

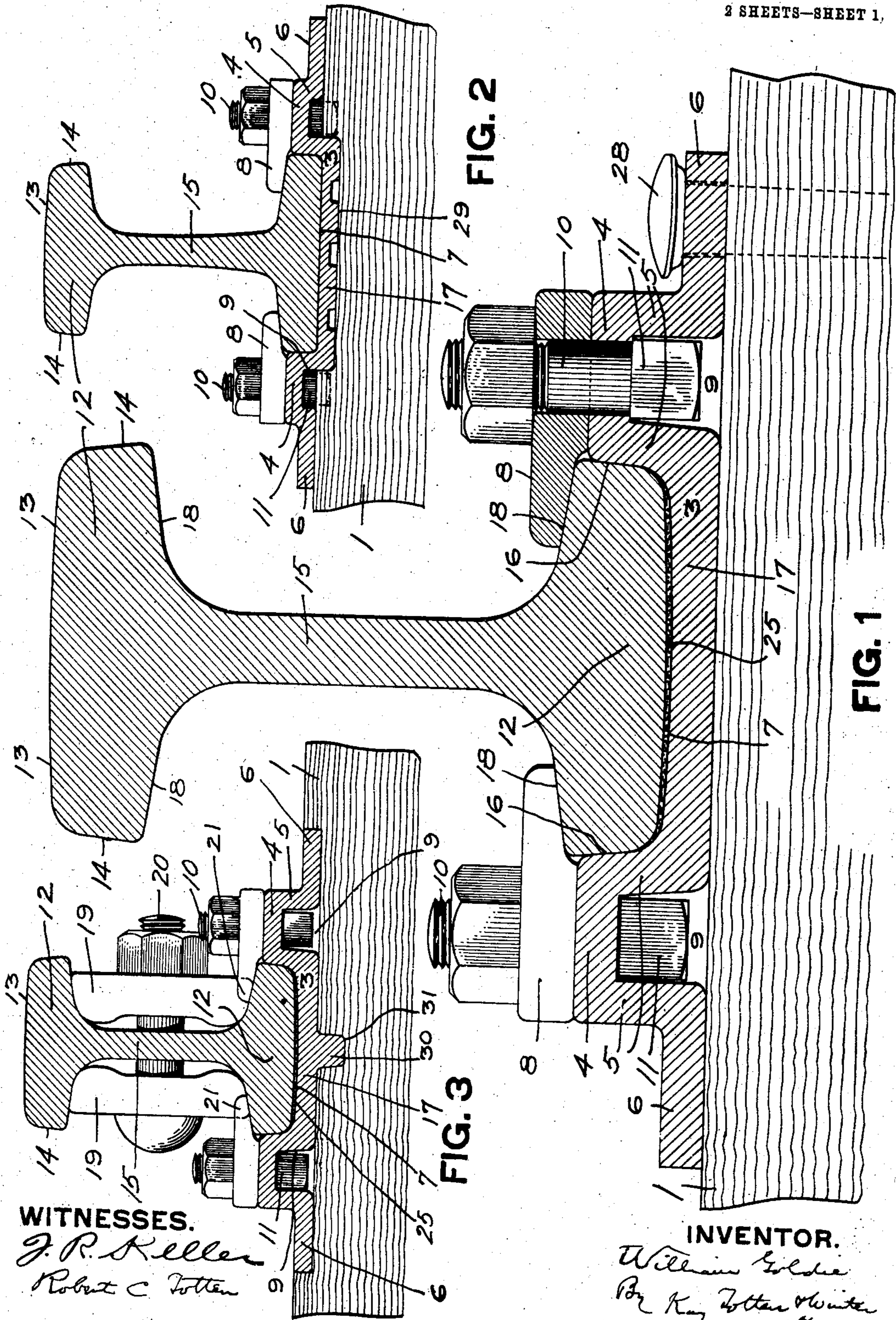
No. 835,021.

PATENTED NOV. 6, 1906.

W. GOLDIE.
RAILROAD TRACK.

APPLICATION FILED APR. 24, 1905.

2 SHEETS—SHEET 1.



WITNESSES.

J. R. Keller
Robert C. Totten

INVENTOR.

William Goldie
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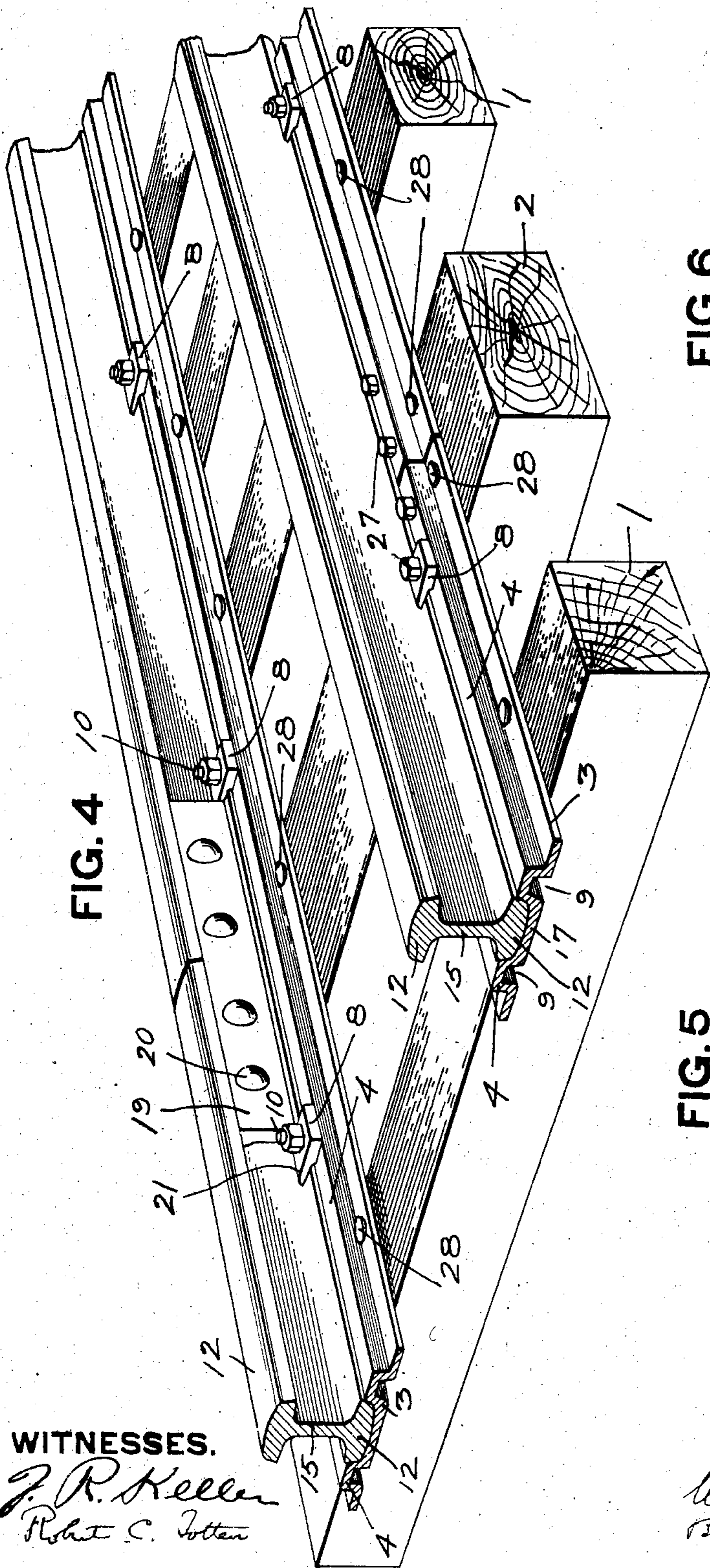
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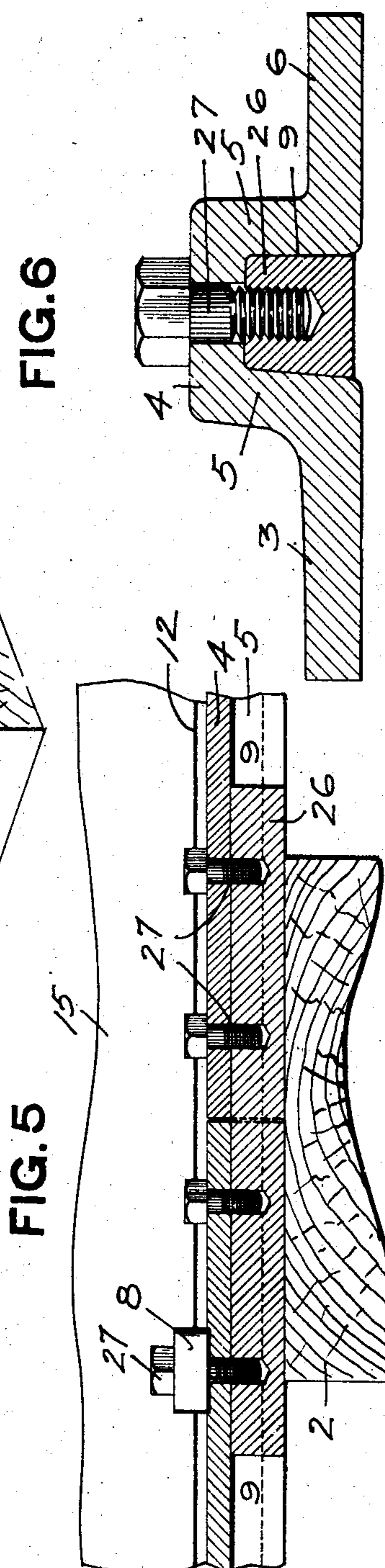
APPLICATION FILED APR. 24, 1905.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM GOLDIE, OF WILKINSBURG, PENNSYLVANIA.

RAILROAD-TRACK.

No. 835,021.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed April 24, 1905. Serial No. 257,138.

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-Tracks; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to railroad-tracks, its object being to provide a railroad-track of sufficient stiffness to carry the loads to which such tracks are at present subjected through the increase of weight of locomotives and the cars and loads carried thereon.

It also has for its object a system of railroad-track in which the bearing of the track upon the ties is extended out for considerably a greater width than the usual rail, thereby giving a greater distribution of the load, and in which a greater angle of lateral resistance is obtained on curves and in like positions.

It also has for its object the provision of a track in which the rail-head or direct load-carrying portion can be more highly compacted and formed of a higher carbon or harder steel than the heavy rails of the present day, and therefore be of much greater wearing capacity, while such rail may, if desired, be made reversible to provide double wearing-surface, and in this way increase the life of the track.

As the weight and speed of trains have increased the railroads have endeavored to provide a stiff enough, and strong enough track to sustain the same by the employment of heavy and higher rails having wider base-flanges to rest upon the ties; but on account of the great bulk of metal in the rail-heads and the development of the wider rail flanges or bases, practical difficulties have been met with in this class of rails. In the first place in forming the rails sufficient work was not applied in the rolls to the rail-head to compact it to any great depth in rolling, as is the case with smaller rail-sections, and after rolling the great bulk of metal in the rail-head in cooling acted to anneal the same and leave the head soft and liable to great wear under the heavy loads and high speed of the train. In the cooling of these rails it was also found that as the flanges forming the rail-base were rolled thin and wide they cooled much more rapidly than the rail-heads and in rails of such heavy section led to initial cracking at the edges of the rail-base and caused internal strains in the rail-body and increased the lia-

bility to cause the rails to camber or curve in cooling. This could only be removed by straightening under presses when cold, and such straightening was liable to increase the internal strain and lead to cracking of the rail or cause the development of cracks in the rail-base—the main cause of broken rails. In the endeavor to provide a rail of greater wearing properties the carbon and manganese have been increased to give greater hardness; but it has been found that in so doing there was greater liability of rail breakage and accident arising from the internal strain on the rail-body leading to initial cracking of the base, which under the heavy loads would quickly extend throughout the rail-body. One of the most difficult problems presented to the railroad engineer has therefore been to provide a stiff railroad-track amply sufficient to bear the load and of high wearing quality and free from great liability of cracking and one that can be easily laid and repaired. The present invention is believed to meet these requirements.

The invention consists in certain improvements in the rails and in the combination therewith of a continuous rail-supporting base-bar, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a cross-section of a railroad track-rail, showing the preferred form of base-bar and rail, the parts being practically full size. Fig. 2 is a cross-section showing the invention in another form and with another form of rail-base. Fig. 3 is a cross-section showing another form of base-bar and illustrating the method of coupling the rails. Fig. 4 is a perspective view of a portion of track, illustrating the invention. Fig. 5 is a side view, partly broken away, illustrating the coupling of the sections and base-bar; and Fig. 6 is a cross-section also illustrating such coupling.

The invention is illustrated in connection with the use of wooden cross-ties, though it may of course be employed with any suitable character of cross-ties. It is shown in Fig. 5 with the cross-ties 1, of the ordinary size, extending under the track-body at all points except where the joints are formed, as illustrated in connection with the cross-tie 2. Supported on these cross-ties is the continuously-running rail-supporting base-bar 3, which is formed of sections and which sections preferably meet upon the enlarged cross-ties, as illustrated, but out of line with the joint of the rail, such sections being con-

nected to each other by joints or coupling
 devices, as above described. The rail-sup-
 porting base-bars 3 are rolled sections, pref-
 erably made of considerably greater width
 5 than the bases of the ordinary rails, the base-
 bars in the full size of track, as illustrated in
 Fig. 1, having a bearing-surface upon the ties
 extending in width for about nine (9) inches,
 this giving such extended surface upon the
 10 tie that an extended and greater distribution
 of the load carried on the track is obtained,
 while the outer point of support is carried
 such distance from the inner edge of the rail-
 head that comparatively little leverage is
 15 brought upon the rail and rocking thereof
 and consequent wear of the tie largely pre-
 vented. This base-bar may either rest
 directly upon the tie without cutting any
 20 kerfs or seats therein, or it may be arranged
 with downwardly-projecting portions, as
 illustrated in Figs. 2 and 3, to take into suit-
 able kerfs or grooves in the tie-body, and
 thereby provide a positive means for holding
 the track to gage, as described in Letters
 25 Patent No. 758,523, granted to me April 26,
 1904. The base-bar may, however, be held
 very securely in place upon the tie of ordi-
 nary smooth surface by spiking or wood-
 screws, as hereinafter described. The base-
 30 bar can be rolled to shape, and it is prefer-
 ably formed as illustrated with the hollow
 raised ribs 4, which provide several vertical
 web portions 5 to add to the stiffness of the
 track structure and also reduce the weight
 35 of the ribs 4 and provide for bolting of the
 fastening devices, while beyond the same are
 the outwardly-extending tread-flanges 6,
 through which it is spiked or otherwise se-
 cured to the ties. The base-bar has in the
 40 central portion thereof the hollow seat 7 be-
 tween the ribs 4, corresponding in shape to
 the rail-base and enveloping the said base,
 the upwardly-extending ribs 4 making it
 possible to provide a seat for the rail-base
 45 sufficiently deep to take in the entire base
 and also to provide means for securing to said
 ribs the clips 8 or other suitable fastening
 devices taking over the upper faces of the
 rail-base and holding it within the seat 7.
 50 As shown in the drawings, the hollow seat
 7 is formed of as great width at its top as at
 its base, being either formed with flaring edge
 walls corresponding to the tapering edge
 faces of the rail-base, as shown in Figs. 1
 55 and 3, or with practically vertical edge walls
 corresponding to the vertical edge faces of
 the rail-base, as shown in Fig. 2. This pro-
 vides for the proper seating of the rail-base
 within the base-bar, while the rail is seated in
 60 the base-bar by a direct downward move-
 ment and raised therefrom by a direct up-
 ward movement, giving a more perfect seat-
 ing of the rail in the base-bar and the proper
 binding of the rail-base in the bar.
 65 As shown in the drawings, the ribs 4 are

formed hollow, the hollow portions 9 thereof
 providing suitable means for the securing-
 bolts 10, the bolt-heads 11 fitting within the
 hollows of the ribs and the bolts extending
 up through the same, holding the clips 8 in 70
 place.

While my invention may be employed
 with any suitable form of rail, I prefer to em-
 ploy a double-headed rail, as illustrated, and
 to form the seat 7 in the base-bar correspond- 75
 ing to the shape of the rail-head, so that the
 rail may be reversed and give double the
 wear. I also prefer to employ the rail-sec-
 tion illustrated in Fig. 1 and Fig. 3, as set
 forth in an application of even date herewith, 80
 Serial No. 257,135, in which the rail-head is
 formed wide and thin, the rail having a sym-
 metrically-formed head, which, as illustrated,
 is approximately three times as wide as its 85
 thickness, such construction giving the ad-
 vantages that while the rail has sufficient
 metal to impart to it great stiffness and load-
 carrying capacity, yet that in the rolling of
 the rail a much greater compactness of metal
 is obtained because of the thinning of the 90
 rail-head, the condensing of the metal
 through the work applied in developing the
 head extending farther into the rail-head,
 which imparts greater toughness and fine-
 ness of structure to resist wear, while the 95
 head itself, being of thinner body, will cool
 more rapidly after rolling and the annealing
 effect taking place in rail-heads of the regular
 standard section of great weight will be
 largely avoided. 100

Where the rail is formed double-headed, as
 shown in Figs. 1 and 3, or where the regular
 rail-base is changed in form to bring it ap-
 proximately close to the section of the head,
 as in Fig. 2, there is the further advantage 105
 that because the head and base correspond
 substantially in shape the one to the other
 and the very thin flanged portions of the or-
 dinary rail-base are avoided the rail will
 cool symmetrically and without great inter- 110
 nal strain and will require little, if any,
 straightening, so that it is not liable to crack
 when in use, and the rail-body can be formed
 with a higher proportion of carbon and man-
 ganese and be therefore of much higher wear- 115
 ing properties. In the double-headed rail
 illustrated the heads 12 are, as shown,
 formed of symmetrical sections, so that the
 rail can be used in any desired position, hav-
 ing the top face at a slight downward incline 120
 from the center of the rail-head, as illus-
 trated at 13, and curving them to the side
 faces 14, which are made slightly sloping,
 while the rail-heads 12 are made not more
 than one-third the thickness of their width, 125
 these heads being connected together by the
 web portion 15. A heavy rail-section of this
 general construction may be formed without
 imparting too great height thereto, while
 giving in the rail itself great stiffness of body 130

and great load-sustaining qualities. At the same time such general form of rail-head can be employed to advantage in connection with the rail-supporting base-bar above described, as the head will fit neatly into the hollow seat 7, that hollow seat being made corresponding in shape thereto, having the slightly sloping faces 16, while the base portion 17 thereof is formed symmetrical and on practically the same lines as the top face of the rail-head, and the rail-head in fitting in said seat becomes practically wedged therein, so that even without any fastening devices it will hold within the seat under the strain of the passing train with little or no liability of rising under the leverage action thereon. The rail-heads, as shown, have also the slightly-inclined inner faces 18, and the clips 8 extend over the same, as illustrated, and act to secure the rails within the base-bars, a much stronger hold upon the rail-base being thus obtained than could be obtained with the ordinary spike. As illustrated in Fig. 4, these fastening devices, such as the clips 8, can be easily secured in place in the spaces between the ties, and they provide efficient means for holding the rail within the base-bars. The rails themselves may be connected by any suitable form of joint, such as the joint-plates 19, secured together by bolts 20, as illustrated in Figs. 3 and 4.

To prevent creeping of the rail upon the base-bar, I place clips or fastening devices 8 at each end of the fish-plate, the inwardly-projecting lips 21 of the clips extending on each side of the joint-plate and holding the parts in proper longitudinal relation. It may be desired to employ in connection with the base-bar and rail a slight cushioning means within the seat 7. For that purpose I may employ a thin sheet or layer of felt, wood, or other like cushioning means, as at 25. This is generally unnecessary, though where a double-headed rail is employed and the rail-head reversed, as above described, it may be desirable to employ the same for proper seating of the rail in the rail-base.

In Fig. 2 I have illustrated another form of base upon the rail, this base being a modification of the ordinary rail-base of the American section-rail. In it the rail-base is reduced in width and thickened in body, so as to correspond more nearly to the rail-head, and as such rail-base fits within the rail-supporting bar and is held by the clips therein, so that the rail and its base-bar are practically one section and the base-bar extends over a large surface of the tie the lateral or leverage strain upon the rail is fully taken care of in such construction.

The rail base-bars may be connected to the ties themselves and to each other in any suitable way. It will generally only be necessary to spike or screw these bars in line

with each other upon the same tie; but, as illustrated in Figs. 5 and 6, the hollow longitudinal seats 9 may be utilized for the purpose of uniting the two base-bar sections. Fitting within such hollow grooves are the coupling-bars 26, extending across between two base-bar sections, these coupling-bars being tapped at suitable intervals to receive the screw-bolts 27, and so bind them together. In case it is desired to place a clip or fastening device to hold the rail and base-bar together at this point the regular clips 8 may be secured in place by the bolts 27, as illustrated in Fig. 5. As above stated, to provide a wide bearing-face of the base-plate upon the ties they are provided with the outwardly-extending flanges 6, and, as illustrated in the drawings, these flanges provide means for spiking the base-plates to the tie, any suitable form of spike or wood-screw 28 being employed for that purpose and the flanges 6 being punched to receive the same. In addition to this the base-plate may be formed as illustrated in Fig. 2, where the seat portion 7 is carried below the level of the flanges 6 and enters into a wide kerf or seat 29, formed therefor in the tie, or the entire base-plate may be let down into the tie, as shown in full lines in Fig. 3, or that base-plate may have a downwardly-projecting rib central of the seat portion 7, as at 30, fitting into a narrower kerf 31, formed in the tie. In any such way the track may be held in proper alinement.

In the use of the track above described the weight of the train is sustained not only by the rail itself, which if formed of the sections illustrated has great load-sustaining capacity; but it is further supported by the base-plate, which in addition to its thickness is added to in vertical strength by means of the rib portions 4 5 with their webs, the vertical portions of which act to brace or truss the rail-body and largely increase its load-carrying capacity. As the train is passing over the track the load brought upon the rail is distributed by the base-plate to the ties, and because of the great width of the base-plate itself a much more perfect distribution of the load upon the ties can be obtained than with any track formed of a single rail, and therefore liability to the cutting of the ties under the load is largely overcome.

As the rail and continuous base-bar are thus combined and united through the seat enveloping the base, they operate substantially as one rail, and to the stiffness of the rail-body is added the stiffness of the vertical portions of the plate, together with the flat body portions thereof, so that the stiffness of the track itself is immensely increased and the weight of the train or load is distributed over a much larger portion of the track, and being sustained by such extended portion of

the track liability to disturb the ballast is largely overcome and the rocking of the ties, leading to the loosening thereof, is practically prevented, so that repair of track from the ordinary causes where the rail itself yields under the load it carries is practically done away with. The track also gives greater resistance to lateral or leverage strain, because the rail-base is firmly held throughout its length by the supporting-bar, and where the rail-base is secured within its seat, so that it cannot rise, liability of the rolling of the rail is reduced, while where the double-headed rail or the rail of the structure of Fig. 2 is employed in fitting in the seat of the supporting-bar the rail is firmly held against such action. They are also enabled to resist such strain where the wide and thin rail-head illustrated is employed, because the load is carried closer to the inner edge of the rail-base, being carried about centrally of the rail-head, so that the weight of the train has a greater tendency to hold down the inner portion of the rail-base, and so hold the rail in position on the tie and less tendency to spread or force the rail-head outwardly under the lateral strain in passing around curves or in like positions.

Another very great advantage of the invention is found in the fact that where the rail is so firmly held in its supporting base-bar the base-bar can be made of soft ductile steel of great toughness and strength such as will resist any tendency to fracture, while the rail itself can be made with considerably higher percentages of carbon, manganese, or other hardening elements, and its hardness and consequent wearing qualities largely increased without fear of accident, first, because the character of strain leading to the breaking of the rail is not liable to be brought upon it, and, second, because if it does break it will be so securely held within the base-bar that there will be little liability to serious accident.

No claim is made in this application for the upper or main rail formed of a head, web and base of relatively hard or high-carbon steel, having high wearing qualities, and a continuously underrunning rail-supporting base-bar, formed of a tough low-carbon steel and having in its upper face a seat corresponding to and adapted to receive and envelop the lower face and edge portions of the rail-base, nor to the employment of a double-headed rail with a continuously underrunning rail-supporting base-bar, having a seat corresponding in shape to such end portion and enveloping the lower face and edge portions thereof but not engaging the rail above the rail-base, as these form the subject-matter of a divisional application filed by me November 15, 1905, Serial No. 287,493.

What I claim is—

1. In a railroad-track, the combination with the upper or main rail formed of a head, web and base, of a continuous underrunning rail-supporting base-bar having in its upper face a seat of as great width at its top as at its base and corresponding to and adapted to receive and envelop the lower face and edge portions of the rail-base, and fastening devices extending from the supporting-bar over the upper face of the rail-base.

2. The combination of a rail having a web portion and head and base of approximately the same width and thickness, the head being made wide and thin and the base portion having thickened edge portions corresponding substantially to the edge portions of the rail-head, and a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the thickened base portion of the rail.

3. The combination of an upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding in shape to and adapted to receive and envelop the lower portion of the rail-base, said base-bar having vertical web portions beyond said seat to increase the stiffness of the track structure.

4. The combination of an upper or main rail, a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding in shape to and adapted to receive and envelop the lower portion of the rail-base, said base-bar having vertical web portions beyond said seat to increase the stiffness of the track structure, and horizontal extensions beyond said web portions to rest upon the tie.

5. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower portion of the rail-base, said base-bar having longitudinal grooves on its under face formed by vertical web portions beyond the rail-seat.

6. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower portion of the rail-base, and fastening devices extending over the rail-base to hold it within said seat, said base-bar having horizontal portions extending beyond the seat for the rail-base, and forming means for securing said fastening devices to the rail-base.

7. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar hav-

ing in its upper face a seat corresponding to and adapted to receive and envelop the lower portion of the rail-base, said base-bar having horizontal portions beyond the seat for the

5 rail-base, and fastening devices secured to said horizontal portions and extending over the upper face of the rail-base.

8. In a railroad-track, the combination with the upper or main rail, of a continuous
10 underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower portion of the rail-base, said base-bar having horizontal extensions beyond the seat for the
15 rail-base, clips extending over the rail-base to secure it to the base-bar, and bolts passing through said horizontal extensions and clips to secure them to the base-bar.

9. In a railroad-track, the combination
20 with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower portion of the rail-base, said base-bar having
25 longitudinal grooves on its under face beyond the seat for the rail-base, clips extending over the upper face of the rail-base, and bolts having their heads seated in said longitudinal grooves and extending through the base-bar
30 and clips to connect the clips to the base-bar.

10. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to
35 and adapted to receive and envelop the lower portion of the rail-base, the sections of the base-bars being united by suitable couplings secured thereto outside the seat for the rail-base.

40 11. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower
45 portion of the rail-base, said base-bars having longitudinal grooves in their lower faces, and coupling-bars fitting within said longitudinal grooves and secured therein to connect the sections of the underrunning base-bar.

50 12. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower
55 portion of the rail-base, said base-bars having longitudinal grooves in their lower faces, coupling-bars fitting within said longitudinal

grooves, and screws passing through the base-bars into said coupling-bars to unite the sections of the underrunning base-bar.

13. In a railroad-track, the combination with the upper or main rail, of a continuous underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower
65 portion of the rail-base, said base-bars having longitudinal grooves in their lower faces, coupling-bars fitting within said longitudinal grooves, screws passing through the base-bars into said coupling-bars to unite the sections of the underrunning base-bar, and clips
70 held by said screws and extending above the upper face of the rail-base.

14. In a railroad-track, the combination with the upper or main rail, of a continuous
75 underrunning rail-supporting base-bar having in its upper face a seat corresponding to and adapted to receive and envelop the lower portion of the rail-base, joint-plates uniting the main-rail sections, and fastening devices
80 connected to the base-bar and extending over the upper face of the rail-base in line with said joint-plates and at the ends thereof to hold the rail and the rail-base against longitudinal movement with relation to each
85 other.

15. The combination of railroad-ties having seats formed on the upper face thereof, an upper or main rail, and a continuous underrunning rail-supporting base-bar having
90 a seat corresponding in shape to and adapted to receive and envelop the lower portion of the rail-base, said seat forming a depressed portion of the base-bar which enters the seats formed in the cross-ties.

16. The combination of railroad-ties having seats formed on the upper face thereof, an upper or main rail, and a continuous underrunning rail-supporting base-bar having
100 a seat corresponding in shape to and adapted to receive and envelop the lower portion of the rail-base, said seat forming a depressed portion of the base-bar entering the seats formed in the cross-ties, and said base-bars having horizontal extensions beyond said
105 seat resting on the cross-ties beyond the seats formed therein.

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

WILLIAM GOLDIE.

Witnesses:

JAMES I. KAY,
ROBERT C. TOTTEN.