May 31, 1938. R. R. ROBERTSON 2,119,355

CENTER AND TRANSVERSE CONTRACTION JOINT

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Fig. 1.

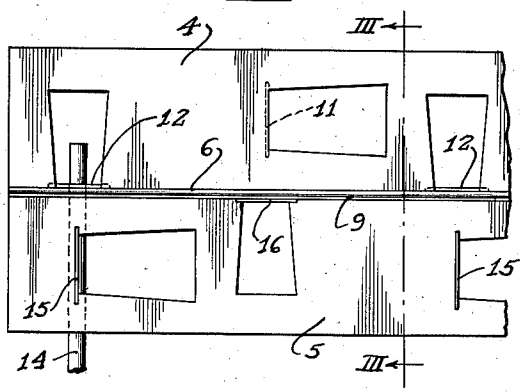


Fig. 2.

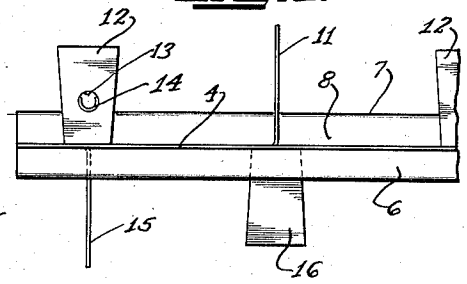
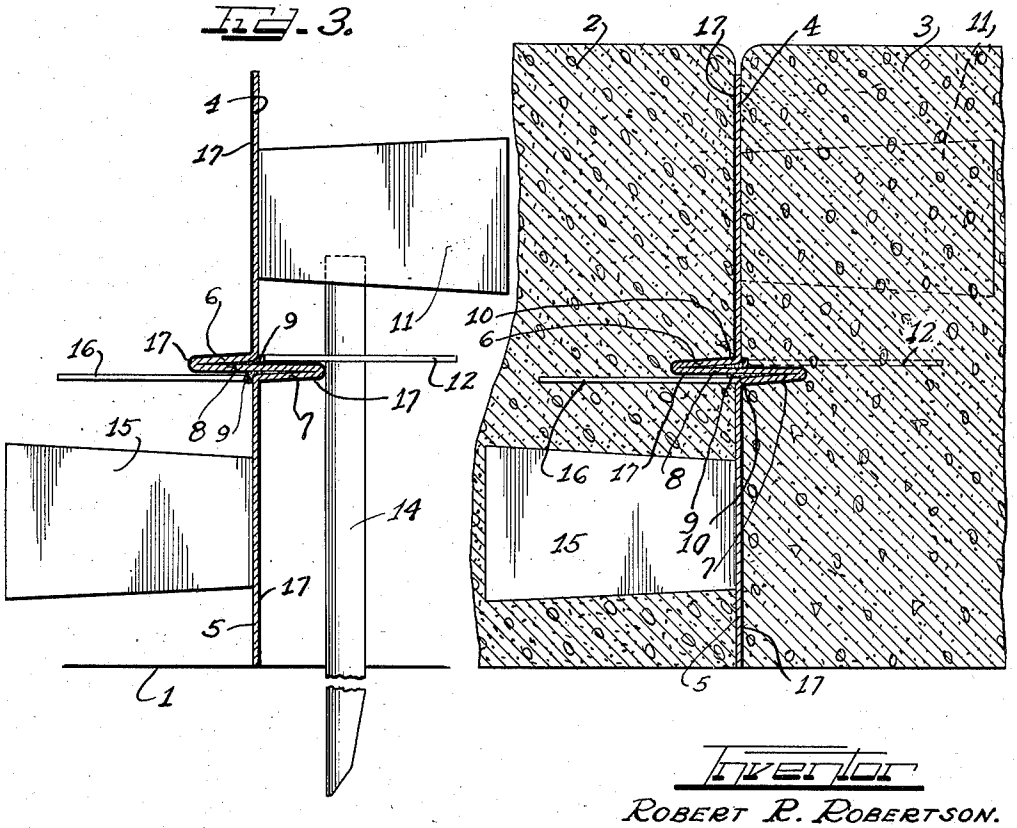


Fig. 4.

Fig. 3.



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Fig. 5.

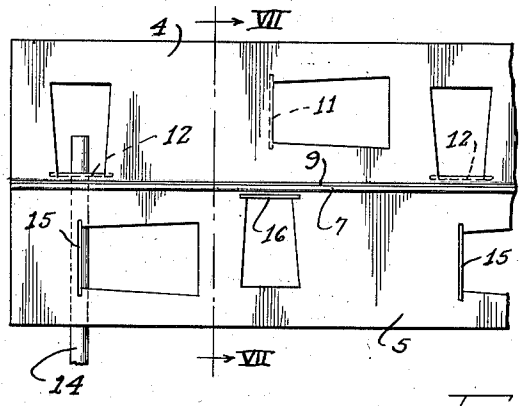


Fig. 6.

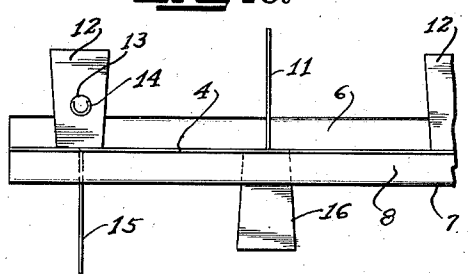
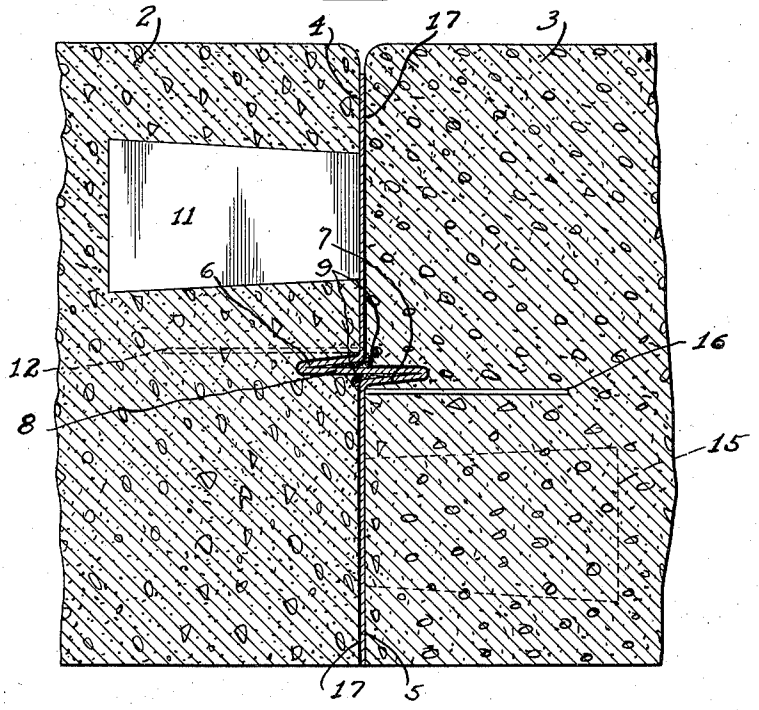


Fig. 7.



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Fig. 8.

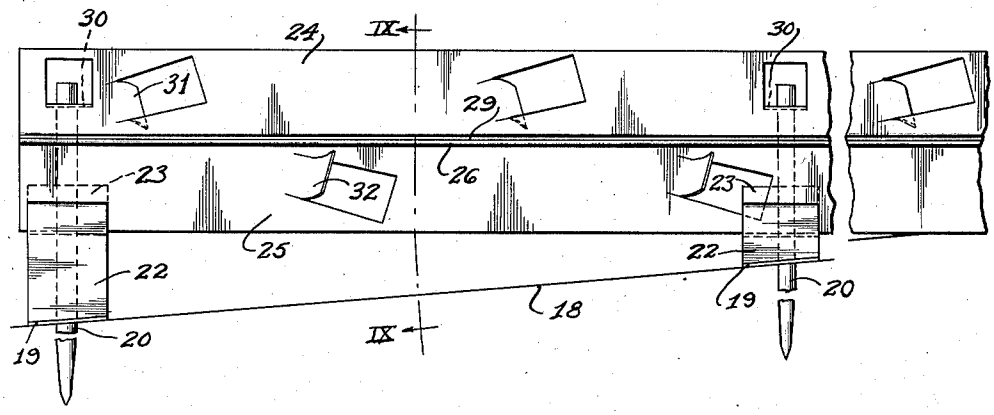


Fig. 9.

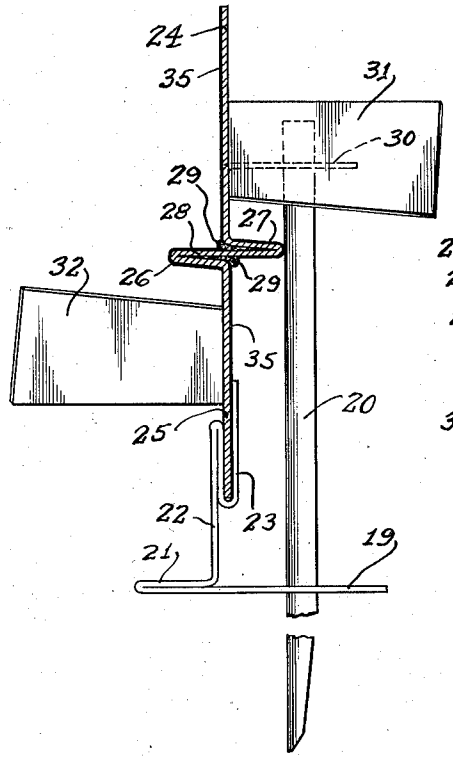
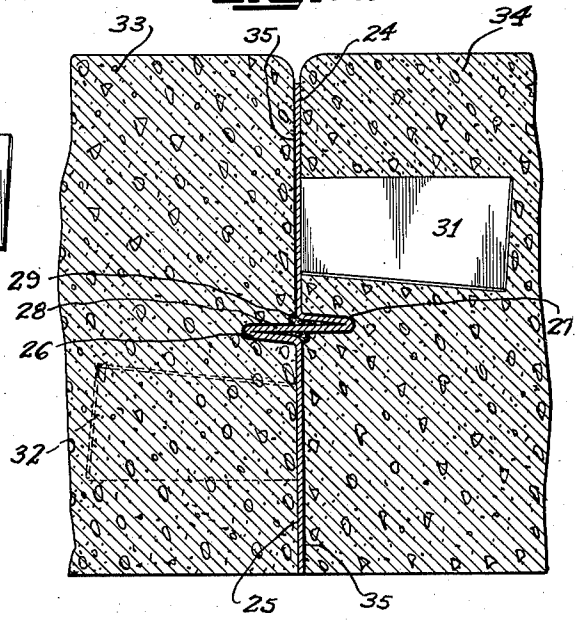


Fig. 10.



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Patented May 31, 1938 2,119,355

UNITED STATES PATENT OFFICE

2,119,355

CENTER AND TRANSVERSE CONTRACTION JOINT

Robert R. Robertson, Chicago, Ill., assignor to The Translode Joint Company, Chicago Heights, Ill., a corporation of Illinois

Application July 6, 1936, Serial No. 88,946

11 Claims. (Cl. 94—18)

This invention relates to concrete construction joints, and more particularly to road contraction joints of both the center and transverse types. The improved contraction joint of this invention, may be used either as a transverse joint positioned across the road between adjacent road slabs, or the contraction joint may be used as a center joint positioned longitudinally of the road between road slabs positioned on opposite sides of the center line of the road. The improved road contraction joint embraces a single plate construction formed to provide reversed diagonally opposite angle members connected by a transverse plate, or the middle portion of the plate may be bent upon itself to provide either an S or a Z-shaped transverse middle section which integrally joins the upper and the lower plate sections or walls from which vertical, horizontal or inclined anchoring blades or wings are struck for the purpose of anchoring the top plate section to one road slab while the bottom plate section is anchored in an adjacent road slab.

It is an object of this invention to provide a road contraction joint adapted to be used either as a transverse joint or as a center joint between concrete road slabs which not only embed the contraction joint forming mechanism but also embed the holders and stakes which serve to support the joint forming mechanism upon a road sub-grade during the construction of the road.

It is also an object of this invention to provide a road contraction joint comprising upper and lower plate sections disposed in the same plane and being integrally connected by means of spring-like transverse shield sections provided with asphalted fillers, portions of which project to cover rounded corners of the joint.

It is a further object of this invention to provide a road contraction joint constructed of a single sheet of material which is so formed to provide upper and lower plate sections disposed in substantially the same plane and integrally connected with one another by means of a transverse intermediate folded section provided with fillers to prevent concrete from entering the folded sections; said upper and lower plates and the intermediate folded section having certain surfaces thereof painted or provided with a coating of selected material for the purpose of preventing the concrete when poured on opposite sides of the joint from adhering to the painted surfaces of the joint, but permiting the unpainted surfaces of the plate portions of the joint to be clamped against surfaces of the road slabs by means of anchoring blades projecting outwardly from the sides of the plate sections opposite the painted surfaces.

It is furthermore an object of this invention to provide a road contraction joint of either the transverse or center joint types, said joint being constructed of a single sheet of metal having the middle portion thereof looped upon itself to form a transverse shield, while the upper and lower plate portions are provided with integral vertical, horizontal or inclined blades, or any combination thereof, for anchoring opposite sides of the joint mechanism to adjacent road slabs.

Another object of the invention is to provide a road contraction joint mechanism comprising a plate having the middle portion thereof bent upon itself in opposite direction to provide a transverse shield provided with filling means for filling the space within the bent-over portions forming the transverse shield, said plate and the intermediate shield portion thereof being painted to prevent bonding to the concrete slabs in which diagonally opposite anchoring blades project from opposite unpainted sides of the joint plate.

A further object of the invention is to provide a road contraction joint embracing a plate supported on the sub-grade by means of holders, said plate having the middle portion thereof doubled upon itself in opposite direction to extend transversely through the plane of the plate, said plate having anchoring blades projecting from opposite sides thereof with certain of said blades having openings therein through which retaining stakes project to engage in the road sub-grade for the purpose of securing the road contraction joint mechanism in place during the pouring of concrete.

It is an object of this invention to provide an improved road contraction joint of either the transverse or center joint types, said joints including a joint plate device adapted to be painted or covered with a substance to prevent bonding to the concrete, said device having holders and securing members associated therewith for holding the plate device in position on a road sub-grade during the pouring of concrete, said plate device having both horizontal and vertical anchoring blades struck from opposite sides thereof above and below a transversely looped shield portion forming an integral part of the plate device and having a filling of asphalted jute, twine, or fiber engaged in the grooved portions of the transverse shield to prevent the entrance of concrete into the shield spaces.

Other and further important objects of this invention will be apparent from the disclosure in

the specification and the accompanying drawings.

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

On the drawings:

Figure 1 is a fragmentary side elevation of a road contraction joint forming mechanism embodying the principles of this invention, with the concrete omitted and showing a fragmentary portion of a retaining stake engaged in position.

Figure 2 is a fragmentary top plan view of the joint forming mechanism illustrated in Figure 1.

Figure 3 is an enlarged fragmentary detailed section taken on line III—III of Figure 1.

Figure 4 is a fragmentary vertical detailed section through the construction joint embedded between the concrete road slabs.

Figure 5 is a fragmentary side elevation of a modified form of road contraction joint of the longitudinal or center joint type.

Figure 6 is a fragmentary top plan view of the modified form of such joint illustrated in Figure 5.

Figure 7 is an enlarged fragmentary vertical detail section of the modified form of contraction joint embedded between concrete road slabs, and showing the anchoring blades projecting in the same direction as the respective looped portions of the transverse shield forming part of the joint.

Figure 8 is a fragmentary side elevation of a transverse road contraction joint embodying the principles of this invention, and having associated therewith supporting holders and retaining stakes for supporting the joint forming mechanisms transversely upon a curved or arched road sub-grade.

Figure 9 is an enlarged vertical transverse detail section taken on line IX—IX of Figure 8.

Figure 10 is a fragmentary vertical detail section taken through the joint forming mechanism at a point near the middle portion of the road, and showing the concrete road slabs in place embedding the joint forming mechanism.

As shown on the drawings:

In the present invention the improved road contraction joint forming mechanism may be provided in two types, namely the two forms illustrated in Figures 1 to 7 inclusive being of the center contraction joint type while Figures 8 to 10 inclusive illustrate the transverse contraction joint type.

The road contraction joint, as illustrated in Figures 1 to 4 inclusive is of the center joint type adapted to be positioned longitudinally between the concrete slabs or in the center line of a concrete road.

The improved center contraction joint shown in Figures 1 to 4 inclusive comprises a joint forming mechanism adapted to be supported upon a road sub-grade 1 and then embedded in concrete which forms road slabs 2 and 3 on opposite sides of the joint forming mechanism. Said forming device is constructed of sheet metal the longitudinal middle portion of which is deflected or formed to provide a transverse longitudinally disposed shield separating an upper flange or top plate 4 from a lower flange or bottom plate 5. The transverse shield extends throughout the entire length of the joint forming unit and comprises an upper looped section or bight portion 6 and a lower loop section or bight portion 7 which extend in opposite directions from the plane of the plates 4 and 5 and are connected by means of a common transverse plate 8. The plate 8 connects and forms a shield between the upper angle member 4—6 and the reversed diagonally opposite lower angle member 5—7.

As the channel or loop portions 6 and 7 forming the transverse shield are formed during the rolling process of forming the joint unit an asphalted filler 9 of jute, twine, fiber or other suitable filling material is squeezed in or clamped between the side walls forming the channel sections to fill the same thereby preventing concrete from entering the cracks or openings in said channel sections. The asphalted filler 9 is permitted to project from the cracks and overhang the corners 10 of the joint construction where the plate sections 4 and 5 join up with the respective channel portions 6 and 7.

For the purpose of anchoring the top plate 4 and the bottom plate 5 in adjacent concrete sections of the road, the top plate 4 has struck outwardly therefrom a plurality of spaced vertical anchoring blades or wings 11 and a plurality of horizontal anchoring blades or wings 12. As clearly illustrated in Figures 1 and 2 the anchoring blades 11 and 12 alternate with one another in a staggered relation and project from the side of the plate 4 opposite the side from which the shield channel section 6 projects.

At spaced intervals certain of the horizontal anchoring blades 12 are provided with openings 13 (Figure 2) through which channel cross-sectioned stakes or pins 14 are driven in contact with the rounded bight portion of the lower channel section 7 and with the tapered lower end of the stake or pin driven into the sub-grade 1 to rigidly hold the joint forming mechanism in position upon a road sub-grade ready for the pouring of concrete.

For the purpose of holding the bottom plate section 5 in contact with a surface of the concrete road slab 2, said bottom plate 5 is also provided with anchoring blades or wings, in the form of vertical anchoring blades 15 and horizontal anchoring blades 16. The lower anchoring blades 15 and 16 project from one side of the bottom plate 5 in a direction opposite from the upper anchoring blades 11 and 12 and in a direction opposite from that of the lower channel section 7. The lower anchoring blades 15 and 16 are arranged alternately with respect to one another and are staggered. As clearly illustrated in Figures 3 and 4 the upper and lower horizontal anchoring blades 12 and 16 respectively project outwardly from opposite sides of the joint plates with the upper blades 12 disposed closely adjacent the top surface of the lower channel section 7 while the horizontal anchoring blades 16 are disposed directly beneath the upper channel section 6.

For the purpose of preventing bond between the concrete and the road joint forming members the sides of the joint plates 4 and 5 opposite the anchoring blades as well as the outer surfaces of the channel sections 6 and 7 are painted with one or two coats of asphalt paint or grease 17 so that the concrete slabs 2 and 3, upon contraction thereof, can slip off or separate from the painted portions of the joint-forming mechanism. As the slabs contract the sides of the plates 4 and 5 which are unpainted and are provided with the vertical and horizontal anchoring blades are securely held in tight contact with the respective surfaces of the concrete slabs 2 and 3.

If preferred both surfaces of the joint form-

ing mechanism plates 4 and 5 and the outer surfaces of the channel sections 6 and 7 may be painted with asphalt paint or the like so that upon contraction of the road slabs 2 and 3 the respective slabs may first separate from the painted surfaces of the joint members which are not provided with the anchoring blades, and with a greater contraction of the slabs the anchored sides of the plates may separate from the plates 4 and 5 when the heel or base portions of the anchoring blades where they join the respective plates are stretched thereby leaving both sides of the plates 4 and 5 and the transverse intermediate shield portion separated from the concrete slabs, but connected thereto by means of the stretched anchoring blades.

Figures 5, 6, and 7 illustrate a modified form of road contraction joint, of the center joint type, and similar in general construction to the center contraction joint illustrated in Figures 1 to 4 inclusive. In the modified form of contraction center joint illustrated in Figures 5 to 7 inclusive the joint forming mechanisms are adapted to be secured in position upon a road sub-grade by means of pins or stakes 14 similar to the arrangement illustrated in Fig. 3. In the modified form of the center joint construction the parts which are substantially identical to the parts hereinbefore described in connection with Figures 1 to 4 inclusive will be designated by corresponding reference numerals.

The only difference between the form of center contraction joint illustrated in Figures 5 to 7 inclusive and the form illustrated in Figures 1 to 4 inclusive, is that in the modified form the upper anchoring blades or wings 11 and 12 are struck from the top plate 4 and project from the same side of the plate 4 as does the shield looped section 6, and the lower anchoring blades or wings 15 and 16 are struck from the lower plate 5 to project in the same direction from said plate as does the lower looped section 7. Comparison of the two forms of center contraction joints illustrated in Figures 4 and 7 show that in the form illustrated in Figure 4 that when the road slabs 2 and 3 contract that the upper and lower plate sections 4 and 5 are pulled in opposite directions by the anchoring blades, to cause closing or compression of the looped intermediate shield section, while in the modified form of the center contraction joint illustrated in Figure 7 when contraction takes place in the road slabs 2 and 3, the anchoring blades tend to force the upper and lower plate sections 4 and 5 to move in opposite directions to produce a different action on the transverse shield section, that is to produce opening or tensional action on the looped shield.

Figures 8 to 10 inclusive illustrate another modified form of road contraction joint in the form of a transverse contraction joint adapted to be positioned on the road sub-grade 18 and extending from the sides of the road inwardly to the center joint. Due to the arched or rounded shape of the top surface of the road sub-grade 18 as illustrated in Figure 8 the outer ends of the transverse contraction joint forming mechanisms are adapted to be supported in a horizontal position transversely of the road, by means of improved holders. As clearly illustrated in Figure 8 the holders are of different heights to compensate for the curvature of the top surface of the sub-grade. As illustrated in Figure 10 no holders are necessary where the joint mechanisms approach the center of the road.

Each of the joint supports or holders comprises a metal base plate 19 adapted to be positioned to project across the vertical center plane of the joint forming mechanism. The base plate 19 is provided with an opening to permit the lower end of a channel cross-sectioned retaining pin or stake 20 to be projected therethrough into the road sub-grade. One end of the base plate 19 is bent over upon itself to form a looped toe 21 the top plate of which extends inwardly a short distance and then is bent upwardly at right angles to provide an upright leg or pedestal 22 the upper end of which is bent downwardly upon itself and then upwardly to provide a supporting hook or socket 23 in which the lower margins of the transverse contraction joint forming mechanism is adapted to engage as clearly illustrated in Figure 9.

The transverse contraction joint forming mechanism comprises a substantially unitary construction in the form of a sheet metal member consisting of an upper or top plate 24 and a bottom or lower plate 25 positioned in substantially the same vertical plane and integrally connected to one another by an intermediate shield section formed by rolling the middle portion of the joint member to form transversely projecting looped sections 26 and 27 which project from opposite sides of the plane of the joint and are connected by a common plate 28 which integrally connects the two looped sections and projects transversely through the vertical plane of the joint. The grooves or openings of the looped sections 26 and 27 are filled by fillers formed of asphalted jute, twine, or fiber squeezed in place as the metal forming the looped portions close up in the rolling process used for forming the joint forming mechanism. The asphalted fillers 29 project out of the looped portions 26 and 27 and overhang the rounded corners which join the looped portions with the respective plates 24 and 25. As clearly illustrated in Figure 9 the bottom plate 25 of the joint forming mechanism is adapted to seat in the hook portions 23 of the holders used to support the outer end portions of the joint forming mechanism in a horizontal line with the inner end of the joint. Struck outwardly from one side of the top plate 24 are a plurality of lugs or arms 30 each of which is provided with an opening to permit a retaining pin or stake 20 to be projected therethrough and project downwardly against one side of the looped section 27 to extend through the apertured base plate 19 of a holder to permit the tapered end of the stake to be driven into the sub-grade for holding the joint forming mechanism braced in position ready for the pouring of concrete.

Struck outwardly from one side of each of the upper and lower joint plates 24 and 25 are a plurality of anchoring blades or wings 31 and 32 respectively with the upper anchoring blades 31 projecting from the same side of the upper plate 24 as to the lugs 30 and in the same direction as the looped section 27 of the intermediate shield portion of the joint forming mechanism. The lower anchoring blades 32 project from the lower plate 25 in the direction of the looped section 26 and opposite from the upper anchoring blades 31. As clearly illustrated in Figure 8 the upper and lower blades 31 and 32 are staggered with respect to one another as well as projecting in opposite direction from the center plane of the joint.

With the joint forming mechanisms rigidly secured in position on the road sub-grade 18 by means of the retaining stakes 20 and the support-

ing holders, concrete is poured on opposite sides of the joint to embed the joint forming mechanisms and form the concrete road slabs **33** and **34**.

To prevent the concrete from bonding or adhering to the sides of the plates **24** and **25** and to the shield looped portions **26** and **27**, said portions of the joint are painted with a double coating of asphalt paint or grease **35**. By coating the joint members, with asphalt paint or grease, the concrete slabs **33** and **34** upon contraction are permitted to separate from the metal joint members with the anchored sides of the joint plates **24** and **25** remaining clamped against the road slabs. This movement of the upper and lower plates **24** and **25** in opposite directions, by the contraction of the concrete slabs, causes opening of the looped portions **26** and **27** or a substantially pivotal action at the longitudinal center line of the common plate **28** which joins the looped sections of the transverse shield portion of the joint.

While the anchoring blades **31** and **32** of the road transverse contraction joint are of the inclined type it will of course be understood that said blades may be either of the horizontal or vertical types as disclosed in Figure 1.

As illustrated in Figure 8 the plates **24** and **25** where they are cut to provide the anchoring blades **31** and **32**, have the side cuts extended beyond the attached ends or heels of the blades to permit stretching of the heels of the blades when the contraction forces in the road slabs are sufficient to cause movement of the slabs from both sides of the plates **24** and **25**.

The body portion of each of the various forms of the contraction joints, is in the form of substantially two angle members arranged in reversed inverted order and are held diagonally positioned by the transverse shield plate which integrally connects the narrow flanges of the angle members.

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 contraction joint for embedding between adjacent concrete slabs, a joint forming mechanism comprising upper and lower plate sections disposed in substantially the same plane and integrally connected to one another by a transverse shield comprising looped sections projecting in opposite directions and connected by a common plate projecting through the plane of the upper and lower plates and separating the same, and anchoring blades struck from the upper and lower plates on opposite sides of the joint forming mechanism and on diagonally opposite side portions of said common plate.

2. In a contraction joint for embedding between adjacent concrete slabs, a joint forming mechanism comprising an upper plate and a lower plate disposed in the same plane, a looped shield section integrally connecting the plates and projecting transversely through the plane of said plates, fillers in the looped shield section, and anchoring blades struck from the plates on diagonally opposite sides of the looped shield section.

3. A contraction joint forming mechanism for embedding between concrete slabs and comprising a metal plate having the middle portions thereof formed to provide a double looped shield projecting transversely through the plane of the plate, filler means engaged in the double looped shield, anchoring members struck from opposite sides of the plate above and below the double looped shield, said plate and the double looped shield having surfaces thereof covered with paint to obviate the bonding of the concrete with said painted surfaces.

4. A contraction joint forming mechanism for embedding between concrete slabs and comprising a metal plate having the middle portions thereof formed to provide a double looped shield projecting transversely through the plane of the plate, filler means engaged in the double looped shield, anchoring members struck from opposite sides of the plate above and below the double looped shield, said plates and the double looped shield having surfaces thereof covered with paint to obviate the bonding of the concrete with said painted surfaces, and means connected with the joint forming mechanism to secure the same in position upon a road sub-grade prior to the pouring of the concrete to form the slabs.

5. In a contraction joint for embedding between adjacent concrete slabs, a contraction joint forming mechanism comprising in combination a plate having an intermediate portion thereof rolled upon itself to provide a looped transverse shield extending through the plane of the plate, filler means engaged in the looped transverse shield to obviate the entrance of concrete into the looped portions of said shield, anchoring members struck from opposite sides of the plate and positioned on opposite sides of said shield, and stake members projecting through certain of the anchoring members and contacting said shield to hold the joint forming mechanism mounted in position upon a road sub-grade prior to the pouring of concrete to form the concrete slabs.

6. In a contraction joint for embedding between adjacent concrete slabs, a unitary contraction joint forming mechanism comprising a metal plate having the middle portions thereof throughout the length of the plate doubled transversely upon itself to form a transverse shield separating the upper portion of the plate from the lower portion, and anchoring members projecting from opposite sides of the plate above the transverse shield on one side of the plate and below the transverse shield on the opposite side of the plate.

7. In a contraction joint for embedding between adjacent concrete road slabs, a unitary joint forming mechanism comprising a main plate having the middle portions thereof throughout the length of the plate doubled upon itself to form a double looped shield with the double looped portions projecting in opposite directions from the main plate and connected by a common plate which projects through the plane of the main plate, horizontally disposed anchoring members struck outwardly from opposite sides of the main plate and closely adjacent opposite sides of the transverse shield, and vertically disposed anchoring members struck outwardly from opposite sides of the main plate and on opposite sides of the transverse shield.

8. In a contraction joint for embedding between adjacent concrete road slabs, a joint forming mechanism comprising a plate having the middle portion thereof throughout the length of the plate doubled upon itself to form a double looped transverse shield one member of which projects

transversely through the plane of the plate, fillers in the looped portions of the transverse shield, horizontal and vertical anchoring members struck from both sides of said plates on diagonally opposite sides of the transverse shield, said outer surfaces of the transverse shield and the surfaces of said plate opposite the anchoring members coated with a non-bonding substance to obviate bonding of the painted surfaces with the concrete.

9. In a contraction joint for embedding between adjacent concrete road slabs, a joint forming mechanism comprising a plate having the middle portion thereof throughout the length of the plate doubled upon itself to provide a transverse shield including oppositely projecting looped portions connected by a common auxiliary plate projecting through the plane of the main plate, horizontal and vertical anchoring members struck from opposite sides of the main plate above and below the transverse shield, and retaining members on one side of the main plate engaging selected horizontal anchoring members and contacting one of the looped portions of the transverse shield to hold the joint forming mechanism secured in position upon a road sub-grade.

10. In a contraction joint for embedding between adjacent concrete road slabs, a joint forming mechanism comprising a main plate having the middle portion thereof, throughout the length of the plate, doubled upon itself to form a double looped shield with the looped portions projecting in opposite direction and connected to one another by a transverse member projecting through the plane of the main plate, anchoring members struck outwardly from diagonally opposite surfaces of the main plate, apertured lugs struck outwardly from one side of the main plate, and retaining stakes projecting through the apertured lugs and projecting downwardly into the road sub-grade to hold the joint forming mechanism staked in position during the pouring of the concrete for forming the road slabs.

11. A contraction joint forming mechanism of one-piece construction, comprising a pair of plates integrally connected by an S-section, and a plurality of longitudinally and transversely disposed anchoring members struck outwardly from one side of each of said plates and arranged in staggered relation, said anchoring members of one plate projecting in a direction opposite from the direction of projection of the anchoring members of the other plate.

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