CONCRETE ROAD CONSTRUCTION

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The present invention relates to the construction of concrete roads and similar surfacing structures, and aims to provide a concrete road having provisions whereby the road may be widened subsequently, with the slabs or sections tied or connected together.

Another object is the provision of a concrete road having anchor rods or members embedded therein along one edge, for the engagement of other anchor rods or members to be embedded in an addition to the road for purpose of widening the road, in order that the slabs or sections at the opposite sides of the division line will be tied or connected together securely to prevent separation thereof.

A further object is the provision of a road composed of slabs or sections at opposite sides of a division line tied or connected together in a novel manner, and providing, if desired, a flexible joint, as well as providing a definite line of division to avoid irregular natural breaks such as occur in concrete roads between the opposite edges thereof when the roads are not provided with means to control the breaking thereof along the longitudinal center line or other longitudinal line.

A still further object is the provision of a concrete road or similar surfacing structure having a novel joint between opposite slabs or sections thereof.

Another object of the invention is the provision of an anchor rod or member of novel form to be embedded in a concrete slab or section at one edge thereof for connection with a corresponding rod or member in an adjacent slab or section.

A further object is the provision of a form rail or member for defining the edge of a concrete slab or section and having provisions for accommodating the anchor rods or members.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of a concrete road under construction, embodying the improvements, and showing the various stages in building the original road or portion thereof and the addition thereto.

Fig. 2 is a cross section of the form rail with the anchor rod or member engaging same.

Fig. 3 is a cross section showing the joint between the opposite slabs or sections, with a groove form in place for defining a groove between said slabs.

Fig. 4 is a perspective view of a road built according to the present invention, with modifications, and illustrating in dotted lines additions to the road at opposite edges thereof.

Fig. 5 is a longitudinal horizontal section of one of the rails shown in Fig. 4 and illustrating a fragmentary portion of the road and anchor rods.

Fig. 6 is a fragmentary plan view of the joint between the road and additional slab at one edge thereof, the adjacent portions of the slabs being broken away and shown in section.

Fig. 7 is a cross section of a modified construction of form rail.

Figs. 8 and 9 are horizontal and cross sections, respectively, of another modified form of rail.

Fig. 10 is a cross section illustrating the improved joint between a road slab and a curb and gutter.

Fig. 11 is a cross section illustrating the improved joint between a road slab and curb.

Referring to Figs. 1, 2 and 3, the invention is illustrated for producing one half or one side of the road first, and the other side or half of the road subsequently, which may be several weeks, months or years later, so that the first part of the road which is built may have the other part added thereto later on with both parts tied or connected together against separation.

The first part of the road, which may be one half or one side of the road of full width ultimately contemplated, is built between longi-
tudinal form rails 14 and 15, between which the aggregate is poured and finished in the usual manner, to produce the slabs 16.

With the view to later adding another part or other slabs to the original slabs 16, anchor rods or members 17 are embedded in the slabs 16 along those edges thereof which are defined by the rail 15, the rails 14 and 15, as well known, being composed of sections disposed end to end. The rods 18 are of V-shape and have the arms 18 diverging from a loop 19, and said arms have downwardly extending terminals or feet 20 at their opposite ends to rest on or enter the sub-base for supporting said rods in place with the arms 18 between the sub-base and the surface of the road, during the pouring and finishing of the plastic concrete. The rods 17 are disposed with their loops 19 at the corresponding edge of the part of the road under construction, with the arms 18 projecting toward the opposite rail 14. In order to accommodate the loops 19 and assist in supporting the rods 17, the web 21 of the rail 15 is provided intermediate the upper and lower flanges of the rail, with outstanding or outstuck portions 22 providing recesses or pockets in the inner side of the rail to receive and support the loops 19, as seen in Fig. 2. Thus, with the loops 19 fitted and seated in the portions 22 of the rails 15 and the terminals 20 of the rods 17 seating on or driven into the sub-base, the rods are maintained in position during the pouring and finishing of the aggregate. Furthermore, the loops 19 will protrude slightly beyond the corresponding edge of the slabs 16. The concrete entering the portions 22 is molded around and over the loops 19, to form lugs 23 integral with the edge of the slabs in which the loops 19 are embedded, to be protected from rust and corrosion. Furthermore, although the loops 19 are embedded in the concrete, they may be readily located due to the fact that the lugs 23 protrude from the edge of the slabs, but such lugs project only slightly from the slabs so as not to be accidentally broken off.

The first part of the road may thus be built in the usual manner between opposite form rails, with the anchor rods 17 embedded in the concrete along one edge thereof to make provisions for the addition of another part of the road at a subsequent time. The rods 17 being embedded in the concrete will be protected, and they may be readily located by the presence of the lugs 23.

When the addition to the road is to be built, such as the opposite side or half to that originally built, the lugs 23 are broken or chiselled away to expose the loops 19 of the rods 17, and other anchor rods or members 17', corresponding with the rods 17, are engaged with the loops 19 of the rods 17, and the terminals of the rods 17' seat on the sub-base. Wedges 32 are driven into the loops 19 of the rods 17 to clamp the loops 19 of the rods 17' in place and assist in preventing accidental displacement of the rods 17'. A form rail 27 is then supported on the sub-base at the desired distance from the slabs 16, and the additional slabs 28 are constructed between the slabs 16 and rail 27, so that the rods 17' are embedded in the slabs 28. The slabs 16 and 28 are thus tied together due to the interengaging of the loops 19 of the anchor rods, said loops being inclined in order that they may interengage with the rods of the opposite slabs in reversed positions. The rods 17 and 17' having their loops engaging one another will tie the opposite slabs together with a hinge joint, thereby permitting the opposite halves or slabs of the road to flex relatively to one another along the line of the longitudinal joint. This will provide a break or division in the full width road that will avoid the irregular breaking of the concrete such as occurs ordinarily when no provision is made for controlling the breaking of the concrete.

As shown, the slabs 16 and 28 have transverse cuts 29 therein which may be readily produced in the surface of the concrete while it is still plastic, and which will control the transverse breaks. As shown, the cuts 29 at the opposite sides of the longitudinal joint are in staggered arrangement. The cuts 29 may be of various depths.

In order to seal the longitudinal joint a groove form is employed, similar to the form disclosed in my Patent No. 1,596,179, granted August 17, 1926. This form, as hereinafter shown, is of sheet metal and is V-shaped in cross-section, as at 25, and one side thereof has a flange 26 extending across and spaced above the upper edge of the opposite side, and provided with a downwardly bent back portion 26' extending reversely across the upper edge of said opposite side. When the anchor rods 17' are engaged with the rods 17 the form 25 is placed over the loops 19 of said rods, as seen in Fig. 3, with the portion 26' overlapping the slabs 16. The loop or bend between the flange 26 and portion 26' is resilient so as to yield should the tamper contact with or bear on said form during the tamping or finishing of the slabs 28, thereby preventing the edges of the slabs 16 being broken off. Then, when the slabs 28 are formed, the form 25 will produce a groove 30 full between the slabs 16 and 28 above the joints of the anchor rods. This groove 30 is filled, as at 31, with tar, asphalt, or other sealing material, in order to prevent water and moisture from passing downwardly between the slabs, and the sealing material will also provide a traffic line in order to separate traffic moving in opposite directions on the road.

Fig. 4 illustrates a narrow road constructed in accordance with the present in-
vention and having provisions along the opposite edges thereof for the connection of additions or shoulders to the road, for purpose of widening it at some subsequent time. The rails 15 are provided, during the construction of the road, between which the concrete road 16 is built, and anchor rods or members 17 are embedded in the concrete at the opposite edges thereof and have arms 19 with diverging terminal portions extending toward the center of the road. Said rods 17 have loops or eyes 19 at the edges of the road. The webs 21 of the rails 15 have longitudinal ribs 22 pressed therefrom and projecting from the inner sides of the rails, with the ends of said ribs spaced apart. The loops 19 of the anchor rods are disposed between the ends of the ribs 22, as seen in Fig. 5, when setting up the form rails and anchor rods, and the ribs 22 form grooves 23 in the edges of the road, with portions 25 between the ends of the grooves in which the loops 19 are embedded, to be protected from water and moisture, and to also locate such loops in order that they may be exposed later on.

When the additions or shoulders 28 are to be added to the road, as indicated in dotted lines in Fig. 4, for purpose of widening the road, the portions 23 are broken or chiselled away, to expose the loops 19, and V-shaped anchor rods 17, or other suitable anchor members are engaged through the loops 19, as seen in Fig. 6, and they are embedded in the additions or shoulders 28, thereby tying said additions or shoulders 28 with the road or main slabs 16. The joints between the slabs 16 and 28 may be flexible, it being noted that the slabs 28 will be formed with longitudinal tongues engaging within the grooves 23 of the slabs 16, to provide hinge joints in connection with the hinge joints of the anchor rods 17. The road 16 is shown with a longitudinal groove 30 for controlling the longitudinal breaking line, inasmuch as the breaks will occur below the groove 30, and the road 16 has transverse tie or dowel rods 30 embedded therein below the groove 30 for tying together the slabs at the opposite sides of the groove 30. Such groove is filled the same as the groove 30 of Fig. 1. As shown in Fig. 6, wedges 32 are driven into the loops 19 behind the rods 17 to clamp the rods 17 rigidly in place and prevent them from becoming displaced when the concrete of the slabs 23 is being tamped and finished.

Fig. 7 illustrates the rail 15 having a wooden or other longitudinal cleat 29 secured to the web thereof, instead of having the pressed portion 22 as shown in Figs. 4 and 5. Figs. 8 and 9 illustrate the web 21 of the rail 15 as having an outstruck portion 22, similar to the portions 22 of the rail 15 shown in Figs. 1 and 2, to receive the loops 19 of the anchor rods 17, and to form outstanding lugs 23 in which the loops 19 are embedded. Fig. 10 illustrates the invention as used for attaching a curb and gutter to a road slab, or vice versa, inasmuch as either may be completed first and the other added later. Thus, the slab 16 and anchor rod 17 in Fig. 10 correspond with the slab 16 and rod 17 as shown in Figs. 1 and 3, and the curb and gutter 28, which may be termed a slab within the scope of the appended claims, corresponds with the slab 28 as shown in Figs. 1 and 3, and has the anchor rod 17 embedded therein and engaging the rod 17, the form 25 being used in substantially the same manner as shown in Figs. 1 and 3.

Fig. 11 illustrates a somewhat similar arrangement between the road slab 16 and anchor rod 17, and a curb or upright slab 28 in which the anchor rod 17 is embedded, and the form 25 is shown between the slab and curb, it being apparent, however, that when the groove between the slabs or sections is not wanted above the loops 19, the form 25 is omitted. Having thus described the invention, what is claimed is:

1. Concrete slabs disposed edge to edge and anchor members embedded in said slabs and interengaging one another to tie the slabs together.
2. Concrete slabs disposed edge to edge, and anchor members embedded in the slabs and having interengaging loops.
3. Concrete slabs disposed edge to edge, anchor members embedded in said slabs at the adjacent edges thereof and interengaging one another to tie the slabs together, the slabs being formed with a groove between them above said members, and sealing material in said groove.
4. Concrete slabs disposed edge to edge, anchor rods embedded in said slabs and having interengaging loops at the adjacent edges of said slabs, the slabs being formed with a groove between them above said loops, and sealing material in said groove.
5. Concrete road slabs disposed edge to edge, anchor rods having loops engaging one another, and a wedging element engaging the loops to retain said anchor rods in engagement with one another.
6. A concrete slab having anchor members embedded therein, said members having portions at one edge of the slab to engage other anchor members, said slab having breakable portions in which the aforesaid portions are embedded.
7. A concrete slab having anchor members embedded therein, said members having portions at one edge of the slab to engage other anchor members, said slab having breakable portions at said edge thereof in which the...
firstnamed portions thereof are embedded, said portions of the slab indicating the locations of and protecting said firstnamed portions.

8. A concrete slab, and anchor rods embedded therein having loops at one edge of the slab to engage other anchor members, said slab having breakable portions at said edge thereof in which said loops are embedded.

9. A concrete slab, and anchor rods embedded therein having loops at one edge of the slab to engage other anchor members, said slab having breakable portions at said edge thereof in which said loops are embedded, said portions being so arranged as to indicate the locations of the loops and said portions protecting said loops.

10. A concrete slab having anchor members embedded therein and having breakable portions concealing said members and indicating the locations thereof.

11. A concrete slab having anchor members embedded therein and provided with loops, said slab having breakable portions concealing said loops and indicating the locations thereof.

12. An anchor member intended to be embedded in a concrete slab and having a portion to rest on the sub-base on which a slab is to be built, said member having a loop at a higher level than said portion to bear against a form which defines one edge portion of the slab.

13. An anchor rod intended to be embedded in a concrete slab, said rod having diverging arms with portions at their opposite extremities to bear on the sub-base on which the slab is built, and said rod having a loop between said arms at a higher level than said portions to contact with a form which defines one edge portion of the slab.

In testimony whereof I hereunto affix my signature.

J. N. HELTZEL.