F. E. CANDA.

CAR WHEEL.

APPLICATION FILED MAY 18, 1909.

934,885.

Patented Sept. 21, 1909.

2 SHEETS—SHEET 1.

Fig: 1,

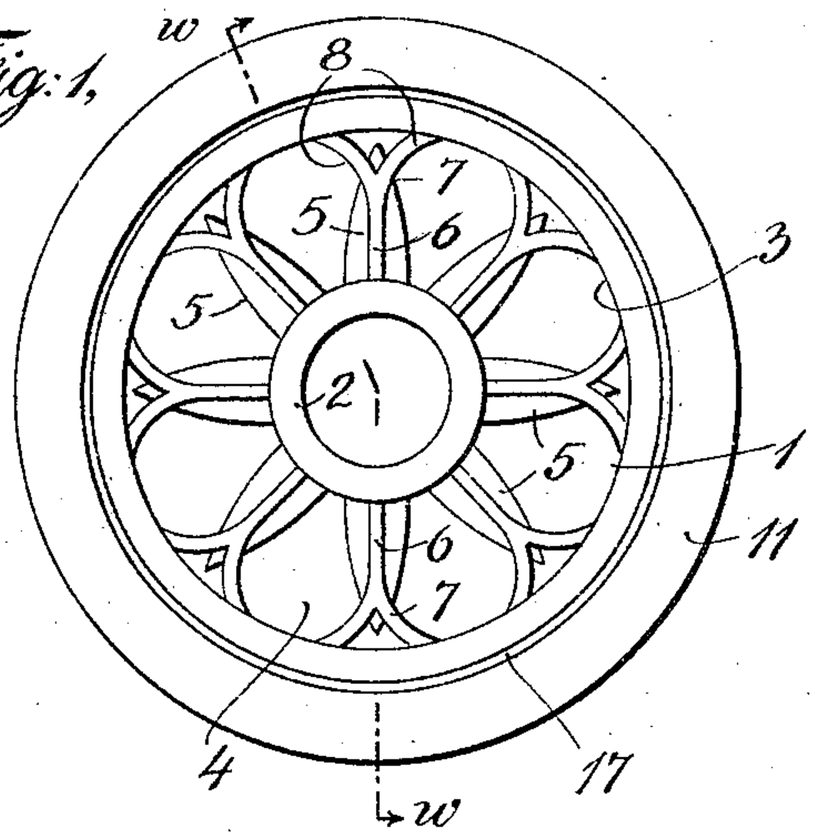
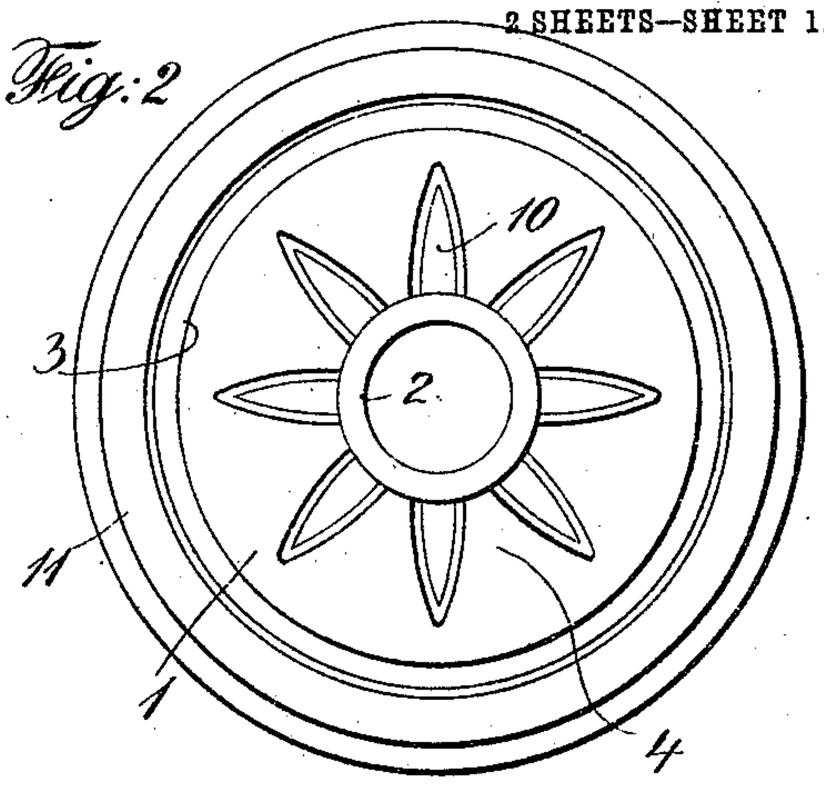


Fig: 2



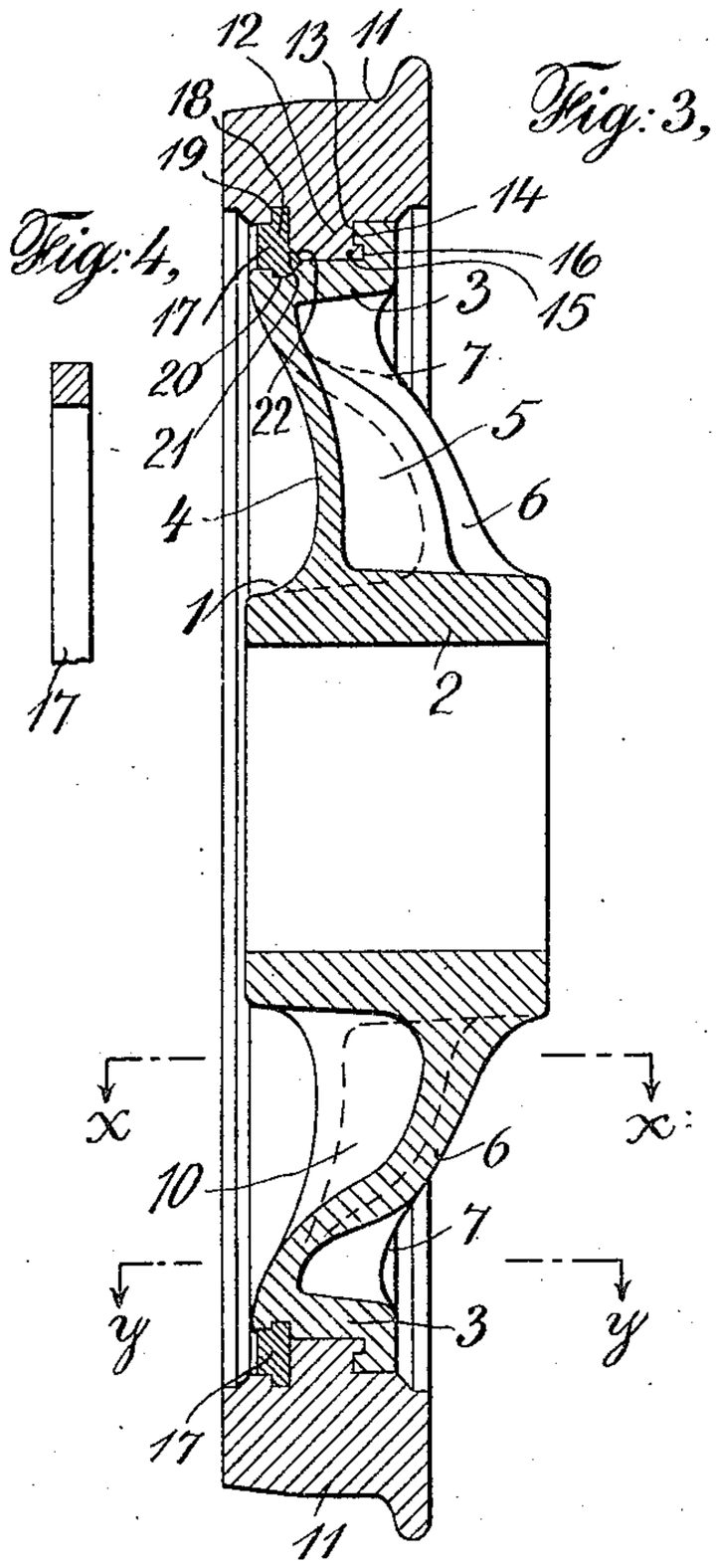
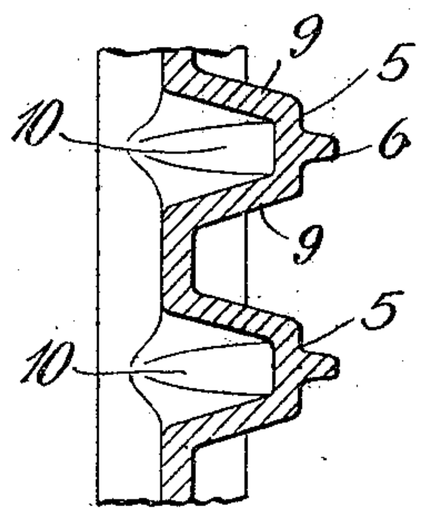


Fig: 3,

Fig: 4,



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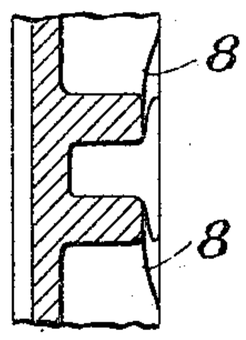

Fig: 6,

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2 SHEETS—SHEET 2.

Fig: 7,

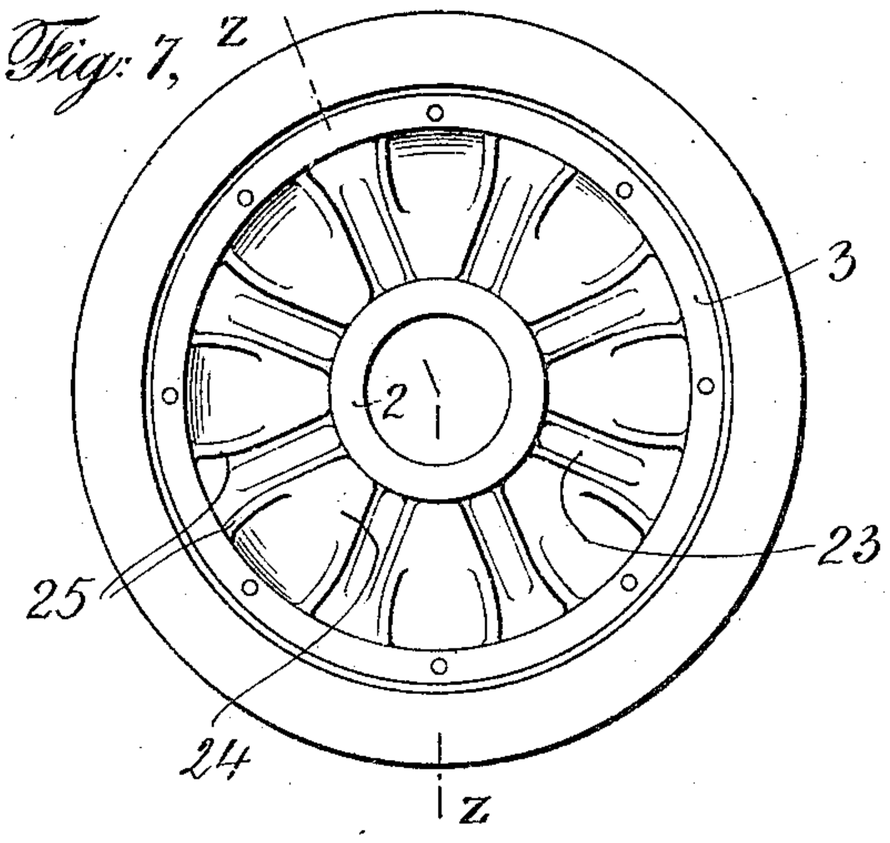

Fig: 8,

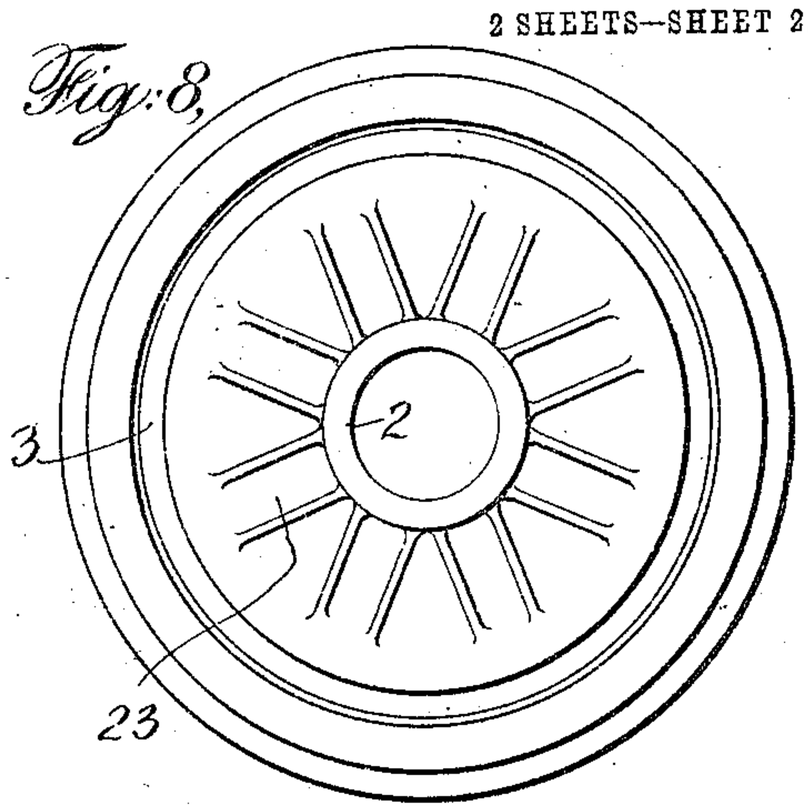

Fig: 10,

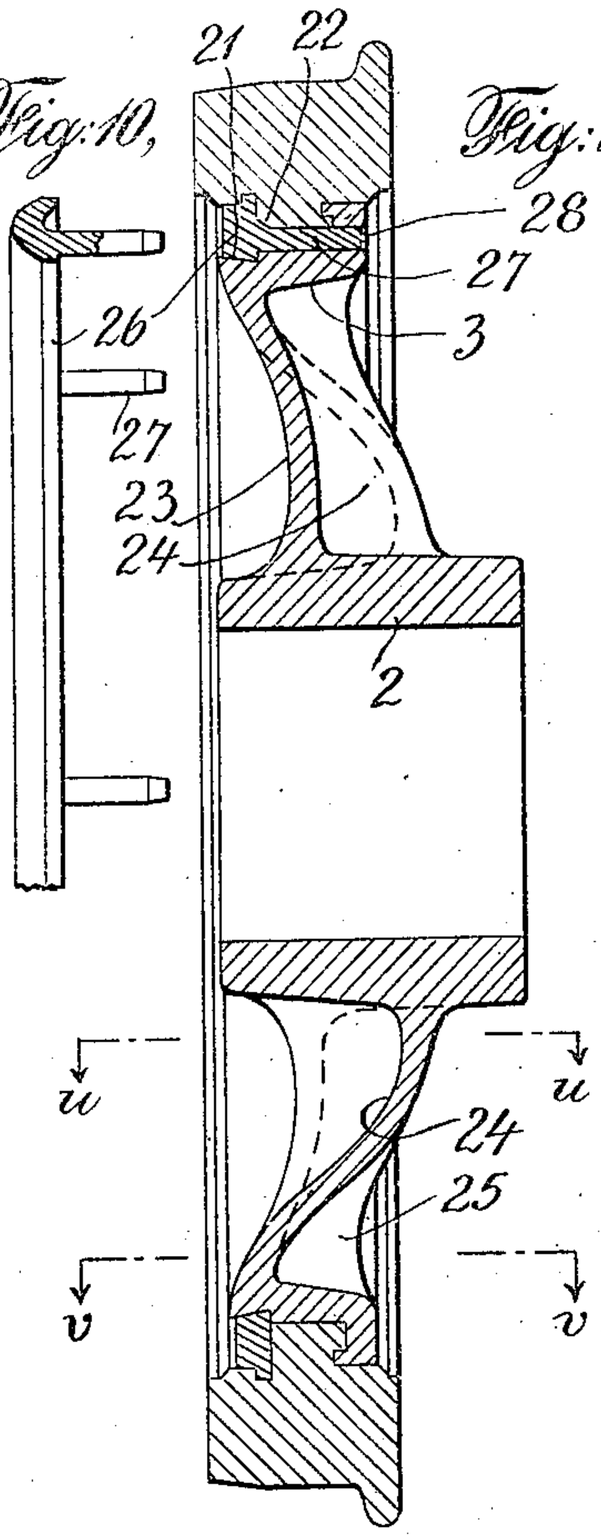

Fig: 9,

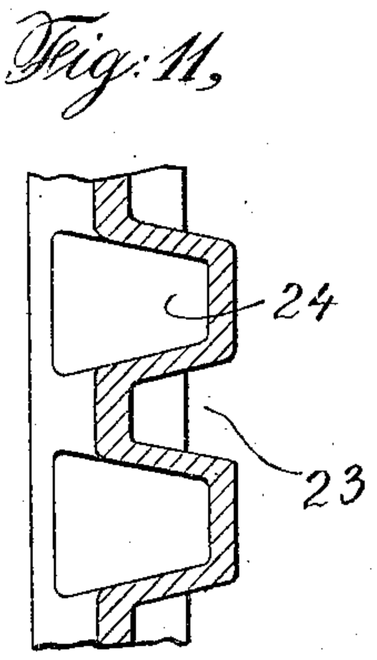

Fig: 11,

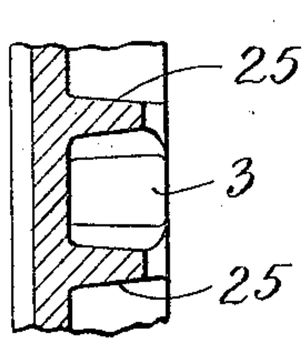

Fig: 12.

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UNITED STATES PATENT OFFICE.

FERDINAND E. CANDA, OF NEW YORK, N. Y., ASSIGNOR TO CANDA BROTHERS, OF NEW YORK, N. Y., A COPARTNERSHIP.

CAR-WHEEL.

934,885. Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed May 18, 1909. Serial No. 496,771.

To all whom it may concern:

Be it known that I, FERDINAND E. CANDA, a citizen of the United States of America, and a resident of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Car-Wheels; of which the following is a specification.

My invention relates to improvements in cast car wheels and comprises an improved construction whereby a car wheel center is produced having substantially the stiffness and strength of the "double plate" type of wheel, while practically as simple and easy to mold and to cast as the "single plate" type of wheel.

My invention comprises a novel arrangement of ridges or webs upon one side of the wheel, and corresponding grooves or recesses upon the opposite side of the wheel, whereby an extremely strong and stiff wheel center, which at the same time is very easy to mold and cast, is produced.

The objects of my invention are, to improve the construction of cast car wheels, and particularly the construction of the wheel centers, and to make the wheel very stiff and strong and at the same time easy to cast.

In the accompanying drawings I illustrate certain embodiments of my invention.

In said drawings: Figure 1 shows a rear elevation of a wheel constituting one embodiment of my invention. Fig. 2 shows a front elevation of such wheel. Fig. 3 shows an axial section of the wheel center on the irregular section line *w—w* of Fig. 1, and also shows the said wheel center provided with a rolled tire held on in the manner described in my patent application Sr. No. 473,002. Fig. 4 is a detail fragmentary side elevation and section of the keying ring employed for holding the tire in place. Fig. 5 shows a fragmentary developed transverse section of the wheel center on the line *x—x* of Fig. 3; and Fig. 6 shows a developed fragmentary transverse section of the wheel on the line *y—y* of Fig. 3. Fig. 7 shows a rear elevation of an alternative form of wheel; and Fig. 8 shows a front elevation thereof. Fig. 9 shows an axial section of said wheel center on the irregular section line *z—z* of Fig. 7, and also shows said wheel center provided with a tire held on in a manner set forth in my applications for Letters Patent Sr. Nos. 473,002 and 475,296. Fig. 10 shows a detail elevation and partial section of the form of keying ring illustrated in Fig. 9. Fig. 11 shows a fragmentary developed section of the wheel on the line *u—u* of Fig. 9; and Fig. 12 shows a fragmentary developed section of the wheel on the line *v—v* of Fig. 9.

It is immaterial, according to the present invention, whether the tread surface of the wheel be formed integrally with the wheel center, or whether the wheel be provided with a separately formed tire. For practical reasons, however, the separately formed tire is preferable, and for that reason I have shown, in Figs. 3 and 9, wheels provided with such separately formed tires.

Referring first to Figs. 1–6 inclusive, 1 designates a wheel center having a hub 2 and rim 3 connected by a plate 4 stiffened by rearwardly projecting hollow ribs 5 and by the further ribs hereinafter mentioned. These ribs 5 extend from the base of the plate 4, that is to say, from the hub portion of the wheel center, to near the rim portion 3 of the wheel, where they merge into the plate 4; the maximum depth of these ribs 5 being, in the construction shown, (though this is not essential), near the hub of the wheel. Upon the backs of these hollow ribs 5 are other ribs 6 extending from the hub 2 of the wheel center to the rim 3 of such wheel center; and at the point 7, nearly opposite where the corresponding rib 5 merges into the plate 4, each such rib 6 bifurcates, as shown particularly in Fig. 1, its two branches 8, 8 spreading out and merging into the rim 3. This rim 3 overhangs rearwardly, with respect to the plate 4, and the bifurcations 8, 8 support and stiffen the overhanging portion of the rim. By reason of the fact that the ribs 5 are hollow, they are, in effect, double ribs, the two sides 9 of each such rib 5 being each, in effect, a rib; and these two sides 5 being somewhat widely separated, the stiffening effect of each rib 5 extends over a relatively great portion of the surface of the plate 4, and imparts to the wheel center, in fact, nearly as great stiffness as if these ribs 5 were of the breadth illustrated, but were solid instead of hollow; while the wheel center is of course very much lighter than it would be if these ribs 5 were solid. The general direction of the backs of the ribs 5 being diagonal (with reference to the axis of the wheel) said ribs form, in

effect, diagonal braces to resist the severe lateral pressure to which wheels are often subjected, as for example, when rounding curves; and the ribs 6 at the backs of these ribs 5 further stiffen the wheel to resist lateral pressure, while at the same time constituting adequate supports for the overhanging portion of the rim. The wheel has the further advantage that, if viewed from the front, its surface is relatively smooth and unobstructed, and therefore the wheel is little likely to raise dust which, rising along the sides of the car under which the wheel is placed, can cause annoyance to occupants of the car; the pockets 10 within the ribs 5 being too small to cause the air to engage them materially during rotation of the wheel.

In the particular construction shown in Fig. 3, the wheel tire 11 is provided on its inner side with a rib 12 having in it a groove 13 within which fits a rib 14 formed on the wheel center 1, said rib 12 having in turn a rib 15 fitting within a groove 16 of the wheel center; the ribs 14 and 15 being therefore interlocked; and on the front side of the wheel a locking strip 17 is provided fitting within a groove 18 and having projecting ribs 19 and 20 fitting into corresponding side extensions of groove 18 in the tire and wheel center, whereby the locking strip 17 is prevented from separating from the wheel center. To prevent relative rotation of the tire with respect to the wheel center, notches 21 are provided at intervals in the wheel center, and corresponding notches 22 are provided at intervals in the wheel tire. As shown particularly in Fig. 4, the locking strip 17 is, in the first instance, a plain strip of approximately rectangular cross section, and in the construction of the wheel, after passing the tire over the wheel center, the locking strip 17, which has first been heated to a forging heat, is placed within the groove 18 and then, by pressure applied by suitable means, as for example, by a hydraulic press, said locking strip 17 is forced into the groove 18 and its metal is spread out by reason of the pressure applied to it, so as to form the ribs 19 and 20 filling the corresponding subgrooves in the tire and wheel center; and at the same time the metal of the strip fills the notches 21 and 22, so locking the tire and wheel center against relative rotation.

In the alternative construction of wheel center, shown in Figs. 7–12 inclusive, said wheel center comprises a hub portion 2 and a rim portion 3 and a plate, here designated by numeral 23, such plate being stiffened by hollow ribs, here designated by numerals 24. These hollow ribs 24 are of greater breadth, relatively, than the hollow ribs 5 of the wheel shown in Figs. 1–6 inclusive, so that the plate 23 in this form of wheel may be said to consist of a series of spokes. The overhanging portion of the rim 3 of the wheel is supported by ribs 25 extending nearly radially from the ribs 24, but slightly diverging, each rib 24 having on its rear side two of these ribs 25 separated somewhat widely.

In Fig. 9 I have illustrated an alternative form of locking strip for holding the tire in place on the wheel, comprising a strip 26 having dowel pins 27 adapted to project through corresponding apertures formed in the wheel center to the rear side thereof. This locking strip is applied in the same manner as the strip illustrated in Figs. 3 and 4, by heating it to a forging heat and then by pressure forcing it to fill the groove between the wheel center and tire; and at the same time, and by the same means, the ends of the dowel pins 27 are upset, forming heads 28. As in the construction shown in Fig. 3, notches 21 and 22 are formed at intervals in the wheel center and tire, which are filled by the metal of the locking strip, when the latter is pressed into place, so that the wheel center and tires are prevented from rotating relatively to each other.

One important advantage of the construction of wheel centers illustrated is, that all parts of the wheel are of nearly the same thickness, there being no thin metal webs and like extensions. This is particularly important when the wheel center is to be formed from steel.

As will be readily seen, the forms of the wheel centers shown are such that said centers may be cast in an ordinary mold formed by ordinary patterns and ordinary molding operations, and that no internal cores or the like are required; said wheel centers being practically as easy to cast as the ordinary single plate car wheel, while possessing, for equal weights, far greater strength and stiffness, and being far less likely to raise excessive dust than is the ordinary ribbed single plate wheel.

What I claim is:—

1. A metal wheel comprising a hub and rim, and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, said plate also provided with other stiffening ribs extending from said bosses to the overhanging rim and supporting the latter.

2. A metal wheel comprising a hub and rim, and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, the rear sides of said bosses extending diagonally, with reference to the axes of the wheel, said plate also provided with other stiffening ribs extending from

said bosses to the overhanging rim and supporting the latter.

3. A metal wheel comprising a hub and rim, and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, said plate also provided with other stiffening ribs located at the backs of the said bosses and extending from the hub along said bosses to the overhanging rim and supporting the latter.

4. A metal wheel comprising a hub and rim, and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, the rear sides of said bosses extending diagonally, with reference to the axis of the wheel, from the hub toward the plate and merging into the plate near the rim, said plate also provided with other stiffening ribs from said bosses to the overhanging rim and supporting the latter.

5. A metal wheel comprising a hub and rim, and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, the rear sides of said bosses extending diagonally with reference to the axis of the wheel, from the hub toward the plate and merging into the plate near the rim, said plate also provided with other stiffening ribs located at the backs of said bosses and extending from the hub along said bosses to the overhanging rim and supporting the latter.

6. A metal wheel comprising a hub and rim, and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, said plate also provided with other stiffening ribs extending from said bosses outward and bifurcated between said bosses and rim, the bifurcations extending laterally to the rim and supporting the latter.

7. A metal wheel comprising a hub and rim and a single plate connecting them, said rim overhanging said plate on one side, said plate provided with hollow projecting bosses forming stiffening ribs extending from the hub outward, the rear sides of said bosses extending diagonally, with reference to the axis of the wheel, from the hub toward the plate and merging into the plate near the rim, said plate also provided with other stiffening ribs extending from said bosses outward and bifurcated between said bosses and rim, the bifurcations extending laterally to the rim and supporting the latter.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FERDINAND E. CANDA.

Witnesses:

FRANK E. RAFFMAN,

H. M. MARBLE.