Nov. 3, 1942. R. B. TUFTS 2,300,995

TRANSVERSE EXPANSION JOINT

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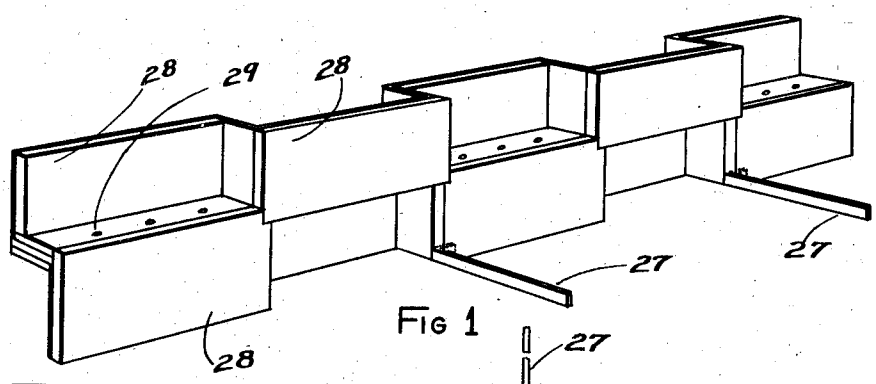


FIG 1

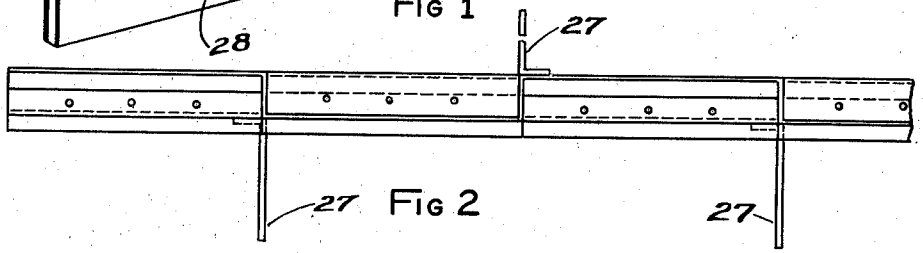


FIG 2

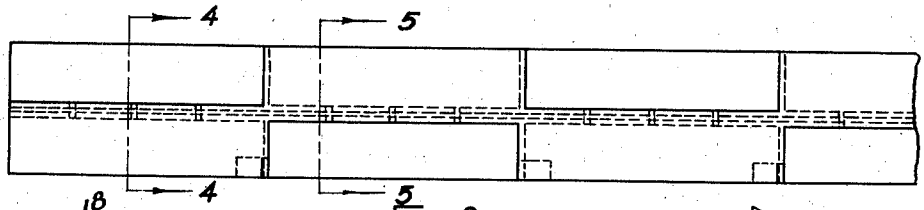


FIG 3

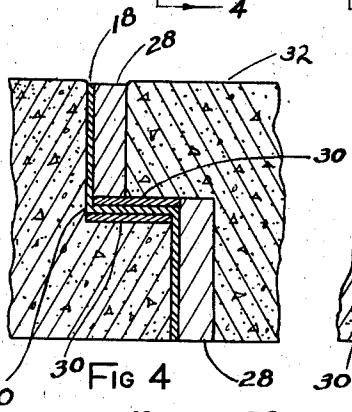


FIG 4

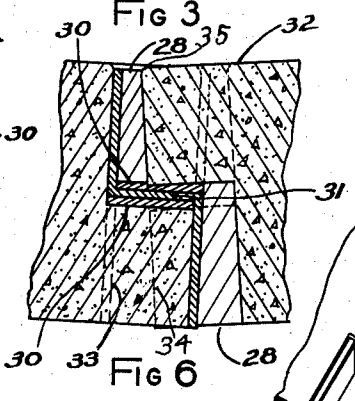


FIG 6

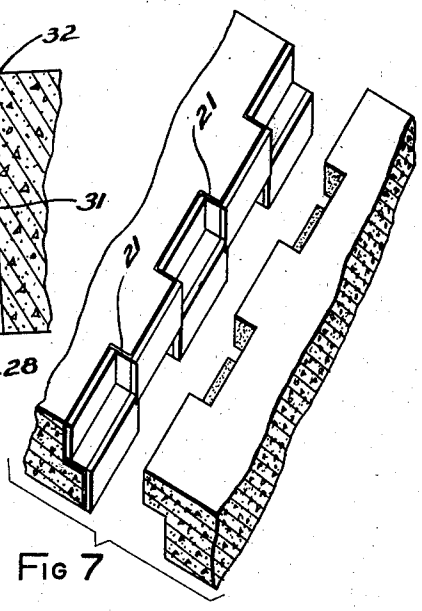


FIG 7

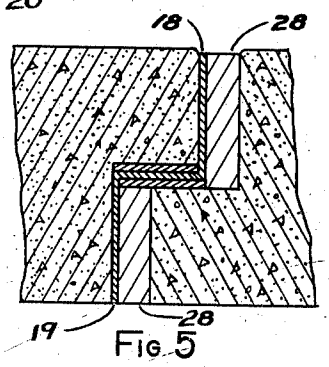


FIG 5

INVENTOR.
ROBERT B. TUFTS

BY Brown & Philips

ATTORNEY.

Nov. 3, 1942. R. B. TUFTS 2,300,995

TRANSVERSE EXPANSION JOINT

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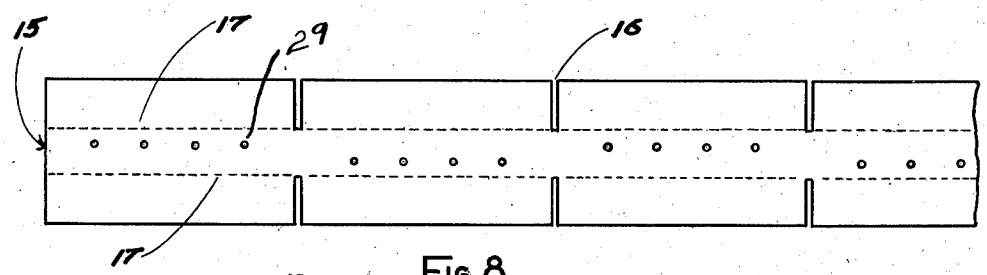


FIG 8

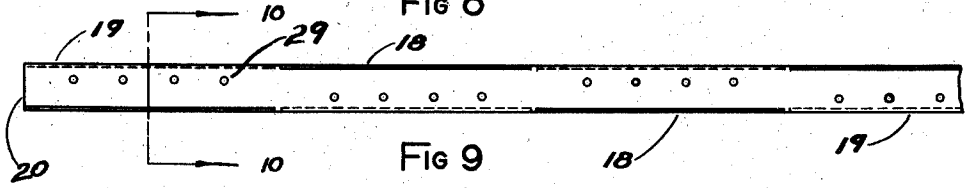


FIG 9

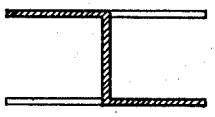


FIG 10

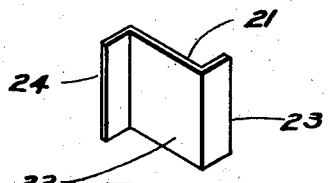


FIG 11

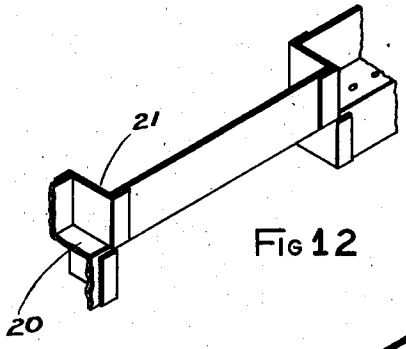


FIG 12

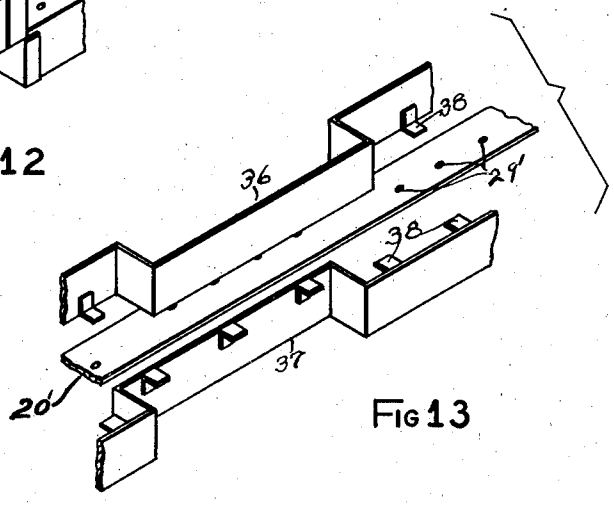


FIG 13

INVENTOR.
ROBERT B. TUFTS

BY Browne & Phelps
ATTORNEY.

Patented Nov. 3, 1942

2,300,995

UNITED STATES PATENT OFFICE

2,300,995

TRANSVERSE EXPANSION JOINT

Robert B. Tufts, Atlanta, Ga.

Application May 8, 1940, Serial No. 334,045

4 Claims. (Cl. 94—51)

The invention relates to transverse expansion joints for concrete pavements, although the structure is usable with a longitudinal joint in the same sort of structure.

It is an object of the invention to provide a simple and cheaply produced form to be placed upon the roadbed to receive the concrete on opposite sides thereof and to provide an expansion joint having provision for support of each meeting slab by the other, and at the same time leave freedom for longitudinal movement or warping movement of the respective slabs.

Failure to provide such support, when the roadbed is at all yielding in character, may result in the slab first receiving the weight being slightly depressed at the joint and causing a severe impact upon the upper corner to which the load is being transferred by passage of the wheel thereover.

A further desirable element of such a joint is that it be water-tight, to prevent softening of, or frost in, the roadbed due to infiltration of water.

A further object of the invention is to provide a joint having flexibility, yet providing the mutual support.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of the completed joint form;

Fig. 2 is a plan view thereof;

Fig. 3 is an elevation of the form of Figure 1;

Figs. 4 and 5 are vertical transverse sections on lines 4—4 and 5—5 respectively of Figure 3;

Figure 6 is a view similar to Figure 4 illustrating the effect on the joint of warping of the slabs, exaggerated;

Fig. 7 is a perspective view of the two slabs having the joint means embedded therein but with one of the slabs moved longitudinally to expose the joint;

Fig. 8 is a plan view of a plate from which the body of the joint form is produced;

Fig. 9 illustrates the second step in the production of the form;

Fig. 10 is a vertical transverse section on line 10—10 of Figure 9;

Fig. 11 is a perspective view of a diaphragm plate to be applied to the structure of Figure 9;

Fig. 12 is a perspective view of the completed form omitting the compressible material illustrated in Figure 1; and

Figure 13 shows one of other methods of manufacture of the joint form.

Referring first to Figs. 8 to 12 inclusive, the form for use in my joint is desirably made from sheet metal 15, slitted as at 16 and the opposite released leaves bent along dotted lines 17 in opposite directions, and the leaves at either edge of the sheet alternately bent in opposite directions, resulting in flanges substantially at right angles to a central band 20 of the sheet.

The next stage in development of the form is to connect the ends of the flanges on opposite edges of the mid-band 20 by diaphragms 21, Figs. 11 and 12, welded or otherwise fastened at junctures with the flanges.

The form is to be used with the flanges disposed vertically.

It will be apparent that the mid-band 20 will be horizontally disposed and continuous throughout the length of the form and that the flanges bent up and down in conjunction with the diaphragms, present a series of pockets having backs and end enclosures but open on one side, these pockets alternately open in opposite directions and that for every pocket above the mid-band 20, there is a corresponding pocket below the mid-band 20, these upper and lower pockets opening in opposite directions.

The combined depths of the upper and lower pockets is substantially the thickness of the pavement.

The form is to be used as a parting member, positioned on the roadbed at the locations and in alignments desired for the expansion joints and are to be enveloped by the concrete deposited for the pavement and are to remain in place and form a part of the permanent pavement.

When the form is used as a parting member and the concrete deposited to envelope the form as described, the pockets will mold each adjacent slab with projecting ledges, those from one slab alternating with and projecting in opposite directions to, and lapping with, those of the oppositely disposed slab.

It is clear that these cantilever projections lap over the ledges, are separated therefrom by the sheet-metal, and that they are capable of sliding on the supporting ledges.

A portion of any superposed load on the slab on either side of the joint will be transferred through the joint to that slab on the opposite side of the joint (assuming a yielding roadbed) since each slab has projecting cantilevers lapping over and resting on corresponding ledges of the oppositely disposed slab.

In order that the joint shall offer no restraint to deflection or to sliding action of the canti-

levers on the ledges, the form or parting member is to be given a coating of asphalt of substantial thickness, which will yield under stress and act as a lubricant for sliding action.

This asphalt coating on the mid-band 20 will further be a seal to prevent water from the pavement reaching the roadbed through the joint.

In order to give clearance for expansion of the slabs due to increased temperature, I fasten to all vertical surfaces transverse to the road, slabs 28, Figs. 1, 4, 5 and 6 of some compressible material such as asphalt, cork, rubber or other material.

The perforations 29, Figs. 1, 2, 8 and 9 are vents to prevent air being trapped under the horizontal mid-band 20.

When a slab warps, the movement which is illustrated in Figure 6 will take place about an axis 31. A line normal with the surface of the moving slab, 32 in this instance, when in its normal position, is shown at 33, Figure 6, and the same line upon the occurrence of such movement will pass to the position 34 in the same figure, thus causing an excess of pressure at the point 35, and compression of the upper edge of the block 28 and expansion of the lower edge of the other block 28, as clearly indicated. The asphalt coating 30 will allow the penetration of the lower corner of the slab while preserving support of the entire overlap between the slab and the plate body 15. Therefore the movement will not be restrained nor will the support for the slab to the right of the joint in Figure 6 be lacking.

As shown in Figure 13, the form of the invention is made from upper and lower deformed strips 36, 37, which may be identical and used in reversed positions, that is, 37 inverted in its relation to 36. A base plate 20', formed with perforations 29', is shown to which the strips 36 and 37 may be secured as by welding. Angles 38 are shown to reinforce the joints.

To preserve the structure in an upright position while being staked or otherwise braced to resist the thrust of the first placed concrete, foot members 27 are shown which may be attached as by welding.

Minor changes may be made in the physical embodiments of the invention within the scope of the appended claims without departing from the spirit thereof.

I claim:

1. A metal form for concrete expansion joints comprising a plate of metal formed with a continuous central horizontal portion; plates integral with the edges of said central portion and formed in sections, said sections extending upwardly at one side of the plate and downwardly at the opposite side of the plate; the plates of alternate occurrence extending in opposite directions from the remaining plates; and transverse partitions connecting adjacent ends of each of the upwardly extending and downwardly extending plates whereby to define a plurality of superposed oppositely open pairs of pockets; the pockets of said pairs opening in opposite directions through the joint.

2. The structure of claim 1 with air discharge openings provided in the horizontal portion of the plate to release trapped air resulting from the pouring of the concrete about the form.

3. A form for an expansion joint for concrete pavements comprising in combination a central horizontal continuous plate member; a series of vertical plate members extending above and below said horizontal member at opposite edges thereof, the plates of the series alternating in their upward and downward relation at each edge of the central member and transverse plates connecting the transversely opposite ends of the vertical plate members, to provide a series of oppositely opening superposed pockets with alternate of said pockets opening in opposite directions; and members extending from the lower edges of the downwardly projecting pocket-forming members to preserve the form in an upright position upon a pavement bed.

4. A metal form for casting of an expansion joint comprising a horizontal plate member extending continuously through the form, a plurality of plate members occurring in pairs at opposite edges of said first named plate member, the plates of said pairs projecting upwardly and downwardly respectively from said edges, and the plates of alternate pairs in reverse position, a plurality of pairs of plates extending transversely of said continuous plate having margins bent in opposite diirections and secured to the transversely opposite ends of the first named plate members to provide tabs to stand on opposite sides of said vertical plates whereby to form the ends of the pockets both above and below said horizontal plate.

ROBERT B. TUFTS.