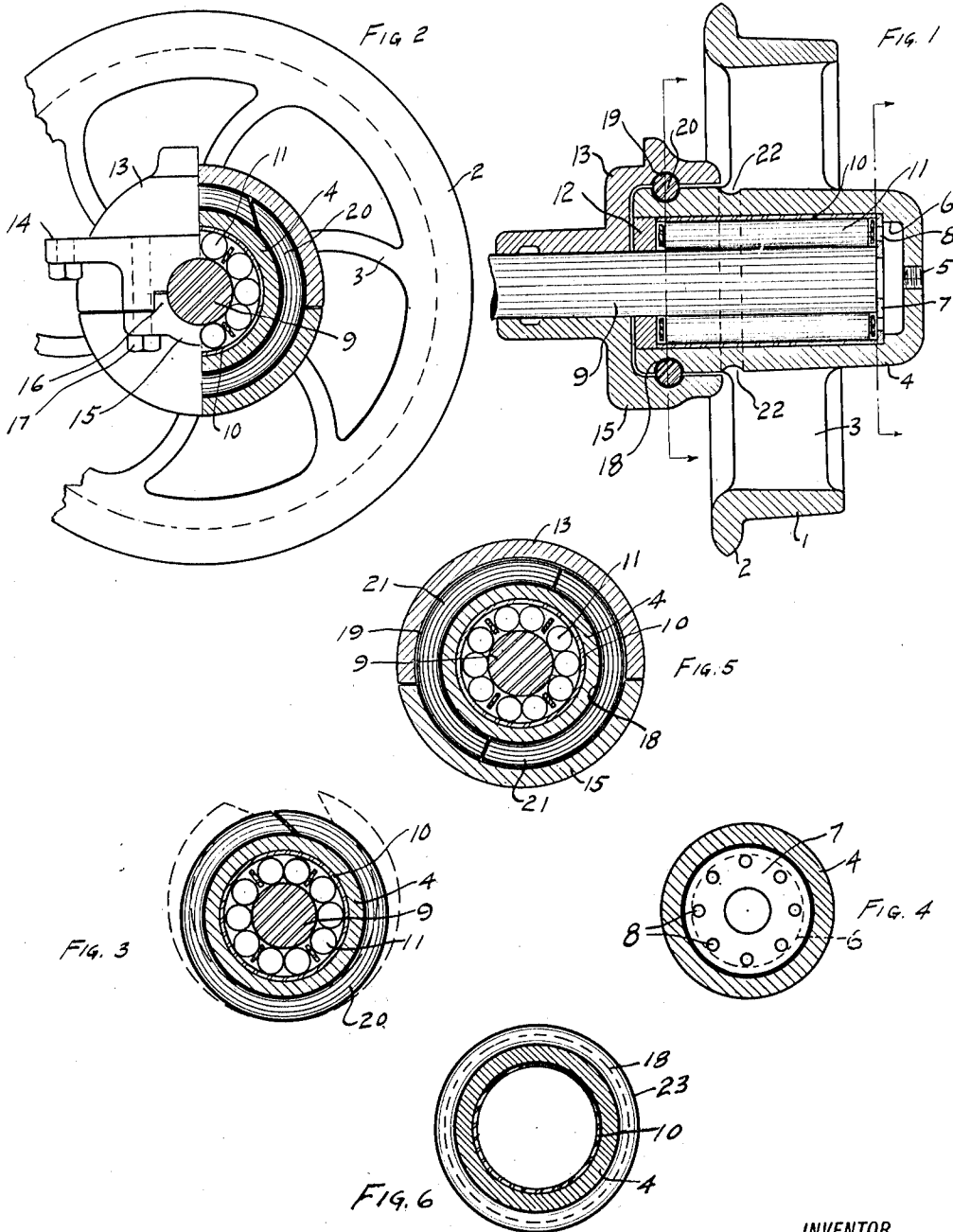


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WHEEL,
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WITNESSES:

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WHEEL.

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To all whom it may concern:

Be it known that I, CHARLES ELLIS FOUST, a citizen of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Wheels, of which the following is a specification.

My invention relates to an improved means for mounting wheels and pulleys on the ends of plain rolled or cylindrical bearings or axles, my object being to provide a simple and effective retaining means which will be protected from the dirt and excessive wear and which will, as far as possible, remove all wear from the wheel hub. I have found, in the case of mine car wheels to which my invention is especially adapted, that the chilled rims and flanges outlast the hub portions of the wheels, and one object of my invention is to so protect the hub portions from excessive wear that the maximum life of the wheel is obtained.

A further object of my invention is to provide a novel and effective means for retaining the wheel hub within a parted boxing, such means being entirely inclosed within the boxing and comprising fastening devices which engage a circumferential groove or chamber about the inner end of the hub which is inclosed between the boxing sections, this fastening means being preferably a steel ring which tightly grips or is cast in the wheel hub so that the wear is transferred to an internal groove or shoulder in the boxing. A sectional ring or curved retaining pins may be inserted between the wheel hub and boxing but I regard the solid or split ring as preferable.

A further object of my invention is to design the boxing so that to remove the wheel it is only necessary to detach the under section of the boxing and slightly raise the upper section of the boxing with the car body. By this arrangement I avoid necessitating the disconnection of the main boxing section from the car.

A further object of my invention is to provide a means to prevent the dirt working in between the hub and boxing sections and to this end I circumferentially groove the wheel hub adjacent to the boxing but at a point not overhung by the boxing, this groove providing a shoulder which acts to

catch and throw out the dirt that tends to work into the joint between the hub and boxing.

My invention further comprises the details of construction and arrangement of parts hereinafter more particularly described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a vertical sectional elevation through a wheel and boxing constructed according to my invention. Fig. 2 is a view partly in end elevation and partly in section along the line $x-x$ of Fig. 1. Fig. 3 is a detail view of the wheel hub and split retaining ring in dotted lines showing the ring expanded for insertion about the hub. Fig. 4 is a vertical sectional view along the line $y-y$ of Fig. 1, illustrating the perforated end wear plate for the axle. Fig. 5 is a vertical sectional view through the hub and boxing showing a sectional retaining ring substituted for the spring retaining ring. Fig. 6 is a vertical sectional view through a cast iron wheel hub showing a solid retaining ring cast therein.

Similar reference numerals refer to similar parts throughout the drawings.

As illustrated in the drawings, I show my invention applied to a formal type of mine car wheel having a rim 1, flange 2, spokes 3 and a hub 4, the outer end of which is closed and provided with an oil supply tap 5. The hub is bored smooth internally except at its outer end where an internal circular offset shoulder 6 is provided against which the peripheral edge of a circular perforated washer 7 is adapted to seat, the perforations 8 in the washer being arranged in a circle and disposed so as to stand opposite the oil chamber formed between the end of the hub and said washer. The inner end of the smooth turned or rounded axle 9 bears against the central portion of the washer which thus takes all end thrust wear off the wheel hub. A hard metal sleeve 10 is inserted in the bore of the hub and suitable roller bearings 11 of any standard design are interposed between said sleeve and the axle. A ring 12 closes the inner end of the bearing chamber and hub and makes a close running fit with the axle. The axle is mounted in a boxing comprising a top section 13 having lateral flanges 14, by means of which it is securely bolted to the bottom

of the car body, and an under section 15, which has a machined offset shoulder 16 adapted to fit tight in a recess cut in the under face of the top boxing section 14 so as to prevent dirt working past the joint in the boxing. Cap screws 17 detachably connect the housing sections together and are removable to drop the bottom section without disturbing the connection of the top section to the car body. The portion of the wheel hub which projects into a circular recess formed between the boxing sections, is provided with a circumferential external groove 18 and the recess in the boxing is similarly grooved internally at 19, said grooves 18 and 19 standing opposite and being adapted to receive a retaining means which is inserted before the boxing sections are fastened together. By this arrangement the retaining means are entirely inclosed and have no exposed parts through which dirt may work into the bearing.

My preferred retaining means is adapted to bear uniformly about the wheel and is a ring which may be either split as in the case of the ring 20 or in sections as in the case of ring 21, though obviously ring sections less than a whole would effectively hold the wheel in position. In the case of the split ring 20, this is formed of spring steel and adapted to be slipped over the wheel hub and to grip into the groove 18 and to leave a running clearance between it and the walls of the groove 19. The purpose of this is to transfer the wear to the groove in the boxing, thus relieving the wheel of any appreciable wear from the retaining means. The boxing sections can be replaced at a nominal expense as compared with the wheel. In the case of the sectional ring the wear will be distributed over the walls of both grooves 18 and 19 and for this reason I do not regard it as my preferred construction though it is practical and operative. The inner end of the axle bears against the washer 7 covering its central opening and leaving the openings 8 uncovered so that the oil has free access from the oil chamber to the roller bearings.

In order to prevent dirt working along the hub and into the running joint between the hub and boxing, I provide the hub with a second circumferential groove 22 which is disposed adjacent to the edge of the boxing but is not overhung thereby, and it serves to catch the dirt as it works toward the joint and throws it off.

The manner of forming the sectional boxing is not essential to my invention, though the boxing must be parted to permit of the insertion of the retaining means. It is preferable that the boxing be divided on a horizontal plane through the longitudinal center of the axle so that the wheel may be dismantled by dropping the lower boxing

section and raising the upper boxing section with the car sufficiently to have the walls of the groove 19 clear the retaining ring.

In Fig. 6 I illustrate a very desirable arrangement for mounting the retaining ring 70 on the wheel hub. Here the ring 23 is preferably a solid steel ring about which the iron hub 4 is cast so as to leave the ring projecting above its periphery. By this arrangement the ring itself forms the groove 18 and is held against rotation therein so that the wear is transferred to the boxing sections and no machining of the groove is necessary.

The design of grooves shown is preferable though obviously it is the inner side wall of the groove 18 and the outer side wall of the groove 19 which is effective in retaining the wheel in assembled position and such shoulders may be provided by grooves of other cross sectional contour.

Having thus described the preferred embodiment of my invention, without however intending thereby to specifically limit myself to such constructions, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination of a wheel having the inner end of its hub externally and circumferentially grooved, a boxing adapted to receive said grooved end of the hub which rotates therein, said boxing having an internal circumferential groove, and a retaining means which is inclosed in the boxing and interposed in the annular space formed between said grooved portions of hub and boxing to engage with the walls of such grooved portions and retain said parts assembled, substantially as described.

2. The combination of a wheel having the inner end of its hub provided with an external circumferential groove, a parted boxing adapted to be connected to a car, an axle passing through said boxing and wheel hub, the outer grooved portion of said hub being adapted to rotate in the boxing which has an internal circumferential shoulder, and a curved retaining means, inclosed by the boxing, which engages a wall of said groove and shoulder and holds the hub and boxing in assembled relationship.

3. The combination with a wheel having the inner end of its hub provided with a circumferential groove, an axle on which said wheel is rotatably mounted, a boxing surrounding said axle and grooved end of the hub, a circumferential groove in said boxing alining with said groove on the hub, an inclosed retaining ring which engages the walls of said grooves, and means to permit the insertion of said ring into the boxing, substantially as described.

4. The combination with a car wheel having its hub circumferentially grooved, of a split retaining ring adapted to be clamped into said groove, an axle on which said

wheel is rotatably mounted, a parted boxing which surrounds the axle and grooved end of the hub and has an inner circumferential shoulder against which said retaining ring works to hold the wheel in running position on the axle, as and for the purposes described.

5. A wheel retaining means comprising a parted boxing, the upper boxing section being adapted to be connected to the car, means to detachably connect the under boxing section to the upper boxing section, a wheel hub extended and adapted to make a close running fit in said boxing, the end of said hub within the boxing being circumferentially grooved and the inner wall of the boxing being correspondingly grooved, and a retaining ring which engages walls of said grooved parts, as and for the purposes described.

6. In combination, a parted boxing hav-

ing an upper boxing section being adapted to be connected to the car and a lower section detachably connected to the upper boxing section, a wheel having the inner end of its hub extended and adapted to make a close running fit in said boxing, the end of said hub within the boxing being circumferentially grooved and the inner wall of the boxing being correspondingly grooved, retaining means which engages the walls of said grooves to hold the parts assembled, and a second circumferential groove surrounding said hub and disposed adjacent to but without said boxing, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES ELLIS FOUST.

Witnesses:

NOMIE WELSH,
R. D. JOHNSTON.