W. E. WILLIAMS.

STEEL DISK WHEEL FOR AUTOMOBILES.

APPLICATION FILED DEC. 15, 1920. RENEWED SEPT. 2, 1921.

1,402,032. Patented Jan. 3, 1922.

2 SHEETS—SHEET 1.

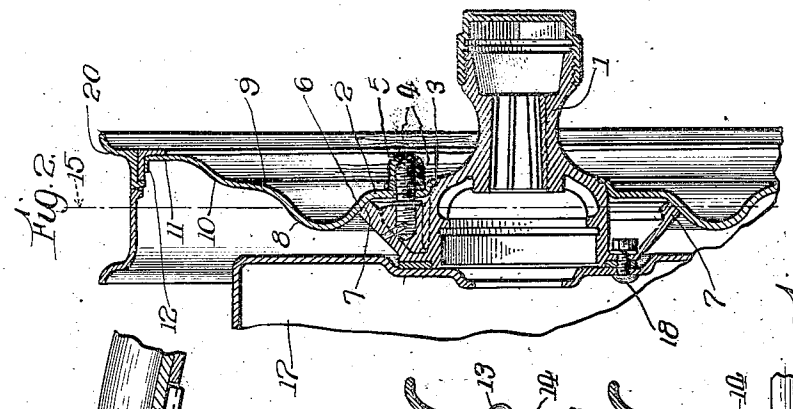


Fig. 2.

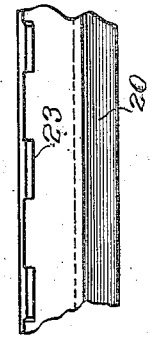


Fig. 7.

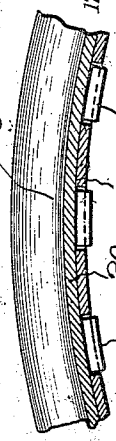


Fig. 3.

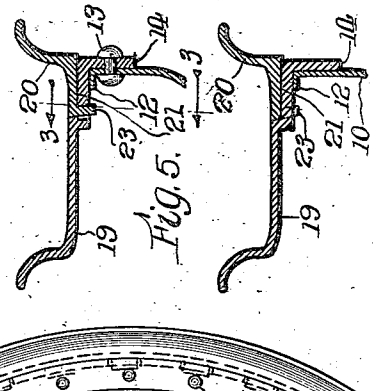


Fig. 4. Fig. 5.

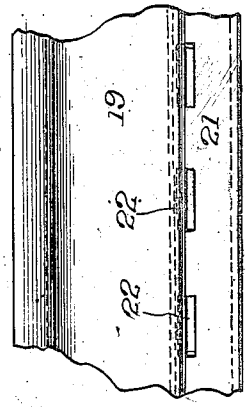


Fig. 6.

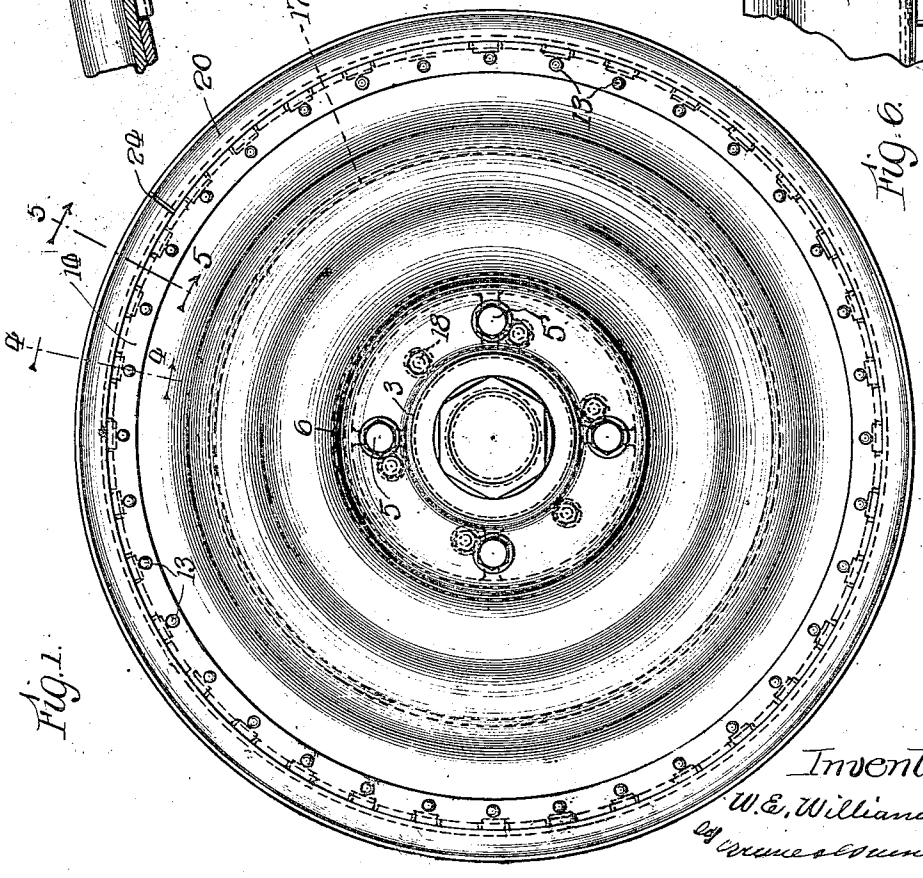


Fig. 1.

Inventor:
W. E. Williams,
by Bruce & Bruce, Attys.

W. E. WILLIAMS.

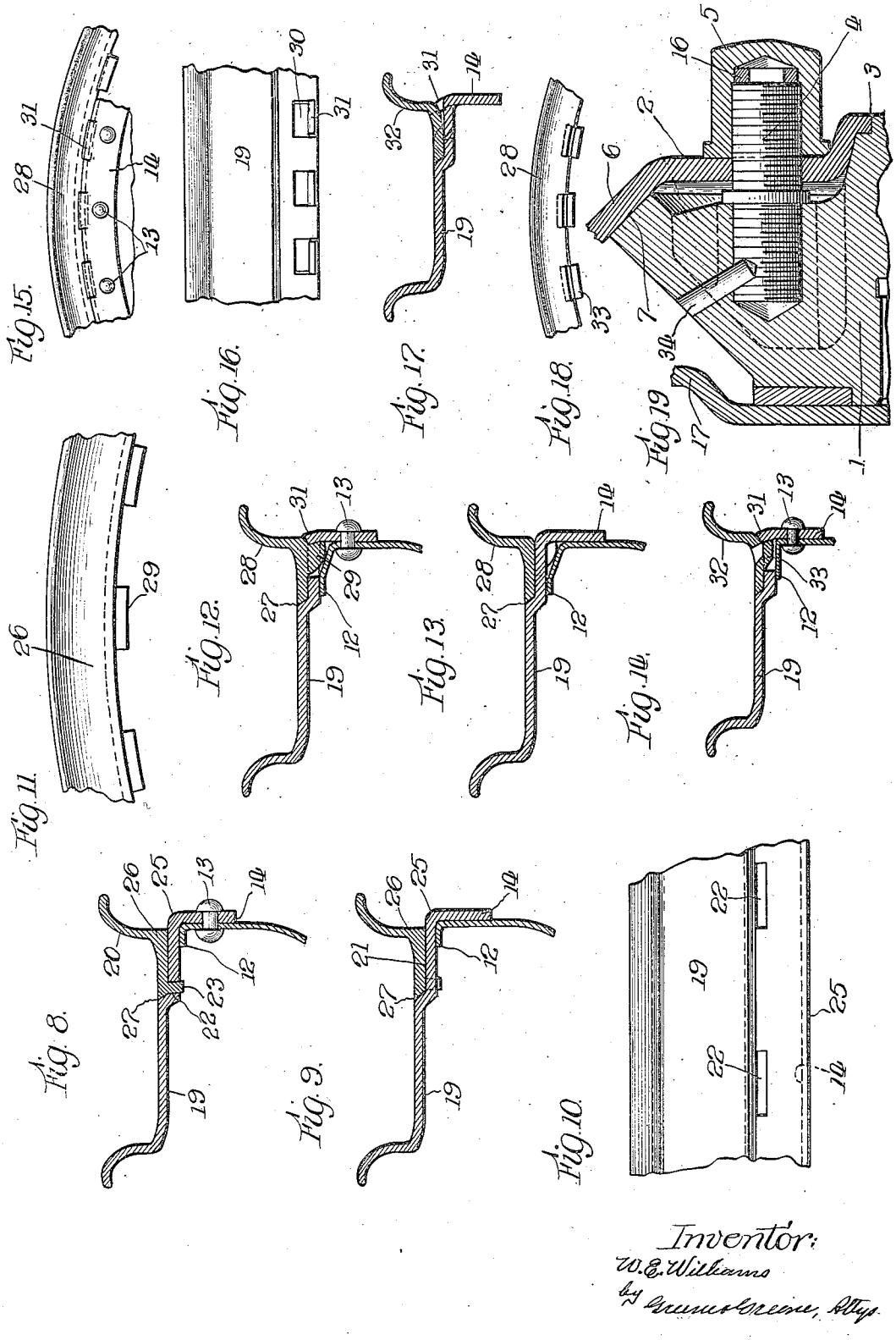
STEEL DISK WHEEL FOR AUTOMOBILES.

APPLICATION FILED DEC. 15, 1920. RENEWED SEPT. 2, 1921.

1,402,032.

Patented Jan. 3, 1922.

2 SHEETS—SHEET 2.



Inventor:
W. E. Williams
by Brumbaugh, Atty.

UNITED STATES PATENT OFFICE.

WILLIAM ERASTUS WILLIAMS, OF WILMETTE, ILLINOIS.

STEEL DISK WHEEL FOR AUTOMOBILES.

1,402,032. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed December 15, 1920, Serial No. 430,926. Renewed September 2, 1921. Serial No. 498,084.

To all whom it may concern:

Be it known that I, WILLIAM ERASTUS WILLIAMS, a citizen of the United States, a resident of Wilmette, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Steel Disk Wheels for Automobiles, of which the following is a specification.

My invention relates to automobile wheels having steel disk webs and novel connection thereof with the hub.

Reference will be had to the accompanying drawings in which Figure 1 is a front elevation of the wheel.

Figure 2 is a vertical diametrical sectional elevation.

Figure 3 is a detailed sectional view on line 3—3 of Figure 4.

Figure 4 is a detailed section of the rim portion on line 4—4 of Figure 1.

Figure 5 is a detailed section on line 5—5 of Figure 1.

Figure 6 is a plan detail of a portion of the rim when the side flange is removed.

Figure 7 is a plan detail of the under side of a portion of the side ring of the rim.

Figure 8 is a section similar to Fig. 4 but showing a modified form.

Figure 9 is a view similar to Fig. 5 showing the same form as Figure 8 but on a different section line.

Figure 10 is a plan of a portion of the main rim piece shown in Figures 8 and 9.

Figure 11 is a side elevation of a portion of the side ring used in the construction shown in Figures 8 and 9.

Figure 12 is another modified form of the rim sections showing a different detail feature of the main rim section and the side ring portion.

Figure 13 is a section on another line of the same form shown in Figure 12.

Figure 14 shows a section of another modified form of the side ring but using the same main rim portion as shown in Figure 12.

Figure 15 is a side elevation at the right side of a portion of the main rim and side ring shown in Figures 12 to 17 inclusive.

Figure 16 is a plan of a portion of the main rim as used in Figures 12, 14, and 17.

Figure 17 is a section through the rim of the form shown in Figure 14 but at a different point.

Figure 18 is a side elevation of a portion of the side ring shown in Figures 14 and 17.

Figure 19 is an enlarged hub detail.

In the drawing 1 indicates the hub of the wheel, which is here shown as adapted to fit a common type of automobile wheel hub, the special features of which, in connection with my invention, relate only to the fastening of the disk to the hub.

The web of the wheel is made of a disk of metal which is thicker around the hub zone than it is on the margin where it joins the rim, thus having a tapering cross section from the central zone to the rim. The disk is dished to a peculiar shape having a flat zone indicated by 2 located a little forward of the central load line of the wheel and around the hub zone and this flat portion is merged into an offset swell indicated by 3 which extends farther outward in the front direction. The flat zone 2 is perforated for a series of screw studs 4 provided with nuts by which the disk is secured to the hub and may be mounted or demounted as desired by unscrewing the nuts 5.

Outwardly beyond the flat zone 2 the disk is pressed inward to fit the annular peripheral inclined surface of an inclined flange 7 of the hub, and this inclined portion of the disk merges into an annular swell 8 the outer portion of which is continuous with a reversed swell 9 which is in turn integral with a third inwardly bent swell 10 continuous with an annular plane portion 11 having an inwardly extending marginal flange 12 fitting against a rim member.

The flat edge 11 is secured by a series of rivets 13 to a flange 14 of the main rim piece and this method of securing the disk to the main rim piece is substantially the same throughout the several modifications shown in the drawings, and the said modifications relate to the method of securing the side ring of the rim to the main rim portion while the general features of the disk remain the same.

The disk shaped as indicated is very strong and serviceable and at the same time allows a slight degree of elasticity under a rolling load.

The flat zone 2 of the disk is so stiffened on each edge of this zone by the offset or swell 3 and the inclined surface 6, that no auxiliary or secondary clamping ring is required under the nuts 5 of the screw studs 4, which saves the weight and cost of the auxiliary ring and also makes the wheel a little easier to clean.

The inclined portion 6, bearing on the in-

clined flange 7 of the disk gives on the central load line 15 a wedging union of the disk and hub whereby the main general load carrying stresses are borne in the neutral central bearing point on the surface 6 and inclined flange 7 and the lateral or skid shocks are taken up over this bearing point as a fulcrum working against the nuts 5 on the studs 4. The shape of this hub zone of the disk, having the outward projecting swell or flange 3 stiffens the edge of the hub aperture of the disk and transmits the load between the screws or studs 4 to the studs themselves and the same is true as relates to the inclined surface 6. Thus the flat zone 2 is stiffened on its margins which permits this zone to be used for the bearing surface of the nuts without requiring any secondary flange or clamping nuts for holding the disk to the hub.

The studs 4 are prevented from being unscrewed by any suitable fastening means but I prefer to use a tapered pin 34 for this purpose.

Nut lock rings, of the ordinary lock washer type are seated on the inside of the heads of the nuts 5 as indicated by 16 and bear directly on the heads of the studs 4, thus serving to hold the nuts from accidentally coming loose.

The wheel shown is for a rear wheel of an automobile and the brake drum 17 is screwed to the hub by bolts 18 shown in the lower part of Figure 2 and in dotted lines in Figure 1. However, this feature varies with different makes of cars, but the arrangement of the hub connection with the disk, may be adapted to almost any type of hub construction.

The preferred form of rim is shown in Figures 4 and 5, wherein 19 is the main rim section which preferably is made out of a rolled special section, but is so formed that with very slight modifications it may be made out of flat stock. The side ring or detachable flange of the main rim is indicated by 20 in Figures 4 and 5 and this also preferably is a special section, but likewise may be made out of flat stock by rounding off the corners, as will be understood from the drawings. The main rim 19 is provided with a projecting flange 14, as heretofore mentioned, and with a seat 21 upon which the side ring flange 20 rests.

The main rim 19 is provided with a series of slots or perforations 22 extending around the inner edge of the surface 21 at intervals, as will be noticed by Figures 3 and 6.

The side ring 20 is provided with a series of projections 23 as indicated by Figures 4 and 7, which are adapted to fit into and register with the slots or perforations 22 of the main rim 19. The way these projections 23 are made is first to provide a continuous flange on the side ring 20 and then by a shearing operation cut away this flange at the desired intervals, leaving the projections 23 adapted to enter and engage in the notches 22 of the main rim.

The side ring 20 is cut asunder as indicated by 24 in Figure 1, thus permitting the ring to be snapped on and pried off the main rim, for the purpose of applying and removing the rubber tires.

It has been a common practice, heretofore, to make rims of a type somewhat analogous to this, by having a side ring that is secured in place by means of a gutter and projections on the side ring which enter into this gutter by means of which the side ring is held in place. The trouble with this type of rims is that while they may hold the tire on securely and the side ring be easily removed and replaced, yet in removing the tire shoe the gutter portion on the main rim becomes a troublesome feature, as the tire beads spring down into the gutter and cause trouble in withdrawing the tire from the rim. In this work with the type of tires which have a gutter on the side of the side ring, the front side of the tire shoe or the bead portion on the outside may pass the gutter with some convenience, but the inside bead of the tire shoe having a sharp and more or less flexible point or edge generally flexes down into the gutter as the shoe is being removed, and causes a lot of work and annoyance in removing the tire shoe from that type of a rim. With the construction I show in this application, there is no gutter on the side, or features which may clog the removing of the tire shoe from the rim and when the side ring is taken out there is ample clearance on the outside for the outside bead of the tire to be immediately free and there is a clear way for the inside bead to slide off without catching anything and this is a great desideratum.

In Figure 8 the main rim piece 19 is made out of a flat sheet of metal and is made a little wider on the front edge of the depending flange 14, as is indicated by the curved portion 25. Thus there is a full flat seat for the side ring 20 and this side ring 20 is shaped slightly different from those of Figures 4 and 5, by reason of the point 27 adapted to fit more nearly the contour on the inside surface of the main rim 19, the projection 23 being substantially the same as in Figures 4 and 5.

In Figures 11, 12 and 13 I provide a different type of a side ring and a slightly different section to the main rim portion and in these figures I indicate the side ring as 28 and the main rim portion as 19. In this case the side ring is a special section rolled with a bead on the under side, which bead is mutilated, leaving the projections 29 which perform the same function as the projections 23 heretofore mentioned.

The main rim in this instance is made out of flat stock and is provided with same sort of a depending flange 14 as in Figures 4 and 5, but the rim is provided with a series of perforations located near the front edge of the main rim 19, as is indicated by 30 in Figure 16. In making these perforations 30 some of the metal is cut out and some of it is turned up slightly, forming shoulders of bearing points 31. (See Figures 12 to 18 inclusive.)

This construction arrives at substantially the same results as Figures 4 and 5, but uses a slightly different location for the projections on the side ring that interlock with the apertures, in the main rim. In Figures 14, 17 and 18, I make my side ring out of flat stock and indicate the side ring as 32 and in order to provide the projections required for locking the ring in place on the main rim 19, I punch down some sections of the metal of the side ring into projecting points as indicated by 33 in Figures 14, 17 and 18. Figure 17 is a cross section at intervals between these projections, while Figure 14 is a cross section through the projections. Figure 18 is a side elevation showing the appearance of the projections from the side. It is some times difficult to get supplies of material of special rolled sections when flat stock may readily be had and I provide this form, allowing the invention to be used and adapted to the type of material most easily obtainable at any given time. The results being substantially the same, save only with slight differences in cost, but I prefer to use the form shown in Figures 4 and 5.

In taking off a tire from my wheel with the rim, as indicated, which is always done when the tire is deflated, the tire is pushed inward opposite the point 24, being the cut asunder ends of the side ring, forcing the bead in beyond its bearing on the side ring at that point. Then, with a screw driver, or other suitable tool, the end of the side ring is sprung upward and outward, freeing the projections 23 on the side ring 22 in the main rim at that end, whereupon the ring may be easily progressively sprung outward and removed almost in the same manner as the side rings are removed wherein side gutters are used.

What I claim is:—

1. In a wheel of the class described, a dished disk having its main bearing on the hub on the central load line of the wheel and inclined thereon for a wedging action, with a zone on the said disk around the hub outward from the central load line through which extend fastening studs adapted to secure the disk to the hub and the inner edge of the said fastening zone having a bearing also on the hub.

2. In a wheel of the class described, the combination with a hub having a peripheral face in the load plane of the wheel and inclined to that plane of a disk secured to the hub at a less distance than said face from the wheel's axis and dished to make contact with said face.

3. A wheel having a dished disk for the web and secured to a hub through the medium of a series of studs passing through a hub zone on the said disk and this hub zone stiffened on both edges by swells in the body of the disk adapted to help carry the load of fastening uniformly around the hub zone without requiring extra stiffening flanges.

4. In a wheel of the class described, a dished disk forming the web of the wheel and having an inclined bearing surface adapted to register with an inclined bearing flange on the hub, in combination with a plane portion parallel with the plane of rotation of the wheel, and fastening means passing through this plane portion for securing the disk to the hub.

5. A wheel having a disk forming the web thereof; and having a zone around the hub adapted to aid in fastening the disk to the hub, said zone having an inclined bearing seat adapted to seat on an incline face on the hub, and another bearing seat at the other edge of said zone adapted to seat on the said hub, with a clearance space between these seats where the disk and the hub do not come in contact.

Signed at Chicago, in the county of Cook and State of Illinois, this 1st day of December, 1920.

WILLIAM ERASTUS WILLIAMS.

Witnesses:

F. ZOBEL,

B. J. BERNHARD.