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CUSHIONING DEVICE FOR TIRES.

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981,253. Patented Jan. 10, 1911

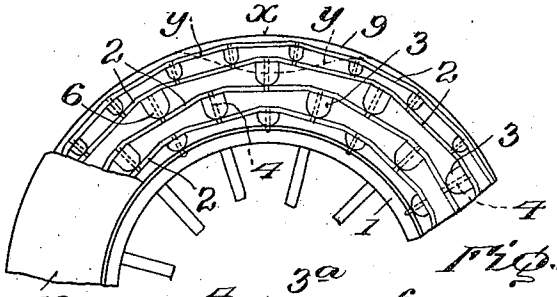


Fig. 2.

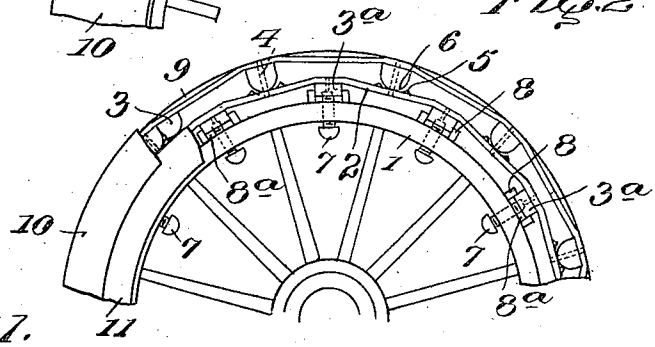


Fig. 1.

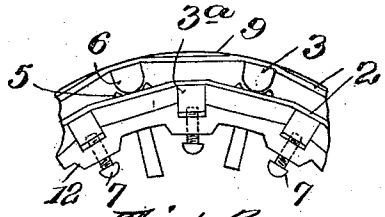


Fig. 3.

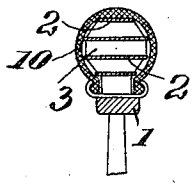


Fig. 5.

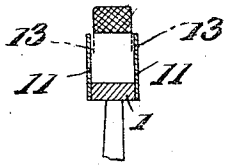
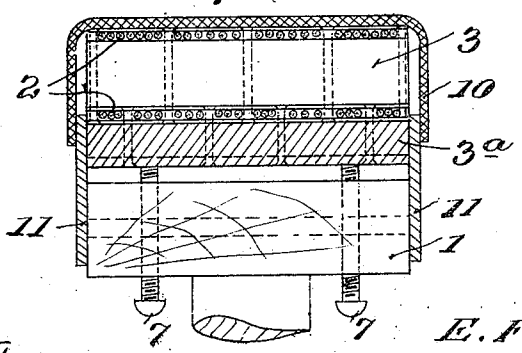


Fig. 6.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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CUSHIONING DEVICE FOR TIRES.

981,253. Specification of Letters Patent. **Patented Jan. 10, 1911.**

Application filed September 19, 1906, Serial No. 335,271. Renewed March 14, 1910. Serial No. 549,359.

To all whom it may concern:

Be it known that I, ETHELBERT FAVARY, citizen of Hungary, and resident of 68 West Ninety-seventh street, New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Cushioning Devices for Tires, of which the following is a specification.

This invention comprehends certain new and useful improvements in cushioning devices for the tires of wheels of automobiles or other vehicles generally, and for other purposes, and the primary object of the invention is an improved cushioning means which will, in the present embodiment of the invention herein illustrated, produce an efficient and resilient wheel, without the use of the ordinary pneumatic or cushion rubber tires, and without requiring the use of rubber or steel springs to secure the desired resiliency.

The invention consists essentially in a cushioning device embodying a plurality of bands, strips or layers of some pliable and substantially inelastic and non-stretchable fabric, and a series of rigid supports arranged in predetermined spaced relation to each other and interposed between the bands, the supports being secured to the bands so as to prevent a creeping or circumferential movement of the supports relative to the bands as well as any lateral displacement, the parts being so arranged that a blow or stress imposed in a radial direction at any point on the cushioning device, will cause a dip in the bands at the point where the blow or stress occurs, the same being resisted by the entire set of supports and bands, and the supports moving toward the point where the dip or impress occurs and taking up such impress one after the other to a gradually decreasing degree in opposite directions away from the point of stress, so as to secure the proper reflex action and produce the desired resiliency.

The invention also consists in a cushioning device embodying a plurality of pliable bands, supports interposed between said bands and secured thereto and tensioning devices arranged to tension the bands in a longitudinal direction. And the invention further consists in a cushioning device for vehicle wheels embodying a band of pliable fabric, a plurality of supports interposed in spaced relation to each other between the felly of the wheel and the band which encircles the same, the supports maintaining the band under tension in a longitudinal direction, and a fabric tread element encircling the band.

In the accompanying drawing, different modifications or embodiments of my invention are illustrated, but it is to be understood that the invention is not limited thereto, or in any wise, except as defined within the terms of the appended claims, as my invention is applicable not only to vehicle wheels, but generally as a cushioning means to secure desired resiliency or cushioning effects, for example, in sofas, or chairs, in lieu of the ordinary helical or spiral springs, or in the frames or bodies of automobiles or other vehicles, in lieu of the steel springs or dash pot arrangements that are so commonly employed to absorb the shocks.

In the drawing, Figure 1 is a side elevation of a portion of a vehicle wheel illustrating one embodiment of my invention, a portion of the outer casing and side plates or rings being broken away to illustrate the interior construction; Fig. 2 is a view similar to Fig. 1, illustrating a modification in which the tensioning devices are omitted; Fig. 3 is a view similar to Fig. 1 illustrating a slight modification in the felly of the wheel. Fig. 4 is a transverse sectional view of another embodiment of the invention; and, Figs. 5 and 6 are transverse sectional views illustrating other modifications herein specifically referred to.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawing by the same reference characters.

In carrying out my invention, I employ a relatively strong, tough, and pliable material or substance, possessing if possible some elasticity when under stress. For example, I may use leather, steel wire, steel rope, canvas, rawhide, gut, strong cord, rope, twine, or ribbons or bands made of these materials or

combinations thereof, or with rubber, in combination with relatively rigid supports which are preferably entirely of rigid material, although they may embody more or less of rubber or some resilient material as may be determined in actual practice.

In the drawing, 1 designates the rim of the vehicle wheel in which, for the purpose of illustration only, I have shown my invention as embodied, the said rim or felly, as well as the interior parts of the wheel such as the spokes and hub, being of any desired construction, design or type.

In that embodiment of the invention as illustrated in Fig. 1, the numeral 2 designates the strip, layer or band of pliable fabric as above mentioned, two of these being there shown. 3 designates one embodiment of the supports that may be formed of any desired substance or material, or composition or combinations thereof, either solid or tubular, the said supports being interposed between the inner and outer strips 2, and being spaced from each other, preferably at equidistant points, and in any desired predetermined spaced relation. It is to be understood that the supports 3 are connected to the strips 2 by any desired means which will substantially prevent any circumferential movement of the supports relative to the strips, as well as any lateral displacement. For instance, for the purpose of showing one means that may be employed, I have indicated that the supports 3 are secured to the outer band or strip 2 by rivets or pins 4 indicated in dotted lines. 5 designates lugs which are arranged to permit a swaying or rocking of the supports.

It is to be understood that my invention is not limited to any particular mechanical element for accomplishing the desired result or connection just mentioned. Any of the supports may be rounded as indicated at 6 so as to permit the supports to rock or turn when a stress is imposed on that portion of the band or bands between them.

It is manifest that under some circumstances at least, it will be advantageous to provide some way of increasing or decreasing the tension imposed upon the strips, bands or layers 2. As one means for accomplishing this end, reference is to be further had to Fig. 1, wherein tension screws 7 are shown as working through threaded apertures in the felly 1 engaging at their outer ends or impinging upon the innermost set of supports designated 3^a which, so far as their function is concerned, are substantially like the supports 3, the adjustable tensioning feature being not now considered. It is of course, also to be understood that the supports 3^a like the supports 3, are held against any appreciable circumferential movement relative to the bands or strips as well as the wheel rim, it being noted that the supports 3^a are secured to the band or strip which encircles them, as by a rivet or pin 4, or any other desired means, and that they are held in relative stationary relation to the wheel rim or felly 1 as by the blocks 8 pairs of which constitute sockets 8^a for the accommodation or reception of the supports.

My invention is of course not limited to any number of strips, bands or layers 2, nor is it limited to the use of the tensioning devices 7. For example, as best seen in Fig. 2, any desired number of strips may be used, four being there illustrated. The same principle is here shown, however, the interposed supports being secured in any desired way to the strips, bands or layers 2, and the supports that are encircled by one band, being preferably set in staggered or alternating arrangement with the supports for the next concentric strip. Fig. 2 also shows an outer tread element 9 made of solid rubber or other suitable material, for the purpose of producing a perfectly circular outer periphery, and also for the purpose of increasing the durability and wearing qualities of the cushioning devices in service, as well as, if possible, to add additional resiliency to the tire. Obviously, any inclosing envelop or cover may be employed. This may extend substantially from the outer periphery of the cushioning devices to the rim or felly 1, as indicated at 10 in Fig. 2, or as indicated in Fig. 1 and further in Fig. 4. The cover or envelop 10 may be used in connection with the side plates or annulæ 11, being secured thereto in any desired way, or free therefrom, if desired.

Before leaving the description of Fig. 2, I deem it expedient to point out the practical operation of my improved cushioning devices which are indicated in a diagrammatic manner in such view. If, for example, a blow, stress, or impression of any character be imposed in an inwardly radial direction upon the cushioning devices, say at the point indicated by the arrow X, it is evident that the pliable strips, bands or layers 2, will dip inwardly, substantially as illustrated by the dotted line *y—y*, this inward stress causing the adjoining supports to move inwardly or in a circumferential direction with their adjoining portions of the strips from all sides, from the point upon which the stress has been imposed, the inward movement of the outermost strip, band or layer being resisted by all portions thereof, together with the supports, as well as the inner-lying strips and supports, and the desired resiliency being thereby effectually produced.

Fig. 3 illustrates substantially the arrangement of parts already described when referring to Fig. 1, except that in order to compensate for the weakening effect which would otherwise be produced upon the felly

1, by forming the sockets 8ª and the screw threaded openings for the tension screws 7, the said felly is thickened or strengthened by producing inwardly projecting or bulged portions 12 at the points where the openings and sockets are formed.

Fig. 4 is not only included for the purpose of illustrating a cross sectional view of my improved cushioning devices, but is for the further purpose of illustrating a modification of which the strips, bands, or layers, themselves are susceptible. In other words, it is to be understood that my invention is not confined to the use of strips of leather, canvas, or equivalent materials or substances laid in strips of definite width, but I may use bands which may be formed either by a plurality of convolutions of a single wire, rope, cord, cable or the like, or that the bands or layers may be formed by a series of relatively independent and distinct rings laid side by side in any desired transversely spaced relation, or in close contact with each other according as judgment may dictate. In the latter event, that is where a plurality of independent rings are used, whether the rings themselves be formed of wires, bands, cables or the like as before mentioned, or of pliable strips of any desired width, it is clear that even though one strip, ring or the like should break or become in any wise impaired, the entire structure would not be thereby endangered as to its usefulness, for the remaining bands or layers would still remain intact.

The whole tire or cushioning devices may also be inclosed by an outer cover or shoe of substantially circular shape in cross section, as indicated at 10, in Fig. 5 or of any desired shape or similar in construction to the outer envelop or shoe which is used in connection with single or double tube pneumatic tires, and as further illustrated in this view, the rim such as the channeled rim there shown, may be conveniently constructed of any of the accepted types to facilitate the mounting or taking off of the shoe. Or, as illustrated in Fig. 6, the flanges or annulæ 11 of any suitable material may be secured at both sides of the felly 1 and the outer rim may be provided with supplementary inwardly extending flanges 13 secured thereto in any desired way.

From the foregoing description in connection with the accompanying drawings, it is obvious that I have provided a very simple, durable and efficient construction of cushioning means for vehicle wheels, or for other purposes, generally, in which, to obtain the desired elasticity or resiliency, it is not necessary to employ rubber air cushions or springs, within the accepted meaning of this term, my improved cushioning devices depending, to secure the desired result, upon a novel and useful arrangement of pliable strips, bands or layers, either continuous or otherwise, together with supports, either with or without tensioning means for the latter, the parts being so correlated that any blow or stress imposed upon the cushioning means at one or more points, is effectively distributed and resisted in a yielding manner, the outer rim being deformable and the inner-lying parts being pliable so as to entirely absorb the shock or stress without transmitting it to the hub or even to the felly of the wheel, if the cushioning devices be embodied in or mounted upon a wheel structure.

Having thus described the invention, what is claimed as new is:

1. In a resilient tire, a plurality of concentric fabric bands, and rigid supports interposed between said bands and fastened thereto, the supports maintaining the bands under tension in a longitudinal direction.

2. In a resilient tire, a plurality of pliable bands, rigid supports interposed between said bands and secured thereto, and tensioning devices operable in an outward radial direction and arranged to tension the bands.

3. In combination with a wheel, embodying a felly, a resilient tire, comprising a plurality of pliable bands, rigid supports interposed between said bands, and secured thereto, and tensioning devices working in the felly and pressing in an outward radial direction against sundry of said supports.

4. In a resilient tire, a plurality of concentric pliable bands and rigid supports interposed between said bands, sundry of said supports having a rocking connection with an adjacent band as and for the purpose set forth.

5. In a resilient tire, a plurality of concentric fabric bands and rigid supports interposed between said bands, the supports maintaining the bands under tension in a longitudinal direction, sundry of said supports having a rocking movement.

6. In a resilient tire, a plurality of concentric fabric bands and rigid supports interposed between said bands, the supports maintaining the bands under tension in a longitudinal direction, sundry of said supports having a rounded edge as and for the purpose set forth.

7. In combination with a wheel, a resilient tire embodying a plurality of fabric bands, a plurality of rigid supports interposed in spaced relation to each other, between the felly and bands and maintaining the bands under tension in a longitudinal direction, and a cushion tread element encircling the bands.

8. In combination with a wheel, a resilient tire embodying a plurality of concentric fabric bands, a plurality of rigid supports interposed in spaced relation to each other between the several bands and between the

innermost band and the felly and maintaining the bands under tension in a longitudinal direction, tensioning devices working in said felly and pressing in an outward radial direction against the supports, and a cushion tread element encircling the bands.

Signed at 68 West 97th str. New York in the county of New York and State of New York this eighteenth day of September A. D. 1906.

ETHELBERT FAVARY.

Witnesses:

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