Nov. 22, 1938. C. CLARE 2,137,566

RAILWAY CROSSING

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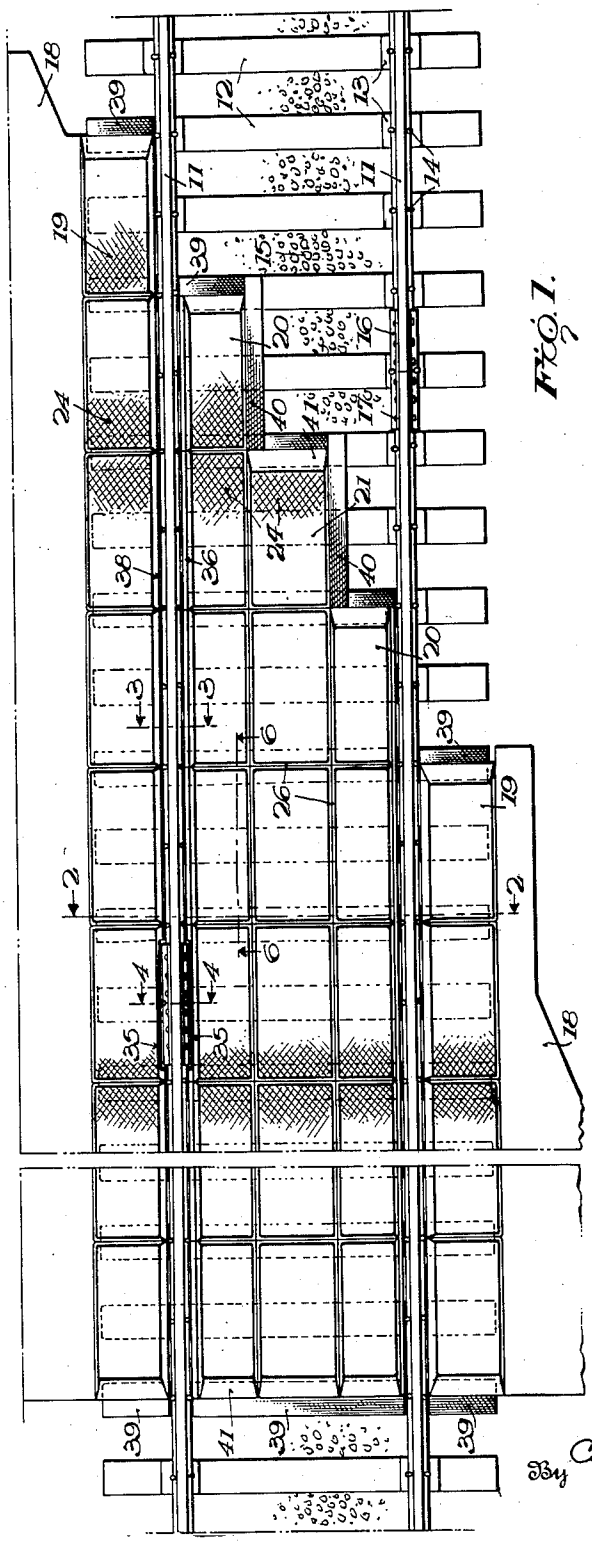


FIG. 1.

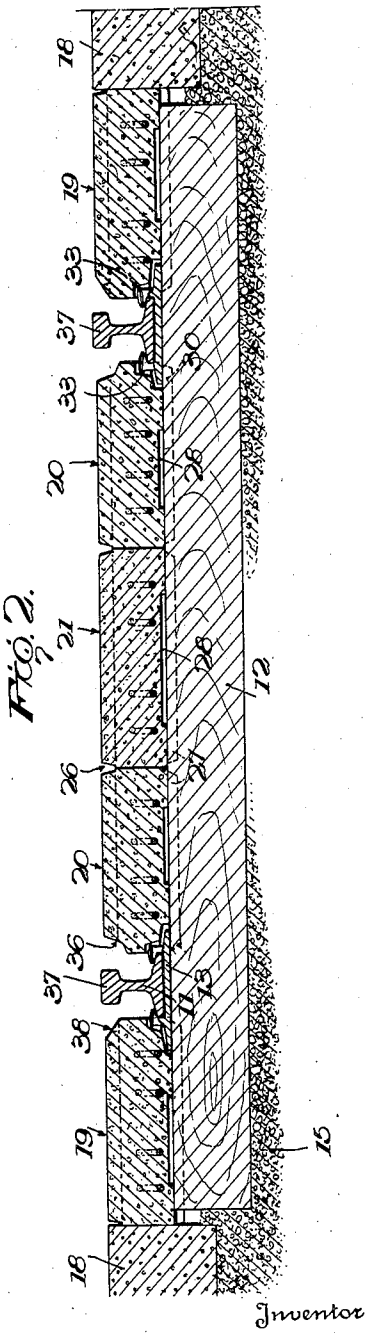


FIG. 2.

Inventor

Charles Clare.

By Cameron, Kerkam & Sutton.

Attorneys

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RAILWAY CROSSING

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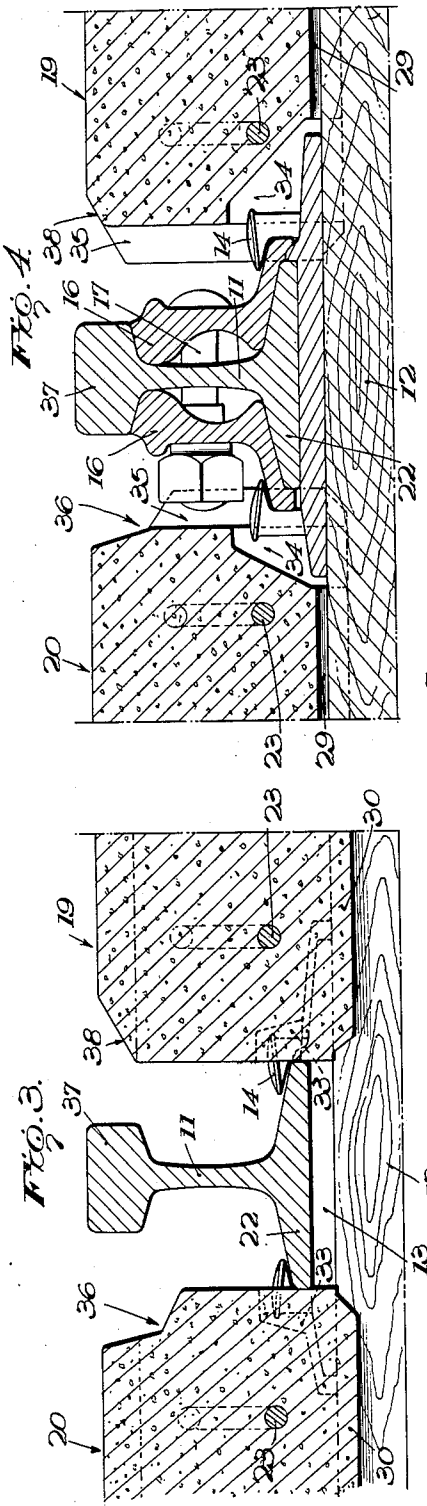


FIG. 3.

FIG. 4.

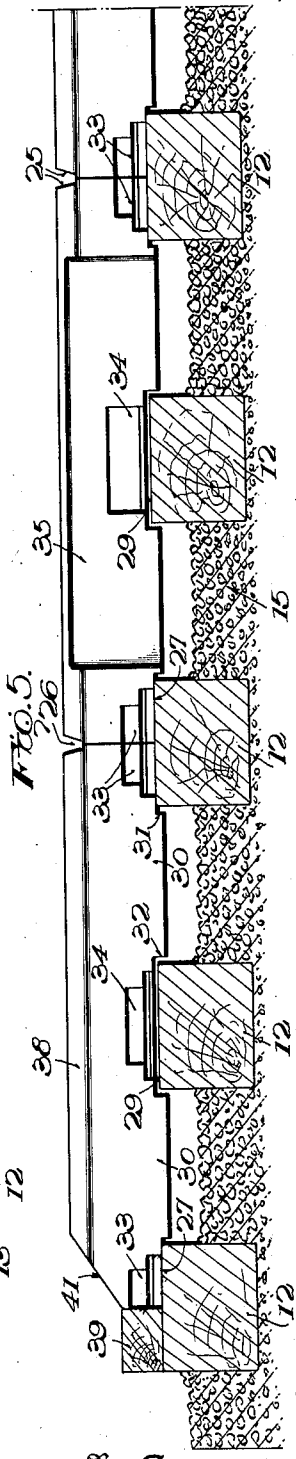


FIG. 5.

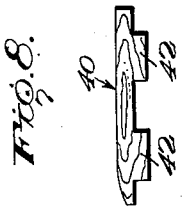


FIG. 8.

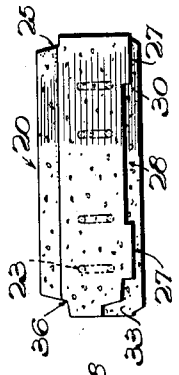


FIG. 7.

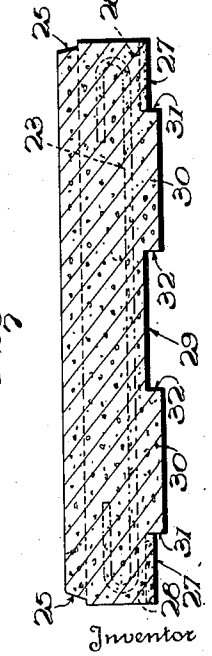


FIG. 6.

Inventor

Charles Clare.

By Cameron, Kerkam & Sutton

Attorneys

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UNITED STATES PATENT OFFICE

2,137,566

RAILWAY CROSSING

Charles Clare, Madison, Wis.

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16 Claims. (Cl. 238—8)

This invention relates to railway crossings, and more particularly to highway-railway grade crossings of the type utilizing precast slabs or blocks of concrete or like material as the structural elements thereof.

Although the use of precast slabs has already been accepted as the most suitable solution now known to the railway crossing problem, the forms of slabs and crossings hitherto available have not been entirely satisfactory from the standpoints of economy, maintenance, smoothness, quietness and safety. For example, in prior crossings it has been customary to insert relatively expensive creosoted oak blocks between the sides of the concrete slabs and the rails of the track so as to form closed trough flangeways. This construction not only increases the cost of installation of the crossing but also seriously hinders, and tends to discourage, periodical removal of the slabs for cleaning, tamping and otherwise correcting defects in the ballast substructure of the track.

It is therefore one of the objects of the present invention to provide an improved form of railway crossing made up of prefabricated blocks or slabs of novel construction which are readily removable and replaceable without loss or damage of materials so as to permit easy access to the track substructure for maintenance purposes.

Another objection to the slab or block type crossings previously used wherein each unit is supported by three or more ties is that, after a relatively short period of service, settlement and under-track action tend to work the multiple tie supports out of plane with one another thereby giving rise to bouncing and rocking of the slabs, decreasing their service life and creating a noisy, rough riding crossing. This condition is further emphasized if the ties are crudely adzed or not truly co-planar when the crossing is laid.

Accordingly it is another object of the invention to provide a railway crossing of the slab type wherein the individual slabs are so constructed and supported that bouncing and rocking thereof are prevented and a quiet, smooth riding crossing of increased life is produced.

A further object is to provide a novel form of crossing slab which may be used without adzing or shims and with pre-dapped ties, thereby resulting in a saving in installation cost and an increase in the stability and service life of the track and crossing.

In building crossings of the character in question, it is the practice to cast the slabs in lengths which slightly underrun normal tie spacing in order to avoid respacing of ties which do not conform to the normal spacing. With slabs of the construction hitherto known, this underrun in length permits the slabs to drift under traffic in a direction parallel to the track, particularly in the cases of long diagonal crossings, a condition which may result in depriving a slab of one of its points of support and thereby seriously endanger the safety of the crossing.

It is therefore still another object of the invention to provide a slab type railway crossing of novel construction wherein each of the slabs is effectively anchored against excessive movement longitudinally of the track.

A still further object is to provide a new and improved form of railway crossing slab which, when laid, produces a crossing having open trough flangeways which materially facilitate removal and subsequent relaying of the slabs at times when it is necessary to work on the track or its substructure.

Another object is to provide a railway crossing of the slab type which is more easily constructed and maintained, and more economical in both first cost and upkeep, than similar crossings previously known to the art.

These and other objects, including the provision of a crossing having adequate drainage facilities and a non-skid surface, will appear more fully from a consideration of the detailed description of the embodiment of the invention which follows. Although there is only one specific form of crossing described and illustrated in the accompanying drawings, it is to be expressly understood that these drawings are for the purpose of illustration only and are not to be construed as defining the scope of the invention, reference being had for this latter purpose to the appended claims.

Referring now to the drawings, wherein like reference characters indicate like parts throughout the several views:

Fig. 1 is a plan view of one form of railway crossing constructed in accordance with the present invention, one portion of the figure illustrating the manner of treatment of a crossing which is perpendicular to the line of the track while the other portion represents a crossing which is diagonal or oblique with respect to the track;

Fig. 2 is a section taken substantially on line 2—2 of Fig. 1 at a slab supporting tie showing the cross sectional forms of the various slabs which make up the crossing;

Fig. 3 is a section taken substantially on line 4—4 of Fig. 1 showing the character of the wheel-

way and the shapes of the slabs adjacent one of the rails at a point between ties;

Fig. 4 is a section taken substantially on line 4—4 of Fig. 1 showing the shapes of the wheelway and slabs adjacent one of the rails at a point where two sections of rail are connected together;

Fig. 5 is an elevation of a portion of the crossing shown in Fig. 1 looking outwardly from one of the rails with the ties, track ballast and slab curbing shown in section;

Fig. 6 is a longitudinal section taken substantially on line 6—6 of Fig. 1 through one of the slabs making up the crossing;

Fig. 7 is an end view of one of the slabs which is adapted to be positioned inside of and adjacent to one of the rails; and

Fig. 8 is a side elevation of one of the pieces of curbing of Fig. 1 running parallel to the track and holding the end slabs against lateral displacement.

As illustrated best in Figs. 1 and 2, a railway crossing constructed in accordance with the present invention comprises a plurality of generally rectangular blocks or slabs of precast concrete or similar material removably supported side by side and end to end on the ties between and on both sides of the rails of the track over which the crossing is made. In the preferred embodiment where three courses of slabs are used between the rails, three different forms of slab are utilized in building the crossing. One form is adapted to lie adjacent the outside surfaces of each pair of rails, the second form is that of the slabs immediately adjacent the inside surfaces of the rails, and the third form serves as the middle course between the rails. Each slab spans at least three ties but rests thereon only at its ends so as to provide a quiet, smooth riding crossing in which there is no bouncing or rocking of the units.

In order to simplify the disclosure of the embodiment illustrated, only a single track has been shown comprising a pair of rails 11 which are secured to ties 12 by tie plates 13 and spikes 14, the ties being embedded in the usual crushed rock ballast 15. At points where sections of rail are connected to one another, there have been indicated (see Figs. 1 and 4) the conventional splice or angle bars 16 and bolts 17. The street or other highway crossing the track is shown as terminating in portions 18 of concrete pavement or the like.

Although differing in specific details, each of the three forms of crossing slab 19, 20 and 21 (being those on the outsides of the rails, on the insides thereof immediately adjacent thereto, and in the middle course between the rails, respectively) is generally rectangular in shape and of a length sufficient to span at least three ties. In the preferred form illustrated, the length of each slab is slightly less than twice the average center to center spacing of the ties, while its width is slightly less than one-third the distance between the inner adjacent edges of the base flanges 22 of the rails 11. As previously pointed out, the slabs are cast from concrete or like material and are preferably provided with reinforcing bars 23 and an anti-skid top surface 24 which may be formed in any suitable manner. The upper edges of the slabs may be beveled as indicated at 25 so that when the crossing is laid a series of longitudinal and transverse grooves 26 are formed which assist in draining the crossing and also serve to minimize skidding.

Each of the slabs, whether of the form 19, 20 or 21, is of the same bottom construction. As shown best in Figs. 6 and 7, each end of the slab is provided with a pair of laterally separated bearing surfaces 27 which are adapted to rest upon the upper surface of a tie and serve as the points of support for the slab. The length of each bearing surface 27 is, as indicated in Fig. 5, slightly greater than half the width of the upper surface of one of ties 12, while the surfaces at each end of the slab are separated from one another by a recess 28 of suitable width to provide a non-rocking support for the slab.

Halfway between the ends of each slab there is formed in the bottom thereof a recess 29 extending transversely across the entire slab, the dimension of this recess parallel to the longitudinal dimension of the slab being equal to twice the length of one of bearing surfaces 27 and hence greater than the width of a tie. The depth of recess 29 is such that, when the slab is in place upon the ties supported by surfaces 27, the horizontal surface of the recess clears the top of the tie intermediate the ties upon which the slab ends rest by at least a quarter of an inch, thereby insuring support of the slab at its ends only and preventing bouncing. Should it be desired that each slab span more than three ties, it will be understood that suitable recesses 29 will be properly located so as to clear each of the ties which may lie between those upon which the slab ends are supported.

In the regions intermediate bearing surfaces 27 and recess 29, each slab is provided with downwardly extending projections 30 of a length less than the distance between adjacent faces of the ties 12 so that when the slabs are in place on the ties the projections 30 will extend into the spaces between the ties. With this construction, the shoulders 31 and 32 which are formed between projections 30 and bearing surfaces 27 and recess 29, respectively, serve as stops which positively limit movement of the slabs in a direction parallel to the rails and thereby anchor the slabs against drift should the tie spacing be such that the slabs when laid do not contact one another at the ends in the manner indicated in Figs. 1 and 5. It is therefore impossible in a crossing constructed in accordance with the present invention for any slab to drift sufficiently to deprive it of one of its end bearings, a condition which obviously would endanger the safety of vehicles passing over the crossing.

As shown best in Figs. 2 and 7, both sides of slabs 21 and one side of slabs 19 and 20 are substantially vertical throughout their entire length. The sides of slabs 19 and 20 which lie immediately adjacent the rails 11, however, while vertical throughout the greater portion of their length, are undercut at the ends and in the middle so as to provide recesses 33 and 34, respectively, to receive without contact the tie plates 13 and spikes 14 by which the rails are secured to the ties 12. Intermediate recesses 33 and 34 the slab sides are plane and vertical, except in the case of a slab which is installed immediately adjacent a joint between two sections of rail 11; in this latter instance, the slab side is provided with an elongated recess 35 (see Figs. 4 and 5) of such length, height and position as to clear without contact the splice or angle bars 16 and bolts 17. Although the drawings show recesses 35 as formed intermediate the ends of the slabs, it will be understood that, should the rail joint occur at a tie upon which the slab ends rest or at any intermediate point, the recesses 35 may be formed and located accordingly. It will be

noted that where it is necessary to form recesses 35 adjacent ties, recesses 34 or 33, as the case may be, are made higher than ordinarily because the use of angle bars 16 elevates the positions of the heads of spikes 14 above those of the spikes at the other ties.

By thus providing recesses in the otherwise vertical sides of the slabs to receive the tie plates, spikes and angle bars by which the rail sections are secured to the ties and to one another, and by constructing the slabs of such thickness that they rest upon the ties with their bottom edges below the base flanges 22 of the rails 11, the slabs engage the rails only at the edges of the base flanges of the latter and provide open trough flangeways which facilitate cleaning and drainage and render the slabs more easily removable and replaceable for maintenance purposes. As will be seen from Figs. 2–4, the provision of open trough flangeways also renders the recesses 33 and 34 manually accessible from above the slabs so that they may function as hand holds by which the slabs may be grasped and readily removed from the crossing.

In addition to the bevels indicated at 25 along certain of the top edges of the slabs, the upper edges of slabs 20 parallel to and immediately adjacent the rails 11 are recessed or rabbeted as indicated at 36 to a depth below the head 37 of rail 11 so as to leave adequate space for the flanges of the wheels of the railway vehicles travelling on the track. Similarly, the upper edges of the sides of slabs 19 adjacent the rails are beveled at a greater angle than the other edges, as indicated at 38, in order to avoid contact between the outer edges of the wheels and the slabs.

In constructing a crossing in accordance with the present invention, the various forms of slabs 19, 20 and 21 are simply laid upon the ties 12 in the respective positions indicated in the drawings until a crossing of the desired area has been formed. Since the slabs are supported at the ends only there is no necessity for adzing the ties or using shims. After the slabs have been laid, pieces 39 and 40 of curbing, preferably formed of creosoted oak, may be secured to the ties in any suitable manner in engagement with the ends and sides, respectively, of the endmost slabs of the crossing, as indicated in Fig. 1. It will be noted that the outer ends of these endmost slabs are preferably provided with a relatively long and gradual bevel as indicated at 41, starting at approximately the level of the top of curbing pieces 39, so as to minimize injury to the slabs which might be caused by objects hanging below railway vehicles passing over the crossing. While curbing pieces 39 may be entirely rectangular, pieces 40, which are usually used only at diagonal crossings, are preferably provided with downwardly extending projecting portions 42 which are adapted to fit into the spaces between adjacent ties and anchor the curbing against movement parallel to the rails in a manner similar to the projections 30 of the slabs.

There is thus provided by the present invention a new and improved form of railway crossing together with slabs or blocks of novel construction by which such a crossing may be economically constructed. By so forming the slabs that they contact the rails of the track only at the edges of the base flanges thereof, open trough flangeways are provided which not only materially expedite drainage and cleaning of the track and crossing but also render the crossing slabs more easily removable from their positions on the ties and thereby facilitate maintenance of the track substructure. A crossing of improved smoothness, quietness and safety results from the elimination of all slab supports intermediate the ends thereof and from the provision of laterally disposed bearing surfaces at each of the ends of the slabs which prevent rocking. At the same time, positive anchorage of the slabs against undesired movement in a direction parallel to the rails has been effected by the novel construction provided for the bottom surfaces of the slabs and their cooperation with the ties upon which they rest. The new form of the slab also eliminates adzing of the ties and the use of shims, and makes possible the construction of a crossing over rails supported on pre-dapped ties. The savings in both first cost and maintenance expense, together with the increase in service life, stability and safety of the crossing, provided by the present invention distinguish the latter from all slab type crossings hitherto known.

Although only one specific form of crossing has been disclosed, it will be obvious that the invention is not limited to the construction shown in the drawings, but is capable of a variety of mechanical embodiments. For example, while each of the slabs has been shown as spanning three ties, it is apparent that the invention could equally well be embodied in a slab of different length. Likewise, although the crossing illustrated includes a middle course of slabs 21 between the rails of the track, it is evident that these particular slabs can be omitted by simply increasing the width of each of slabs 20 to approximately half the distance between adjacent edges of the base flanges of the rails. Various other changes, which will now become apparent to those skilled in the art, may be made in the form, details of construction and arrangement of the parts without departing from the spirit of the invention. Reference is therefore to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block having substantially vertical sides of a height such that when in place the entire bottom edges thereof lie below the base flange of the track rail except at points where ties are located, one of said vertical sides being undercut at intervals therealong to form recesses adapted to receive without contact the tie plates and spikes by which the rail is connected to the ties, whereby said slab engages the rail only at the edge of its base flange and continuously throughout the length of the slab except at points adjacent the ties.

2. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block having substantially vertical sides of a height such that when in place the bottom edges thereof lie below the base flange of the track rail, one of said vertical sides being undercut at intervals therealong to form recesses adapted to receive without contact the tie plates and spikes by which the rail is connected to the ties, whereby said slab engages the rail only at the edge of its base flange, said recesses being manually accessible from the top of the slab when the latter is in place so as to provide hand holds for removing the slab.

3. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block of re-

inforced concrete the top of which is provided with anti-skid surface, said block having substantially vertical sides of a height such that when in place the entire bottom edges thereof lie below the base flange of the track rail except at points where ties are located, one of said vertical sides having recesses formed therein of such size, shape and location as to receive without contact the tie plates, spikes and angle bars by which the sections of rail are connected to the ties and to one another, whereby said slab engages the rail only at the edge of its base flange and continuously throughout the length of the slab except at points adjacent the ties.

4. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block of a length sufficient to span at least three ties, said block embodying means for supporting the slab at the ends only when in place on the ties, the portion of said block intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends.

5. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block of a length sufficient to span at least three ties, the bottom of said block at the ends thereof being provided with bearing surfaces adapted to rest upon ties and thereby support the slab, the portion of said block bottom intermediate the ends having at least one transversely extending recess formed therein of sufficient depth to receive without contact the tie or ties intermediate those in supporting engagement with the ends of the slab.

6. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block of a length sufficient to span at least three ties, each end of said block being provided with a pair of laterally separated bearing surfaces adapted to rest upon a tie and thereby support the slab, the portion of said block intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends.

7. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block of a length sufficient to span at least three ties, the ends of said block being provided with bearing surfaces adapted to rest upon ties and thereby support the slab, the portion of said block intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends, and means carried by said block for anchoring the slab when in place on the ties against undersired movement in a direction parallel to the tracks.

8. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block the bottom of which is provided at the ends thereof with bearing surfaces adapted to rest upon ties and thereby support the slab, the portion of said block intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends, said block including means positioned between its ends extending downwardly from the bottom thereof below said bearing surfaces and adapted to anchor the slab when in place on the ties against movement in a direction parallel to the tracks.

9. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block embodying means for supporting the slab at the ends only when in place on the ties, the portion of said block intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends, and means carried by said block for anchoring the slab when in place on the ties against movement in a direction parallel to the tracks.

10. A slab for use in constructing crossings over tie supported railway tracks or the like comprising a substantially rectangular block of a length sufficient to span at least three ties, the bottom of said block at the ends thereof being provided with bearing surfaces adapted to rest upon ties and thereby support the slab, the portion of said block bottom intermediate the ends having at least one transversely extending recess formed therein of sufficient depth to receive without contact the tie or ties intermediate those in supporting engagement with the ends of the slab, the portions of said block bottom between its ends and said transversely extending recess projecting downwardly below said bearing surfaces and forming stops for anchoring the slab when in place on the ties against movement in a direction parallel to the tracks.

11. A crossing for tie supported railway tracks or the like comprising in combination with the ties and rails of the track a plurality of substantially rectangular slabs removably supported on the ties between and on both sides of the rails, each of said slabs spanning at least three ties and having tie-engaging bearing surfaces at its ends only, the portion of each of said slabs intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends, and stop means projecting downwardly from the bottom of each slab intermediate the ties spanned thereby for limiting movement of the slab in a direction parallel to the rails.

12. A crossing for tie supported railway tracks or the like comprising in combination with the ties and rails of the track a plurality of substantially rectangular slabs removably supported on the ties between and on both sides of the rails, each of said slabs having bearing surfaces at its ends only resting on non-adjacent ties, the portion of each of said slabs intermediate its ends being so constructed and arranged as to clear without contact any tie intermediate those in supporting engagement with the ends, and means for anchoring each of said slabs against undesired movement in a direction parallel to the rails.

13. A crossing for tie supported railway tracks or the like comprising in combination with the ties and rails of the track a plurality of substantially rectangular slabs removably supported on the ties between and on both sides of the rails, each of said slabs spanning at least three ties but resting thereon at its ends only, said slabs having recesses formed in the bottoms thereof to receive without contact the ties intermediate those on which the slab ends rest.

14. A crossing for tie supported railway tracks or the like comprising in combination with the ties and rails of the track a plurality of substantially rectangular slabs removably supported on the ties between and on both sides of the rails, each of said slabs spanning at least three ties

but resting thereon at its ends only, each slab having a pair of laterally separated tie-engaging bearing surfaces at each end thereof to support said slab without rocking, and laterally extending grooves formed in the bottoms of said slabs intermediate the ends thereof to receive without contact the ties positioned between those on which the slab ends rest.

15. A crossing for tie supported railway tracks or the like comprising in combination with the ties and rails of the track a plurality of substantially rectangular slabs removably supported on the ties between and on both sides of the rails, and curving members secured to the ties in both parallel and angular relation to said rails for preventing movement of the endmost slabs of the crossing, the curbing members lying parallel to the rails including downwardly extending portions adapted to project into the spaces between adjacent ties and anchor said members against movement in a direction parallel to the rails.

16. In a railway crossing installation, the combination of a railway comprising a pair of rails supported by a plurality of ties, a plurality of crossing slabs, said slabs extending longitudinally of the railway and spanning the spaces between a plurality of ties, said slabs being formed with grooves adjacent each of the ties under the slabs, the bases of the grooves at the slab ends forming supporting surfaces and the grooves intermediate the slab ends being deeper to prevent contact with intermediate ties.

CHARLES CLARE.