(No Model.) 2 Sheets—Sheet 1.

S. McCARTY.

RAILWAY RAIL AND JOINT.

No. 323,946. Patented Aug. 11, 1885.

FIG. 1.

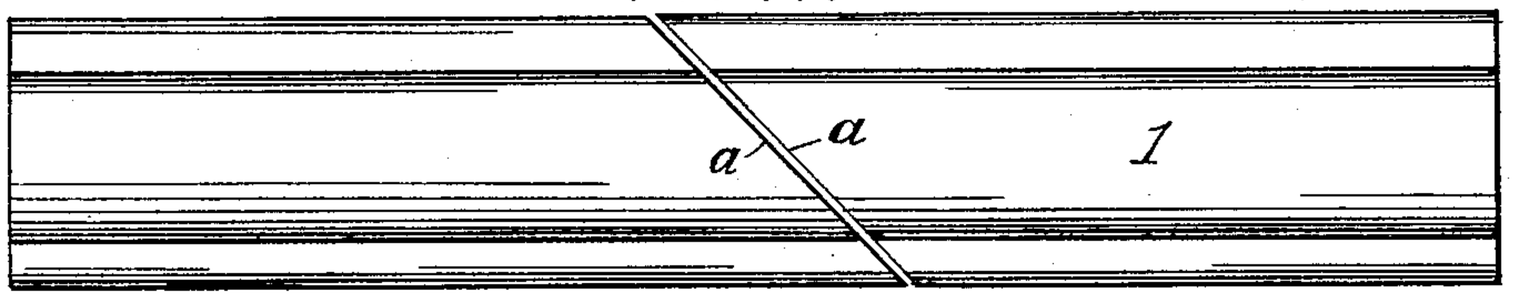


FIG. 2.

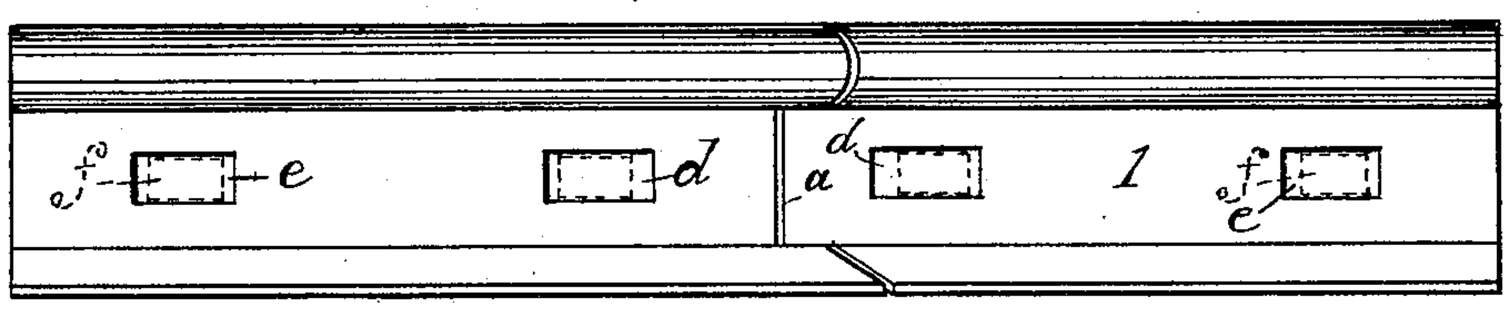


FIG. 3.

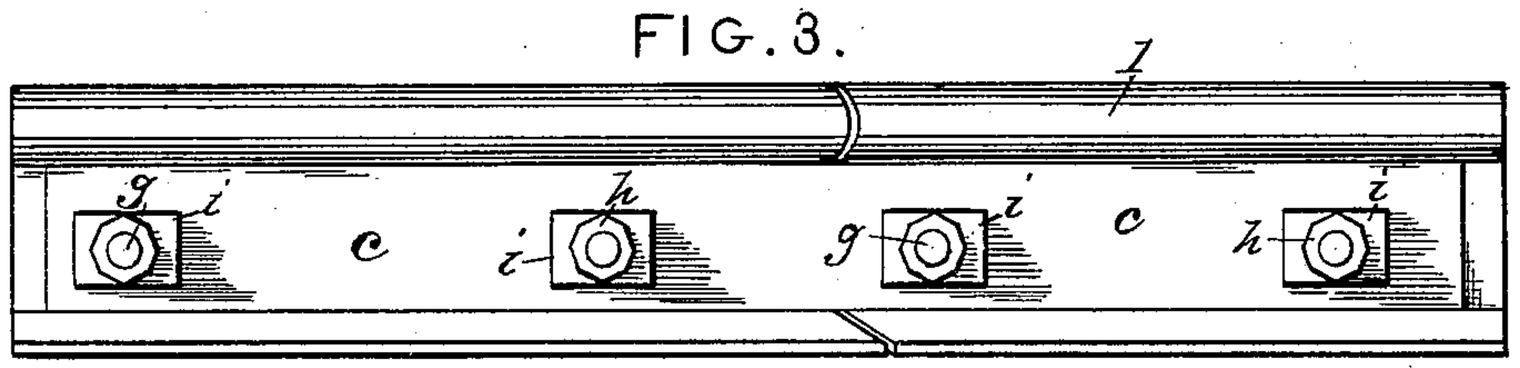


FIG. 4.

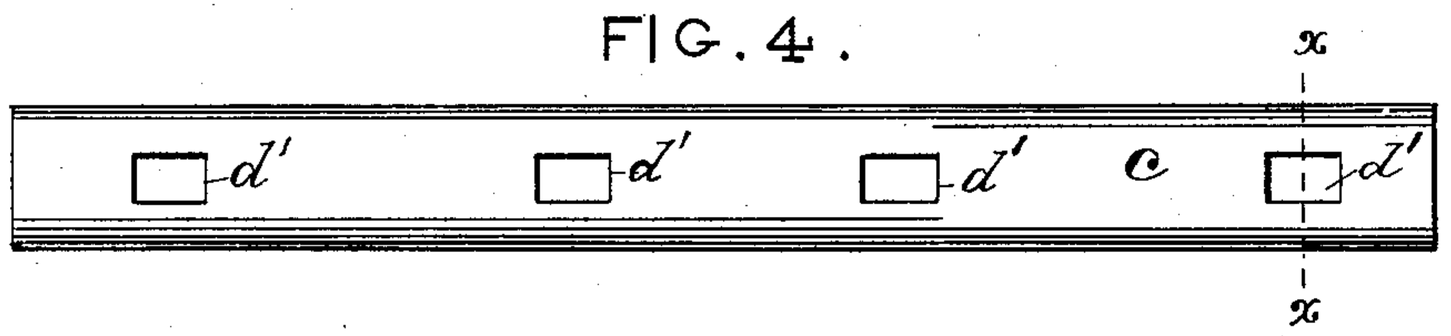


FIG. 5.

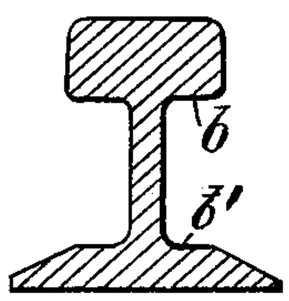


FIG. 6.

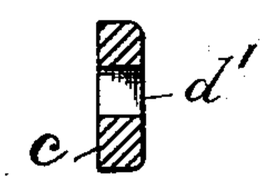


FIG. 7.

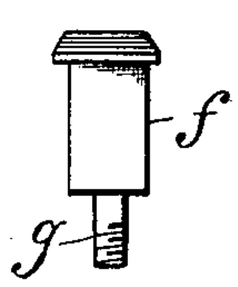


FIG. 8.

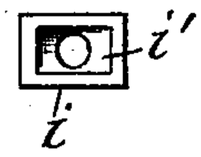
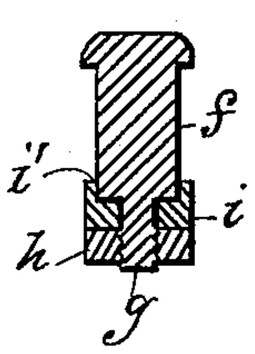


FIG. 9.



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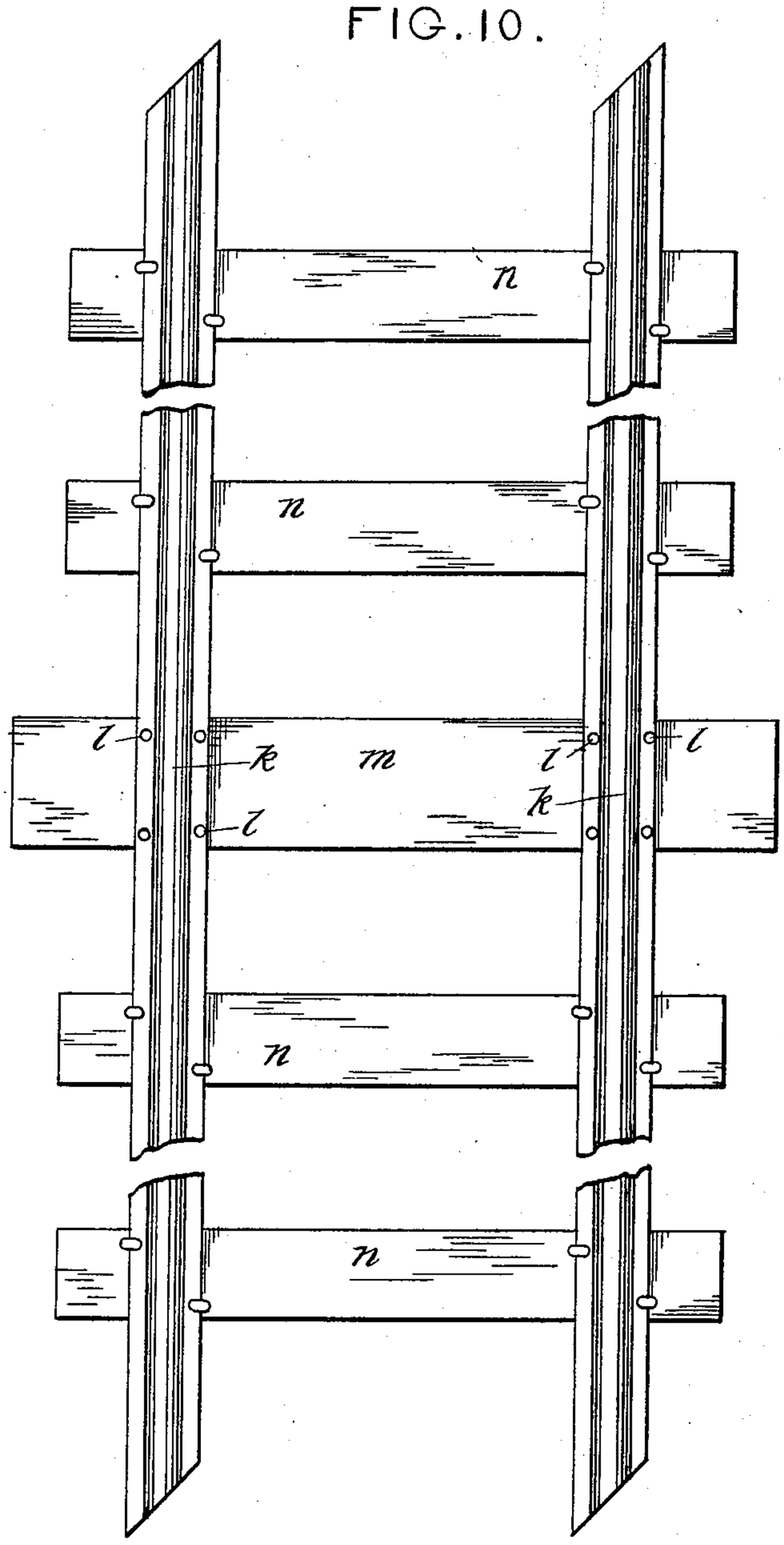
(No Model.) 2 Sheets—Sheet 2.

S. McCARTY.

RAILWAY RAIL AND JOINT.

No. 323,946. Patented Aug. 11, 1885.

FIG. 10.



Witnesses:
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his Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL McCARTY, OF AURORA, ILLINOIS.

RAILWAY RAIL AND JOINT.

SPECIFICATION forming part of Letters Patent No. 323,946, dated August 11, 1885.

Application filed May 7, 1885. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL MCCARTY, of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Railway Rails and Joints; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The main object of my invention is to make a noiseless and safe joint, and one which, while allowing the requisite expansion and contraction of the rails under changes of temperature, will yet keep the several joints substantially equal and uniform, and prevent what is called "creeping" of the rails, by permanently confining the contraction and expansion of each rail to itself, holding it firmly at its center, and causing the variations in its length to assert themselves at both ends, and as will presently be more clearly described.

In the drawings, Figure 1 is a plan of the adjacent ends of two bevel end rails; Fig. 2, a side view of the same, showing bolt-slots of graduated lengths—that is, with the slots nearest the ends of the rail somewhat longer than those which are farther from such ends; Fig. 3, a side view, with my side or fish plates applied to complete my improved joint; Fig. 4, a side plate detached, and Fig. 6, a cross-section through line *x x* of Fig. 4; Fig. 5, a cross-section of my rail, showing the flat seats for the side plates; Fig. 7, an elevation of one of my oblong bolts; Fig. 8, an inner face view of one of the washers for the bolts; Fig. 9, a section through the bolt, washer, and nut; Fig. 10, a plan of a track, partly broken away, and showing the manner of compelling the expansion and contraction of the rails from their centers toward their ends.

The rails may be, in the main, of any usual form, whether T or H shaped, but are made with their ends slanting or beveled at any desired angle, as shown at *a*, but preferably at forty-five degrees, to avoid any abutting of square-cut ends, and also to allow of any degree of lengthwise expansion to which in use they may be subjected, and, further, to make a line of successive rails practically continuous. I further make them with horizontal or flat seats, as seen at *b* and *b'* for the side plates, *c*, to lodge against or rest upon, so that these side or fish plates shall perform not only the duty of connecting together the ends of adjacent rails, but also by virtually increasing the practical thickness of the web or upright part of the rails add materially to their vertical strength in receiving the impact or thrust due to the passing of trains, squarely supporting, as they do, the upper flanges of the rails, and being squarely upheld by the lower flanges. These plates *c* are connected to the ends of two adjacent rails in a novel manner, in order to prevent creeping while not interfering with the unavoidable expansion and contraction. Near the end of each rail are made oblong slots *d e* for key-bolts.

The slots *d'* in the side plates, *c*, are all of a size as to their lengths, and such as to correspond in height with those in the rails, (but the rail-slots *d* nearest to their ends are longer than those marked *e*, which are farther from such ends, because the expansion or the contraction is not so great at those points *e* of the rail.) Steel key-bolts *f f*, of oblong form in their cross-section, and with the edges either square or oval, and having heads at one end, and at their other ends a threaded part or bolt *g*, adapted for a nut, *h*, are made so that their oblong portions or main part shall snugly fit all the oblong slots in the side plates; but in the rails these key-bolts fit snugly only at the top and bottom, and do not fill the whole lengthwise space of the slot, but leave sufficient room for the endwise expansion or contraction of the rail.

Railroad men usually estimate the expansion in a rail to be one-eighth ($\frac{1}{8}$) of an inch for every ten (10) feet of rail. Taking this as a basis, the slot *d* in the rail nearest its end should be made just long enough relatively to the breadth of its bolt *f* to allow for the expansion and contraction, reckoning from the center of the rail, and the next slot, *e*, should be somewhat shorter, so as to allow for this expansion and contraction and no more.

The oblong part of the key-bolts is preferably made of such length that when they are inserted in the side or fish plates and rails their ends next the threaded part shall project

a little beyond the outer face of the adjacent side or fish plate. I then place a thick, strong washer or cap-piece, *i*, having oblong recesses *i'*, over the end of each of the key-bolts, and against the face of the plate, and tighten all up with nuts *h*. These pieces *i*, it will now be seen, cannot turn upon the key-bolt, and thus cannot work loose or work away from the bolt or tend to loosen the nuts. These keys, having broad horizontal surfaces, also make an easy and level plate for the rail to slide on as it contracts and expands, and with little or no friction, and the character and arrangement of the slots, as already stated, are such that in each rail there can be no creeping, because the rail has at each side of its confined center *k* equal liberty or freedom to shift under expansion or contraction, and the key-bolts tightly fit the length of the slots in the side plates, leaving the rails free to expand or contract in both directions from their centers toward their ends. Thus the whole rail cannot creep or change its location, and cause dangers and accidents to trains.

The rails must be made permanently fast or fixed at the center of their lengths. This is done by securing them by spikes or bolts, as seen at *l* in Fig. 10, to a tie, *m*, of larger size than the other or ordinary ties, *n*, and in some cases, where necessary, they may also be longer. The object of this increased size, or increased size and length, being to immovably hold the center of the rail and compel the expansion and contraction to work both ways from such center toward each end.

The rails should be laid by a careful trackmaster, and every rail should be laid by consulting a thermometer, so as to make the proper allowance for the contraction and expansion, according to the temperature of the weather at the time the rail is put down.

In my construction it will readily be understood that the inclined or bevel joint at the ends of the rails is important as preventing any abrupt or close abutting together of two square ends, as in ordinary rails, and also as permitting a longer range for expansion, while never leaving an open gap directly across the rail, the bevel-rails being substantially continuous by means of their side lapping ends, although not closely united. For these reasons my improved joints render the rails safer and less noisy.

The great advantage of my side plates having a square seat on the rails to stand on is that it takes the great strain off from the bolts, whereas the fish-plates in general use stand on an inclined plane on the base or foot of the rail, and are only kept there by the great force and strain of the bolts, the tendency constantly being to slide down the incline, and the contraction and expansion in such case tend to roll the bolts first one way and then the other as the rails expand and contract, thereby unscrewing the bolt-nuts and loosening the ends of the rail, causing the cars to jump the track.

Square-edged joint-plates, one end of which has been attached firmly to the rail by welding or riveting, have been heretofore used; but I make no claim to any such construction, as both ends of my side or fish plates are similarly connected to the ends of the rails.

I do not claim, broadly, rails with beveled ends, nor, broadly, rails having oblong slots to receive keys; but

I claim—

1. In a railway-track, rails permanently secured at their centers to a strong cross-tie, and having oblong bolt-holes of graduated lengths near each end, as described, in combination with side plates and flat connecting-bolts, the combination being, as set forth, such as to compel the expansion and contraction of the rail from the center toward both its ends to prevent creeping and accommodate the fish-joint.

2. The rail joint consisting of the following combination, namely: rails having their adjacent ends made with overlapping bevels *a*, and having oblong slots *d e*, of graduated lengths, as set forth, near the ends of the rail, side plates having oblong slots all of the same size, but shorter than those in the rail, and key bolts *f*, oblong in cross-section, fitting tightly all the slots in the side-plates, but not fitting fully the slots in the rail, all as set forth.

3. In combination with the rails having the long and short oblong slots *d e*, as set forth, and having the upper and lower flat seats, *b b'*, the side plates, slotted as described, and adapted to fit between and bear upon such seats, and key-bolts fitting snugly all the slots of the side plate.

4. In combination with rails and with side plates, all having oblong slots therein, as set forth, key-bolts adapted for such slots, and provided with washers or cap-pieces *i*, having oblong recesses *i'* and tightening nuts *h*, all as and for the purposes set forth.

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