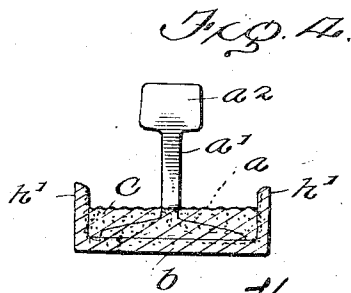
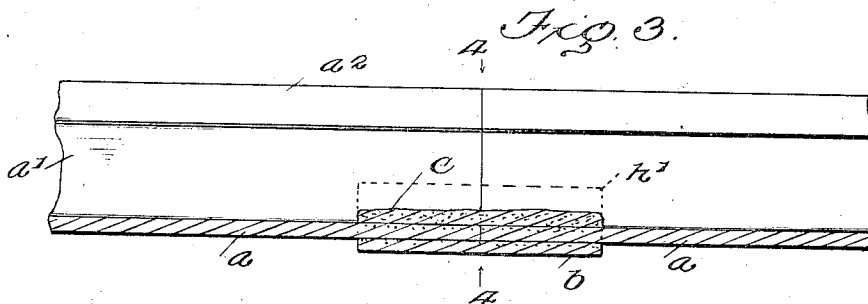
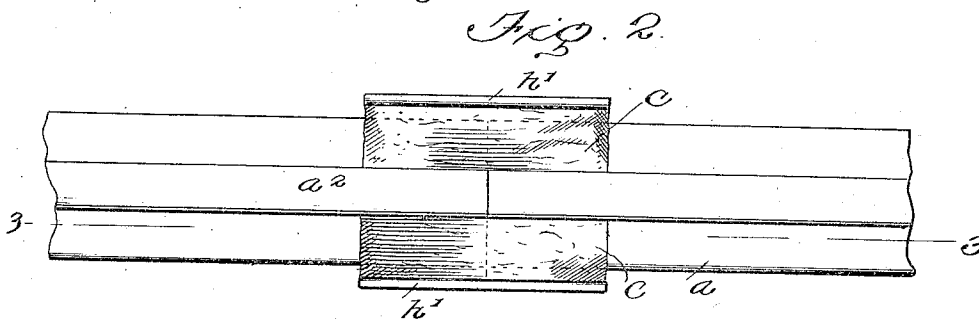
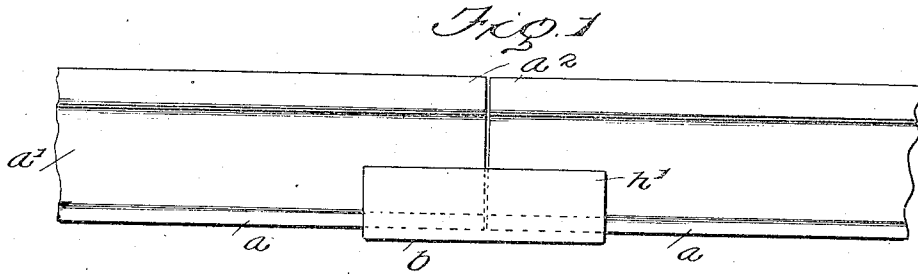


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CONTINUOUS RAIL JOINT.
APPLICATION FILED JUNE 30, 1909.

952,904.

Patented Mar. 22, 1910.



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CONTINUOUS-RAIL JOINT

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952,904.

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To all whom it may concern:

Be it known that I, HEINRICH ERNST HOFF, a subject of the Emperor of Germany, residing at Koblenz, Province of the Rhine, Germany, have invented certain new and useful Improvements in Continuous-Rail Joints; and I 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.

This invention relates to certain improvements in continuous rail joints, and the objects and nature of my invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawings illustrating what I now consider my preferred embodiment from among other methods and structures within the spirit and scope of my invention.

It is an object of my invention to so unite the base portions of the meeting ends of rails as to produce an improved continuous rail joint wherein the rail heads will not be directly united but will retain their original formation, temper and density or other desirable characteristics while the foot or base portions of the meeting rail ends will be permanently or integrally united by welding or fusing by a simple and economical method which can be easily performed after the rails have been laid.

The invention consists in the method and structure more fully and particularly pointed out and described hereinafter.

Referring to the accompanying drawings:—Figure 1 is a side elevation of the meeting ends of a pair of rails showing the base or fish plate applied thereto before the fusing heat is applied. Fig. 2, is a top plan view, showing the joint after the top reinforcing bodies have been applied and fused. Fig. 3, is a longitudinal section on the line 3—3, Fig. 2. Fig. 4, is a cross section on the line 4—4, Fig. 3, and showing the completed joint.

In the drawings, I show the meeting ends of a pair of railway rails, such for instance, as the steel rails of an electric railway. Each rail is of any ordinary or desirable construction or formation and is illustrated of conventional form with the base or foot a , the usual vertical web a' , and the top head a^2 .

b , is a metal base, foot or fish plate ar-

ranged beneath and longitudinally of the rail ends with the rail base resting thereon and meeting about at the center of said plate. The plate can be of any suitable shape, form and dimensions, but should be the necessary thickness, strength and material (iron for instance) to form the joint of the desired rigidity and durability to sustain the strains and stresses of the work to be carried thereby. In the specific example illustrated, I show this plate greater in width than the rail bases so as to project laterally beyond the rail bases, and at its outer longitudinal edges formed with longitudinal vertical flanges b' , although I do not wish to so limit the broad features of my invention.

c , are metal reinforcing bodies of iron or other suitable metal arranged between the webs of the rail ends and the flanges b' , of the chair or base plate and resting longitudinally and about horizontally on the upper faces of the rail bases, and bridging the joints or meeting edges of the rail bases. Two reinforcing bodies are usually arranged at each joint and on opposite sides of the rail webs.

In the completed joint uniting the rail ends, the feet or bases of the two rail ends, the rail chair receiving the same, and metal bodies laid on said rail feet and bridging the junction between the same, are all melted or fused together, or are welded together, using the term "welded" in its broad sense without being limited to the use of welding pressure. The rail feet, chair and reinforcing bodies are fused together into a practically homogeneous integral mass, but the meeting rail end surfaces are otherwise separate and disconnected above said mass.

In practicing my invention, I usually scratch or clean the bases or feet of the meeting rail ends by any suitable means to remove rust and dirt, and locate the chair or base b , under the rail ends about as shown in Fig. 1, with the rail ends spaced apart, say about one sixteenth of an inch.

By the formation of an electric arc through the medium of suitable agencies and in a manner well understood by those skilled in the art, and restricted to the rail bases, and the plate or chair b , beneath said bases, I then fuse or weld together the rail bases and said chair, while maintaining the rail heads cool by artificial means or by the re-

striction of the welding or fusing temperature to the areas to be welded, that is to the rail bases and the base plate. While at present advised by experience I prefer to employ an electric arc for producing the temperature desired, yet other means might be employed for producing the fusing, melting or welding temperature to which only the feet of the rails are exposed in connection with the base plate while the rail heads are protected by the atmosphere or otherwise against such temperature as will deleteriously change the density, temper or nature thereof. While the electric fusing arc is established and usually after the rail feet ends and a base plate have been thus fused, metal rods (of soft iron, if so desired) are laid on the rail feet and across the junctions between the same and are melted or fused to permanently weld the same to the rail feet or to the mass of metal on which said rods are laid; such fusing temperature being so applied to said metal bodies as to protect or remove the rail heads from fusing or injurious temperature. These rods or metal bodies are usually dropped one at a time onto the bases of the two rail ends and between the chair flanges h' , and the rail webs a' , and are melted down, and a sufficient number of such rods or bodies are melted or fused on the rail bases to form the reinforcing plates overlying the rail ends between said flanges and webs.

The rail ends should be spaced about one sixteenth of an inch (more or less) apart, before the application of the fusing heat. During the fusing process the rail feet will expand, but the fused mass in cooling will draw the end faces of the rail heads tightly together and thus maintain the unbroken continuity of the top surfaces of the rail heads. This contraction of the fused mass in cooling is so strong that if the rail heads are placed together in contact before application of the fusing head, the contraction of the fused mass or cooling will cause the rail heads to bulge up at their meeting ends. This fact is taken advantage of in uniting old rails having their heads worn or flattened at the ends, as such rails can be so united as to cause up-

ward bulging of the ends of their heads, and the bulged portions can then be ground down by suitable grinders.

The essential feature of the invention is to prevent such change in the structure density, formation or temper of the usual steel rail heads, as to reduce the efficiency or durability thereof or result in undue flattening or wear thereof or of the car wheels passing thereover, such as results where the nature or temper of the rail heads is changed by the heat of casting or fusing joints as heretofore practiced and furthermore by my invention I avoid the expense and disadvantages incident to the insertion of bridge pieces in the rail heads.

While I have explained specific steps that can be followed in melting or welding together the meeting ends of the rail feet and bracing the joint by melting or welding bodies of metal around and to said feet, yet I do not wish to limit myself to such specific steps nor to the particular base plate or chair and reinforcing bodies described, but consider myself entitled to all such variations and modifications as fall within the spirit and scope of my invention.

What I claim is:—

A rail joint wherein the meeting feet ends only of the rails are united by fusing and the meeting rail heads are of their original temper and characteristics and held abutting by the united feet, said joint consisting of the meeting ends of two rails having their feet ends united by and integral with bridging masses of metal fused and melted into and with said feet by a fusing temperature restricted to the feet portions of said meeting rail ends while said ends are spaced apart, whereby the rail heads are maintained relatively cool and of their original temper, and whereby said bridging masses of metal in cooling draw said rail head ends together to form a continuous joint.

In testimony whereof I affix my signature, in presence of two witnesses.

HEINRICH ERNST HOFF.

Witnesses:

JOHN WAGENER,
LOUIS VANDORN.