No. 869,514. PATENTED OCT. 29, 1907.

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

CAR WHEEL.

APPLICATION FILED APR. 7, 1906.

Fig. 1.

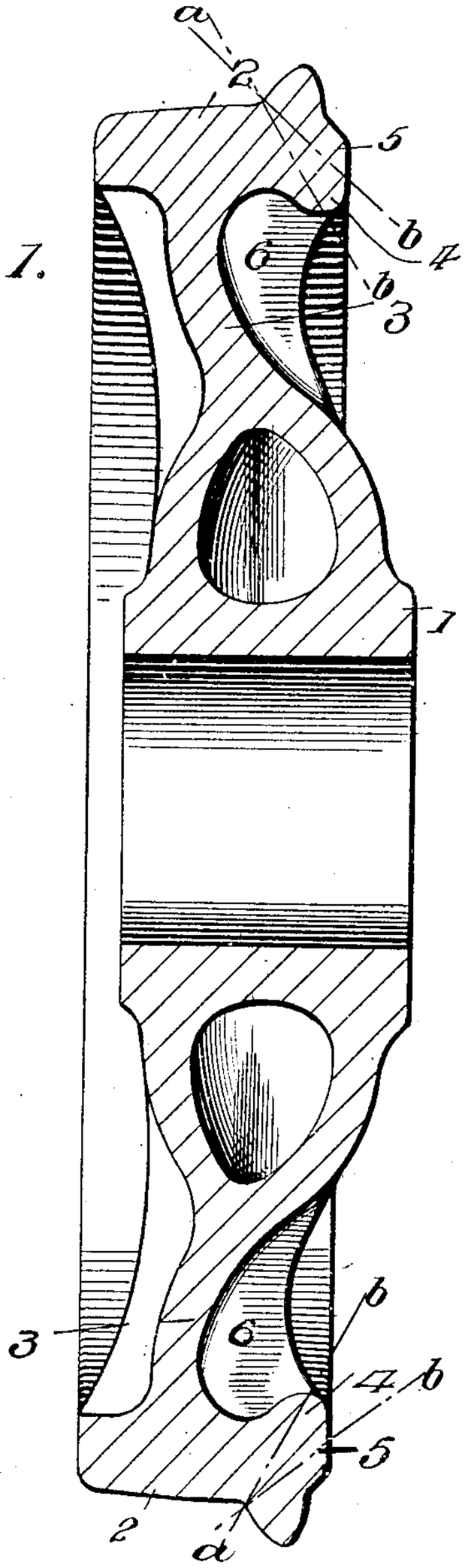
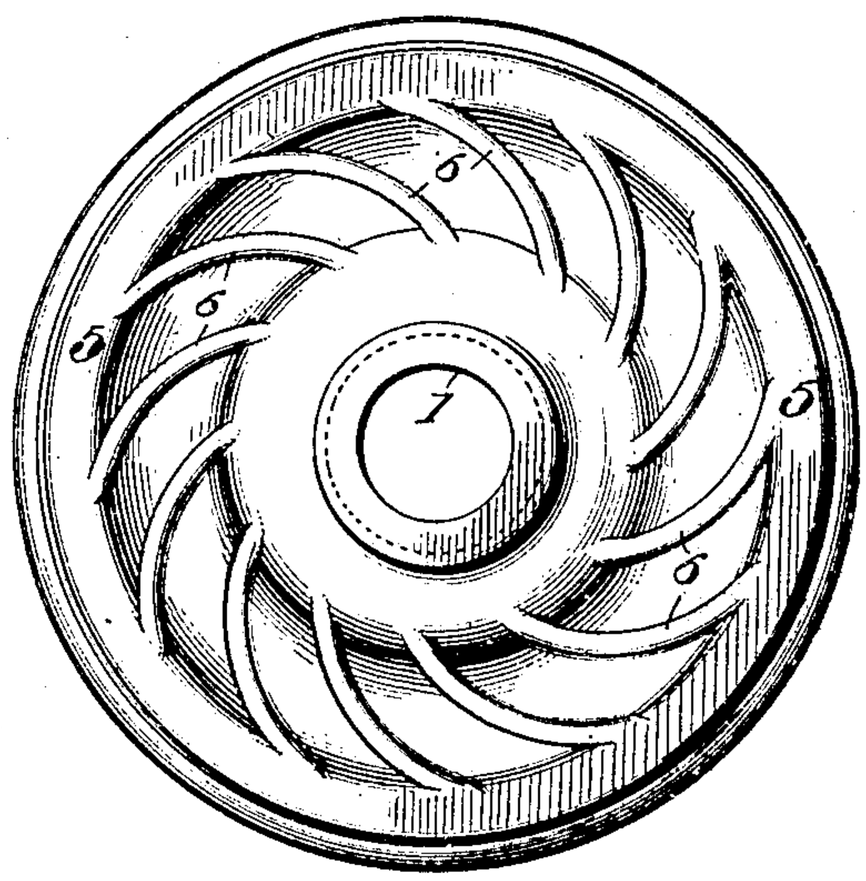



Fig. 2.

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# UNITED STATES PATENT OFFICE.

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

## CAR-WHEEL.

No. 869,514. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed April 7, 1906. Serial No. 310,537.

*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; particularly to that class of chilled cast iron wheels referred to in an application for Letters Patent filed by us concurrently herewith, upon which was issued Patent No. 830,363 dated Sept. 4, 1906.

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 by 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, etc., 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 led us to the method hereinafter described of obtaining the strong wheel flange within the limitations already set by the allowable flange thickness. The deep chilling of the wearing surface 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 desirably 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 the line 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 the 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 the 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 present invention while having the same generic objects in view as set forth in our co-pending application hereinbefore referred to, consists in increasing the thickness of the rim section at a point opposite the flange by a body of metal extending inwardly opposite the flange and outwardly beyond the back of the flange and integral with the rim or tread section, 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 fully appreciate its advantages we will proceed to describe the construction of the same referring by numerals to the accompanying drawing in which—

Figure 1 represents a central cross section of a wheel embodying our improvements, and Fig. 2 an outside elevation of the same on reduced scale.

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

1, is the hub of the wheel; 2, the chilled tread portion or rim; 3, the web or arch plate whether single or double, and extending in a curved line from the hub to a point opposite the tread, all cast integral. The web or arch plate and the thickened portion of the rim

or tread-section constitute an O—G curve as clearly shown at Fig. 1, and hence as will be readily appreciated the increased quantity of metal employed in the rim or tread section is located at the point only where it is desired to strengthen the flange and to lengthen or increase the line of usual cleavage which occurs in the flange, without increasing the weight of the wheel to any appreciable extent. We have shown the web composed of the ordinary double plate with the usual core opening, but it will be understood that our invention applies equally as well with the ordinary single or arch plate, and that the generic feature of our invention consists in strengthening or reinforcing the flange by increasing the thickness of the rim opposite the flange, and extending the body of metal inwardly opposite the flange and outwardly beyond the back of the flange, thereby lengthening or extending the usual lines of fracture or cleavage. The rim or tread section 2, is thickened at a point opposite the flange by a body of metal extending inwardly as indicated at 4, and outwardly beyond the back of the flange as shown at 5, and which is cast integral with the web or arch plate 3, the rim or tread-section 2, and the ordinary brackets 6.

While our present invention as heretofore stated has substantially the same aims and objects in view as the construction shown and described in our co-pending application referred to, it will be understood that in the present case our invention is not limited to any particular form or condition of the web or arch plate or the character or location of the brackets, although the presence of the latter may materially coöperate to produce the results aimed at, but that our invention resides in the broad idea of lengthening or extending the usual lines of fracture or cleavage of the flange without increasing the thickness of the rim or tread section except inwardly opposite the flange and outwardly beyond the back of the same without materially adding to the weight or cost of the wheel.

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

1. In a car-wheel such as described, the flange strengthened by a body of metal extending inwardly opposite the flange and outwardly beyond the back of the flange and integral with the rim or tread-section, substantially as shown and described.

2. In a car-wheel such as described, the flange strengthened by a body of metal extending inwardly opposite the flange and outwardly beyond the back of the flange and integral with the rim or tread-section, and a web or arch plate extending from the hub to the rim at a point in front of the flange, substantially as shown and described.

3. 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 point opposite the tread and means for reinforcing the strength of the flange, comprising a body of metal at the inner portion of the rim, extending inwardly opposite the flange, and outwardly beyond the back of the flange, substantially as and for the purpose set forth.

4. 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 tread; means for reinforcing the strength of the flange, comprising a body of metal at the inner portion of the rim extending inwardly opposite the flange and outwardly beyond the back of the flange, and brackets extending from the web or arch plate to the reinforce of the flange, substantially as shown and described.

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:
ROBERT H. PERSINGER,
FRANK WELCH.