Feb. 2, 1943. F. O. HELTZEL 2,309,767

TRANSVERSE EXPANSION AND CONTRACTION JOINT

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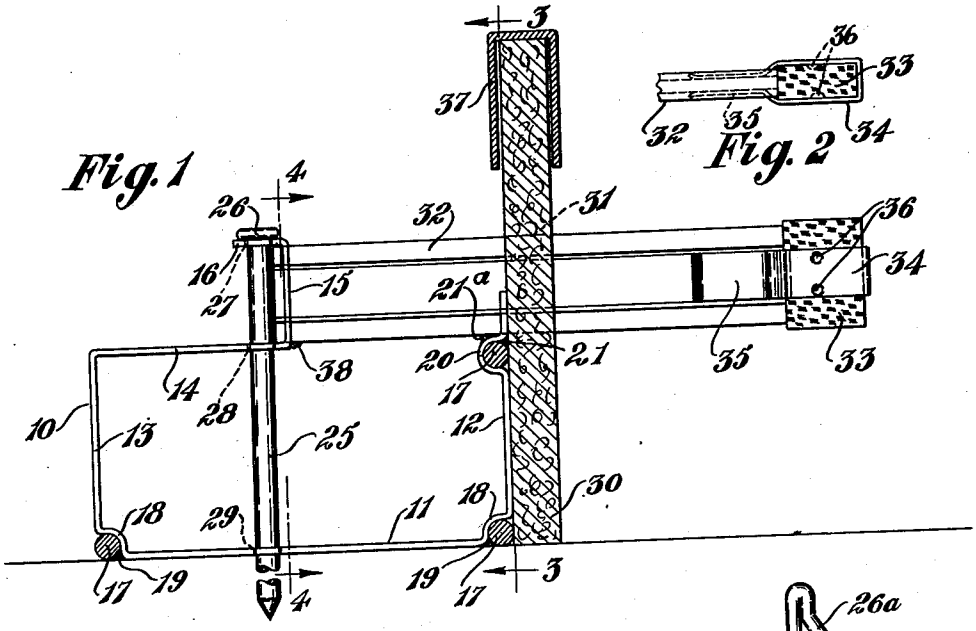
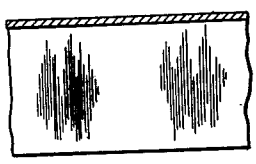


Fig. 1

Fig. 2



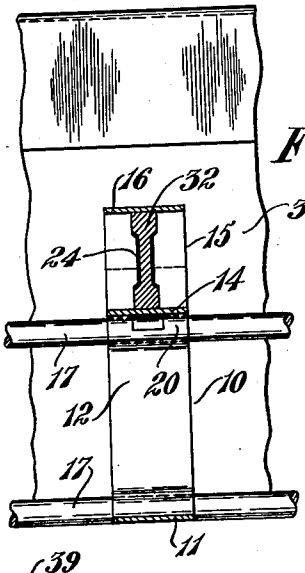


Fig. 4



Fig. 8

Fig. 7

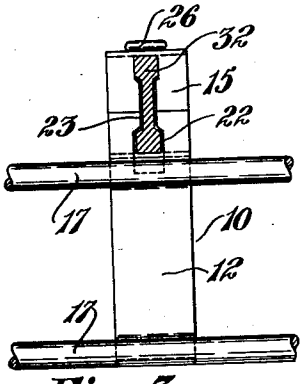
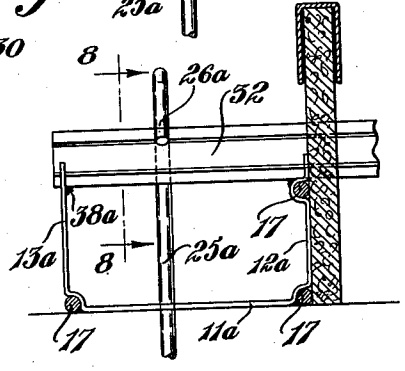


Fig. 3



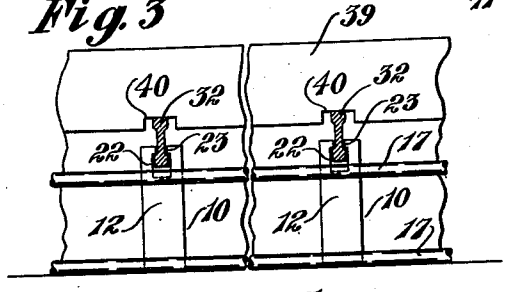


Fig. 5

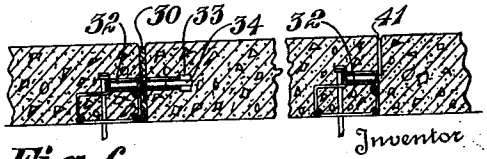


Fig. 6

Inventor

Francis O. Heltzel

By Frease and Bishop

Attorneys

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TRANSVERSE EXPANSION AND CONTRACTION JOINT

Francis O. Heltzel, Philadelphia, Pa.

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4 Claims. (Cl. 94—18)

The invention relates to joints such as are used in concrete pavement construction, and more particularly to a transverse joint designed to compensate for expansion and contraction of the pavement due to changes in temperature and moisture content.

It is common practice to form transverse joints in concrete pavements with pre-molded fillers of asphalt or similar material between sections of the pavement, and in order to transfer the load from one section of concrete to another it is customary to place transload doweling through the joints. In order to provide voids under the movement of the concrete sections to permit for expansion and contraction around the dowel pins or bars various devices have been used in the past none of which are entirely satisfactory.

It is an object of the present invention to provide doweling for a transverse joint in which a block of cork or similar compressible material is attached to the end of the dowel bar by means of a spring clip, thus, permitting the cork block to be compressed as the concrete sections expand.

It is another object of the invention to provide an expansion and contraction joint formed of a plurality of chairs made of strap iron, wire or the like, having tie-bars welded thereto and provided with slots to receive a dowel pin or bar preferably of I-cross-sectional shape.

A further object is to provide a transverse joint of this character in which the chairs are positioned in place upon the road base or foundation by stakes or pins.

The above objects together with others which will be apparent from the drawing and following description, or which may be later referred to, may be attained by constructing the improved transverse expansion and contraction joints in the manner illustrated in the accompanying drawing in which

Figure 1 is a transverse sectional view through a pre-molded joint showing the improved construction of chair, tie-bars and dowel pin;

Fig. 2, a detail fragmentary plan view of an end portion of the dowel bar showing the compressible cork block attached thereto by a spring clip;

Fig. 3, a section taken as on the line 3—3, Fig. 1;

Fig. 4, a section taken as on the line 4—4, Fig. 1;

Fig. 5, an elevation on a smaller scale showing a portion of a contraction joint formed with the improved device;

Fig. 6, a fragmentary longitudinal section through a portion of a pavement on a smaller scale showing an expansion joint and a contraction joint;

Fig. 7, a view similar to Fig. 1 on a smaller scale showing a modified form of the invention; and

Fig. 8, a section taken as on the line 8—8, Fig. 7.

Similar numerals refer to similar parts throughout the several views.

The improved joint to which the invention pertains includes a plurality of spaced chairs, indicated generally by the numeral 10. Each of these chairs may be formed from a single length of strap iron, wire or the like comprising the horizontal base portion 11, the upright forward leg 12, formed at the forward end of the base portion, the upright rear leg 13, formed at the rear end of the base portion, the forwardly disposed, horizontal portion 14, at the upper end of the rear leg, the upright extension 15 at the forward end of the horizontal portion 14, and the rearwardly disposed terminal flange 16 at the top of the upright extension.

Tie-rods 17 connect the several chairs of each joint together, being preferably connected to each end of the horizontal base portion 11, by forming the metal of the chair to fit around the tie-rods as at 18, and welding the tie-rods thereto as at 19; and by forming a substantially semi-cylindric portion 20, near the upper end of the front leg 12, and welding the upper tie-rod 17 thereto, as shown at 21.

The upper end of the front leg 12 is slotted, above the semi-cylindric portion 20, as shown at 22, and the slot is preferably reduced at its upper end, as at 23, for a purpose to be later explained. A central slot 24, aligned with the slot 22, is formed throughout the entire length of the upright extension 15, said slot extending from the horizontal portion 14 to the terminal flange 16.

A pin or stake 25, provided with a head 26, is adapted to be driven down through apertures 27, 28, and 29, in the terminal flange 16, horizontal portion 14 and base portion 11, respectively, and into the road foundation or base, as shown in Fig. 1 for the purpose of positioning each chair.

The premolded joint 30 may be formed of any usual and well-known asphalt or bitumen composition, as in ordinary practice and is provided with apertures or slots 31, spaced at proper intervals to register with the slots 22 and 24 of the several chairs used in the construction of the joint.

A dowel 32, preferably of I-beam cross-sectional shape, is located through each opening 31 in the pre-molded joint 30, and through the slots 22 and 24 of the corresponding chair, the rear end of the dowel butting against the pin 25, and

the other end of the dowel being located substantially an equal distance from the pre-molded joint 30. This latter half of the dowel may be painted or coated as required by State specifications, and forms a slip dowel upon which the corresponding slab of concrete may expand or contract.

For the purpose of permitting the necessary amount of expansion, a block 33, of cork, or other readily compressible material, is detachable connected to the outer end of the dowel 32, as by the substantially U-shape, spring clip 34, the legs 35 of which are preferably off-set toward each other so as to slidably fit upon the reduced web portion of the I-beam dowel, and are of sufficient width to fit between the enlarged upper and lower portions of the dowel, whereby the spring clip may slide upon the dowel without danger of tilting.

In order to securely hold the cork block 33 in place while the concrete is poured, one or more blisters or indentations may be formed in the spring clip, as shown at 36.

A removable joint shield, or cap 37, of inverted channel form, may be placed upon the upper edge of the pre-molded joint 30, to protect the same while the concrete is being poured, after which the shield may be removed and used again upon other joints.

In order to form an integral structure, the inner end of each dowel 32 may be arc welded to the corresponding chair, at the juncture of the horizontal portion 14 and the upright extension 15, as indicated at 38 in Fig. 1.

As shown at 21a in Fig. 1, the dowel member 32 may also be welded to the upper portion of the leg 12.

Where it is desired to provide contraction joints between the expansion joints of the pavement, a metal strip 39, notched on its lower edge at spaced points as at 40, to fit over the dowels 32, may be placed in position, as shown in Fig. 5, and after the concrete has been poured this metal strip may be removed, forming a joint as shown at 41 in Fig. 6.

Referring now to Figs. 7 and 8, a slightly modified form of the invention is shown, in which the chair may be formed of a strip having the horizontal base portion 11_a, and the upright front and rear legs 12_a and 13_a respectively, each having a notch or slot in its upper end conforming to the slot 22—23, shown in Fig. 3, to receive the dowel 32.

The rear end of the dowel may be welded to the chair as shown at 38_a, and the tie-rods 17 may be the same as above described, and connected to the chair in the same manner.

Owing to the change in the construction of the chair, the pin or stake above described is not practical for this modified form of the invention, and for this reason a pin 25_a, having its upper end hooked downward, as at 26_a, is preferred.

The hooked upper end of this pin engages over the upper edge of the dowel and holds the entire assembly in position while the concrete is poured. Otherwise, this chair and associated parts may be the same as shown in Figs. 1 to 5, inclusive.

I claim:

1. A trans-load joint for concrete roads comprising a supporting chair of strip material having a horizontal base portion and upright legs at the ends thereof, tie-rods fixed to the lower ends of both legs and to the upper portion of one leg, said tie rods extending between a plurality of similar chairs, said last named leg having a slot at its upper end, a horizontal portion at the upper end of the other leg, an upright extension at the end of the horizontal portion, and having a slot therein, said slots being in horizontal alignment, said upright extension terminating in a horizontal terminal flange, there being aligned apertures in said terminal flange, horizontal portion and base portion, a headed pin located through said apertures, a rigid, one-piece dowel member located through said slots, and rigidly connected to both legs, a vertical joint forming member located intermediate the ends of the dowel member and abutting the leg having the slot in its upper end for dividing the road into adjacent sections, the dowel member extending into each of the adjacent sections of the road to transfer loads from one section to the other and prevent relative vertical movement thereof.

2. A trans-load joint for concrete roads comprising a supporting chair of strip material having a horizontal base portion and upright legs at the ends thereof, one leg having a slot at its upper end, an inturned horizontal portion at the upper end of the other leg in horizontal alignment with said slot, a rigid, one piece dowel member located through the slot in said one leg and having one end rigidly connected to the inner end of the horizontal portion of the other leg, there being aligned apertures in the base portion and horizontal portion, a pin located through said apertures, tie rods fixed to said chair for attaching similar chairs at spaced intervals, and a vertical joint forming member located intermediate the ends of the dowel member and abutting said first mentioned leg for dividing the road into adjacent sections, the dowel member extending into each of the adjacent sections of the road to transfer loads from one section to the other and prevent relative vertical movement thereof.

3. A trans-load joint for concrete roads comprising a supporting chair of strip material having a horizontal base portion and upright legs at the ends thereof, tie-roads fixed to the lower ends of both legs and to the upper portion of one leg, the strip material of the chair being formed to fit around said tie-rods, said tie-rods extending between a plurality of similar chairs, said last named leg having a slot at its upper end, a horizontal portion at the upper end of the other leg, an upright extension at the end of the horizontal portion and having a slot therein, said slots being in horizontal alignment, said upright extension terminating in a horizontal terminal flange, there being aligned apertures in said terminal flange, horizontal portion and base portion, a headed pin located through said apertures, a rigid, one piece dowel member located through said slots, and rigidly connected to both legs, a vertical joint forming member located intermediate the ends of the dowel member and abutting the leg having the slot in its upper end for dividing the road into adjacent sections, the dowel member extending into each of the adjacent sections of the road to transfer loads from one section to the other and prevent relative vertical movement thereof.

4. A trans-load joint for concrete roads comprising a supporting chair of strip material having a horizontal base portion and upright legs at the ends thereof, one leg having a slot at its upper end, an inturned horizontal portion at the upper end of the other leg in horizontal alignment with said slot, a rigid, one piece dowel

member located through the slot in said one leg and having one end rigidly connected to the inner end of the horizontal portion of the other leg, there being aligned apertures in the base portion and horizontal portion, a pin located through said apertures, tie rods fixed to said chair for attaching similar chairs at spaced intervals, the strip material of the chair being formed to fit around said tie rods, and a vertical joint forming member located intermediate the ends of the dowel member and abutting said first mentioned leg for dividing the road into adjacent sections, the dowel member extending into each of the adjacent sections of the road to transfer loads from one section to the other and prevent relative vertical movement thereof.

FRANCIS O. HELTZEL.