5 Sheets—Sheet 1.

A. J. ACASTER.
Securing Railway Rails.

No. 205,600. **Patented July 2, 1878.**

FIG: 1.

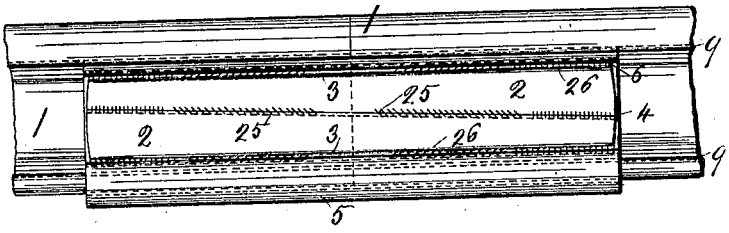


FIG: 2.

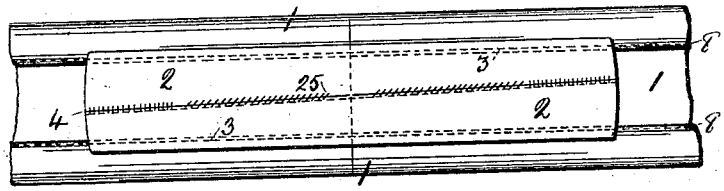


FIG: 3.

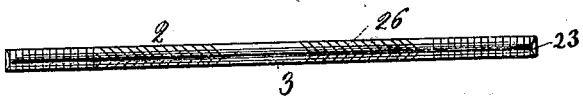
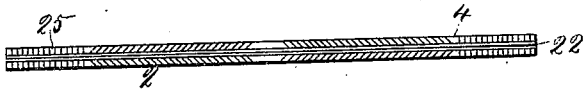


FIG: 4.



WITNESSES.

Henry Howson Jr.
Thomas McElvain

INVENTOR.

Amos J. Acaster
by his attorneys
Howson & Howson

5 Sheets—Sheet 2.

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FIG. 13.

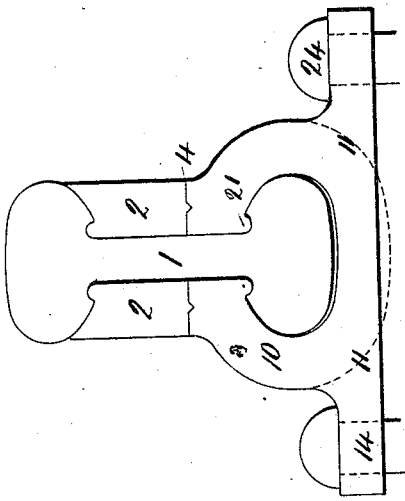


FIG. 14.

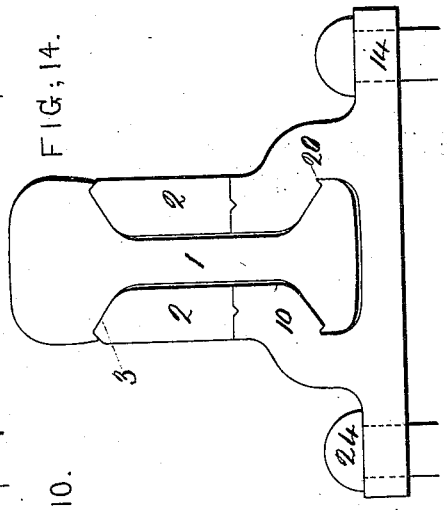


FIG. 9.

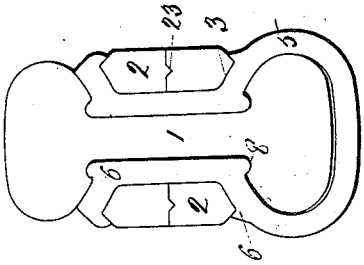


FIG. 10.

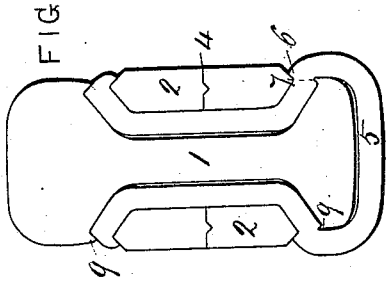


FIG. 5.

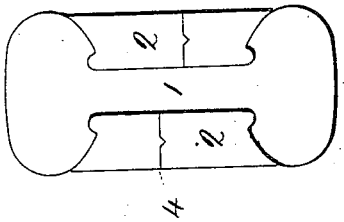
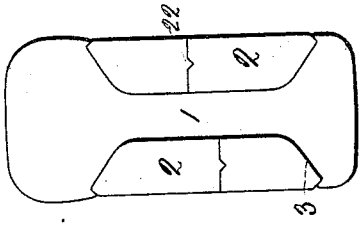


FIG. 6.



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No. 205,600. **Patented July 2, 1878.**

FIG. 15.

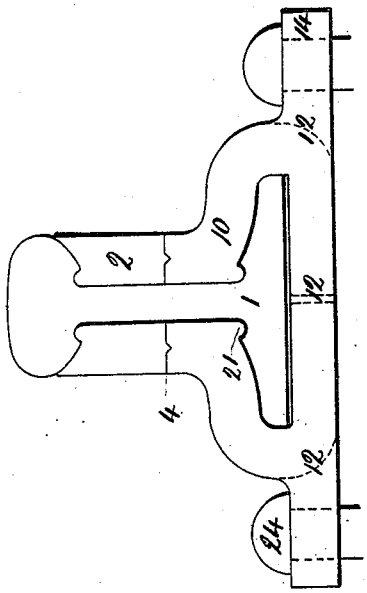


FIG. 16.

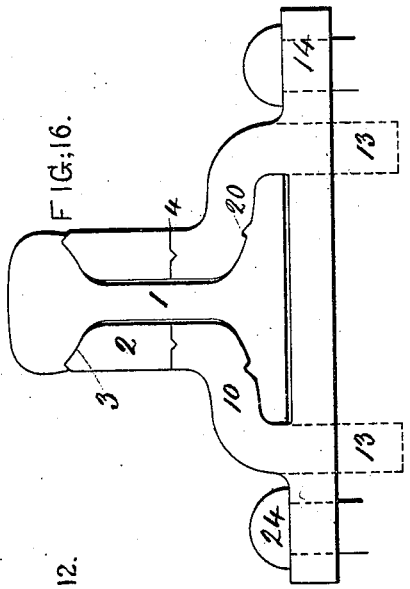


FIG. 11.

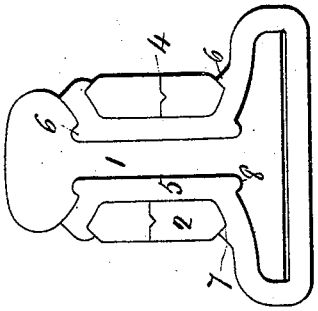


FIG. 12.

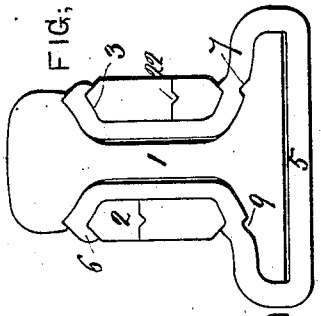


FIG. 7.

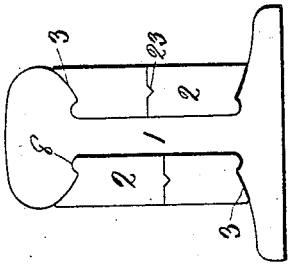
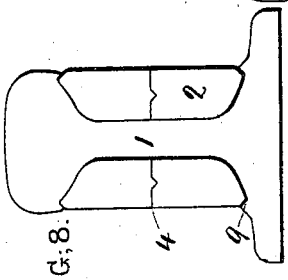


FIG. 8.



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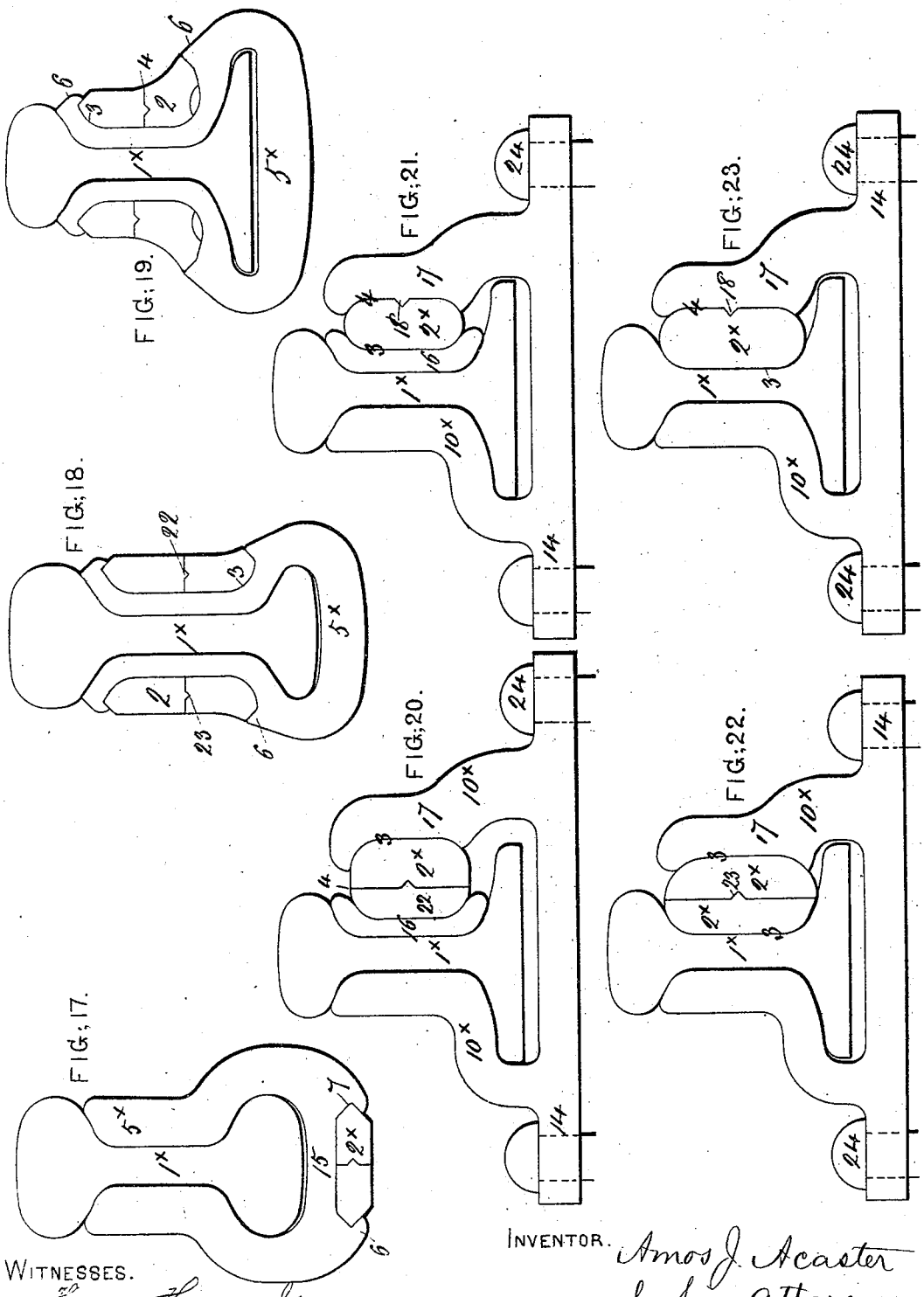

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5 Sheets—Sheet 5.

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Securing Railway Rails.

No. 205,600. **Patented July 2, 1878.**

FIG. 26.

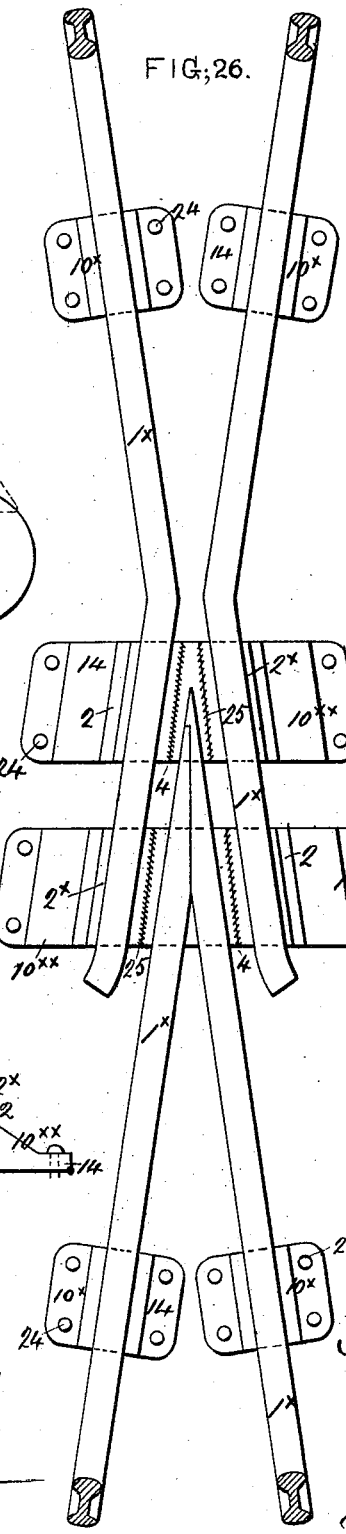


FIG. 25.

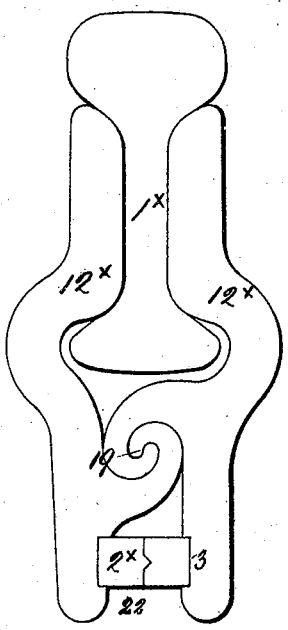


FIG. 24.

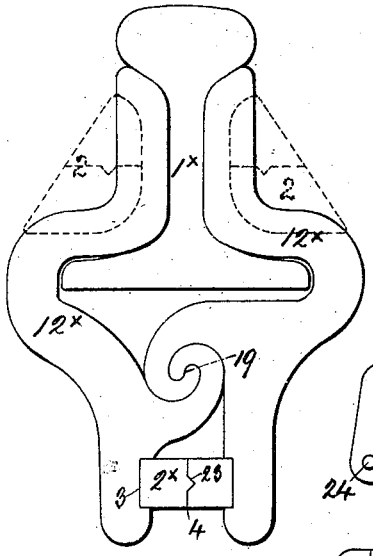
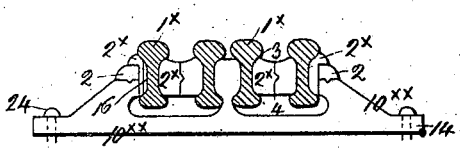


FIG. 27.



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Amos J. Acaster

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UNITED STATES PATENT OFFICE.

AMOS JOSEPH ACASTER, OF SHEFFIELD, ENGLAND.

IMPROVEMENT IN SECURING RAILWAY-RAILS.

Specification forming part of Letters Patent No. **205,600**, dated July 2, 1878; application filed January 2, 1878; patented in England, December 18, 1876.

To all whom it may concern:

Be it known that I, AMOS JOSEPH ACASTER, of Sheffield, in the county of York, England, engineer, have invented certain Improvements in the Permanent Way of Railways, of which the following is a specification:

This invention, which relates to improvements in the permanent way of railways, and for which an English patent, No. 4,884, December 18, 1876, was granted to me, has for its objects the dispensing with the use of nuts and bolts in jointing or connecting the ends of rails, and consequently with the necessity for drilling or punching holes therein, and in the usual fish-plates, which adds considerably to the cost, and materially weakens the rails and the joint; the lessening of the number and weight of the parts required; the provision of strong elastic self-locking joints, which, when once securely tightened up, will remain so until the rails are so worn as to be unfit for further use, rendering the joints almost as strong as if the rails were continuous, and will cause the adjoining rail-ends to deflect equally at the approach of an engine or train; and the suspension or supporting of rails and crossing-rails in an improved manner, whereby the disadvantages attendant upon a rigid basis are entirely avoided.

These objects I attain by the employment of wedges whose adjoining faces are roughened, one face being provided with a longitudinal rib adapted to a groove in the other face, as more fully described hereinafter.

In the accompanying drawings, Figures 1 and 2, Sheet 1, show my improved wedges as adapted for securing the ends of rails; Figs. 3 and 4, views of the corresponding faces of the two wedges, while on Sheets 2, 3, 4, and 5 are represented various modifications of the application of my improvement.

With reference, first, to the modifications illustrated in Figs. 1 to 16, Figs. 1 to 5 and 8 illustrate the use, in combination, of longitudinally grooved or ribbed rails 1 (of any cross-section) with upper and lower longitudinally ribbed or grooved wedge-shaped keys 2, transversely notched, indented, serrated cross or diamond cut, or otherwise equivalently roughened on all their edge contact-faces 3 4 with the rails and with each other.

Figs. 1, 3, 4, and 9 to 12 illustrate the use, in combination with such rails 1 and keys 2, of sheaths 5, longitudinally ribbed, as at 6, or grooved, as at 7, both inside and outside correspondingly with the grooves 8 or ribs 9 of the rails, and of the outer edges 3 of the keys, the sheaths being placed between the rails and the keys.

Figs. 13 to 16 (without reference to the dotted lines in Figs. 13, 15, and 16) illustrate the use, in combination with such rails 1 and upper keys 2, of wedge-chairs 10, grooved as at 20, or ribbed, as at 21, acting as ordinary chairs, or as compound rail-joints and chairs, and being fastened, as usually, to the sleepers by spikes 24.

Figs. 5, 9, and 13 illustrate the application of the improvements to double-headed grooved rails, Figs. 6, 10, and 14 to single-headed ribbed rails, Figs. 7, 11, and 15 to grooved T-rails, and Figs. 8, 12, and 16 to ribbed T-rails.

Figs. 5, 9, and 13 will serve, also, as illustrations of the application of the improvements to single-headed grooved rails, and Figs. 6, 10, and 14 of the application thereof to double-headed ribbed rails, without necessitating separate illustrations.

These improvements may be equally well adapted to rails of other sections than those delineated on the accompanying drawings, and in other modifications than those above described, and of which a short description with reference to the dotted lines in Figs. 13, 15, and 16 will suffice. These modifications differ only from that hereinabove described, and delineated in Figs. 13 to 16, in that wedge-sheaths encircling the lower head or flange of the rail, as dotted at 11, Fig. 13, or separate half-sheaths partly encircling it, as dotted at 12, Fig. 15, or continuing from the lower head straight down for a short distance, as dotted at 13, Fig. 16, are substituted for the wedge-chairs 10, not any of these modifications being formed with the outward spike-flanges 14. (Shown by the full lines in these figures.)

With reference, secondly, to the modifications illustrated in Figs. 17 to 25, Fig. 17 illustrates the use, in combination with ordinary rails $1^{\times}$, (of any cross-section, a double-headed rail being shown,) of correspondingly-shaped sheaths $5^{\times}$, ribbed or grooved outside at their bottoms 15, and of the above-described keys

$2^{\times}$, which, tending to force the bottom of the sheath asunder, cause its upper jaws to nip and firmly hold the rails.

Figs. 18 and 19 illustrate a similar combination to that illustrated in Figs. 9 to 12; but they illustrate, respectively, ordinary single-headed and T rails $1^{\times}$, not formed with the ribs or grooves illustrated in the said figures, the inner sides of the sheaths $5^{\times}$ being correspondingly formed.

All the wedge-keys 2 illustrated in Figs. 1 to 16 and 18 and 19 have a vertical action, intended to truss the rails well up to their work, and cause smooth riding; but the wedge-keys $2^{\times}$ illustrated in Figs. 17 and 20 to 25 have a horizontal action, intended to tightly nip the webs of the rails and bind them well against the chair-jaws, and also to truss the rail-heads well up to their work.

Fig. 20 illustrates a pair of such horizontally-acting wedge-keys $2^{\times}$, used in combination with a chair, $10^{\times}$, and truss-piece 16 to support an ordinary rail, $1^{\times}$.

Figs. 21 to 23 are illustrations of a similar combination, but show, respectively, in addition to the rail and chair, a truss-piece with one wedge-key, the adjacent jaw 17 of the chair being conformably wedge-shaped and ribbed or grooved at 18, two wedge-keys, and one wedge-key, the adjacent jaw 17 of the chair being conformably wedge-shaped and ribbed or grooved at 18.

Figs. 24 and 25 illustrate separate semi-sheaths or jaws, $12^{\times}$, fulcrumed below the rails, as shown at 19, and caused to nip the webs of the rails, and truss the rail-heads by horizontally-acting wedge-keys $2^{\times}$. The dotted lines in Fig. 24 illustrate the further application, in combination with this arrangement, of vertically-acting wedge-keys 2.

With reference, thirdly, to the application of the said principle to crossing rails, (illustrated in Figs. 26 and 27,) these figures illustrate a built-up crossing of ordinary rails, $1^{\times}$, showing the same suspended in sheaths or wedge-chairs $10^{\times\times}$, sufficiently wide to embrace the rails by horizontally-acting and vertically-acting wedge-keys $2^{\times}$ 2, the latter being applied outside the outer rails, and the former being also applied between the sheaths or wedge chair-keys 2 and the webs of the outer rails, and between the webs of the pairs of rails, in lieu of the usual blocks placed between the rails to keep them at the required distance apart. The left-hand side of Fig. 27 shows the application of a truss-piece, 16, also. Crossing-rails, which are cast whole, may also be suspended in such chairs $10^{\times\times}$ by means of such horizontally-acting and vertically-acting wedge-keys $2^{\times}$ 2 applied between the jaws of the chairs and the webs and heads of the outer rails.

The important feature hereinabove referred to as being illustrated in Figs. 1 to 4, and which from extensive experiments I have found to be most material to the safety and durability of the joint, consists in the above-referred-to notching, indenting, serrating, cross or diamond cutting, or other equivalent roughening of all the contact or bearing edges or faces 3 4 of the wedge-shaped keys, by which they are enabled to obtain a firm and secure hold of the rails, sheaths, chairs, or of each other, and are prevented loosening or slipping endwise when the joint is subjected to the jar arising from the passage of engines or vehicles. The keys are prevented slipping sidewise by the interlocking of the ribs 22 on the inclined faces of the upper keys with the grooves 23 in the inclined faces of the lower keys. 25 represents the notches, indentations, or roughenings of the inclined contact-faces 4 of the keys; and 26 the notches, indentations, or roughenings of the parallel contact-faces 3 thereof.

Fig. 1 represents, on a reduced scale, a side elevation of Fig. 10; Fig. 2, a similar view of Fig. 5; Fig. 3, a plan view of the parallel faces 3 of the keys, and Fig. 4 a similar view of the inclined faces 4 thereof.

Figs. 5 to 25 and 27 are all cross-sections, Fig. 27 being a section of Fig. 26 through *x x*.

With reference to Figs. 2 and 5 to 8, in jointing the rails, the ends thereof being brought opposite, the lower wedge-key of each side is first placed in position, and then the upper key, the inclined ribbed, grooved, and notched edges 4 being in contact, and the parallel or outer ribbed or grooved and notched edges 3 being in the longitudinal grooves, or about the ribs of the rails, the wedges being then well knocked together endwise, the rail-ends are well and strongly supported by the outer edges of the keys, while the latter are prevented from moving sidewise or slipping endwise by the ribbing, grooving, and notching, indenting, or roughening of their contact edges.

With reference to Figs. 1 and 9 to 12, the rail-ends are first placed within the sheaths, and then the wedges are applied to the sheaths in the same manner as they are to the rails, as immediately above described.

With reference to Figs. 13 to 16, the wedge-chairs are first threaded onto the rail-ends, or the semi-sheaths are placed about the lower parts of the rails, and then the upper wedges are applied and well knocked in.

With reference to Figs. 17, 18, and 19, the sheath-jaws are slightly forced apart by a bar or anything handy and suitable, and threaded onto the rails, and then the wedges are applied as above.

With reference to Figs. 20 to 23, the chairs are threaded onto some sections of rails, while other sections of rails can be lowered thereinto, and then the truss-pieces and wedges are placed and the latter well knocked in.

With reference to Figs. 24 and 25, the semi-sheaths are fulcrumed together and opened, the rails inserted, the jaws brought together, and the wedges placed and well knocked in.

With reference to Figs. 26 and 27, the rails being placed, the wedges are inserted between

them and between them and the chair and well knocked in.

It will be seen from the above description, and on reference to Figs. 13, 14, 15, 16, 21, and 23, that a portion of the sheath or a portion of the rail-chair may in some cases constitute one of the grooved or serrated wedges for securing the rails.

The ribbing or grooving of the rails may be limited to their ends or any part, or be continuous throughout their length, so as to allow of their being cut in any length and jointed.

I do not claim, broadly, a rail-joint wedge having a roughened face; but

I claim as my invention—

1. The combination, in a rail-fastening, of rails with wedge-keys, one key having a longitudinal rib, adapted to a corresponding groove in the other key, substantially as described.

2. In a rail-fastening, the railroad-rails, combined with and secured by wedge-keys, having their adjoining faces roughened or serrated, and one face being provided with a longitudinal rib, adapted to a corresponding groove in the other face, all substantially as described.

3. The combination of wedge-keys with longitudinally ribbed or grooved rails, to which the said keys are adapted, substantially as set forth.

4. The combination of wedge-keys with the rails, and with longitudinally-ribbed wedge-sheaths interposed between the said wedges and rails, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

A. J. ACASTER.

Witnesses:

BERNARD WAKE, *Solicitor, Sheffield.*

W. T. SHEPHERDSON, *His Clerk.*