

No. 617,744.

Patented Jan. 17, 1899.

A. HOFFMANN.
RAIL JOINT.

(Application filed Apr. 25, 1898.)

(No Model.)

2 Sheets—Sheet 1.

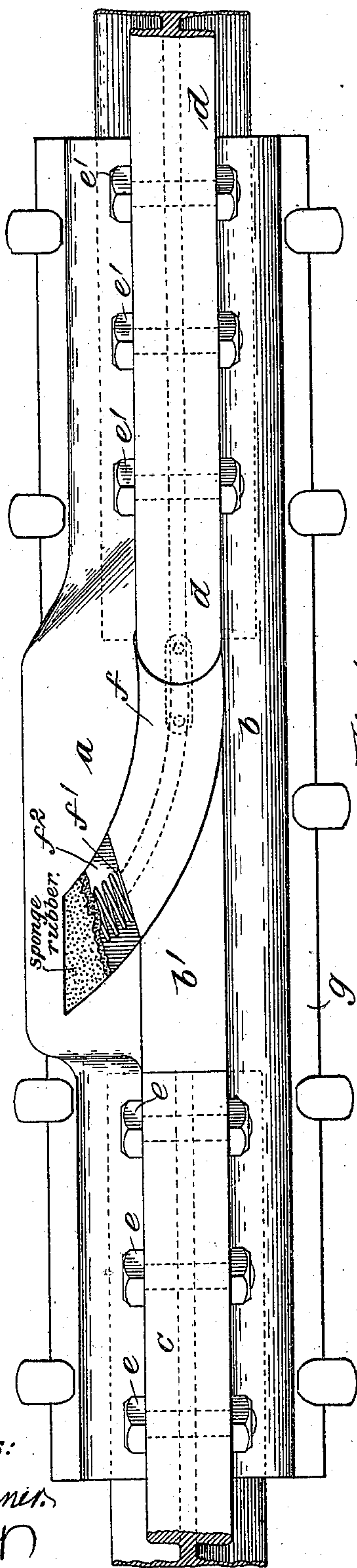


Fig. 1.

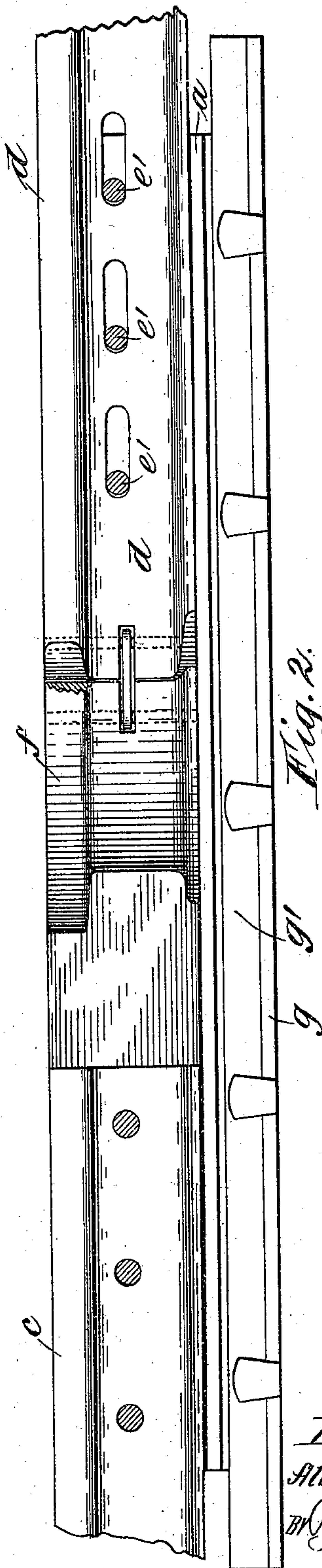


Fig. 2.

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2 Sheets—Sheet 2.

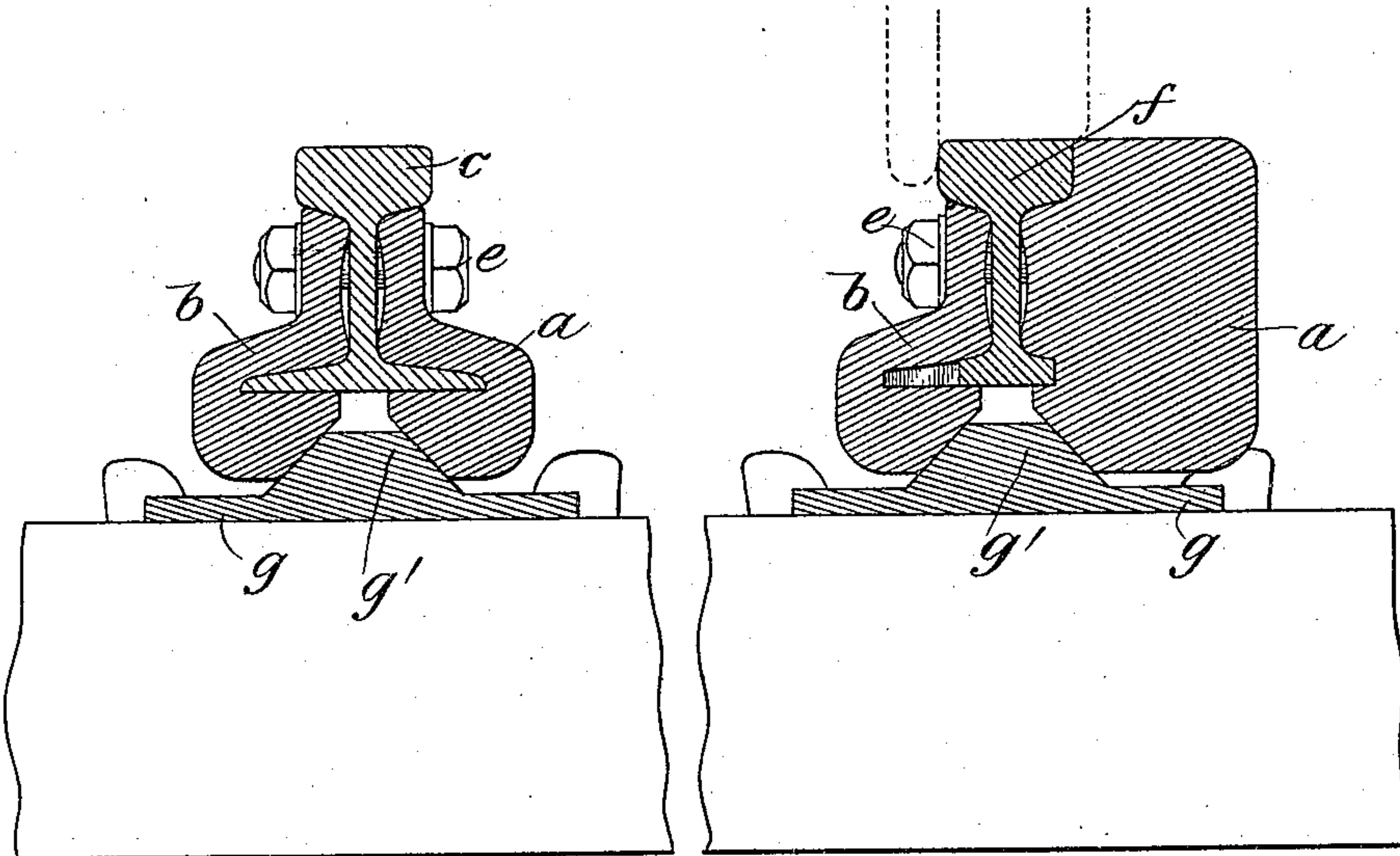


Fig. 3.

Fig. 4.

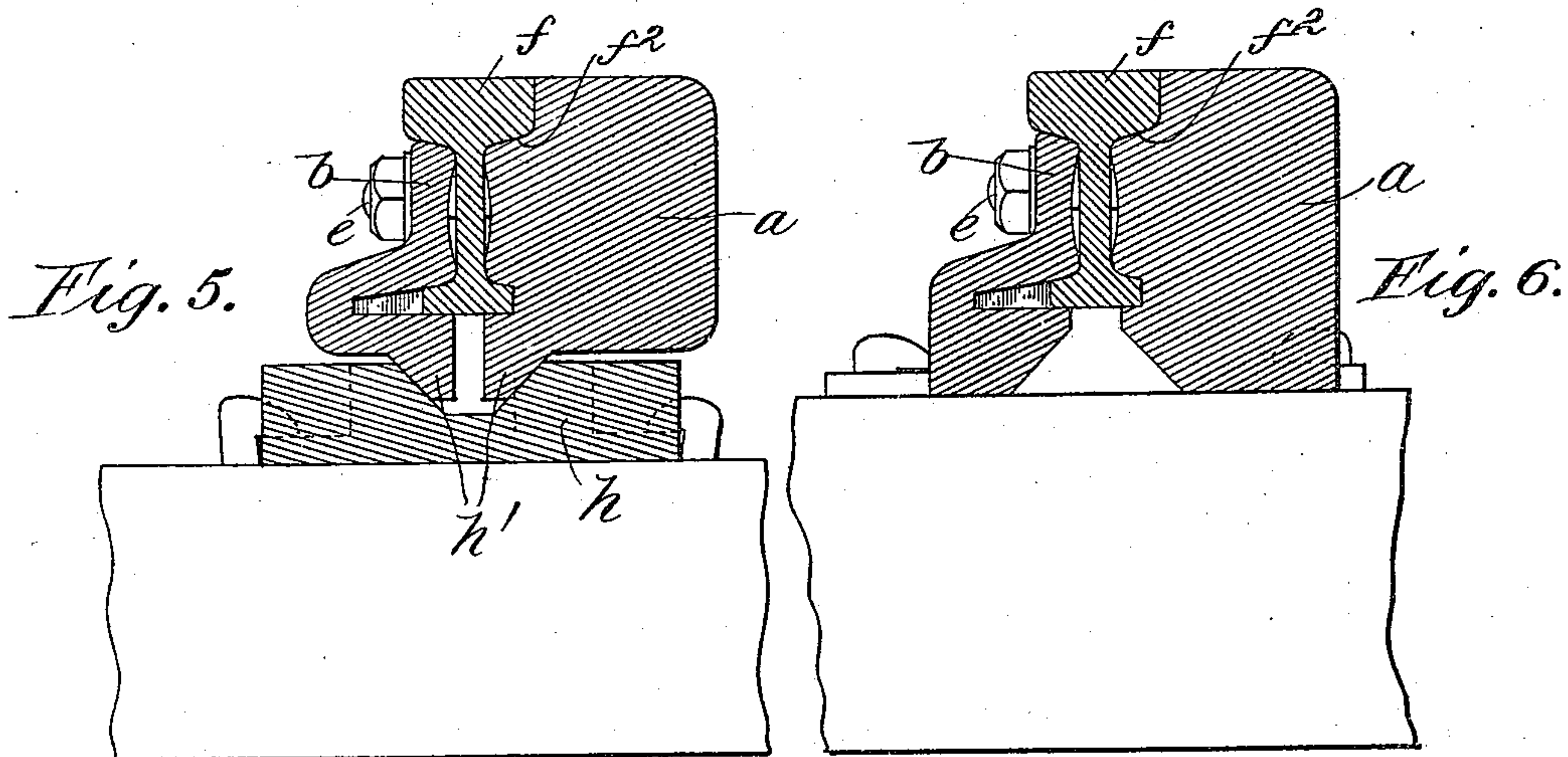


Fig. 5.

Fig. 6.

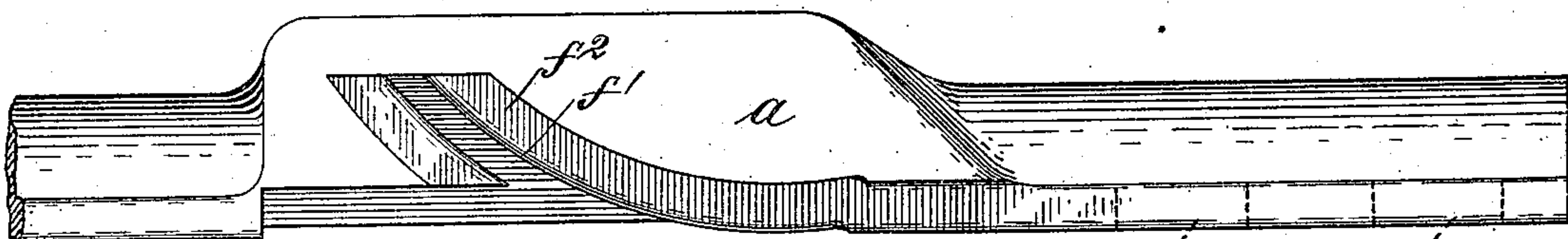


Fig. 7.

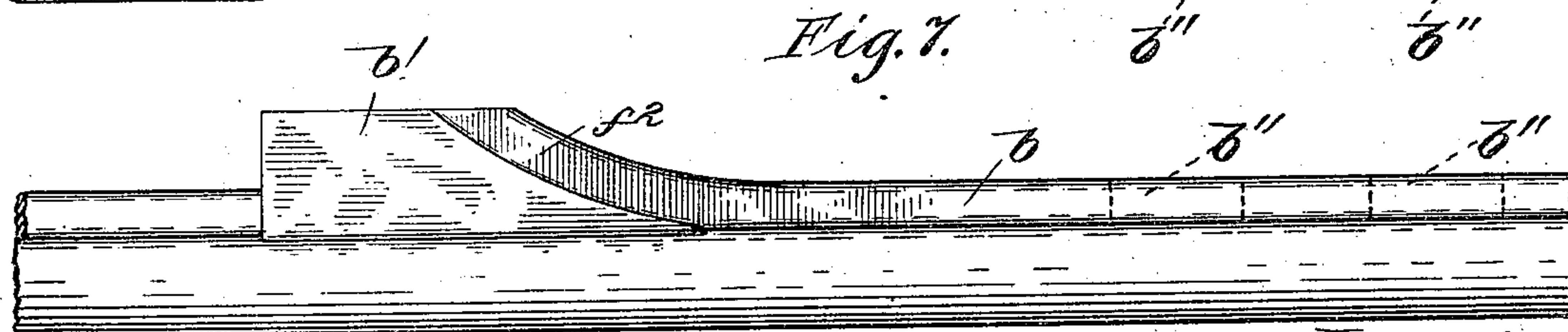


Fig. 8.

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UNITED STATES PATENT OFFICE.

ALBERT HOFFMANN, OF MILWAUKEE, WISCONSIN.

RAIL-JOINT.

SPECIFICATION forming part of Letters Patent No. 617,744, dated January 17, 1899.

Application filed April 25, 1898. Serial No. 678,742. (No model.)

To all whom it may concern:

Be it known that I, ALBERT HOFFMANN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Rail-Joints, (Case No. 1,) of which the following is a full, clear, concise, and exact description.

My invention relates to improvements in rail-joints, and has for its object the provision of means for uniting rails of considerable length which will permit of the expansion or contraction of said rails, while affording at all times a satisfactory and efficient connection without impairment of the practical continuity of the rail at said joint.

In systems of railway-rails wherein is employed the continuous-rail system or a system involving the use of cast or rigid joints at the ends of the individual rails considerable difficulty is at times experienced in compensating for the necessary contraction and expansion of the metal under varying temperatures. It is highly desirable that as far as possible the rails be made continuous or formed in long lengths by cast-metal joints, since the ideal rail is one affording a bearing-surface or head which is perfectly even and continuous. It is necessary under some circumstances, however, to supply at intervals means for permitting expansion and contraction of the rails; otherwise in a system of rails of considerable length the weaker joints are liable to be fractured and other damage to the road-bed may result from the expenditure of the tremendous force exerted by the metal under the influence of marked differences in temperature. I have accordingly devised a rail-joint admitting of decided movement on the part of the connected rails, which, however, affords at all times a continuous rail-head and accommodates itself to any position which the rails may normally assume under the maximum or minimum temperatures to which they are subjected. The joint of my invention, moreover, permits of the formation and use of individual rails in continuous lengths and much greater lengths than has previously been practicable.

I may briefly refer to the expansion rail-joint herein specifically described and shown as consisting of an expansion member or part

disposed between the two united rails and adapted to occupy the variable space at the joint or between said rail ends and combined supporting-blocks and fish-plates designed to receive the rail ends and expansion member and firmly support said parts in their respective positions. I have further provided means for locking the parts rigidly in their relative positions during the passage of a car or vehicle, consisting of a wedge serving as a compression member adapted to effect the gripping of the several parts between the fish-plates under the stress of the supported weight.

I will describe my invention more particularly in connection with the accompanying drawings, showing rail-joints embodying the features of my invention, wherein—

Figure 1 is a plan view of a completed rail-joint constructed in accordance with my invention. Fig. 2 is a side view thereof with the interior fish-plate removed. Figs. 3 and 4 illustrate means which I employ for locking the several portions of the rail-joint rigidly in position at the moment when the vehicle is passing over said joint. Figs. 5 and 6 illustrate a modification thereof. Fig. 7 illustrates the outer fish-plate, and Fig. 8 illustrates the inner fish-plate, of the expansible rail-joint of my invention herein shown and described.

The same letter of reference is used to designate like parts throughout the several figures of the drawings.

The fish-plates *a b* are constructed to receive the ends of the rails *c d*, which are formed in such continuous lengths as may be found practicable for use. The rail *c* is secured rigidly in position between the fish-plates by means of bolts *ee* in the well-known manner, said rail end abutting the rail-section *b'*, formed upon the fish-plate *b*. The rail-section *b* is squared upon its outer end and conforms in height and shape to the tread of the rail *c*, thus forming practically a continuation thereof. The rail *d* is provided with a rounded or convex end, which is adapted to fit closely within the concave portion of the rail-section or expansion member *f*, disposed in the recessed portion *f'*, provided in the fish-plates *a b* when united to receive the connected rails.

The expansion member conforms generally in size and shape to the corresponding parts of the standard rail with which it is used, the base-flange portion, however, preferably being somewhat reduced in size and closely fitting the recessed portion or socket f' , provided therefor in the fish-plate. The expansion member of my improved rail-joint is formed with a curvilinear configuration having a comparatively large radius, and the head thereof rests upon flanged portions f^2 , lying within the recess f' of the fish-plates.

I preferably connect the rail-section f with rail d by means of a link, whereby the curved ends thereof are always maintained in engagement. The right-hand end of the fish-plate is provided with slotted openings $b'' b''$, through which the bolts $e' e'$ pass, securing the rail within the joint against any other than a longitudinal movement. The reverse of this construction, having slots provided in the rail ends, obviously may be employed if desired. The fish-plates preferably embrace the web and base-flange of the rail, as is more clearly shown in Figs. 3, 4, 5, and 6 of the drawings, thus maintaining the portions of the joint in perfect alinement. In Figs. 3 to 5, above indicated, I have shown means, however, for rigidly locking all portions of the joint in their relative positions during the passage of a train or vehicle, whereby the effect is practically the same as is secured by a rigid or solid joint. For this purpose I employ a bed-plate g , which rests upon the ties and has a central wedge-shaped rib g' provided thereon, fitting within the corresponding opening provided between the lower portions of the fish-plates. Immediately the rail is utilized to support any considerable weight the tendency is to spread the lower portions of the fish-plates, which causes the upper portions thereof firmly to grip the several parts of the rail-joint and maintain them securely in position.

Fig. 5 shows a slightly-modified structure wherein the wedge h' is provided upon the lower portion of the fish-plates, while the wedge-opening is formed within the bed-plate h .

Fig. 6 illustrates the employment of the improved rail-joint of my invention without the use of a bed-plate, the fish-plates being spiked or otherwise secured directly to the tie j , forming a portion of the road-bed.

Figs. 7 and 8 illustrate the characteristics of the fish-plates employed in the preferred form of my improved rail-joint, said plates being separated to show the individual parts thereof and the recessed portions adapted to receive the expansion member and connected rail ends.

Within the opening f' may be provided a spring or equivalent means, the tension whereof is adapted to force the rail-section f firmly in engagement with the rail d at all times. I also propose to place in the upper

portion of the recess f' sponge-rubber or like material, adapted to prevent the access of water, snow, or dirt to the interior of the rail-joint through any opening at the free end of rail-section f . It may be desirable, however, to provide a suitable covering for said opening beyond the tread of the rail, which would serve the same purpose.

The expansion member or movable rail-section f , it will be seen, is at all times maintained flush with the surface of the rail-heads, thereby preserving a continuous effective rail-head at the joint.

The operation of my expansion rail-joint will now be readily comprehended from the description of its construction appearing above. In Figs. 1 and 2 the several parts are indicated in the positions which they would occupy upon an extreme contraction of the connected rails, the expansion member being considerably withdrawn from its recess and its head becoming an effective portion of the continuous system of rails. It will be seen, however, that the continuity of the upper and inner portions of the rail-head is not affected thereby, the joint presenting a perfectly smooth and even bearing-surface for the passage of a train. Upon the expansion of the connected rails the reverse action obviously occurs, the abutting rails of the system being forced toward each other, whereby the expansion member is actuated to move farther within its segmental recess. Thus at all times the rail-joint is adapted to compensate for any resultant alteration in the lengths of the connected rails of a continuous-rail system, such compensation maintaining, however, the practical continuity of the rails of the system.

By employing my improved rail-joint very much longer lengths of rail may be used than has hitherto been practicable, since the ensuing gap caused by contraction of the rails makes ordinary methods of uniting the same almost out of the question. The number of expansion-joints per mile may thus be greatly reduced, since the same may be constructed to compensate for very decided alterations in the lengths of the united rails. Inasmuch as the actual expansion or contraction per day is comparatively small the movement of the rails under ordinary conditions will be but slight, and an inconsiderable creeping action shared by both rails united at the expansion-joint will readily compensate for any alteration of rail length, thus relieving all serious strain upon the joints.

It will of course be understood that the number of joints per mile and the amount of compensation accomplished by each joint will correspond to the climatic conditions of the particular section where the track is laid.

I am aware that the use of movably-disposed split rails at intervals in the line of railway-track has previously been suggested and that the segmental expansion rail-joint

is not broadly new. My present invention, however, is distinguished from the above by reason of its extreme simplicity of construction and its high efficiency and durability.

5 In the form of joint herein disclosed the ordinary fish-plate and joint-chair are eliminated and a specialized form of fish-plate is employed for receiving both the adjacent rail ends and the expansion member and for
10 locking the several parts securely in position when a weight is supported by the rail-joint. For securing the last-named result the fish-plates preferably are associated with a bed-plate having inclined faces, which is adapted
15 to cause the said fish-plates to grip the rail ends and expansion member, thus locking the same practically in a solid joint. As pointed out, however, this bed-plate may be dispensed with, if desirable.

20 The expansion rail-joint of my invention, having fish-plates of peculiar construction adapted to receive and embrace the rail ends and expansion member, is always capable of affording ample support for these relatively
25 movable parts, while insuring their correct position and permanent alinement at all times.

By forming the rail-section *b'* upon one of the fish-plates it is seen that the squared end
30 of rail *c* may be bolted into place between the fish-plates. Should it be desired, the rail-section *b'* may be dispensed with, and the rail *c* will then be provided with a curved end corresponding to the inner face of said
35 rail-section; but I prefer the construction herein shown and described. The expansion member and its associated parts may also be altered in general configuration—for example, the concave and convex abutting portions of the section and the rail *d* may be reversed; but the construction shown I consider secures better results.

It is apparent that further modifications may be made in the structure of my improved
45 rail-joint without departing from the spirit of my invention, and I do not desire to be understood as limiting the same to the precise form of rail connection herein specifically described and shown, and

50 I accordingly claim, and desire to secure by these Letters Patent, the following:

1. In an expansion rail-joint, the combination with the fish-plates *a b* adapted to receive the ends of the rails, said fish-plates being provided with a recess *f'*, of an expansion member *f* disposed within said recess, and means for causing said expansion member to compensate for the alteration in the length of the connected rails, whereby an even and
60 practically continuous rail-head is maintained at the joint, substantially as described.

2. In an expansion rail-joint, the combination with the fish-plates *a b* adapted to receive the ends of the rails, said fish-plates being provided with a recess *f'*, of an expansion member *f* disposed within said recess, means
65 for causing said expansion member to com-

pensate for the alteration in the length of the connected rails, and additional means for locking the several parts of the rail-joint in
70 position when pressure is applied to said joint from above, substantially as described.

3. In an expansion rail-joint, the combination with the fish-plates *a b* adapted to receive the ends of two rails, of an expansion member *f* associated with said parts, means
75 for causing the same to compensate for alterations in the length of the connected rails, and a wedge or its equivalent associated with said rail-joint, whereby the several parts are locked
80 firmly in position when the joint serves to support a weight, substantially as described.

4. The combination in an expansion rail-joint with the fish-plates *a b* adapted to receive the rail ends, of a rail-section *b'* formed
85 upon one of said fish-plates, a recess *f'* being provided in said fish-plates, a curved expansion member *f* disposed within said recess, and means for causing said expansion member to preserve the continuity of the rail-head
90 at the joint, substantially as described.

5. The combination in an expansion rail-joint with the fish-plates *a b* adapted to receive the rail ends, of a rail-section *b'* formed
95 upon one of said fish-plates, a recess *f'* being provided in said fish-plates, a curved expansion member *f* disposed within said recess, means for causing said expansion member to preserve the continuity of the rail-head at the joint, and additional means for
100 locking the several parts of the rail-joint in their respective positions when the weight of a car or vehicle is supported by the adjacent rail-head, substantially as described.

6. The combination with a system of rails
105 formed in continuous lengths, of fish-plates *a b* adapted to receive the ends of two such rails, a curved expansion member *f* movably disposed within a recess formed within said fish-plates, and means for causing said expansion member to compensate for the alteration in the length of the connected rails, whereby the effective surface of the rail-head is at all times preserved at the joint, substantially as described.
115

7. In a rail-joint of the class described, the combination with two alined railway-rails, of a segmental expansion member disposed at their adjacent ends, fish-plates adapted to receive said rail and expansion member and
120 maintain them in their relative positions, and means for causing the expansion member to occupy the variable space between the rail ends, substantially as described.

8. In an expansion rail-joint, the combination with the fish-plates *a b* adapted to receive the rail ends, of an expansion member *f* disposed between the rail ends and adapted to preserve the continuity of the rail-head at the joint, and locking mechanism comprising
130 inclined or wedge-shaped faces adapted to maintain the parts securely in position when the joint serves to support a weight, substantially as described.

9. In a rail-joint, the combination with a pair of fish-plates adapted to receive the ends of the united rails, of a bed-plate *g*, having a centrally-disposed, wedge-shaped rib *g'*, the said fish-plates being provided with inclined faces conforming thereto, adapted to lock the rail ends in position when the joint serves to support a weight, and bolts *e'* securing the rail ends and fish-plates in position, the same being inserted near the upper surfaces of the fish-plates, substantially as described.

10. In a rail-joint of the class described, the combination with fish-plates *a b* wherein the rail ends are adapted to be bolted in position permitting of their relative movement, the said fish-plates being provided with a segmental recess *f'*, of an expansion member *f* movably disposed within said recess and extending between the ends of the united rails adapted to maintain the continuity of the rail-head at the joint, means for securing a compensating movement of the expansion member, and additional means comprising coacting inclined faces for locking the parts of the joint securely in position when a weight

is supported thereby, substantially as described.

11. In a rail-joint of the class described, the combination with fish-plates *a b* wherein the rail ends are adapted to be bolted in position permitting of their relative movement, the said fish-plates being provided with a segmental recess *f'*, and a rail-section *b'* forming one face of said recess, of an expansion member *f* movably disposed within said recess, and extending between the ends of the united rails adapted to maintain the continuity of the rail-head at the joint, means for securing a compensating movement of the expansion member, and additional means comprising coacting inclined faces for locking the parts of the joint securely in position when a weight is supported thereby, substantially as described.

In witness whereof I hereunto subscribe my name this 21st day of April, A. D. 1898.

ALBERT HOFFMANN.

Witnesses:

HERMAN W. FALK,

EMMANUEL EMIL ALBERT WURSTER.