J. S. WILLIAMS.

DEMOUNTABLE WHEEL EQUIPMENT.

APPLICATION FILED DEC. 15, 1917.

1,394,658. Patented Oct. 25, 1921.

Fig. 1.

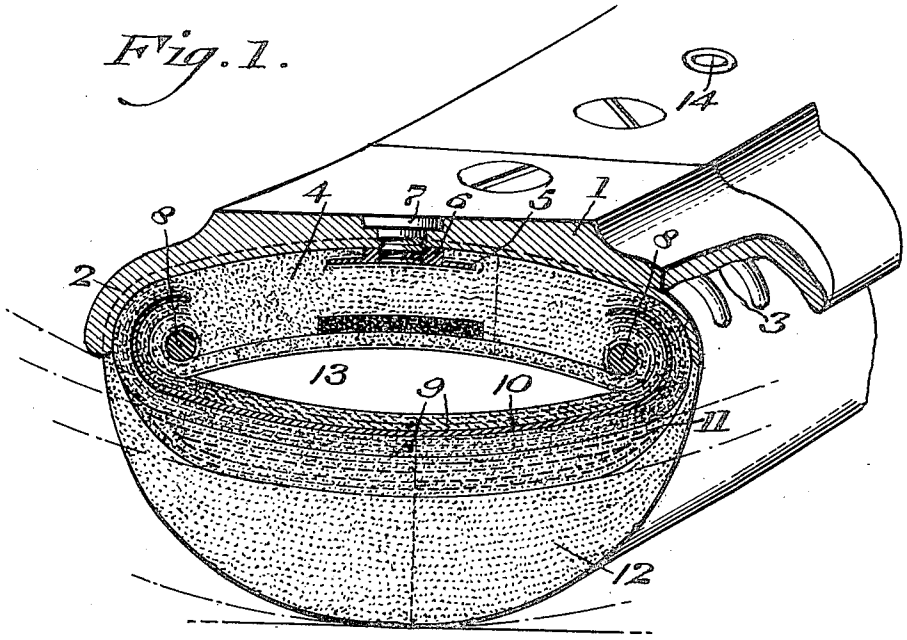


Fig. 2.

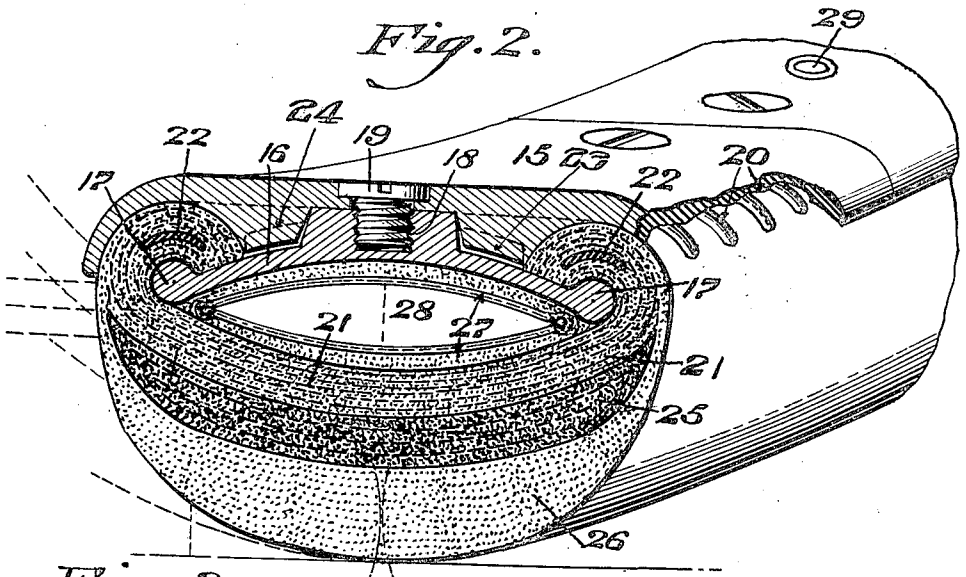
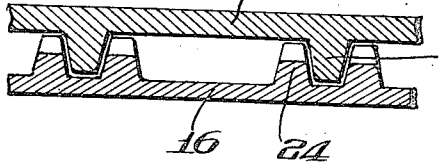


Fig. 3.



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DEMOUNTABLE WHEEL EQUIPMENT.

1,394,658. Specification of Letters Patent. Patented Oct. 25, 1921.

Original application filed January 19, 1911, Serial No. 603,552. Divided and this application filed December 15, 1917. Serial No. 207,232.

To all whom it may concern:

Be it known that I, JOSEPH S. WILLIAMS, a citizen of the United States, residing at Riverton, county of Burlington, State of New Jersey, have invented a new and useful Demountable Wheel Equipment, of which the following is a specification.

My present invention consists of a novel resilient wheel equipment which is demountable as a unit of structure and wherein an inner trussing portion is provided with abutments at its sides around which the terminals of an outer trussing portion extend. These terminals extend inwardly of such abutments and are compressed with respect to them. This outer trussing portion is annular and is transversely disposed in flattened arch formation relatively to the major axis of the equipment in cross section and has bonded with it means to increase the capacities to resist and limit circumferential and lateral elongation of the outer trussing portion and provide load support capacities in the flattened arch and the parts coöperating therewith. Between the inner and outer trussing portions means are provided for the flexing movements of the outer trussing portion. The outer trussing portion is combined with the inner portion tension relationship transversely and longitudinally outwardly of the major axis and about the abutments of the equipment in cross section.

The transverse and longitudinal tension is shown consisting of multiple layers of suitable fabric frictioned, coated and securely embedded with layers of vulcanized rubber so as to utilize the required strength and stability of construction suited to any special service. Air, fluid or viscous material or any suitable mobile material can with advantage be employed according to the results desired.

Novel features of construction and advantage will hereinafter appear in the detailed description.

For the purpose of illustrating my invention, I have shown in the accompanying drawings embodiments thereof which are at present preferred by me, since the same will be found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents in perspective and in section a resilient wheel equipment, embodying my invention.

Fig. 2 represents in section and in perspective another embodiment of my invention.

Fig. 3 represents in section interlocking features of the construction seen in Fig. 2.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings.

In my copending application Serial #603,552, filed January 19, 1911, and of which this is a division, I have described and broadly claimed a novel resilient wheel equipment. My present invention relates more particularly to a demountable wheel equipment which forms a concrete, unitary structure which can be secured to the vehicle wheel in any desired manner.

Referring first to the embodiment seen in Fig. 1, 1 represents a transversely divided annulus having the side flanges 2, the outer face of said annulus being provided if desired with transversely disposed corrugations 3. 4 designates an annularly and transversely disposed truss which is flexible and resilient and disposed inwardly of the major axis of the demountable equipment in cross section. The truss 4 forms the seat of the tire and has embodied therein an annular band 5 having threaded lugs 6 to receive cap screws 7 seated in the annulus 1 and effecting a lock between the tire seat to prevent any relative lateral or circumferential movements of such parts. The sides of the truss 4 have embodied therein annular rings 8 which may or may not be endless. Centrally of the truss near its outer face is an annular layer of resilient material which is more resilient than the rest of the truss. The outer portion of the truss 4 is formed of fabric and rubber extending transversely in arch formation and anchored around the rings 8. 9 designates an annular belt of fabric and rubber disposed transversely in flattened arch formation and having its side terminals extending in curvatures around the rings 8 and bonded to the sides of the truss 4.

If desired the belt 9 may be reinforced by an annular spring member 10 transversely disposed in arch formation with its sides extending in curvatures around the rings 8.

Outwardly of the tension belt 9 is an annular, transversely disposed belt 11 of fabric and rubber. 12 designates the tread the rubber of which is extended around the sides of the belts 9 and 11 and bonded with the truss 4. The inner face of the tire body is preferably provided with transversely disposed corrugations to interlock with the corrugations 3 of the annulus 1 which forms a transversely divided rim member. With the exception of said rim 1 the equipment is vulcanized into a unit of structure. Due to the formation, there is formed between the truss 4 and the tension belt 9 an annular transversely disposed clearance space 13, the walls of which form an air tight tube into which mobile material may be inserted through the valve opening 14. The inner portion of the seat is yielding so that the annulus 1 can be expanded against it and interlock with the tire.

In the embodiment seen in Fig. 2 the underlying principle is substantially the same except as to the construction of the inner truss. 15 designates a transversely divided annulus forming a rim member similar to that seen in Fig. 1. The inner truss 16 is nonflexible and is formed of an annular metal band in recessed or channeled formation in cross section with its sides enlarged, as at 17, to form beads. The truss 16 is provided with threaded openings 18 to receive cap screws 19 which seat in the annulus 15 and prevent any relative lateral or circumferential movements of the truss and the tire having its seating portion clamped between them. The body of the tire and the rim member have common to them interlocking corrugations 20. 21 designates an annular tension belt of fabric and rubber transversely disposed in flattened arch formation with its sides extending in curvatures around the beads 17 of the truss 16. The terminals of the tension belt 21 may be reinforced by annular metal bands 22 which as illustrated have a curved formation in cross section. In order to prevent relative circumferential movement of the truss and rim the rim is provided with lugs 23 and the truss is provided with lugs 24, said lugs interlocking when the parts are assembled, see Fig. 3. Outwardly of the tension belt 21 is an annular tension belt 25 transversely disposed in flattened arch formation. 26 designates a tread bonded to the tension belts. Between the truss 16 and the tension belt 21 is an annular transversely disposed fluid tight tube 27 the walls of which are reinforced and which is provided with an annular, transversely disposed clearance space 28 into which mobile material may be introduced through the valve opening 29. The clearance space is shown in Figs. 1 and 2 as of elliptical formation but the shape of this space may vary. All of the parts except the rim 15 may be vulcanized into a unit of structure and if desired the truss 16 as well as the tube may be detachable from the rest of the equipment.

In both of the embodiments shown the portion outwardly of the major axis in cross section is in flattened arch formation and flexes on the side abutments of the inner truss which latter may be flexible or nonflexible. The inner seating portion of the tire is yielding and the rim is expanded against such seating portion, means being provided to render the seating portion inextensible outwardly of its yielding portion. In each embodiment, I provide a tension belt the sides of which are anchored to provide transverse tension and also an annular tension belt bonded to it so that the tire body which is flexible and resilient is in tension both laterally and circumferentially when in wheel equipment, the tension being varied by the introduction of mobile content under any desired pressure. The belt in transverse tension limits lateral elongation of the tire body and the belt in circumferential tension coöperates to limit circumferential elongation of the tire body. Such belts may be formed of any desired number of layers of fabric suitably frictioned and coated or without intermediate layers of rubber vulcanized together to provide the requisite strength both transversely and circumferentially to give load supporting capacity in the flattened arch formation of the outer truss for any desired load and to operate in trussing relationship with the inner portion. The load supporting capacity and resiliency of the truss may be increased by using mobile material. The entire tire body forms a flexible and resilient truss.

It will now be apparent that I have devised a novel and useful demountable wheel equipment which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described preferred embodiments thereof which will give in practice satisfactory and reliable results, it is to be understood that the same are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A demountable wheel equipment, comprising an endless, annular body having an inner, annular trussing portion, provided with a seating and with side abutments substantially on the major transverse axis of the body, an outer annular trussing portion transversely disposed in flattened arch formation relatively to the major axis of the

body in cross section and having its sides extending around said abutments and anchored inwardly of said inner trussing portion, said inner and outer trussing portions having disposed between them means to provide for the flexing movements of said outer trussing portion, an annular tension member bonded with said outer trussing portion, and a tread.

2. A demountable wheel equipment, comprising an endless, annular body having an inner annular trussing portion provided with a seating and with side abutments substantially on the major transverse axis of the body, an outer annular trussing portion transversely disposed in flattened arch formation relatively to the major axis of the body in cross section and having its sides extending around said abutments and anchored to said inner trussing portion, said inner and outer trussing portions having disposed between them means to provide for the flexing movements of said outer trussing portion, an annular tension member bonded with said outer trussing portion, a tread, a rim operating expansively against said seating to truss said side abutments, and means to vary the tension of one of said trussing portions.

3. In a device of the character stated, a truss forming the seat of the tire and adapted to be secured to an inner support, annular circumferentially inextensible members embedded in the inner portion of said truss, an annular layer of resilient material located centrally of said truss, the outer portions of said truss being formed of fabric and rubber extending transversely in arch formation and anchored around said members, and an annular belt of fabric and rubber disposed transversely in flattened arch formation and having its side terminals extending in a curvatures around said members and bonded to the sides of said truss.

4. In a device of the character stated, a truss forming the seat of the tire and comprising an annular portion adapted to receive fastening devices and having inner rings embedded in the inner portion of said truss, an annular layer of resilient material located centrally of said truss, the outer portions of the latter being formed of fabric and rubber extending transversely in arch formation and anchored around said inner rings, an annular belt of fabric and rubber disposed transversely in flattened arch formation and having its side terminals extending in curvatures around said inner rings and bonded to the sides of said truss, said belt being reinforced by an annular spring member transversely disposed in arch formation and having its outer terminals extending in curvatures around said inner annular rings.

5. A demountable wheel equipment, comprising an endless annular body having an inner annular truss formed of an annular inextensible member, an outer annular trussing portion disposed in flattened arch formation relatively to the major axis of the body in cross section and having its sides deflected around and inwardly of said inner truss, an annular tension belt bonded to said outer trussing portion, a tread, annular reinforcements in the terminals of said outer trussing portion, means to compress the terminals of said outer trussing portion against said inner truss to form as a unit of structure a demountable wheel equipment, and an annular cavity between said inner truss and said outer annular trussing portion.

6. In a device of the character stated, a truss forming the seat of the tire and comprising an annular band, inner rings embedded in the inner portion of said truss, an annular layer of resilient material located centrally of said truss, the outer portions of said truss being formed of fabric and rubber extending transversely in arch formation and anchored around said inner rings, and an annular belt of fabric and rubber disposed transversely in flattened arch formation and having its side terminals extending in curvatures around said inner rings and bonded to the sides of said truss, in combination with an outer annular transversely disposed belt of fabric and rubber, and an outer tread, the rubber of which is extended around the sides of said belts and bonded with said truss.

7. In a device of the character stated, a truss forming the seat of the tire and comprising an annular portion adapted to receive fastening devices and having inner rings embedded in the inner portion of said truss, an annular layer of resilient material located centrally of said truss, the outer portions of the latter being formed of fabric and rubber extending transversely in arch formation and anchored around said inner rings, an annular belt of fabric and rubber disposed transversely in flattened arch formation and having its side terminals extending in curvatures around said inner rings and bonded to the sides of said truss, said belt being reinforced by an annular spring member transversely disposed in arch formation and having its outer terminals extending in curvatures around said inner rings, in combination with an outer annular transversely disposed belt of fabric and rubber, and an outer tread, the rubber of which is extended around the sides of said belts and bonded with said truss.

8. A demountable wheel equipment, comprising an endless, annular and transversely elongated body, having an outer resilient portion in flattened arch formation across its major width in close proximity to the major transverse axis of the body, and with side

abutments projected from the curvatures of said arch, substantially on said axis within the width of the body, said arch being formed of flexible tension and resilient material extending to said abutments and a tread supported by said arch.

9. A demountable wheel equipment, comprising an endless, annular and transversely elongated body having an outer resilient portion in flattened arch formation across its major width in close proximity to the major transverse axis of the body, and with side abutments projected from the curvatures of said arch, substantially on said axis within the width of the body, said arch being formed of flexible tension and resilient material extending to said abutments, a tread supported by said arch, an inner trussing support having formation and means inwardly of the major transverse axis combined with said outer portion in annularly transversely trussing and tensioning association with said arch and providing circumferential inextensibility in said abutments, substantially on the major transverse axis, said body having a clearance space within it inwardly of said arch and having a seating portion adapted to coact, lock with and be locked and tensioned with any suitable form of inner support such as a demountable or fixed rim equipment, so as to maintain the abutments and such arch in trussed and tension relationship about said inner trussing support.

10. A demountable wheel equipment, comprising an endless, annular and transversely elongated body, having an outer resilient portion in flattened arch formation across its major width in close proximity to the major transverse axis of the body, and with side abutments projected from the curvatures of said arch, substantially on said axis within the width of the body, said arch being formed of flexible tension and resilient material extending to said abutments, a tread supported by said arch, an inner, trussing support having formation and means inwardly of the major transverse axis combined with said outer portion in annularly, transversely trussing and tensioning association with said arch and providing circumferential inextensibility in said abutments, substantially on the major transverse axis, said body having a clearance space within it inwardly of said arch, and having a seating portion adapted to co-act, lock with and be locked and tensioned with any suitable form of inner support such as a demountable or fixed rim equipment, so as to maintain the abutments and such arch in trussed and tension relationship about said inner trussing support, and a resilient medium in said space for resiliently trussing, tensioning and supporting said arch and body.

11. A demountable wheel equipment comprising an endless annular body having a portion extending outwardly from the major transverse axis of the body in cross section and consisting of annular and transverse tensile reinforcing material, resilient bonding and flexible tread material, concentrically disposed and combined in flattened arch formation outwardly from and relatively to the major transverse axis of the body, and with transverse tension reinforcements across and from said arch forming flexible tension side abutments for said arch and body substantially on the major transverse axis of the body.

12. A demountable wheel equipment comprising an endless annular body having a portion extending outwardly from the major transverse axis of the body in cross section and consisting of annular and transverse tensile reinforcing material, resilient bonding and flexible tread material concentrically disposed and combined in flattened arch formation outwardly from and relatively to the major transverse axis of the body, and with transverse tension reinforcements across and from said arch forming flexible tension side abutments for said arch and body substantially on the major transverse axis of the body, in combination with means inwardly of said axis in the width of the body providing circumferential inextensibility for said abutments, substantially on said axis.

13. A demountable wheel equipment comprising an endless annular body having a portion extending outwardly from the major transverse axis of the body in cross section and consisting of annular and transverse tensile reinforcing material, resilient bonding and flexible tread material, concentrically disposed and combined in flattened arch formation outwardly from and relatively to the major transverse axis of the body, and with transverse tension reinforcements across and from said arch forming flexible tension side abutments for said arch and body substantially on the major transverse axis of the body, and an inner annular and transverse spanning support for said outer portion including formation and means in the sides for providing circumferential inextensibility for said side abutment substantially on and about the major transverse axis of the body, a core space in the body formed by said arch and inner support and contributing to the resilient movements of said arch, and providing for the resilient tensioning of said arch and body outwardly of the transverse axis by means of fluid content under pressure within said core space.

JOSEPH S. WILLIAMS.

Witnesses:
C. D. McVay,
M. E. Byrne.