June 7, 1927. 1,631,928

J. H. DOTY

FABRIC DISK WHEEL

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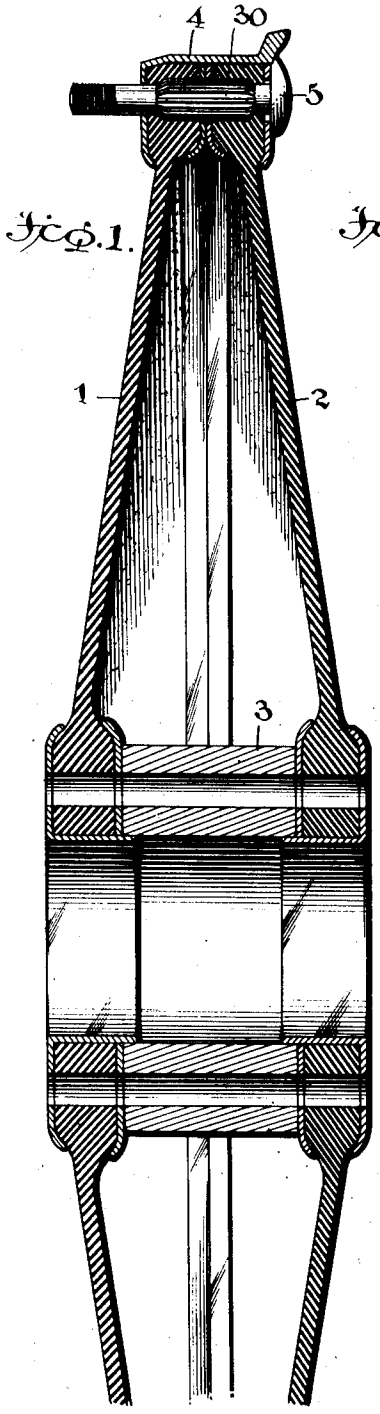


Fig. 1.



Fig. 2.

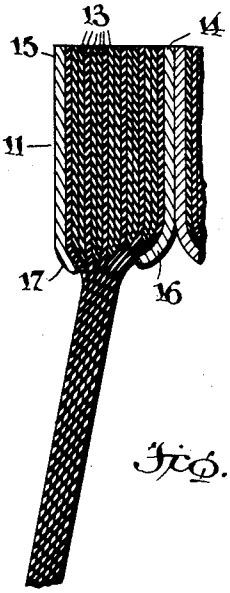


Fig. 3.

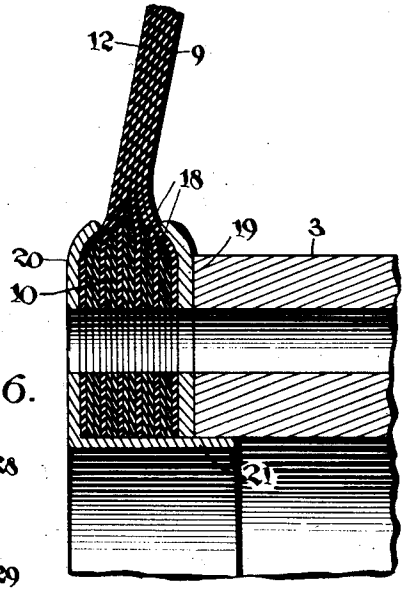
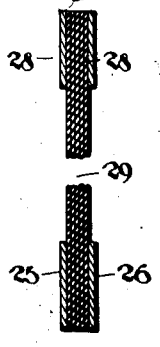


Fig. 6.



INVENTOR

John H. Doty,

BY A. D. Prague

ATTORNEY

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J. H. DOTY

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Fig. 4.

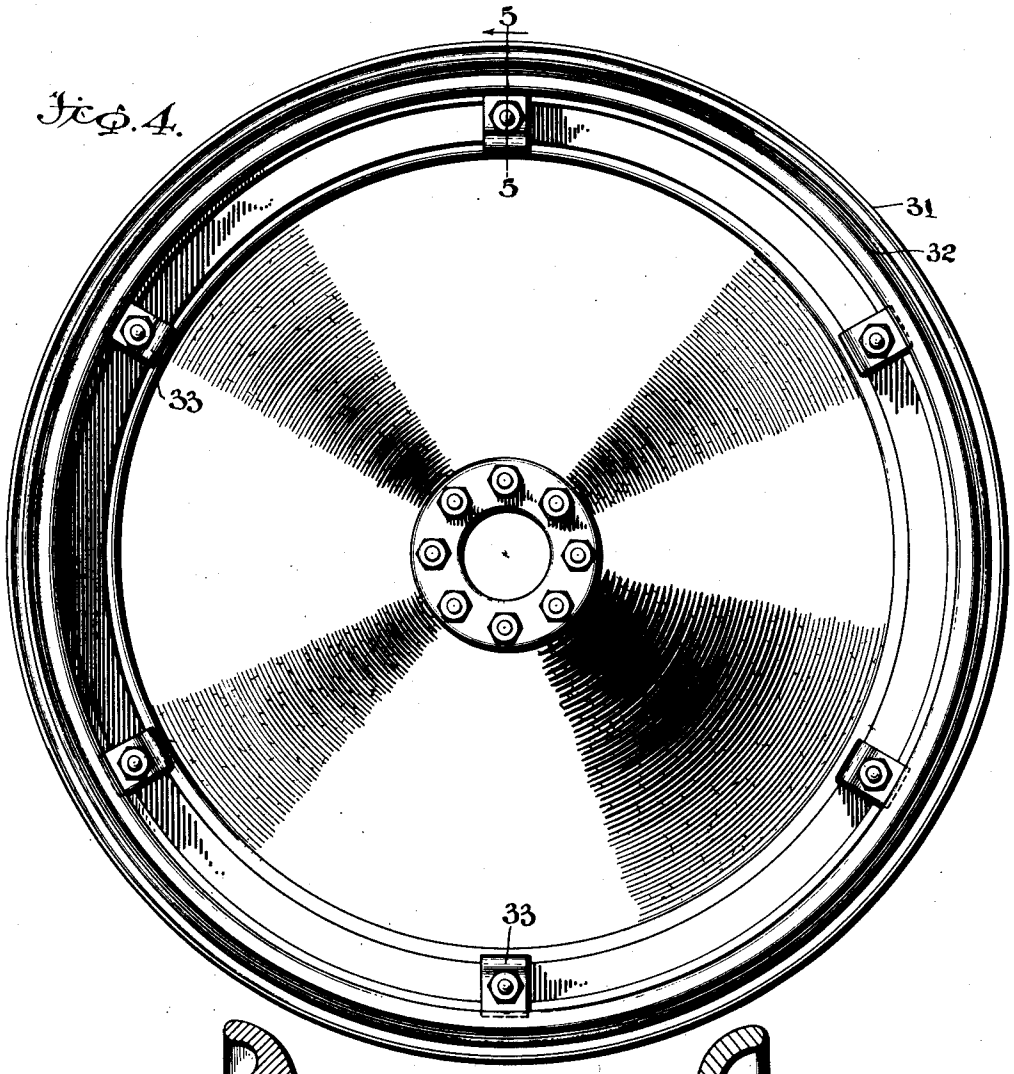
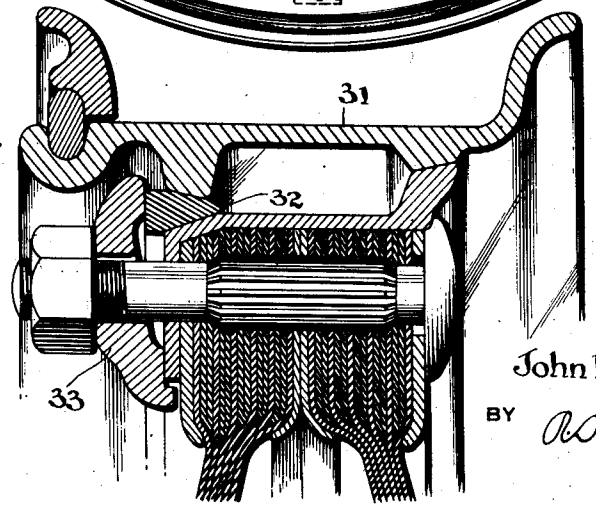


Fig. 5.



John H. Doty, INVENTOR

BY R. D. Trogner

ATTORNEY

Patented June 7, 1927. 1,631,928

UNITED STATES PATENT OFFICE.

JOHN H. DOTY, OF AKRON, OHIO.

FABRIC DISK WHEEL.

Application filed February 20, 1925. Serial No. 10,520.

This invention relates to vehicle wheels and it particularly pertains to wheels of the so-called disk type that are particularly adapted for use on automotive vehicles.

Various forms of disk wheels have previously been proposed that comprised opposed disks of metal or laminated wood or the like. The present invention differs from this practice in that it contemplates forming a disk wheel from a pair of disk members of pliable material. The invention also contemplates a method of forming such a wheel in which the body or disk portion of the wheel is of laminated fabric that is preferably so tensioned as to suspend the hub porton of the wheel under load.

Fig. 1 of the accompanying drawings is a lateral sectional view of a vehicle wheel constructed in accordance with my invention;

Fig. 2 is a lateral cross-sectional view of one of the disk members entering into the construction of the wheel;

Fig. 3 is a lateral sectional view, shown in detail on a larger scale, of one of the disk elements making up the wheel;

Fig. 4 is a side elevational view of a wheel of the form shown in Fig. 1 having a rim mounted thereon;

Fig. 5 is a lateral cross-sectional view of the rim and felly portion of the wheel shown in Fig. 4, taken substantially on line 5—5 thereof, with parts broken away; and

Fig. 6 is a lateral cross-sectional view of a modified form of wheel disk embodying my invention.

The disk wheel shown in the accompanying drawings embodies a pair of opposed disk elements 1 and 2 that are spaced at their center portions by means of a hub member 3 and are drawn together at their periphery to operative engagement with a felly band 4 by means of suitable transverse bolts 5. Figs. 2 and 3 are separate views of one of the disk elements corresponding to elements 1 and 2 of Fig. 1.

Particularly referring to Fig. 3 of the drawings, each of the disk portions 1 and 2 comprises a bead portion 10, that constitutes the hub supporting portion of the wheel, an outer bead portion 11, that supports the felly 4, and an intermediate supporting disk 12 of superposed layers of fabric, that connects the bead elements 10 and 11.

The body of each of the disk elements is formed of a plurality of superposed layers of fabric that are preferably suitably frictioned with rubber or otherwise treated with a flexible binder and assembled in fan-wise formation. The disk portion 12 is enlarged at its outer edge portion by interposing fabric washers 13 between the successive layers of the material making up the body of the disk 12, in order to provide the bead portion 11 which extends around the outer periphery of the disk and serves as an anchoring bead for the various layers of fabric making up the disk. A pair of supporting plates 14 and 15, which respectively have inwardly turned flanges 16 and 17 along their innermost edges, are preferably permanently vulcanized to the bead portion 11 of the disk. The bead portion 10 of each disk is also enlarged by interposing suitable annular washers or fabric elements 18 between successive layers 9 of the body of the disk. A pair of metal disks 19 and 20, preferably having their respective rim portions bent toward each other, are mounted on each side of the bead portion 10 and preferably securely vulcanized thereto.

A disk for a vehicle wheel of the type herein considered may be formed by any conventional process or the metal disk members 14, 15, 19 and 20 may be assembled with the finished disk structure in order to support the outer and inner marginal edge portions of the disk elements. If it is not desired that the enlarged bead portions 10 and 11 be used, then the metal disk elements 14, 15, 19 and 20 may be replaced by plain annular disks 25, 26, 27 and 28 as shown in Fig. 6.

Although vehicle wheels of this general form may be constructed from either cross-woven fabric or from so-called cord fabric, it is preferred that the separate disk elements be formed from cord fabric having the warp elements thereof grouped in fan-wise formation, in order that the distortion of the disk may be substantially the same in all directions and in order that the vehicle wheel disk will have the same load supporting capacity for all positions of the wheel. The same suggested fan-wise construction may also be used if the disk elements are formed of cross-woven fabric.

In view of the fact that the material from which a disk wheel of the above designated character is formed is of pliable character, it is advisable to tension that material in order to obtain the most desirable load sup-

porting characteristics. Moreover, such tensioning results in suspending the load that is imposed by the vehicle on the hub of the wheel from the upper portion of the wheel felly, without entirely relieving the tensile stress that is initially imposed in the fabric of the lower portion of the wheel. The tensioning of the pliable material, from which the wheel is formed, also serves to prevent any permanent displacement of the felly band relative to the hub of the wheel while permitting relative yielding of the wheel under sudden lateral impact. The wheel therefore possesses all of the very desirable characteristics of resilient disk wheels that have heretofore been proposed and in addition is of lighter weight and of more flexible character than wheels of laminæ of wood or other material.

In wheels of the character that I have herein described, the material of the disk portion of the wheel may be relatively thin and adequately support the load that is imposed upon it. In fact, the structure of the disk portion of the wheel corresponds closely to the structure of the sidewall of a so-called balloon tire or tires of like description that are used on automobiles at the present time.

It should also be understood that the bead portion of the disk is not necessarily enlarged to the degree shown in the drawing. The function of this portion of the disk is to provide means for adequately anchoring the inner and outer edge portions of each of the disks with the respective supporting hub and felly of the wheel. It may, therefore, be adequate to merely vulcanize suitable metal disks 25 and 26, as shown in Fig. 6, directly to the wheel disk in order that, when the disk is tensioned, the disk portion 29 of the wheel will be tensioned between the inner anchoring disks 25 and 26 and the outer anchoring disks 27 and 28, as shown in Fig. 6.

Vehicle wheels of this general type are formed by arranging a pair of disk elements 1 and 2, of identical form, in opposed relation on each side of the hub spacer element 3. The disks are preferably formed with only a slight degree of cupping or concavity, as shown in Fig. 2. When the peripheral bead portions 11 of the disks are drawn together in cooperative relation with the felly band by suitable bolts 5 that extend through both of the bead portions 11, the disk portions 12 of the separate disk elements 1 and 2 are thereby tensioned to any desired degree, depending upon the degree of concavity originally imparted to the disk elements and the length of the spacer element 3 that is interposed between them. As previously described, the spacer element 3 is preferably held in position by laterally extending lips 21 that fit within the central portion of the spacer elements 3. After a wheel is thus assembled and after the bolts 5, the shank portion 30 of which is knurled, are forced into place, it will usually be unnecessary to use additional means to maintain the outer edge portions of the disk elements 1 and 2 in abutting relation.

A wheel of the type shown in the figures of the drawings is mounted on the conventional form of automotive vehicle, not shown, in any conventional or convenient manner. The felly band 4 of the wheel, which is of conventional type, serves to detachably support a pneumatic tire-supporting rim 31, that is detachably secured thereon by means of a conventional wedge ring 32, clamps 33 and clamping bolts 34, as shown in Figs. 4 and 5.

Although I have described my invention as applied to a disk wheel comprising disk elements which are formed of superposed layers of fabric, it is obvious that my invention comprehends other forms of pliable disk material that may be employed in this general manner and that may be suitably tensioned between the hub and the felly portions of the vehicle wheel. The disk portion of the wheel may also obviously be formed of superposed layers of metal fabric or other material having reinforcing strands or fibers extending therethrough.

What I claim is:

1. A vehicle wheel comprising a vulcanized body portion formed of two opposed outwardly convergent disk portions, each of said portions being composed of superposed plies of rubberized fabric vulcanized to form a composite body, the warp elements of the fabric composing said plies being grouped in fan-wise formation.

2. A vehicle wheel comprising a vulcanized body formed of a pair of similar disk elements each composed of superposed plies of rubberized fabric vulcanized to form a composite body, and spacing members placed between the plies near the hub and felly portions thereof.

3. A vehicle wheel comprising a vulcanized body formed of a pair of similar disk elements composed of superposed plies of rubberized fabric, having enlarged bead portions formed by the insertion of laminated fabric spacing members between the plies.

In witness whereof, I have hereunto signed my name.

JOHN H. DOTY.