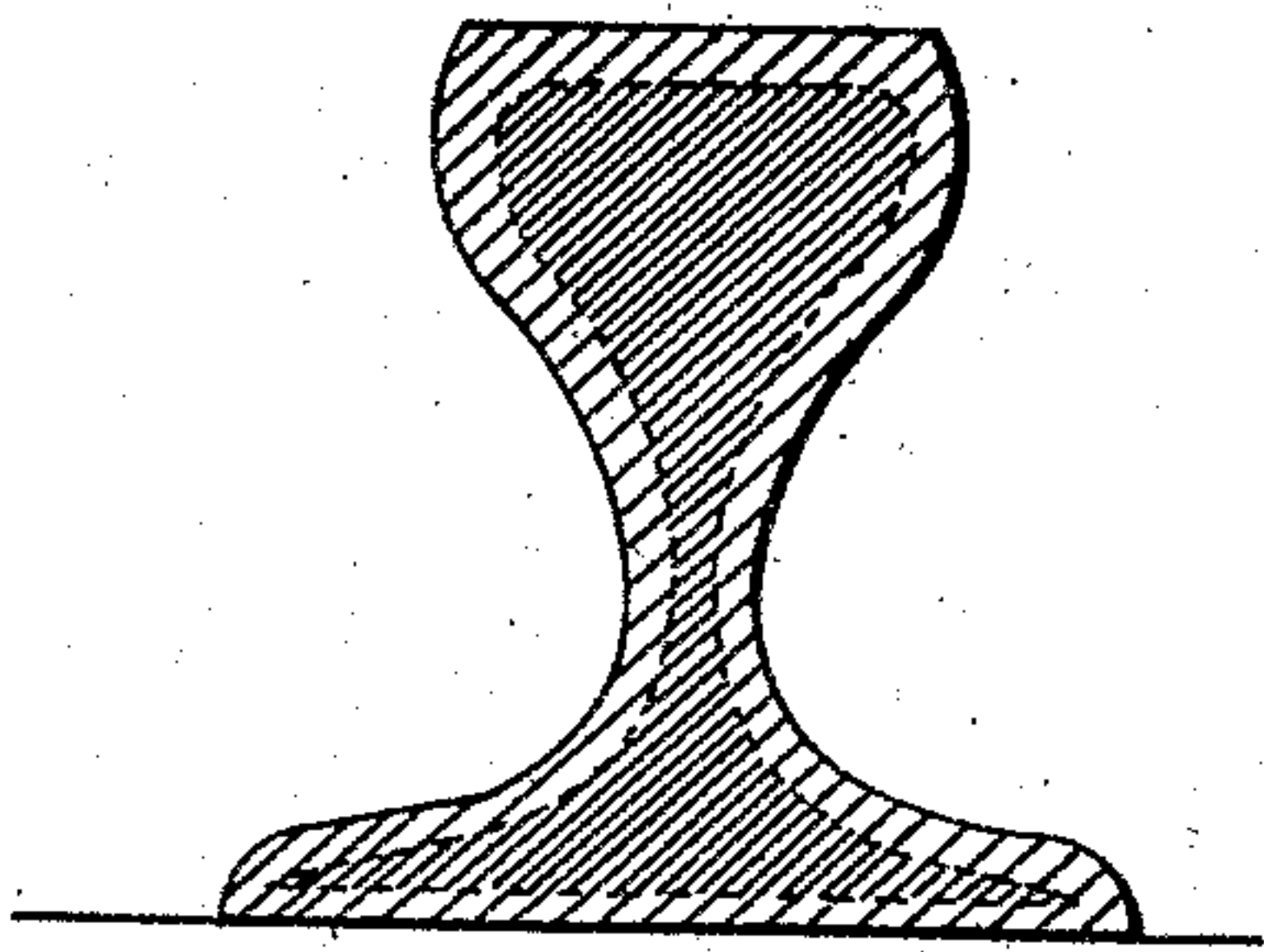


*J. Myers, Jr.,*

*Railroad Rail.*

*No. 89,425.*

*Patented Apr. 27, 1869.*



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# United States Patent Office.

JAMES MYERS, JR., OF WILLIAMSBURG, NEW YORK, ASSIGNOR TO THE BARRONS  
PATENT-STEEL MANUFACTURING COMPANY.

*Letters Patent No. 89,425, dated April 27, 1869.*

## IMPROVED STEEL-SURFACED RAILROAD-BAR

The Schedule referred to in these Letters Patent and making part of the same

### *To all whom it may concern:*

Be it known that I, JAMES MYERS, JR., of Williamsburg, Kings county, New York, have invented a new and improved Railroad-Bar; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

The figure is a cross-section of my improved rail, or railway-bar.

The nature of my invention consists in constructing a rail, or railway-bar, such as is used for the track upon which railway-locomotives and cars are ordinarily moved, in such a manner that the rail, or parts of the same, shall consist of an interior core, of ordinary wrought or malleable iron, and an outer envelope, of steel, formed from a homogeneous bar of wrought or malleable iron, by the conversion of the outer portions of such bar into steel, by chemical processes.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation, after first setting forth the state of the art at the time of the making of my invention.

It is well known that it has for a long time been a desideratum in railroad engineering to obtain a rail which should possess the toughness or difficulty of rupture, which is found in malleable or wrought-iron, and which at the same time should have the hard and resisting wearing-surface which might be found in a steel rail.

The expense of a rail composed wholly of steel, has been a serious objection to its introduction, while there is no advantage in having the merely supporting portions of the rail composed of a harder metal than malleable iron, the steel portions being required only for the parts of the rail subjected to wear.

To remedy this difficulty various devices have been conceived and tried, for constructing the rail, in such a manner that the supporting portions should be composed of wrought or malleable iron, and the wearing portions should be composed of steel.

In the construction of rails of this kind, the steel portions have invariably been united to the malleable-iron portions of the rail by riveting, or welding, or by some other mechanical means.

Such rails, known in the arts, as steel-headed rails, notwithstanding the recent improvements in their construction, are liable to great objection, from the difficulty of welding on the heads, and from the liability of the separation of the steel heads from the iron, under the prolonged and irregular hammering produced by the wheels of railway-trains.

Even if perfect welds should be obtained, which appears to be doubtful, the cost of these rails must be intermediate between that of the iron rail and the

steel rail, a cost too great for their adoption on ordinary railways.

By employing the new processes for converting iron into steel, secured by patents to Thomas J. Barron, of January 1, 1867, and to John F. Boynton, dated July 16, 1867, and reissued December 1, 1868, I was able to convert, with great rapidity and economy, bars of iron, either wholly into steel, or to convert the exterior portions of such bars into steel, to any depth required, leaving the cores or interior portions in the original condition of wrought or malleable iron.

This led me to conceive that by the application of these or analogous processes, homogeneous railway-bars, of wrought or malleable iron, could be converted into steel at their surface, and to any required depth from such surface, leaving the interior of the bar unchanged; and that a rail so produced, would possess advantages over all others before made in cheapness of construction, and in the impossibility of separating the steel from the iron portions, by any mechanical force.

Having perfectly succeeded in this experiment, I will proceed to describe the method which I have adopted.

Railroad-bars, of any desired form, are placed in a refractory retort, of suitable length, capable of being surrounded by a flame of heated gas, so that the contents of the retort may be brought, when heat is applied, by any suitable device, to a white heat, or thereabouts.

Gases, surcharged with carbon, by being passed through a carbonizing-vessel, and then enriched by being mixed or combined with the vapors of hydrocarbons, or gases produced by any of the processes described in the patents granted to John F. Boynton, dated July 16, 1867, and reissued December 1, 1868, and to Thomas J. Barron, dated January 1, 1867, are introduced into the retort aforesaid, and passed over and around the heated railway-bars, converting the outer portion of such bars into steel, the conversion proceeding progressively inward, as the process is continued.

It may be continued until the bar is converted throughout into steel; or it may be continued just so long as is required to give the desired thickness to the exterior envelope of steel, the interior portions of the bar remaining unchanged.

Although I am not aware of any process by which the exterior portions of the iron rails may be converted into steel so cheaply and effectually as by the process above described, as the essence of my invention does not consist in the process, but in the production of a rail of new construction.

I do not limit myself for the conversion of the exterior portions of such rails into steel, to any particular process, nor to the use of any particular gas, nor



even to gas alone, as it may possibly be found advantageous to effect such partial conversion through cementation by direct contact of solid carbon.

The process of the conversion of the outer portions of the bar into steel may be applied at any stage of the rolling-process to which the bar is subjected, and after the steeling-process, the bar may be subjected to one or more rollings, to give the desired fibre to the steel.

I do not limit myself to any particular sectional form of rail, and it is obvious that material modification in the forms of rails will be induced by the practical application of the principle of this invention.

The thickness of the steel envelope must be governed by the requisites demanded for different roads.

It is not necessary that the whole exterior of the rail should be converted into steel; the bearing portions of the rail, if desired, may be protected by suitable devices from being converted.

The advantages of this rail are, the great economy of its production, the capacity of applying the steel to the iron, at the points where it will be most effectual, and the impossibility of separating the steel from the iron portions of the rail by any mechanical means.

Having thus described my invention,

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

A rail, or railway-bar, so constructed that the rails, or parts of the same shall consist of an interior core, of wrought or malleable iron, and an outer envelope of steel, of any desired thickness, formed from a homogeneous bar of wrought or malleable iron, through the conversion of the outer portions of such bar into steel, by chemical processes, as and for the purpose set forth.

JAMES MYERS, JR.

Witnesses:

FRANK BLOCKLEY,  
JAMES T. GRAHAM.