Nov. 12, 1929. A. C. FISCHER 1,735,270

EXPANSION JOINT

Filed Nov. 29, 1926

Fig. 1

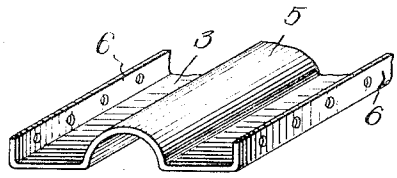


Fig. 2

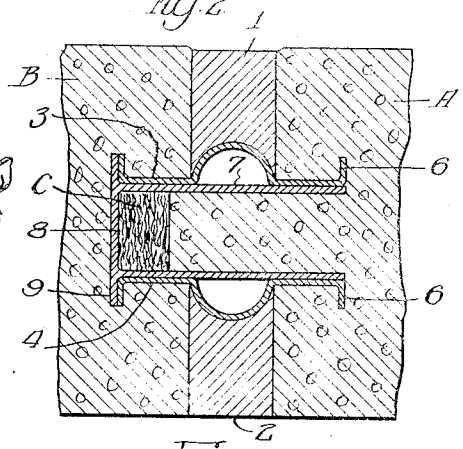


Fig. 3

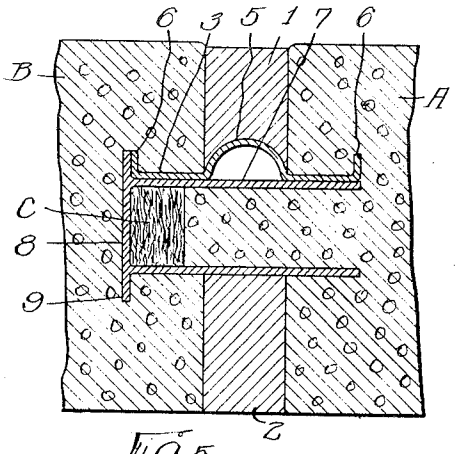


Fig. 4

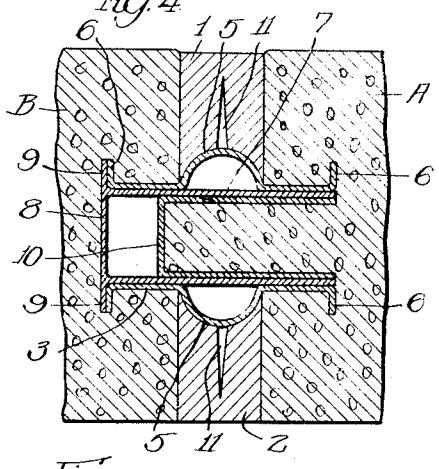


Fig. 5

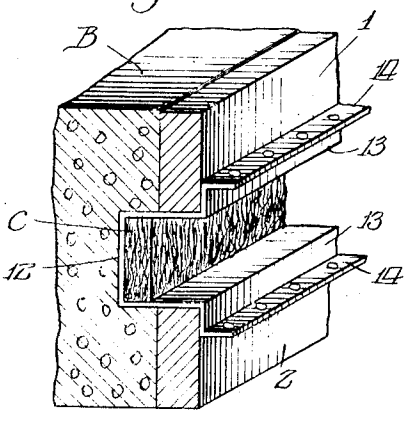
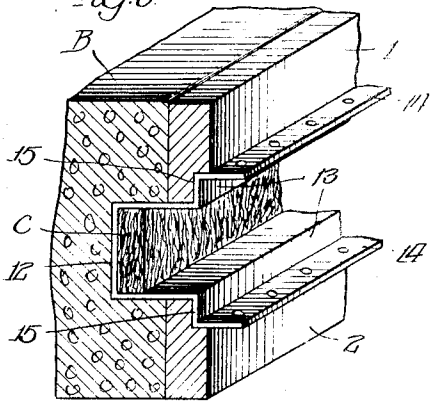


Fig. 6



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UNITED STATES PATENT OFFICE

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EXPANSION JOINT

Application filed November 29, 1926. Serial No. 151,413.

My invention is concerned with means for compensating for contraction and expansion in concrete or other monolithic structures, such as, pavements, roadways and the like.

In the accompanying drawing which serves to illustrate the salient features of the invention Figure 1 is a perspective view of one of the bridge members of the joint.

Figure 2 is a view in vertical section illustrating one form of joint installation.

Figure 3 is a similar view of a slightly modified form.

Figure 4 is a vertical section of a modified form of joint installation.

Figures 5 and 6 are detailed perspective views of still another form of joint installation, which, while embodying the same principle, differ from the other forms in cooperative relationship with the parts making up the joint and from one another in detailed construction.

Referring now to the drawing in detail. In all forms of the invention I employ expansion joint material in the form of preformed strips of compressible material having the inherent qualities of compressibility and re-expansibility. This material is installed between sections A and B of the concrete construction, so as to compensate for expansion of the sections, as well as compensate for contraction of the sections, and in this way avoid cracks which would ordinarily occur when the concrete expanded. Due to the re-expanding qualities of the preformed strips of expansion joint material the joint made by the installation of the same would be kept filled at all times and even after the sections A and B have contracted.

In making up the preformed strips of expansion joint material I would ordinarily proceed by mixing up a quantity of bituminous material and fibrous material and rolling or otherwise forming the strips from the same.

Taking first the construction shown in Figure 2 the strips 1 and 2 of expansion joint material are used in combination with an arch structure which is installed preferably in the middle of the concrete, the same dividing the strips 1 and 2 and co-operating with the same to develop the joint. This intermediate arch structure comprises a pair of bridge members 3 and 4, each of which being formed from sheet metal having intermediate curvatures 5 with turned ends 6. These bridge members are supported by a horizontal barrel 7, one end of which, as in 8, being closed and made with flanges 9, these flanges 9 of the barrel 7 abut against the turned ends 6 of the bridge members 3 and 4 on one side of the installation, and together with the same serve as interlocking extensions about which concrete in the section B is poured. The opposite side of the barrel is open, but the ends 6 on the bridge members serve as interlocking means about which concrete in the section A is poured.

In making up the assembly I first proceed by setting up the strip 2 of expansion joint material, then the lower bridge member 4, then the barrel 7, and upon the same can be placed the upper bridge member and then the strip 1. When the parts have thus been assembled the concrete is ready to be poured, and as shown in Figure 2 it will not only form itself around the parts of the joint but will also fill the barrel 7. In this way I develop a horizontal extension of the concrete section A, which not only extends horizontally thru the joint but a slight distance into the section B. This will enable me to interlock the sections A and B of the concrete structure and prevent one section rising above the other. Such an arrangement, however, will not in any way interfere with the movement of the sections A and B upon expansion, but on the other hand movement as a result of expansion will be encouraged. It will be compensated for, however, by the compressibility of the strips 1 and 2, as well as the compressibility of the material C, which is packed into the closed side or end of the barrel 7.

In referring to the part 7 as a barrel it should be understood that it is not necessarily a long, tubular structure, and it would be more practical to make the same square and in the form of an elongated rectangular box, closed at one side and open at the opposite side. The bridge members 3 and 4

can likewise be made as relatively long strips, corresponding to the length of the barrel 7, and with the curvatures 5 therein extending longitudinally of the members.

In Figure 3 I have shown practically the same arch structure as in Figure 2, excepting that in this form I use only one of the bridge members 3, and this single one is preferably used on top of the barrel 7.

In Figure 4 I have shown a way to dispense with the compressible material C. To do this, however, it is necessary to employ an insert 10 in the barrel 7. Otherwise when the concrete section A is poured the concrete would flow into the barrel and completely fill the same so that it would abut against the closed side 8 and leave no space which would permit the extension to slide in the barrel. The insert 10 being shorter than the barrel 7 would serve to leave a space which would permit a telescoping effect when the sections A and B expand and contract. The strips 1 and 2 of expansion joint material in this particular form differ from the strips 1 and 2 in the other forms in that they are made with longitudinal division 11. In other words, a longitudinal internal slot is formed in the strips, so that they will spread apart upon contraction of the sections A and B, and thus more readily compensate for expansion and contraction.

In Figures 5 and 6 I have shown a more simplified form of the arch arrangement, in that I combine the bridge members 3 with the barrel 7 by making up a single barrel-like device 12, the same being formed with shoulders 13 so as to confine the strips 1 and 2 of expansion joint material, and the flanges 14 may be imbedded in the opposed concrete sections. The concrete even in this form of the device fills the barrel, and the packed material C allows for a limited telescoping action upon expansion and contraction of the sections.

The only difference between the form shown in Figure 6 and that shown in Figure 5 is that the shoulder 13 in Figure 6 is not as wide as the shoulder 13 in Figure 5. Consequently strips 1 and 2 of the same thickness shown in Figure 5 must be made with rabbeted edges as at 15, in order to fit between the section B and the shoulder 13.

In all forms a horizontal tongue, so to speak, is formed in the concrete section A, and a telescoping effect is produced, so that upon expansion of the sections A and B the tongue will slide in the space provided for this purpose. The same effect is realized upon contraction of the sections, except that the tongue in this instance slides away from the section B, whereas upon expansion it slides toward the section B. At all times, however, the sections A and B are locked together against vertical movement so that one section cannot rise above the other, which is a common difficulty when ordinary expansion joints are employed.

I claim:

1. In an expansion joint installation between abutting sections of concrete construction, a horizontally disposed intermediate arch imbedded, at one side in one of the abutting sections and extending into the body of the other section, a strip of expansion joint material supported above the arch and a similar strip confined under the arch, said section into which the arch extends having a horizontal projection extending into the space formed by the arch and adapted to slide therein upon contraction and expansion of the pavement.

2. In an expansion joint installation between abutting sections of concrete construction, a horizontally disposed intermediate arch imbedded, at one side in one of the abutting sections and extending into the body of the other section, a strip of expansion joint material supported above the arch and a similar strip confined under the arch, said section into which the arch extends having a horizontal projection extending into the space forward by the arch and adapted to slide therein upon contraction and expansion of the pavement, and a compressible cushion in the space formed by the arch against which the said projection of the paving section abuts.

3. In an expansion joint installation between abutting sections of concrete construction, a horizontally disposed intermediate arch imbedded, at one side in one of the abutting sections and extending into the body of the other section, a bridge member supported upon said arch, a strip of expansion joint material supported by said bridge member, a similar strip of expansion joint material confined under the arch, said section into which the arch extends having a projection extending into the space formed by the arch and adapted to slide therein upon contraction and expansion of the paving.

4. In an expansion joint installation between abutting sections of concrete construction, a horizontally disposed intermediate arch imbedded, at one side in one of the abutting sections and extending into the body of the other section, a bridge member supported upon said arch, a strip of expansion joint material supported by said bridge member, a similar strip of expansion joint material confined under the arch, said section into which the arch extends having a projection extending into the space formed by the arch and adapted to slide therein upon contraction and expansion of the paving, said arch comprising a metallic box-like structure open at one side for the reception of the horizontal projection on one of the paving sections, and closed at its opposite side, and a compressible cushion disposed along the closed end of the

arch structure against which the horizontal projection on the paving section abuts.

5. In an expansion joint installation between abutting sections of concrete construction, a horizontally disposed intermediate arch comprising a box-like sheet metal structure, opposite sides of which are being imbedded in the paving sections between which the joint is installed, one side of said arch structure being open for the reception of a horizontal projection extending from the side of one of the paving sections, and the opposite side of the arch structure being closed, a strip of expansion joint material supported above the arch structure and a similar strip supported beneath the arch structure.

6. In an expansion joint installation between abutting sections of concrete construction, a horizontally disposed intermediate arch comprising a box-like sheet metal structure, opposite sides of which are embedded in the paving sections between which the joint is installed, one side of said arch structure being open for the reception of a horizontal projection extending from the side of one of the paving sections, and the opposite side of the arch structure being closed, a strip of expansion joint material supported above the arch structure and a similar strip supported beneath the arch structure, and a compressible cushion in the space formed by the arch structure against which the projection of one of the paving sections abuts, substantially as and for the purpose described.

7. In an expansion joint installation between abutting sections of concrete construction, a barrel member embedded in one of the abutting sections and extending into the body of the other section, a strip of expansion material arranged above said member and between abutting faces of the sections, and a second strip confined between the abutting faces of the sections below the member, said section into which the member extends having a projection extending into the member and adapted to slide therein upon contraction of the joint whereby the abutting sections are locked against relative displacement.

Signed at Chicago, Illinois, this 24th day of November, 1926.

ALBERT C. FISCHER.