Oct. 9, 1945. R. R. ROBERTSON 2,386,265

EXPANSION JOINT

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Fig. 1.




Fig. 2.

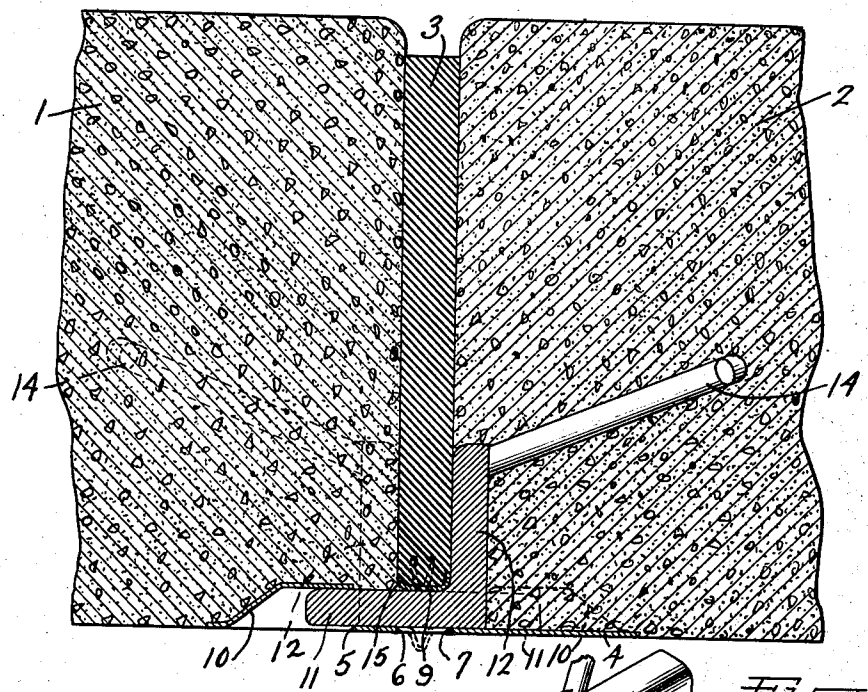



Fig. 4.

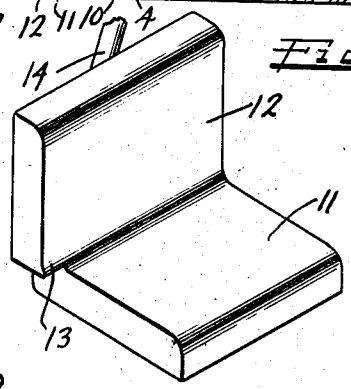
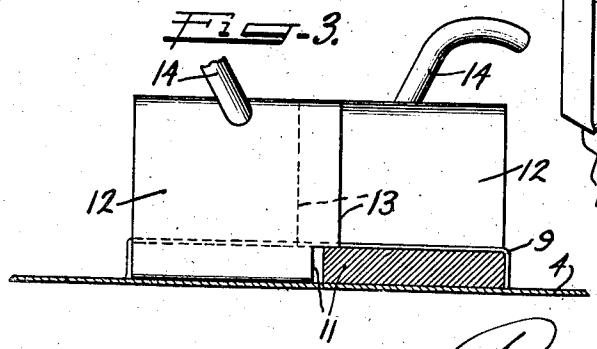



Fig. 3.




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Fig. 5.

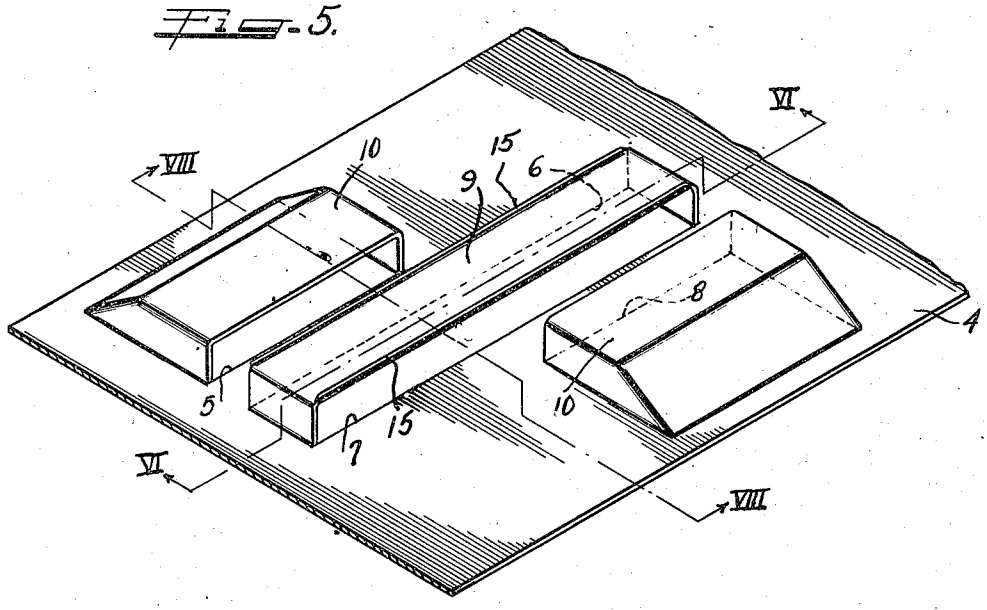



Fig. 6.

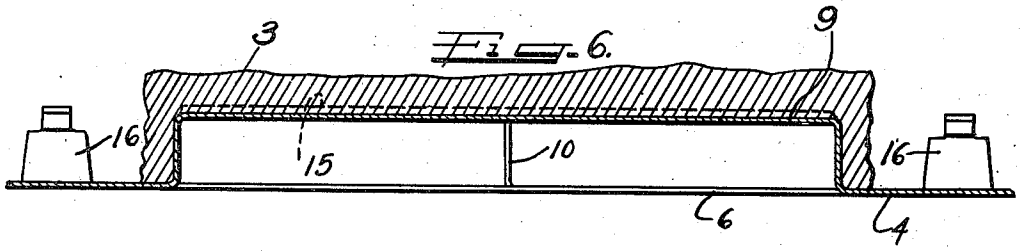
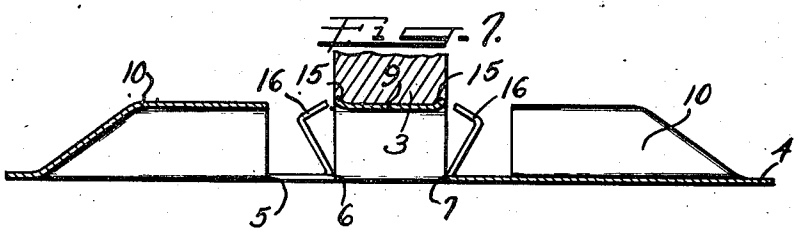



Fig. 7.




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Patented Oct. 9, 1945

2,386,265

# UNITED STATES PATENT OFFICE

2,386,265

## EXPANSION JOINT

Robert R. Robertson, Chicago, Ill.

Application February 7, 1944, Serial No. 521,325

13 Claims. (Cl. 94—8)

This invention pertains to an improved type of road joint forming mechanism and more particularly to an expansion joint unit of the load distributing type and including an improved base of a desired length having filler board gripping clamps struck therefrom and also having sections thereof cut to permit groups of guide pockets and guide straps to be expanded from the base plate metal for the reception of sets or pairs of alternately reversed load transmission angle shoes constructed to overlap one another for the transmission of loads and arranged to be moved into contact with opposite sides of an expansion joint filler board which is supported in vertical position on the base by the gripping clamps which hold the filler board braced in place to be embedded in concrete to form a suitable road joint to separate the concrete road slabs in which the load transmission shoes are suitably anchored.

It is an object of this invention to provide an improved type of concrete road joint forming mechanism which is designed and constructed with improvements for increasing the adaptability and efficiency thereof.

It is also an object of this invention to provide an improved type of concrete road joint forming mechanism including an improved base unit having filler board gripping means formed thereon and also having portions thereof expanded therefrom and shaped to form suitable guide means for the reception of reversed pairs of load transmission shoes formed to overlap and coact with one another.

It is a further object of this invention to provide an improved road joint forming mechanism adapted to be embedded transversely in a road or similar concrete construction to separate concrete slabs and permit loads to be transmitted from one slab to another through overlapping sets or pairs of load transmitting anchoring shoes engaged in suitable guides formed out of expanded portions of a base plate.

It is furthermore an object of this invention to provide an improved type of road joint forming mechanism including a base plate having groups or sets of guide straps and pockets expanded therefrom for the proper reception of sets of load transmission members arranged and formed to overlap one another for the transmission of loads from oppositely positioned road slabs.

It is an important object of this invention to provide an improved type of road joint forming mechanism including spaced sets of filler board supporting members struck from a base plate and adapted to be driven into opposite sides of a filler board to hold the same clamped in place on the base plate and engaged over guide straps and between guide pockets expanded from the base plate and slidably receiving reversed sets of load transmission anchor shoes.

It is furthermore an important object of this invention to provide a road joint forming mechanism with an expanded metal base unit formed with integral toothed filler board gripping members and with groups of guide straps and pockets for the reception of pairs or sets of reversed and staggered load transmitting means whereby loads may be transmitted between concrete road slabs separated by the joint forming mechanism including a filler board held in place by the gripping members.

Other objects and features of the invention will be apparent from the disclosures in the following description taken in connection with the accompanying drawings which illustrate a preferred embodiment of the invention.

In the drawings:

Figure 1 is a fragmentary top plan view of an improved expansion joint embodying the principles of this invention and disclosing a continuous base having a filler board clamped thereon between a plurality of spaced sets or groups of overlapping load transmitting anchor members having interfitting relationship with straps and pockets expanded from the sheet metal material of which the base is constructed.

Figure 2 is an enlarged vertical sectional view taken on line II—II of Figure 1 showing the road joint forming mechanism embedded between the concrete road slabs.

Figure 3 is an enlarged vertical sectional view taken on line III—III of Figure 1 with the filler board omitted, and illustrating the overhanging or overlapping relationship of the load transmitting shoes engaged in reverse relationship upon the base plate and having portions thereof projecting through one of the guide straps of the base plate.

Figure 4 is an isometric view of one of the load transmitting shoes with the anchoring member partly broken away.

Figure 5 is a fragmentary isometric view of the base unit of the expansion joint forming mechanism, illustrating one set of the grouped pockets and intermediate strap forming integral parts of the base plate for the reception of a pair of overlapping load transmitting anchor shoes.

Figure 6 is a detailed sectional view taken on

line VI—VI of Figure 5 and showing two of the filler board gripping clamps.

Figure 7 is a transverse detailed sectional view taken on line VII—VII of Figure 5 and showing a pair of the filler board gripping clamps ready to be driven into engagement with opposite sides of a filler board.

As shown in the drawings:

The present invention is directed to a road joint forming mechanism and more particularly to a mechanism for the forming of an expansion joint including a joint filler board or plate vertically supported in place longitudinally on the center line of a base plate by means of pairs or groups of gripping members or clamps struck from the base plate between sets of alternately reversed and staggered load transmission members which are engaged in spaced pairs through suitable pockets and guides expanded from or integrally forming a part of the continuous road joint base plate.

In Figure 2 of the drawings the expansion joint forming mechanism is illustrated as being supported on a road sub-grade and embedded between concrete road slabs 1 and 2. The expansion joint forming mechanisms are adapted to be positioned transversely of the road to hold a compressible expansion joint filler board or plate 3 in proper position before the pouring of the concrete which forms the road slabs 1 and 2.

The improved road joint forming mechanism includes a base unit and a plurality of groups or pairs of load transmission anchoring means engaged therewith. The base unit comprises a sheet metal base plate 4, the length of which corresponds with the length of the joint, which in the ordinary form of expansion road joint extends from the center of the road transversely across the sub-grade to the side of the road.

The base plate 4 has expanded or struck therefrom a plurality of groups of guides for the load transmitting means hereinafter more fully described. The metal base plate 4 is first provided with parallel cuts or slits along the lines 5, 6, 7 and 8 (Figure 5) with the lines 6 and 7 disposed between the lines 5 and 8 and of substantially twice the length of the slits formed by the cuts along the lines 5 and 8. After the base plate 4 has been cut or slotted as described at spaced intervals along the length of the plate, the metal strips between the slits 6 and 7 are expanded upwardly to form a plurality of guide straps 9 along a longitudinal center line of the base plate 4. The metal adjacent the respective slits or cuts 5 and 8 is also expanded upwardly from the plate to form integral guide pockets 10 which, and as illustrated in Figure 5, are arranged in reversed pairs on opposite sides of the guide strap 9 and open inwardly adjacent the open sides of the respective guide straps. The outer sides of the pockets 10 are inclined downwardly and closed. As clearly illustrated in Figure 1 the guide pockets 10 are arranged in pairs and in staggered reversed relationship along the length of the base plate 4.

Associated with each pair of the pockets 10 and with the guide strap positioned therebetween, is a pair of load transmission anchor units which are reversed and staggered with respect to one another and pass underneath the guide strap 9 from opposite directions across the base strips between the guide strap and pockets 10 and into said pockets as illustrated in Figure 2.

Each of the load transmission units comprises a metal holder or shoe consisting of an angle member, including a base flange 11 and an integral upright flange 12. One side of each of the upright flanges 12 is formed at one end with an integral load transmitting shoulder or extension 13 as clearly illustrated in Figure 4 so that when a load transmission unit is engaged through one of the guide straps and has the base flange 11 thereof projecting into one of the base plate pockets 10 the load transmitting shoulder 13 of the upright flange overhangs and rests upon a portion of the base flange 11 of the adjacent load transmission unit as shown in Figure 3. Brazed or otherwise rigidly secured to the back face of each of the upright flanges 12 of the load transmission holders or shoes is an anchoring hook or arm 14.

After the various pairs or sets of load transmission shoes are projected through the guide straps 9 and into the respective guide pockets 10, the filler board or core plate 3 is engaged in position between the staggered upright flanges 12 of the load transmission shoes with the lower edge of the filler or core plate cut out at spaced intervals to seat over the aligned guide straps 9 and projects downwardly between the adjacent ends of the guide straps to rest upon the top surface of the base plate 4. The straps 9 have the longitudinal edges of the tops thereof deflected to provide retaining edges 15 to form seats for the cut out portions of the filler board 3.

For the purpose of holding the compressible filler board 3 longitudinally secured or clamped upon the center line of the base plate 4, a plurality of pairs of toothed gripping clamps 16 are struck from the base plate at spaced intervals between the sets of guide straps 9 and pockets 10. The filler board may be placed centrally upon the base plate 4 after which the clamps 16 are bent inwardly against opposite sides of the lower margin of the filler board. The toothed or angled ends of the clamps are then driven into the filler board to hold the same securely clamped in a centrally aligned position upon the base plate 4.

The assembly of the base plate and the filler board may be done on the shoulder of the road. The load transmission shoes may also be slidably engaged in reversed staggered relationship through the guide straps 9 and in the pockets 10 to extend through the filler board into contact with opposite sides thereof to complete the road joint assembly which may then be conveniently handled and placed as a unit transversely of the road sub-grade. The concrete is then poured to embed the joint forming unit to complete the road structure with the hook members 14 anchored in the opposite road slabs 1 and 2.

With the improved joint forming mechanisms embedded in the concrete forming the road, it will be noted that the load transmission shoes of each pair overlap one another by means of the shoulders 13, with the lower end of one load transmission shoulder 13 resting upon the top face of an adjacent base flange 11 of the adjacent shoe.

In the improved form of expansion joint forming mechanism it will be noted that a unitary base plate construction forms a part of the joint forming mechanism, with said base plate having the filler board clamps struck therefrom and also having the groups or sets of guide pockets and straps expanded from the base plate metal to afford an arrangement whereby the load transmission anchor shoes may be readily engaged in pairs or groups on the base plate. The clamps 16 form suitable supports which grip or bite into the filler board to hold the same secured in place

on the base plate to permit the pouring of concrete to form the road slabs. The overlapping relationship of the respective load transmission shoes when engaged in reverse pairs upon the base plate, is such that the load from one road slab may readily be transmitted through the load transmitting shoes to the opposite road slab.

With the expansion of the road slabs 1 and 2 the filler board is compressed and the load transmission shoes and the slabs move toward the center of the joint mechanism thereby causing the tops of the guide straps 9 to be transversely compressed to bend upwardly as illustrated in dotted lines in Figure 2 while the end flanges of the guide strap tend to shear off from the base plate. The portions of the base plate disposed between the ends of the guide straps 9 are caused to buckle downwardly as shown in dotted lines in Figure 2 with the expansion of the road slabs and the resultant movement of the side margins of the base plate toward each other.

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. In a road joint former and load distributor including a base unit comprising a base plate, a plurality of sets of guide pockets and straps integrally formed in spaced relationship on the base plate for slidably receiving a plurality of load transmission units engaged in reversed staggered relationship therein, and clamping means struck from said base plate for gripping and holding a filler board on the base plate.

2. A road joint former and load distributor comprising a base plate, a plurality of sets of guide pockets and straps expanded from the metal forming the base plate, a plurality of load distributing units engaged in said pockets and straps in reversed staggered relationship, load transmitting shoulders formed on said units with the shoulders of adjacent units projecting to rest on one another.

3. A road joint former and load distributor comprising a base plate, a plurality of guide straps struck from the base plate, a plurality of guide pockets struck from the base plate and positioned on opposite sides of the guide straps, load transmission anchor shoes seated on the base plate in reversed staggered relationship with respect to one another and projecting through the guide straps and into said pockets, a projecting shoulder formed on each of said load transmission anchor shoes with the shoulder of one of said shoes projecting over and resting upon an adjacent shoe, a filler member engaged over said guide straps and disposed between the staggered load transmission shoes, and clamping members struck from the base plate and engaged in opposite sides of the filler board to hold the same in place.

4. A road joint former and load distributor comprising a metal base plate, a plurality of guide straps expanded therefrom and aligned in spaced relationship longitudinally of the base plate, a plurality of guide pockets expanded from the base plate and arranged in reverse relationship with respect to one another on opposite sides of the guide straps, a plurality of load transmission angle shoes supported on the base plate and arranged in reversed staggered relationship with respect to one another to project through the guide straps and into said pockets, load transmission shoulders formed on said load transmission shoes with the load transmission shoulder of one load transmission shoe projecting over and resting upon an adjacent load transmission shoe, anchor means formed on said load transmission shoes, a filler board supported on the base plate and engaged over the aligned guide straps with the load transmission shoes contacting opposite sides of said filler board, and gripping members integral with the base plate and engaged in opposite sides of the filler board to hold the same secured in place on the base plate.

5. A road joint former comprising a base plate, a guide strap struck therefrom, a pair of reversed staggered guide pockets struck from the base plate on opposite sides of the guide strap, a pair of load transmission angle shoes supported on the base plate and projecting through the guide strap from opposite directions and extending into said pockets, a load transmission shoulder formed on each of said load transmission angle shoes with the shoulder of one shoe projecting over and resting on an adjacent shoe, a filler board engaged over the guide strap between said load transmission angle shoes, and means on the base plate gripping into the filler board to hold the same secured in place.

6. The combination with an expansion joint filler, of load transmitting members arranged in staggered relation to project therethrough and contact opposite sides thereof, a base section for supporting the expansion joint filler, said base section comprising a base plate having a plurality of groups of spaced parallel slits cut therein with the material adjacent said slits expanded from the base plate to form guide straps and guide pockets for the reception of the load transmitting members, and means on the base plate engaging the filler to hold the same braced in position on the base plate.

7. In a load transmission joint of the class described including a base unit comprising a metal plate having a plurality of spaced parallel slits cut therein and furthermore having the material adjacent the slits expanded upwardly to form a guide strap between and spaced from a pair of reversed staggered guide pockets, said guide strap and guide pockets adapted to receive load transmitting members forming part of the load transmission joint.

8. A load transmission joint base unit comprising a metal plate for the support of a filler and a plurality of reversed staggered load transmitting members, said plate provided with spaced groups of spaced parallel slits with the material adjacent the slits in each group expanded from the base plate to form a guide strap between a pair of reversed staggered guide pockets, said guide strap and pockets adapted to receive the load transmission members engaged therein in reversed staggered relationship with respect to one another, and gripping means struck from the plate for gripping into and holding the filler in position.

9. In a load transmission joint forming mechanism of the class described, a base unit comprising a base plate having pairs of toothed filler board gripping members formed thereon, a plurality of groups of guides for load transmission members formed on the base plate between the gripping members, said groups of guides each comprising a longitudinally disposed guide strap positioned between and spaced from a pair of reversed staggered guide pockets.

10. A road joint forming mechanism comprising a base plate having a plurality of spaced guide straps arranged in alignment with one another longitudinally of the base plate, a plurality of reversed staggered guide pockets formed on the base plate on opposite sides of the guide straps, a plurality of sets of load transmission shoes supported on the base plate in spaced staggered relationship with respect to one another and engaged through said straps to project into said pockets, said load transmission shoes having projecting shoulders formed thereon with the shoulder of one load transmission shoe projecting over and supported on an adjacent load transmission shoe.

11. A load transmission road joint forming mechanism comprising a base plate, a plurality of aligned spaced guide straps formed longitudinally thereon, a pair of reversed staggered guide pockets formed on the base plate on opposite sides of each of the guide straps and spaced therefrom, spaced pairs of reversed staggered load transmitting shoes supported on the base plate and projecting through the guide straps into said guide pockets, load transmitting extensions formed on the load transmitting shoes with the load transmitting extension of one shoe projecting over and supported on an adjacent shoe, a road joint filler board engaged over said guide straps and seated on the base plate, and gripping means on the base plate between the guide straps and driven into the filler board to hold the same secured in position.

12. The combination with an expansion joint filler having openings therein, of load transmitting members arranged to project through and support the same, a base section beneath the filler, said base section comprising a base plate having slits therein with the material adjacent said slits expanded from the base plate to form spaced aligned guide straps projecting into the filler openings for the reception of the load transmitting members, and means integral with the base plate for gripping the filler to assist in holding the same in position on the base plate.

13. The combination with an expansion joint filler having notched out openings in the lower margin thereof, of load transmitting members arranged to project through the filler openings and engage the filler to hold the same in position, a base plate beneath the filler and said load transmitting members, and a plurality of spaced aligned guide straps struck from the base plate and projecting into the filler openings over the load transmitting members.

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