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CONTINUOUS DOWEL BAR SUPPORT

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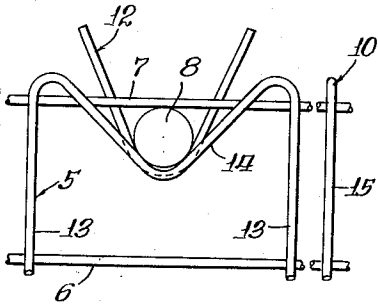


Fig. 1.

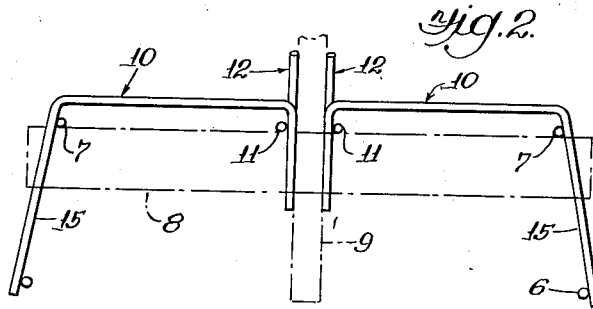


Fig. 2.

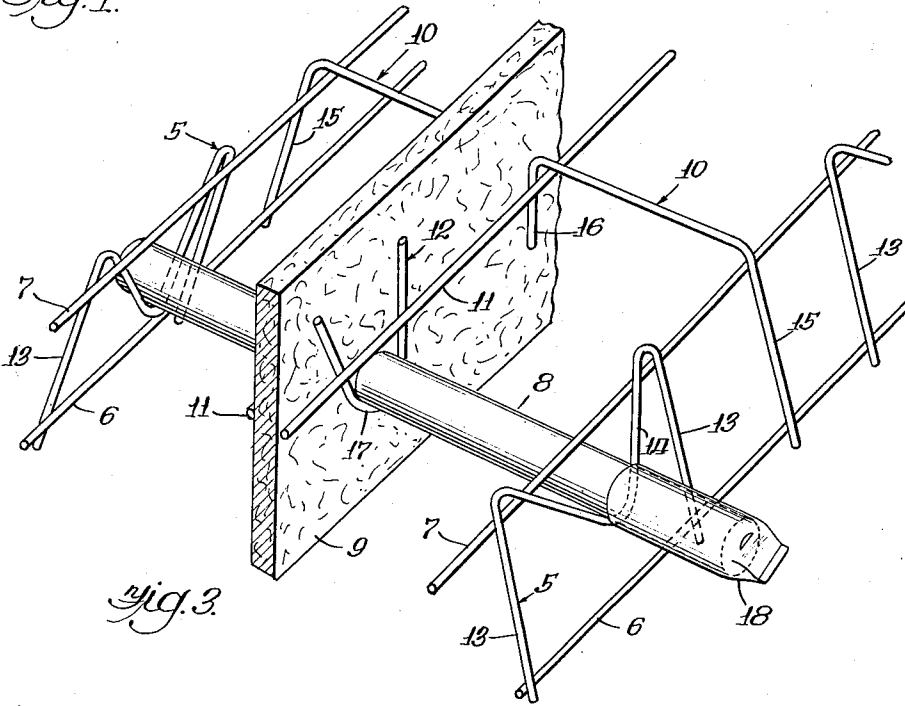


Fig. 3.

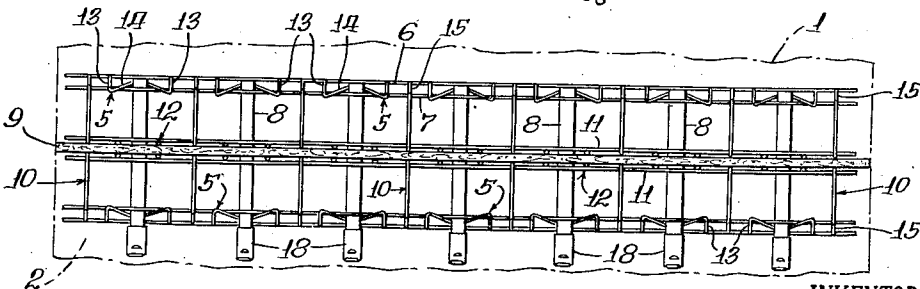


Fig. 4.

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CONTINUOUS DOWEL BAR SUPPORT

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5 Claims. (Cl. 94—8)

This invention relates generally to the art of concrete pavement expansion joints wherein dowels are disposed through the joint filler and embedded in adjacent edges of the pavement in order to provide a continuous reinforcement for the concrete sections while permitting relative movement therebetween in response to temperature changes. More particularly, the invention is directed to an improved form of continuous dowel bar support for such expansion joints.

In the usual arrangement of transverse expansion joints for concrete pavement, which include a resilient filler strip, dowel bars are utilized for load transfer across the joint. It is necessary that such dowel bars be accurately located in parallel relation to the longitudinal axis of the pavement in order that the expansion and contraction of the pavement be along the axis of the dowels. Furthermore, it is essential that the supporting structure for the dowel bars preserve the true alignment of the dowel bars throughout the pouring of the concrete, as well as throughout the life of the pavement. Experience has proven that the best way of achieving and preserving this accurate alignment of the dowels is to use a continuous support for the dowel bar assemblies.

The principal object of the present invention is to provide a new and improved form of continuous dowel bar support for holding the dowel bars in a fixed position of alignment with one another, wherein the two rows of chairs for supporting opposite ends of the dowels are maintained parallel to and at fixed distances from the joint filler by positive engagement with the latter. A further object of the invention is to provide a continuous dowel bar support of the type described which may be completely fabricated in the shop and which permits a nesting of a plurality of the supports to facilitate handling and storage. Other objects and advantages will become apparent as the disclosure progresses with respect to the accompanying drawings, wherein:

Figure 1 is a fragmentary side elevation showing a portion of the continuous dowel bar support with parts broken away.

Figure 2 is an end view of the dowel bar support with the dowel bar and expansion joint filler indicated by broken lines.

Figure 3 is a fragmentary, perspective view of an expansion joint employing the continuous dowel bar support shown in Figures 1 and 2.

Figure 4 is a reduced scale, top plan view of a complete expansion joint assembly in position between adjoining slabs of concrete.

With reference to the drawing, it is seen that the present invention is directed to an improved form of continuous dowel bar support for a pavement expansion joint, wherein the dowel bar support and the joint filler cooperate in maintaining the complete expansion joint assembly in proper alignment during the pouring of the concrete and in maintaining such alignment during the life of the joint to permit free expansion and contraction of the adjoining pavement slabs 1 and 2.

The illustrated embodiment comprises two rows of chairs 5, each row being interconnected by a lower spacer bar 6 and an upper spacer bar 7, which provide a support for a series of spaced, parallel dowel bars 8 extending transversely of a resilient filler strip 9. Also fixed to the spacer bars 6 and 7, intermediate the chairs 5, are a series of cross bars 10 which extend to the filler strip 9 and position the chairs 5 in inclined relation to the filler strip. An elongated tie rod 11 interconnects the ends of the cross bars 10 which abut the filler strip 9, and these tie rods also have fixed thereto a plurality of wire V-clips 12 in position to supportingly receive the center portion of each of the dowel bars 8.

Each of the chairs 5 is preferably a one-piece structure consisting of a single length of heavy wire bent in the shape of the letter M to thereby present a pair of parallel legs 13 and a V-shaped support 14 intermediate the upper ends of the legs for supporting an end portion of the dowel bar 8. The adjoining chairs of each row are spot welded or otherwise secured to the spacer bars 6 and 7 which position the legs 13 of the several chairs in a common plane and also uniformly position the V-shaped dowel bar supports 14 in spaced relation to one another. The upper spacer bar 7 is preferably disposed at a suitable distance above each of the dowel supporting seats 14 to accommodate the dowel bar 8 therebetween in closely fitting relation.

Intermediate each pair of adjacent chairs 5, there is fixedly positioned one of the cross bars 10 which terminates at its outer end in a relatively long, downwardly inclined leg portion 15 which is welded to the upper and lower spacer bars 6 and 7 in parallel relation to the chair legs 13. The inner end of each cross bar 10 terminates in a relatively short leg portion 16 which is bent at right angles with respect to the upper portion of the cross bar to lie along the face of the filler strip 9. The longitudinal tie rod 11 is welded to the legs 16 of the several cross bars 10, and this tie rod is disposed on the inner sides of these leg portions 16 in parallel relation to the spacer bars 6 and 7. The V-clips 12 abut the adjacent surface of the filler strip 9 and provide seat portions 17 disposed a suitable distance below the tie rod 11 to accommodate an intermediate portion of the dowel bars 8 in closely fitting relation thereto.

It will be noted particularly in Figures 2 and 3 that the cross bars 10 are constructed with the leg portion 15 forming an obtuse angle with the main portion of the cross bar, in order to provide for disposition of the chairs 5 in inclined relation to the plane of the filler strip 9. Furthermore, the arrangement of the short leg portions 16 of the cross bars in abutting relation to the side of the filler strip assures the maintenance of this disposition of the chairs wherein the latter are inclined upwardly in the direction of the filler strip 9. The inclination of the chairs 5 toward the filler strip 9 is effective to distribute the load on the dowel bar supporting structure, so that a lateral thrust is imposed on the filler strip by the legs 16 of the cross bars. This has the desirable effect of wedging the filler strip between the dowel support assemblies disposed on opposite sides thereof, while holding the rows of chairs 5 in fixed positions on each side of the filler strip for the joint. The V-clips 12 which receive the center portions of the dowel bars also serve to assist in maintaining the entire dowel supporting structure in position relative to the filler strip 9.

The particular arrangement of the V-clips 12, seat portions 17 of the chairs 5, the tie rods 11, and the upper spacer bars 7 provides for a positioning of the dowel bars 8 in relatively fixed relation to the filler strip and to the dowel support assembly, whereby the dowel bars will remain undisturbed during the pouring of the concrete and

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throughout the expansion and contraction of the concrete. The dowel bars, of course, extend through the filler strip 9, and the usual dowel bar socket 18, known generally as a "whistle," is positioned on one end of each of the dowel bars.

From the foregoing, it will be apparent that the described construction provides a continuous dowel bar support on each side of the filler strip of an expansion joint, which affords accurate positioning of the dowel bars along spaced axes normal to the line of the joint and parallel to one another. Moreover, the described dowel bar supporting assembly is arranged to cooperate with the filler strip, which determines the line of the joint between adjoining concrete slabs, so that the filler strip actually determines the correct initial position of the supporting assembly and so that the filler strip and dowel support coact with each other to maintain such correct position throughout the life of the joint.

The continuous support may be completely fabricated in the shop with the tie rod 11 and the spacer bars 6 and 7 spot welded or otherwise secured to the V-clips 12, cross bars 10 and chairs 5, as indicated above. The supporting assemblies are constructed to permit nesting in compact relation to one another for storage and for shipment. The entire dowel bar support may be readily assembled on the job by placing a continuous support on each of the opposite sides of the filler strip, or joint line if a filler strip is not used, and placing the dowel bars in position, as seen in Figures 3 and 4.

Although described with respect to a particular structure, it will be apparent to those skilled in the art that other modifications may readily be made without departing from the principles of the present invention.

I claim:

1. A continuous support for dowel bar assemblies comprising a plurality of chairs each defining a support for the outer end of a transversely extending dowel bar, a pair of parallel spacer bars fixed to the upper and lower portions respectively of said chairs, said chairs being uniformly spaced along said spacer bars in coplanar relation to one another, a plurality of cross bars each having an angularly bent leg portion fixed to said spacer bars intermediate said chairs and in parallel relation to the legs of said chairs, each of said cross bars having a main portion extending laterally from the plane of said chairs and terminating in a second leg portion disposed at right angles to said laterally extending main portion, an elongated tie rod fixedly interconnecting said second leg portions of said cross bars and disposed in generally parallel relation to said spacer bars, and a plurality of U-shaped yoke elements fixed to said tie rod in spaced apart relation to one another, each of said yoke elements providing a seat portion disposed in axial alignment with the dowel bar support portion of one of said chairs so as to provide a support for an intermediate portion of a dowel bar having its outer end supported on said one chair.

2. In a joint construction for paving slabs, an assembly comprising a joint filler strip of resilient material, a plurality of spaced parallel dowel bars extending transversely through said filler strip, and a pair of continuous dowel supports disposed on respectively opposite sides of said filler strip, each of said continuous dowel supports comprising a row of chairs spaced apart and including a seat receiving on end of one of said dowel bars, a pair of parallel spacer bars fixed to the upper and lower portions respectively of said chairs, to align said chairs in coplanar relation to one another, said upper spacer bar being disposed above each of said seats a distance permitting entry of a dowel bar in close relation between said upper spacer bar and the seat, a plurality of cross bars each having a leg portion fixed to said spacer bars in transverse relation thereto, the main portion of said cross bar extending laterally away from said upper spacer bar at substantially right angles thereto and

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terminating at its free end in a second leg portion extending at substantially right angles to said main portion in the general direction of said first leg portion, an elongated tie rod fixedly interconnecting said second leg portions and disposed in generally parallel relation to said spacer bars, said second leg portion of each of said continuous dowel supports being positioned in parallel abutting relation to the side of said filler strip, to thereby position said chairs to receive the opposite ends of said dowel bars with the latter in closely fitting relation between said chairs and said upper spacer bars, and a plurality of U-shaped yoke elements secured to said tie rod in position for engagement with the side of said filler strip, each of said yoke elements providing a dowel seat disposed in axial alignment with the dowel seat on one of said chairs and receiving the center portion of said dowel.

3. In an expansion joint construction for paving slabs, a filler strip of resilient material, a plurality of spaced parallel dowel bars extending transversely through said filler strip, and a pair of continuous dowel supports disposed on respectively opposite sides of said filler strip, each of said continuous dowel supports comprising a row of chairs spaced apart and each having a seat receiving an end of one of said dowel bars, a pair of parallel spacer bars interconnecting the upper and lower portions, respectively, of said chairs to thereby align said chairs in coplanar relation to one another, one of said spacer bars being spaced above each of said seats a distance affording entry of the dowel bars therebetween in closely fitting relation, a plurality of spaced parallel cross bars extending transversely of said one spacer bar and toward said filler strip, each of said cross bars terminating at the end thereof adjacent said filler strip in a downwardly extending leg portion which engages said strip, an elongated tie rod interconnecting said leg portions and disposed in generally parallel relation to said spacer bars, and a plurality of U-shaped yoke elements secured to said tie rod in positions for engagement with the side of said filler strip, each of said yoke elements providing a dowel seat disposed in axial alignment with the dowel seat on one of said chairs, the seat portion of each of said U-shaped yoke elements being disposed below said tie rod a distance affording entry of a dowel bar therebetween in closely fitting relation and receiving the central portion of said dowel.

4. A continuous support for a plurality of spaced parallel dowel bars which are disposed transversely of a joint for paving slabs, said support comprising a plurality of generally vertically extending chair forming members which are interconnected adjacent their upper portions by an elongated spacer bar to thereby position said chair forming members in spaced-apart coplanar relation to one another, said chair forming members providing with said spacer bar a plurality of enclosures forming dowel bar end seats which essentially limit the dowel bars to axial movement, an elongated ground-supported tie rod disposed generally parallel to and below said spacer bar and fixedly interconnecting the lower portions of said chair forming members, a plurality of cross bars fixed to said spacer bar and extending transversely thereof in a generally horizontal direction, a second elongated tie rod disposed in spaced parallel relation to said spacer bar and fixed to each of said cross bars at approximately the same elevation as said spacer bar, and yoke elements carried by said second tie rod and providing therewith a plurality of enclosures forming intermediate dowel bar seats which are aligned, respectively, with each of said dowel bar end seats to receive the center portion of said dowel bars.

5. A continuous support for a plurality of spaced parallel dowel bars which are disposed transversely of a joint for paving slabs, said support comprising a plurality of generally vertically extending chair forming members which are interconnected adjacent their upper portions by an elongated spacer bar to thereby position

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said chair forming members in spaced-apart coplanar relation to one another, said chair forming members providing with said spacer bar a plurality of dowel bar end seats formed to essentially limit the dowel bars to axial movement, an elongated ground-supported tie rod disposed generally parallel to and below said spacer bar and fixedly interconnecting the lower portions of said chair forming members, a plurality of cross bars fixed to said spacer bar and extending transversely thereof in a generally horizontal direction, a second elongated tie rod disposed in spaced parallel relation to said spacer bar and fixed to each of said cross bars at approximately the same elevation as said spacer bar, and a plurality of yoke elements including leg portions fixed to said second tie rod at spaced positions therealong to provide intermediate dowel bar seats which are aligned, respectively, with each of said dowel bar end seats, each of said yoke

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elements cooperating with said second tie rod to receive the central portion of said dowel within the confines of the bight portion of said yoke element and said second tie rod to restrain the dowel bars against lateral movement.

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