 . . . {Carcass joints or splices}
- 2009/0416 . . . {Physical properties or dimensions of the carcass cords}
 - 2009/0425 {Diameters of the cords; Linear density thereof}
 - 2009/0433 {Modulus}

2009/0441	. . . .	{Density in width direction}	2009/2016	. . . .	{comprising cords at an angle of 10 to 30 degrees to the circumferential direction}
2009/045	. . . .	{Tensile strength}	2009/2019	. . . .	{comprising cords at an angle of 30 to 60 degrees to the circumferential direction}
2009/0458	. . . .	{Elongation of the reinforcements at break point}	2009/2022	. . . .	{comprising cords at an angle of 60 to 90 degrees to the circumferential direction}
2009/0466	. . . .	{Twist structures}	2009/2025	. . . .	{with angle different or variable in the same layer}
2009/0475	. . . .	{Particular materials of the carcass cords}	2009/2029	. . . .	{with different cords in the same layer, i.e. cords with different materials or dimensions}
2009/0483	. . . .	{Different cords in the same layer}	2009/2032	. . . .	{characterised by the course of the belt cords, e.g. undulated or sinusoidal}
2009/0491	. . . .	{with special path of the carcass cords, e.g. sinusoidal}	2009/2035	. . . .	{built-up by narrow strips}
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 (B60C 9/07, B60C 9/09 take precedence)	2009/2038	. . . .	{using lateral belt strips at belt edges, e.g. edge bands}
9/07	. . . .	the cords curve from bead to bead in plural planes, e.g. S-shaped cords	2009/2041	. . . .	{with an interrupted belt ply, e.g. using two or more portions of the same ply}
9/08	. . . .	the cords extend transversely from bead to bead, i.e. radial ply (B60C 9/07 takes precedence)	2009/2045	. . . .	{with belt joints or splices}
9/09	. . . .	combined with other carcass plies having cords extending diagonally from bead to bead, i.e. combined radial ply and bias angle ply	2009/2048	. . . .	{characterised by special physical properties of the belt plies}
9/10	. . . .	the reinforcing cords within each carcass ply arranged in a crossing relationship	2009/2051	. . . .	{Modulus of the ply}
9/11	. . . .	Woven, braided, or knitted plies	2009/2054	. . . .	{being different within the same ply}
9/12	. . . .	built-up with rubberised layers of discrete fibres or filaments	2009/2058	. . . .	{being different between adjacent plies}
9/13	. . . .	with two or more differing cord materials	2009/2061	. . . .	{Physical properties or dimensions of the belt coating rubber}
9/14	. . . .	built-up with sheets, webs, or films of homogeneous material, e.g. synthetics, sheet metal, rubber	2009/2064	. . . .	{Modulus; Hardness; Loss modulus or "tangens delta"}
2009/145	. . . .	{at the inner side of the carcass structure}	2009/2067	. . . .	{Thickness}
9/16	. . . .	built-up with metallic reinforcing inlays	2009/207	. . . .	{Double layers, e.g. using different rubbers in the same belt ply}
9/17	. . . .	asymmetric to the midcircumferential plane of the tyre	2009/2074	. . . .	{Physical properties or dimension of the belt cord}
9/18	. . . .	Structure or arrangement of belts or breakers, crown-reinforcing or cushioning layers	2009/2077	. . . .	{Diameters of the cords; Linear density thereof}
9/1807	. . . .	{comprising fabric reinforcements}	2009/208	. . . .	{Modulus of the cords}
2009/1814	. . . .	{square woven}	2009/2083	. . . .	{Density in width direction}
9/1821	. . . .	{comprising discrete fibres or filaments}	2009/2087	. . . .	{with variable density in the same layer}
2009/1828	. . . .	{characterised by special physical properties of the belt ply}	2009/209	. . . .	{Tensile strength}
9/1835	. . . .	{Rubber strips or cushions at the belt edges (compositions B60C 2001/0075)}	2009/2093	. . . .	{Elongation of the reinforcements at break point}
2009/1842	. . . .	{Width or thickness of the strips or cushions}	2009/2096	. . . .	{Twist structures}
9/185	. . . .	{between adjacent or radially below the belt plies}	9/22	. . . .	the plies being arranged with all cords disposed along the circumference of the tyre
2009/1857	. . . .	{radially above the belt plies}	9/2204	. . . .	{obtained by circumferentially narrow strip winding}
2009/1864	. . . .	{wrapped around the edges of the belt}	2009/2209	. . . .	{characterised by tension of the cord during winding}
2009/1871	. . . .	{with flat cushions or shear layers between belt layers}	2009/2214	. . . .	{characterised by the materials of the zero degree ply cords}
2009/1878	. . . .	{with flat cushions or shear layers between the carcass and the belt}	2009/2219	. . . .	{with a partial zero degree ply at the belt edges - edge band}
2009/1885	. . . .	{with belt ply between adjacent carcass plies}	2009/2223	. . . .	{with an interrupted zero degree ply, e.g. using two or more portions for the same ply}
2009/1892	. . . .	{with belt ply radial inside the carcass structure}	2009/2228	. . . .	{characterised by special physical properties of the zero degree plies}
9/20	. . . .	built-up from rubberised plies each having all cords arranged substantially parallel	2009/2233	. . . .	{Modulus of the zero degree ply}
9/2003	. . . .	{characterised by the materials of the belt cords}	2009/2238	. . . .	{Physical properties or dimensions of the ply coating rubber}
9/2006	. . . .	{consisting of steel cord plies only}	2009/2242	. . . .	{Modulus; Hardness; Loss modulus or "tangens delta"}
9/2009	. . . .	{comprising plies of different materials}	2009/2247	. . . .	{Thickness}
2009/2012	. . . .	{with particular configuration of the belt cords in the respective belt layers}	2009/2252	. . . .	{Physical properties or dimension of the zero degree ply cords}

2009/2257	. . . . .	{Diameters of the cords; Linear density thereof}	11/0323	. . .	{tread comprising channels under the tread surface, e.g. for draining water}
2009/2261	. . . . .	{Modulus of the cords}	2011/0325	. .	{Irregular patterns with particular pitch sequence}
2009/2266	. . . . .	{Density of the cords in width direction}	11/0327	. .	{characterised by special properties of the tread pattern}
2009/2271	. . . . .	{with variable density}	11/033	. . .	{by the void or net-to-gross ratios of the patterns}
2009/2276	. . . . .	{Tensile strength}	11/0332	. . .	{by the footprint-ground contacting area of the tyre tread}
2009/228	. . . . .	{Elongation of the reinforcements at break point}	2011/0334	. . .	{Stiffness}
2009/2285	. . . . .	{Twist structures}	2011/0337	. .	{characterised by particular design features of the pattern}
2009/229	. . . . .	{characterised by the course of the cords, e.g. undulated or sinusoidal}	2011/0339	. . .	{Grooves}
2009/2295	. . . . .	{with different cords in the same layer}	2011/0341	. . . .	{Circumferential grooves}
9/24	. .	built-up of arcuate parts	2011/0344	. . . . .	{provided at the equatorial plane}
9/26	. .	Folded plies	2011/0346	. . . . .	{with zigzag shape}
9/263	. . .	{further characterised by an endless zigzag configuration in at least one belt ply, i.e. no cut edge being present}	2011/0348	. . . . .	{Narrow grooves, i.e. having a width of less than 4 mm}
2009/266	. . . .	{combined with non folded cut-belt plies}	2011/0351	. . . . .	{Shallow grooves, i.e. having a depth of less than 50% of other grooves}
9/28	. .	characterised by the belt or breaker dimensions or curvature relative to carcass (B60C 9/30 takes precedence)	2011/0353	. . . . .	{characterised by width}
2009/283	. . .	{characterised by belt curvature}	2011/0355	. . . . .	{characterised by depth}
2009/286	. . . .	{being substantially flat}	2011/0358	. . . .	{Lateral grooves, i.e. having an angle of 45 to 90 degrees to the equatorial plane}
9/30	. .	asymmetric to the midcircumferential plane of the tyre	2011/036	. . . . .	{Narrow grooves, i.e. having a width of less than 3 mm}
11/00		Tyre tread bands; Tread patterns; Anti-skid inserts	2011/0362	. . . . .	{Shallow grooves, i.e. having a depth of less than 50% of other grooves}
11/0008	. .	{characterised by the tread rubber}	2011/0365	. . . . .	{characterised by width}
2011/0016	. .	{Physical properties or dimensions}	2011/0367	. . . . .	{characterised by depth}
2011/0025	. . .	{Modulus or tan delta}	2011/0369	. . . . .	{with varying depth of the groove}
2011/0033	. . .	{Thickness of the tread}	2011/0372	. . . . .	{with particular inclination angles}
11/0041	. .	{comprising different tread rubber layers}	2011/0374	. . . .	{Slant grooves, i.e. having an angle of about 5 to 35 degrees to the equatorial plane}
11/005	. .	{with cap and base layers}	2011/0376	. . . . .	{characterised by width}
11/0058	. . .	{with different cap rubber layers in the axial direction}	2011/0379	. . . . .	{characterised by depth}
11/0066	. . . .	{having an asymmetric arrangement}	2011/0381	. . . .	{Blind or isolated grooves}
11/0075	. . .	{with different base rubber layers in the axial direction}	2011/0383	. . . . .	{at the centre of the tread}
11/0083	. .	{characterised by the curvature of the tyre tread}	2011/0386	. . .	{Continuous ribs}
2011/0091	. .	{built-up by narrow strip winding}	2011/0388	. . . .	{provided at the equatorial plane}
11/01	. .	Shape of the shoulders between tread and sidewall, e.g. rounded, stepped, cantilevered (arrangements of grooves or ribs on the sidewalls B60C 13/02)	2011/039	. . . .	{provided at the shoulder portion}
2011/013	. . .	{provided with a recessed portion}	2011/0393	. . . .	{Narrow ribs, i.e. having a rib width of less than 8 mm}
2011/016	. .	{different rubber for tread wings}	2011/0395	. . . . .	{for linking shoulder blocks}
11/02	. .	Replaceable treads	2011/0397	. . . .	{Sacrificial ribs, i.e. ribs recessed from outer tread contour}
11/03	. .	Tread patterns	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)
11/0302	. .	{directional pattern, i.e. with main rolling direction}	11/042	. . .	{further characterised by the groove cross-section}
11/0304	. .	{Asymmetric patterns}	11/045	. . . .	{the groove walls having a three-dimensional shape}
11/0306	. .	{Patterns comprising block rows or discontinuous ribs}	11/047	. . . .	{the groove bottom comprising stone trapping protection elements, e.g. ribs}
11/0309	. . .	{further characterised by the groove cross-section}	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)
11/0311	. .	{Patterns comprising tread lugs arranged parallel or oblique to the axis of rotation}	11/12	. .	characterised by the use of narrow slits or incisions, e.g. sipes
2011/0313	. . .	{directional type}	11/1204	. . .	{with special shape of the sipe}
11/0316	. . .	{further characterised by the groove cross-section}	2011/1209	. . . .	{straight at the tread surface}
11/0318	. .	{irregular patterns with particular pitch sequence}	2011/1213	. . . .	{sinusoidal or zigzag at the tread surface}
11/032	. .	{Patterns comprising isolated recesses}			

- 11/1218 {Three-dimensional shape with regard to depth and extending direction}
- 11/1222 {Twisted or warped shape in the sipe plane}
- 2011/1227 {having different shape within the pattern}
- 2011/1231 {being shallow, i.e. sipe depth of less than 3 mm}
- 11/1236 {with special arrangements in the tread pattern}
- 11/124 {inclined with regard to a plane normal to the tread surface}
- 2011/1245 {being arranged in crossing relation, e.g. sipe mesh}
- 11/125 {arranged at the groove bottom}
- 2011/1254 {with closed sipe, i.e. not extending to a groove}
- 11/1259 . . . {Depth of the sipe}
- 11/1263 {different within the same sipe}
- 2011/1268 {being different from sipe to sipe}
- 11/1272 . . . {Width of the sipe}
- 2011/1277 {being narrow, i.e. less than 0.3 mm}
- 11/1281 {different within the same sipe, i.e. enlarged width portion at sipe bottom or along its length}
- 2011/1286 {being different from sipe to sipe}
- 2011/129 . . . {Sipe density, i.e. the distance between the sipes within the pattern}
- 2011/1295 {variable}
- 11/13 . . characterised by the groove cross-section, e.g. for buttressing or preventing stone-trapping
- 11/1307 {with special features of the groove walls}
- 11/1315 {having variable inclination angles, e.g. warped groove walls}
- 11/1323 {asymmetric}
- 2011/133 {comprising recesses}
- 2011/1338 {comprising protrusions}
- 11/1346 {covered by a rubber different from the tread rubber}
- 11/1353 . . . {with special features of the groove bottom}
- 2011/1361 {with protrusions extending from the groove bottom}
- 11/1369 . . . {Tie bars for linking block elements and bridging the groove}
- 11/1376 . . . {Three dimensional block surfaces departing from the enveloping tread contour}
- 11/1384 {with chamfered block corners}
- 11/1392 {with chamfered block edges}
- 11/14 . . Anti-skid inserts, e.g. vulcanised into the tread band
- 2011/142 . . . {Granular particles, e.g. hard granules}
- 2011/145 . . . {Discontinuous fibres}
- 2011/147 . . . {Foamed rubber or sponge rubber on the tread band}
- 11/16 . . of plug form, e.g. made from metal, textile
- 11/1606 . . . {retractable plug}
- 11/1612 {actuated by fluid, e.g. using fluid pressure difference}
- 11/1618 {actuated by temperature, e.g. by means of temperature sensitive elements}
- 11/1625 . . . {Arrangements thereof in the tread patterns, e.g. irregular}
- 11/1631 . . . {inclined with regard to the radial direction}
- 11/1637 . . . {Attachment of the plugs into the tread, e.g. screwed}
- 11/1643 . . . {with special shape of the plug-body portion, i.e. not cylindrical}
- 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 ([tyre pressure monitoring B60C 23/04](#))}
- 13/00 Tyre sidewalls; Protecting, decorating, marking, or the like, thereof ([B60C 17/08 takes precedence](#); [tyre shoulders B60C 11/01](#))**
- 13/001 . {Decorating, marking or the like}
- 13/002 . {Protection against exterior elements}
- 13/003 . {characterised by sidewall curvature ([carcass ply curvature B60C 9/0292](#))}
- 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}	2015/061	. . . {Dimensions of the bead filler in terms of numerical values 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 ; rims B60B 21/00)	2015/0614	. . {characterised by features of the chafer or clinch portion, i.e. the part of the bead contacting the rim}
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)}	2015/0617	. . {comprising a cushion rubber other than the chafer or clinch rubber}
15/0206	. . {using inside rim bead seating, i.e. the bead being seated at a radially inner side of the rim}	2015/0621	. . . {adjacent to the carcass turnup portion}
15/0209	. . {Supplementary means for securing the bead}	2015/0625	. . . {provided at the terminal edge portion of a carcass or reinforcing layer}
15/0213	. . . {the bead being clamped by rings, cables, rim flanges or other parts of the rim}	15/0628	. . {comprising a bead reinforcing layer}
15/0216	. . . {the bead being pierced by bolts, rivets, clips or other elements}	15/0632	. . . {using flippers in contact with and wrapped around the bead core and, at least partially, in contact with the bead filler}
15/022	. . . {the bead being secured by turned-in rim flanges, e.g. rim of the clincher type}	15/0635	. . . {using chippers between the carcass layer and chafer rubber wrapped around the bead}
15/0223	. . . {the bead being secured by clip-hook elements not forming part of the rim flange}	2015/0639	. . . {between carcass main portion and bead filler not wrapped around the bead core}
15/0226	. . . {the bead being secured by protrusions of the rim extending from the bead seat, e.g. hump or serrations}	2015/0642	. . . {between carcass turn-up and bead filler not wrapped around the bead core}
15/023	. . . {the bead being secured by bead extensions which extend over and wrap around the rim flange}	2015/0646	. . . {at the axially inner side of the carcass main portion not wrapped around the bead core}
15/0233	. . {Securing tyres without beads; Securing closed torus or tubular tyres}	2015/065	. . . {at the axially outer side of the carcass turn-up portion not wrapped around the bead core}
15/0236	. . {Asymmetric bead seats, e.g. different bead diameter or inclination angle (asymmetric transverse section B60C 3/06 ; asymmetric bead reinforcement B60C 2015/0696)}	15/0653	. . . {with particular configuration of the cords in the respective bead reinforcing layer}
15/024	. . Bead contour, e.g. lips, grooves or ribs	2015/0657	. . . . {comprising cords at an angle of maximal 10 degrees to the circumferential direction}
15/0242	. . . {with bead extensions located radially outside the rim flange position, e.g. rim flange protectors}	2015/066	. . . . {comprising cords at an angle of 10 to 30 degrees to the circumferential direction}
2015/0245	. . . {Bead lips at the bead toe portion, i.e. the axially and radially inner end of the bead}	2015/0664	. . . . {comprising cords at an angle of 30 to 60 degrees to the circumferential direction}
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}	2015/0667	. . . . {comprising cords at an angle of 60 to 90 degrees to the circumferential direction}
15/028	. . Spacers between beads (emergency load supporting means B60C 17/00)	2015/0671	. . . . {the cord angle being different or variable within the same layer}
15/032	. . . inflatable	2015/0675	. . . . {characterised by the course of the cords, e.g. undulated or sinusoidal}
15/036	. . Tyres permanently fixed to the rim, e.g. by adhesive, by vulcanisation	2015/0678	. . . . {Physical properties of the bead reinforcing layer, e.g. modulus of the ply}
15/04	. Bead cores (producing bead-rings or bead-cores for tyres B29D 30/48)	2015/0682	. . . . {Physical properties or dimensions of the coating rubber}
2015/042	. . {characterised by the material of the core, e.g. alloy}	2015/0685	. . . . {Physical properties or dimensions of the cords, e.g. modulus of the cords}
2015/044	. . {characterised by a wrapping layer}	2015/0689	. . . . {Cord density in width direction}
2015/046	. . {Cable cores, i.e. cores made-up of twisted wires}	2015/0692	. . . . {characterised by particular materials of the cords}
2015/048	. . {Polygonal cores characterised by the winding sequence}	2015/0696	. . {Asymmetric bead reinforcement, e.g. arrangement of bead reinforcing layer or apex}
15/05	. . multiple, i.e. with two or more cores in each bead	17/00	Tyres characterised by means enabling restricted operation in damaged or deflated condition; Accessories therefor (having multiple separate inflatable chambers B60C 5/20 ; additional shear belt layers B60C 9/18)
15/06	. Flipper strips, fillers, or chafing strips {and reinforcing layers for the construction of the bead}	17/0009	. {comprising sidewall rubber inserts, e.g. crescent shaped inserts}
15/0603	. . {characterised by features of the bead filler or apex (compositions of the apex rubber B60C 2001/0058)}	17/0018	. . {two or more inserts in each sidewall portion}
15/0607	. . . {comprising several parts, e.g. made of different rubbers}	17/0027	. . {comprising portions of different rubbers in a single insert}
		17/0036	. . {comprising additional reinforcements}
		17/0045	. . {comprising grooves or ribs, e.g. at the inner side of the insert}

2017/0054	. . {Physical properties or dimensions of the inserts}	19/122	. . {disposed inside of the inner liner}
2017/0063	. . . {Modulus; Hardness; Loss modulus or "tangens delta"}	19/125	. . {disposed removably on the tyre}
2017/0072	. . . {Thickness}	19/127	. . {for inner tubes}
2017/0081	. {comprising special reinforcing means in the crown area}	23/00	Devices for measuring, signalling, controlling, or distributing tyre pressure or temperature, specially adapted for mounting on vehicles (measuring in general G01, e.g. G01L 17/00; remote signalling in general G08); Arrangement of tyre inflating devices on vehicles, e.g. of pumps, of tanks {(supplying air for tyre inflation B60S 5/04)}; Tyre cooling arrangements
17/009	. {comprising annular protrusions projecting into the tyre cavity}	23/001	. {Devices for manually or automatically controlling or distributing tyre pressure whilst the vehicle is moving}
17/01	. utilising additional inflatable supports which become load supporting in emergency	23/002	. . {by monitoring conditions other than tyre pressure or deformation}
17/02	. . inflated or expanded in emergency only	23/003	. . {the control being done on the vehicle, i.e. comprising a rotating joint between a vehicle mounted tank and the tyre}
17/04	. utilising additional non-inflatable supports which become load-supporting in emergency	23/004	. . {the control being done on the wheel, e.g. using a wheel-mounted reservoir}
17/041	. . {characterised by coupling or locking means between rim and support}	23/005	. {Devices specially adapted for special wheel arrangements}
17/042	. . . {preventing sliding or rotation between support and rim}	NOTE	
17/043	. . {made-up of an annular metallic shell}		B60C 23/001 , B60C 23/02 , B60C 23/04 , B60C 23/06 or B60C 23/08
17/044	. . {Expandable supports}	23/006	. . {having two wheels only}
17/045	. . {Rotatable supports relative to the rim}	23/007	. . {having multiple wheels arranged side by side}
17/046	. . . {by means of ball bearings}	23/008	. . {having wheels on more than two axles}
17/047	. . {comprising circumferential ribs}	23/009	. . {having wheels on a trailer}
17/048	. . {comprising transverse ribs}	23/02	. Signalling devices actuated by tyre pressure {(hand-held tyre pressure gauges G01L 17/00)}
17/06	. . resilient	23/04	. . mounted on the wheel or tyre
17/061	. . . {comprising lateral openings}	23/0401	. . . {characterised by the type of alarm}
2017/063	. . . {comprising circumferentially extending reinforcements}	23/0403	. . . . {Mechanically generated audible signals, e.g. by buzzer or whistle signals}
17/065	. . . {made-up of foam inserts (tyres filled with foam B60C 5/002)}	23/0405	. . . . {Mechanically generated visible signals, e.g. by using a gauge needle}
17/066	. . . {made-up of plural spherical elements provided in the tyre chamber}	23/0406	. . . . {Alarms noticeable from outside the vehicle, e.g. indication in side mirror, front light or audible alarms (B60C 23/0403, B60C 23/0405 take precedence)}
2017/068	. . . {comprising springs, e.g. helical springs}	23/0408	. . . . {transmitting the signals by non-mechanical means from the wheel or tyre to a vehicle body mounted receiver}
17/08	. Means facilitating folding of sidewalls, e.g. run-flat sidewalls (for storage purposes B60C 3/08)	23/041	. . . . {Means for supplying power to the signal-transmitting means on the wheel}
17/10	. Internal lubrication	23/0411	. . . . . {Piezo-electric generators}
17/103	. . {by means of surface coating, e.g. PTFE}	23/0413	. . . . . {Wireless charging of active radio frequency circuits}
17/106	. . {Composition of the lubricant}	23/0415	. . . . . {Automatically identifying wheel mounted units, e.g. after replacement or exchange of wheels}
19/00	Tyre parts or constructions not otherwise provided for	23/0416	. . . . . {allocating a corresponding wheel position on vehicle, e.g. front/left or rear/right}
19/001	. {Tyres requiring an asymmetric or a special mounting}	23/0418	. . . . . {Sharing hardware components like housing, antenna, receiver or signal transmission line with other vehicle systems like keyless entry or brake control units}
19/002	. {Noise damping elements provided in the tyre structure or attached thereto, e.g. in the tyre interior}	23/042	. . . . . {cooperating with wheel hub mounted speed sensors}
19/003	. {Balancing means attached to the tyre}		
2019/004	. {Tyre sensors other than for detecting tyre pressure}		
2019/005	. {Magnets integrated within the tyre structure}		
2019/006	. {Warning devices, e.g. devices generating noise due to flat or worn tyres}		
2019/007	. . {triggered by sensors}		
2019/008	. {Venting means, e.g. for expelling entrapped air}		
19/04	. Tyres 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 (B60C 9/00 takes precedence; inflatable inserts having reinforcing means B60C 5/08 ; sealing compositions per se B29C 73/163; devices for introducing sealing compositions into the tyre B29C 73/166)		

23/0422	. . . . .	{ characterised by the type of signal transmission means }	23/0462	. . . . .	{ Structure of transmission protocol }
23/0423	. . . . .	{ Photo-electric, infra-red or visible light means }	23/0464	. . . . .	{ to avoid signal interference }
23/0425	. . . . .	{ Means comprising permanent magnets, e.g. Hall-effect or Reed-switches }	23/0466	. . . . .	{ with signals sent by transmitters mounted on adjacent vehicles }
23/0427	. . . . .	{ Near field transmission with inductive or capacitive coupling means }	23/0467	. . . . .	{ Electric contact means, e.g. slip-rings, rollers, brushes }
23/0428	. . . . .	{ using passive wheel mounted resonance circuits }	23/0469	. . . . .	{ Transmission by sound, e.g. ultra-sound }
23/043	. . . . .	{ using transformer type signal transducers, e.g. rotary transformers }	23/0471	. . . . .	{ System initialisation, e.g. upload or calibration of operating parameters }
23/0432	. . . . .	{ using vehicle structural parts as signal path, e.g. chassis, axle or fender }	23/0472	. . . . .	{ to manually allocate ID codes or mounting positions, e.g. by service technicians }
23/0433	. . . . .	{ Radio signals }	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 }
23/0435	. . . . .	{ Vehicle body mounted circuits, e.g. transceiver or antenna fixed to central console, door, roof, mirror or fender }	23/0476	. . . . .	{ Temperature compensation of measured pressure values }
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 }	23/0477	. . . . .	{ Evaluating waveform of pressure readings }
23/0438	. . . . .	{ comprising signal transmission means, e.g. for a bidirectional communication with a corresponding wheel mounted receiver }	23/0479	. . . . .	{ Communicating with external units being not part of the vehicle, e.g. tools for diagnostic, mobile phones, electronic keys or service stations }
23/044	. . . . .	{ Near field triggers, e.g. magnets or triggers with 125 KHz }	23/0481	. . . . .	{ System diagnostic, e.g. monitoring battery voltage, detecting hardware detachments or identifying wireless transmission failures }
23/0442	. . . . .	{ the transmitted signal comprises further information, e.g. instruction codes, sensor characteristics or identification data }	23/0483	. . . . .	{ Wireless routers between wheel mounted transmitters and chassis mounted receivers }
23/0444	. . . . .	{ Antenna structures, control or arrangements thereof, e.g. for directional antennas, diversity antenna, antenna multiplexing or antennas integrated in fenders }	23/0484	. . . . .	{ Detecting an ongoing tyre inflation }
23/0445	. . . . .	{ Means for changing operating mode, e.g. sleep mode, factory mode or energy saving mode }	23/0486	. . . . .	{ comprising additional sensors in the wheel or tyre mounted monitoring device, e.g. movement sensors, microphones or earth magnetic field sensors }
23/0447	. . . . .	{ Wheel or tyre mounted circuits }	23/0488	. . . . .	{ Movement sensor, e.g. for sensing angular speed, acceleration or centripetal force }
23/0449	. . . . .	{ Passive transducers, e.g. using surface acoustic waves, backscatter technology or pressure sensitive resonators (near field passive transducers B60C 23/0428) }	23/0489	. . . . .	{ for detecting the actual angular position of the monitoring device while the wheel is turning }
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 }	23/0491	. . . . .	{ Constructional details of means for attaching the control device }
23/0452	. . . . .	{ Antenna structure, control or arrangement (vehicle tyre mounted antennas H01Q 1/2241) }	23/0493	. . . . .	{ for attachment on the tyre }
23/0454	. . . . .	{ Means for changing operation mode, e.g. sleep mode, factory mode or energy save mode }	23/0494	. . . . .	{ Valve stem attachments positioned inside the tyre chamber }
23/0455	. . . . .	{ Transmission control of wireless signals }	23/0496	. . . . .	{ Valve stem attachments positioned outside of the tyre chamber }
23/0457	. . . . .	{ self triggered by timer }	23/0498	. . . . .	{ for rim attachments (B60C 23/0494 , B60C 23/0496 take precedence) }
23/0459	. . . . .	{ self triggered by motion sensor }	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} }
23/0461	. . . . .	{ externally triggered, e.g. by wireless request signal, magnet or manual switch }	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 . Arrangements of tyre-inflating pumps mounted on vehicles {(B60C 23/001 takes precedence)}
- 23/105 . . {the pump being mounted in the saddle-pillar of a bicycle}
- 23/12 . . operated by a running wheel
- 23/14 . . operated by the prime mover of the vehicle
- 23/16 . Arrangements of air tanks mounted on vehicles {(B60C 23/001 takes precedence)}
- 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, repairing or inspecting pneumatic or solid tyres (apparatus or tools for mounting or dismounting wheels [B60B 29/00](#); apparatus or tools characterised by the means for holding wheels or parts thereof [B60B 30/00](#))**
- 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 manually removing tyres from or mounting tyres on wheels
- 25/015 . . {for only breaking the beads}
- 25/02 . . Tyre levers or the like, i.e. hand-held (machine operated [B60C 25/05](#))
- 25/025 . . . {with a jack}
- 25/04 . . . pivotal about the wheel axis, or movable along the rim edge, e.g. rollable
- 25/05 . . Machines {, i.e. motorized devices, e.g. for mounting, demounting (matching of tyres with rims, i.e. conjoint balancing [G01M](#))}
- 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 sidewall
- 25/13 acting axially on a part of the bead or sidewall 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}
- 25/147 . . {Safety cages for inflation}
- 25/15 . . with means for inverting the tyre
- 25/16 . {Tools for repairing damaged tyres}
- 25/18 . Tools for mounting or demounting air valves
- 25/185 . . {Automated devices, e.g. robots}
- 25/20 . Tools for attaching metallic tyres, e.g. iron tyres upon wooden rims

27/00	Non-skid devices temporarily attachable to resilient tyres or resiliently-tyred wheels {(vehicle mounted non-skid chains B60B 39/00)}	27/125	. . . . {Centrifugal forces for tensioning while driving}
27/003	. {Mounting aids, e.g. auxiliary tensioning tools, slotted ramps}	27/14	. . automatically attachable
27/006	. {provided with protective parts, e.g. rubber elements to protect the rim portion}	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}
27/02	. extending over restricted arcuate parts of the circumference of the tread (B60C 27/20 takes precedence)	27/16	. . formed of close material, e.g. leather {or synthetic mats}
27/0207	. . {involving lugs or rings taking up wear, e.g. chain links, chain connectors (chain couplings for, e.g. hoisting F16G 15/00)}	27/18	. . . the material being fabric, e.g. woven wire {or textile}
27/0215	. . . {Profiled links, e.g. cross-section other than round}	27/20	. comprising ground-engaging plate-like elements
27/0223	. . . {Studded links, i.e. traction enhancing parts located on the link or inserted into the link}	27/22	. for tandem tyres (endless-track features B62D)
27/023	. . {provided with radial arms for supporting the ground engaging parts on the wheel}	29/00	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; valves per se, valve dust caps F16K)
27/0238	. . {provided with tensioning means}	29/002	. {characterised by particular features of the valve core}
27/0246	. . . {Resilient pretension}	29/005	. {characterised by particular features of the valve stem}
27/0253	. . . {Centrifugal forces for tensioning while driving}	29/007	. {for tyres with segmental sections or for multi-chamber tyres}
27/0261	. . {provided with fastening means}	29/02	. Connection to rims
27/0269	. . . {acting on the wheel, e.g. on the rim or wheel bolts}	29/04	. Connection to tyres {or inner tubes}
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}	29/06	. 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)}
27/0284	. . . {acting on the tread portion, e.g. special fixing agents, fastened in the groove of the tyre}	29/062	. . {for filling a tyre with particular materials, e.g. liquids (B60C 5/004 , B60C 5/005 take precedence)}
27/0292	. . . {acting on the sidewall of the tyre}	29/064	. . {Hose connections for pneumatic tyres, e.g. to spare wheels}
27/04	. . the ground-engaging part being rigid	29/066	. . {Valve caps}
27/045	. . . {involving retractable devices (fixing of spade lugs B60B 15/00)}	29/068	. . {Pressure relief devices, i.e. safety devices for overpressure}
27/06	. extending over the complete circumference of the tread, e.g. made of chains {or cables} (B60C 27/20 takes precedence)	99/00	Subject matter not provided for in other groups of this subclass
27/061	. . {provided with radial arms for supporting the ground engaging parts on the tread}	99/003	. {Tyre heating arrangements}
27/062	. . {provided with fastening means}	99/006	. {Computer aided tyre design or simulation}
27/063	. . . {acting on the wheel, e.g. on the rim or wheel bolts}	2200/00	Tyres specially adapted for particular applications
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}	2200/02	. for aircrafts
27/065	. . . {acting on the tread portion, e.g. special fixing agents, fastened in the groove of the tyre}	2200/04	. for road vehicles, e.g. passenger cars
27/066	. . . {acting on the sidewall of the tyre}	2200/06	. for heavy duty vehicles
27/067	. . {Special chain layout, i.e. distribution of chain portions over the tread, e.g. arranged in polygon pattern}	2200/065	. . for construction vehicles
27/068	. . {the ground-engaging part being rigid}	2200/08	. for agricultural vehicles
27/08	. . involving lugs or rings taking up wear {, e.g. chain links, chain connectors (chain couplings for, e.g. hoisting F16G 15/00)}	2200/10	. for motorcycles, scooters or the like
27/083	. . . {Profiled links, i.e. cross-section other than round, e.g. hexagonal}	2200/12	. for bicycles
27/086	. . . {Studded links, i.e. traction enhancing parts located on the link or inserted into the link}	2200/14	. for off-road use
27/10	. . {provided with} tensioning means		
27/12	. . . resilient {pretension}		