

No. 786,580.

PATENTED APR. 4, 1905.

J. F. MIDDLETON.
VEHICLE WHEEL.
APPLICATION FILED DEC. 27, 1904.

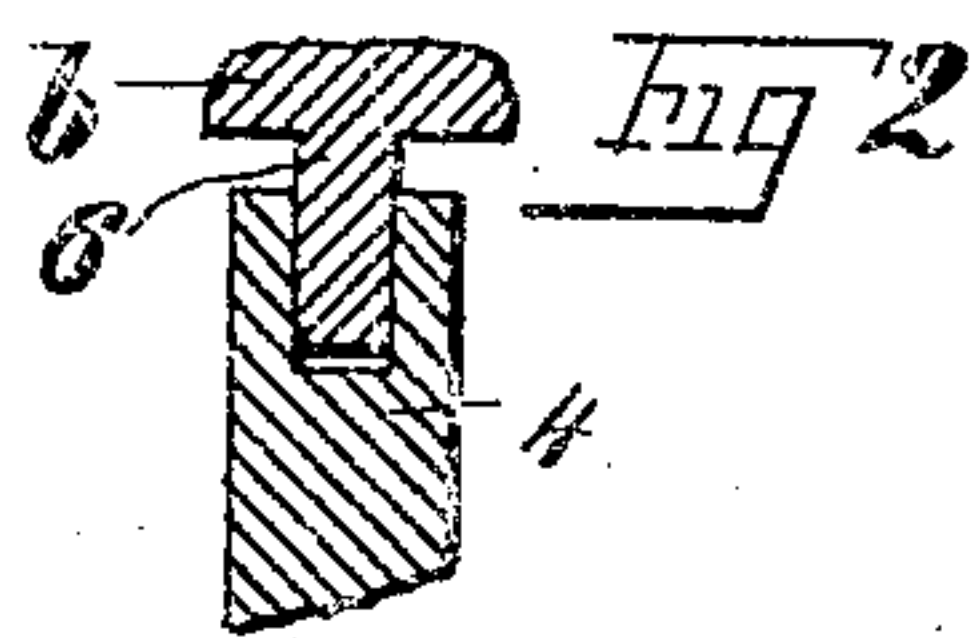


Fig. 3

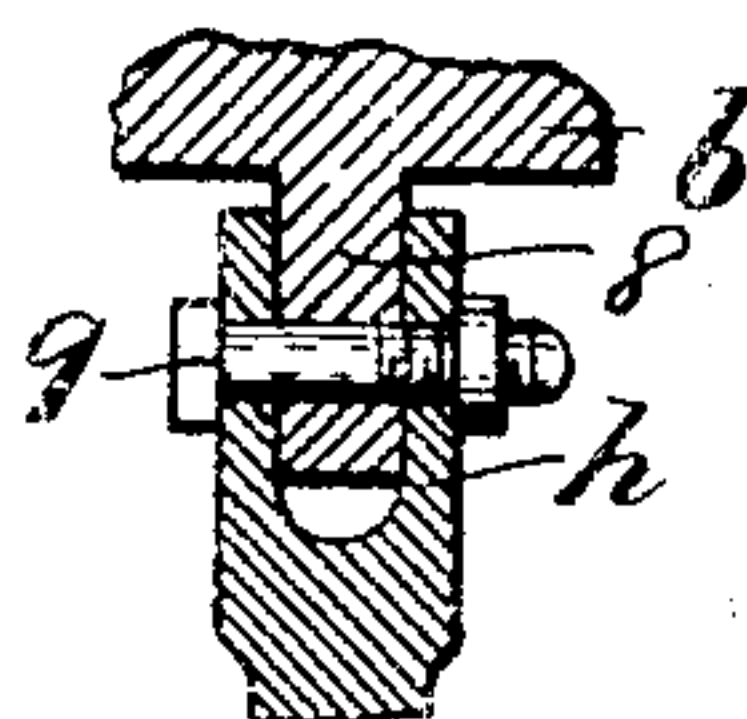


Fig. 1

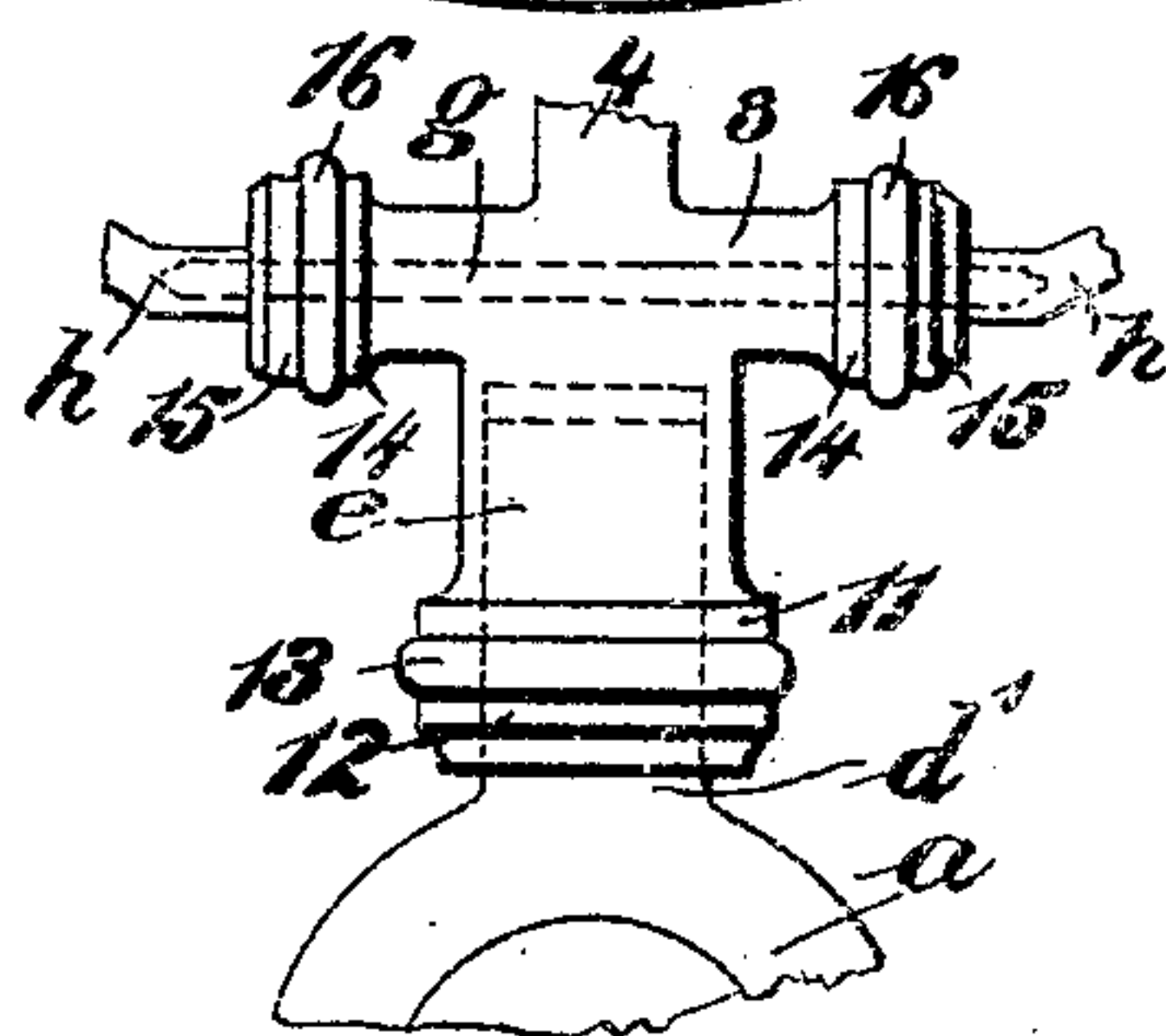
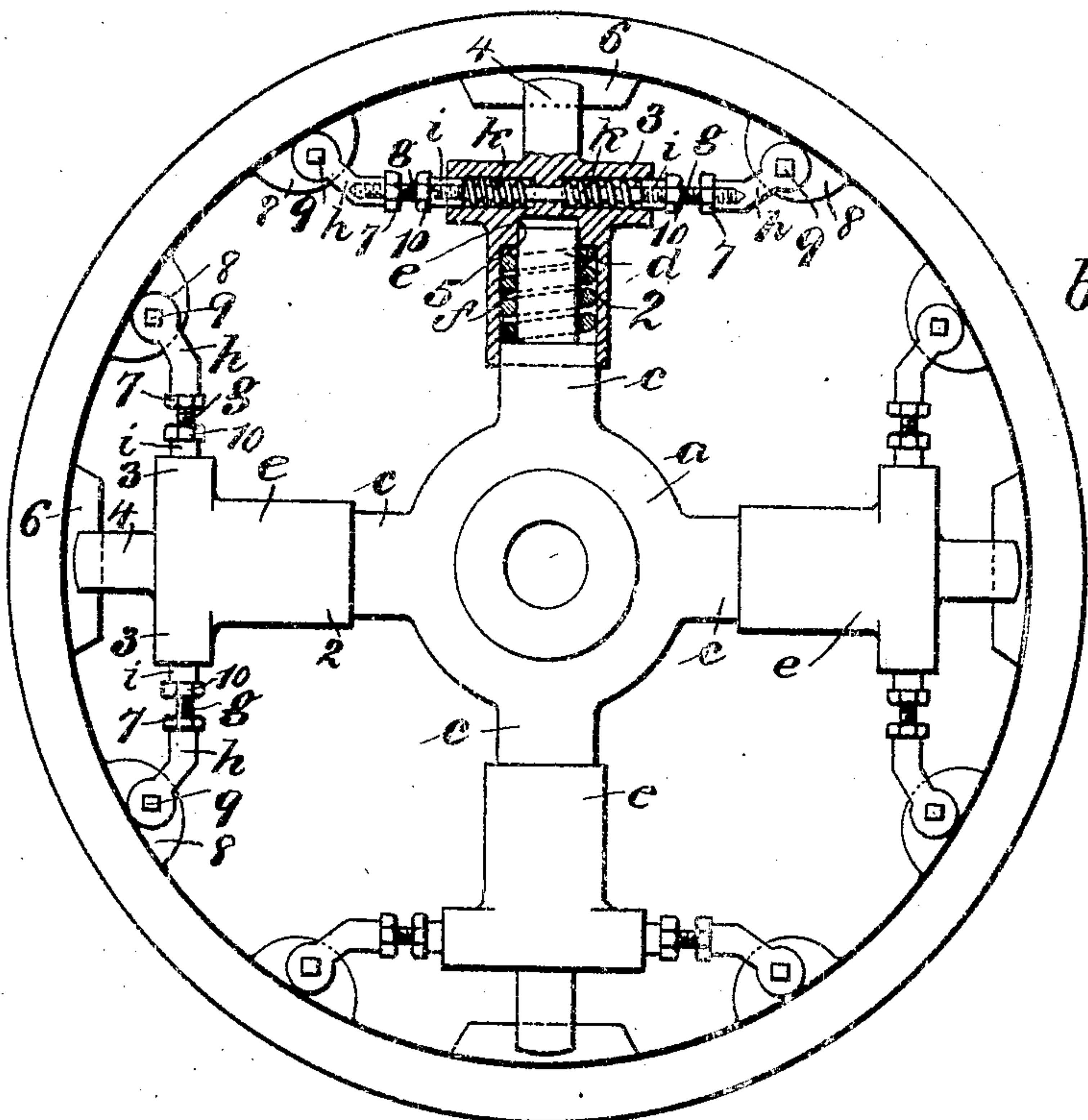


Fig. 4

WITNESSES

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JAMES F. MIDDLETON, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR OF
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VEHICLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 786,580, dated April 4, 1905.

Application filed December 27, 1904. Serial No. 238,397.

To all whom it may concern:

Be it known that I, JAMES F. MIDDLETON, a citizen of the United States, residing in Pittsfield, in the county of Berkshire and State of Massachusetts, have invented an Improvement in Vehicle-Wheels, of which the following is a specification.

My invention relates to vehicle-wheels, and particularly to that class of wheels in which the jar and jolt due to uneven roads are taken up in the wheel structure, thereby relieving the driving mechanism and other working parts of the vehicle from practically all strains arising from vibrations originally transmitted through the wheels.

In carrying out my invention I employ, together with the hub and rim of the vehicle-wheel, a series of spaced-apart radially-placed arms integral with or fixed in the hub, each of which may be provided with a reduced end portion providing a shoulder. I also employ a plurality of T-shaped members corresponding in number with the number of said arms, the body portions of which are hollow and each adapted to fit over one of said arms and in which the arm is radially movable, each T member being also provided with a radial extension adapted to engage and to be slidably movable on a suitable lug fixed in the rim of the wheel. I provide bars, one of each of which extends through the cross-arm of a T member, and connections between the ends of each of said bars and the rim of the wheel, means for resisting a radial pressure against each of said radially-placed arms, means for resisting equal lateral pressures from opposite sides on each of the cross-arms of said T members, and adjustable means for varying the said lateral resistance.

In the drawings, Figure 1 is a general elevation and partial section of my improved vehicle-wheel. Figs. 2 and 3 are sectional views of details of construction, and Fig. 4 is an elevation of a modified form of my invention.

a represents the hub, and b the rim, of a vehicle-wheel, and according to my invention I provide the hub a with a series of spaced-apart radially-placed arms c , each preferably

circular in cross-section and having a reduced end portion d , also preferably circular in cross-section, at the intersection of each of which parts there is a shoulder.

e represents the T-shaped members, which in number correspond to the number of the radial arms c . Each T member comprises a hollow body portion 2, cross-arms 3, and a radial extension 4, and as the parts associated therewith are in all instances similar the further description will be made singular.

The hollow body portion 2 of the T member is provided with a bore equal in diameter to that of the arms c and also with a reduced bore 5, equal in diameter to that of the reduced ends d of the arms c . A T member is employed in conjunction with each of the arms c , the arm c entering the bore of the hollow body portion of the T member and the reduced end d of the arm c entering the reduced bore of the T member, the arm c and reduced end d thereof having bearings in the respective bores which they enter.

f represents a helical spring surrounding the reduced end d of the arm c within the hollow body portion 2 of the T member, and this spring has a bearing at one end against the shoulder formed by the reduced bore 5 and at the other end against the shoulder in the arm c formed by the reduced end d . The radial extension 4 of the T member is preferably notched to span a suitable lug 6, fixed in the rim b , which structure relieves the lateral and radial strain on the T member e and also guides the same in its movements.

The cross-arm 3 of the T member is provided with suitable bores of equal diameter extending from the ends thereof to a central partition, through which cross-arm and partition a bar g passes centrally. The ends of the bar g are screw-threaded and are received in interiorly-threaded apertures in the connecting members h , which are preferably angular and are secured to lugs 8, fixed on the rim b by bolts 9. This structure is clearly illustrated in Fig. 3, and the bar g is preferably held in position in the connecting members h by means of lock-nuts 7 or otherwise,

I also employ a sleeve *i*, with a nut 10 integral therewith or bearing thereon, on each screw-threaded end of the bar *g*.

The diameter of the sleeve *i* is the same as
 5 that of the bores in the cross-arm 3, which bores the sleeves *i* are adapted to enter, so as to center and steady the bar *g*. *k k* are helical springs surrounding the bar *g* within the cross-arms 3 on either side of the portion be-
 10 tween the bores therein, and the springs *k k* extend between the sides of this partition and the ends of the sleeves *i*, by which latter it will be apparent that the tension on the springs *k k* may be variably adjusted, so as to over-
 15 come the thrust upon the rim at points spaced apart and between the radial extensions 4.

It is believed that now it will also be ap-
 parent that the hub, axle, and parts associated therewith are movable radially in the hollow
 20 body portions 2 of the T members and also at right angles to said radial direction and in the plane of the wheels in the cross-arms of the T members through the bearing between the arms *c* and the reduced ends thereof and the
 25 hollow body portions 2 of the T members, whereby the vibrations are absorbed in the various spring members of the structure herein described and are not transmitted to the vehicle-body and the parts associated there-
 30 with, and it may also be noted that the weight of the load is evenly distributed throughout the rim of the wheel.

With reference to Fig. 4 it will be under-
 stood to be within the nature and scope of my
 35 invention to make the arm *d'* of the same diameter throughout and to provide the end of the body portion of the T member with a suitable head 11 and the arm *d'* with a flange 12, corresponding to the head 11, and to employ
 40 a pneumatic or other cushion 13 surrounding the arm *d'* and intervening between the head 11 and the flange 12. In this structure the ends of the cross-arm of the T member are also provided with heads 14 and the ends of
 45 the connecting members *h* with flanges 15, between which parts I may employ pneumatic or other cushions 16.

I claim as my invention—

1. A vehicle-wheel comprising a hub, a rim,
 50 arms equally spaced apart and extending from said hub, members corresponding in number with said arms, each of which is adapted to fit over one of said arms in which the arm is movable radially, means for resisting a radial
 55 pressure on each of said arms, and means whereby the hub is, relatively to the rim, also movable at right angles to said radial move-
 ment in the plane of the wheel.

2. A vehicle-wheel comprising a hub, a rim,
 60 arms spaced ninety degrees apart and extending radially from the hub, members corresponding in number with said arms, each of which is adapted to fit over one of said arms in which the arm is movable radially, a spring

for resisting a radial pressure on each of said 65
 arms, and means whereby the hub is, relatively to the rim, also movable at right angles to said radial movement in the plane of the wheel.

3. A vehicle-wheel, comprising a hub, a rim,
 a series of radial arms extending from said 70
 hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one
 75 of said arms in which the arm is movable radially, and means whereby the hub is, relatively to the rim, also movable at right angles to the said radial movement in the plane of the wheel.

4. A vehicle-wheel, comprising a hub, a rim, 80
 a series of radial arms extending from said hub and having reduced end portions, a plurality of T-shaped members, corresponding in number to the said arms, the body portion of each T member being adapted to fit over one 85
 of said arms in which the arm is movable radially, means whereby the hub is, relatively to the rim, also movable at right angles to the said radial movement in the plane of the wheel, and means for resisting a radial pres- 90
 sure on each of said radial arms.

5. A vehicle-wheel comprising a hub, a rim,
 a series of radial arms extending from said 95
 hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one
 100 of said arms in which the arm is movable radially, means whereby the hub is, relatively to the rim, also movable at right angles to the said radial movement in the plane of the wheel, and a helical spring surrounding the reduced end of each of said arms within the body portion of said T member to resist ra- 105
 dial pressure on the said arms.

6. A vehicle-wheel comprising a hub, a rim,
 a series of radial arms extending from said 110
 hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one
 115 of said arms in which the arm is movable radially, bars, each of which passes centrally through a cross-arm of one of the T members at right angles with said radial arm, devices
 for connecting the ends of said bars to said rim, and means for resisting pressures from opposite sides on the cross-arm of each of said members.

7. A vehicle-wheel comprising a hub, a rim, 120
 a series of radial arms extending from said hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one 125
 of said arms in which the arm is movable radially, bars, each of which passes centrally through a cross-arm of one of the T members

at right angles with said radial arm, devices for connecting the ends of said bars to said rim, means for resisting pressures from opposite sides on the cross-bar of each of said members, and means for guiding the movement of each of the said T members.

8. A vehicle-wheel comprising a hub, a rim, a series of radial arms extending from said hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one of said arms in which the arm is movable radially, bars, each of which passes centrally through a cross-arm of one of the T members, lugs on said rim, connecting members in which are secured the ends of the said bars, means for fixing said connecting members in said lugs, and means for resisting pressures from opposite sides on the cross-arm of each of said T members.

9. A vehicle-wheel, comprising a hub, a rim, a series of radial arms extending from said hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one of said arms in which the arm is movable radially, bars, each of which passes centrally through a cross-arm of one of the T members, lugs on said rim, connecting members in which

are secured the ends of the said bars, means for fixing said connecting members in said lugs, springs surrounding each of said bars and in the opposite ends of the cross-arm of each of the T members, and means for varying the tension of each of said springs.

10. A vehicle-wheel, comprising a hub, a rim, a series of radial arms extending from said hub and having reduced end portions, a plurality of T-shaped members corresponding in number to the said arms, the body portion of each T member being adapted to fit over one of said arms, in which the arm is movable radially, bars having screw-threaded ends, each of which passes centrally through a cross-arm of one of the T members, lugs on said rim, connecting members in which are secured the ends of the said bars, means for fixing said connecting members in said lugs, springs surrounding each of said bars and in the opposite ends of the cross-arm of each of the T members, and sleeves fitting over the screw-threaded ends of the said bars and bearing against the last aforesaid springs to determine the tension thereof.

Signed by me this 19th day of December, 1904.

JAMES F. MIDDLETON.

Witnesses:

S. E. WEDDIFIELD,

GEO. F. WRIGHT, Jr.