

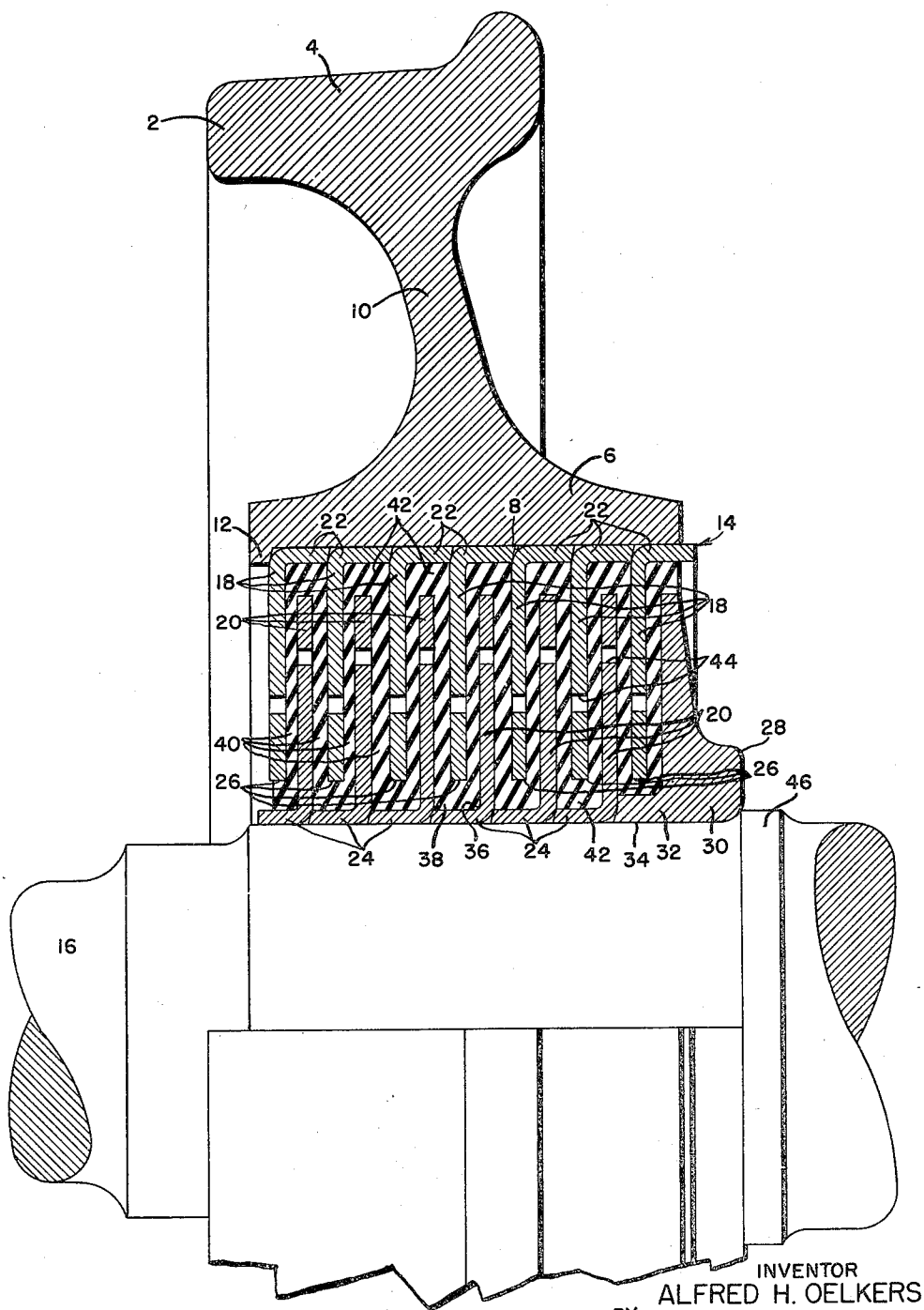
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WHEEL

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WHEEL

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My invention relates to car wheels and more particularly to a resilient car wheel particularly suited for use in connection with railway car trucks.

A specific object of my invention is to devise a resilient car wheel of simple construction such as will have the requisite shock-absorbing characteristics, have long life in service, and be relatively easy to mount on an axle.

A further object of my invention is to devise a simple resilient hub unit for a railway car wheel which is easily assembled and disassembled with said car wheel and an associated axle.

Another object of my invention is to devise such a wheel as will resist out-of-plane treads on the wheel.

A still further object of the invention is to devise a resilient wheel, the resiliency characteristics of which will be least impaired by the extreme heat due to braking.

These and other objects of the invention will be apparent from the specification and the drawings, wherein the single figure is a fragmentary side elevation of a wheel and axle assembly embodying my invention, the view being partly in section in a vertical plane substantially bisecting the wheel transversely.

Referring to the drawing in detail, the invention is illustrated as embodied in a railway car truck wheel and axle assembly adapted for general railway service. The wheel comprises a flanged rim 2 presenting a tread surface at 4, a rigid hub 6 having an internal cylindrical surface defining an axial center or bore 8 and an integral plate or web 10 interconnecting said rim and rigid hub.

An returned annular flange 12 is formed at the outboard end of the rigid hub and within the bore 8 in said rigid hub is inserted a tight fitting cylindrical resilient hub unit, generally indicated at 14, in abutment at its outboard end with said flange 12, said resilient hub unit being sleeved over an axle 16 as by a tight press fit and affording a tight connection between the wheel and the axle.

The resilient hub 14 comprises a radially outer cylindrical unit including a plurality of annular pressed steel discs or plates 18, 18 and a radially inner cylindrical unit including a plurality of annular pressed steel discs or plates 20, 20 inter-

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leaved with the plates 18 for a purpose hereinafter described.

The outer plates 18, 18 are provided at their outer peripheries with axially extending annular flanges 22, 22 spaced outwardly of the outer perimeters of said inner plates and abutting each other and forming an external segmental substantially continuous cylindrical surface defining the outer contour of said hub unit 14 complementary to said bore 8 and affording a seat for said hub unit against the internal cylindrical surface of said rigid hub.

The flanges 22 are preferably separable to facilitate assembly of the resilient hub in the manner hereinafter described; however, if desired, these flanges may be interconnected to form a cylinder with internal radially projecting annular flanges or discs 18 mentioned above.

The inner plates 20, 20 are formed at their inner peripheries with axially extending annular flanges or collars 24, 24 abutting each other and projecting through central openings 26, 26 in said outer plates, said flanges 24, 24 being inwardly spaced from the radially inner extremities of said outer plates and forming an internal substantially continuous cylindrical surface defining an axial bore through said resilient hub unit and affording means for mounting said unit on said axle. The flanges 24 are also preferably separable to facilitate the assembly of the resilient hub; however, if desired, these flanges may be integrally connected to form a cylinder with external radially projecting annular flanges or discs 20, 20 hereinbefore described.

At the inboard end of the hub unit is an annular end piece 28 axially aligned with said inner plates and axially spaced from the adjacent outer plate and having its outer perimeter radially inwardly spaced from the flange 22 on the adjacent outer plate. The end piece has a hub portion 30 provided on its inner side with an axially extending annular flange 32 projecting through the opening 26 in the adjacent outer plate, said flange 32 being radially inwardly spaced with respect to the inner extremities of said adjacent outer plate 18 and abutting against the flange 24 of the adjacent inner plate 20.

The hub portion 30 and the flange 32 are provided with a bore 34 forming a continuation of the axial bore through said hub unit.

The end piece, the inner and outer plates, and the flanges 22 and 24 thereof in being spaced as heretofore described, form a continuous zagged cavity, indicated generally at 36, extending from end to end of said hub unit. The cavity is filled with a deformable flowable resilient substance 38, such as rubber, which is vulcanized to said plates, flanges and end piece.

As will be readily apparent from the drawing, the resilient substance 38 in cooperation with said inner and outer units will yieldably resist any tendency on the part of the wheel to tilt and also will accommodate radial movement between said inner and outer units.

Upon radial movement between the inner and outer units of said hub 14, portions 40, 40 of the substance 38 between the plates will be distorted in shear, while, simultaneously, portions 42, 42 of said substance between the outer peripheries of the inner plates and the flanges 22, 22 and between the inner extremities of the outer plates and flanges 24, 24 will be under compression.

Any tilting of the wheel will be resisted principally by compression of portions 40, 40 of said substance between the outer and inner plates and also by distortion in shear of the portions 42, 42 thus precluding the wheel from rotating in such tilted position and developing out-of-plane treads.

It will also be observed that the resilient hub unit is centrally of the wheel remote from the tread surface thereof to which the brakes are applied. The heat generated during such brake application will be radiated for the most part into the atmosphere by the rim and web of the wheel, thus eliminating the possibility of the heat deteriorating or otherwise destroying the resiliency characteristics of the hub unit 14.

In assembling the resilient hub, the end piece and the inner and outer plates are inserted into a suitable mold, the inner and outer plates being alternately arranged and the end piece being placed at the appropriate end of the assembly. An excessive quantity of the resilient substance 38 is inserted between the inner and outer discs and between the end piece and adjacent outer disc. The end piece and the inner and outer discs are then pressed together to the position shown, the resilient substance being vulcanized to the plates and end piece. The plates may be perforated as at 44, 44 to facilitate flow of the substance before and during curing of said substance. After curing, the hub unit is removed from the mold and the outer and inner cylindrical surfaces of the hub unit are ground to size.

To assemble the hub unit with the wheel and the axle, the hub unit is press-fitted into the bore 8 in the wheel and then the hub unit as assembled with the wheel is press-fitted on the axle 18 until it abuts against the shoulder 46 formed on said axle.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown which is merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A railway wheel and axle assembly comprising a wheel, having a hub with an axial bore, a resilient unit press fitted into the bore, an axle extending through the center of the unit in press fit engagement therewith, said unit comprising a plurality of axially spaced discs with integral

flanges at their outer peripheries and projecting from one side thereof, adjacent flanges seating edge to edge and all of said flanges tightly engaging said hub, a plurality of plates alternated with said discs, each plate having an axial opening receiving the axle and having an integral collar at one side thereof extending through an axial aperture in an adjacent disc and tightly embracing the axle, the collars of adjacent plates seating edge to edge and being spaced a substantial distance radially inward of the inner peripheries of said discs, each plate having its outer periphery spaced a substantial distance radially inward from the adjacent flange, an imperforate mass of flowable resilient material between the discs and plates and bonded thereto, said material having portions extending axially between said flanges and the outer peripheries of said plates and completely filling the spaces therebetween, said material having segments extending through the apertures in said discs and completely filling the spaces between said collars and the inner peripheries of said discs, and said material having sections completely filling the spaces between the plates and discs, said discs having axial holes spaced a substantial distance from the inner peripheries thereof, said plates having axial holes spaced a substantial distance radially inward from the outer peripheries thereof and disposed radially outward of the holes in said discs, said material at said portions being wholly confined by and between adjacent portions of said flanges, discs and plates and at said segments being wholly confined by and between adjacent portions of said collars whereby during relative radial movement between said plates and discs said segments and portions of said material are stressed in compression and cause the material to flow substantial distances radially between the plates and discs, before flowing into the holes, the flange of each disc overlapping the adjacent plate and the collar of the latter extending through the aperture in the former whereby the loads on all of the parts of each disc and respective parts of the adjacent plate is substantially equalized.

2. A railway wheel and axle assembly comprising a wheel with an axial bore, a resilient unit press fitted therein, an axle extending tightly through the center of said unit, said unit comprising a plurality of axially spaced radial discs in tight engagement at their outer peripheries with the wheel within the bore, a plurality of radial plates sleeved over the axle in tight engagement therewith, each disc having an axially extending portion at its outer perimeter spaced radially outward from the outer perimeter of an adjacent plate and in radially overlapping relationship therewith, each plate having an integral portion at its inner perimeter spaced radially inwardly of the inner perimeter of the adjacent disc and in radially overlapping relationship therewith, the portion of each disc being arranged in partial radial alignment with a part of said portion of an adjacent plate, an imperforate mass of flowable resilient material between said plates and discs and bonded thereto, said material acting as a column between said axially extending portions of each plate and adjacent disc for compression therebetween, said material being wholly confined between the discs and plates and bearing directly against the full surfaces thereof, said discs having a single annular series of axial openings therethrough adjacent their inner peripheries and said plates having a singular annular

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series of openings adjacent their outer peripheries whereby said plates and discs are accommodated for relatively less restrained angular movement axially of said unit than radially of the unit whereupon the material between said outer perimeters of the plates and said portions of the discs and between the inner perimeters of the discs and said portions of said plates is caused to be stressed in compression, whereby said material is caused to flow radially to said openings whereupon it is accommodated flow axially of the unit.

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