Jan. 8, 1935. C. H. DILL 1,987,392

ROAD CONSTRUCTION

Filed Aug. 1, 1929 2 Sheets-Sheet 1

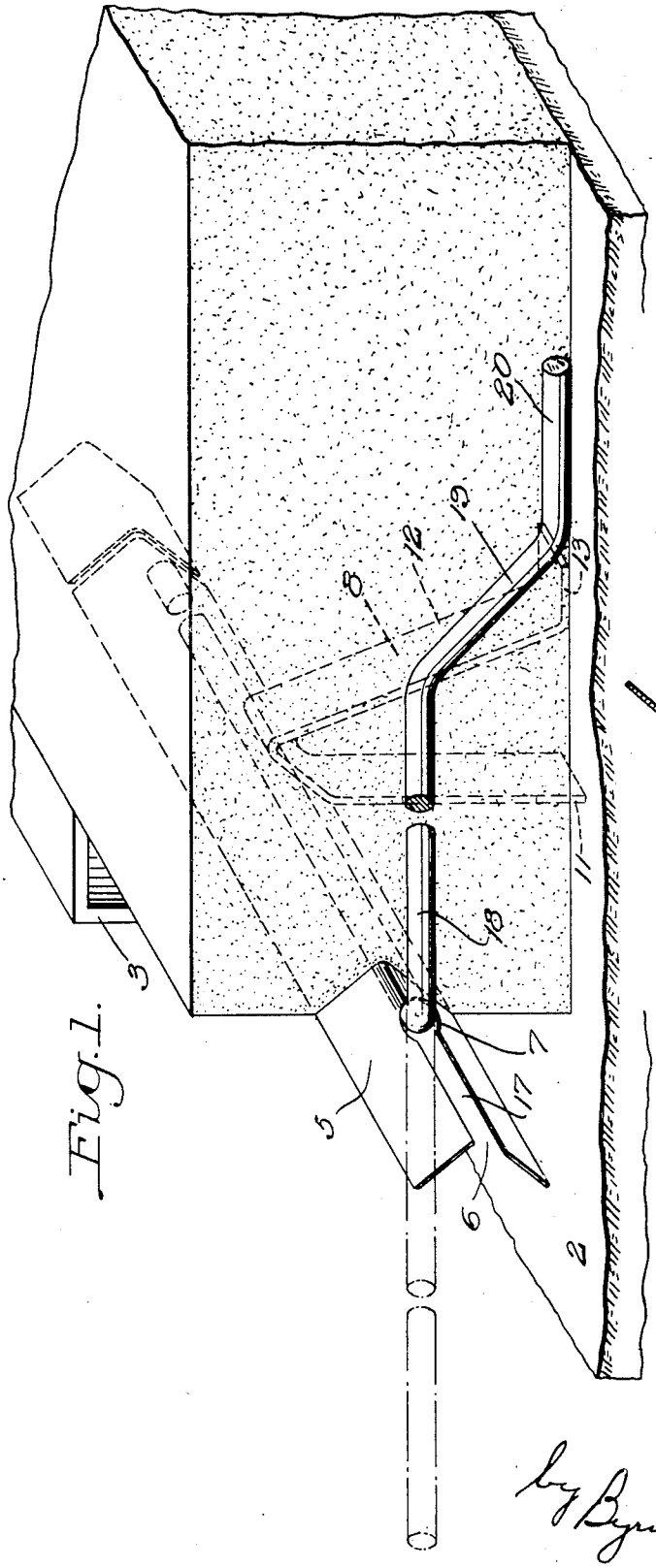


Fig. 1.

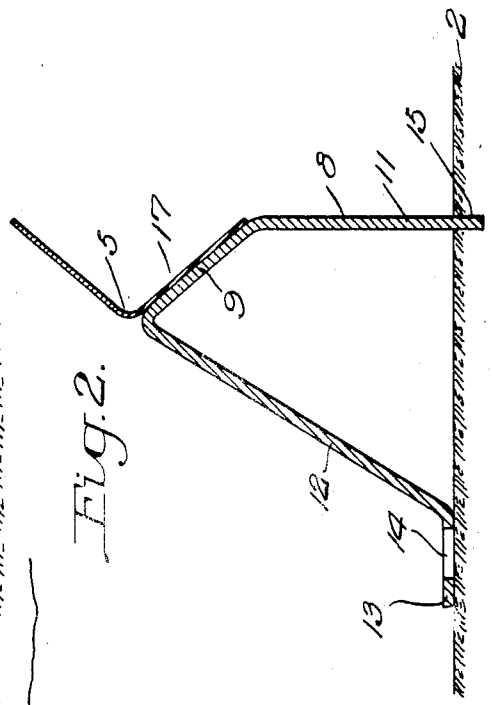


Fig. 2.

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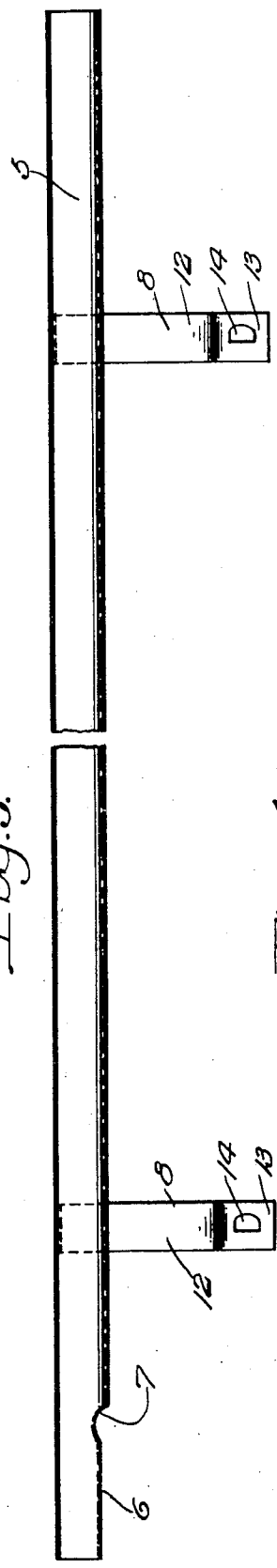


Fig. 3.

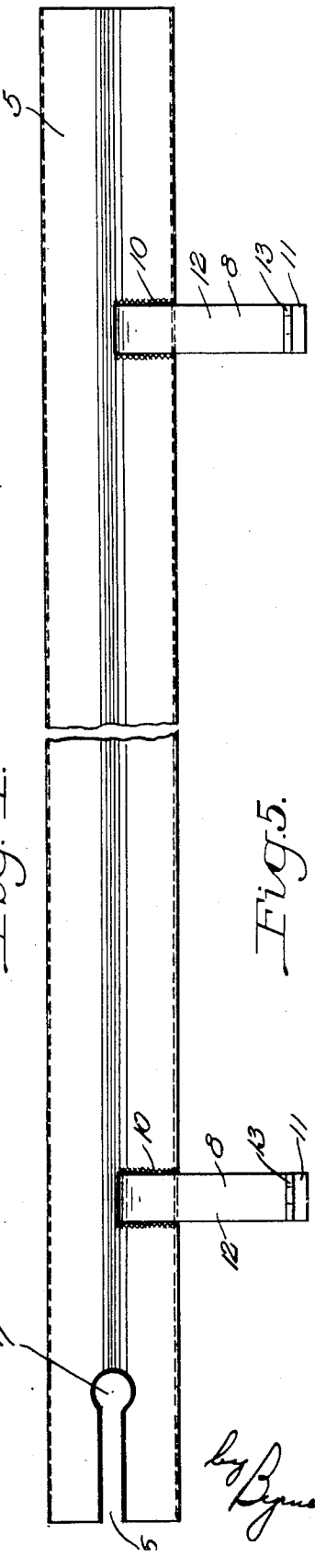


Fig. 4.

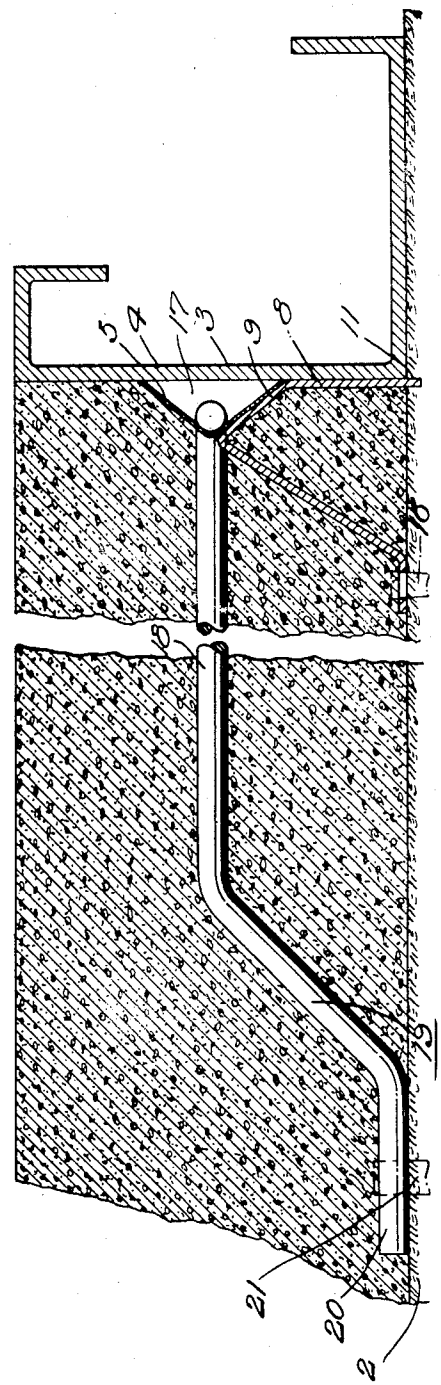


Fig. 5.

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ROAD CONSTRUCTION

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Application August 1, 1929, Serial No. 382,726

19 Claims. (Cl. 25—118)

This invention relates to road construction and more particularly to a method and means for building a road having a dividing plate therein. It relates still more particularly to an improved dividing plate construction.

It is common in the road making art to build roads having dividing plates embedded therein and extending longitudinally thereof to divide the road material into at least partially segregated masses whereby to eliminate to a considerable extent the danger of undesired cracking of the road surface due to expansion and contraction thereof under changes in temperature. Such dividing plates ordinarily comprise a substantially vertically extending portion for dividing up the mass of road material and a substantially channel-shaped portion for providing a "tongue and groove" construction in the road whereby the two sides of the road interlock in the vertical direction. Such interlocking assists in preventing one side of the road from rising above the other side due to unequal temperature conditions or due to any difference which may exist in the construction of the road.

Dowel bars are used in conjunction with the dividing plates to join together the portions of the road on opposite sides of the plates whereby to prevent such oppositely disposed portions from spreading apart. Therefore, by the provision of the "tongue and groove" construction in conjunction with transversely extending dowel bars, the oppositely disposed road portions are prevented from relative movement either horizontally or vertically.

It has become the general practice in road building to construct a road in halves in order to permit traffic to move over one half of the road while the other half is under construction. When this method is followed one side of the road is ordinarily completed before the other side is commenced and there is consequently considerable difficulty in joining the two opposite sides by means of dowel bars. It is necessary to embed one half of a dowel bar in the first half of the road to be built and to permit the other half of the dowel bar to extend out laterally from the first half of the road toward the second half. Due to the fact that traffic is moving on the second half immediately beside the first half, some provision has to be made for disposing of the protruding portion of the dowel bar. This has heretofore been done in various ways, as by bending it straight up in the air or by bending it lengthwise of the road against the road form. The former method is unsatisfactory because of the danger occasioned by reason of the dowel bar extending straight up in the middle of the road, and the latter is very unsatisfactory because after the road material is poured and hardens and the form is removed, it is necessary to pull the second half of the dowel bar out of the hardened road material, thereby breaking a portion of the road material.

Difficulty has also been encountered in laying the dividing plate sections and dowel bars. Most roads in the present day are made by moving a road material machine over the sub-surface to discharge road material behind the machine as it moves forward, such road material being spread out to form the road. Such road material machines are of great size and weight, and consequently the sub-surface must be clear of impediments, such as dowel bars, when the road material machine moves thereover.

In the known constructions of the dividing plates and dowel bars it is necessary to emplace the plate sections and dowel bars at the same time as the dowel bars pass through small holes in the plate sections and it would be extremely difficult to thread the bars through the plate sections if the plate sections had first been emplaced. Consequently, it has been necessary to first move the road material machine over and beyond the portion of the sub-surface to which road material is to be delivered and then emplace the dividing plate and dowel bars preparatory to the actual discharge of road material from the machine. This is extremely wasteful of time as the machine must necessarily stand idle while the dividing plate sections and dowel bars are being emplaced behind it and before the road material can be discharged from the machine.

The above and other defects in present day road construction practice are overcome according to my invention whereby I provide for eliminating the disadvantages arising by reason of the protruding half of the dowel bar while the first half of a road is being formed, and also the delay occasioned by the necessity of having the road material machine stand idle while the dividing plate sections are emplaced and before the road material can be delivered.

When roads are built in halves as above described, there is little or no need for vertically extending portions of the dividing plate as one-half of the road hardens before the other half is made, the two halves thereby in effect being segregated masses as they do not bond together so well as do portions of a mass formed at the same time. The edges of the masses abut one another

but they do not become so intimately connected as to be in effect one large integral mass and hence are not subject to serious cracking. It is, however, desirable to provide both the "tongue and groove" construction for preventing the opposite halves of the road from moving vertically with respect to each other and the dowel bars for preventing relative horizontal movement of the two halves of the road.

I provide a dividing plate having two legs only, both of such legs extending at an angle to the vertical, the legs being angularly disposed with respect to each other, and road material lying against the plate on both sides, whereby to form in the road a "tongue and groove" between the portions on opposite sides of the plate. By this provision the "tongue and groove" construction is provided for, a ready means is provided for disposing of the protruding portion of the dowel bar during formation of the first half of the road, and the expense incident to provision of the dividing plate is substantially cut in half.

I further provide a dividing plate having in its end a dowel bar slot extending from the end surface substantially longitudinally of the plate, whereby a dowel bar may be moved transversely of its axis into engagement with the plate. I still further provide in a method of road construction the steps comprising first emplacing sections of dividing plate along a sub-surface, then moving a road material machine along such sub-surface, then emplacing dowel bars behind the machine and then discharging road material from the machine. These provisions eliminate the waste of time occasioned by the necessity of having the road material machine stand idle while the dividing plate sections are emplaced behind it and before the road material can be discharged.

Other objections and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawings I have shown a present preferred embodiment of the invention wherein

Figure 1 is a perspective phantom view of a portion of a road in the process of construction;

Figure 2 is a cross section through a dividing plate and supporting chair;

Figure 3 is a top view of a dividing plate supported by chairs;

Figure 4 is an elevation of the dividing plate and chairs shown in Figure 3; and

Figure 5 is a cross section through one half of a road construction.

Referring more particularly to the drawings, reference numeral 2 designates generally a road sub-surface upon which a road is to be constructed. The sub-surface 2 is graded and smoothed in the usual manner preparatory to emplacement of the road form for confining the road material, the dividing plate sections and the dowel bars. Disposed along the sub-surface is a road form 3 which has a vertically extending wall 4 against which on one side the road material is adapted to be formed. The road form 3 is divided into sections which are placed end to end longitudinally of the road so that the wall 4 lies substantially at the center line of the road to be constructed. The half of the road to the left hand side of the road form 4, viewing Figure 5, is the first half to be formed. After this half of the road is formed, the road form is removed and the right hand half is formed, using the edge of the left hand half as a form for confining the road material of the second half.

I provide a dividing plate made up of sections 5. Each section is of a suitable length and, as shown in Figure 2, comprises two legs only, such legs being angularly disposed with respect to each other. An elongated dowel bar slot 6 is formed in the end of each plate section, such slot extending from the end surface substantially longitudinally of the plate, whereby a dowel bar may be brought into co-operative relationship with the plate by movement transversely of the axis of the dowel bar and substantially longitudinally of the plate section. The dowel bar slot 6 is provided with an enlarged inner extremity 7 adapted to retain the dowel bar and prevent it from slipping out during formation of the road.

The plate sections 5 are adapted to be emplaced with both of their legs extending at an angle to the vertical as shown in Figure 2. Such plate sections are emplaced flush against the wall 4 of the form 3 as shown in Figure 5 and are maintained in position by chairs 8. Each chair 8 comprises an angularly extending portion 9 adapted to lie along one of the legs of the dividing plate to support it in the desired position. The dividing plate is shown in Figure 4 as being welded to the chairs 8 as at 10, although the plate sections may be connected with the chairs in any other suitable manner. It is, however, desirable to weld the plate and chairs together as they may be sold as an assembly ready for emplacement.

Each chair 8 also comprises an upstanding leg 11 and a downwardly angularly extending leg 12 provided with a horizontal foot 13 having a dowel pin hole 14. Each plate section is emplaced by positioning it, together with its supporting chairs, against the road form and then pressing down the plate and chairs so that the leg 11 of each chair will sink into the sub-surface 2 for a short distance, as shown at 15 in Figure 2. A dowel pin 16 (Figure 5) passes through the hole 14 in the chair, thus firmly maintaining the dividing plate in place.

A triangular opening 17 is provided by the channel of the dividing plate between the plate and the wall 4 of the road form. The plate sections are preferably spaced apart longitudinally of the sub-surface whereby to permit insertion of the dowel bars into the slots 6. Dowel bars 18 are provided which are bent at right angles substantially at their longitudinal centers so that one half of each bar is adapted to extend transversely of the road and the other half to lie longitudinally along it until the first half of the road is completed, whereupon it is bent out into substantial alignment with the first half of the bar. The end of the dowel bar is bent downwardly as shown at 19 and is provided with a substantially horizontal extremity 20 adapted to lie along the sub-surface and to be held in place thereagainst by a U-shaped spike 21.

In constructing a road the road form 3 is first laid so that its wall 4 lies substantially along the proposed center line. The dividing plate sections 5 and their supporting chairs are then emplaced against the road form as explained. The road form and sections of the dividing plate may be set in place a substantial distance ahead of the road material machine as they are to one side of the path to be traveled by the machine and hence are not in the way. As above-mentioned, the plate sections are preferably spaced apart

at least far enough to permit of insertion of the dowel bars into the slots 6.

After the road form and plate sections have been emplaced the road material machine is moved over a portion of the sub-surface and then dowel bars are quickly emplaced in such portion of the sub-surface by moving them into the slots 6. As above-mentioned, the bars are first bent substantially at right angles. One leg of each bar is inserted into the triangular opening 17 provided between the plate and the form and the other leg extends transversely of the first half of the road to be constructed. The time required for insertion of the dowel bars is almost negligible so that there is no necessity for the road material machine to stand idle during emplacement of the plate sections. After the dowel bars are set in place, road material is discharged from the machine and such material is spread out over the sub-surface around the dowel bars and against the plate sections and road form to form the road. The machine is then moved forward again, more dowel bars are emplaced and the operation is repeated.

According to the method above described, the plate sections may be emplaced any desired distance ahead of the machine. This may be done at times when the machine is in operation or when it is convenient because laborers may be used for the purpose who are not for the moment employed elsewhere. The emplacing of the plate sections is not dependent on the forward movement of the road material machine.

After the road material is formed in the first half of the road, and such material has hardened, the form 3 is removed. This permits bending out of the half of the dowel bar lying in the channel of the plate section whereby to form the second half of the road with the dowel bar extending across the center line. Due to the fact that the second leg of the dowel bar lies in the channel of the dividing plate, it is not necessary to break away any of the road material in straightening it out, and hence no damage is done to the first half of the road to be formed.

The second half of the road is formed against the edge of the first half, such edge serving as a permanent road form. However, due to the fact that the first half of the road has hardened a considerable time before the second half is formed, and also due to the fact that the dividing plate remains in place between the two halves, there will not be such a bonding in the center line as will result in cracking due to an enlarged integral mass of road material.

Thus, as above pointed out, there is no necessity for the provision of vertically extending legs on the dividing plate as has heretofore been customary for the purpose of dividing the road into two halves. Such vertically extending legs are of advantage when the entire road is poured at one time, but their usefulness ceases in roads constructed by halves. Therefore, I provide to eliminate considerable expense incident to the provision of the dividing plate as its weight is cut substantially in half and its cost is reduced accordingly.

The dividing plate at the same time serves to provide for the "tongue and groove" construction between the two halves of the road. If desired, the dividing plate, instead of being permanently connected to the supporting chairs, may be removably held in place so that after the road material has been formed in the first half of the road, the dividing plate may be entirely removed and used again along with the road form at another portion of the road. The purpose of the dividing plate is substantially served in providing for the "tongue and groove" construction and for the shielding of the bent leg of the dowel bar from the road material. If it is desired to remove the dividing plate it may, instead of being supported on the chairs, be supported from the road form. The slot 6 in the end of each plate section facilitates removal from the dowel bar.

While I have shown and described a present preferred embodiment of the invention, it is to be distinctly understood that the same is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

I claim:

1. A road construction comprising a dividing plate having two legs only, both of such legs extending at an angle to the vertical, the legs being angularly disposed with respect to each other, spaced chairs for supporting the plate above the sub-surface while leaving unobstructed a plane through the extremities of both legs and parallel to the axis of the plate, and road material lying against the plate on both sides.

2. In a road construction, a dividing plate having two angularly disposed legs both of which extend at an angle to the vertical, a dowel bar adapted to have a portion lying against the plate and between said legs, and means for supporting the plate against a road form during formation of the road to protect said portion of the dowel bar from road material lying against the opposite side of the plate.

3. A road construction comprising a dividing plate having two legs only, both of such legs extending at an angle to the vertical, the legs being angularly disposed with respect to each other, a dowel bar passing through and bent against the plate, and road material against the plate and about the dowel bar.

4. In a road construction, a dividing plate having two legs, the legs being angularly disposed with respect to each other, and a dowel bar slot in the end of the plate whereby a dowel bar may be moved transversely of its axis into engagement with the plate.

5. In a road construction, a dividing plate having in its end a dowel bar slot extending from the end surface substantially longitudinally of the plate, such slot having an enlargement at its inner extremity.

6. In a road construction, a dividing plate having two legs angularly disposed with respect to each other, the plate having a dowel bar slot in its end, such slot being at the juncture of the two angularly disposed legs and extending from the end surface substantially longitudinally of the plate.

7. In a road construction, a dividing plate having in its end a dowel bar slot extending from the end surface of the plate substantially longitudinally thereof, and chairs supported on the road sub-surface for independently supporting the plate clear of the sub-surface.

8. A method of constructing roads and the like, comprising emplacing along a sub-surface a dividing plate having two legs only extending at an angle to each other, positioning a dowel bar with a portion protected by said plate, and delivering road material to the sub-surface.

9. Road construction, comprising a dividing plate made of a length of material having lateral

extremities extending generally in the same lateral direction and spaced apart so as to provide between them a longitudinal opening, and supporting devices each having a portion underlying a portion of the dividing plate.

10. The method of making concrete roads containing slabs having interlocking engagement at their edges, which comprises forming one slab with an irregular edge by the use of a dividing plate separate from the road form, and with dowels partially imbedded therein, removing the dividing plate, and thereafter pouring a second slab with one edge in abutting relation with said irregular edge and over the unimbedded portions of said dowels.

11. The method of constructing concrete roads, which comprises pouring a road section over one end portion of a bent dowel bar whose other end portion extends at substantially right angles to the first-named portion and against a dividing plate, thereafter straightening the bar, and pouring a second road section over the second-named end portion of said dowel bar and against said dividing plate.

12. A road construction comprising a sub-surface, a road form, a dividing plate separate from the road form, supporting means for such plate adapted to support the same over the sub-surface while leaving one side of the plate unobstructed to permit it to lie against the road form, the dividing plate leaving a substantial portion of the road form exposed below the dividing plate, and road material over the sub-surface and against the dividing plate.

13. Road construction, comprising a dividing plate having two legs only extending at an angle to each other, a dowel bar having a portion lying longitudinally along the plate, and road material against the plate opposite said portion of the dowel bar.

14. A road construction comprising a sub-surface, a dividing plate, supporting means for such plate adapted to support the same over the sub-surface while leaving one side of the plate unobstructed to permit it to lie against a road form positioned over the sub-surface, said supporting means supporting the dividing plate independently of the road form, and road material over the sub-surface and against the dividing plate.

15. Road construction, comprising a dividing plate made of a length of material shaped to provide a longitudinal opening and having lateral extremities extending generally in the same lateral direction, said dividing plate being adapted to be positioned with the ends of said lateral extremities against a road form, said dividing plate having a dowel bar opening therein extending transversely of and joining said longitudinal opening, and means for supporting the dividing plate.

16. A road construction comprising a sub-surface, a road form, a dividing plate separate from the road form, said dividing plate being made of a length of material shaped to provide a longitudinal opening and having lateral extremities extending generally in the same lateral direction, supporting means for the dividing plate adapted to support the same over the sub-surface while leaving one side of the plate unobstructed to permit the ends of the lateral extremities thereof to lie against the road form, and road material over the sub-surface and against the dividing plate.

17. A dividing plate for road construction, comprising an elongated member shaped to provide a longitudinally extending opening adjacent a road form when said member is emplaced against such road form, said member having a transverse opening therein communicating with said longitudinally extending opening, said transverse opening being so constructed and arranged as to provide for insertion therethrough from the side of the plate opposite said longitudinally extending opening after emplacement of the plate against a road form of a portion of a dowel bar to lie along the plate in said longitudinally extending opening.

18. A dividing plate for road construction, comprising an elongated member shaped to provide a longitudinally extending opening adjacent a road form when said member is emplaced against such road form, said member having a transverse opening therein communicating with said longitudinally extending opening, said transverse opening being elongated generally in the direction of the length of the dividing plate and being adapted for insertion therethrough from the side of the plate opposite said longitudinally extending opening after emplacement of the plate against a road form of a portion of a dowel bar to lie along the plate in said longitudinally extending opening.

19. A dividing plate for road construction, comprising an elongated member shaped to provide a longitudinally extending opening adjacent a road form when said member is emplaced against such road form, said member having a transverse opening therein extending from an end thereof and communicating with said longitudinally extending opening, said transverse opening being elongated generally in the direction of the length of the dividing plate and being adapted for insertion therethrough from the side of the plate opposite said longitudinally extending opening after emplacement of the plate against a road form of a portion of a dowel bar to lie along the plate in said longitudinally extending opening.

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