



# UNITED STATES PATENT OFFICE.

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## RAILROAD-RAIL.

No. 835,062.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed April 24, 1905. Serial No. 257,136.

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

Be it known that I, WILLIAM GOLDIE, a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Railroad-Rails; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to railroad-rails, its object being to provide a rail of a high degree of stiffness to sustain the loads to which the tracks are now subjected through the increased weight of locomotives, cars, and the loads carried therein and the increased speed of trains.

It has for its further object to provide a rail which can be rolled practically free from the internal strains developed in the rail-sections at present in use and also practically free from liability to curve or camber.

As the weight and speed of trains have increased in late years, railroads have endeavored to provide a rail stiff and strong enough to sustain the same by the employment of heavier rails having wide base-flanges to rest upon the ties; but practical difficulties have been met with in the development of these wide base-flanges and in the rolling of the rails with heavy practically square bulky heads. In the development of the desired width of rail-base the metal has been rolled thin, and as this thinner base cooled more rapidly than the bulky rail-head there was great liability of the whole body of the rail curving or being thrown on a camber in cooling, which would develop internal strains, and such rail was necessarily straightened under powerful presses which increased the internal strains. On account of the internal strains there is also liability to the development of cracks in the rail-base when in use, which gradually run up into the rail body and head, such cracks being the main source of broken rails and the many accidents caused thereby. These difficulties prevented the employment of a relatively high percentage of carbon, manganese, or of other hardening element in the steel from which the rails were rolled, and for this reason and because of the annealing of the heavy bulky rail-head the rails wore very rapidly, their life being shorter than the rails of smaller section, which were, however, too light to carry the heavy loads of the present day. Where the percentage of carbon, &c., was increased to give greater hardness to the rail-surface, it

was found that the liability to rail breakage and accident was increased, and the cracking developed in the thin flanged portions of the rail-base would extend more quickly through the rail-body under the jars and blows of the passing train. By my invention I am enabled to provide a rail in which practically all these difficulties are overcome.

It consists, generally stated, in a railroad-rail having a web portion, a head and a rail-base, the body of said rail-base having a flat lower face and being formed with thick edge portions of greater thickness than one-eighth the width of the rail-base, as hereinafter described.

The accompanying drawing shows a vertical cross-section of a rail embodying the invention, together with the supporting-chair or base-bar preferably employed therewith.

The invention may be employed with any suitable form of web portion 2 and rail-head 3 and with any suitable rail-support 5, in which the base portion 4 rests.

The rail-base 4 is provided with the flat lower face 8 and the thick edge portions 9, which in the preferred construction are formed with vertical side faces, as illustrated, and the rail-base has the slightly-inclined top faces 10 connecting said thick edge portions with the web 2 by means of fillets 11.

As illustrated in the drawing, the base of the rail is made of a width a little over five times the thickness of the edge portions, it being found that when such edge portions are thickened up the rail-base can be reduced in width. It is preferred that the width of the rail-base shall not be greater than eight times the thickness of the edge portions. Variations within these limits can of course be employed. Such construction provides edge portions of sufficient thickness and strength to overcome any tendency to the development of cracks in use. In rolling a rail of this section it will be seen from the drawing that as the rail-head and rail-base are made to contain substantially the same bulk of metal, while the rail-head may be made of proper form to support the wheels of the rolling-stock and the rail-base of proper form to rest upon a supporting-base bar or chair, the two sections are of such general similarity that they can be rolled without the development of great internal strain in the rail-body and while applying such work to the rail-head as to toughen and harden the same, while the rail head and base

will cool at substantially the same rapidity and liability of the development of internal strains or the curving or cambering of the rail in cooling is overcome. The rail-base above described may be employed with the thick practically square rail-heads now usually employed or of any other suitable form of rail-head, and the rails are easier to roll than the standard rail-sections, because the edge portions of the rail-base are not spread out nor their thickness reduced to anything like the same extent as required in the development of the thin wide flange, while the base itself is so reduced in width as to resemble more closely the head portion of the rail. In proportion as the rail-base and head approach each other in form the difficulty of formation of internal strains or cambers in cooling is of course overcome. With said rail-sections any suitable form of support, such as a chair or a rail supporting bar, may be employed. I have illustrated in Fig. 1 the rail-supporting bar forming the subject-matter of a separate application of even date herewith, Serial No. 257,138, in which base-bar the seat 12 is made to conform to the flat lower face of the rail-base, while the edge faces 13 of said seat conform to the thickened edge portions 9 of the rail-base, so that the rail-base can fit properly within the seat of the rail-support, and the rail can be held therein by any suitable fastening devices—for example, the clips 14, as illustrated in the drawing. The same section may be employed for separate chairs on each tie. For use with such rail-support I prefer to form the body of the rail-base practically square—that is, with flat base and vertical sides—and to form the seats of the rail-supports corresponding in shape, so that the rail when seated therein cannot be forced out from such seats by lateral strain, and the rail and support form practically one combined rail, as

described in an application of even date herewith, Serial No. 257,137. The rail may also be employed with the form of continuous base-bar set forth in Letters Patent No. 785,523, granted to me April 20, 1904, the rail being secured thereto by spiking. It may also be employed with any suitable form of chair.

The rail illustrated has many advantages over the ordinary rail-section in that it provides for the rolling of both head and base freer from strain, because of their similarity of form, so preventing to a large extent the development of internal strains either in rolling or in cooling, while liability to cracking of the edges of the rail-base, the chief source leading to rail breakage, is overcome on account of the employment of the thick edge portions of the rail-base. As the main source leading to the cracking of the rail-body is overcome, it is also clear that the rail may be rolled from steel having a higher percentage of carbon or other hardening elements, and therefore a rail produced having much higher wearing qualities than the present standard section of rail without so great fear of breakage, while the rail itself, even if not set in a suitable supporting base-bar, can be made sufficiently stiff and strong to carry heavy loads.

What I claim is—

A railroad-rail having a web portion, a head and a rail-base, the body of said rail-base having a flat lower face and being formed with thick edge portions of greater thickness than one-eighth the width of the rail-base.

In testimony whereof I, the said WILLIAM GOLDIE, have hereunto set my hand.

WILLIAM GOLDIE.

Witnesses:

JAMES I. KAY,  
ROBERT C. TOTTEN.