

June 8, 1937.

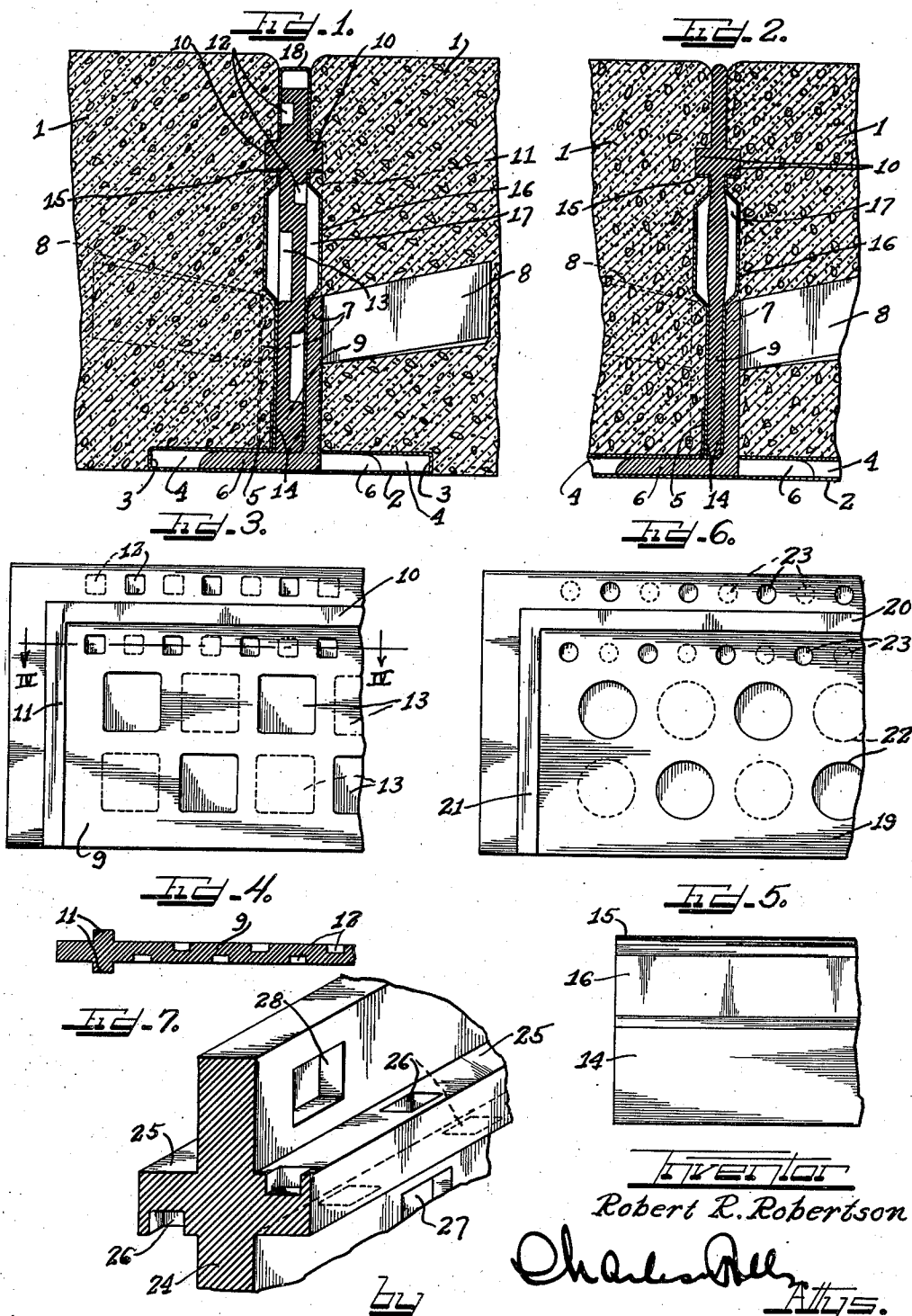
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EXPANSION JOINT CORE

Filed Sept. 30, 1935

2 Sheets-Sheet 1



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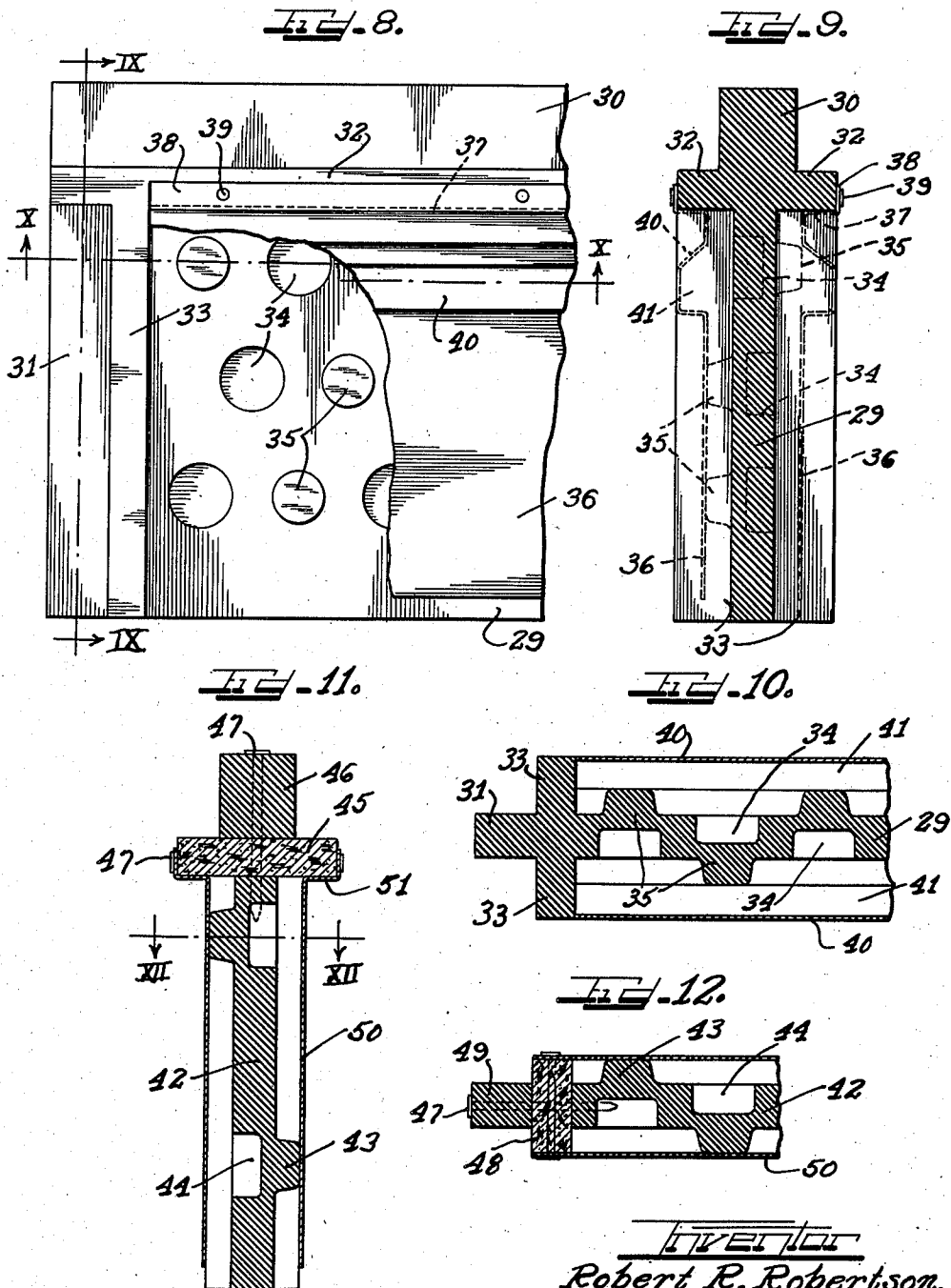
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UNITED STATES PATENT OFFICE

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EXPANSION JOINT CORE

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10 Claims. (Cl. 94-18)

This invention relates to a concrete road joint and more particularly to a load transmission expansion joint wherein a base unit has supported thereon an improved non-extruding asphalt core unit embodying the principles of this invention and including a preformed asphalt filler provided with integral side ribs or beads and having provided in opposite sides thereof rows of staggered recesses or pockets both in the main body of the filler and in the upper flange portion thereof whereby the filler upon the expansion of road slabs on opposite sides of the core unit is adapted to be readily compressed allowing the filler material to fill up the recesses or pockets to obviate extruding of the material from the joint. The filler material after filling the recesses or pockets is permitted to extrude into grooves provided in reinforcing channels forming parts of metal plates which are clamped against the opposite sides of the recessed filler within the bounds of the stop beads or ribs which project from opposite sides of the filler.

It is an object of this invention to provide an expansion joint including in combination a core unit comprising a preformed plastic filler board having stop beads formed on opposite sides thereof and also having rows of staggered pockets and bosses formed on both sides of the plastic board.

It is also an object of this invention to provide an expansion joint road forming mechanism with a board having recesses formed on both sides thereof and also having integrally formed on opposite sides of the board precast ribs or beads which also have recesses or pockets formed therein for the reception of concrete resulting from the pouring of concrete slabs on opposite sides of the joint.

It is a further object of this invention to provide a concrete joint forming device including a plastic core having groove forming plates seated on opposite sides thereof, said plastic core being provided with recesses on opposite sides thereof with the size and number of said recesses being determined by the maximum degree of compression for which the core is designed.

It is furthermore an object of this invention to provide a road expansion joint with a precast plastic filler having recesses in opposite sides of the main body portion thereof and also having integrally formed on the opposite sides thereof stop ribs which together with the upper margin of the filler are provided with staggered recesses, said rib recesses being provided for the reception

of concrete when concrete is poured on opposite sides of the joint to form road slabs.

It is an important object of this invention to provide an expansion joint mechanism for embedding in concrete to separate the concrete road slabs, said mechanism comprising a base for supporting groove forming plates on opposite sides of a preformed plastic filler having stop ribs integrally cast on opposite sides thereof and furthermore having staggered recesses formed on both sides of the filler as well as in the upper margin of the filler and in the integral ribs forming a part thereof. The precast filler is provided with means for covering the recesses in the main body and flange of the filler leaving the recesses in the ribs exposed for the reception of concrete when concrete is poured on opposite sides of the filler to form road slabs.

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

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

On the drawings:

Figure 1 is a transverse vertical section taken through an expansion joint mechanism embedded between concrete road slabs and including an improved preformed plastic filler provided with recesses and having integral preformed beads formed thereon, said filler having groove forming plates contacting opposite sides thereof.

Figure 2 is a similar sectional view with the filler cap removed and illustrating the position of the parts when the concrete road slabs have expanded to compress the plastic filler causing the filler material to fill in the recesses and partially extrude into the grooves formed by the side plates.

Figure 3 is a fragmentary side elevation of the preformed plastic filler removed from the joint to disclose the preformed stop ribs and the rows of staggered recesses.

Figure 4 is a fragmentary detailed sectional view taken on line IV-IV of Figure 3.

Figure 5 is a fragmentary side view of one of the groove forming plates.

Figure 6 is a fragmentary side view of a modified form of plastic filler having round recesses formed therein.

Figure 7 is a fragmentary perspective view of the upper portion of another modified form of plastic filler wherein the preformed ribs are provided with staggered recesses and wherein the

upper margin of the filler is also provided with recesses as well as the body portion of the filler.

Figure 8 is a fragmentary side elevation of another modified form of plastic filler provided with rows of recesses and projections and having closure plates secured to the sides of the filler and contacting said projections.

Figure 9 is a transverse vertical section taken on line IX—IX of Figure 8.

Figure 10 is a fragmentary horizontal section taken on line X—X of Figure 8.

Figure 11 is a vertical section of another modified form of plastic filler provided with transverse rib forming plates formed of cork to which flat side plates are secured.

Figure 12 is a fragmentary detail section taken on line XII—XII of Figure 11.

As shown on the drawings:

Figures 1 and 2 illustrate a vertical sectional view of an improved road expansion joint forming mechanism which is embedded between concrete road slabs 1 which are supported upon the road subgrade in the regular manner. In the form of the device illustrated in Figures 1 to 5 inclusive, the expansion joint is of the load transmission type including a load transmission base unit which serves as a load transmitting medium between the adjacent slabs of the concrete road. In the present showing, the base unit comprises an elongated base member consisting of a solid base plate 2 constructed of sheet metal or other suitable material. The longitudinal margins of the base plate 2 are bent upwardly and then inwardly toward one another to form oppositely positioned guide channels 3. The guide channels 3 of the base unit provide oppositely positioned guide grooves 4. The margins of the top plates of the guide channels 3 are bent upwardly and are cut away to provide spaced upwardly projecting retaining flanges 5. The retaining flanges 5 on opposite sides of the base unit are staggered with respect to one another. Notches are provided between the retaining flanges 5 on each side of the base unit to permit load transmitting anchor shoes or holders to be seated therein in proper spaced relation for the support of a core unit hereinafter more fully described.

The load transmitting mechanism associated with the base unit consists of a plurality of anchor shoes or holders which are movably or shiftably engaged in the base section and are arranged longitudinally in offset or staggered relation with respect to one another. The anchor shoes or holders are of substantially identical construction and are arranged with the adjacent shoes reversed with respect to one another as clearly illustrated in Figure 1. Each of the anchor shoes is constructed of metal and comprises an angle bar including a base flange 6 and an upright flange or web 7 integral with said base flange. Struck outwardly from the upper margin of each of the flanges or webs 7 are anchoring blades or wings 8 leaving the inner side of the upright flange or web flat.

Supported on the base flanges 6 of the anchor shoes between the upright flanges or webs 7 is a preformed plastic filler or core board 9 constructed of asphalt or other suitable material. As clearly illustrated in Figure 3 each side of the plastic filler or board 9 has precast or formed thereon a longitudinally disposed rib or bead 10 positioned a short distance below the upper margin of the filler and having the ends thereof terminating in the upper ends of vertical or end ribs or beads 11 which are also precast or in-

tegrally formed on each side of the plastic filler a short distance from the end edges. The ribs 10 and 11 are provided to serve as stop members to prevent moisture and foreign matter from entering the main portion of the expansion joint. Formed on each side of the upper portion of the plastic filler are staggered rows of small pockets or recesses 12 with the rows on each side of the filler being separated by the longitudinal stop ribs or beads 10 as clearly illustrated in Figure 3. Also provided in the opposite sides of the main body portion of the plastic filler 9 are staggered rows of large pockets or recesses 13. The pockets or recesses 12 and 13 are provided in the preformed plastic filler 9 for the purpose of providing sufficient space into which the material forming the filler may be squeezed when the plastic filler or core is compressed due to the expansion of the road slabs 1. The size and number of the pockets or recesses are regulated or determined by the degree of compression to which the core board 9 is designed to be subjected, so that the maximum amount of compression may be applied to the core board without causing extrusion of the plastic material from the joint.

Engaged against each side of the main body portion of the recessed plastic filler 9, within the frame formed by the precast ribs 10 and 11, is a metal plate 14 the upper margin of which is deflected outwardly to form a top flange 15. The upper half of the plate 14 is deflected to one side of the plate to form a channel 16 which is positioned a short distance below the top flange 15 and extends from end to end of the plate. The channel 16 is provided to form a groove 17 in the side of the concrete slab 1 abutting the side of the filler. Before the concrete is poured on opposite sides of the joint forming mechanism the plates 14 are projected downwardly between the side surfaces of the filler board 9 and the straight surfaces of the upright flanges or webs 7 of the anchor shoe, thereby holding the top flanges 15 of the plate seated beneath the lower surfaces of the precast longitudinal ribs 10 as clearly illustrated in Figure 1. The groove forming metal plates positioned on opposite sides of the main body portion of the filler have the channel members 16 thereof so positioned that they form covers for the upper rows of the pockets 13 and the lower rows of the smaller pockets 12. The lower straight portions of the plates 14 seat against the sides of the lower portion of the body of the filler to close the lower rows of the large pockets or recesses 13.

After the plates 14 are engaged in position a channel-shaped metal cap 18 is removably engaged over the upper margin of the plastic filler 9 allowing the longitudinal edges of the inverted cap 18 to seat upon the plastic ribs 10 to hold the top of the cap 18 near the top surface of the concrete road to permit proper rounding off of the top edges of the slabs 1. As clearly illustrated in Figure 1, the side flanges of the cap 18 close the upper rows of pockets or recesses 12 which are provided in the top margin of the filler 9.

After the filler 9, the cap 18 and the side plates 14 are engaged in position supported by the anchor shoes, concrete is poured on opposite sides of the joint forming mechanism to form the road slabs 1. After the concrete has set sufficiently, the top edges of the slabs adjacent the joint are rounded and the cap 18 is then pulled out. The groove resulting from the removal of the cap 18

may be left open as formed or if necessary the groove may be partially filled up with asphalt or the like.

When the concrete road slabs 1 are subjected to temperature increases, they expand toward one another thereby compressing the joint core unit and primarily the asphalt filler board 9 causing the material of the preformed asphalt filler to flow into the pockets or recesses 12 and 13 to substantially fill the same when the expansion of the road slabs is sufficient. After the pockets 12 and 13 have been filled up as illustrated in Figure 2, any further expansion of the road slabs will cause the plastic material of the filler to gradually flow into the grooves 17 thereby obviating the extrusion of the asphalt material from the joint. The channel portions 16 of the plate 14 not only are used to form the grooves 17 in the adjacent sides of the road slabs but said channel members also act as reinforcing members for the plates 14 thereby permitting thin sheet metal to be used. When the concrete is poured to form the slabs 1, the concrete is prevented from entering the ends of the grooves 17 by the preformed plastic end ribs 11 against which the ends of the depressed channels 16 abut. Upon contraction of the road slabs from the positions illustrated in Figure 2, the concrete pulls away from the plastic filler and away from the channel portion of the metal plates 14. The shoulders, formed by the concrete slabs and which surround the rib portions 10 and 11, upon contraction of the slabs are adapted to move outwardly with respect to the stop ribs thereby permitting said stop ribs to act as stops for a filling which may be poured into the marginal spaces extending downwardly from the top of the slabs and inwardly from the ends of the joint. It will thus be noted that with the overlapping of the concrete shoulders with the plastic ribs 10 and 11 that water and foreign materials are prevented from finding their way into the main portion of the expansion joint.

Figure 6 illustrates a modified form of a precast plastic filler or core board consisting of a plastic board 19 having stop ribs 20 and 21 integrally cast or formed on both sides thereof similar to the arrangement used on the filler illustrated in Figure 3. Formed on each side of the plastic board 19 are rows of staggered pockets or recesses 22 of circular form and staggered rows of small circular pockets or recesses 23 which are arranged above and below the horizontal ribs 20. The plastic filler 19 illustrated in Figure 6 is adapted to be used in the same manner as the filler illustrated in Figure 3.

Figure 7 illustrates another modified form of plastic filler unit consisting of a plastic board 24 having integrally cast or formed on both sides near the upper edge thereof plastic ribs or beads 25. Each of the ribs 25 is provided with pockets or recesses 26 which are provided in the upper and lower surfaces of the ribs with the rows of pockets or recesses staggered. The main body portion of the filler board 24 is provided with staggered groups or rows of pockets or recesses 27 similar to the arrangement illustrated in both Figures 3 and 6. The upper marginal portion of the filler board 24 above the ribs 25 is also provided with pockets or recesses 28 with the pockets on opposite sides of the top flange or margin of the board staggered with respect to one another. The opposite sides of the main body portion of the filler board 24 are adapted to be closed by means of metal plates of the type illustrated in Figure 5 while the upper flange or

margin of the filler board 24 is adapted to have a cap 18 engaged thereover to close the pockets or recesses 28. Attention is called to the fact that the staggered pockets or recesses 26 formed in the top and bottom surfaces of the ribs 25 however are not closed so that when concrete is poured the concrete is adapted to flow into the pockets 26 to fill the same and form concrete teeth whereby the plastic ribs 25 are adapted to be stretched and compressed with the contraction and expansion of the road slabs 1.

Figures 8, 9 and 10 disclose a further modified form of a filler unit comprising a precast plastic board 29 having an integral upper flange 30 and integral end flanges 31. Integrally formed between the upper flange 30 and the main board 29 are outwardly projecting upper ribs or beads 32. Side ribs or beads 33 separate the said flanges 31 from the board 29.

Formed in opposite sides of the plastic board 29 are staggered rows of sockets or recesses 34 which are formed by partially punching the board and forcing the punched material into forms or molds of less diameter than the sockets 34 to form staggered rows of knobs or bosses 35 which are of less diameter than the holes from which they are punched. The bosses 35 and the sockets 34 on each side of the board are arranged in rows and alternate with one another in each row as clearly illustrated in Figure 8.

Engaged against each side of the plastic board 29, within the frame formed by the ribs 32 and 33, is a metal plate 36 the upper margin of which is deflected outwardly and then upwardly to form an angle comprising a shoulder 37 and a top flange 38 having openings therein for the reception of retaining nails 39. The upper portion of the plate 36 is formed with an outwardly projecting channel 40 which serves to reinforce the plate and provides a groove 41. The plastic board 29 and the plates 36 are adapted to be mounted for use on a supporting base similar to the arrangement illustrated in Figure 1. The plates 36 have the upper flanges 38 secured to the ribs 32 by nails 39 thereby permitting the plates 36 to seat against the bosses 35 which hold the plates spaced from the sides of the plastic board 29. A channel cap 18 is removably engaged over the plastic top flange 30 of the filler similar to the arrangement disclosed in Figure 1.

With the filler unit in position as described, concrete is poured on opposite sides thereof to form road slabs 1 after which the cap 18 is removed. The groove resulting from the removal of the cap 18 may be left open to be filled later when the plastic top flange 30 is compressed due to the expansions of the road slabs 1.

When the concrete road slabs 1 are subjected to temperature increases, they expand toward one another thereby causing the metal plates 36 to force the plastic bosses 35 into the board 29 to fill up the sockets or recesses 34. Continued expansion of the slabs 1 would permit the compressed board to extrude into the grooves 41 provided by the channels 40. The top ribs 32 and the end ribs 33 act to respectively close the top and the ends of the expansion joint to obviate the entrance of water and foreign materials into joint.

Figures 11 and 12 disclose an expansion joint core or filler unit comprising a precast plastic board 42 having staggered rows of bosses or knobs 43 and sockets or recesses 44 formed on each side thereof. Seated upon the top edge of the

board 42 is a cross board or strip 45 constructed of cork or other suitable material. The cork strip 45 projects beyond both sides of the board 42 to form top ribs. Seated upon the top of the cork strip 45 is a top flange or bar 46 formed of plastic material. Both the flange 46 and the cork strip 45 are secured to the top of the board 42 by nails 47 or the like.

Secured by means of nails 47 to each end of the board 42 is a cork side strip 48 and a plastic side flange 49. Metal side plates 50 are provided on the sides of the board 42 and seat against the bosses 43. The ends of the metal plates are nailed to the cork side strips 48. Angle strips 51 are formed on the upper edges of the metal plates 50 and said angle strips fit against the cork top strip 45 and are also secured thereto by nails 47 or the like. The cork top and end strips 45 and 48 serve to close the expansion joint spaces provided between the sides of the board 42 and the metal plates 50.

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. An expansion joint filler comprising a precast plastic board having staggered rows of recesses formed in opposite sides thereof, and stop ribs integrally formed longitudinally and transversely on both sides of the board.
2. An expansion joint filler comprising a plastic board, having recesses formed in the opposite sides thereof, and rib members integrally formed on the opposite sides of the board with each of said rib members having recesses therein.
3. A non-extruding asphalt joint for embedding in concrete and including in combination a core unit comprising a preformed plastic filler board having recesses therein to be filled by the material forming the board when the board is compressed due to the expansion of the concrete, rib members integrally formed on the sides of the filler board, and grooved plates positioned against the sides of the board and substantially surrounded by said rib members.
4. A non-extruding asphalt joint for embedding in concrete and including in combination a core unit comprising a preformed plastic filler board having recesses therein to be filled by the material forming the board when the board is compressed due to the expansion of the concrete, groove forming plates contacting the sides of the

board to provide grooves in the concrete for the reception of the material forming the board when the recesses have been filled, and rib members integrally formed on the sides of the filler board and having recesses formed therein for the reception of concrete to cause transverse stretching of the rib members when the concrete contracts.

5. An asphalt joint including in combination a filler unit comprising a precast plastic board having recesses in the opposite sides thereof with the recesses in one side staggered with respect to the recesses in the opposite side, and precast longitudinal and transverse ribs integrally formed on the sides of the filler board with said longitudinal ribs having upper and lower recesses therein with the upper recesses staggered with respect to the lower recesses.

6. A joint forming mechanism including in combination a core unit comprising a preformed plastic filler board having rib members cast on the sides thereof, said rib members having upper and lower recesses formed therein with said upper recesses staggered with respect to the lower recesses.

7. An expansion joint forming mechanism including in combination a core unit comprising a preformed plastic filler board having rib members cast thereon, said rib members having concrete receiving recesses formed therein to cause transverse stretching of the core unit with the contraction of the concrete slabs which bound the expansion joint.

8. An expansion joint filler comprising a precast plastic board having staggered rows of recesses formed therein, staggered rows of bosses integrally formed on said board with the bosses alternating with said recesses, ribs projecting from the sides of said board, and plates seated against the bosses and secured to said ribs.

9. A non-extruding asphalt joint for embedding in concrete and including in combination a core unit comprising a preformed plastic board having recesses formed therein, bosses formed on said board, cork strips secured to edges of the board and projecting beyond the sides of the board, plastic flange members secured to the cork strips, and plates seated on said bosses and secured to the cork strips.

10. An expansion joint forming mechanism including in combination a plastic board, bosses punched outwardly from opposite sides of the board leaving recesses in opposite sides of said board opposite said bosses, ribs projecting from opposite sides of the board, and plates secured to said ribs and contacting the bosses.

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