

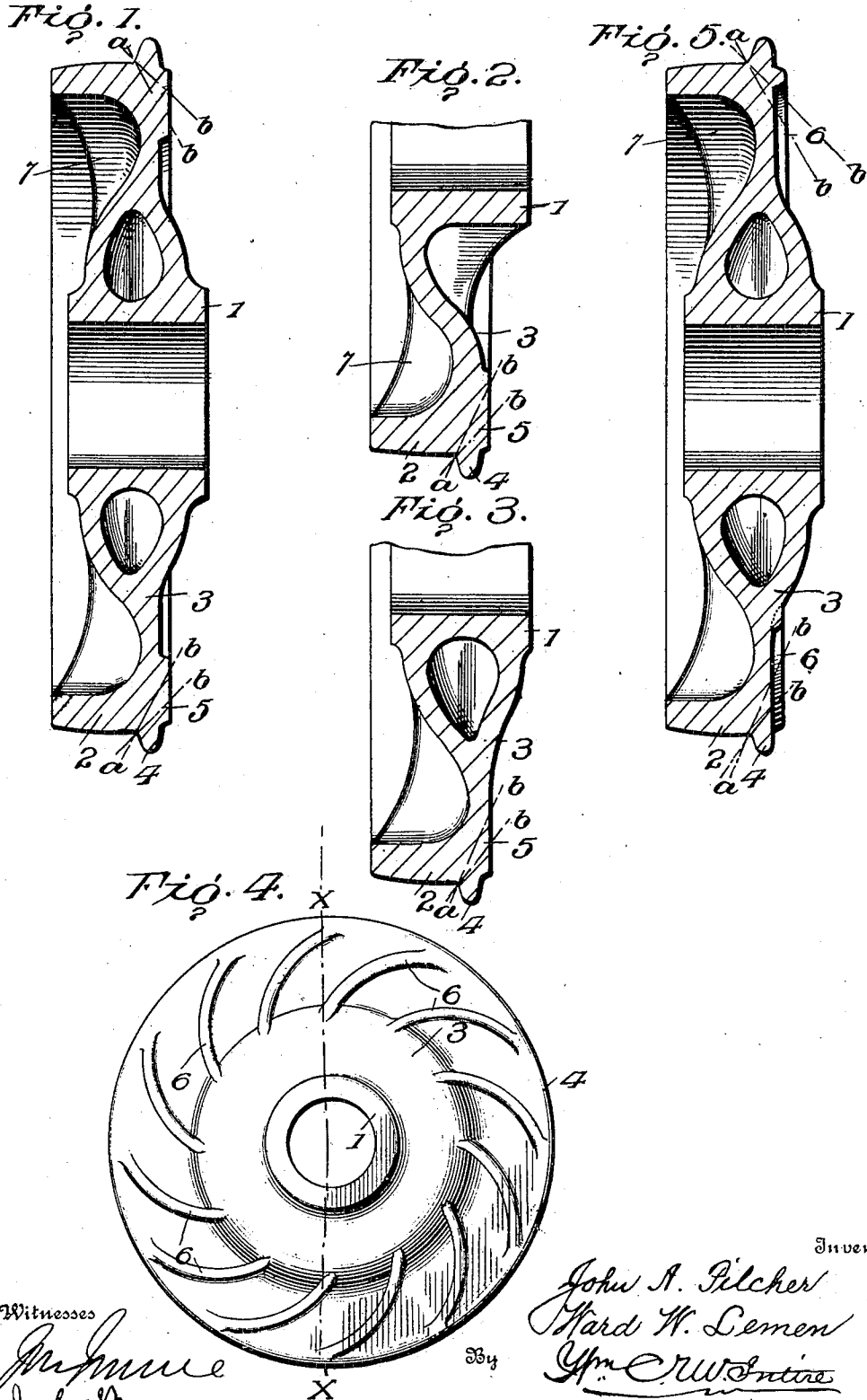
No. 830,363.

PATENTED SEPT. 4, 1906.

J. A. PILCHER & W. W. LEMEN.

CAR WHEEL.

APPLICATION FILED APR. 7, 1906.



Witnesses
J. C. Brown

Inventors
John A. Pilcher
Ward W. Lemen
Wm. C. W. Entire
Attorney

UNITED STATES PATENT OFFICE.

JOHN A. PILCHER AND WARD W. LEMEN, OF ROANOKE, VIRGINIA.

CAR-WHEEL.

No. 830,363.

Specification of Letters Patent.

Patented Sept. 4, 1906.

Application filed April 7, 1906. Serial No. 310,536.

To all whom it may concern:

Be it known that we, JOHN A. PILCHER and WARD W. LEMEN, citizens of the United States, residing at Roanoke, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Car-Wheels; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain new and useful improvements in flanged wheels for railroad-cars, particular reference being had to chilled cast-iron wheels.

It has for its object the production of a wheel with a much stronger flange than the wheel now commonly used in the same class of service for which this wheel is intended without materially increasing its weight. This is accomplished by so disposing of the metal used as to bring a large portion to that part adjacent the flange, thus lengthening the usual line of fracture or cleavage which occurs in connection with a broken cast-iron wheel-flange.

It is a matter of common knowledge and experience with those who use car-wheels that of wheel breakages causing damage the breakage of the flange is the most serious as well as the most frequent. This trouble with broken flanges has become very much more frequent and serious since the recent use of very large capacity cars. So serious is this question of flange breakage that some large owners are considering the question of the use of expensive steel wheels in the place of cast-iron.

The most obvious method of strengthening the wheel-flange would be to make it thicker. This, however, is prevented by the limitations already set by guard-rails, frogs, &c., which could not be changed without enormous expense and inconvenience.

Our observation of the fact that in every case of a broken wheel-flange the line of fracture or cleavage is not a line parallel with the tread, but a line more nearly normal to the tread, has lead us to the method hereinafter described of obtaining the strong wheel-flange within the limitation already set by the allowable flange thickness.

The deep chilling of the wearing-surfaces of cast-iron wheels is very desirable, as it adds much to the lifetime of the wheel. Our observations of broken flanges from chilled

cast-iron wheels have shown that the grain of the iron in chilling sets normal to the surface exposed to the chillers, rendering it much more easily broken than when not chilled. The desirably deep-chilled surface therefore renders the flange much more easily broken from the wheel than if it were not chilled. This direction of the grain of the chilled iron also largely influences the direction of the line of fracture or cleavage. Our invention overcomes this serious objection to the desirable deep chill by placing against it for support an abundance of strong unchilled gray iron. The observation of these same facts has brought about the method of strengthening the flange of the wheel by adding metal to the rim inside, toward the center of the wheel, of the tread-line and extending beyond the back of the flange, as illustrated in Letters Patent No. 788,677, dated March 2, 1905. The length of fracture or cleavage is in this case, however, largely limited by the thickness of the rim or tread section, the increase of which is entirely undesirable on account of the correspondingly large increase in the weight and cost of the wheel.

It is almost universal practice to make the treads of railroad equipment-wheels slightly conical. The purpose is to prevent the flanges of the wheels from rubbing against the rail when running on straight track in case there should be a slight difference in the circumference of the two wheels mounted rigidly on one axle, also to help in passing around a curve. This conical surface bears on top of a rail which has its top surface parallel with the center line through the axle. This localizes the pressure between the wheel-tread and the rail at a point on the wheel-tread close to the flange. This localizing of these stresses also has a large influence in the breakage of flanges from the wheels, as is readily seen from close observation.

Our invention so disposes of the metal used as to bring a large portion to that part of the wheel thus strained, and in this manner limits or prevents the flange failure or breakage from this cause.

Our invention is designed to accomplish the results and overcome all the difficulties as already recited. It consists, specifically, in extending the arch-plate or web of the wheel from the hub to that part of the rim opposite the flange and reinforcing the flange by a portion integral with the rim and arch-

plate or web and extending out beyond the back of the flange, as will be hereinafter and in detail described.

In order that those skilled in the art to which our invention appertains may know how to make our improved wheel and appreciate its advantages, we will proceed to describe its construction, referring by numerals to the accompanying drawings, in which—

Figure 1 is a central cross-section of what is known in the art as a "double-plate" wheel, having the usual core-openings and showing our improvement. Fig. 2 is a similar section of a wheel formed of a single web-plate and also embodying our improvement. Fig. 3 is a view similar to Fig. 1, but showing the web-plate itself projecting beyond the back of the flange. Fig. 4 is an inside elevation of a modification in which the reinforce to the flange is produced by extending brackets beyond the flange, and Fig. 5 is a cross-section on the line X X of Fig. 4.

Similar reference-numerals indicate like parts in the several figures of the drawings.

1 is the hub, 2 the chilled tread portion or rim, and 3 the web or arch-plate, whether single or double and all cast integral. The arch-plate or web 3 joins the tread portion or rim opposite the flange 4, as clearly shown in Figs. 1, 2, 3, 4, and 5, and constitutes a brace thereto.

5 is a circumferential reinforce back of the flange 4 and inside of the tread of the wheel. The broken lines *a b* indicate the somewhat-variable line of cleavage which occurs in the flange when broken and indicates the desirability and advantage of the reinforce 5, which necessarily increases or prolongs the cleavage-line, and consequently greatly decreases the liability of breakage.

In the construction shown at Fig. 3 the web or arch-plate at the point of juncture with the tread or rim section 2 projects beyond the flange and constitutes in itself the reinforce to the flange, substantially the same as the circumferential reinforce 5. (Shown in Figs. 1 and 2.)

On the inner side of the wheel brackets 6 may be provided to give additional strength, if desired, and 7 shows the brackets usually employed in car-wheel construction.

With the web or arch-plate extending from the hub to a point back of the flange, as shown, and with the reinforce projecting beyond the flange, it will be readily understood that the line of cleavage of the flange is extended without regard to the thickness of the rim or tread and that the wheel as a whole may be thus made very strong without materially increasing its weight. Consequently it does not become necessary, as would be the case in wheels of the usual construction, to thicken the tread-section in order to increase or lengthen the line of cleavage in the flange, which increased thickness would greatly in-

crease the weight of metal in the wheel and consequent cost.

In the modification shown at Figs. 4 and 5 the reinforce 5 is produced by the brackets 6, which can be either curved, as shown, or radial, or of any curved form terminating in a circumferential plane back of the flange and constituting separate reinforces at predetermined distances apart and which may in many cases be sufficient to produce the results sought, although we prefer either the construction shown at Figs. 1 and 2 or Fig. 3.

The web or arch-plate is shown attached to the rim in the usual location for wheels having the usual brackets on the inside; but it is attached at a point nearer the face of the tread than the inside of that portion of the rim opposite the flange, and hence, as will be readily seen and appreciated, the increased quantity of metal employed in the rim or tread section is located only at the point where it is needed to strengthen the flange and to lengthen or increase the line of usual fracture or cleavage, which occurs in case of a broken flange, without materially increasing the weight of the wheel or the corresponding cost.

We do not wish to be limited to any particular design or weight of wheel, as it may be varied in these respects without departing from the spirit of our invention, which resides in the broad idea of increasing or lengthening the line of cleavage of the flange by a circumferential reinforce below the tread of the wheel and integral the web or arch-plate to thus lengthen or extend the usual lines of fracture or cleavage.

Having described the construction and advantages of our improved wheel, what we claim as new, and desire to secure by Letters Patent, is—

1. A car-wheel formed of a single piece of metal having a rim constituting a tread-section; a flange on the rim; a web or arch-plate extending from the hub to a point opposite the flange; and means for reinforcing the strength of the flange, comprising a body of metal integral with the rim and web or arch-plate, and projecting beyond the back of the flange, substantially as hereinbefore set forth.

2. A car-wheel formed of a single piece of metal having a rim constituting a tread-section; a flange on the rim; a web or arch-plate extending from the hub to a point opposite the flange and terminating in, and forming a projection beyond the back of the flange, substantially as and for the purpose set forth.

3. A car-wheel formed of a single piece of metal, having a rim constituting a tread-section; a flange; a web or plate extending from the hub to a point opposite the flange; means for reinforcing the flange comprising a body of metal integral with the rim and plate and

projecting beyond the back of the flange; and a series of brackets on the side of the wheel and integral with the rim and plate, substantially as hereinbefore set forth.

5 4. A car-wheel formed of a single piece of metal, having a rim constituting a tread-section; a flange; a web or plate extending from the hub to a point opposite the flange; and means for reinforcing the flange comprising
10 a series of brackets integral with the rim and

plate, and projecting beyond the back of the flange, substantially as hereinbefore set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN A. PILCHER.

WARD W. LEMEN.

Witnesses:

C. C. THOMAS,

P. M. NOELL.