

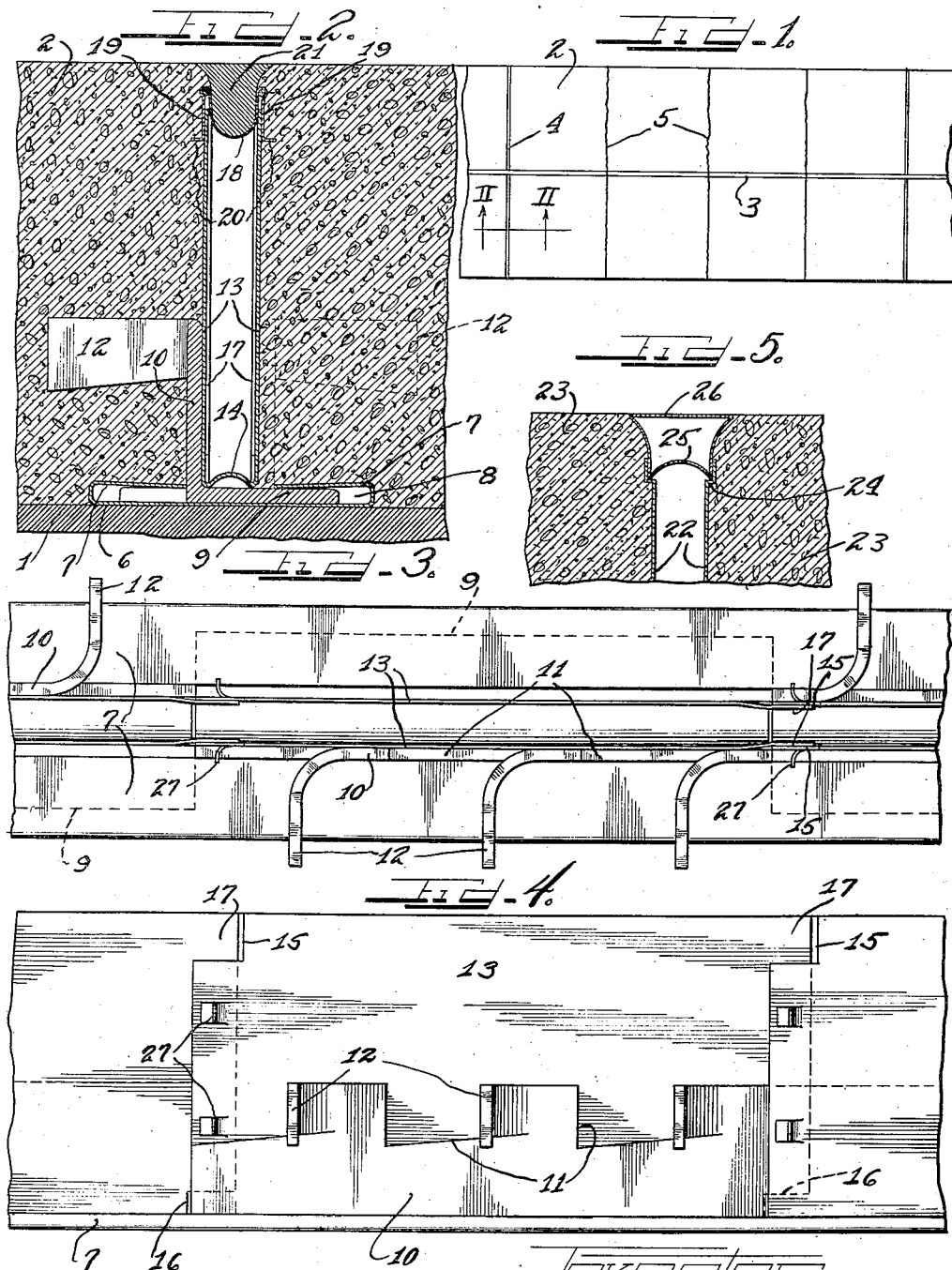
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LOAD TRANSMISSION JOINT FOR ROADS

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Att'y.

UNITED STATES PATENT OFFICE

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LOAD TRANSMISSION JOINT FOR ROADS

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13 Claims. (Cl. 94—18)

The present invention relates to an improved type of load transmission joint for concrete roads, floors, pavements and similar concrete constructions to afford an arrangement whereby loads from adjacent sections of a concrete construction may be distributed across the joint by means of anchoring shoes. The shoes are disposed in staggered relation in a channel base and have hollow compressible interfitting units rigidly secured thereon with the open upper ends of the compressible units having a grooved top member seated thereon for holding a removable core for the purpose of forming a suitable groove when removed for the reception of a filling of a bituminous or other suitable plastic material.

It is an object of this invention to provide an improved type of load transmission joint for concrete constructions, said joint embodying a base member and a top member separated by means of a plurality of aligned interfitting anchoring units affording a hollow compressible closed section permitting adjacent sections of the concrete construction to move toward and away from one another due to temperature changes.

It is also an object of this invention to provide a load transmission joint structure including an anchor and load transmitting shoe having rigidly formed or secured thereon a chambered compressible housing closed at both the top and the bottom to obviate the entrance of concrete or other foreign substances into the hollow housing when the load transmission joint is imbedded in a concrete structure.

A further object of the invention is the provision of a load transmission joint device embodying a grooved guide base for receiving anchor sections in staggered relation and offset with respect to one another to permit chambered housings carried by the anchor sections to interfit one another to permit expansion and contraction of adjacently positioned concrete sections while the anchor sections serve to distribute loads between the concrete sections.

It is furthermore an object of this invention to provide an improved type of load transmission joint for concrete structures said joint consisting of load distributing units which are shiftably positioned within a guide base which serves as a means for preventing upward seepage of water and slit into hollow or chambered cores which are closed at the sides and at the bottom and have the open upper ends thereof closed by means of a grooved top member and a replaceable groove forming means carried thereby for the forming of a groove in the concrete structure adapted

to be filled with a compressible and expansible filling.

Another object of the invention is the provision of an improved type of load transmission joint structure wherein the angle iron anchor sections are shiftably mounted in staggered relation within a guide base and carry chambered core units formed to interfit similar core units of adjacent anchor sections to form a continuous core the open upper portion of which is closed by means of a grooved top unit carrying a groove forming removable bar whereby when the bar is removed after the pouring of concrete a groove is provided for the reception of a compressible and expansible bituminous filling.

It is an important object of this invention to provide an improved type of load distributing expansion or contraction joint forming device adaptable for use in concrete constructions to separate adjacent sections and interlock said sections for load transmitting purposes, said device including a base having shiftably engaged therein a plurality of aligned reversibly positioned anchoring units having hollow core members rigidly secured to said sections and interfitting one another to form a continuous hollow core the upper open end of which is closed by means of a groove forming mechanism whereby a groove is formed in the concrete construction above the joint forming device for the reception of a filling of a bituminous material which will contract and expand with the compression and expansion of the joint forming device resulting from the expansion and contraction of the concrete sections due to temperature changes.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawing.

The invention (in a preferred form) is illustrated in the drawing and hereinafter more fully described.

On the drawing:

Figure 1 is a fragmentary top plan view of a concrete road having load distributing expansion joint forming devices imbedded transversely in the road at spaced intervals.

Figure 2 is an enlarged vertical detail section taken on line II—II of Figure 1 and illustrating the load distributing expansion joint device in position between two concrete sections forming part of the road.

Figure 3 is a fragmentary top plan view of the load distributing expansion joint device with the groove forming top unit omitted and illustrating the alternate or staggered positioning and inter-

fitting relationship of the anchoring shoes and core sections in engagement with the guide base forming part of the device.

Figure 4 is a side elevation of the load distributing joint shown in Figure 3.

Figure 5 is a fragmentary detail section through a portion of a concrete construction illustrating a modified form of groove forming unit engaged in position to close the upper portion of the hollow core unit forming part of a load transmission joint.

As shown on the drawing:

As illustrated in Figures 1 and 2 the reference numeral 1 indicates a concrete road sub-grade having an upper or crown concrete section 2 formed thereon and provided with a longitudinal center joint 3 and with transversely disposed expansion joints 4 separated by a plurality of spaced contraction joints 5.

The improved load distributing or transmission joint embodying the principles of this invention is adapted for use in concrete constructions for the purpose of providing suitable expansion joints between different sections of the construction and furthermore provide means whereby the adjacent sections of the construction are interconnected by means of anchoring members forming part of the joint so that loads are distributed between the sections thereby obviating excessive compression in the sections and the elimination of crushing or upheaval in the concrete construction.

The improved load transmission joint comprises an elongated base member consisting of a solid base plate 6 constructed of sheet metal or other suitable material. The longitudinal margins of the base plate 6 are bent upwardly and then inwardly toward one another to form oppositely positioned guide channels 7. The channel portions 7 of the base member provide oppositely positioned guide grooves 8. The top flanges of the channel members 7 are spaced apart to provide a longitudinal top opening in the base member of the device. The grooved or channel base member is provided in a desired length which may be half of the width of the road or less if preferred. In the present showing the channeled base member is adapted to be positioned transversely upon the road subgrade 1 and extends from the side margin of the road to one side of the road center strip 3.

Slidably and shiftably engaged in the base member are a plurality of anchor shoes or holder sections which are arranged longitudinally in offset or staggered relation with respect to one another. The anchor shoes are of identical construction with the adjacent shoes reversed with respect to one another as clearly illustrated in Figure 3. Each of the anchor shoes is constructed of metal and comprises an angle bar consisting of a base flange 9 and an upright flange or web 10 integral with the base flange 9. The upper margin of the web 10 is cut to provide a plurality of spaced notches 11 and the material from said notches is bent outwardly to provide anchoring blades or wings 12. The notches 11 are so cut out that the lower edges of the blades or wings 12 are inclined so that the outer ends of the blades are wider than the inner ends to form wedge shaped anchoring members. The anchoring blades 12 project outwardly from one side of the web 10 leaving the opposite side of the web flat as clearly illustrated in Figure 2.

The anchoring shoes are shiftably and slidably mounted within the base section, with adja-

cent shoes reversed with respect to one another so that the anchoring blades or wings 12 project outwardly leaving the flat side of the web or flange 10 facing inwardly. Seated upon the upper surface of the base flange 9 and contacting the inner surface of the upright flange or web 10 is a hollow housing or core section of U-shaped cross section comprising spaced parallel walls or plates 13 having the lower margins thereof integrally connected by means of an arched bottom 14. The core plates 13 terminate at one end flush with the end of the anchor shoe and have the upper corners cut out to provide notches 15. The opposite ends of the core plates 13 project a short distance beyond the opposite ends of the anchor shoe. The projecting portion of the U-shaped core has the lower portion thereof cut away across the arched bottom and a short distance up on each side to provide a clearance notch 16 and form projecting margins or flaps 17 to frictionally project into one end of an adjacent core in an overlapping relation as clearly illustrated in Figure 4 thereby permitting the ends of the anchor shoes to abut one another.

As illustrated in Figures 3 and 4 the anchor shoes are engaged in the guide base in staggered reversed relation with respect to one another to permit the ends of the core sections to telescope or interfit one another. The notches 15 are provided in the upper corners at one end of each of the hollow core sections to eliminate a double thickness of metal along the upper edges of the core plates at the overlapping portions. This arrangement is provided for the reception of a top closure unit of a length substantially the same as the length of the base unit. The top closure unit comprises a U cross sectioned or channel mold cap 18 having integrally formed on the longitudinal margins thereof downwardly projecting side flaps 19 providing grooves between the outer sides of the mold cap 18 and the inner sides of the side flaps 19 to permit the mold cap to be frictionally engaged over the upper longitudinal edges of the side plates 13 of the core members. As clearly illustrated in Figure 2 the lower margins of the side flaps 19 are bent outwardly to form anchoring flanges or retaining strips 20. It will thus be noted that the upper ends of the hollow core sections are closed by the top units just described. Removably seated in the groove of the mold cap 18 is a removable filler or wedge bar 21. After the pouring of concrete on opposite sides of the load transmission joint the groove forming bar or filler 21 is removed leaving a groove into which bitumen or similar substance is deposited to form a designating line in the top of the concrete structure in which the load transmission joint is imbedded. It will be noted that the improved device provides a hollow core member between adjacent concrete sections of the construction with the core wall 13 which abuts against the upright flange or web 10 of an anchor shoe is rigidly secured to said web by spot welding or other suitable means. The anchoring blades or wings 12 serve to securely anchor the angle shoes in the concrete sections and afford an interlocking means between these sections. The load transmission joint is closed at the bottom by means of the guide base and at the top by means of the mold cap. The sides of the load transmission joint are closed by the overlapping of the ends of the core plates 13 thereby providing a hollow closed core between adjacent sections of the road or other construc-

tion in which the load transmission joint is imbedded so that no concrete can enter into the hollow core. It will thus be noted that the adjacent shoes forming part of the joint are anchored in opposite sections of the concrete construction so that the anchor shoes are allowed to move transversely in the hollow guide base with the expansion and contraction of the concrete sections due to temperature changes. The base flanges of the anchor shoes project underneath the hollow core or across the joint into an adjacent section of the concrete construction thereby affording an arrangement whereby the loads are transmitted across the joint from one concrete section to an adjacent or opposite concrete section to obviate upheavals or crushing of the concrete sections of the construction due to temperature changes.

With the expansion of the road sections the side walls 13 of the core units of the joint are adapted to be moved toward one another thereby compressing the arched bottom 14 of the core to increase the height of the arch. With the contraction of the concrete sections the core plates are separated.

Figure 5 illustrates a fragmentary sectional view of a concrete road or similar construction to illustrate a modified form of groove forming mold cap for closing the upper open end of a load transmission joint. In the modified construction the reference numeral 22 indicates the side walls of a hollow core which is imbedded between concrete sections 23 of a road or similar construction. The upper margins of the side walls 22 are deflected outwardly and then upwardly to provide shoulders at 24 for the reception of the side margins of an arched closure plate 25. Projecting into the upper open end of the hollow core above the closure plate 25 is a removable mold cap 26. After the setting of the concrete the mold cap 26 is removed leaving the arched closure plate 25 in position. The groove formed by the removal of the mold cap 26 is filled with a bituminous substance.

Referring to the construction illustrated in Figures 1 to 4 inclusive the end margins of the core plates 13 beneath the notches 15 have a plurality of anchoring hooks or lugs 27 struck outwardly therefrom to assist in anchoring the load transmission joint in adjacent concrete sections of the construction. The anchoring hooks or lugs 27 are only struck out from one end of the core plate where they overlap the ends 17 of an adjacent core unit so that the openings formed by striking out the anchoring hooks are closed by the projecting margins 17 to prevent concrete from entering into the hollow core.

The improved type of load distributing joint is adapted to be imbedded in concrete with the closed bottom of the base section seated on the road sub-grade to serve not only as a guide for the anchor shoes but is also adapted to serve as a sealer or means for preventing seepage of water and silt upwardly in the joint of a concrete construction in which the device is used.

While the hollow core members are described as being spot welded to the upright web 10 of an anchor shoe it will of course be understood that the hollow core unit may be rigidly secured to the anchor shoe by any other suitable means.

It will of course be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is therefore not the purpose to limit the patent granted hereon

otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A load transmission joint comprising a channel base section, a plurality of alternately reversed anchor shoes transversely shiftable therein, and hollow core units rigidly secured to said anchor shoes and interfitting one another to form a continuous core.

2. A load transmission joint comprising a base section, an angle iron shoe shiftable supported therein, anchor means formed on said shoe, a hollow core unit secured on the shoe, means for closing the top of said core unit, and a groove former removably seated in said means.

3. A load transmission joint comprising a grooved base section, a plurality of shoes movably supported therein with adjacent shoes reversed with respect to one another, hollow core units secured to the shoes, said core units being open at the top and at both ends with the open ends of adjacent core units interfitting one another, and a groove forming means closing the tops of said interfitting core units.

4. A load transmission joint comprising a grooved base section, a plurality of anchor shoes movably engaged therein with adjacent shoes reversed with respect to one another, hollow core units secured to said shoes and interfitting one another, anchoring means on said core units, a closure member engaged on the tops of said interfitting core units to close the same, and a groove former removably seated in said closure member.

5. A load transmission joint comprising a grooved base section, a plurality of shoes movably engaged therein with adjacent shoes reversed and staggered with respect to one another, anchor members formed on said shoes, hollow core units secured to said shoes and interfitting one another, anchoring means on said core units, a grooved member engaged on the tops of said interfitting core units, and a groove former removably seated in said grooved member.

6. A load transmission joint comprising a grooved base section, a plurality of winged anchoring shoes shiftable mounted therein with adjacent shoes reversed with respect to one another and staggered, hollow core members secured to said shoes with the core members of adjacent shoes interfitting one another, anchoring means formed on said core members, and groove forming means engaged on the tops of said core members to close the same.

7. A load transmission joint comprising a base member, a top member, a hollow core means for supporting said top member, and load transfer means between said base member and said core means and including flange members projecting in opposite directions underneath the hollow core means, said hollow core means having an arched bottom to facilitate compression and expansion of the core means when the load transfer means are shifted due to changes in temperature in the material in which the joint is embedded.

8. A joint forming device comprising a hollow core section, a groove forming means thereon, and anchor shoes rigidly secured in staggered relation to opposite sides of the hollow core section.

9. A joint forming device comprising a hollow core section, a mold cap thereon, and angle iron shoes rigidly secured to opposite sides of the hollow core section and having flanges thereof pro-

jecting in opposite directions across the bottom of the hollow core section.

10. A joint forming device comprising a hollow core section having an arched bottom and a grooved top, and angle members rigidly secured in staggered relation to opposite sides of the hollow core section, said angle members having portions thereof projecting in opposite directions beneath the arched bottom of the hollow core section.

11. A joint forming device comprising a hollow core grooved at the bottom and top, supporting members rigidly secured in staggered relation to opposite sides of the hollow core and having portions thereof projecting in opposite directions across the bottom of the hollow core, and anchor means formed on said supporting members and on the hollow core for anchoring the device in adjacent sections of a concrete construction in which the device is imbedded.

12. A joint forming device comprising a hollow core having an arched bottom, a mold cap

thereon, supporting members rigidly secured in staggered relation to opposite sides of the hollow core and having base portions projecting in opposite direction beneath the hollow core and beyond the sides thereof, anchor means on said supporting members and on said hollow core for anchoring the device in opposite sections of a concrete construction in which the device is embedded, and a grooved hollow base engaged on the base portions of said supporting members.

13. A load transmission joint comprising a hollow grooved base, a plurality of supporting means transversely shiftable in said base with adjacent means reversed with respect to one another to be moved in opposite directions in said base, and a hollow core secured between said means, said core comprising a plurality of channel cross-sectioned members formed to telescopically interfit one another to form a continuous core of a length equal to the length of the base.

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