(No Model.) 2 Sheets—Sheet 1.

J. WHITEFORD.

PERMANENT WAY OF RAILWAYS.

No. 273,923. Patented Mar. 13, 1883.

FIG. 1.

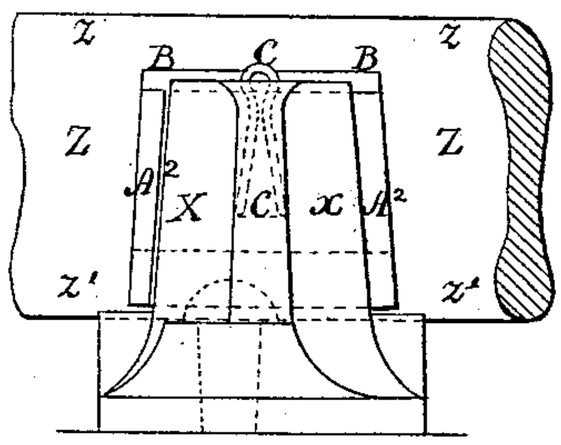


FIG. 2

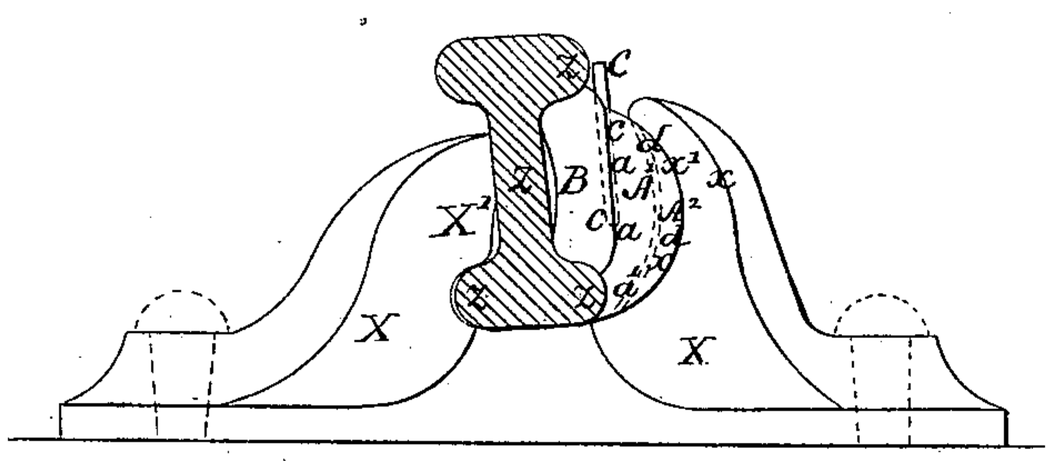


FIG. 3

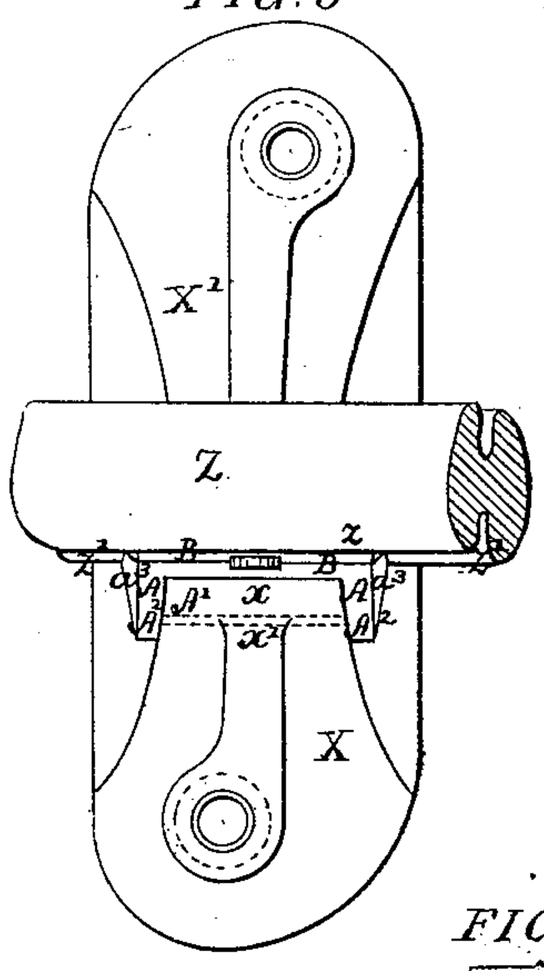


FIG. 7.

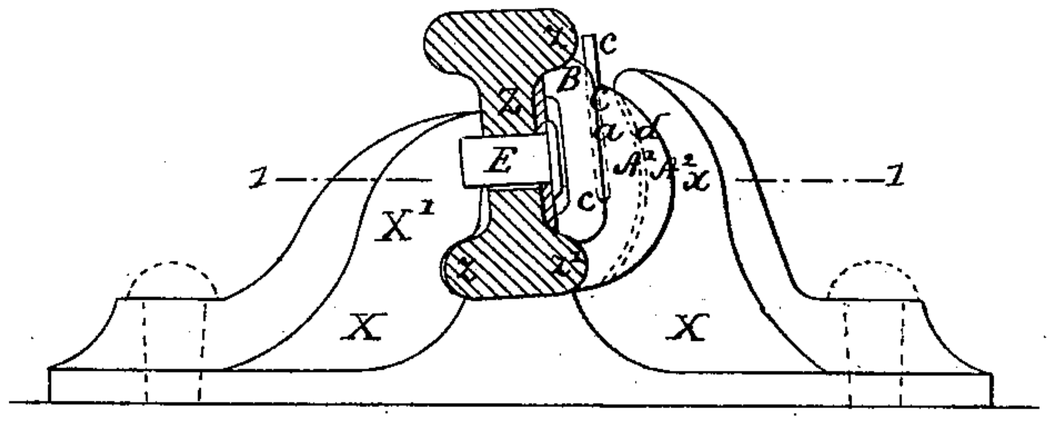


FIG. 8.

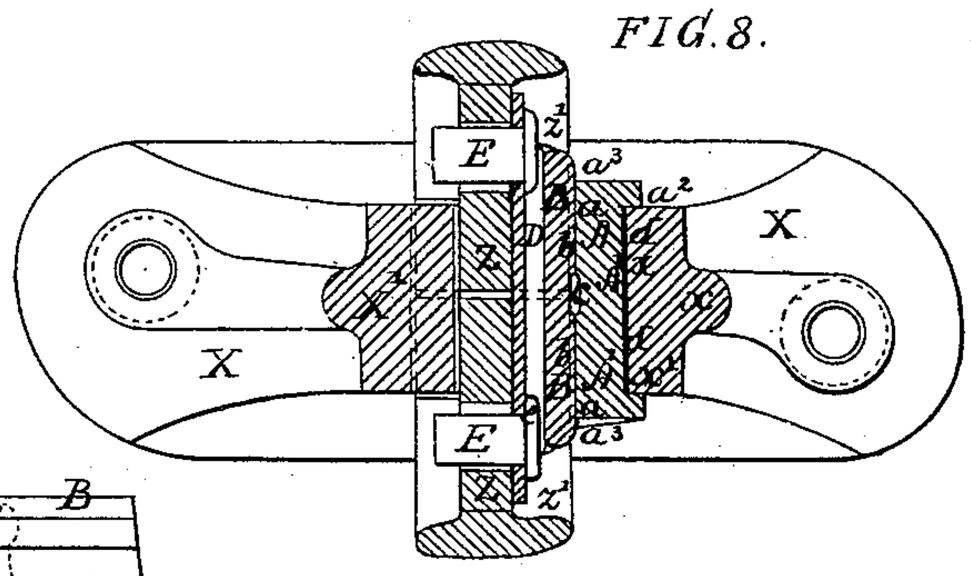


FIG. 9

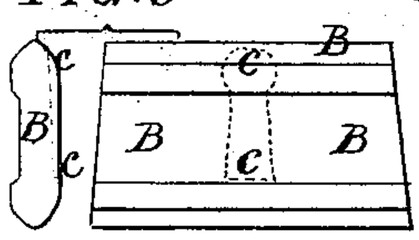


FIG. 4.

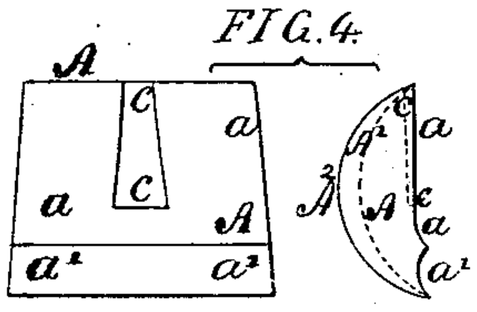


FIG. 10.

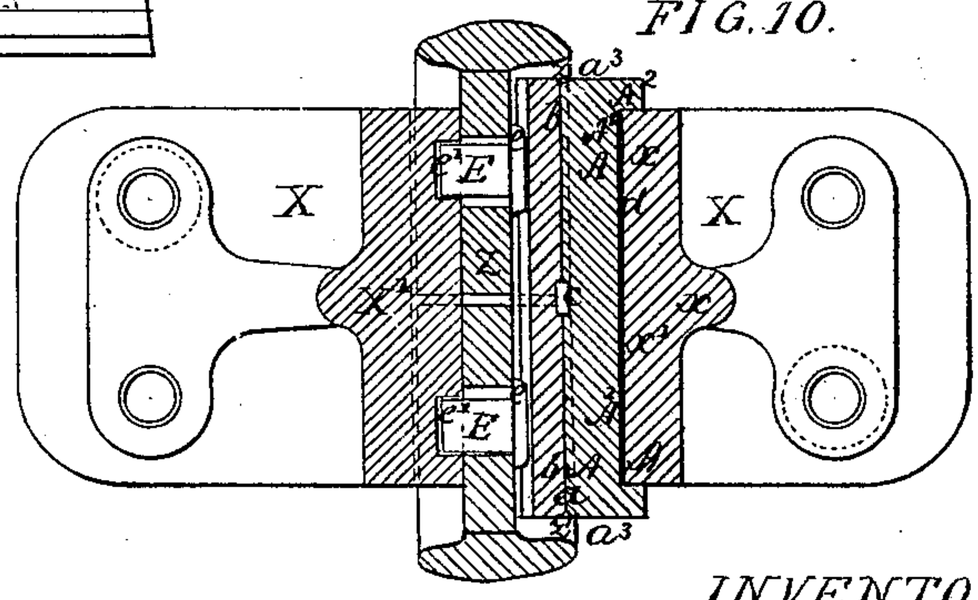


FIG. 5.

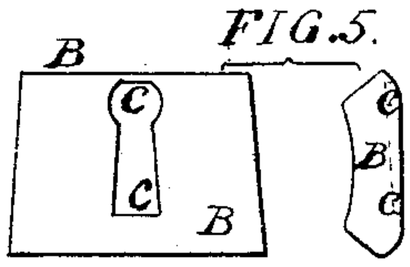
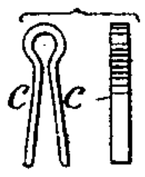


FIG. 6



WITNESSES:

Harry Drury.

Hubert Howson

INVENTOR:

James Whiteford

by his attorneys

Howson and Sons

(No Model.) 2 Sheets—Sheet 2.

J. WHITEFORD.

PERMANENT WAY OF RAILWAYS.

No. 273,923. Patented Mar. 13, 1883.

FIG. 13.

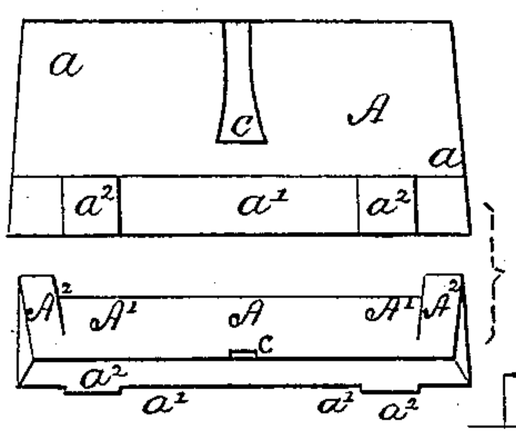


FIG. 11

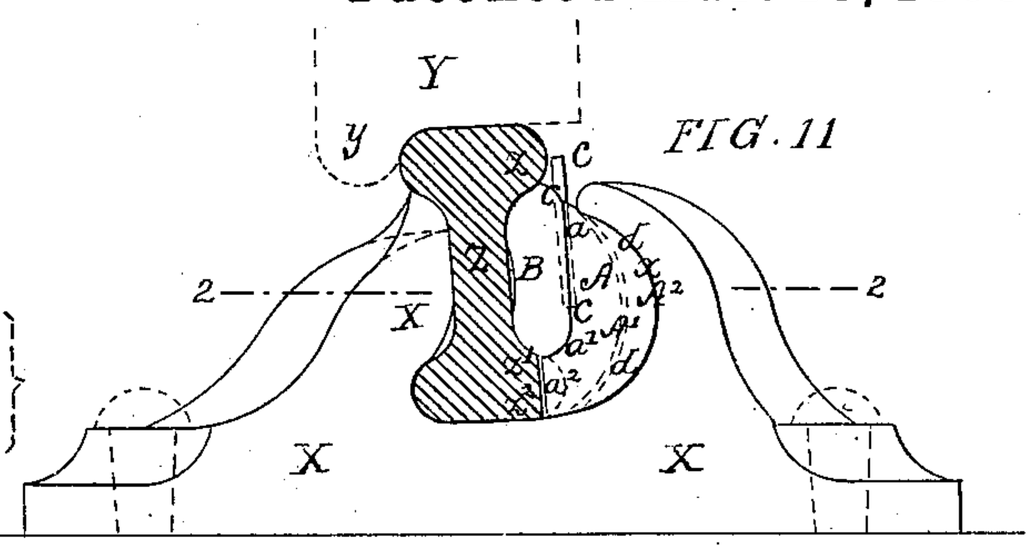


FIG. 12.

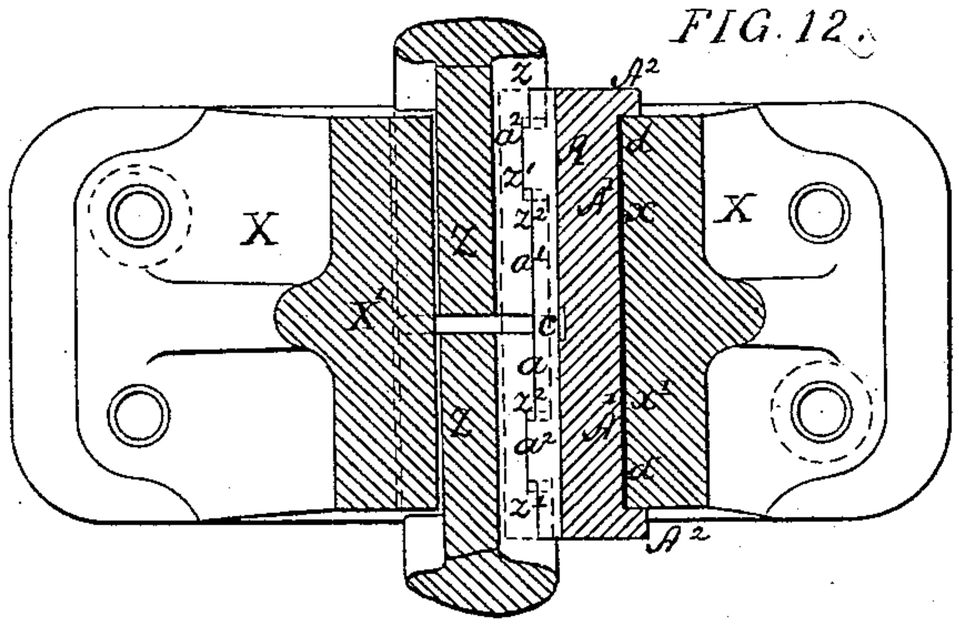


FIG. 14

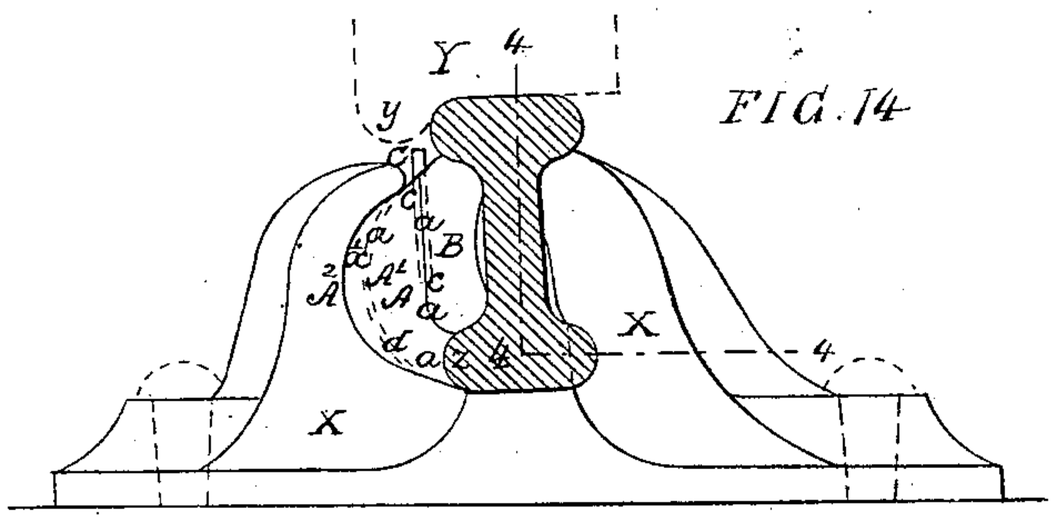
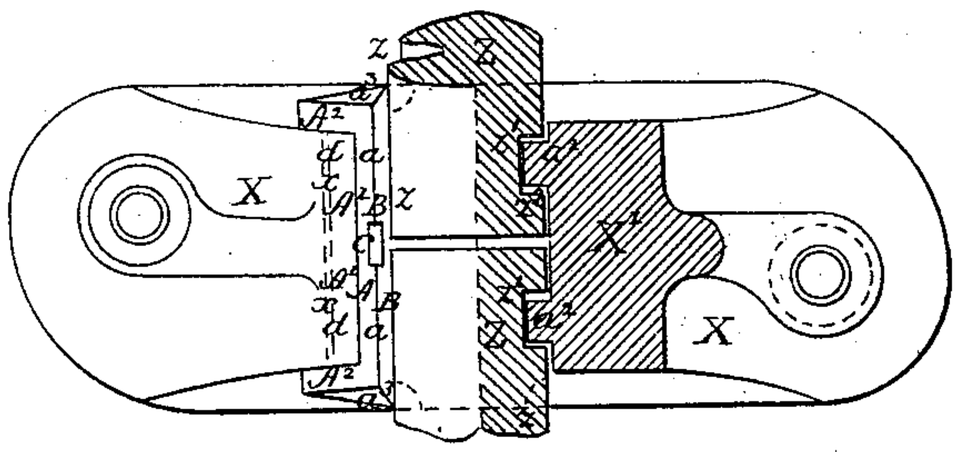


FIG. 15.



WITNESSES:

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INVENTOR:

James Whiteford

by his attorneys

Howson and Sons

UNITED STATES PATENT OFFICE.

JAMES WHITEFORD, OF GREENOCK, COUNTY OF RENFREW, SCOTLAND.

PERMANENT WAY OF RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 273,923, dated March 13, 1883.

Application filed June 19, 1882. (No model.) Patented in England, November 7, 1881, No. 4,861.

To all whom it may concern:

Be it known that I, JAMES WHITEFORD, of Greenock, in the county of Renfrew, Great Britain, doctor of medicine, have invented certain Improvements in the Permanent Way of Railways and in fittings connected therewith, which improvements are fully set forth in the following specification and the accompanying two sheets of drawings.

My invention has reference to the permanent way of railways, and especially to an improved mode and means of securing the rail in the chair, both in its continuity and at the ends or points of junction of the rails.

The invention is applicable to the existing form of chair and double-headed rail in ordinary use (or, with suitable modification, to any other form of chair and rail) without requiring any change in or interference with the actually-existing condition of either chair or rail, and may be relied upon for securing the rail in its continuity, and also for joining and fastening the ends of the rails in the chair, thereby avoiding the use of the ordinary end-joint fish-plates; and the invention essentially consists in the use of a new cheek-plate or bearing-block, A, fixing-key B, and retaining split cotter or pin C for fixing and retaining the rails in their chairs, instead of the ordinary wooden key heretofore used, all as set forth in the annexed claims.

In the accompanying drawings, Figures 1, 2, and 3 on Sheet 1 are respectively a side elevation, a corresponding transverse section, and a plan of a part of an ordinary double-headed or flanged rail, Z, properly secured in position within an ordinary narrow chair, X, (where no end joints of the rail are required) by one construction and arrangement of my new or improved fasteners, all in accordance with this invention, while Figs. 4, 5, and 6 show a side elevation and edge view of the three main parts, respectively, of the fasteners—namely, the bearing-block A, the wedging or fixing key B, and the retaining split cotter or pin C. Figs. 7 and 8 are a transverse vertical section and a corresponding horizontal section, taken on the line 1 1 in the former, of an ordinary chair, X, with the adjacent ends of two ordinary double-flanged rails, Z Z, properly secured therein by a slight modification of my said improvements from that shown in the former, Figs. 1, 2, and 3, also in accordance with this invention, while Fig. 9 shows a side and an edge view of the fixing-key B of this arrangement shown in Figs. 7 and 8. Fig. 10 shows a horizontal section corresponding to Fig. 8, but with a wider chair, X, for securing the joint ends of two rails, Z Z, to the chair X, without the retaining-plate D of the former arrangement, by and in accordance with the improvements of my invention. On Sheet 2 of the drawings, Fig. 11 is a transverse vertical section, and Fig. 12 a horizontal section taken on the line 2 2 of the former, with the key-piece B as removed, showing the end joint of the two rails Z Z for being secured in a broad or wide chair, X, (but also applicable to an ordinary narrow chair,) by a slight modification of my improvements, as shown in Figs. 1 to 6, Fig. 13 showing the front view and plan of the cheek-plate A as modified in this arrangement. Fig. 14 is a transverse vertical section of a rail and side view of a chair; and Fig. 15 is a corresponding plan in horizontal section on the line 4 4 of the former, showing a modification of my improvements, suitable for either narrow or broad chairs, for securing the rails at the middle or the ends, respectively, of the rails Z to the outer jaw of the chair X, with my improved securing parts fitted on the inner side of the rail and chair, instead of on the outside, as shown in the former figures.

Referring generally to the figures on the accompanying two sheets of drawings, the nature and novelty of this invention consist in substituting for the wooden key or wedge at present in use for securing the rails in their chairs a new construction, arrangement, and combination of cheek-plate A, key-piece B, and bolt, cotter, or split pin C, all of which may be formed of metal, such as cast or malleable iron or steel wholly, or partly of such metal and partly of wood, but preferably wholly of metal.

The new cheek-plate A is formed so as, when in position, to fit by its outer surface, A′, exactly to the inner surface, *x′*, of the jaw of the chair X, and by the part *a′* of its inner surface, *a a′*, to the outer surface of the lower flange, *z′*, of the rail Z below, for which purpose it is fluted below at *a′*, the rest of this surface *a* forming a vertical plane parallel to the web of

the rail Z. About the middle of this plane *a* there is formed a vertical groove or recess, *c*, of rectangular section, extending about two inches in length by one-eighth of an inch in depth, by three-eighths of an inch, or thereabout, in breadth (for about half the length) above, widened to five-eighths of an inch below. At each end of this cheek-plate A there is formed a flange, A^2 A^2, which projects backward, so as to fit to the edges of the jaw *x* of the chair X.

The improved key-piece B is made to fit exactly, so as to fill the space left between the vertical plane surface *a* of the cheek-plate A, already mentioned, and the rail Z. This piece B is grooved correspondingly at *c*, so that when pushed, driven, or tapped longitudinally (namely, in the direction of the rail) into position between the flanges *z z* of the rail Z the two grooves or recesses *c c* in the cheek-plate A and key B, being brought into a position, form together a vertical slot, *c*, for the reception of the cotter and bolt or split pin C. The cotter, bolt, or split pin C, as shown in side and edge view in Fig. 6, is of rectangular section, having the split transverse and vertical to the direction of the rail when placed in position in the recess *c c*, formed for it in the cheek-plate A and key B, whereby the key B is prevented from moving out of place by any vibration of the rails.

The cheek-plate A and key B, when in position as seen in Figs. 2, 7, 11, and 14, thus fill the whole space between the chair and rails, which is only partially filled by the present wooden key; and accurate adjustment, so as to produce sufficient friction and tightness between the key B and rail Z, may be obtained, when necessary, by inserting wood-shavings, canvas, or sheet metal, felt, paper, or other convenient substance, as shown at *d d*, between the cheek-plate A and cheek or jaw *x* of the chair X, before inserting the key B.

The cheek-plate A and key B used together, and thus fastened, are relied upon not only for securing the rail in its continuity in the narrow or ordinary chairs, where there are no end joints, as shown in Figs. 1, 2, and 3, but also for fastening the ends of the two rails in a chair sufficiently wide, as shown in the other figures, 7 to 15, thereby forming a solid joint without the use of fish-plates or requiring any important change in or interference with the form or construction of the actually-existing chairs and rails.

Referring to the modification and arrangement shown in Figs. 7, 8, and 9, the two ends of the rails Z Z are inserted into the ordinary chair, X, with the joint near the center of the chair, and have a thin connecting longitudinal plate, D, across the end joint, bearing on the vertical web of the rails, with two round holes, *e*, in it at the proper distance to suit the center of the usual slightly-oblong holes, as used for the ordinary fish-plate in the web of the rail, as seen particularly in Fig. 8, for the insertion of short thin headed pins E through the plate D, and the web of the rails projecting on each side of the inner bearing-cheek of the chair, as seen in Figs 7 and 8. This allows of a free motion of the rails for expansion at their end joint, and yet prevents the rails from slipping longitudinally out of the chairs. The key-piece B, in this case, is made thinner and longer than in the former, Figs. 1, 2, and 3, with a hollow in the center to clear the head of the pins E to retain them in position, all as seen in Figs. 7, 8, and 9, and particularly in Fig. 9 detached; but otherwise the rails are held tight in the chair X by the cheek-plate A, key B, and cotter C, all substantially as shown and described in reference to Figs. 1 to 3. In Fig. 10 the plate D is dispensed with, and the chair is made wide enough to have holes or recesses *e'* formed in the inner jaw, X', or that against which the rail bears, to receive the ends of the pins E for retaining the ends of the rails in the chair, and yet allow of the proper freedom for expansion at the end joints. In this case the pins E may or may not have heads, as described; but otherwise this modification is substantially the same as shown and described in reference to Figs. 7 to 9, for securing the rails in the chair by the cheek-plate A, key B, and cotter C.

Figs. 11 to 13 show a slight modification of my improvements for properly jointing and securing the adjacent ends of the rails Z Z in a wider chair X; or it might be an ordinary chair without either the plate D or pin E of the former modification, by forming two small projections, a^2, on the lower inner fluted bearing part, *a'*, of the cheek-plate A, as seen particularly in Fig. 13, and cutting corresponding recesses, z^2, in the side of the lower flange, *z'*, of the rails Z Z, for these projections a^2 to enter, but sufficiently wide longitudinally to allow of the necessary freedom for the expansion of the rails at the end joint, as seen particularly in Fig. 12—that is, the recess z^2 in the flange *z'* of the rail should exceed the projection a^2 on the cheek-plate A by a quarter of an inch, or thereabout, exactly in the same manner as the longitudinal diameter of the holes at present in use in the rails exceeds the diameter of the bolts for the fish-plates. At the same time it will be seen that the rails are firmly secured laterally in the chair by the block A, key B, and cotter C, substantially as described in reference to all the other figures and modifications.

Figs. 14 and 15 show a modification of my improvements as arranged and fitted for tightening and securing the rails Z Z in their chair X on the inner side by fitting the bearing-block A and key B, with their retaining-cotter C, on that side quite below the flanges *y* of the carriage-wheels Y, instead of on the outside, as in the other figures, and which is generally the case. The lower bearing part, *a'*, of the block A is fluted to bear on the rounded edge of the lower flange at *z'* of the rail Z, as in all the other modifications; but in this modification the projections a^2 are shown as formed

on the lower grooved part of the jaw X′ of the chair on which the rail bears, (instead of on the block A, as in the former figures, 11 to 13,) the notches z^2 being formed in the lower flange, z', of the rail on the corresponding side to receive the projections and retain the joint of the rails in the center of the chair longitudinally, and also allow freedom for their expansion.

The bearing-blocks A and the tightening-keys B, as shown in the drawings, are intended for being made of cast-iron, and made parallel or slightly tapered and rounded off at the ends a^3 of their adjacent bearing-surfaces *a*, and *b*, for being easily entered and driven up, the desired tightness being given by adding a thin layer of wood, felt, paper, canvas, or other soft yielding material at *d*, between the bearing-surface A′ of the block A and the cheek *x* of the chair. However, as before stated, these blocks A and keys B might be made of other metals, or one or other of them of hard wood; but the retaining-cotter C, when split, as shown, would be made of steel or other hard elastic material.

I am aware that various constructions of retaining wedges, keys, and pins have been used for securing rails in chairs—such, for instance as the construction shown in Cochrane's French Patent No. 18,417, May 1, 1857; but, so far as I know, it is new to construct and combine the devices in the manner above described—that is, to combine with a chair and rail of the ordinary construction a cheek-piece, A, fitting the chair, and a key, B, between the cheek-piece and rail, which key is held in place longitudinally by a split pin or cotter, C, adapted to a vertical opening formed by corresponding grooves in key and cheek-plate. Owing to this simple construction, no change has to be made in the ordinary form of chair, no grooves cut on or projections added to it, (unless it is desired to use the modification shown in Fig. 15,) and there is but little strain on the pin and no chance of its working out of place. Moreover, the cheek-plate A bears not only on the chair and wedge B, but also bears directly on the lower flange of the rail and secures the latter firmly against the opposite arm of the chair, for the insertion of the key B, pressing on the upper side of the plate A, binds the lower side firmly against the lower flange of the rail, and the rounded form of the bearing which the plate A has in the chair facilitates this.

I claim as my invention—

1. The combination of a railway rail and chair with the cheek-plate A, adapted to said chair, and having a vertical groove or recess, a tightening-key, B, between the said plate and rail, and having a corresponding vertical recess, and a pin or cotter, C, adapted to the opening formed by the said vertical recesses, substantially as set forth.

2. The combination of a railway rail and chair with a cheek-plate, A, adapted to bear on said chair and on the lower flange of the rail, and a tightening key, B, between the said plate and the web of the rail, and a retaining-pin, substantially as described.

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

JAS. WHITEFORD.

Witnesses:

WALLACE FAIRWEATHER,

PETER FORGIE.