United States Patent

Ziegler

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[54] RAILROAD GRADE CROSSING

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[52] **U.S. Cl.** **238/8**

[51] **Int. Cl.** **E01b 2/00**

[58] **Field of Search** 238/8, 7

[56] **References Cited**

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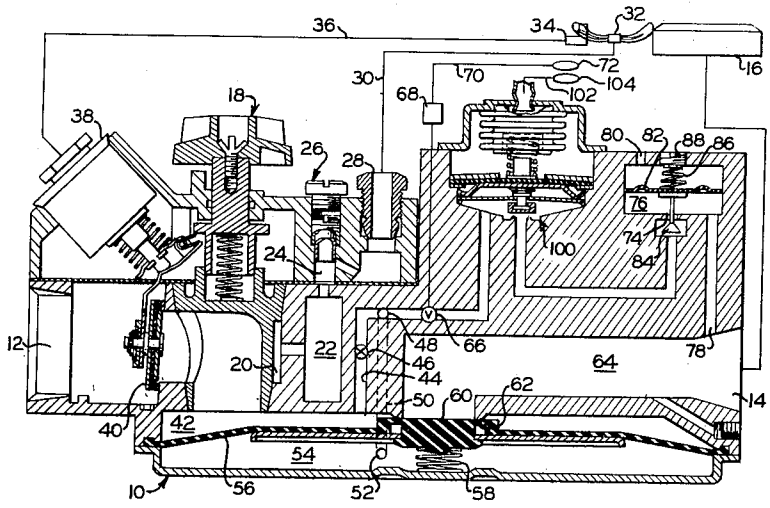
[57] **ABSTRACT**

A novel railroad grade crossing is disclosed comprising elongated support members secured to each side of each rail and substantially complementing the rail profile. Resting upon the support members and secured thereto, are filler plate members which extend between the two rails and outwardly from either rail. Inasmuch as the filler plate members do not directly contact the rail, and therefore do not need to be elaborately profiled, the filler plate members may be constructed of concrete, thereby effecting a great cost saving over known cast-iron filler plates.

9 Claims, 3 Drawing Figures



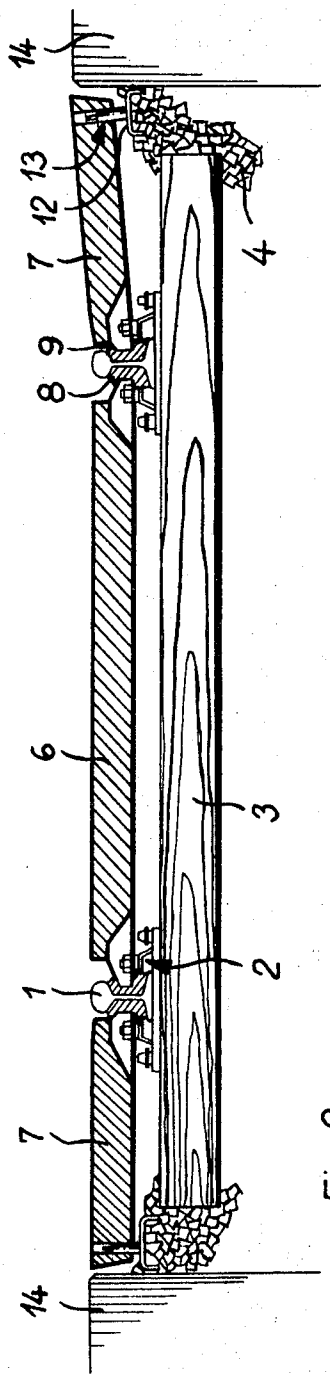


Fig. 2

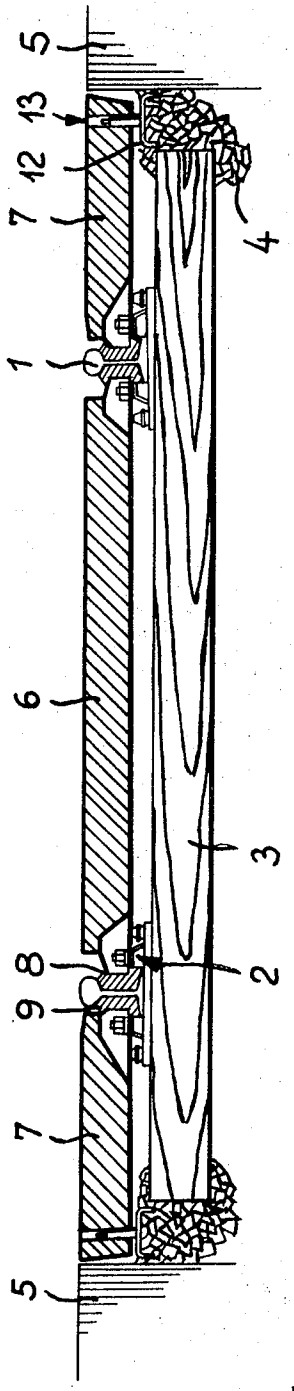


Fig. 1

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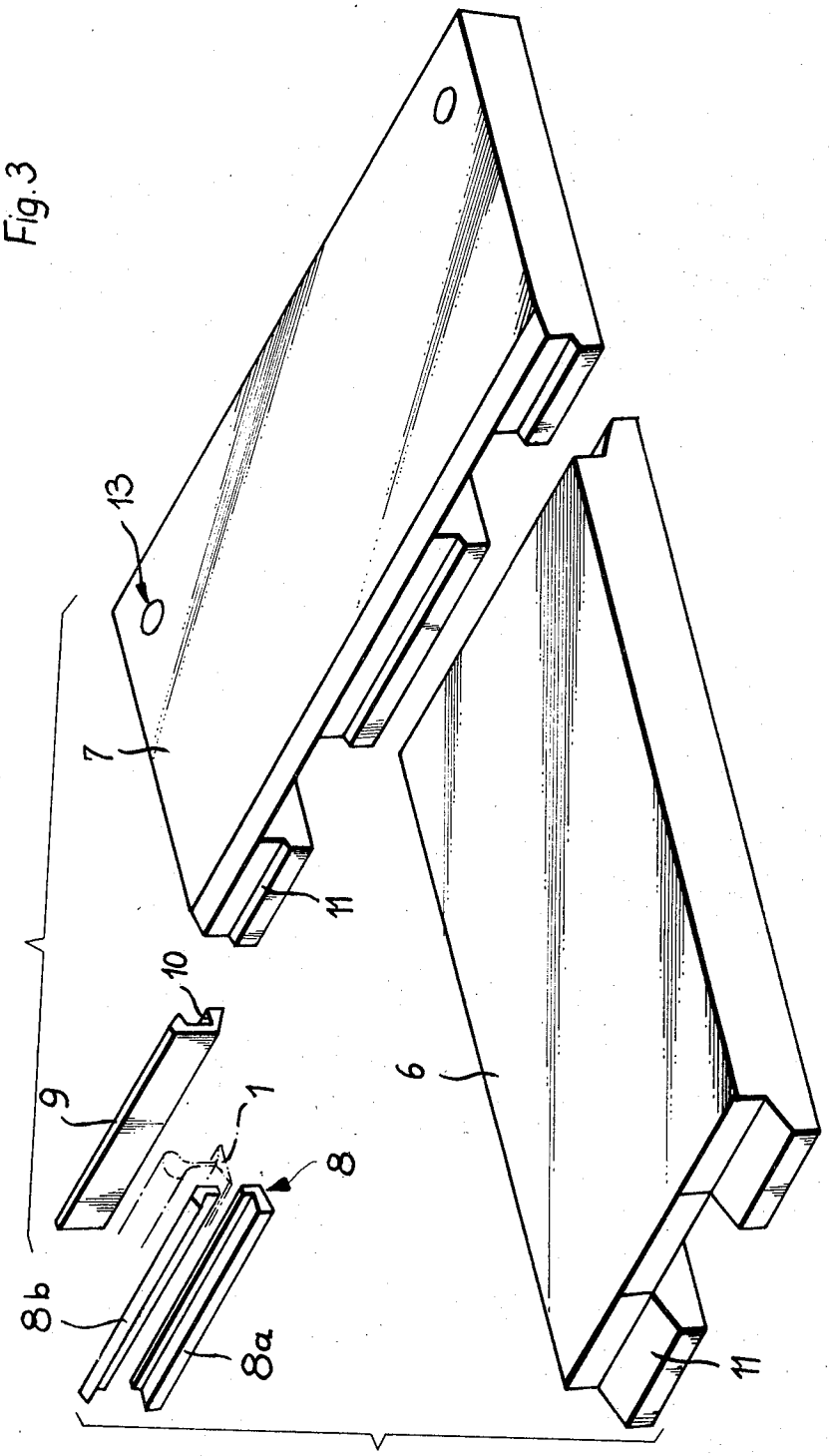
Fig. 3



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RAILROAD GRADE CROSSING

BACKGROUND OF THE INVENTION

This invention is concerned with a railroad grade crossing having at least one inner plate bridging the inner region between a pair of rails and at least one outer plate at each outer side of the pair of rails, and particularly to such a grade crossing in which the inner plate is supported individually and the outer plates are supported at the sides of the rails, laterally adjacent the rail profile.

Railroad grade crossings of the aforementioned kind are generally known to the art. In the case of such a known railroad crossing, several inner and outer plates, arranged laterally side by side, are provided, each of which is generally constructed of cast iron. On their sides facing the rails, the inner plates are profiled in such fashion that they exhibit, on the one hand, a footlike portion with which they support themselves upon the base of the rail, and, on the other hand, exhibit a recess extending parallel to the rails. Between the lateral rail profile and the recess in the inner plates are arranged two wedge members, displaceable towards one another, which firmly wedge the inner plate stationary.

The outer plates of such known crossings are also comprised of cast iron and are on their sides facing the rails, generally profiled in such fashion that they can be disposed directly against the lateral rail profile and can preferably be clamped thereto. The sides of the outer plates, facing away from the rails, are mounted upon the crossties and are secured in suitable manner against displacement.

The construction of the inner and outer plates as cast iron or other cast members, which is partly due to the complicated profiling required for the sides facing the rails, results in such an increase in costs of such known railroad crossings that these are economically unfeasible for most normal railroad crossings. Furthermore, the construction of such railroad crossings is relatively complicated inasmuch as the inserting and wedging of the wedge members in the narrow space between each rail and the inner plate requires a certain amount of dexterity. It can, moreover, easily happen that the wedge members are unevenly tightened on either side, whereby the inner plates are displaced towards one side. This can lead to such a large widening of the gap between the inner plate and the rail on one side that, on the one hand, the traffic passing thereover and, on the other hand, the rail installations themselves, are subjected to a considerable sudden shock load. In addition, the support of the outer plates upon the crossties conducts the shocks caused by the traffic directly onto the crossties, whereby the latter are subjected to a constant atypical load which can easily lead to a loosening of the attachment between crosstie and rail. In addition, the outer plates are, due to their special adaption to the lateral rail profile, only suitable for a particular rail profile, so that different outer plates must be used for different rail profiles.

SUMMARY OF THE INVENTION

With the above background in mind, it is therefore an object of the present invention to provide a railroad grade crossing which eliminates the above-mentioned disadvantages of the prior art.

Specifically, it is a primary object of this invention to provide such a grade crossing which can be installed simply, rapidly, and with a high degree of precision.

It is a further object of the invention to provide such a grade crossing which can guarantee a high degree of protection of the rail attachment to its road bed and the ballast bed.

It is yet a further object of this invention to provide such a grade crossing which can easily be adapted to different rail profiles.

These, as well as other objects which will become apparent as the description proceeds, are implemented by the present invention characterized by support means comprising elongated form members, secured longitudinally between the attachment installations of the rails and laterally between the rails and the inner plate(s), and between the rails and the outer plates, which at each side of the rails are adapted to the lateral rail profile and form at the side of the plates a support or bearing for the inner and outer plates.

A large number of substantial and decisive advantages can be achieved simultaneously by the provision of the railroad crossing according to the instant invention.

By virtue of the arrangement of form members between the inner and outer plates and the rails, there is achieved a laying of the plates during construction of the railroad crossing which is particularly more simple, fast and precise. The form members which are adapted to the lateral rail profile need only be laid against the rail profile and the plates need only to be inserted thereupon. The laying requires neither complicated tools nor other auxiliary installation means, nor the use of trained experts. The laying is carried out extremely rapidly since no preparation of the rail or roadbed is required. The interruption of rail and/or highway traffic is thus restricted to a minimum.

After being laid upon the form members, the plates are immediately and to a high degree of precision seated at their predetermined location without the need for intricate manipulating of wedges or the alignment of the plates. The gaps between the plates and the rails can thereby also be kept extremely small since inaccuracies do not have to be taken into consideration during laying. The shock loads of the rails and rail attachments, on the one hand, and of the traffic passing thereover, on the other hand, are reduced to a minimum. This benefits the longevity and durability of the rail construction and the railroad crossing as well as the driving comfort of the vehicles using the crossing.

Inasmuch as form members serve as connecting elements between the rail and inner and outer plates, it is not necessary to impart a complicated form or profile to the plate sides facing the rails. It is, therefore, also no longer necessary to form these plates as expensive cast-iron bodies, but these can now comprise simple and inexpensive materials, as for example, concrete, which are well able to cope with the loads needed, but which can only with difficulty be formed into complicated profiles which can consequently be only lightly loaded. The arrangement of the form bodies also makes possible, provided the track gauge is constant, the use of the same inner and outer plates for different rail profiles. It is only necessary to use for laying form pieces which are adapted in each instance to a particular rail profile. Since fabrication of different form pieces is substantially less expensive then the production or fabrication of different inner and outer plates, the result is, therefore, a substantial standardization of parts and a corresponding cost reduction of the fabrication of railroad crossings as compared to those know to the art.

One can also achieve with the instant railroad crossing a maximum protection of the attachment between rail and crosstie and of the ballast bed of the rail. Neither the inner plates not the outer plates bear directly against the crossties or the ballast bed. The traffic loads are therefore no longer transmitted directly onto the crossties or the ballast bed, but are introduced into the rails and thus result in the same stress patterns as would be produced by a train passing overhead. The traffic loads are thus transformed into a load which is typical for rails and are distributed by the rails upon a larger area of the rail substructure. The rail attachment as well as the ballast bed are thereby protected. Since no balancing layers of fine ballast or the like, have to be applied upon the ballast bed either, the superstructure of the railroad track remains in the vicinity of the crossing substantially the same as in the case of the open rail, i.e., outside effects of heat, frost, snow and rain are absorbed in the vicinity of the railroad crossing in the same manner as in the case of open rail.

The instant invention exhibits not only the advantage of being economically fabricated, but it possesses, moreover, a long duration of life while requiring only a minimum of maintenance.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention itself will be better understood, and additional objects and advantages thereof will become apparent, from the following detailed description of a preferred embodiment of the invention, taken in conjunction with the accompanying drawings, in which:

FIG. 1 depicts a cross-sectional view of a railroad grade crossing constructed according to this invention, and particularly adapted for a highway crossing;

FIG. 2 depicts a slightly modified railroad crossing similar to FIG. 1 and having one end thereof slightly inclined as for use as a cart crossing in a railroad station; and

FIG. 3 is an exploded view depicting the arrangement of the elements of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, FIG. 1 depicts a railroad crossing constructed in accordance with this invention, in which a pair of rails 1 are arranged upon crossties 3 by means of suitable known attachment installations designated as 2. The crossties 3 rest within a ballast bed 4. The railroad track and ballast bed are bounded on either side by street or pavement 5.

The railroad grade crossing exhibits at least one inner plate member 6 which is arranged between the rails 1, and at least one outer plate member 7 which is arranged at each outer side of the pair of rails. Depending upon the size of the railroad crossing, it may, however, be necessary to arrange a plurality of inner and outer plates side by side in longitudinal direction of the rail extension. The inner plate member(s) 6 and the outer plate members 7 are, adjacent the side of the rails 1, mounted individually upon inner and outer form members 8 and 9, respectively, which form members are in turn supported laterally upon the side of the track profile.

The construction details of the plates and form members are more clearly depicted in FIG. 3. The form members 8 and 9 may be constructed of different heights, with inner form members 8 extending up to the base of the railhead and outer form members 9 extending up to the running surface of the rails. Preferably, however, form members 8 and 9 are, with respect to their shape, formed alike and exhibit at the side of the rails a profile which is complementary to the lateral rail profile and which extends vertically from the upper edge of the base of the rail to the lower end of the railhead. This is necessary in order to give enough freedom of movement to the rim of the wheels passing over the rails and to leave a conventional flangeway. On the side facing away from the rail, the form members comprise a support or bearing means for the inner or outer plates 6, 7, which support means extends parallel to rail 1. This support or bearing means may comprise a shoulder which is, for example, wedge shaped at the outer side of the form member, which shoulder then engages in a corresponding recess in the facing side of the respective plates. The support or bearing means is, however, preferably arranged in the side of each form member in the form of a recess having a support or bearing surface 10. It is useful for this recess to be wedge shaped in which case the wedge surface can be inclined at both sides. As can be seen from the drawings, one will, however, as a rule, align the lower wedge surface 10 of the wedgelike recess parallel to the rail level. It will be appreciated that the form members cannot be of indefinite length, but are only so long that they fill the space between two successive attachment installations 2 of a given rail 1 upon crossties 3. The form members 8 and 9 can be each formed as an integral or single-piece member. However, each of the inner form members 8 at the inner side of the rails is preferably divided in lengthwise direction into lower and upper portions 8*a* and 8*b*, respectively. This division is preferably carried out above the level of the support or bearing surface 10. The form members are preferably made of a plastic material and, in this regard, the use of neoprene or similar materials has proven to be particularly satisfactory. The form members can thus be produced in the desired profiles in the simplest fashion. If desired, the form members can alternately be constructed of glued or cemented oak wood laminations of appropriate contour.

The inner and outer plates 6 and 7 are each provided with a profile surface 11 on their sides which face the form members. This profile surface 11 is complementary to the profile of form members 8 and 9, which faces away from the respective rail. In the vicinity of the rail attachment installations 2, the profile surface 11 is recessed so that the plates can also be arranged above these attachment installations.

The inner and outer plates 6 and 7, respectively, preferably are constructed of reinforced concrete and are sealed off on their sides facing the form members by a profiled iron member, not shown, which is anchored in the respective plate body. Alternately, a particularly useful arrangement may be provided wherein each of the inner and outer plates comprises a closed peripheral iron frame within which the concrete is cast.

While the inner plates 6 are supported on both sides upon the inner form members 8, this is true for the outer plates 7 only in the case when two tracks (i.e., two pairs of rails) are lying side by side and the outer plates 7 in such case would connect the rail pairs. Normally, however, the outer plates 7 are supported by the outer form members 9 only at the inner ends of the plates; the sides of these plates facing away from the rails can be mounted upon construction elements adjoining the track structure, in any desired fashion. As shown in the drawings, the outer plates 7 are, at their ends facing away from the rails, supported upon respective U-irons 12, which may preferably comprise rolled U-irons which rest in the outer portion of the ballast bed. In order to enable the outer plates 7 to be adapted to adjoining construction elements such as a roadway, platform, or the like, it is beneficial to provide each of the outer plates 7 with a vertical adjustment means 13. As shown in FIGS. 1 and 2, the vertical adjustment means may preferably comprise screw spindles for this purpose. FIG. 1 shows the manner in which such an outer plate 7 is adjusted to the level of an adjoining street 5, whereas in FIG. 2, such an outer plate 7 is shown as adjusted to the comparatively elevated level of an adjoining railroad station platform 14.

The mounting of the railroad grade crossing is extremely simple and rapid. First, the lower portions 8*a* of the inner form members 8 are laid along the inner side of each rail 1 at predetermined locations between the rail attachment installations 2, upon the base of rail 1. The inner plates 6 can then be immediately laid upon the support or bearing surfaces 10 of the lower portions 8*a* of the form members 8, and are, thus, already firmly seated in their proper position. The upper portions 8*b* of the form members 8 can now simply be inserted from the side, between rail 1 and the edge of the inner plate 6. Alternately, in the event single-piece inner form members 8 are utilized, the inner plate members 6 are initially temporarily supported at approximately the desired height between the rails, the inner form members 8 are laterally inserted between the inner plate members and the rails, and the inner plate members are then lowered so that they rest upon and are supported by the respective support surfaces 10. In laying the outer plates 7, it is first necessary to lay the rolled U-irons 12 after previously compacting the inner ballast bed, if necessary. Thereafter, the outer form members 9 are inserted into the lateral rail profile, and then the outer plates 7 are laid thereupon. After regulating the elevational position of the outer plates 7 by means of screw spindles 13, the laying operation is substantially complete. The plates can now, if desired, be additionally secured against lateral displacement by firmly threading nonillustrated end closure members, on the one hand, at the front surfaces of the outermost plates and, on the other hand, at the rail attachment devices. In the middle of the front surface of the outermost inner plates 6 there can be provided, if desired, a deflector plate, also not illustrated, for the protection against coupling parts which are hanging down from rail vehicles.

Besides the already previously mentioned advantages, the instant railroad grade crossing according to this invention possesses in addition the further advantage that for all types of rails and all kinds of railroad grade crossings, the same kinds of inner and outer plates can be used. In order to adapt the connection of these plates to any and all rail profiles, it is only necessary, in the case of a given track gauge, to provide form members **8** and **9** having a suitable profile. In the case of different gauges, the inner plates **6** must be produced with correspondingly adapted lateral dimensions. The mounting level of the plates can also be easily determined by providing the support or bearing surfaces **10** for the carrier plates at the corresponding level within form members **8** and **9**.

A further advantage of the inventive grade crossing resides in the fact that it can be easily and quickly disassembled when the track section must be freed for track maintenance work, such as compaction or reballasting. The thus dismantled parts can be readily reused as desired.

By providing a railroad grade crossing according to the above-detailed description, it is believed evident that all of the objects set forth at the outset to the specification have been successfully fulfilled. Accordingly,

What is claimed is:

1. A railroad grade crossing for at least one pair of rails, each rail having a base portion and a head portion spaced from one another to define therebetween a predetermined lateral rail profile at each side thereof, with such rails secured to crossties at spaced intervals by attachment installations arranged along each rail, comprising

at least one inner plate member bridging the region between the pair of rails;

at least one outer plate member disposed to each side of the pair of rails;

support means extending along and adjacent to each side of the rails and positioned between the attachment installations to form the only means of support for the portion of said plates positioned nearest the rails and forming the only support for the inner plate member, each said support means comprising an elongated form member formed of one-piece construction and extending from the base portion at least up to the head portion of the rail, each said form member has a first longitudinal side facing the rail, said first side conforming to the lateral rail profile and a second longitudinal side, said second longitudinal side having a receiving recess therein, each recess bounded at its lower region by a lower support surface extending substantially parallel to the plane formed by the pair of rails;

each said plate member being provided with a laterally extending profile surface means for engaging and conforming to said receiving recess, each said profile surface means engages a receiving recess in a form member whereby each said inner plate member is supported only by said profile surface means along the sides thereof closest said pair of rails and each said outer plate member is supported on the side thereof closest a rail only by said profile surface means.

2. A railroad grade crossing as defined in claim **1**, wherein said profile surface means of each plate member includes a lower surface likewise extending substantially parallel to the track and which bears upon said lower support surface of the associated form member into which it is inserted.

3. A railroad grade crossing as defined in claim **2**, wherein said lower support surface of each receiving recess and said lower surface of each profile surface means extend substantially horizontally.

4. A railroad grade crossing as defined in claim **1**, wherein said cooperating surface of said form members adjacent the associated rail possess a profile complementing the neighboring lateral rail profile of such rail.

5. A railroad grade crossing as defined in claim **1**, wherein said plate members are recessed at the area of said attachment installations in order to render access to said receiving recesses for said profile surface means of said plate members.

6. A railroad grade crossing as defined in claim **1**, wherein each of said inner plate members and each of said outer plat members is constructed of concrete.

7. A railroad grade crossing as defined in claim **1**, wherein each of said inner plate members and each of said outer plate members comprises a peripheral iron frame means filled with concrete.

8. A railroad grade crossing as defined in claim **1**, wherein each of said outer plate members, at the sides thereof opposite said rails, comprises vertical adjustment means for adjusting the elevation of the outer sides of said outer plate members.

9. A railroad grade crossing as defined in claim **8**, wherein said vertical adjustment means comprise screw spindles cooperating with said plate members and with the track substructure.

* * * * *

UNITED STATES PATENT OFFICE

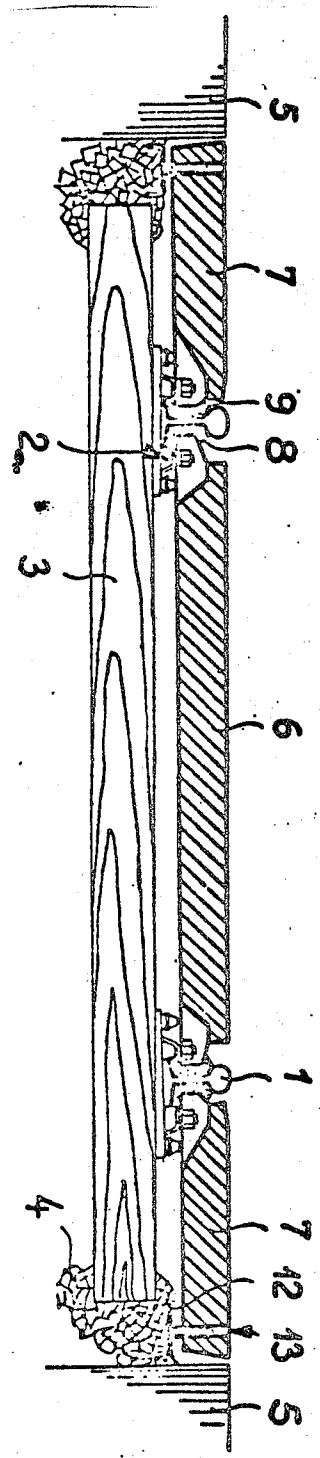
CERTIFICATE OF CORRECTION

Patent No. 3,643,864 Dated February 22, 1972

Inventor(s) Hans Ziegler

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet the illustrative drawing should appear as shown below:



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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334,

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,643,864 Dated February 22, 1972

Inventor(s) Hans Ziegler

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Signed and sealed this 1st day of August 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
☆ U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.