July 1, 1930. A. C. FISCHER 1,769,828

REENFORCED EXPANSION JOINT

Filed March 22, 1926

Fig. 1.

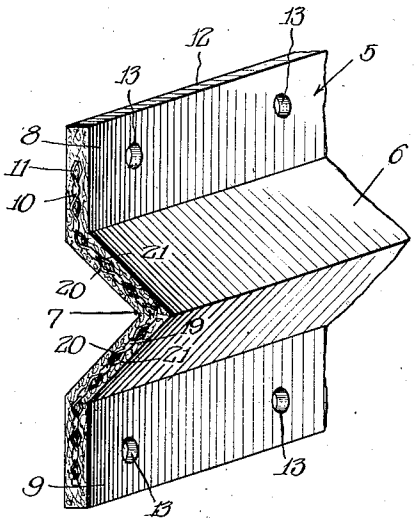


Fig. 2.

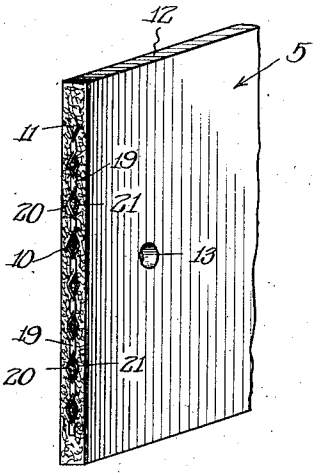


Fig. 3.

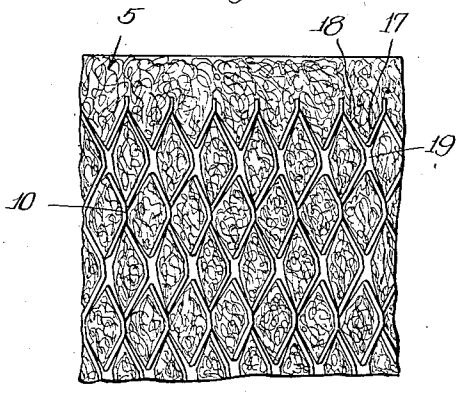


Fig. 4

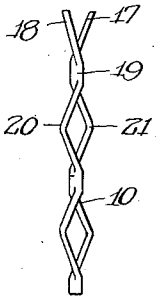
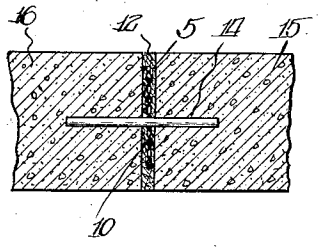


Fig. 5



Inventor:
Albert C. Fischer,
By William N. Knight
Atty

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UNITED STATES PATENT OFFICE

ALBERT CHARLES FISCHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE PHILIP CAREY MANUFACTURING COMPANY, A CORPORATION OF OHIO

REENFORCED EXPANSION JOINT

Application filed March 22, 1926. Serial No. 96,520.

My invention relates in general to expansion joints for concrete or the like monolithic constructions, and has particular reference to a preformed reenforced strip for this purpose.

In highway construction it is desirable to use a preformed strip of bituminous or other suitable material as a joint between concrete slabs to compensate for expansion and contraction. Often these joints are poured but more frequently the joint is supplied in strip form, having been moulded, extruded or rolled out in sheet form at the factory and sold in proper dimension for the purpose to which it is to be put.

In warm weather these preformed strips are not ordinarily satisfactory unless they are reenforced or otherwise constructed so as to prevent the bituminous material, which usually forms the bulk of the composition from which they are made, from becoming soft and rather flabby. It can readily be appreciated that due to their long length, as compared to their width and thickness, they would not retain the desired broadlike consistency so that they could be laid in a straight line and otherwise satisfactorily handled.

The principal phase of my invention resides in the construction of these preformed strips so as to overcome the handling difficulties just mentioned, and also aid the strip in functioning properly when installed. Briefly, I propose to reenforce the strip with a metallic lattice.

As an illustrative embodiment of this metallic lattice I have selected what is known to the building trade as metallic lathing, and particularly that type of lathing known as diamond mesh. As a matter of fact I prefer to use this particular type of lattice due to certain inherent qualities, which will be hereinafter specified.

Metallic lattice as reenforcing means, while unusually effective in one sense, would prove wholly impractical unless suitable means are employed to prevent the same from creeping, so to speak. In other words, upon expansion of the concrete sections severe pressure is imposed on the joint, and this pressure frequently results, especially in warm weather when the bituminous or plastic material of the joint is soft, in the joint oozing. If a metallic lattice were employed in such a joint it would be very apt to respond to this pressure, with the result that it would be forced vertically of the joint, and project over the crown of the joint, where it would be exposed to the road surface and the ragged sharp edges of the same would injure the tread surface of tires of automobiles.

With the above conditions to be reckoned with the primary object of my invention is to take advantage of the many desirable reenforcing qualities of metallic lattice and to overcome the one disadvantage of the same. I accomplish this purpose preferably by a construction as illustrated in the accompanying drawing, in which Figure 1 is a perspective view of a portion of a strip of tongue and groove preformed expansion joint; Figure 2 is a perspective view of a portion of a straight strip of preformed expansion joint; Figure 3 is a view in elevation of the inside of a portion of a strip of expansion joint; Figure 4 is a detailed view in end elevation of a portion of the metallic lattice; Figure 5 is a cross section of two concrete slabs illustrating the application of one form of the invention.

Referring now to the drawing in detail 5 represents a strip of expansion joint which is made up of some standard compressible material, such as, blown asphalt. This material may be a specially prepared composition of asphalt, and a filler, or it need not be asphalt. The point is that any suitable compressible material will serve the purpose and the composition of the same has little if anything to do with the salient feature of the present invention.

I will say, however, that the most desirable way of making these strips will be with either a mould or a sheet forming machine. They could hardly be extruded when the reenforcing means is to be imbedded therein. The strip may or may not be surfaced with saturated felt, web-like strengthening pieces, or any suitable surfacing material. So far as the present invention is concerned I will refer to the material as a plastic mass.

As shown in Figure 1 the strip is made with a tongue 6 on one side and a corresponding groove 7 on its opposite side, the straight portions 8 and 9 at the top and bottom of the tongue and groove, the metallic lattice 10 is shown as imbedded in the strip in the form of a continuous net like mesh. It should be noted that at least the upper edge 11 of the metallic lattice terminates short of the upper edge 12 of the strip. This is done to leave a solid crown along the upper edge of the strip, so that should the metallic lattice creep vertically to a limited extent the solid crown will still cover the same. The lower edge of the metallic lattice may extend to the lower edge of the strip, but it makes no difference which is the upper and which is the lower edge so far as the joint is concerned, but I would prefer to terminate the edge of the metallic lattice short of both horizontal edges of the strip, so that the strip can be applied without paying attention to which is top and which is bottom.

It can be readily seen that when a strip constructed with this tongue and groove is installed, the tongue will be imbedded in one slab and the concrete in the other slab will fill up the groove, thus absolutely locking the joint between the slabs. Since the metallic lattice is imbedded as a continuous sheet so to speak, it would be impossible for the same to creep vertically regardless of the pressure imposed on the sides of the joint, and therefore I can overcome the likelihood of the same projecting above the surface of the road and injuring automobile tires, and at the same time I can realize a properly reenforced joint.

As a further precaution of this creeping effect of the metallic lattice, as well as to realize reenforcing means for preventing the concrete slabs from buckling, I can equip the strip with transverse openings 13, the same being preferably made in the straight flat surfaces of the joint and adapted to receive transverse reenforcing members which will project from the sides of the strip, and adapted to be imbedded in the concrete material of the slabs in which the strip is installed. This feature is illustrated in Figure 5. It will be more particularly referred to with reference to the form of joint shown in Figure 2.

It can be appreciated that these transverse reenforcing members will serve a dual purpose, by not only positively anchoring the metallic lattice, but as just stated, they will act as reenforcing means.

In Figure 2 a straight surface joint is shown. In this form the metallic lattice 10 is imbedded in the material of the strip, just as described with reference to Figure 1, but the strip is lacking the tongue and groove structure. Since the tongue and groove is primarily relied upon to prevent creeping of the metallic lattice, and in the absence of the same, as shown in Figure 2, I will simply rely on transverse openings 13 and the members 14 for anchoring the metallic lattice against creeping. These openings are, as described with reference to Figure 1, made to receive transverse members 14, which project from the sides of the joint and are adapted to be imbedded in the concrete slabs 15 and 16. I prefer to construct these members 14 of steel rods.

While I have shown openings 13 in the formation of the joint, illustrated in Figure 1, I do not wish to be understood as raising a doubt as to whether the tongue and groove structure will anchor the metallic lattice, as it will do so and need not rely on the cooperation of the members 14, but since it is often desirable to use these members 14 in combination with the tongue and groove structure I have simply illustrated the feature as a possibility. I also call attention to the fact that the tongue and groove structure also serves as a means of preventing the slabs from buckling, even when used without the cooperation of the members 14.

Resiliency in a joint is always a desirable feature, and in selecting a metallic lattice as a reenforcing medium I prefer to use a type which will impart certain resilient qualities to the joint, so that the compressible material of the joint will not have to be solely relied on for resilient qualities. More specifically I prefer resiliency from within. In other words, upon expansion of the concrete slabs the joint must be so constructed that it will compensate for the pressure, then upon contraction of the slabs the joint should also be constructed so as to expand. While the compressible material of the joint will have a certain degree of this expanding quality, it will be ordinarily limited unless the joint is so constructed that it will expand from within. To realize this expansion from within I have selected a certain type of metallic lattice, and the same is illustrated in Figures 3 and 4, particularly Figure 4, where it will be noticed that it is a net-like mesh made up of strands 17 and 18, joined by webs 19, and with the strands bent so that the high side 20 of one strand is opposite the high side 21 of another strand. The end elevation in Figure 4 shows this clearly. This formation makes up a springy resilient structure which is responsive to pressure from the sides, and not only compensates for such pressure but when the pressure is relieved the re-expansion is transmitted to the surface of the strip thru the compressible material thereof. From the above it will readily be seen that I have combined many desirable qualities with one embodiment of joint, which have only been possible heretofore by sacrificing several of these advantages.

I claim:

1. An expansion joint embodying in its construction a preformed strip, having imbedded therein resilient and expansible reenforcing means, said means comprising a reticulated metal sheet.

2. A preformed expansion joint comprising a bituminous body having a metallic strip imbedded therein so that the bituminous substance wholly surrounds both faces and at least one end of the metallic strip, said metallic strip consisting of substantially diamond shaped meshes made up of strands joined by webs, with the strands bent so that the high side of one strand is opposite the high side of another strand, whereby to provide a springy, resilient structure responsive to pressure from the sides, and whereby the bituminous material may pass thru the openings in the foraminated structure.

3. A preformed expansion joint comprising a bituminous board-like slab having a metallic reenforcing sheet imbedded wholly within the interior of said slab, said sheet being foraminated and formed in a net-like mesh made up of strands joined by webs and with the strands bent so that the high side of one strand is opposite the high side of another strand, whereby to permit the high sides of the opposed strands to be compressed toward each other to take up pressure exerted against the walls of the joint, and whereby the bituminous material of the joint may flow thru the meshed portions of the reenforcing strip.

4. Preformed constructional material comprising a preformed sheet of waterproofed binder having imbedded therein a sheet of reticulated metal, the meshes of which are relatively large to provide openings into which the surrounding waterproofed binder may pass, said portions of the metal forming said relatively open meshes being disposed in open mesh formation, not only in the plane of the reticulated sheet but also in a plane transverse to the plane of the reticulated sheet, so that when the preformed body is subjected to pressure on its opposed faces, said metal prongs forming the opening mesh will compress and expand in planes transversely to the plane of the sheet.

5. Preformed elastic and compressible constructional material comprising a body of plastic material having imbedded therein a resilient and expansible reticulated sheet capable of expanding the body upon release of a compressing force.

6. Preformed elastic and compressible constructional material comprising a body of bituminous composition having imbedded therein a resilient and expansible reticulated sheet capable of expanding the body upon release of a compressing force.

7. Preformed elastic and compressible expansion joint strips comprising a body of plastic material having imbedded therein a resilient and expansible reticulated sheet capable of expanding the body upon release of a compressing force.

Signed at Chicago, Illinois, this 19th day of March, 1926.

ALBERT CHARLES FISCHER.