Feb. 13, 1923.

1,445,405.

L. MATHIAS.

VEHICLE WHEEL.

FILED OCT. 15, 1921.

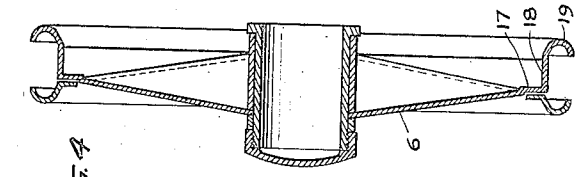


FIG. 4

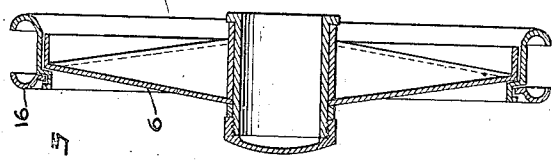


FIG. 3

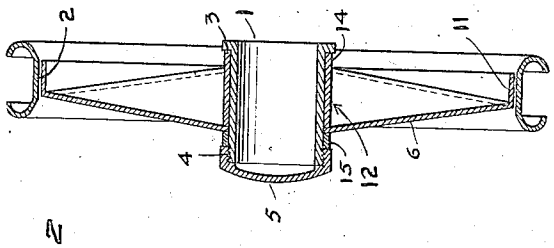


FIG. 2

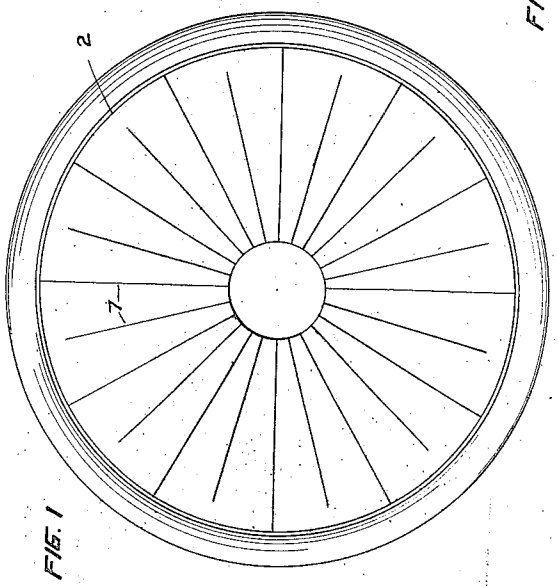


FIG. 1

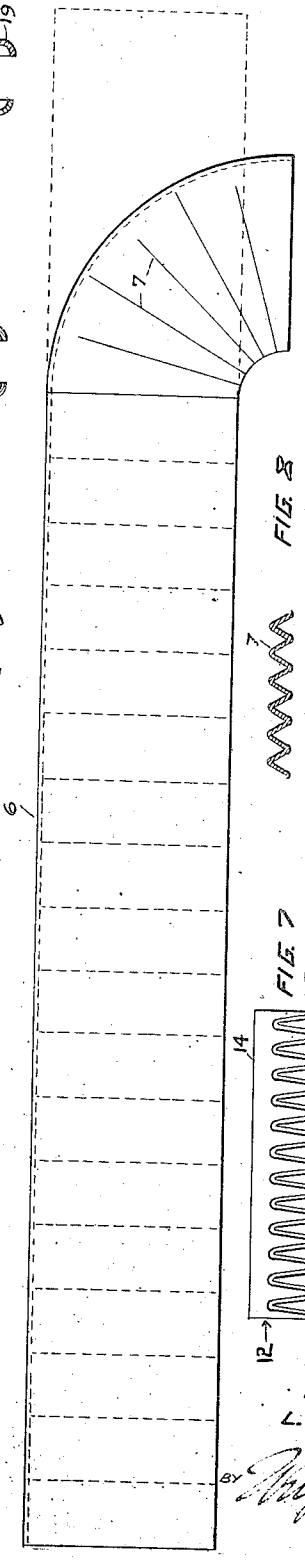


FIG. 5

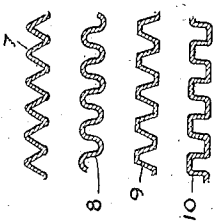


FIG. 8 FIG. 9 FIG. 10 FIG. 11

FIG. 7

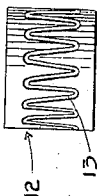


FIG. 6

INVENTOR
L. MATHIAS

BY

ATTYS.

Patented Feb. 13, 1923. 1,445,405

UNITED STATES PATENT OFFICE.

LOUIS MATHIAS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO DIEDRICH LUTJEN, OF SAN FRANCISCO, CALIFORNIA.

VEHICLE WHEEL.

Application filed October 15, 1921. Serial No. 507,948.

To all whom it may concern:

Be it known that I, LOUIS MATHIAS, a citizen of the Republic of Germany, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Vehicle Wheels, of which the following is a specification.

The present invention relates to improvements in vehicle wheels of the disc type.

Heretofore disc wheels have been constructed of two or three discs and in some instances, one disc has been used, but in the latter case the single disc is made of relatively heavy and thick material in order to provide the necessary strength to take care of axial stresses. Thus wheels of the one disc type, because of the necessity of employing thick and heavy material, are usually as heavy as wheels made up of several discs. In the manufacture of disc wheels, the disc is usually cut or stamped from a single piece of sheet metal, and in both cases a considerable waste of material results.

The primary object of the present invention is to provide a comparatively simple and inexpensive vehicle wheel of the disc type wherein only one disc is employed, the wheel will be lighter than disc wheels heretofore produced and will have the same or even greater strength, durability and stability, the single disc being formed in a novel and simple manner from a minimum amount of material so as to avoid waste and thereby lessen the cost of production.

A further object of the invention is to provide in a disc wheel of the character described novel means for holding the disc in position, said means being simple as to construction, inexpensive and capable of being readily and easily assembled and disassembled.

The invention further consists in generally improving disc vehicle wheels so as to render them less expensive, reduce the number of parts, as usually employed heretofore, and to minimize the weight of the wheel without sacrificing strength and durability.

The invention possesses other advantages and features some of which, with the foregoing will be set forth at length in the following description where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming a part of the present specification. In said drawings I have shown one form of the construction of my invention, but it is to be understood that I do not limit myself to such form since the invention as expressed in the claims may be embodied in a plurality of forms.

Referring to the drawings:

Fig. 1 represents a side elevation of wheel constructed in accordance with the present invention.

Fig. 2 is a vertical sectional view of the wheel.

Fig. 3 is a vertical sectional view showing a modified form of rim construction.

Fig. 4 is a vertical sectional view showing another modified form of rim construction.

Fig. 5 is a top plan view partly diagrammatic, of a metal blank of which the disc is formed, showing one end of the disc as it would appear when taking form.

Fig. 6 is a top plan view of the means for holding the disc assembled in place upon the hub.

Fig. 7 is a top plan view of the blank of which said means is formed.

Figs. 8, 9, 10 and 11 are fragmentary sectional views exemplifying different forms of corrugations which may be embodied in the disc.

In carrying out the present invention I employ a single piece of thin sheet metal of rectilinear outline. Although I prefer to use a steel plate, I do not wish to limit myself to the character of material employed and may use material of other metals or non-metallic material, as desired. The plate or sheet of material that I employ is equal in width to the distance from the inside circumference of the rim to the outside circumference of the hub and the length of the material is equal to the inner circumference of the rim. The sheet or piece of material of the dimensions described is stamped or otherwise corrugated or folded in such manner that it will assume an annular form having corrugations which are substantially V-shaped in cross section. However, the corrugations may be otherwise shaped, as desired, the main requirement being to provide corrugations such that the straight rectangular strip will take annular form and the corrugations will be radial to the center of the disc, each corrugation being of greater width axially near the hub and decreasing in width and height toward the rim in order to

terminate at an end point, or in other words. converge at a point where the disc contacts with the rim. In this way each corrugation will be substantially triangularly formed with the apex disposed at the rim and the base at the hub, whereby a series of corrugations will provide maximum strength and the requisite resistance to axial stresses. After the single sheet of material is corrugated and takes the annular form, the meeting edges, that is the ends of the plate, are secured to one another, preferably by being welded and the disc is thus formed with a central aperture thru which the hub projects. As a means for securing the disc upon the hub, I preferably employ a band which is divided by circumferentially cutting, in a zig zag formation, or of such formation as will correspond to the shapes of the corrugations in the disc, whereupon the opposed faces of the parts or halves of the band will interfit upon opposite sides of and hold the disc in place. A nut or hub cap being employed to hold the disc upon the hub.

Referring particularly to the drawings wherein I have illustrated the principal embodiments of my invention, 1 designates a hub, 2 a rim, which in this instance as shown in Figs. 1 and 2 is of the clincher type, the hub is provided upon its rear end with an annular flange 3 and upon its opposite end is externally screw threaded, as at 4, so as to receive a hub cap or nut 5.

The single disc 6 forming a connecting medium between the hub and rim of my invention is formed of a single piece of relatively thin sheet metal of rectilinear outline as shown in Fig. 5. This sheet of metal, in view of the construction and arrangement thereof, in forming the disc, may be made of thinner and lighter material than has been heretofore employed in constructing discs for disc wheels. In forming an annular disc from a blank of sheet metal, I stamp, fold or otherwise treat the disc so as to form corrugations 7 which extend transversely of the sheet or blank of material and are formed in such manner that the strip of material will assume an annular form. Corrugations 7, preferably V-shaped, as shown in Fig. 8, may be U-shaped as shown at 8, in Fig. 9; another shape is shown at 9, in Fig. 10: and Figure 11 is of still another shape as shown at 10.

In forming the corrugations every other one of the said corrugations extends from edge to edge of the material whereas the other of the corrugations extends from the inner edge to a point slightly spaced from the outer edge of the material. This arrangement permits of the formation of corrugations which will converge towards their outer ends so that the greatest width of the corrugations axially will be at the hub and the said corrugations will terminate substantially as points, at the rim. In forming the disc, one edge of a strip is bent so as to form an annular flange 11, which constitutes a rim seat engaging upon the inner side of the rim and preferably secured thereto by being riveted or welded. After the corrugations are formed and the sheet of material has taken annular form, the meeting edges or ends of the sheet are secured to one another, preferably by being welded and the disc is then ready to be assembled with the wheel. It will thus be seen that the formation of the disc may be effected with a single stamping operation followed by the welding of the ends of the strip and in this way no waste of material is occasioned and a minimum number of steps is required in the formation of the disc, whereby the cost of production of the latter is materially lessened than is the case with discs heretofore produced.

As a means for securing the disc upon the hub and holding the wheel assembled, I employ a specially constructed device 12 which is formed from a single circular band. The band is separated circumferentially by cutting the same as shown in Figs. 6 and 7, with a zig zag cut 13, which forms two bands 14 and 15 respectively, the opposed faces of which are formed with a series of teeth adapted to interfit, as shown in Fig. 6. The circumferential cutting or separating of the band is such that the teeth formed will extend between the corrugations when the rings or bands 14 and 15 are mounted upon opposite sides of the disc.

In assembling the wheel, the ring or band 14 is mounted upon the hub so as to engage the flange 3 and the disc 6 is then positioned upon the hub so that the teeth on the band 14 will extend between and conform to the outline of the corrugations. The band 15 is then mounted in place upon the hub so that the teeth will engage between the corrugations on the outside of the disc and the nut or hub cap 5 is screwed into place so as to engage the outer edge of the band 15. By tightening the nut or hub cap, the bands 14 and 15 will be moved into interlocking position with the corrugations closely fitted between the irregular edges of said bands, whereupon the disc is rigidly assembled and held in proper position upon the hub.

It will thus be seen that the device 12 for holding the disc in place may be formed with but a single operation, the splitting of the band forming this device into halves being effected with a cut such as will cause the halves of the band to have a shape corresponding to the shapes of the corrugations in the disc so that an effective interfitting of these parts to the disc may be had in assembling the device.

With reference to Figs. 3 and 4, it will

be seen that in the case of Fig. 3, the disc 6 is constructed the same as in Figs. 1 and 2, but the rim 16 is of a demountable type. In Fig. 4, the disc 6 is provided with an off-set portion 17 at its outer edge and then bent angularly as at 18 and from the angularly bent portion curled as at 19 to form one side of a demountable rim, said side being integral with the disc. The purpose of these illustrations is to show the adaptability of the construction of this invention for use with rims of different characters but I do not wish to limit myself to any particular form of rim, since it is obvious that this is of no vital importance of the invention itself. However, as shown in Fig. 4, it may prove distinctly advantageous to have a part of the rim integral with the disc itself.

I claim:

A disc wheel comprising a hub, a rim, and a single disc between the hub and rim and characterized that the disc is made of a single piece of thin sheet material having a length equal to the inner circumference of the rim and a width equal to the distance between the rim and hub, said disc being caused to assume annular form thru formation of radial corrugations, which corrugations decrease in width axially from the hub to the rim, the ends of said piece of material being rigidly secured to one another, means for holding the disc upon the hub comprising two bands surrounding the hub, engaging and conforming to the surface outline of the opposite faces of the disc and a member fitted upon the hub and engaging one of said bands to hold the wheel assembled, said bands being formed from a single band divided circumferentially with a cut so as to form opposed edges of a contour corresponding to the surface contour of the disc.

LOUIS MATHIAS.