Nov. 18, 1924. 1,516,048

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DOUBLE DISK WHEEL

Filed Jan. 26. 1920

Fig. 2.

Fig. 3.

Fig. 1.

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Patented Nov. 18, 1924. 1,516,048

UNITED STATES PATENT OFFICE.

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DOUBLE-DISK WHEEL.

Application filed January 26, 1920. Serial No. 354,075.

To all whom it may concern:

Be it known that I, ALFRED M. LOFLAND, a citizen of the United States, residing at Lebanon, in the county of Boone and State of Indiana, have invented new and useful Improvements in Double-Disk Wheels, of which the following is a specification.

This invention relates to metal vehicle wheels in the manufacture of which I have found that a number of features of construction and arrangement should be followed in order that the cost of manufacture and upkeep be reduced to a minimum; that the strength under any load condition encountered be of the maximum required with the minimum of weight in the wheels; that they be symmetrical and therefore have the proper appearance; that they be of the simplest possible form and made standard for the various equipment that go to make up the complete wheel; that the same be accompanied by the elimination of any material or features which has no strength giving value; and that they do not become distorted or noisy because of unseen internal frictional forces thereby causing their ultimate destruction.

Broadly stated, therefore, my invention has to do with the construction of metal wheels calculated to accomplish among other things the results referred to in the preceding paragraph. Specifically the invention relates to a stamped or pressed double disk wheel in which there is provided a hub or a hub sleeve having a securing flange at one end thereof, a pair of sheet metal disks provided with central bores of less diameter than the hub or hub sleeve but drawn towards each other to telescope thereover and to fit snugly thereon, a bracing center interposed between said disks and provided with portions located adjacent to the drawn portions of said disks, and means for directly securing said disks, hub or hub sleeve and bracing center to each other.

Other features, advantages and characteristics of my invention will more fully appear from the detailed description below taken in connection with the accompanying drawings which:

Figure 1 illustrates a side view of a complete wheel embodying my invention;

Figure 2 is a cross section, taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary view of the invention, omitting the tire and that portion of the wheel below the hub.

Referring to the drawing in detail, the reference numeral 4 designates the axle, 5 the ball race, 6 the ball bearings, 7—8 the hub driving flange, 9 the hub or hub sleeve, and 10 a flange on said hub or hub sleeve contacting with the hub driving flange of a conventional form of wheel.

Mounted upon the hub sleeve 9 are two disks 11 and 12 of stampable material, preferably sheet metal, provided with drawn portions 13 and 14 telescoping over the hub sleeve and turned towards each other as clearly illustrated in Fig. 3. The disks 11 and 12, by proper stamping operations, are provided respectively with peripheral flanges 15 and 16 preferably extending in a lateral direction towards the inside of the wheel, thus leaving the outside of the finished wheel perfectly smooth from the hub sleeve thereof to the periphery of the sheet metal disks.

Surrounding the hub sleeve is an annular spacer or bracing center 17 which is provided with portions located adjacent to the drawn portions 13 and 14 of the disks 11 and 12 and which determines the distance between said disks. Also assembled on the hub sleeve in contact with the outer face of the inner sheet metal disk 12 is a brake drum or member 18. As will be readily apparent from a casual inspection of Fig. 3 the outer face of the flange 10 of the hub sleeve normally bears against the inner face of the hub flange 8. Located between the flange 10 and spacer 17 is the central portion of the outer sheet metal disk 11 and located between the spacer 17 and the inner face of the brake drum or member 18 is the central portion of the inner sheet metal disk 12. The driving flange 8, hub flange 10,

disks 11 and 12, spacer 17, and drum 18 are provided with a plurality of registering perforations through which the securing bolts 19 extend, the construction being such that when the nuts 19ª and 19ᵇ on the ends of these bolts are tightened the various parts just mentioned are firmly secured to each other. The bolt 19 is provided at an intermediate point with an enlargement 19ᶜ adapted to engage with a correspondingly formed depression in the outer face of flange 10, thus enabling in actual practice the hub sleeve 9, disks 11 and 12, spacer 17 and brake drum 18 to be secured rigidly to each other and assembled in place before the driving flange 7 is secured thereto, as will be clearly understood by those skilled in the art. And it will be clearly apparent that for wheels adapted to be employed for the front axle, a ring plate or member (not shown in the drawings) may be substituted in lieu of the brake drum or member 18. The hub sleeve extends completely through the center of the wheel and in conjunction with the flange 10 forms a circular channel into which the metal disks are fitted.

A metal felloe-band or rim 20, preferably channeled and having its flanges bent in an appropriate manner, is secured directly to the overlapping disk flanges 15 and 16. In the form shown the securing means comprises a plurality of rivets 21 preferably located in the load plane passing through the roller bearings 6. Secured to the rim 20 by means of the usual tire bands and fasteners, including bolts 22 and clamps 23, is a conventional form of pneumatic tire 21ª. 24 is a valve hole in the flanges and 25 is a pocket or depression in the disk 12 for the free assembly of the valve.

From the foregoing it will be seen that I have devised a very simple form of wheel provided with inner and outer stamped or pressed sheet metal wheel forming members which approach each other in a radial direction and which are preferably provided with inwardly bent overlapping flanges rigidly secured to each other and adapted to form a tire supporting device, in combination with improved means for connecting the metal wheel members to the hubs. The means for securing the flanges to each other, and the means connecting the metal wheel members to the hub sleeve are the only connecting means between the sheet metal wheel members. Thus it will be seen that the outer faces of the sheet metal wheel members are perfectly smooth from the hub sleeve to the circumference, thereby not only enhancing the appearance of the finished wheel, but also eliminating all connections having no strength qualities. The laterally bent overlapping peripheral flanges on the disks 11 and 12 not only provide an effective tire supporting means and enable a direct connection of a rigid character between the stamped metal wheel forming members, but also form a circumferential construction of great strength because any stresses or strains set up in one are at least partially absorbed by the other, thereby rendering it impossible to distort, collapse or otherwise injure this portion of the wheel.

To sum up, my invention comprises, among other things, sheet metal disks provided with centers drawn inwardly toward each other and a spacer located between said disks which preferably engages the drawn portions thereof, with a view of causing a tight engagement of the disks with the cylindrical surface of the wheel hub sleeve. The advantages of this construction are that the disks are simple to make, less expensive and the bore of the stampings can be made smaller so that when a standard wood wheel hub is pressed on the drawn portions of the disk will grip the hub sleeve making a neat and practical fit. Furthermore, the tightening of the securing bolts causes the built-up center to nestle, that is, there are no obstacles that would tend to hold the parts away from one another when the bolts are tightened. It also will be apparent that when the bolts are tightened, the drawn portions are forced towards the axis of the hub sleeve thereby effecting a tight engagement between the hub sleeve and the disks which will naturally take away a part of the strain which would otherwise occur at the perforations through which the securing bolts are passed. Briefly stated, the invention has to do with a construction in which the tightening of the securing bolts 19 causes the nestling action of the different parts thereby making a better and more snug fit of the disks to the hub sleeve. Furthermore, in the construction shown, the disks 11 and 12 are perfectly free to move toward each other under the action of the bolts 19 until they engage with the outer surfaces of the spider or bracing center. These features of construction so far as I am aware, are not shown anywhere in the prior art. It may be further pointed out that the driving flange may be removed without disturbing the connection between the component parts of the wheel. This is effected by means of a double ended bolt, one end of which is adapted to secure the hub sleeve, the disks and the spider rigidly to one another and the other end of which is adapted to be connected to the driving flange 7—8 and consequently the driving axle to which said flange is connected may be removed without disturbing the wheel proper from its mounting upon the wheel housing. These features of construction so far as I am aware are also novel.

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

1. In a metal wheel, a hub sleeve extending completely through the center thereof and provided with an upturned flange on the exterior surface thereof to form one side of a circular channel, a pair of sheet metal disks fitted into said channel and provided with central bores to fit said hub sleeve, said disks being drawn inwardly towards each other at said bores to effect a snug engagement of the disks with the hub sleeve, a bracing center interposed between said disks and engaging the drawn portions thereof, a member located upon the inner end of the hub sleeve, a driving flange, and means for securing said hub sleeve, disks, bracing center and member to said driving flange.

2. In a metal wheel, a hub sleeve provided with a securing flange at one end thereof, a pair of sheet metal disks provided with central bores of less diameter than the hub sleeve but drawn towards each other to telescope thereover and to fit snugly thereon, a bracing center interposed between said disks and provided with portions which engage with the drawn portions of said disks, and means for directly securing said disks, hub sleeve and bracing center to each other.

3. In a metal wheel, a hub sleeve provided with a securing flange at one end thereof, a pair of sheet metal disks provided with the centers thereof stamped therefrom to provide bores of less diameter than the hub sleeve but drawn inwardly towards each other at the periphery of the bores to telescope over and to fit upon the hub sleeve, a spacer interposed between said disks and provided with portions shaped to engage the interior drawn portions of said disks whereby when said disks and spacer are clamped to each other the drawn portions of said disks tightly engage said hub sleeve, and means for clamping said disks and spacer to each other and for securing the same to the flange of said hub sleeve.

4. In a metal wheel, a hub sleeve provided with a securing flange at one end thereof, a pair of sheet metal disks provided with bores at the center thereof drawn inwardly towards each other and telescoping over said hub sleeve, a spacer interposed between said disks and adapted to engage the drawn portions of said disks to cause a tight engagement of the latter with the hub sleeve, and means for uniting said hub sleeve, disks and spacer to each other.

5. A sheet steel wheel structure adapted for application to a hub sleeve, consisting of a pair of sheet metal disks having central bores with the metal around the bores drawn inwardly towards each other so that the outer surfaces of said drawn portions are adapted to fit upon and engage the cylindrical portion of said hub sleeve, and a spacer interposed between said disks having a portion which engages with the interior surface of the drawn portions of said disks, and means for clamping said disks to said spacer and thereby causing a tight engagement of said drawn portions with the hub sleeve.

6. In a metal wheel construction, a hub sleeve extending completely through the center thereof and provided at its outer end with an integral flange, a brake member at the inner end of said hub sleeve, a pair of sheet metal disks interposed between said flange and member, and a bracing center for said disks, in combination with means for securing said hub sleeve, disks, center and brake member to each other comprising a bolt having at an intermediate point an enlargement to provide double ends thereon, one of said ends passing through said flange, disks, center and brake member to secure these parts rigidly to one another with the enlargement on the bolt resting in a counter-sunk portion of the hub flange so that the outer end thereof is located substantially in the plane of the outer surface of said hub flange, and a driving flange provided with perforations through which the other end of said bolt passes, and clamping means on the respective ends of said bolt.

7. In a metal wheel construction, a hub sleeve extending completely through the center thereof and provided at its outer end with an integral perforated annular flange, a perforated member at the inner end of said hub sleeve, a pair of perforated sheet metal disks interposed between said flange and member, a spacer for said disks, a perforated driving flange and means for securing said flanges, disks, member and spacer rigidly to one another so that the driving flange may be removed without disturbing the connection between the other parts comprising a double ended bolt one end of which is adapted to secure the said hub flange, member and disks rigidly to each other and the other end of which is adapted to be connected to said driving flange.

8. In a metal wheel construction, a hub sleeve extending completely through the center thereof and provided at its outer end with an integral annular flange having counter-sunk perforations therein, a perforated member on the inner end of said hub sleeve, a pair of perforated sheet metal disks interposed between said flange and member, a spacer between said disks, and means for securing said flange, sheet metal disks, spacer and member to each other comprising a double ended bolt one end of which passes through the perforations of said flange, member and disks with the head

thereof located in the counter-sunk perforations of said hub flange, the other end of said bolt serving to secure the driving flange to said wheel.

3. A sheet steel wheel structure comprising a hub sleeve, a pair of sheet metal disks, a spacer between said disks and a double ended bolt, one end of said bolt being employed to secure said hub sleeve, spacer and disks to each other, in combination with a driving flange connected to said wheel structure by the other end of said bolt whereby the driving flange may be removed from said wheel structure without disturbing the connections between the hub sleeve, disks and spacer.

10. In a metal wheel, a hub sleeve provided with a securing flange at one end thereof, a pair of sheet metal disks provided with bores at the center thereof, each of said disks being provided at the bores thereof with an inwardly drawn portion which engages with the hub sleeve, a portion inclined inwardly towards the other disk, and a radial portion connecting said drawn and inwardly inclined portions, in combination with a spacer the end surfaces of which are located in radial planes and which contact substantially throughout their entire extent with the inner surfaces of said radially extending portions of said disks.

11. In a metal wheel, a hub sleeve provided with a securing flange at one end thereof, a pair of sheet metal disks provided with bores at the center thereof, each of said disks being provided at the bores thereof with an inwardly drawn portion which engages with the hub sleeve, a peripheral portion inclined inwardly towards the other disk and a radially extending portion connecting said drawn and inclined portions, in combination with a spacer the end surfaces of which are adapted to engage with the drawn and radially extending portions of said disks, and means for clamping said hub sleeve, disks and spacer rigidly to each other.

12. In a metal wheel, a hub sleeve extending completely through the center thereof and provided with an upturned flange on the exterior surface thereof to form one side of a circular channel, a pair of sheet metal disks fitted into said channel and provided with central bores to fit said hub sleeve, said disks being drawn inwardly towards each other at said bores to effect a snug engagement of the disks with the hub sleeve, a bracing center interposed between said disks and located adjacent the drawn portions thereof, a member located upon the inner end of the hub sleeve, a driving flange, and means for securing said hub sleeve, disks, bracing center and member to said driving flange.

13. In a metal wheel, a hub sleeve provided with a securing flange at one end thereof, a pair of sheet metal disks provided with central bores of less diameter than the hub sleeve but drawn towards each other to telescope thereover and to fit snugly thereon, a bracing center interposed between said disks and provided with portions located adjacent to the drawn portions of said disks, and means for directly securing said disks, hub sleeve and bracing center to each other.

Signed at Lebanon, Indiana, this 7th day of January, 1920.

ALFRED M. LOFLAND.