W. E. WILLIAMS.

METAL DISK WHEEL.

APPLICATION FILED JULY 26, 1920.

1,402,029.

Patented Jan. 3, 1922.

2 SHEETS—SHEET 1.

Fig. 2.

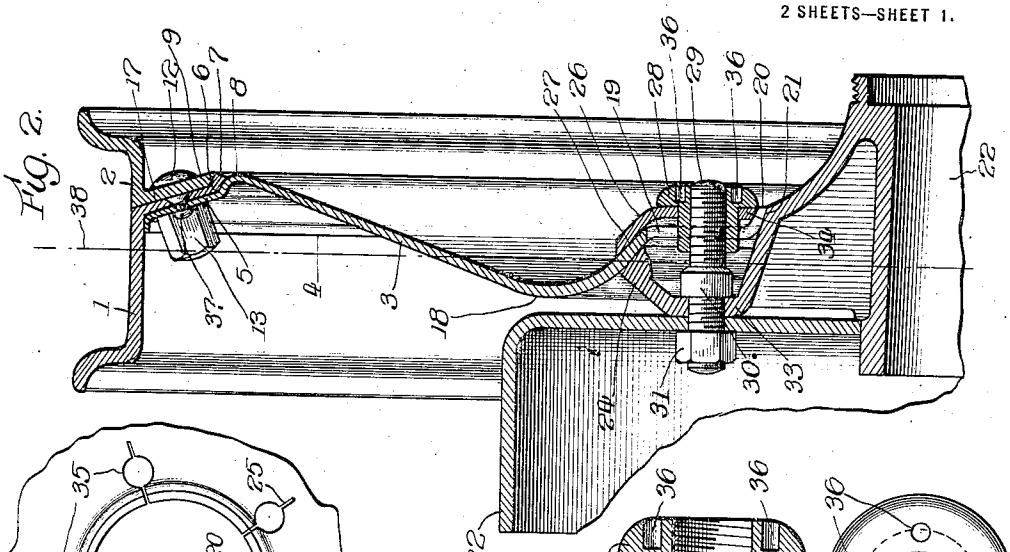


Fig. 3.

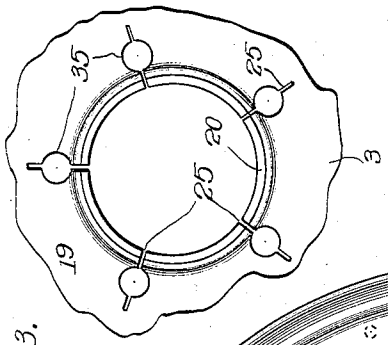


Fig. 4.

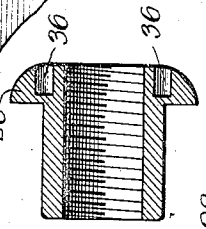


Fig. 5.

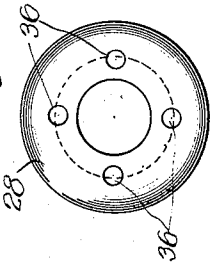
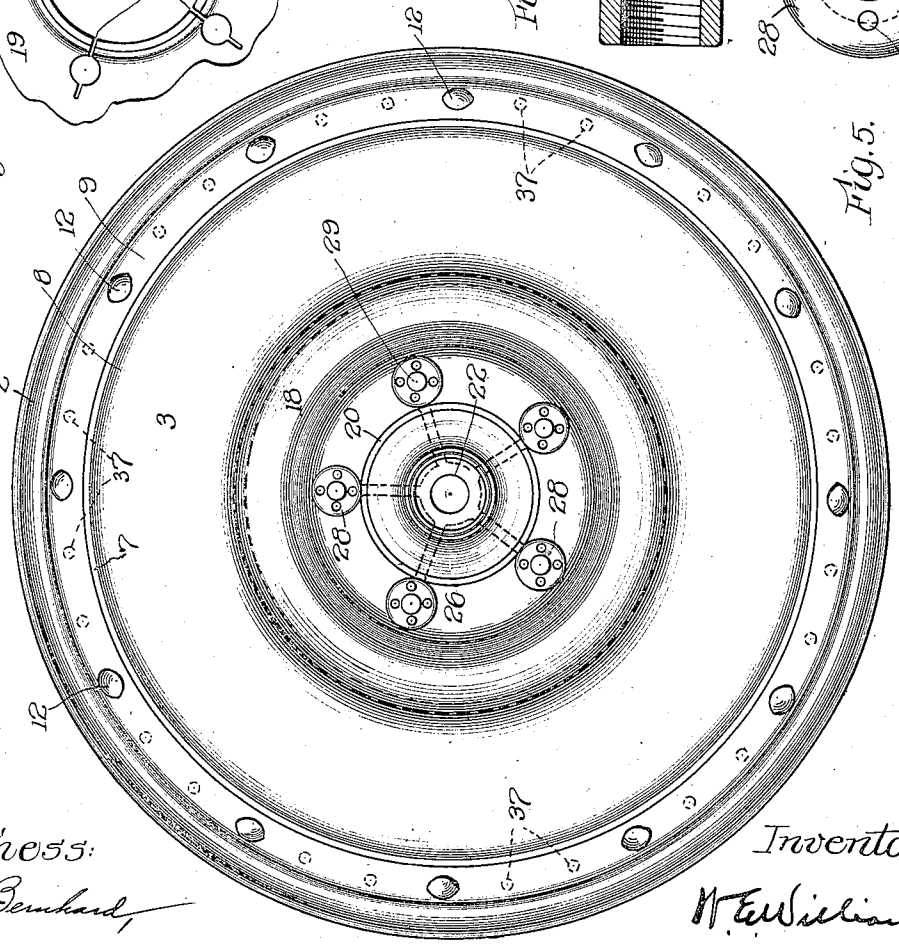


Fig. 1.



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2 SHEETS—SHEET 2.

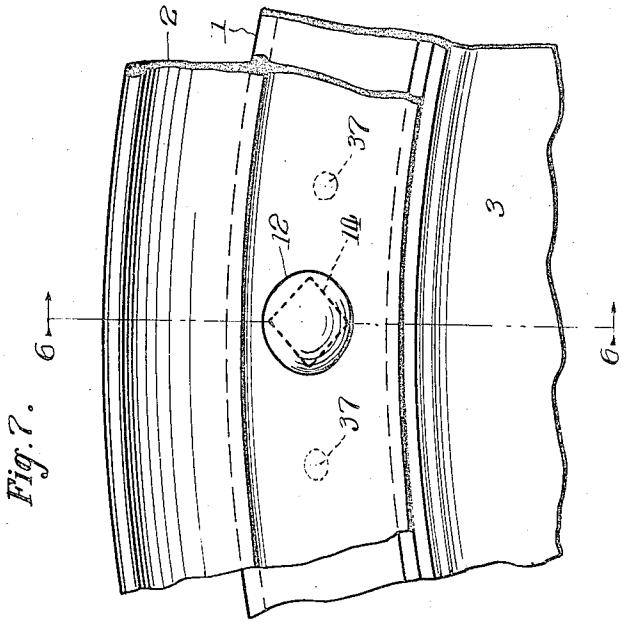


Fig. 7.

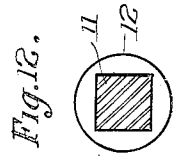


Fig. 12.

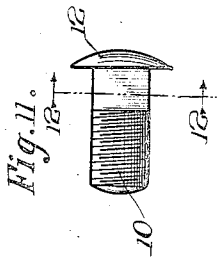


Fig. 11.

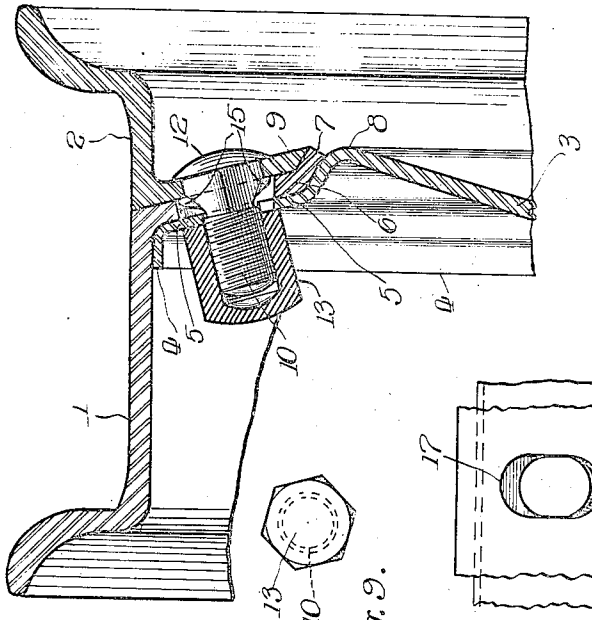


Fig. 6.

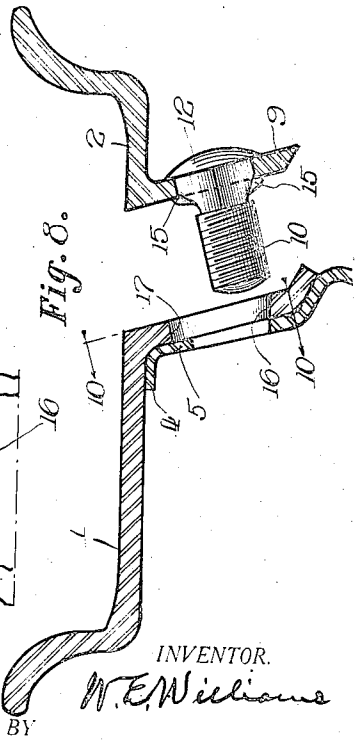


Fig. 8.

Fig. 10.

Fig. 9.

WITNESS:

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UNITED STATES PATENT OFFICE.

WILLIAM ERASTUS WILLIAMS, OF CHICAGO, ILLINOIS.

METAL DISK WHEEL.

1,402,029. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed July 26, 1920. Serial No. 398,927.

To all whom it may concern:

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

The object of my invention is to obtain a disk wheel having a desirable form of rim and a desirable form of hub fastening, together with the shape of the disk which gives that greatest strength together with the greatest elasticity and provides the most secure fastenings for the rim and the hub and also have a sanitary feature in the ease of washing.

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

Figure 2 is a vertical sectional elevation.

Figure 3 is a front elevational detail of a part of the disk.

Figures 4 and 5 show the details of the hub nut on an enlarged scale.

Figure 6 shows an enlarged section on line 6—6 of Figure 7.

Figure 7 is a side view of a part shown in Figure 6.

Figure 8 shows a position of the two parts of the rim in relation to each other when they are about to be assembled.

Figure 9 shows the end view of the nut used in fastening the rim in place.

Figure 10 is a view in the direction of the arrows 10—10 of Figure 8.

Figure 11 shows one of the rim clamping bolts.

Figure 12 is a section of one of the rim clamping bolts.

In the drawing 1 indicates the main portion of the rim of the wheel and 2 indicates the companion or bolted on flange which in conjunction with the main rim part 1 composes the rim of the wheel. 3 indicates the disk of the wheel here shown as a tapered disk and it is provided with the turned over flange 4 which merges into a flange 5 which is fitted to the inside of the inwardly projecting flange 6 of the main rim part 1 and the latter is provided with a terminating shoulder 7 on which the body of the disk merges from the portion 5 and is turned over at the swell 8 into the dished form of the disk that extends toward the hub.

The companion flange 2 is provided with a flange 9 which fits against a shoulder on the portion 7 of the main rim part 1. A series of bolts 10 having square shanks 11 and flattened curved heads 12 bolt the flanges 9 and 6 of the rim together through the medium of the nuts 13.

The bolt holes in the flange 9 of the companion flange 10 are square in shape as indicated by the dotted lines 14 in Figure 7 and the square shanks 11 of the bolts are secured into these square holes by having the corners of the shanks swedged over into interlocking positions on the top and bottom sides as indicated by 15. Thus these bolts are made fast in the companion flange 2 and remain perpetually with this piece the same as if they were an integral part thereof.

In assembling the rim parts the positions of the two pieces of the rim are indicated by Figure 8 and owing to the inclined position of the bolts 10 there must be provided an enlargement of the holes in the main rim flange 6 on the lower side thereof as is indicated by 16 and to provide for the swedged over metal which locks the bolt in place I provide the extra clearance at the top of the holes as indicated by 17.

This clearance of the bolts in the holes in the main rim flange prevents shearing strain on the bolts and allows the bolts to take up only direct pulling loads. The flange 9 registers on the shoulder 7 of the main rim which together with the inclined shape of the two flanges in relation to the plane of rotation of the wheel takes the registering or centering load strain in place of the bolts 10. The disk 3 is tapered as shown, being thinner at the margin and progressively thickened up to the region to where it joins the hub.

The outer face of the disk is made concave as shown and is provided with the swell 18 which shape gives strong resistance to skid shocks and furnishes a slight degree of elasticity. From the swell 18 the disk is curved outward and terminates in a plane vertical zone 19 and it merges into an outwardly projecting flange 20 which bears on the main hub barrel at 21. The hub is indicated by 22 and is provided with a flange 24 located substantially in the central load line and inclined to fit the inclined surface of the disk at this point. The flange 20 and surface 21 of the hub 22 are also slightly inclined in order to make a hub registering fit.

The vertical zone 19 of the disk is cut

through at intervals as is indicated by 25 in Figure 3 in order to produce a certain degree of elasticity and bending in the fitting of the disk to the hub.

I provide a clamping ring 26 having an inclined bearing 27 which registers on the disk opposite the flange 24 of the hub and is clamped to the disk through the medium of the round headed nuts 28 screwed on to the bolts 29 and the latter through the medium of the shoulders 30 and nuts 31 fasten the brake drum 32 to the hub although in the case of the front wheel the brake drum is wanting but the bolted arrangement is substantially the same, save only the nuts 31 will then clamp directly on to the hub flange at 33. The clamping ring 26 has a shoulder 34 that clamps on the small flange 20 of the disk and when the nuts 28 are screwed up tightly this shoulder 34 presses the flange 20 through the spring of the parts induced by the slots 25 into a registering fit with the hub surface 21. The nuts 28 extend into the holes 35 and register therein as against the turning movement of the disk on the bolts 29. The nuts 28 are provided with holes 36 adapted for use with a special wrench in fastening and unfastening the nuts.

The flat rounded heads of the nuts are easily washed and aid in keeping the wheel sanitary which is a desideratum.

The inclined surface of the flange 24 where it fits the disk together with the inclined fit of the flange 20 with the surface 21 of the hub insures at all times a tight registry of these parts.

The clamping ring 26 with its overlapping clamping flange 27 clamping on to the body of the disk, together with the shoulder 34 of the said ring clamping on to the flange 20 of the disk secures the disk to the hub in tension strain lines as well as the registry of the disk on the hub itself provides for strut strains.

The hub fastening as described has the all important feature of permitting the disk to be securely and tightly fastened to the hub both in tension and strut strain lines and yet when the nuts 28 are removed the disk will be easily removed from the hub which is a great desideratum.

Demountable disks necessarily fit other parts closely and often in such a way that demounting is difficult. In my devices, the nuts 28 having tubular shanks lying in the large bolt holes allow no lateral relative movement of the disk, nuts and bolts. The nuts may be easily removed separately and when removed the disk is readily removed, there being nothing whatever to hold it.

The disk is secured to the main rim part 1 through the medium of the rivets 37 in addition to the rim bolts 10.

The central load line of the wheel is indicated by the dotted line 38 and it will be noticed that this line passes through the main shoulder fastening of the hub flange 24 in what may be termed a neutral position which takes a direct load without putting bending strains upon the hub fastening. The inclined fit between the margin of the disk and the main rim part takes shear off from the rivets 37 and thus permits a lesser number of those rivets for a given surface.

What I claim is:

1. In a device of the class described, a rim and web of the wheel composed of a disk suitably secured to the rim in the region outward from the central load line and dished inward crossing the central load line and then merging outward of the central load line in the fastening to the hub; in combination with a suitable hub provided with a flange having a bearing surface on the margin of the flange adapted to bear on the said disk and a bearing surface on the hub barrel adapted to bear around the central aperture of the disk and a clamping flange adapted to clamp the disk to the hub through the medium of a series of bolts passing through the disk and through the clamping flange.

2. In a device of the class described, a suitable rim secured to the disk, the latter forming the web of the wheel and a suitable hub detachably connected to the said disk, inclined bearing surfaces on said hub adapted to register on inclined bearing surfaces on the disk; in combination with a clamping ring adapted to clamp the disk to the said hub through a series of bolts secured to the hub and passing through the disk and through the clamping flange.

3. The combination with a hub, a wheel disk, a clamping ring, and a series of bolts passing through the ring and binding an inclined surface portion of the disk against a companion inclined surface portion of the hub, the bolt holes in the ring being materially larger than the bolts and the nuts upon the latter having tubular shanks closely filling the clearance space around the bolts.

4. In a device of the class described, a disk forming the web of the wheel and joined to the hub through the medium of two inclined bearing surfaces formed in the hub zone of the disk and a suitable hub having a flange provided with an inclined bearing surface and a hub barrel also having an inclined bearing surface with a clamping ring adapted to clamp the disk to the hub through the medium of a series of bolts passing through the flange on the hub through the disk and through the clamping ring, the said bolts provided with clamping nuts having tubular shanks extending through the clamping ring and through the disk.

5. In a device of the class described, a suitable hub, a disk forming the web of the wheel and clamping ring adapted to clamp

the disk to the hub, the said disk provided with an annular aperture adapted to register over the hub barrel with a marginal ring around its aperture and said clamping flange adapted to register on the said annular flange around the hub aperture of the disk, said hub provided with a hub flange having an inclined bearing surface for the disk and said disk having an inclined bearing surface adapted to fit the inclined surface of the said hub flange and said clamping ring being provided with an inclined clamping outer zone adapted to register on the disk portion overlying the inclined bearing on the hub flange.

6. The combination with a hub provided with a flange having a lateral, inclined, disk-receiving surface area, of a disk having a central hub-opening surrounded by a marginal flange and also having an inclined zone fitting the inclined surface area of the hub flange, a ring having an inclined peripheral zone adapted to press the disk against the inclined surface area of the hub flange, and bolts clamping the hub flange, the ring, and the intermediate disk together.

7. The combination with a hub, of a wheel disk, a clamping ring, and a series of bolts passing through the disk and loosely through large holes in the ring and provided with nuts having tubular shanks to fill the spaces, in the ring, around the bolts and thus bar all relative lateral movement with respect to the bolts.

8. A wheel having a disk forming the web thereof and detachably secured to the hub; a suitable hub provided with a bearing surface on the hub barrel and a bearing surface on an outer extending flange adapted to register at the said points with the said disk, the said disk being slit around the central aperture to give a slight degree of elasticity and adjustment in clamping the same to the hub; in combination with a clamping flange and a series of bolts passing through the disk and clamping flange and adapted to clamp the parts together in a demountable connection.

9. The combination with a hub provided with inclined disk-receiving surfaces at different distances from the axis, of a disk having a hub opening surrounded by a flange parallel to the inner of said disk-receiving surfaces and provided further with a zone parallel to the outer of said surfaces, a clamping ring having marginal faces fitting the disk and in registry, respectively, with the underlying disk-receiving areas of the hub, and bolts rigidly binding the ring and disk to the hub.

10. The combination with a hub having at unequal distances from its axis two inclined disk-receiving areas, of a disk making contact with the hub only at said inclined areas, and means for detachably clamping the co-acting hub and disk areas together.

11. The combination with a hub having at unequal distances from its axis two disk-contact areas inclined to said axis, of a disk having corresponding inclined areas adapted to move simultaneously directly toward and from said disk-contact areas, a ring overlying the disk and having contact therewith only in parts registering with said disk-contact areas, and bolts forcing the ring toward said areas to clamp the disk only under the ring margins.

Signed at Chicago, in the county of Cook and State of Illinois, this 13th day of July, 1920.

WILLIAM ERASTUS WILLIAMS.

Witnesses:
FLORENCE ZOBEL,
B. J. BERNHARD.