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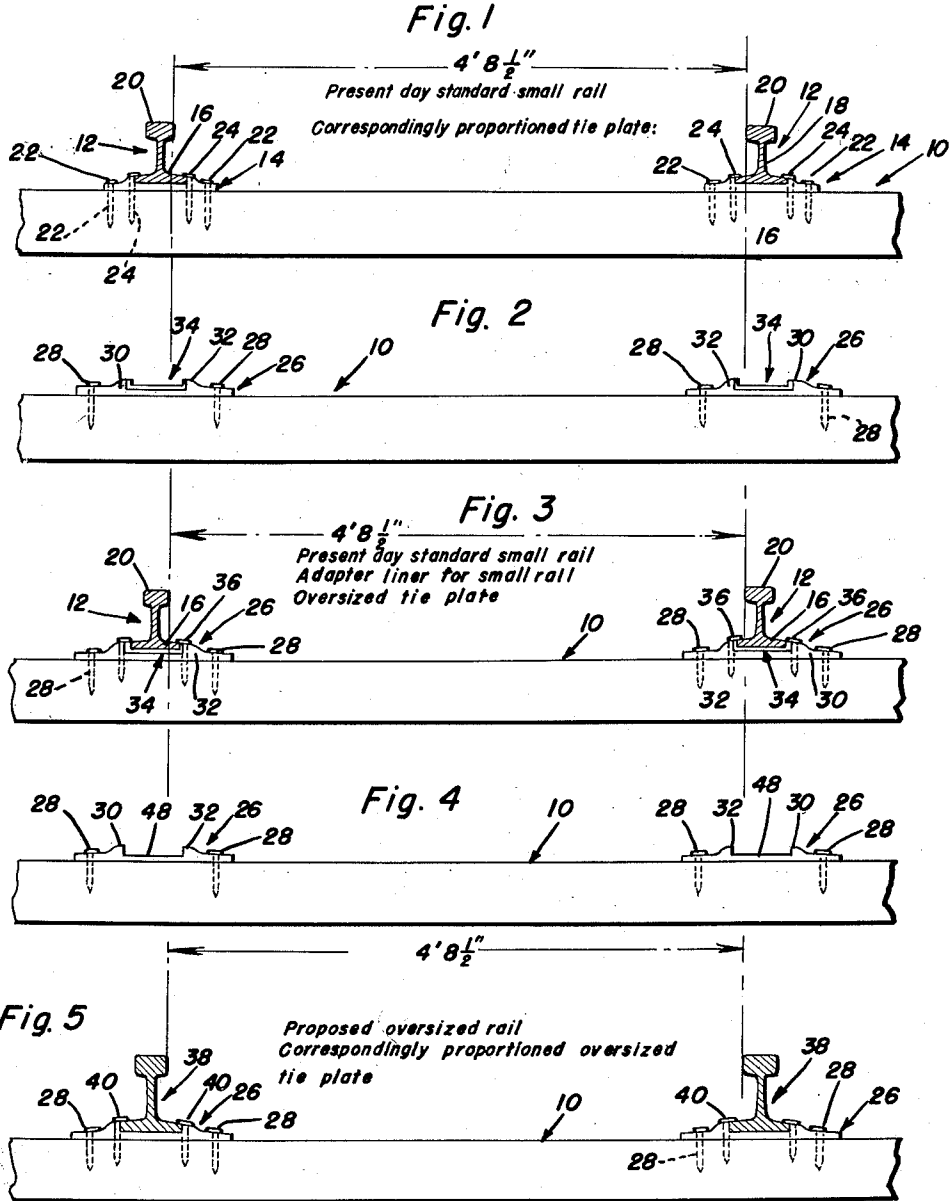
L. SPENCER

2,578,099

ALTERABLE COMMON GAUGE RAILWAY TRACK CONSTRUCTION

Filed Sept. 15, 1950

2 SHEETS—SHEET 1



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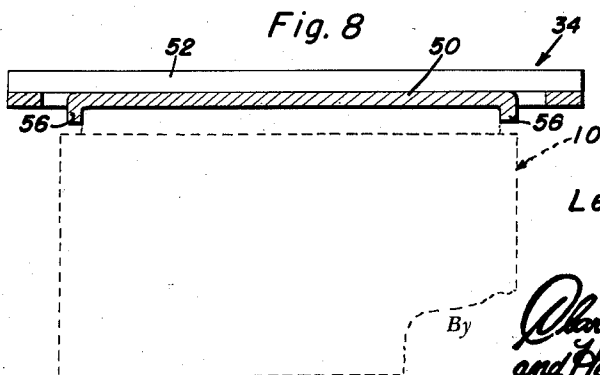
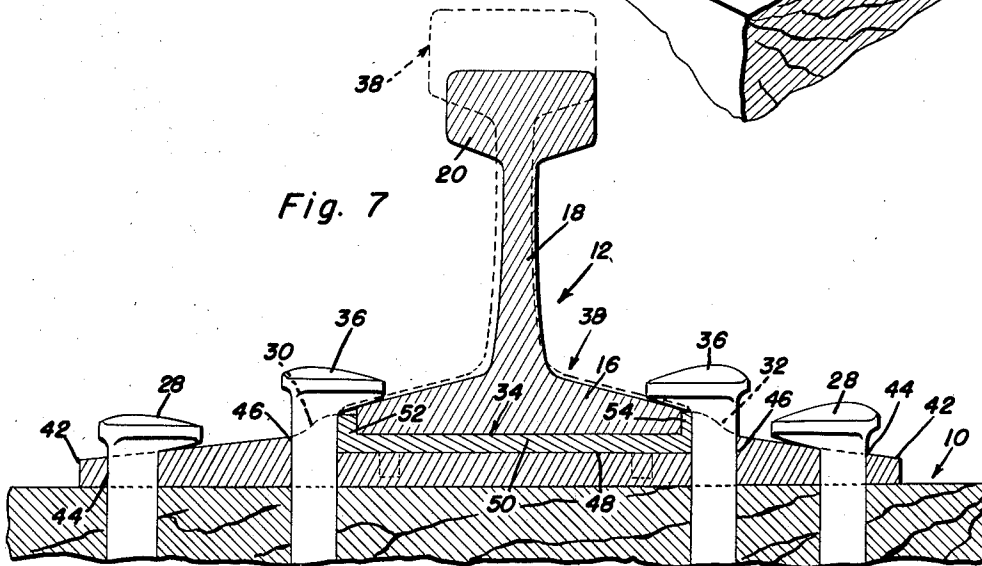
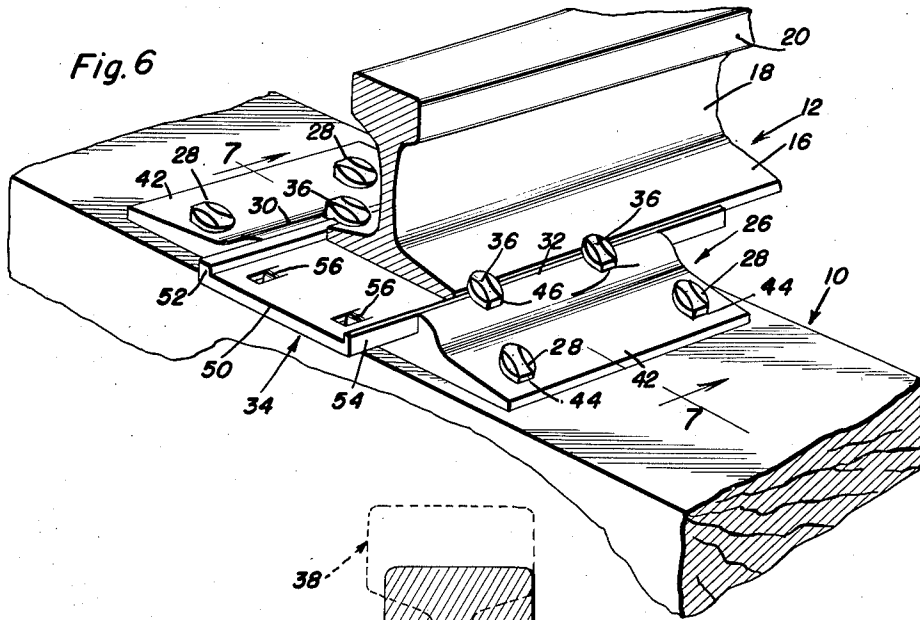
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2 SHEETS—SHEET 2



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# UNITED STATES PATENT OFFICE

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## ALTERABLE COMMON GAUGE RAILWAY TRACK CONSTRUCTION

Lee Spencer, Phoenix, Ariz.

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5 Claims. (Cl. 238—287)

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This invention relates to certain new and useful improvements in railway track constructions and, more particularly, has to do with an experimental but definitely workable method and novel structural means whereby a standard railroad trackway, already in use and currently embodying light duty rails and correspondingly light duty tie-plates, may be readily and economically altered and converted or "changed over," at all times using standard equipment, to a trackway embodying heavy duty tie-plates and correspondingly heavy duty rails.

It is a matter of common knowledge that almost all of the leading railroads have programs, as of now, which call for the removal of both light duty rails and light duty tie plates sometime in the predictable future and replacement of same with much heavier and larger rails and tie-plates which may be conveniently called standard A. R. E. A. heavy duty types. These heavy duty tie-plates, in virtually all instances, are A. R. E. A. standard double shouldered types manufactured to accommodate and accurately fit a heavy duty broad base rail. The problem requiring practical solution is how best to meet the many difficult to cope with conditions so that the change over from light to heavy equipment may be resultfully achieved, keeping in mind steel shortages, expenditures in money, time and labor factors and countless other employee and material contingencies.

In acceptable railway track constructions, standard rails are, in general, supported on tie-plates of steel in order to distribute the weight and attending wheel loads over more area of wood and thus to protect the ties from the damage that results when only the base of the rail itself rests directly on the tie.

For a great many years, tie-plates were made with only one shoulder to contact the rail base on the outside and to take any outward thrusts of the wheels but of late years, they have been made with a shoulder on each side of the rail base flange to thus help retain the rail in proper position and relieve the spikes on the inner edge from cutting away and letting the rail loosen up.

With the stated single shoulder plates in use, it was no problem to provide ways and means of fitting rails having bases of different widths, since the base contacted, as explained, the single shoulder and it was just a case of punching holes in the plate at the proper point on the other or inner side in order to accommodate any and all sizes of rails. With the double shoulder plate, of course, these plates are made to accommodate one size of rail base and that is where my invention becomes significant.

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As already stated and manifestly, the increased sizes of equipment and weights coupled with increased speeds, is causing terrific abuse of the wooden ties, and the currently used small tie-plates of inadequate area, because of the loads and impacts, are sinking into the ties and compelling their removal long before any signs of decay are evident, and the only acceptable remedy, before my invention, has been to install a rail of much greater weight and size with, of course, a much larger sized tie-plate to distribute the load over a larger wood surface.

Confronted with the foregoing and the many attending difficulties, I have evolved and perfected, I believe, a practicable procedural method of track alteration whereby the currently used light duty tie-plates may be taken out and replaced, as of now, with heavy duty tie-plates. Secondly, my method involves replacing the momentarily removed light duty rails on and again fastening same to the spiked heavy duty tie-plates. However, and in order to adequately and satisfactorily achieve this end my invention invokes the use of adapter means which are expressly designed and made to conformingly coact with the standard heavy duty tie-plates and the present light duty rail, the adapter means being of a compensating character and functioning to maintain a common gauge point for the wheel flange surfaces of heads of bolt (A) light duty and (B) heavy duty rails. Said adapter means also paves the way for subsequent and permanent removal of a light duty rail and replacement of same with a heavy duty rail at which time the adapter means is also removed and the heavy duty rail is substituted therefor and permanently installed in the heavy duty tie-plate. From the time of installation, however, the heavy duty tie-plates are not touched, having been accurately set at the date of original installation and therefore ever set and ready for reception of the larger heavy duty rail.

Fundamentally and basically, what I contemplate is universal adoption and use of larger track rails and correspondingly larger tie-plates, the tie-plates being of double shouldered types, a program which, in actual practice, necessitates gradual discarding of currently used small rails and advance discarding of small tie-plates, the final change-over to be taken care of gradually and the way now paved, prior to the change-over stage, by taking out the small tie-plates and substituting the larger type heavy duty tie-plates to accommodate not only the eventually usable larger standardized track rails but novel adapter means which is associated with said larger or heavy duty tie-plates in order to permit the pres-

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ently used smaller track rails to be retained in the track until such time as replacement of the same with heavy duty rails becomes necessary or essential.

More specifically, and from a structural point of view the invention has to do with a combination of structural adaptations embodying a standard wooden cross-tie, a pre-gauged oversized tie-plate which is adapted to be installed in advance of the larger size rail and which is adapted to be precision gaged, set and permanently fastened on the cross-tie, said tie-plate being of a standard type and embodying a substantially rectangular plate or body portion with flat top and bottom surfaces, the top surface being provided, as usual, with a pair of upstanding spaced parallel vertical ribs, the inner opposed surfaces of said ribs then serving to provide uninterrupted or continuous shoulders which are adapted, under predetermined circumstances, to directly contact the marginal edges of the base flange of a heavy duty conventional-type track rail, the horizontal bed portion of said plate, the portion which is between said shoulders, being substantially if not wholly, imperforate and solid to provide a satisfactory seat or chair for the adapter plate, the end portions of the tie-plate being provided with regulation spike holes and there being additional spike holes in registry with the shoulders on the tie-plate whereby to permit conventional railroad spikes to be employed in spiking down the tie-plate and leaving it stay in position until the change over is made. The innermost spikes may be temporarily pulled but the outermost spikes will remain in position so that the initially established position of the tie plate will not in any manner be shifted or tampered with. It is novel, I believe to use an oversized tie-plate having such facilities and particularly the seating space between the primary or main shoulders which contact the edges of the larger base flange. It is also novel to put an adapter unit, particularly one of the type shown, in the space between the shoulders, said adapter being a plate with upstanding longitudinal ribs, there being a pair of such ribs and these being parallel. These ribs provide auxiliary shoulders on the adapter plate and provide the necessary seating space between themselves for the narrow base flange on the light duty rail and are polygonal in cross-section and the rib or shoulder on one side generally is of greater cross-section than the rib or shoulder on the other side in order to fix the relationship of the light duty rail to the cross-tie, tie-plate and adapter and to maintain the light duty rail in the wanted position and to do the same thing, that is, maintain and establish the position of the larger rail when the larger rail is put in and the light rail and adapter unit are simultaneously taken out.

Other objects, features and advantages will become more readily apparent from the following description and the accompanying illustrative drawings:

Figure 1 is a diagrammatic view showing, in elevation and section, a standard railway track construction of present day dimensions; namely small or light duty rails and correspondingly small or light duty double shouldered tie-plates on a wooden tie;

Figure 2 is a diagrammatic view based on Figure 1 wherein the light duty rails and light duty tie-plates of Fig. 1 have been removed and

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improved heavy duty tie-plates with adapters have been substituted, the accurately established positions of the tie-plates insuring maintenance of the required common gauge track;

Figure 3 is a diagrammatic view based on Figure 2 showing not only the heavy duty tie-plates spiked down but light duty rails seated in the adapters and spiked down for use;

Figure 4 is a diagrammatic view similar to Figure 2 but showing the light duty rails and adapters removed with the heavy duty tie-plates readied for the final change over to an all heavy duty track construction;

Figure 5 is a view based on Figure 4 and showing the heavy duty rails in final spiked down positions;

Figure 6 is an enlarged fragmentary perspective view partly in section based on Figure 3 and showing a cross-tie, heavy duty tie-plate, light duty rail and adapter with all parts assembled for use;

Figure 7 is a view on a greatly enlarged scale of a fragmentary and sectional type taken approximately on the plane of the line 7-7 of Figure 6, looking in the direction of the arrows; and

Figure 8 is a longitudinal sectional view through one of the adapter units or plates with the spikes and rail removed and with the tie-plate and tie in dotted lines.

By way of brief introduction to the description of the details, and, taking a general glance at the several figures in the drawings, it will be seen that the structure has to do with the combined functioning of a standard wooden cross-tie, a permanently usable pre-gauged oversized or heavy-duty tie-plate superimposed at a predetermined spot on an end portion of the cross-tie, the tie-plate being of conventional type and embodying a substantially rectangular plate portion with flat top and bottom surfaces and, in addition being provided on the top surface with a pair of upstanding spaced parallel ribs. The inner vertical faces of the ribs serve to provide substantially uninterrupted shoulders which are adapted, under predetermined circumstances, to directly contact the marginal edge portion of the base flange of a heavy duty conventional type track rail. The outer transverse end portions of the plates have regulation spike holes punched therein and adapted to accommodate conventional tie-plate hold down spikes.

In carrying out the principles of the invention I contemplate the provision of varying styles and forms of so-called adapter plates and units. Insofar as the construction of the adapter unit is herein concerned it is in the form of a flat rectangular plate which is seated immediately or directly upon the solid bed or foundation portion of the standard tie-plate between the regular shoulders of the latter, said adapter plate being provided with upstanding longitudinal ribs which constitute auxiliary shoulders and which are in direct contact from end to end with the abutment surfaces of the fixed shoulders on the tie-plate, which in the instant situation is the aforementioned heavy duty tie-plate.

It will be further evident by scanning the various views of the drawings that sheet one, containing Figures 1 to 5 inclusive, is diagrammatic and shows the rails and plates in pairs and consequently acquaints the reader with the overall or complete system. It shows the various aspects in step-by-step sequence. Sheet two,

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devoted to Figures 6, 7 and 8 shows more particularly the special spiking arrangement and the light duty rail in the light duty adapter with the latter spiked to the heavy duty tie-plate.

With reference to the system depicted in Figures 1 to 5, inclusive, reference is had first to Figure 1 wherein the cross-tie, which is standard or conventional is denoted by the numeral 10. The parallel complementary light duty track rails are denoted at 12—12 and the corresponding light duty tie-plates by the numerals 14—14. The tie-plate has the usual parallel fixed or main shoulders for the edge portions of the base flange 16 of the track rail. The web is denoted at 18 and the ball or head portion by the numeral 20. The tie-plate hold-down spikes are denoted at 22 and the rail hold-down spikes are denoted by the numerals 24—24. Figure 1 represents step No. 1, a currently employed "light duty" track construction.

Figure 2 represents step No. 2 in the over-all system or "change over" program. Here the light duty tie-plates 14 are completely removed and discarded. The light duty rails are momentarily set aside. Heavy duty tie-plates are then brought into play and these are denoted by the numerals 26. The positions of these are carefully measured off and definitely established and they are fastened down with hold-down spikes 28—28. The heavy duty plates must be spiked so that the shoulders 30 and 32 will be perfectly positioned to maintain precisely the same track gauge as depicted in step No. 1 in Figure 1, that is, 4 feet 8½ inches. At this stage, however, the insertable and removable adapter plates or units 34 are brought into play. These will be described in detail later on. In this figure the units are merely installed on the tie-plates between the shoulders to provide auxiliary shoulders for the light duty rails.

Now we come to step No. 3 in Figure 3 wherein the light duty rails 12 are put back in position on the cross tie by way of the heavy duty tie-plates but are located and reestablished in precise track gauge relationship by way of the inserts or adapters 34. The hold-down spikes for the adapters and rails denoted at 36 will be referred to later on.

Taking up now the fourth step in Figure 4 the change over from light to heavy duty rails is begun and this has to do with completely removing and discarding the light duty rails 12 but leaving the heavy duty tie-plates in position. At the same time the rails 12 are taken out the adapters 34 are removed. However, the adapters are still useful and may be used over and over so long as they are employed in conjunction with heavy duty tie-plates for which they are made to fit.

The final step is shown in Figure 5 wherein the heavy duty rails 38 (introduced for the first time in Figure 5) are installed in the heavy duty tie-plates and secured by hold-down spikes 40 of a conventional type. These may be the same spikes that were used to hold-down the light duty rail in Figure 3. In the stages or steps diagrammatically put forth in Figures 1 to 5, inclusive, it will be evident that from step No. 1 to step No. 5, inclusive, the track gauge is the same, this being an essential inventive aspect of the instant matter.

Taking up now the details of construction depicted in Figures 6 to 8, inclusive, the same reference numerals, for the most part, are employed to designate like parts already referred

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to in connection with Figures 1 to 5, inclusive. Referring then to Figure 6 the cross-tie is denoted at 10 and the heavy duty tie-plate at 26. The outer transverse ends 42—42 have spike holes 44 to accommodate the tie-plate hold-down spikes 28 already referred to. The shoulders 30 and 32 have already been described. It is to be pointed out, however, that these shoulders are provided with accommodation notches 46—46 for the shank portions of the adapter and track rail hold-down spikes 36—36. As best shown in Figure 7, the solid chair or bed portion of the tie-plate is denoted at 48 and this seats the plate or flat body portion 50 of the insert or adapter unit 34. It will be noticed in this connection that the outside auxiliary rib or shoulder 52 is rectangular in cross-section and of a cross-section greater than the thinner or narrower complementary shoulder 54. It will be noticed that the auxiliary shoulders are unbroken from end to end and have end to end abutting contact with the fixed shoulders on the tie-plate. It is also clear that the heads on the hold-down spikes 36 bridge over the auxiliary shoulders and engage the marginal edge portions of the base flange of the light duty rail. It will further be noticed that the plate portions of the adapters are longer than the cross-section of the wooden cross-tie and the projecting portions are provided with struck-out and down bent prongs 56—56 which constitute detents and engage the adjacent longitudinal edge portions of the underlying tie-plate to prevent slipping of the adapter in relation to the bed portion of the tie-plate.

Recapitulating, the invention under advisement has to do with: a (1) standard wooden cross-tie, (not altered) a (2) pregauged oversized standard tie-plate which is adapted to be installed in advance of the larger size track rail and which is adapted to be permanently fastened on the cross-tie at a prescribed location, said tie-plate being of a conventional-type and embodying a substantially rectangular plate or body portion with flat top and bottom surfaces, the top surface being provided, as usual, with a pair of upstanding spaced parallel vertical ribs, the inner opposed surfaces of said ribs then serving to provide substantially uninterrupted permanent shoulders which are adapted, under predetermined circumstances, to directly contact the marginal edges of the base flange of a heavy duty conventional-type track rail, the horizontal bed portion of said tie-plate between said shoulders being substantially imperforate and solid to provide a satisfactory chair for an adapter plate and consequently the base flange of the rail which is seated on the adapter plate, the end portions of the tie-plate being provided with regulation spike holes and further provided with additional spike holes in registry with said shoulders on the tie-plate whereby to permit conventional railroad spikes to be employed in spiking down the tie-plate and leaving it stay in position until the change-over is made. The (3) innermost spikes may be temporarily pulled but the (4) outermost spikes will remain in position so that the established position of the tie-plate will not be shifted or tampered with. It is novel, to use an oversized tie-plate having such facilities and particularly the seating space between the primary or main shoulders which contact the edges of the larger base flange. It is also novel to put (5) an adapter unit, particularly one of the one-piece type shown, in the space between the per-

manent shoulders, said adapter unit being a plate with upstanding longitudinal ribs, there being a pair of such ribs and these being parallel. Said ribs provide auxiliary shoulders on the adapter plate and provide the necessary seating space between themselves for the narrow base flange on the light duty rail and are polygonal in cross-section and the rib on one side is of a greater cross-sectional area or dimension than the rib on the other side in order to fix the relationship of the light duty rail to the cross-tie, tie-plate and adapter to maintain the light duty rail in the wanted position and to do the same thing, that is, maintain and establish and position of the larger or heavy duty rail when the latter rail is put in and the light rail and adapter plate are both taken out.

Reverting to the method aspect of the concept under advisement, it is obvious that this has to do with what may be identified as a standard railroad track construction such as is currently in use and which is, obviously, therefore characterized by standard unaltered wooden cross-ties, light duty rails and corresponding light duty tie-plates which are spiked to the end portions of the cross-ties in the usual way. In accordance with the invention described this regulation track construction is to be temporarily altered, while keeping the same light duty rails in use, and then ultimately converted to a track construction which is the same as the original except that heavy duty tie-plates and heavy duty rails are then in use. The steps pursued are first, removing and discarding light duty tie-plates and momentarily setting the complemental light duty rails aside; second, replacing said light duty tie-plates with heavy duty tie-plates and permanently spiking the latter to the companion cross-tie so that said heavy duty tie-plates are adapted to accommodate heavy duty rails on the one hand and light duty rails on the other hand and, regardless of the size differences of such rails, are adapted to maintain a common gage point for the wheel flange surfaces of both sizes of rails; third, inserting a shouldered adapter plate between the usual fixed shoulders on each tie-plate and separately interlocking said adapter plate with said tie-plate so that said adapter plate is then, in effect, a temporary tie-plate; fourth, restoring the light duty rails and seating and spiking same to the cross-ties by way of said adapter plates and tie-plates; and fifth, removing and discarding said adapter plates and light duty rails and finally replacing the latter by way of heavy duty rails, whereby it is wholly unnecessary to move or otherwise adjust said heavy duty tie-plates once the latter have been correctly spiked on their respective cross-ties.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Minor changes in the shape, size and arrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

The present application is a continuation in part of my co-pending application identified as Serial No. 694,451, entitled Adapter Equipped Tie-Plates and filed in the U. S. Patent Office September 3, 1946 but now abandoned.

Having described the invention, what is claimed as new is:

1. In a railway track construction of the class

described, in combination, a standard wooden cross-tie, a pair of duplicate permanently applicable pre-gauged heavy duty tie-plates superimposed at a predetermined point of anchorage on said cross-tie to establish and maintain complementary rail heads at common track gauge positions, each tie-plate being of a conventional-type and embodying a substantially rectangular plate having flat top and bottom surfaces, the top surface embodying a pair of upstanding spaced parallel ribs, the inner vertical faces of said ribs serving to provide substantially uninterrupted primary shoulders which are adapted, under predetermined circumstances to directly contact the marginal edges of the base flange of a heavy duty conventional-type track rail, the opposite end portions of said tie-plates having regulation spike holes punched therein and adapted to accommodate conventional-type hold-down spikes, a one-piece channel-shaped adapter plate removably fitted atop each tie-plate, said adapter plate having means at its respective ends releasably interlocked with edge portions of the companion tie-plate to prevent slipping of the adapter plate in relation to the tie-plate, said adapter plate being provided along opposite longitudinal edges with upstanding ribs, said ribs constituting secondary auxiliary shoulders and being in contact with and resting against said first named primary shoulders, standard light duty track rails, each embodying a base flange resting on the respective adapter plate and confined between and with its edge portions in snug abutting relation with the complemental auxiliary shoulders, conventional-spikes passing through said spike holes and anchored in said cross-tie to anchor the tie-plates on said cross-tie, and additional spikes passing through said tie-plates and into said cross-tie and engaged with said rail base flanges, said auxiliary shoulders being substantially polygonal in cross-section and serving to establish a standard track gauge distance between the wheel flange surfaces of said light duty rails, and said primary shoulders functioning, after the light rails and adapter plates have been removed, to maintain the same track gauge distance between heavy duty rails which are adapted to be substituted for the then removed adapter plates and light duty rails.

2. As a new article of manufacture and as a component part of an alterable railway track construction, an adapter unit adapted to be removably seated in a space provided therefor between spaced parallel shoulders on a standard-type double shouldered tie-plate of a heavy duty type and temporarily designed to seat an ultimately disposable light duty rail comprising an elongated rectangular substantially imperforate plate having flat top and bottom surfaces, said plate being provided along opposite longitudinal edges with upstanding ribs and said ribs defining auxiliary shoulders and being adapted to seat the base flange of a light duty rail therebetween, said auxiliary shoulders being polygonal in cross-section and the cross-section of one shoulder being less than the cross-section of the other shoulder, and the end portions of said plate having laterally and downwardly offset lugs and said lugs being adapted to releasably engage the longitudinal edge portions of a complemental tie-plate, whereby the adapter plate may be temporarily interlocked with the aforementioned tie-plate.

3. In a track construction of the class shown and described, in combination, a conventional

wooden cross-tie, a conventional-type rectangular heavy duty tie-plate provided at opposite outer transverse ends with spike openings for reception and maintenance of tie-plate hold-down spikes to be driven through said openings into said cross-tie, provided at its intermediate portion with spaced parallel primary track gauge establishing and maintaining shoulders adapted to accommodate insertable and removable light duty adapter means on the one hand and a heavy duty track rail on the other hand, and readily insertable and removable adapter means seated on and separably interlocked with said tie-plate embodying secondary common track gauge maintaining rail change-over shoulders abutting said primary shoulders, said primary and secondary shoulders being selectively usable, whereby the one heavy duty tie-plate, when permanently anchored, may be used to temporarily base and support said adapter means and a complementary light duty rail for prescribed period of time and may also be used, after removing said light duty rail and adapter means, to permanently base a heavy duty rail while at all times establishing and accurately maintaining a common gauge point of the wheel flange surfaces of the heads of both light duty and heavy duty rails relative to said cross-tie and tie-plate and respective primary and secondary shoulders.

4. In a railway track construction of the class described, in combination, a standard unaltered wooden cross-tie, a permanently applicable pre-gauged heavy duty tie-plate superimposed, at an exact predetermined region on the top surface of said cross-tie, said tie-plate also being of a standard-type and embodying a substantially imperforate rectangular plate having a flat top surface and a flat bottom surface, the top surface embodying, as usual, a pair of integral upstanding spaced parallel ribs, the inner opposed vertical surfaces of said ribs serving to provide substantially uninterrupted permanent shoulders which are adapted to bear against coacting marginal edges of the base flange of a heavy duty standard-type track rail, the outer transverse end portions of said tie-plate having pairs of hold-down spike openings punched therein and adapted to accommodate common tie-plate hold-down spikes, a one-piece channel-shaped adapter unit embodying a substantially rectangular flat plate removably seated directly upon the tie-plate between said shoulders, said flat plate having down-bent locating and retaining lugs at its ends engageable with the adjacent edge portions of the tie-plate, said adapter plate being provided along opposite longitudinal edges with upstanding ribs, the inner opposed vertical surfaces of said latter ribs constituting uninterrupted auxiliary shoulders, said permanent shoulders having spike notches for passage of common rail hold-down spikes, said auxiliary shoulders abutting said permanent shoulders and bridging the open sides of said notches, a standard-type light duty track rail removably fitted in and on said

adapter plate and having the edges of its base flange in firm abutting contact with said auxiliary shoulders, common hold-down spikes passing through said hold-down spike openings into said cross-tie, and common rail hold-down spikes passing through the spike notches in said permanent shoulders and into said cross-tie with their heads overlying the auxiliary shoulders and also overlying and engaging said base flange.

5. In a temporarily usable, readily alterable railway track construction, in combination, an unaltered common wooden cross-tie of standard measurements, a pair of duplicate heavy duty tie-plates fastened atop said cross-tie in customary positions inwardly of the respective ends of said cross-tie, each tie-plate being a standard type rectangular flat surfaced plate having customary upstanding spaced parallel rail locating and position retaining ribs, the inner vertical surfaces of said ribs constituting uninterrupted shoulders which are adapted to directly contact the longitudinal marginal edges of the base flange of a heavy duty conventional type track rail, said shoulders being prescribed distances apart to correspond with the width of the base flange of the heavy duty rail which is adapted to be fitted between said shoulders, said tie-plates also being spaced definite distances apart so that said tie-plates are adapted to accommodate heavy duty rails on the one hand, light duty rails on the other hand, and, regardless of the cross-sectional differences of said rails, are adapted to maintain a common and constant track gauge for the wheel flange surfaces of both heavy and light duty rails, and a pair of adapter plates for said tie-plates, each adapter plate having longitudinal marginal ribs, said plate being seated on its companion tie-plate and having detent means releasably interlocked with said tie-plate, the inner vertical surfaces of said marginal ribs constituting auxiliary shoulders, the latter contacting said first-named shoulders, said auxiliary shoulders being prescribed distances apart to bear against the edge portions of the base flange of a light duty rail, said tie-plates, with said adapter plates removed, serving to establish the desired track gauge between said heavy duty rails, and said adapter plates, when locked in said tie-plates, serving to establish the same track gauge between light duty rails.

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