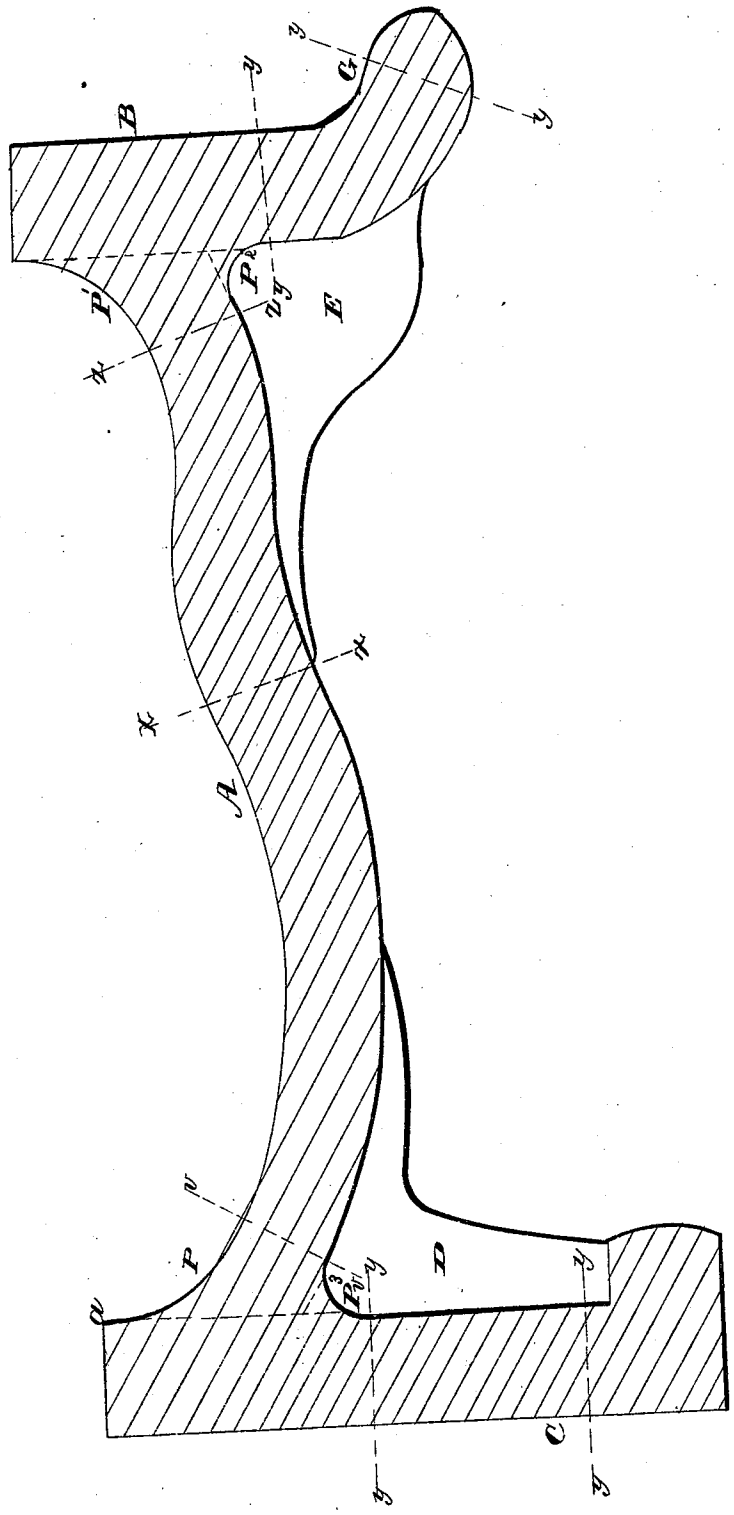
J. M. ROSS.

Car Spring.

No. 16,851. Patented Mar. 17, 1857.



UNITED STATES PATENT OFFICE.

JAS. M. ROSS, OF SPRINGFIELD, MASSACHUSETTS.

CAST-IRON CAR-WHEEL FOR RAILROADS.

Specification of Letters Patent No. 16,851, dated March 17, 1857.

To all whom it may concern:

Be it known that I, JAMES M. Ross, of Springfield, in the county of Hampden and State of Massachusetts, have invented a certain new and useful Improvement in Constructing Cast-Iron Railroad-Car Wheels with a Chilled Rim, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing of the same, which represents a transverse section taken centrally through a wheel embracing my improvements.

The object of my invention is to give such a form and distribution of metal to the wheel as will preserve the natural strength and elasticity of the iron, and overcome the usual strain consequent upon an unequal cooling of the wheel after being cast by equalizing the opposing forces; this being accomplished by gradually increasing the thickness of the disk as it recedes from the hub and tread of the wheel until it shall be equal to that of either of the former, the effect of which is to cause the three to cool evenly and simultaneously, even if exposed to cool in the open air at a white heat after being cast, a result which has never before been attained.

I am aware that John M. Sigourney, of Watertown, in the county of Jefferson and State of New York, has a patent granted Oct. 21st, 1856, claiming to have accomplished the same result, namely, to construct a wheel so as to produce simultaneous cooling and hence prevent the unequal contraction in cooling after being cast; I wish to call the attention to the difference between the two modes of construction; Sigourney makes his disk straight, I make mine slightly waved or corrugated; Sigourney makes his disk of even thickness, I make mine of unequal thickness it being from one fourth to three eighths of an inch thicker about midway between the hub and tread than the thinnest point at the hub some nearer the tread than the hub as hereinafter described to compensate for the chill of the former. Sigourney runs his ribs or braces across his disk thereby tieing the plate making it perfectly stiff and rigid, a principle that I have taken every precaution to avoid by the peculiar shape and principle of my braces as applied and for the purposes hereinafter described; again he makes his tread thicker than the disk or the hub, I make the thickest part of my disk the hub and tread one and the same thickness. There are two things between us that are alike, a reduced hub and a single plate neither of which do I claim as new, but our general mode of construction is broadly different when reduced to practice.

To enable others skilled in the art to make, construct and use my invention, I will now proceed to describe its construction in detail. The wheel is formed of a single plate (A) having the ordinary chilled rim (B) and flange (G); this plate (A) may be made of a slightly waved or corrugated shape, as that form is better calculated to assist in relieving it of a portion of the strain exerted upon it by the expansion and contraction of the metal in cooling; but as the tendency of the plate when of an even thickness on casting the wheel is to cool and become set quicker about its middle than either the tread or hub, it is therefore liable to fracture at that point on cooling; to remedy which I gradually thicken it, commencing near its point of connection with the hub and rim of the wheel, until the thickness of the metal at or about the point of termination of the braces that support the flange and tread shall be equal to either the hub or rim, so that the three shall cool simultaneously, and by this means remove the strain from the middle of the plate, as its temperature will be equal to that of the others. The point of greatest thickness is located slightly nearer the tread than the hub in order to compensate for the chill of the former varying from an inch and a half, to two inches and a half, but as a general thing about two inches when of this diameter which is thirty three inches the size most commonly used, measuring from the outside line of the disk, and about one and a half inches for a thirty inch wheel, and about two and a half inches when the wheel is thirty six inches in diameter, as circumstances may require. The thirty six inch wheel is seldom used, but when I wish to construct a thirty or thirty six inch wheel I distribute the metal proportionally the same as I have described for a thirty three inch wheel which any one skilled in the art can easily do.

The red line x, x, represents the point of greatest thickness of the disk, it being at that point equal to that of the hub or tread as shown by the red line y, y; with the exception of those parts that form the points

of connection between the disk, the hub and tread, which being curved to obtain the requisite strength necessarily requires an increase of metal, hence an increase of heat at the junctions, which is obtained and compensated for by gradually diminishing the thickness of the disk upon each side as it recedes from the line x, x, to the line v, v, and z, z, at which point they again gradually increase to form the curved connections r, r', r^2, r^3; the conduction of the heat from the increased mass of metal at the curves and into the diminished mass of the disk has a tendency to make them cool simultaneously.

The line v, v, represents the thinnest point of the disk between the line x, x, and the hub, it being from one fourth to three eighths of an inch less than at its thickest point X, X, which as a general thing is deemed sufficient to yield the necessary mass of metal to form the curved connections and compensate for the increase of heat at the junction, and less than the thinnest part of the disk at its point of junction Z, Z, with the tread by the sixteenth part of an inch, because of the usual dishing of the hub (half an inch) which requires a greater mass of metal to form the curve (r) from its outer edge (a) than is necessary for the shorter curve (r') of the tread. In this instance the wheel represented in the drawing shows the disk at its thickest point X, X, the hub and tread as being one and five sixteenth parts of an inch in thickness; and through the lines v, v, and z, z, the thinnest points of the disk, and from which its graduation commences, as being one and one sixteenth, and one and one eighth parts of an inch respectively. A wheel constructed upon this principle will effectually remove all strain upon the disk at or near its center, as it causes the whole to cool simultaneously, by which a wheel with a chilled rim may be cast and exposed to cool in the open air without danger of being ruptured or broken.

Between the flange of the rim (B) and the plate (A) are cast a series of braces (E) (for the support of the flange and tread which are exceedingly liable to get broken) of a peculiar form having a long tapering point partaking somewhat of the shape of the front part of the human foot, so that while they shall act as a support to strengthen the flange and tread, they shall not be so stiff as to prevent the plate (A) from accommodating itself to the opposing forces brought into action on the cooling of the wheel. Around the hub are also cast a series of braces D, shaped and operating in the same manner and for a similar purpose as the braces (E).

I claim nothing in Mr. J. M. Sigourney's mode of constructing his wheel; but

What I do claim as new and desire to secure by Letters Patent is—

My mode of constructing the plate (A) viz, by gradually increasing the thickness of the disk as it recedes from the hub and tread of the wheel in the manner and for the purposes substantially as described.

In testimony whereof I hereunto set my hand this thirtieth day of January A. D. 1857.

JAMES M. ROSS.

Witnesses:
G. W. McLane,
W. Leski.