April 8, 1958 F. VANEK 2,829,572

TRANSVERSE JOINT ASSEMBLY

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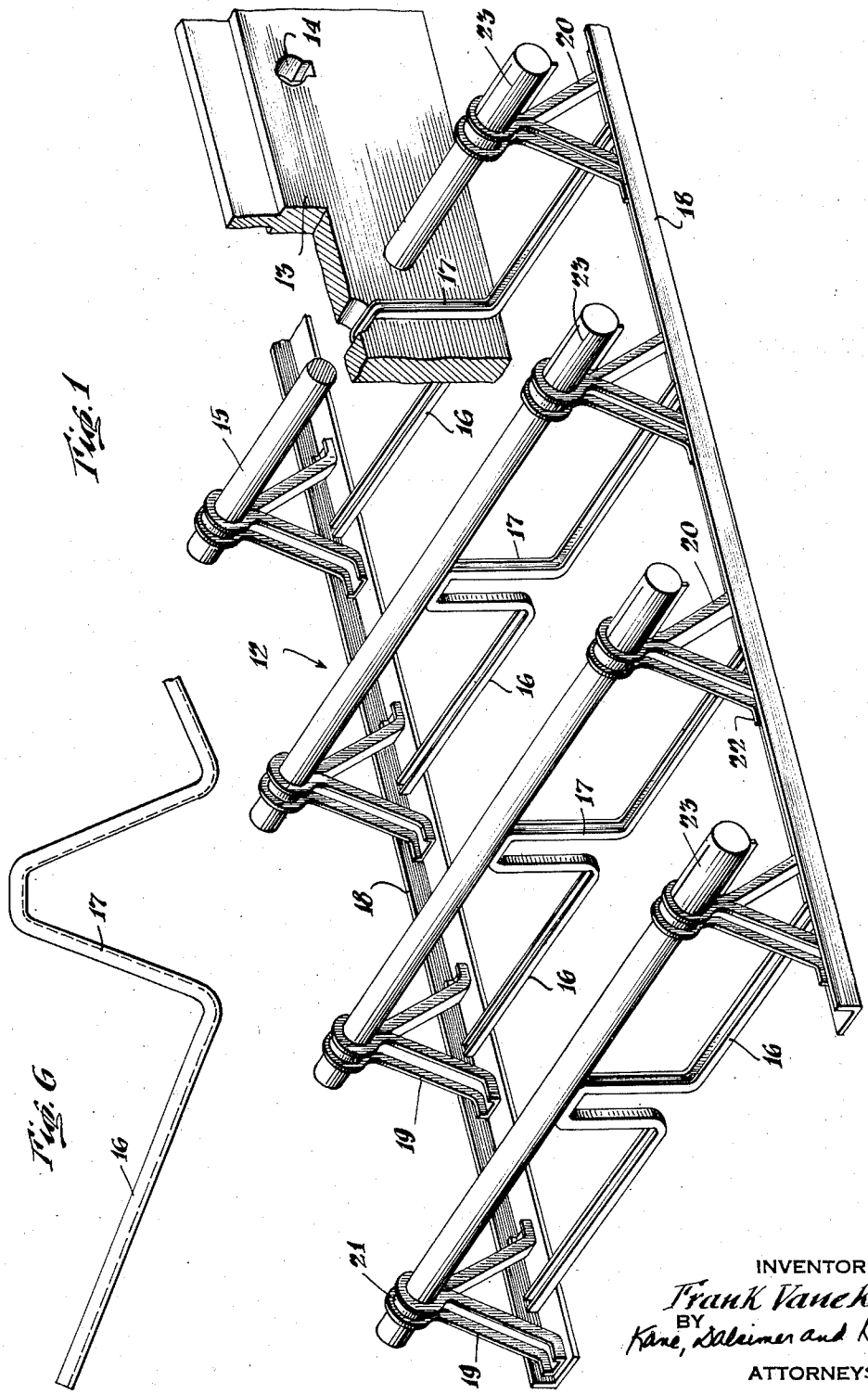


Fig. 1

Fig. 6

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Fig. 2

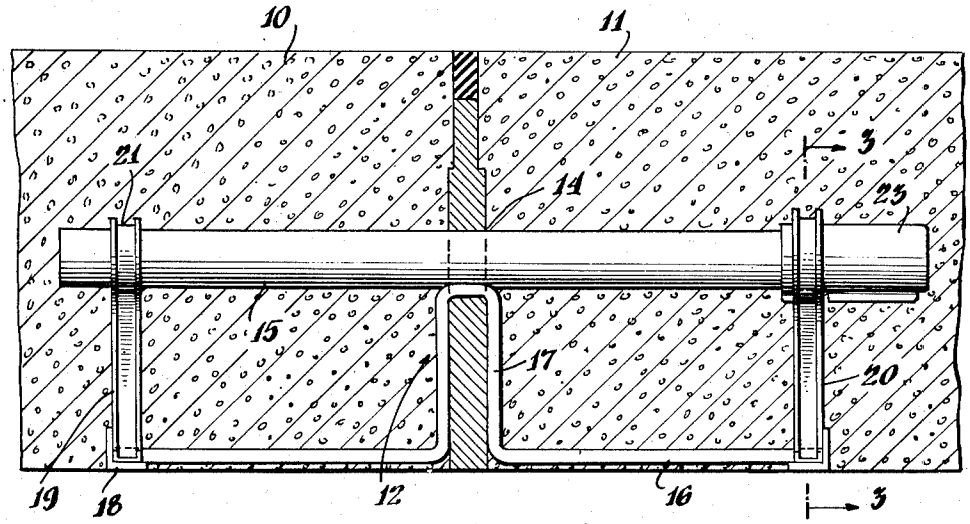


Fig. 3

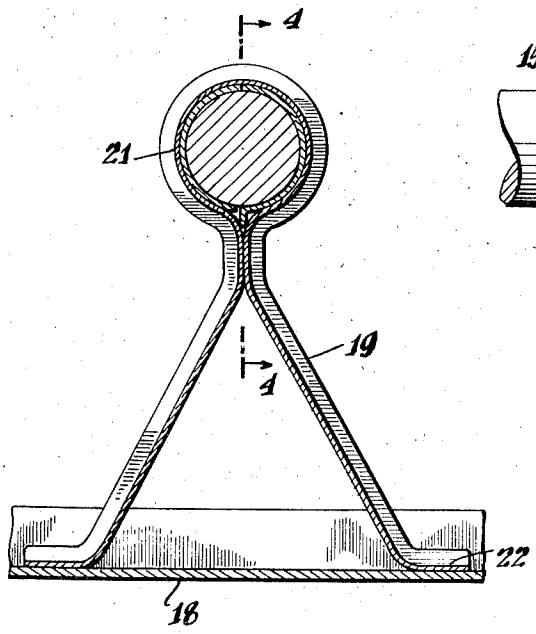


Fig. 4

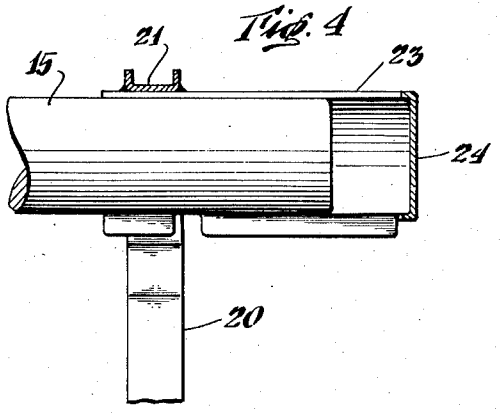
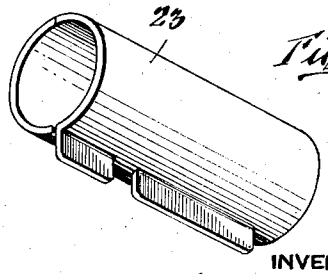


Fig. 5



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TRANSVERSE JOINT ASSEMBLY

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This invention relates to improved transverse expansion joint assemblies for concrete highways.

Modern concrete highways generally comprise parallel strips each consisting of a plurality of separate slabs having transverse expansion joints interposed therebetween. A transverse expansion joint generally consists of a strip of compressible material such as wood, synthetic material, plastics, rubber or the like with metal dowels arranged in parallel relationship extending through the expansion strip and embedded in the concrete slabs on opposite sides of the strip. The dowels are held in place by brackets resting on the roadbed on the two sides of the expansion strip. The purpose of the transverse expansion joints is to permit expansion and contraction of the concrete slabs under varying thermal conditions while at the same time providing support to the slabs at the joint.

The expansion joint assemblies heretofore available have had recognized disadvantages. Thus, in certain instances they have been unduly bulky, clumsy or heavy, or they have been difficult to assemble or it has been necessary to assemble them on the job under unfavorable conditions with the result that the cost of assembling was excessive and the complete assemblies were lacking in uniformity. Also, some of the expansion joint assemblies heretofore available did not respond properly to thermal expansion and contraction while others did not provide adequate support to the edges of the slabs with the result that they would shift relative to each other in a vertical plane and this in time would cause damage to the slabs.

It is an object of the present invention to overcome the difficulties heretofore encountered and to provide an improved transverse expansion joint assembly for concrete highways which is light yet nevertheless strong; which is economical to manufacture and assemble and is subject to modern manufacturing and assembling technics; which may be partially pre-assembled in the factory rather than on the job thereby reducing the cost of assembling and providing for uniform high quality in the finished product; which is relatively simple to transport and handle; and which will properly provide for expansion and contraction of the concrete highway under varying thermal conditions while at the same time providing adequate support at the joint between adjoining concrete slabs.

For a fuller understanding of the invention reference should be had to the drawings in which—

Fig. 1 is a perspective view partially fragmentary of a transverse expansion joint assembly embodying my invention showing the portions of the assembly in place prior to the pouring of the concrete slabs;

Fig. 2 is a sectional view through the joint assembly showing portions of adjoining concrete slabs with the expansion strip interposed therebetween and with the other portions of the assembly embedded in the slabs;

Fig. 3 is a detailed sectional view in the direction of the arrows on the line 3—3 of Fig. 2, showing one of the supporting brackets together with a tubular sleeve for receiving one end of the dowel;

Fig. 4 is a detailed sectional view in the direction of the arrows on the line 4—4 of Fig. 3 showing the tubular sleeve, the end of the dowel and portions of the supporting bracket;

Fig. 5 is a perspective view of the tubular sleeve; and

Fig. 6 is a side view showing one of the stress reducing cross members prior to assembling.

Referring more specifically to Fig. 2, I have shown the adjoining portions of two concrete slabs 10 and 11 with my improved transverse joint assembly, indicated at 12, arranged therebetween.

The joint assembly comprises an expansion strip 13 of conventional construction made in the usual manner of compressible material such as wood, synthetic material, plastics, rubber or the like. Extending through the strip at regular intervals are apertures 14 which accommodate the dowels 15 as well as the stress reducing spacing and supporting members 16.

The dowels are made of steel or other suitable material and they project outwardly from opposite sides of the expansion strip and are embedded in the concrete.

The stress reducing spacing and supporting members 16 are also made of a suitable metal such as steel and are preferably made of flat strip stock formed into channel shape, as shown, to increase the strength to weight ratio. The central portion 17 of the stress reducing spacing and supporting member is of inverted U-shape, so that the two end portions rest on the roadbed, as shown, with the central inverted U-shaped portion extending upwardly on the two sides of the expansion strip 13 and thence through the aperture 14 beneath the dowel. The spacing and supporting member serves to provide support for the expansion strip and for the dowel and also serves to maintain the several parts of the assembly in properly spaced relationship. The inverted U-shape portion 17 serves to permit expansion and contraction and relative shifting of the end portions of the cross member when the adjacent concrete slabs expand and contract in response to varying thermal conditions.

At their opposite ends, the spacing and supporting members are suitably secured as by welding to the base members 18 arranged on opposite sides of the expansion strip 13 in parallel relationship thereto.

The base members are in the form of angular metal strips and they rest on the roadbed on opposite sides of the expansion strip and preferably equally spaced therefrom. They serve to distribute the load from the dowel supports 19 and 20 and from the spacing and supporting members over a wider area and also to provide a uniform and even base for these members.

The dowel supports 19 and 20 are made of a suitable metal such as steel, and are preferably made of a flat strip stock formed into channel shape. The supports 19 and 20 are of similar construction both having an eye portion 21 providing a circular opening at the upper end and having integral diverging supports depending therefrom terminating in the projecting flanges 22 which are welded to the base members 18. The eye portion of support 19 is preferably slightly smaller than the eye portion of support 20 and the end portion of dowel 15 is inserted in support 19 and preferably welded thereto. Cylindrical sleeve 23 which is closed at its outer end as shown at 24 is preferably welded in the eye portion of support 20 and the opposite end of dowel 15 is freely accommodated in the sleeve so that it may shift with respect thereto in response to thermal expansion and contraction.

In manufacturing and assembling my improved transverse expansion joint assembly, the base plates, dowel supports and spacing and supporting members may first

be formed from strip stock in stamping and forming equipment thereby reducing the cost of the parts while at the same time providing a light but strong structure. The dowel supports 19 may then be welded to one of the base plates 18 in the desired spaced relationship, controlled by means of a fixture, and the dowels may be inserted in place in the supports 19 and then welded in position. The tubular sleeves 23 are welded in place in the dowel supports 20 and the supports in turn are welded in properly spaced relationship also controlled by means of a fixture to another base member 18 with the closed end of the sleeve facing outwardly as shown. This initial pre-assembly work may be performed at the manufacturing plant under favorable conditions with the result that the cost of pre-assembly is reduced and a higher degree of uniformity is achieved.

The stress relieving spacing and supporting member 16 is initially formed in the general shape indicated in Fig. 6 with each of the end portions disposed in a uniform plane and with the two end portions disposed at an angle of less than 180° to each other. The end portions are integrally joined with the central inverted U-shaped portion 17 at right angles and the two depending side walls of the inverted U-shaped portion incline outwardly with respect to each other from their upper ends to their lower ends.

By forming the spacing and supporting members in this indicated shape it is easier to assemble them with the expansion strip 13. Thus, they are assembled with the expansion strip by inserting one end through an aperture 14 until the top of the inverted U-shaped portion is disposed in the aperture. The end portions of the member 16 are then brought into alignment with each other with all of the angles of the U-shaped portion formed substantially into right angles as shown in Figs. 1 and 2.

The respective assemblies of base plates 18 and dowel supports 19 and 20 are placed on opposite sides of the expansion strip and the dowels inserted through the apertures 14 above the U-shaped portions of the members 16 and the free ends of the dowels are inserted in the tubular sleeves 23. The base plates 18 are arranged in parallel relationship as shown in Figs. 1 and 2 with the ends of the spacing and supporting members 16 resting on the base members beneath the dowel supports 19 and 20. When thus arranged the ends of the members 16 are welded to the base members 18 thereby completing the assembly.

It will be seen that the inverted U-shaped portions 17 of the several spacing and supporting members serve to provide support for the expansion strip 13 and for the central portion of the dowels 15 while at the same time serving as a hinge to permit limited relative movement of the parts in response to varying thermal conditions. The opposite ends of the dowels are supported by the members 19 and 20. The ends of the dowels which are inserted in the sleeves 23, including the entire portion of the dowels exposed on the right hand side of expansion strip 13 as viewed in Fig. 2, are coated with a suitable lubricant such as a grease to prevent it from adhering to the concrete. The concrete forms are assembled and the concrete is poured in the usual manner and after the concrete has set the portion of the dowel disposed on the left-hand side of Fig. 2 is firmly embedded in the concrete and held against movement with respect thereto. However, due to the lubricant and due to the fact that the end of the dowel is freely received in the sleeve 23, the right-hand end of the dowel may have relative movement with respect to the concrete slab 11 in response to thermal expansions and contractions. Due to the inverted U-shaped portions 17, the spacing and supporting members may also flex in response to thermal changes.

It will thus be seen that my improved transverse joint assembly is of light but strong construction and is relatively economical to manufacture and assemble and is subject to modern manufacturing and assembling technics.

It will also be seen that it may be partially pre-assembled in the factory rather than on the job thereby reducing the cost of assembling and providing for uniform high quality. In addition, my improved assembly provides properly for expansion and contraction of the concrete slabs under varying thermal conditions while at the same time giving adequate support to the concrete slabs in the area of the joint between adjacent slabs.

Modifications may of course be made in the illustrated and described embodiment of my invention without departing from the invention as set forth in the accompanying claims.

I claim:

1. A transverse expansion joint assembly for use between adjacent concrete slabs in a concrete highway strip comprising: an elongated expansion strip formed with apertures therein cooperable to be arranged between adjacent slabs in a concrete highway; a pair of elongated base members cooperable to rest on the roadbed on opposite sides and equally spaced from the expansion strip, said base members being parallel to each other and to said strip; a dowel extending through one of the apertures in the expansion strip and projecting outwardly from opposite sides thereof at substantially right angles to the strip; a pair of upstanding dowel supports secured to said base members and arranged on opposite sides of said expansion strip in confronting relationship, opposite end portions of said dowel being engaged and supported by said dowel supports, one of said dowel supports including a sleeve which receives the one end of the dowel; and a spacing and supporting member connected between said base members adjacent said dowel supports, said spacing and supporting members having end portions resting on the roadbed between the opposite sides of the expansion strip and the respective base members and having an integral central portion of inverted U-shape arranged with the connected upper end thereof extending through the aperture beneath the said dowel disposed in the aperture and with the two sides of the U-shaped portion disposed on opposite sides of the expansion strip so that the central portion of the spacing and supporting member lends support to the expansion strip and to the central portion of the dowel while at the same time providing for thermal expansion and contraction.

2. A transverse expansion joint assembly for use between adjacent concrete slabs in a concrete highway strip comprising: an elongated expansion strip formed with apertures therein cooperable to be arranged between adjacent slabs in a concrete highway; a pair of elongated base members cooperable to rest on the roadbed on opposite sides and equally spaced from the expansion strip, said base members being parallel to each other and to said strip; a dowel extending through one of the apertures in the expansion strip and projecting outwardly from opposite sides thereof at substantially right angles to the strip; a spacing and supporting member connected between said base members and having end portions resting on the roadbed between the opposite sides of the expansion strip and the respective base members and having an integral central portion of inverted U-shape arranged with the connected upper end thereof extending through the aperture beneath the said dowel disposed in the aperture and with the two sides of the U-shaped portion disposed on opposite sides of the expansion strip so that the central portion of the spacing and supporting member lends support to the expansion strip and to the central portion of the dowel while at the same time providing for thermal expansion and contraction; and a pair of upstanding dowel supports supported on said assembly on opposite sides of said expansion strip in confronting relationship in alignment with the aperture through which the dowel extends with opposite end portions of said dowel being supported by said dowel supports, one of

said dowel supports including a sleeve which receives the one end of said dowel.

References Cited in the file of this patent

UNITED STATES PATENTS

2,021,361	Hillberg	Nov. 19, 1935
2,133,553	Lord	Oct. 18, 1938
2,331,548	Geyer	Oct. 12, 1943
2,349,910	Methven	May 30, 1944
2,405,654	Hunt	Aug. 13, 1946
2,608,142	Jacobson	Aug. 26, 1952
2,651,243	Guille	Sept. 8, 1953

FOREIGN PATENTS

562,018	Germany	Oct. 20, 1932