May 18, 1948. R. R. ROBERTSON 2,441,903

ROAD JOINT

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Fig-1

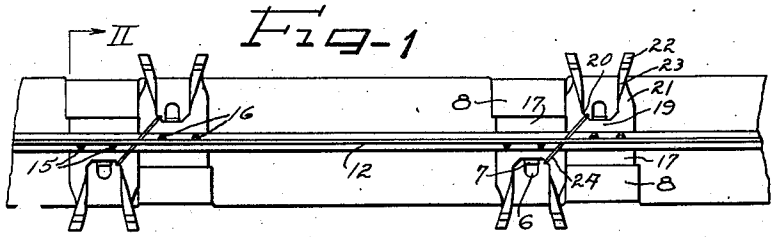


Fig-2

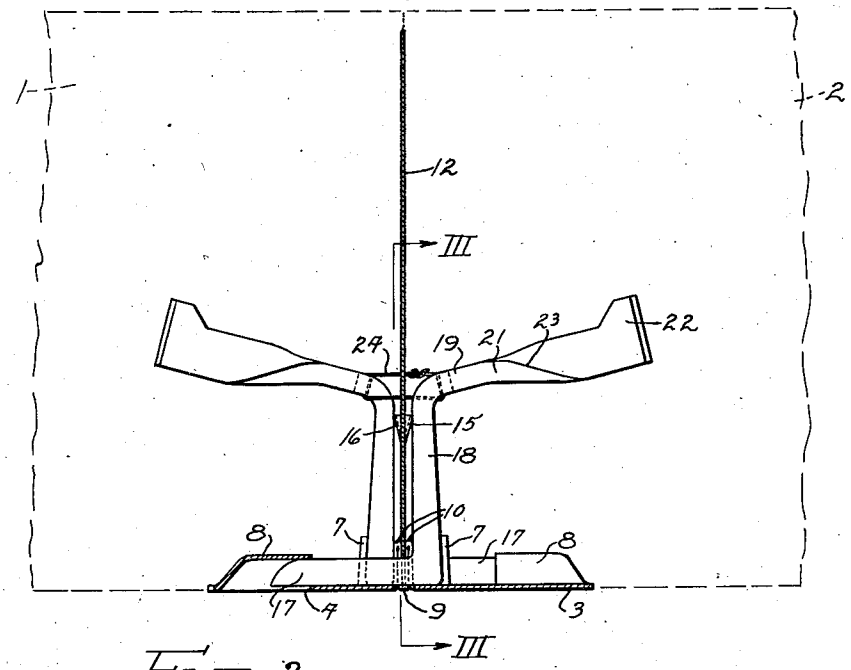
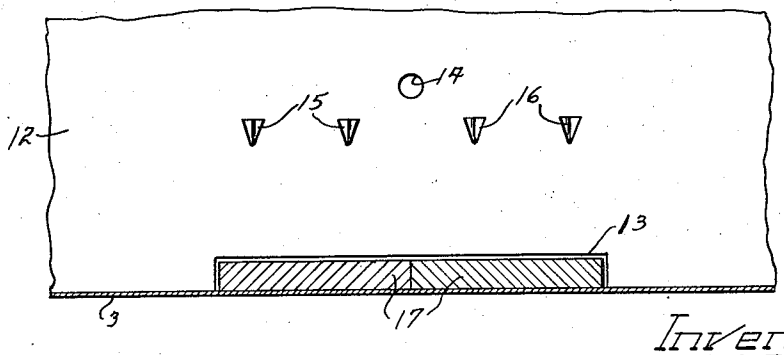


Fig-3



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Fig. 4

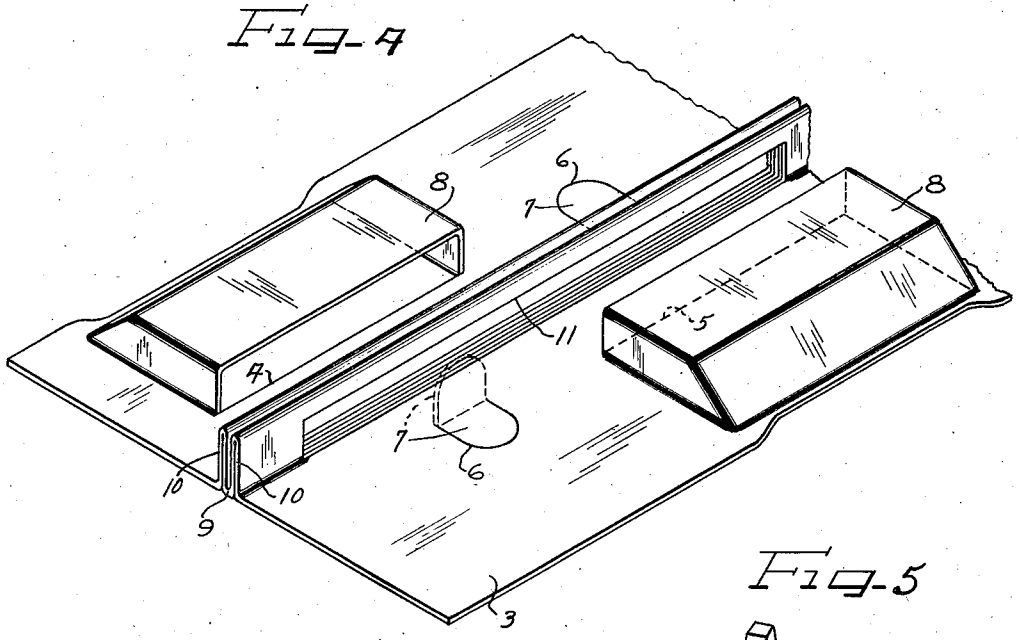


Fig. 5

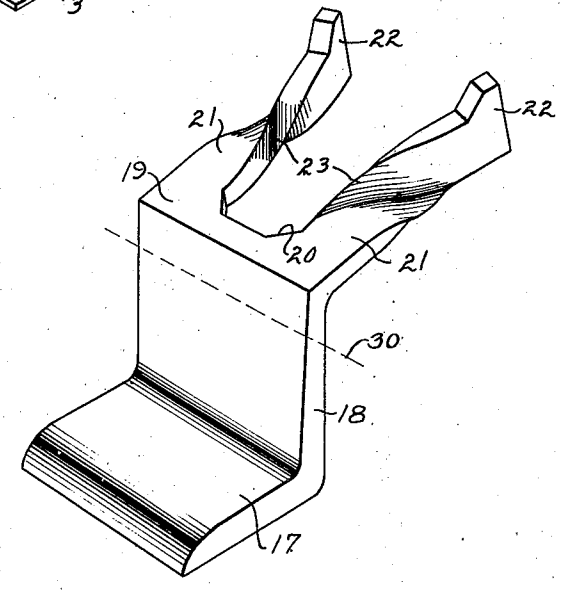


Fig. 6

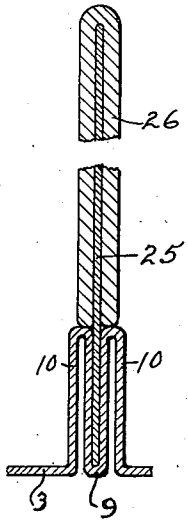
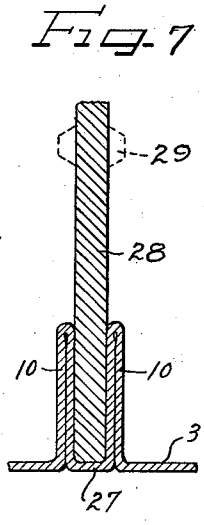


Fig. 7



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UNITED STATES PATENT OFFICE

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ROAD JOINT

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2 Claims. (Cl. 94—8)

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This invention relates to transverse road joints, and more particularly to load distributing expansion and contraction joints including long or continuous base plates formed with an integral longitudinally disposed double looped channel section or holder provided at spaced intervals with openings for the reception of sets or pairs of alternately reversed load transmission shoes, the base flanges of which project not only through the openings in the looped holder but also through openings in the lower margin of a road joint plate or filler to permit the projecting base flanges of the load transmission shoes to project into guide pockets formed in staggered pairs on opposite sides of the looped holder on the base plate of the road joint forming unit.

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.

Another object of the invention is to provide an improved type of either expansion or contraction joint forming mechanism, including an improved base unit formed with load transmission shoe receiving guide pockets on opposite sides of a spring-like clamping channel apertured for the reception of the load transmission shoes and furthermore adapted to receive and hold a joint dividing plate or filler board in upright position with cut-out portions of the lower margin thereof seating over the base flanges of the load transmission shoes.

It is also an 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 by means of improved Z-bar load transmission units arranged in reversed sets or pairs to project through openings in a clamping channel forming part of a base unit and serving as a support for a joint dividing member beneath or through which the load transmitting units are engaged to permit said units to project from one road slab into another.

It is a further object of this invention to provide an improved type of road joint forming mechanism including an improved base plate having guide pockets expanded therefrom in reversed staggered relationship on opposite sides of a spring-like dividing plate holder integrally formed from the base plate and provided with guide openings adjacent the guide pockets for

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the reception of load distributing units forming part of the road joint forming mechanism.

It is furthermore an object of this invention to provide an improved type of road joint forming mechanism including a base plate having the middle portion thereof formed to provide longitudinally disposed spaced looped flanged to form a spring-like holder for clamping a road joint dividing member in position for the forming of either a contraction or an expansion joint forming mechanism.

Another object of the invention is the provision of an improved type of road joint forming mechanism including load distributing units of Z-bar construction having one of the flanges thereof formed to provide a pair of arms having enlarged outer ends, said arms being twisted intermediate their ends to form anchoring members for embedding in a concrete road slab for transmitting loads from said slab through an angle portion of the load transmission unit to an adjacent concrete road slab.

Still another object of the invention is the provision of an improved type of road joint forming mechanism wherein a base plate has longitudinally formed centrally thereon a double-looped channel shaped holder having spaced openings therein and adapted to receive the notched lower margin of a joint dividing member with the notches in said member registering with the openings in the holder to permit load transmitting units to project in opposite directions through the dividing member and holder and contact spacers projecting from opposite sides of the dividing member to assist the holder in securing the dividing member in position for embedding between concrete road slabs.

Still another object of the invention is the provision of a road joint forming mechanism for forming either contraction or expansion joints, said mechanism including a base plate formed with a spring-like holder for receiving joint dividing members of different thicknesses and having spacing means projecting from opposite sides thereof to contact load transmission units supported on the base plate and projecting through registering openings in the dividing member and in the channel holder, said dividing member and load transmission units being connected by tieing means for holding the road joint forming mechanisms in assembled relationship for embedding between concrete road slabs.

It is furthermore an object of this invention to provide an improved form of road joint forming mechanism for the construction of either

contraction or expansion joints, said mechanism including a base unit, a dividing unit and groups of load transmission units assembled in interfitting and co-operating relationship with respect to one another and including suitable guides, spacing means and tieing means whereby the various units may be properly supported in assembled relationship to form a road joint forming assembly adapted to be readily placed in position on a road subgrade to facilitate the forming of a required type of transverse joint in a road structure or the like.

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

In the drawings:

Figure 1 is a fragmentary top plan view of an improved contraction joint forming mechanism embodying the principles of this invention;

Figure 2 is an enlarged vertical sectional view taken on line II—II of Figure 1, showing the road joint forming mechanisms supported on a road subgrade and embedded in concrete road slabs illustrated in dotted lines;

Figure 3 is a fragmentary vertical sectional view taken on line III—III of Figure 2 to illustrate details of the dividing plate and one of the notches or openings in the lower margin thereof to permit the load transmission base flange members to project through the dividing plate;

Figure 4 is a fragmentary isometric view of the base unit of the road joint forming mechanism, illustrating one set of stops and a set of the reversed guide pockets for the load transmission units, and furthermore illustrating the longitudinally disposed spring type clamping channel and one of the openings therethrough for permitting the load transmission units to project therethrough from opposite directions and into the guide pockets;

Figure 5 is an isometric view of one of the load transmission shoes illustrating a cut-away portion of the top flange of the shoe to form the anchoring arms which are spirally twisted intermediate their ends and illustrating the enlarged end portions at the outer ends of the anchoring arms;

Figure 6 is a fragmentary vertical sectional view through the middle looped holder portion of a base plate and supporting a modified form of dividing member in the form of a premolded filler; and

Figure 7 illustrates a fragmentary modified form of a dividing member in the form of a thicker filler board for use in the formation of an expansion joint, said filler board having the lower margin thereof clamped within the intermediate channel or pocket formed by two looped flanges formed from the base plate.

As shown on the drawings:

This invention is directed to a road joint forming mechanism and more particularly to a mechanism for the forming of either a contraction or an expansion joint which is determinable by the thickness of the dividing member used. The invention also involves the use of a novelly constructed base unit for clamping and holding the dividing member to permit Z-bar load transmission shoes to project from opposite sides of the dividing member through registering openings therein and in the holder and into guide pockets integrally formed on the base plate, from which stop lugs are also struck for bending into position behind the load transmission units after the same have been placed in final positions on the base plate.

Figures 1 to 3, inclusive, illustrate a contraction joint forming mechanism for road construction work or the like. Figure 2 illustrates the joint forming mechanism as being supported on a road subgrade and embedded between concrete road slabs 1 and 2 illustrated in dotted lines. The road joint forming mechanisms are adapted to be assembled and be positioned as an assembled unit transversely on the road subgrade to extend from the center of the road outwardly to the edge of the road for the formation of either a contraction or an expansion joint, depending upon the thickness and kind of dividing member used. After the road joint forming units are placed in position at spaced distances on the subgrade, the concrete is poured to embed the joint-forming units.

Figures 1 to 5, inclusive, illustrate contraction joint-forming mechanisms for road construction work or other concrete construction work in which contraction joints are required. Each contraction joint-forming unit comprises a base unit consisting of a sheet metal base plate 3, the length of which corresponds to the length of the joint, which in the ordinary form of a contraction road joint extends from the center of the road transversely across the subgrade to the side or shoulder of the road.

The base plate 3 has expanded or struck therefrom a plurality of groups of guides for the load transmitting means hereinafter more fully described. The metal base plate 3 is first provided with a plurality of sets of parallel offset or staggered cuts or slits along the lines 4 and 5 (Figure 4) on opposite sides of the longitudinal central portion of the base plate 3. Also cut from the base plate 3 are sets of staggered U-shaped cuts 6 to form stop lugs or tongues 7 which are positioned diagonally with respect to one another on opposite sides of the longitudinal central portion of the base plate 3 and opposite the respective slits 4 and 5. The longitudinal central portion of the base plate 3 is also stamped out or cut to provide spaced groups of parallel openings between the slits 4 and 5 and the tongue cuts 6. Each group of the longitudinally disposed openings consists of a central rectangular opening and two spaced rectangular side openings, said side openings being approximately half the width of the central opening.

After the base plate 3 has been provided with the groups of central longitudinally arranged openings and with the slits 4 and 5 and the stop tongue cuts 6, as described, the plate is subjected to expanding and forming treatments whereby the metal adjacent the respective slits 4 and 5 is expanded upwardly from the base plate to form integral guide pockets 8 which, as illustrated in Figure 4, are arranged in reversed staggered pairs on opposite sides of the groups of central openings in the base plate. The longitudinal central portion of the base plate is then subjected to deforming treatments to form a springlike clamping holder consisting of an intermediate receiving pocket or channel 9 formed by looped or folded portions of the plate which form looped or double thickness upwardly projecting flanges 10. When the base plate 3 has the central portion thereof bent or formed to provide the upwardly projecting looped flanges 10 to form the intermediate pocket or channel 9 the groups of openings formed longitudinally in the central portion of the base plate provide transverse open-

ings 11 in the spring-like clamping holder formed by the looped portions of the base plate.

By referring to Figure 4 it will be noted that the openings 11 are positioned to register with the openings in the guide pockets 8 with the stop tongues 7 in each group positioned diagonally opposite one another on opposite sides of the spring-like clamping holder. A base unit is thus provided to include a central longitudinally disposed spring-like clamping holder formed by the loop portions 9 and 10 of the plate 3 with said looped holder having the spaced openings 11 provided therethrough. The holder is for the purpose of receiving a joint dividing member which, in the case of a contraction joint, consists of a dividing plate 12 which may be constructed of 22 gauge hot rolled annealed steel. The dividing plate 12 has the lower margin thereof cut out to provide a plurality of spaced openings 13 spaced to register with the holder openings 11 when the dividing plate has the lower margin thereof inserted in position in the holder between the spring-like clamping flanges 10, as illustrated in Figures 1 and 2.

The dividing plate 12, above each of the openings 13 therein, is provided with a wire receiving opening 14 and with a plurality of aligned stops or spacers 15 and 16 which are struck or expanded from the dividing plate 12. As clearly illustrated in Figure 1 the stops or spacers 15 project outwardly from one side of the dividing plate 12 while the stops or spacers 16 project outwardly from the opposite side of the dividing plate, so that the stops or spacers 15 and 16 are arranged in staggered groups above the respective openings 13 of the dividing plate. It will thus be noted that the dividing plate is adapted to be clamped in position upon the base plate between the looped flanges 10 and seated in the intermediate pocket or channel 9 in position to receive the groups of load transmitting units which form a part of the road joint forming mechanism.

Associated with each pair of the guide pockets 8 of the base plate is a pair of load transmission anchor units which are reversed and staggered with respect to one another and have the base portions thereof positioned to pass through the openings 11 of the clamping holder and through the opening 13 provided in the lower margin of the dividing plate 12. The load transmitting units are seated on the base plate 3 and normally engage over the stop tongues 7 until the base portions of the reversed load transmission members engage through the registering openings 11 and 13 and project into the guide pockets 8 as illustrated in Figure 2. The tongues 7 are next bent upwardly behind the load transmission units to act as stops therefor.

Each of the load transmission units or shoes is preferably constructed from a hot rolled steel Z-bar consisting of a base flange or foot 17, an upright integral body plate or flange 18 and an integral top flange 19. The top flange 19 of each of the load transmission shoes is preferably inclined, and has the middle portion thereof stamped or cut out to provide an opening 20 which opens outwardly through the outer or upper edge of the top flange 19 and is so shaped as to form a pair of anchoring arms 21 the outer ends of which are slightly enlarged to provide anchoring heads 22. Each of the anchoring arms 21 is spirally twisted intermediate the ends thereof to form a spiral twist section 23 causing the outer ends of the anchoring arms 21 to diverge with respect to one another with the heads 22 positioned substantially at right angles with respect to the inner ends of the arms 21 and with respect to the top flange 19 of the anchoring shoe.

Each pair of load transmission anchoring shoes are reversed with respect to one another and have the bases or flanges 17 thereof projecting in opposite directions through the openings 11 of the dividing plate holder of the base plate 3 and into the respective guide pockets or hoods 8 until the upright body plates 18 are brought into contact with the respective stops or spaces 15 and 16 and into engagement with the outer surfaces of the looped flanges 10 of the dividing plate holder, as shown in Figure 2. When the anchoring shoes are in their innermost positions as described, the stop tongues 7 in the base plate are cleared, thereby permitting said tongues to be deflected upwardly against the backs of the lower portions of the load transmission shoe plates 18 to hold the anchoring shoes in proper spaced position on the base plate and against the spacers on opposite sides of the dividing plate, thereby assisting in holding the dividing plate in position.

To further hold the load transmission shoes in assembled relationship with respect to the dividing plate 12 each pair of load transmission anchoring shoes are tied together by means of a tie wire 24 which is looped around the inner end of one of the anchoring arms of one of the shoes and then projects through the respective opening 14 in the dividing plate 12 to permit the wire to be looped around a diagonally opposite arm of an adjacent load transmission shoe. The ends of the wire are then tightly twisted or knotted together to tie the two load transmission shoes to one another through the dividing plate, as clearly illustrated in Figures 1 and 2.

Figure 6 illustrates a modified form of joint dividing member adapted to be engaged in a base plate holder of a base unit such as illustrated in Figure 4. The modified form of dividing member comprises a sheet metal stiffener plate 25 the lower margin of which is provided with spaced openings such as the openings 13 in the dividing plate 12. The lower margin of the stiffener plate 25 is exposed to permit the stiffener plate to be inserted into the intermediate receiving channel 9 of the base plate holder, while the upper major portion of the stiffener plate 25 may be enclosed by a treated paper covering to form a dividing member for a contraction joint. For the formation of an expansion joint the upper portion of the stiffener plate 25 is embedded in a compressible plastic coating 26 which extends over the top edge of the stiffener plate. The lower edges of the opposite sides of the plastic coating 26 are adapted to rest on the upper edges of the holder flanges 10, which are left open to provide spaces therein to permit compression or closing of the looped flanges when the pre-molded dividing member is used to produce an expansion joint. The plate 25 with its coating or covering 26 forms a pre-molded filler for use with sets of load transmission anchor shoe units of the type illustrated in Figure 5. The load transmission anchor shoes are adapted to be projected through the openings in the base plate holder and in the lower margin of the stiffener plate 25, with the base plates of the shoes projecting into guide pockets 8 on the base plate 3. With the pre-molded filler illustrated in Figure 6, the coating material covering the upper portion of the stiffener plate 25 is adapted to be contacted by the plates 18 of the load trans-

mission shoes, thereby permitting the shoes to assist in holding the pre-molded filler in position. If desired, or when it is found necessary, the pre-molded filler may be provided with openings to permit the wires **24** to be used in a manner similar to the arrangement illustrated in Figure 2 of the drawings.

Figure 7 illustrates another modified form of road joint forming mechanism which is adaptable for forming road expansion joints. In this modified form the base plate unit is constructed similarly to the base plate unit illustrated in Figure 4 with the exception that the intermediate portion of the spring clamping holder is provided with a wider intermediate pocket **27** between the looped spaced flanges **10** of the base plate **3**, which looped flanges are provided with openings **11** as shown in Figure 4. Engaged in the wide receiving channel **27** of the base unit is the lower margin of a dividing member which in this case consists of a filler board **28** constructed of a compressible plastic material. The lower margin of the compressible filler board **28** is provided with openings adapted to register with the openings **11** in the holder flanges **10** to permit the use of the sets of load transmission units similar to the arrangement shown in Figure 1. If desired, spacers **29** may be provided on opposite sides of the filler board **28** to permit the intermediate plates **18** of the load transmission shoes to contact the same similar to the arrangement shown in Figure 2.

In the forms of contraction and expansion road joint forming mechanisms herein described the various elements comprising a road joint-forming unit may be assembled as a unit and shipped to location so that the joint-forming unit may be placed transversely upon a road subgrade between the longitudinal center joint mechanism of the road and the road side forms to permit the concrete to be poured to embed the joint-forming unit between road slabs, such as the slabs **1** and **3** shown in dotted lines in Figure 2.

In order to prevent rusting and bonding of the concrete to the load transmission Z-bar units below line **30** it is desirable to coat all surfaces of said units below the line **30** shown in Figure 5 with a rust-preventive and non-bonding paint.

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 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 a spring type clamping holder integrally formed on the base plate and consisting of portions of the base plate folded upon itself for receiving and holding a joint dividing member supported on the base plate, said holder having openings through the folded portions for permitting the load transmission units to project therethrough to engage in said guide pockets.

2. A road joint former and load distributor comprising a base plate, a pair of looped flanges formed longitudinally on the base plate and forming a receiving channel therebetween, said flanges having openings therein, a plurality of guide pockets expanded from the base plate and arranged in reverse relationship with respect to one another on opposite sides of said flanges and opposite the openings therein, a plurality of load transmission shoes supported on the base plate and arranged in reversed staggered relationship with respect to one another to project through the flange openings and into said pockets, spiral anchor arms integrally formed on said shoes, anchoring heads formed on the ends of said arms, a joint dividing member engaged in the channel formed between said base plate flanges and having openings therein to register with the flange openings to permit said dividing member to engage over portions of the load transmission shoes, spacers projecting from opposite sides of the dividing member and contacted by said shoes, and tie means projecting through the dividing member for tieing the reversed shoes together in pairs.

ROBERT R. ROBERTSON.

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