June 14, 1932. C. D. YOUNG 1,863,146

RAIL RETAINING KEY

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FIG. I.

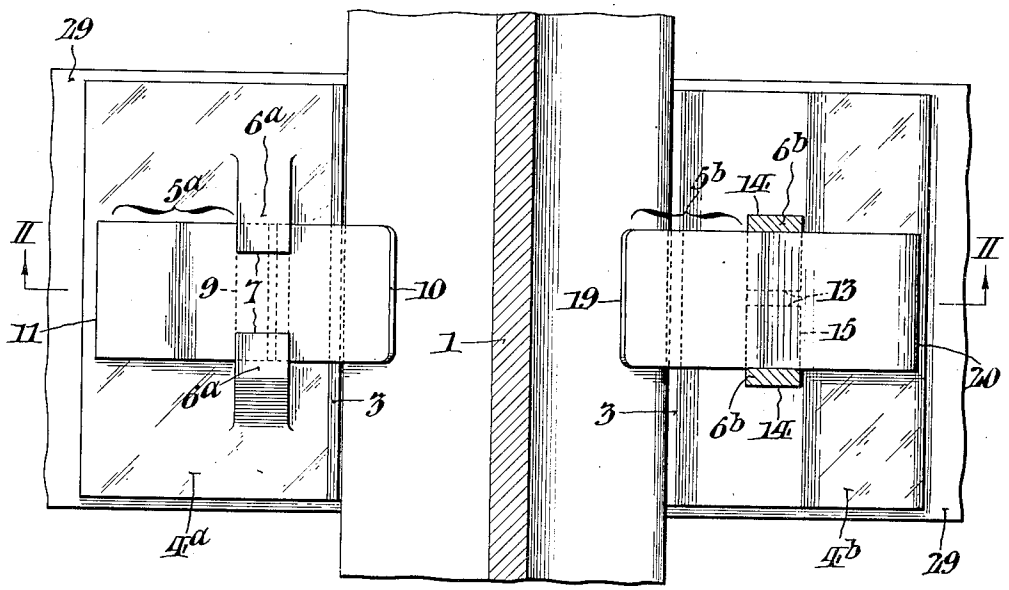
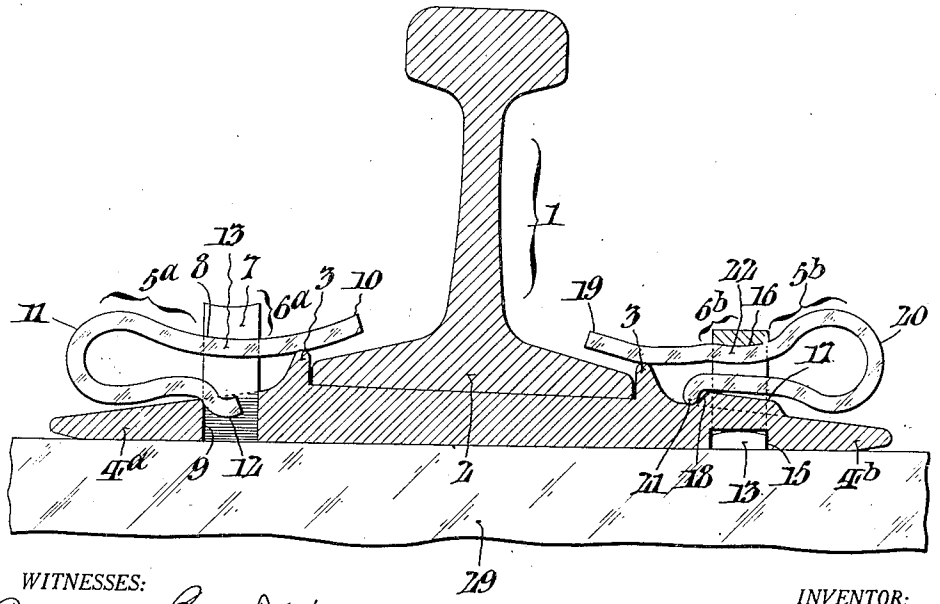


FIG. II.



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FIG. III.

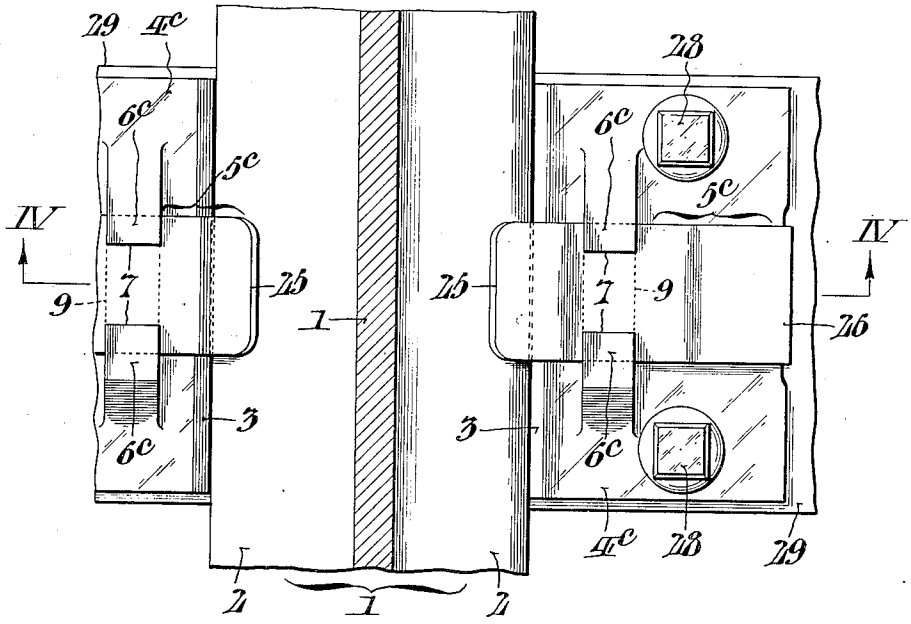
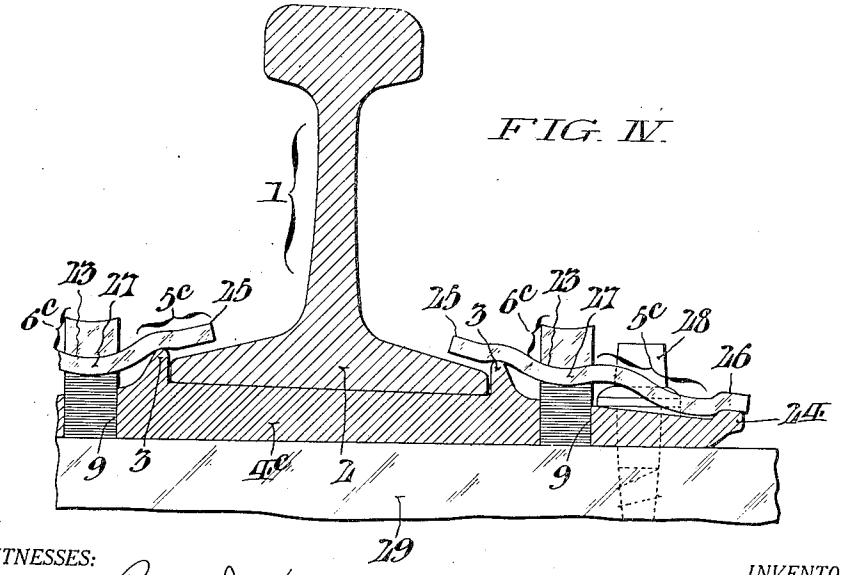


FIG. IV.



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UNITED STATES PATENT OFFICE

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RAIL RETAINING KEY

Application filed October 17, 1931. Serial No. 569,357.

This invention relates to rail retaining keys, and more particularly to means for retaining rails upon underlying tie plates, though in using the term "tie plate" herein, I mean to include any form of plate, tie or foundation, upon which the base of a rail is adapted to rest or to be secured.

Heretofore many devices have been proposed, in the nature of rail fasteners or spring plates, for holding rails to their tie plates. Where ordinary track spikes are employed for this purpose it is found that the heads of the spikes are in time lifted to positions above the rail flanges, incident to vibration or movement of the rails, and once the spikes become loosened from their original positions they lose their retaining capacity, and the rails become free to move vertically and longitudinally. Where rail fasteners which bear with positive engagement or heavy spring pressure upon the base flanges of rails are employed, it is found that under the pressure of heavy loads the rails will move vertically and carry with them their tie plates and ties, thus causing the ties to be loosened from the underlying ballast, which is a most undesirable condition.

The object, therefore, of my present invention is to provide, in combination with a rail and tie plate, a retaining key which when applied to a tie plate assumes a predetermined position above the rail flange and clear therefrom, thus permitting the rail to move with relation to the tie plate within certain desired limits, but preventing excessive movement. This object I accomplish by means of comparatively simple and inexpensive forms of tie plates and retaining keys.

Other objects and advantages characterizing my present invention will become apparent from the description of several examples of the practice thereof which follows hereinafter, having reference to the accompanying drawings. Of the drawings:

Fig. I represents a plan view with the rail shown in section, of a rail and tie plate assembly, with one form of spring key and fulcrum combination shown at the left hand of the figure and another such combination shown at the right hand of the figure.

Fig. II represents a cross-section of the same, taken as indicated by the lines II—II of Fig. I, with the keys shown in side elevation.

Fig. III represents a fragmentary plan view similar to that of Fig. I, but showing a modified form of tie plate and spring key assembly; and,

Fig. IV represents a cross-section of the same, taken as indicated by the lines IV—IV of Fig. III, with the keys shown in side elevation.

In the drawings, my invention is shown applied to forms of tie plates and retaining keys generally similar to those described in my pending application for U. S. Letters Patent, Serial No. 550,432, filed July 13, 1931. In each figure of the drawings, the rail is designated at 1 and its base or flange is designated at 2. The rail base 2 is seated between upstanding longitudinal ribs 3 of an underlying tie plate. For convenience two forms of spring key and tie plate assemblies are shown in Figs. I and II, one arrangement being shown at the right hand side of the rail 1 and another being shown at the left hand side. Accordingly one half of the tie plate is designated at 4*a* and the other half at 4*b*, there being selected for illustration a tie plate of gradually diminishing thickness effecting a slight inclination to the rail 1 from the perpendicular to the tie 29.

With reference to the assembly shown at the left hand of Figs. I and II, there is shown a rail retaining key 5*a* in combination with fulcrum members 6*a* formed out of the tie plate portion 4*a*. In this example the fulcrum members 6*a* comprise opposite upstanding lugs punched from the tie plate and turned over so that their ends 7 lie in a substantially horizontal plane. At the underside of the lug ends 7, smoothly curved bearing surfaces 8 are provided for engagement with the spring key 5*a*. As shown in Fig. II, the opening formed by the punching of the lugs affords a sharp angular edge 9 beneath the fulcrum members 6*a*.

The spring key 5*a* of this assembly has an upwardly deflected end portion 10 bearing on the top surface of the rib 3, which is ad-

jacent to the edge of the rail, and projecting inwardly above the rail flange 2 parallel to its slope and with a predetermined clearance therefrom. At the opposite end the key 5*a* is bent to form a spring loop 11 which terminates in a sharply bent extremity 12 adapted to catch yieldingly on the angular surface 9 of the tie plate. At the intermediate portion 13 between the loop 11 and the end portion 10, the key 5*a* is bowed with a curvature complementary to the curved bearing surfaces 8 of the fulcrum members 6*a*.

The manner of assembling the spring key 5*a* will be apparent from the above description, it being merely necessary in applying the key to direct it properly towards the rail base and to deliver a blow upon the back of the spring loop 11 to cause the key to move inward, with its end 10 passing over the rib 3, to the point where the sharply bent extremity 12 catches on the edge 9 of the tie plate opening. When so driven, the spring loop 11 will expand to cause the key 5*a* to be seated in its predetermined proper position. To disengage the key 5*a* from the tie plate, it is merely necessary to compress the spring loop 11, as by a wedge applied beneath the loop, and then to apply a force in a direction transverse to the rail to cause the key to move upward.

With reference to the assembly at the right hand of Figs. I and II, there is shown a rail retaining key 5*b* in combination with a fulcrum member 6*b* which in this example constitutes a separate attachment rather than an integral part of the portion 4*b* of the tie plate. In this example the fulcrum member 6*b* is in the form of a stirrup of inverted U-shape with its ends 13 passing through slots 14 in the tie plate and bent over to lie in a horizontal plane. The stirrup ends 13 are accommodated within a recess 15 of corresponding size at the bottom of the tie plate. At the under side of the central portion of the fulcrum member 6*b* a smoothly curved bearing surface 16 is provided for engagement with the spring key 5*b*. The portion 4*b* of the tie plate is formed with a boss 17 having a comparatively sharp edge 18 adjacent to the fulcrum member 6*b*.

The spring key 5*b* of this assembly has a turned end portion 19 bearing on the rib 3 and projecting above the rail flange 2 in a direction parallel to its slope and with a predetermined clearance therefrom. At its opposite end the key 5*b* is bent to form a loop 20, which terminates in a sharply bent extremity 21 adapted to catch yieldingly on the inner edge 18 of the boss 17. At the intermediate portion between the loop 20 and the end portion 19, the key 5*b* is relatively flat except for an offset 22 which is curved complementary to the curved bearing surface 16 of the fulcrum member 6*b*.

The manner of assembling the spring key 5*b* is similar to the manner of assembling the previously described key 5*a*, it being merely necessary in applying the key to direct it properly towards the rail base and to deliver a blow upon the back of the spring loop 20 to cause the key to move inward with its end 19 projecting above the rail base and clear therefrom, and to the point where the sharply bent extremity 21 passes over the edge 18 of the boss 17. When so driven, the spring loop 20 will expand to cause the key 5*b* to be seated in its predetermined proper position.

With reference to the assembly of Figs. III and IV, there is shown a tie plate 4*c* having fulcrum member 6*c* at each side thereof and spring keys 5*c*. In this example the fulcrum members 6*c* are in the form of oppositely projecting lugs and are substantially similar to the fulcrum members 6*a* previously described, except that their curved bearing surfaces 23 are described with shorter radii. At the outer edge of the tie plate 4*c* an upstanding marginal boss 24 is provided. The spring key 5*c* is formed with a succession of waves or corrugations. At its inner end 25 the key 5*c* bears upon the rib 3 and projects inwardly above the rail flange 2 and with a predetermined clearance therefrom; at its outer end 26 it is sharply bent to catch on the boss 24 of the tie plate; and at the intermediate portion there is a concaved region 27 with a curvature complementary to the curved bearing surfaces 23 of the fulcrum members 6*c*. Screw spikes 28 are conveniently employed in this example for securing the tie plate 4*c* to the tie 29.

The manner of assembling the spring key 5*c* will be apparent from the above description. The key is driven towards the rail base to the point where the concaved region 27 engages the underside of the fulcrum 6*c*. At this point the sharply bent extremity 26 will catch on the boss 24 of the tie plate in such manner as to resist dislodgement of the spring key, and the end 25 will project above the rail base at a predetermined distance therefrom.

In the various arrangements described above, it will be seen that in addition to the upstanding ribs 3, the tie plates are provided with opposed bearing surfaces, comprising the underside of a fulcrum member and an additional irregular surface on the top of the tie plate. The retaining key in each example is wedged between these opposed bearing surfaces and the top surface of the tie plate rib with its end projecting above the rail base; and the key is driven to a point where it catches on these surfaces and resists movement in either direction laterally. The curved or irregular portions of the retaining keys and the corresponding curved or irregular opposed bearing surface on the tie plate cause the key when driven to seat itself in the proper position with relation to the rail so that in a length

of track all of the retaining keys will be uniformly applied.

While I have described a number of examples of the practice of my invention, it will be apparent that other modifications may be made in the form of tie plate, spring key and fulcrum member herein described, without departing from the spirit of my invention as defined in the annexed claims.

Having thus described my invention, I claim:

1. In combination with a rail, and a tie plate having a rib adjacent to the rail base, means on said tie plate affording opposed bearing surfaces, and a retaining key wedged between said opposed bearing surfaces and said tie plate rib with its end projecting above the rail base, said retaining key and bearing surfaces being so formed as to cause said key when driven to catch on said surfaces with its inner end at a predetermined position clear of the rail base.

2. In combination with a rail, and a tie plate having a rib adjacent to the rail base, means on said tie plate affording opposed bearing surfaces of irregular contour, and a resilient retaining key wedged between said opposed bearing surfaces and said tie plate rib with its end projecting above the rail base, said retaining key being formed with irregular surfaces substantially complementary to said bearing surfaces whereby when driven it is adapted to catch on said bearing surfaces with its inner end at a predetermined position clear of the rail base.

3. In combination with a rail, and a tie plate having a rib adjacent to the rail base, a fulcrum member on the tie plate affording a curved bearing surface, and a spring key having one end engaging said rib and projecting over the rail base clear therefrom, and having its other end engaging the tie plate, and having an intermediate curved portion complementary to the curved bearing surface of the fulcrum member and in contact therewith.

4. In combination with a rail, and a tie plate having a rib adjacent to the rail base, a fulcrum member on the tie plate affording a curved bearing surface, a spring key having one end engaging said rib and projecting over the rail base clear therefrom, and having its other end sharply bent to catch yieldingly on the tie plate, and having an intermediate curved portion complementary to the curved bearing surface of the fulcrum member and in contact therewith.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 13th day of October, 1931.

CHARLES D. YOUNG.