July 12, 1960 G. R. BURKHARDT 2,944,740

ADJUSTABLE RAIL BRACE

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Fig. 1.

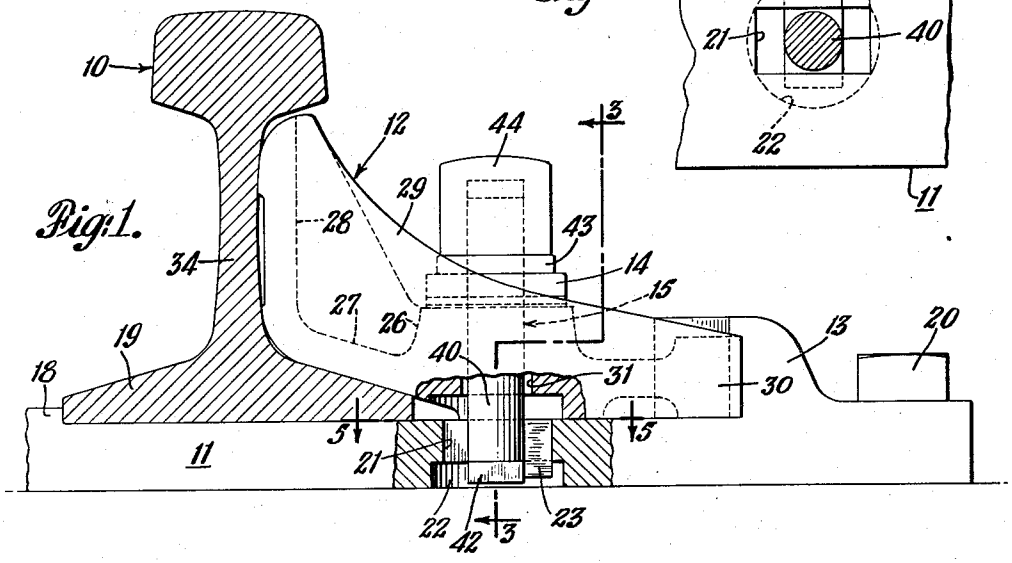


Fig. 5.

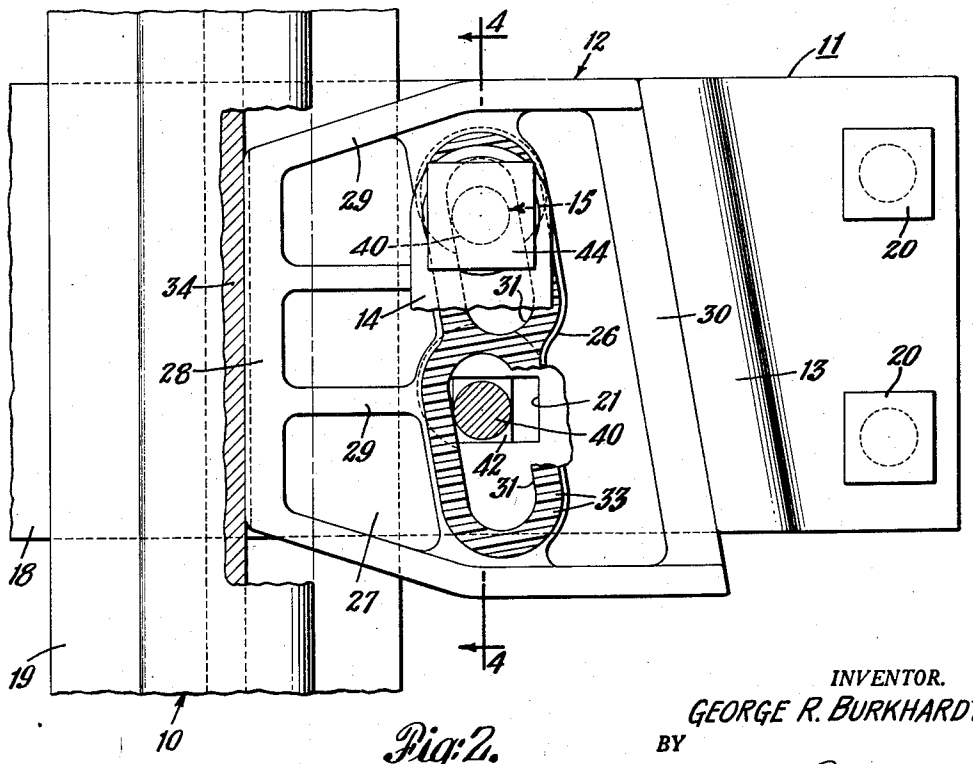


Fig. 2.

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Fig:3.

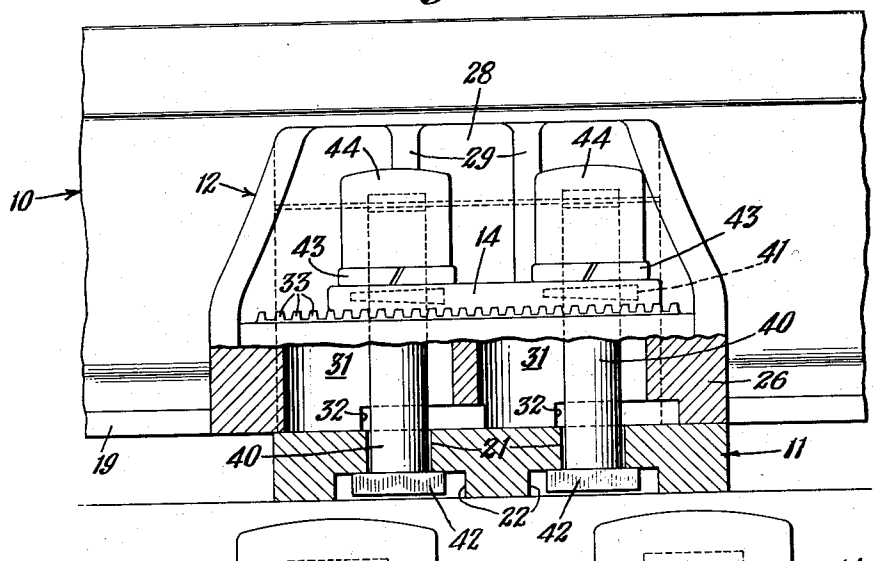
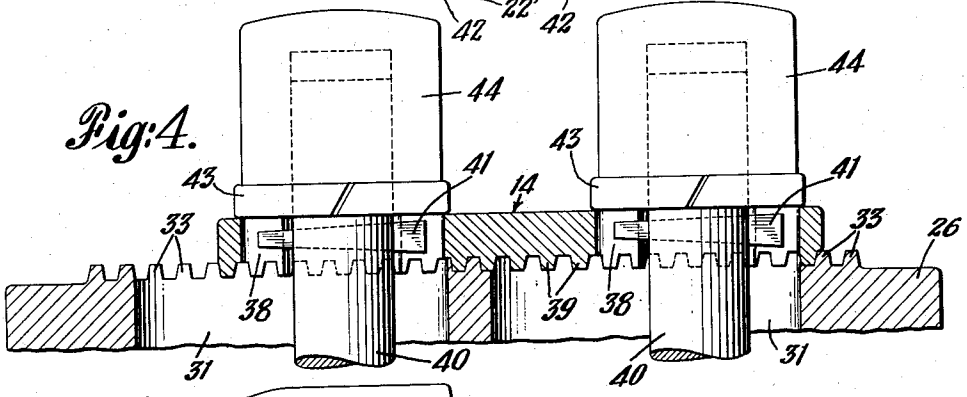


Fig:4.



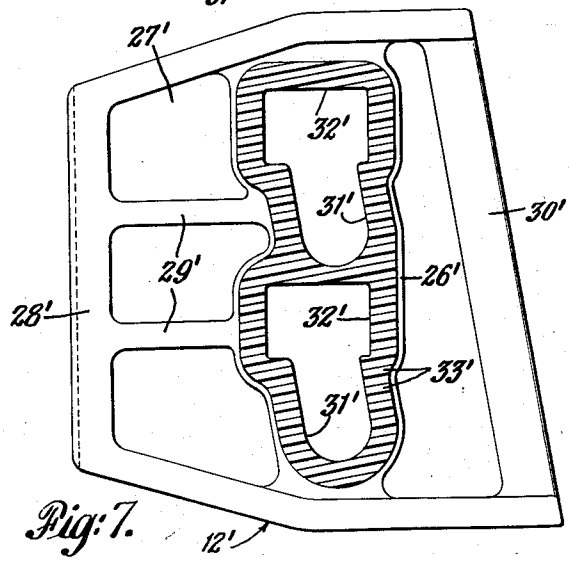
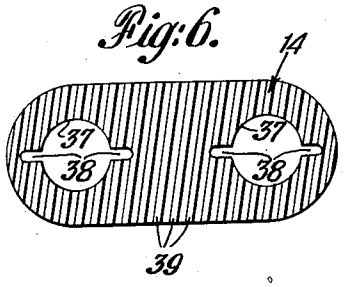


Fig:7.

Fig:6.



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Fig:8.

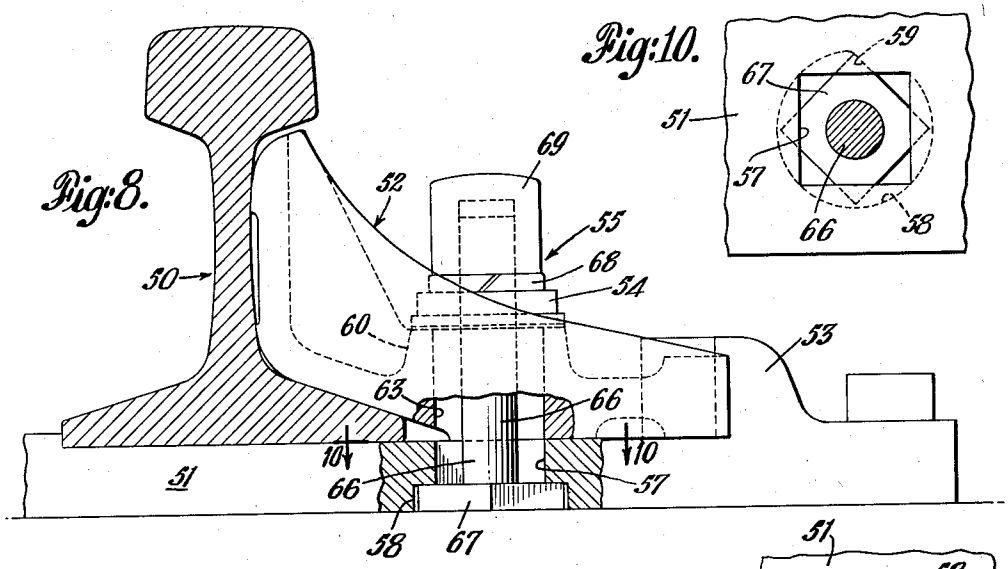


Fig:10.

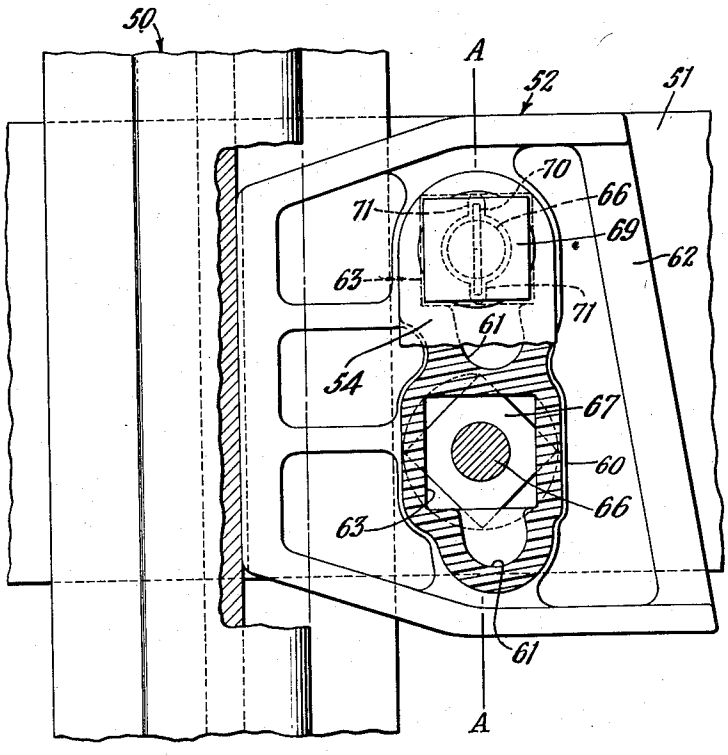


Fig:9.

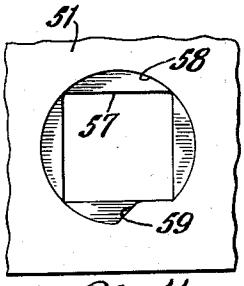


Fig:11.

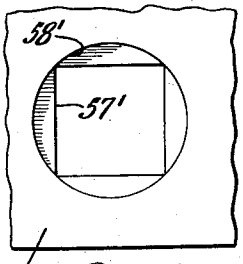


Fig:12.

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2,944,740

ADJUSTABLE RAIL BRACE

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Filed Feb. 15, 1955, Ser. No. 488,203

7 Claims. (Cl. 238—292)

The invention relates to braces for railway track rails and, more particularly, to the type in which the adjustable wedge element is bolted to the tie plate.

An object of the present invention is to provide an adjustable rail brace of the above type which is inexpensive to build and simple to use; and in which the bolts may be inserted from the top without disturbing the tie plate on the tie. In general, in the preferred form of the invention, this desirable result is accomplsihed by using a bolt having a non-circular head, such as a T-head; by providing specially shaped openings in the adjustable wedge element and in the tie plate; by providing a unique relationship between these openings; whereby to permit insertion of the bolt head from above, and then turning the head to interlock the head with the underside margins of the tie plate opening.

These and other objects will be apparent from the following description and claims when considered with the accompanying drawings in which:

Fig. 1 is an end elevation of a rail brace according to the invention, with parts broken away;

Fig. 2 is a plan view of the rail brace, with parts broken away to illustrate the construction;

Fig. 3 is a longitudinal side elevation, partly in section, taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary vertical section taken on the line 4—4 of Fig. 2;

Fig. 5 is a detail section, taken along the top surface of the tie plate, on the line 5—5 of Fig. 1, illustrating the relationship between the T-head of the bolt and the transverse slot in the tie plate;

Fig. 6 is a bottom plan view of the lock or bridge plate;

Fig. 7 is a top plan view of a second form of wedge member, which may be used in place of the wedge member illustrated in Figs. 1 to 6;

Fig. 8 is an end elevation of a modified form of brace using a square-headed bolt instead of a T-headed bolt;

Fig. 9 is a plan view of the rail brace shown in Fig. 8 with parts broken away;

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 8, illustrating the interlocked relationship between the square head of the bolt and the square hole in the tie plate;

Fig. 11 is a detail showing the underside of the tie plate shown in Figs. 8 and 10 and illustrating a stop lug to limit turning of the blot head; and

Fig. 12 is a bottom view of the underside of a still further modified form of tie plate using a square hole but without the stop lug.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

Referring now to the drawings which illustrate preferred embodiments of the invention, and more particularly to Figs. 1 to 6, the rail brace assembly, according to the invention, comprises in general a tie plate 11 adapted to rest on a conventional wooden tie (not shown), an adjustable wedge 12 working against an upstanding backer 13 secured to the tie plate, a lock plate or twin washer 14, and two T-bolt assemblies 15. The adjustable rail brace holds a stationary stock rail 10 against a shoulder 18 on the tie plate 11.

The tie plate 11 is a generally flat plate having a seat on which the rail flange 19 of the rail 10 rests against shoulder 18. It has an upstanding wedge backer 13 and openings for hold down bolts 20 which are driven into the wooden tie, as will be understood by those skilled in the art. The wedge backer may be forged onto the tie plate or it may be welded or riveted thereto.

The tie plate has parallel elongate slots 21 whose lengths extend perpendicular to the stock rail 10. The underside of the tie plate 11 has enlarged recesses or counter bores 22 whose diameters are generally equal to the length of transverse slots 21, and whose centers are laid out on the line 4—4 of Fig. 2, parallel to the rail. The tie plate 11 has a lug 23 welded thereto against which the head 42 of the T-bolt engages to prevent turning, when the cap nut 44 is wrenched.

The wedge or brace member 12 has a heavy base 26 connected to a plate section 27 overlying the base flange 19 of the rail and a plate section 28 adapted to engage the web 34 of the rail. The tapered rim 30 is of heavy section to engage the tapered wedge surface on backer 13, as will be seen particularly in Fig. 2. Gussets or ribs, indicated in general by 29, connect the several parts of the brace 12 to impart strength thereto.

The heavy base 26 has a set of oblique slots 31 passing entirely through the base. The center lines of these slots are generally parallel to the wedge surface of rim 30. The slots are offset to cooperate with the transverse slots 21. The ends of oblique slots 31 nearest the rail have keyhole type recesses 32 on their undersides for a purpose hereinafter explained more in detail. The top surface of the base 26 has a series of teeth 33 extending generally at right angles to the length of the oblique slots, which interfit similar teeth on the lock plate 14, as explained hereinafter.

The lock plate or twin washer 14 (Fig. 6) has teeth 39 on its underside adapted to engage the teeth 33 of the brace 12, and a smooth top surface. Lock plate 14 has two holes 37 provided with keyways 38.

The T-bolt assemblies 15 each comprise a shank 40 having T-head 42, a spring washer 43 and a cap nut 44. A wedge pin 41 passes through a hole in shank 40, as indicated especially in Fig. 4. The wedge pins 41 act as keys fitting in the keyways 38 to prevent the T-bolts from turning when the cap nuts 44 are wrenched in either direction. The wedge pins 41 are adapted to be permanently secured to the shanks 40. Instead of using the separate wedge pins, the shanks 40 of the bolts may be deformed to provide the keys.

The parts are assembled as follows. The tie plate 11 is placed on the tie, and the stock rail 10 is placed on its seat against shoulder 18 in the usual manner. The wedge 12 is then placed in position over the base flange 19 of the rail with its tapered rim 30 engaging the tapered backer 13, with the keyhole ends of the oblique slots 31 approximately in register with the transverse slots 21, in a position somewhat as indicated in Fig. 2 which shows the wedge driven slightly beyond the assembly position.

The T-bolts are then inserted from the top. Each T-bolt is fitted in its oblique slot 31, moved until the T-head occupies enlarged recess 32, at which position the T-head may be turned to occupy a transverse position so that it may be dropped through the transverse slot

21 in the tie plate. When the T-head 42 engages the top of the wooden tie, the counter bore 22 permits the T-head to be turned at right angles so that the T-head engages across the recess, somewhat as illustrated in Fig. 5.

The wedge member 12 is then tapped to wedge it into position after which the lock plate 14 is threaded over the T-bolts 15. In the event the teeth 33, 39 do not correctly interengage, the wedge 12 is tapped slightly either to slightly tighten it, or slightly loosen it, to make the teeth 33, 39 interfit. The taper pins 41 engage in the keyways 38. Conventional spring washers 43 and cap nuts 44 are then placed in position, and the nuts 44 are wrenched tight.

Referring now to the form shown in Fig. 7, for purposes of simplicity of explanation, parts of Fig. 7 corresponding to Figs. 1 to 6 will be given corresponding reference characters but primed.

Wedge 12' is similar in construction to wedge 12 and cooperates with adjoining parts in the same manner. The main difference in wedge 12', as compared with wedge 12, is in the shape of the oblique slots 31'. In Fig. 7, the enlarged ends 32' of oblique slots 31' are enlarged all the way through from bottom surface to top of the heavy base portion 26'. The assembly of the brace utilizing wedge 12' is similar to that described in connection with Figs. 1 to 6; except that in Fig. 7, when the enlarged ends 32' are in register with the transverse slots 21 in the tie plate 11, the T-bolts 15 (with their heads transverse to the rail) may be dropped right through the aligned openings 32' and 21 and then rotated to a position corresponding to that shown in Fig. 5.

It will be noted that two provisions are made for holding the T-heads 42 in proper relationship to the tie plate slots 21: head locks 23, and the cooperating pins 41 and keyway slots 38. The cooperating pins 41 and keyway slots 38 prevent turning of the bolts in either direction, so that the head locks 23 may be omitted if desired.

Referring now to Figs. 8 to 11, here the structure is similar to that shown in Fig. 7 except that square-headed bolts are used instead of T-headed bolts. The rail 50, tie plate 51, wedge 52, lock plate 54 have, in general, the same relationship to each other as the corresponding parts in Figs. 1 to 6.

The tie plate 51 has square openings 57 whose centers are laid out on the line A—A, parallel to the rail 50. The underside of the tie plate 51 has enlarged recesses or counter bores 58 (see Fig. 11) whose diameters are generally equal to the diagonals of the square openings 57. Each counter bore or recess 58 has a head lock or stop lug 59 which may be welded in position; or which may be placed there during the forging operation, in the event the tie plate is forged. The head lock 59 limits turning of the bolt when its cap nut is wrenched.

The heavy base 60 of the wedge 52 has a set of oblique slots 61 passing entirely through the base. The center lines of these slots are generally parallel to the wedge surface of rim 62. The ends of the oblique slots 61 nearest the rail have enlarged square recesses 63 whose centers are also laid out on a line parallel to the line A—A and which are adapted to be brought into register with the holes 57 through the tie plate for insertion of the bolts.

The bolt assemblies 55 each comprise a shank 66 having a square head 67, a lock washer 68 and a cap nut 69. Wedge pins 70 are secured to the shanks 66 as the corresponding parts in Figs. 1 to 6. The wedge pins 70 act as keys fitting in keyways 71 in the lock plate 54 to prevent the bolts from turning whent he nuts 69 are wrenched in either direction.

The assembly of the parts in Figs. 8 to 11 is generally the same as in Figs. 1 to 6. Assume the tie plate 51 is placed on the tie and the stock rail 50 is placed on the tie plate. The wedge 52 is then placed in position with its square openings 63 in register with the square openings 57 in the tie plate, as indicated in Fig. 9.

The bolts 66 are then inserted from the top. The head 67 of each bolt is dropped through the registered recesses 63 and 57 until the head 67 occupies the recess 58 on the bottom side of the tie plate. The bolt is then turned until a corner of the head 67 engages the head lock 59 (see Fig. 10), in which position the corners of the head 67 interlock with the edges of the square opening 57 in the tie plate.

The wedge member 52 is then tapped to wedge it into position tight against the rail, after which the lock plate 54 is threaded over the bolts 66. The taper pins 70 engage in the keyways in the lock plate 54. The conventional lockwashers 68 and cap nuts 69 are then placed into position and the nuts are wrenched tight.

Referring now to Fig. 12, here the square opening 57' in the tie plate 51' has in its underside an enlarged recess or counter bore 58'. But here no head lock corresponding to 59 in Fig. 11 is provided. This construction may be used in the event the locking plate 54 alone is employed for preventing rotation of the bolts during wrenching.

The present invention permits assembly of the bolts after the tie plate and brace are in position on the tie. This has two advantages over present methods of inserting the bolt from the bottom of the tie plate: (1) the bolts can be renewed when the threads are worn or corroded without disturbing the plate on the tie; (2) the entire brace assembly can be removed from the plate, without disturbing the plate on the tie; thereby simplifying replacement of the stock rail 10, which may occur several times during the life of the plate and of the brace. The tie plate openings do not weaken the plate. The enlargements at the ends of the oblique slots in the brace do not weaken the brace.

While certain novel features of the invention have been disclosed herein, and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In an adjustable rail brace, a tie plate, a stationary backer secured to said tie plate, said backer having a stationary wedge surface, a longitudinally adjustable rail-contacting wedge element movable lengthwise of the rail, said wedge element having a wedge surface engaging said stationary wedge surface, said adjustable wedge element having a base portion engaging said tie plate, said wedge surfaces sloping toward the rail in a direction lengthwise of the rail, a bolt for securing said adjustable element to said tie plate, said bolt having a non-circular head, said tie plate having a non-circular opening, the underside of said tie plate having an enlarged recess adjoining said opening, said base portion having an oblique slot extending generally parallel to said wedge surfaces, the end of said oblique slot nearest the rail having an enlarged part for the reception of said bolt head so that said head may be inserted through said tie plate opening from above, said head being disposed under said tie plate in said recess and bridged across said tie plate opening with the shank projecting through said tie plate opening and said slot, a washer element overlying said base portion and having an opening through which said shank passes, and a nut on said shank overlying said washer element.

2. The adjustable rail brace according to claim 1 in which said bolt has a T-head and said enlarged part is located on the bottom surface only of said base portion, whereby the T-head may be inserted from above through said oblique slot and then turned at right angles in said enlarged part so that, when said enlarged part is directly over said tie plate opening, said head may be inserted through said tie plate opening.

3. The adjustable rail brace according to claim 1 in which said enlarged part extends all the way through said

base portion whereby, when said enlarged part is directly over said tie plate opening, the head of the bolt may be inserted from above through said enlarged part and said tie plate opening.

4. In an adjustable rail brace, a tie plate, a stationary backer secured to said tie plate, said backer having a wedge surface, a longitudinally adjustable rail-contacting wedge element movable lengthwise of the rail, said wedge element having a wedge surface engaging said backer wedge surface, a base portion overlying said tie plate and a brace portion to engage the rail web, said wedge surfaces sloping toward the rail in a direction lengthwise of the rail, a generally upright bolt for clamping said wedge element to said tie plate, said bolt having a head and a threaded shank, said tie plate having an opening with an adjoining abutment, said head having a portion located under said abutment when said bolt is in operative position, said opening having an entrance accessible from above to receive said head portion when said bolt is inserted head-first from above, said head portion being movable laterally of said shank to operative position under said abutment, said base portion having an opening through which said shank projects, means including a nut threaded on said shank overlying said base portion to clamp said wedge element in adjusted position against said tie plate.

5. The adjustable rail brace according to claim 4 in which the opening in said base portion is of such shape as to pass said bolt head when inserted head-first from above.

6. The adjustable rail brace according to claim 4 in which said tie plate opening is non-circular and said bolt head is non-circular, whereby after said tie plate opening receives said bolt head, said bolt head may be rotated to interlock the head with the margin of the tie plate opening.

7. An adjustable rail brace according to claim 4 in which a locking element overlies said base portion, said locking element having an opening through which said shank projects, said base portion and said locking element having a first set of interfitting parts and said locking element and said bolt having a second set of interfitting parts, to prevent the bolt from turning.

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