March 21, 1933. A. C. FISCHER 1,901,870

EXPANSION JOINT

Original Filed Aug. 21, 1926

Fig. 1

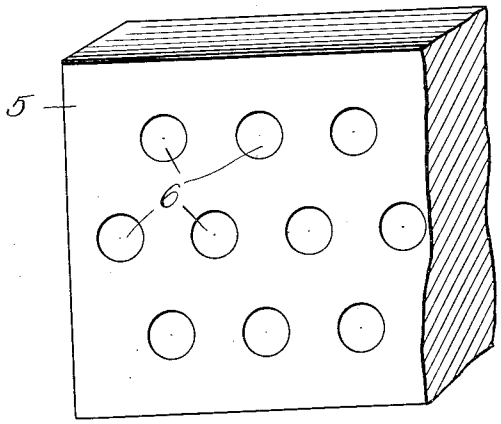


Fig. 2

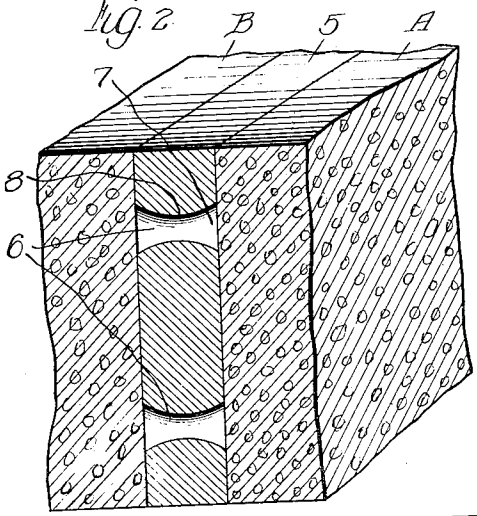


Fig. 3

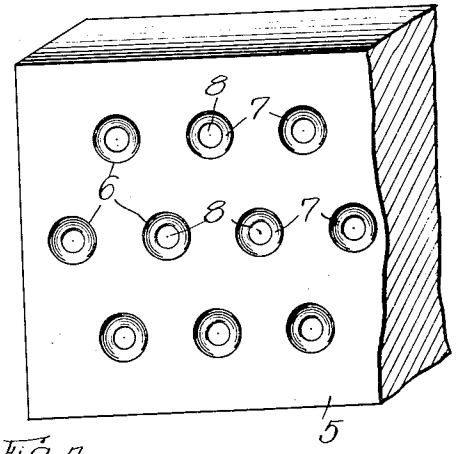
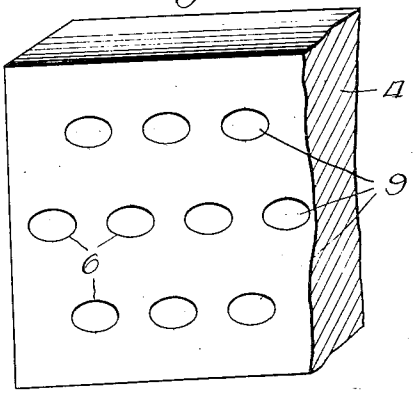


Fig. 4



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Patented Mar. 21, 1933

1,901,870

UNITED STATES PATENT OFFICE

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EXPANSION JOINT

Application filed August 21, 1926, Serial No. 130,683. Renewed May 9, 1932.

My present invention relates in general to construction material for use in expansion joints for compensating for expansion and contraction in concrete and the like structures, and has particular reference to a preformed expansion joint strip especially adapted for use in concrete roadways for the above outlined purposes.

The primary object of my invention is to provide a preformed strip which will offer certain compressible, or rather elastic qualities so as to be readily compressible, compensating for expansion in the concrete, and readily elastic, compensating for contraction of the concrete. In other words, when the concrete expands it is necessary that the strip be more or less readily compressible in order to compensate for the expansion, and when the concrete contracts the strip should be sufficiently elastic to fill the space in the joint so as not to leave crevices or spaces in which refuse will collect, which would have a tendency to destroy the functioning powers of the joint. Other objects and advantages will appear as the description now proceeds.

This application is a continuation in part of application Serial No. 336,713, filed Nov. 8, 1919. With reference to the accompanying drawing, Figure 1 is a perspective view of a portion of an expansion joint strip made in accordance with my present improvement.

Figure 2 is a perspective view of the strip in place between two confronting sections of a concrete roadway as an example.

Figure 3 is a perspective view of a portion of a strip, showing one deformable condition in the perforated structure, as the result of the application of pressure to the sides of the joint.

Figure 4 is a perspective view of a portion of an expansion joint strip showing the deformable condition of the perforated structure of the strip as a result of application of pressure to the top or crown of the strip.

Referring now to the drawing in detail. 5 represents the preformed strip, or rather a portion thereof. This strip may be produced from various materials suitable for the purpose, particularly some material or a composition of materials which will develop compressible and expansible qualities, or at least having the inherent qualities of elasticity such as rubber, so that the same will readily compress upon the application of pressure and expand upon the release of pressure and assume its preformed normal dimensions. In most cases a strip of this nature, at least as an expansion joint for concrete roadways, may be made ranging from ¼ to 1 inch in thickness, 4 inches in depth and about 5 feet long. These dimensions are simply illustrative of the form of the strip and must not be considered as controlling in every instance, as the dimensions of the strip have little if anything to do with the novel features of the invention, except that in most every instance the strip will be produced in this general figuration.

A material suitable for the purpose comprises a rubber composition, which may be produced from 75 to 90 per cent of bituminous material, preferably blown asphalt or the like oxidized material, or even asphalt flux, or any other such residual oil of this general character, combined with rubber latex, dissolved rubber, dissolved rubber scrap 10 to 25 per cent, or any such materials may be used providing the resultant product will have considerable elasticity and compressibility. The idea being that after once molded or otherwise shaped it should not be over-sensitive to changes in temperature, so that it will not become brittle in cold weather, nor should it have a tendency to ooze or flow in warm weather. As a matter of fact the changes in the physical characteristics of the strip, due to varia-

tions in temperature, will hardly be noticeable, at least hardly any more so than in the case of a so-called solid rubber vehicle tire.

In some cases I may desire to use a small percentage of filling material, say about 5 per cent finely divided fibrous material to cheapen the production of the strip and add certain binding qualities to the other materials used.

I do not consider that the composition of the strip has anything to do with my invention other than to make it clear just what qualities the strip is capable of producing, so that it may adapt itself to the use to which it is to be applied.

Having produced a strip of this character I will proceed to perforate the same, as at 6, so that the final development of the strip is in the nature of a perforated preformed expansion joint strip. The strip will be installed as is customary with preformed expansion joints, between sections A and B of the concrete roadway, with the crown of the strip usually installed flush with the surface of the concrete.

The most satisfactory way to install the strip would be to support it on edge, so that the concrete can be poured around the same. As thus installed the concrete will provide a sealing medium for the perforations thus developing trapped air pockets throughout the joint, which will thus develop what in reality results in a pneumatic joint.

Upon expansion of the concrete sections A and B considerable pressure will be developed on the sides of the joint, and the pneumatic qualities of the joint will function to absorb this pressure so to speak, which, together with the perforations, will enable the joint to assume whatever deformable figuration will result from the application of such pressure. In other words, as best shown in Figure 2, the perforations, while ordinarily tubular, will change their shape due to the outer ends of the same spreading and the inner diameter tending to compress. This result is clearly shown in Figure 2 and again shown in Figure 3. For instance, as shown at 7, the outer diameter of the perforations are spread and the inner diameter is brought together, as at 8. As stated, this is a result of pressure applied to the sides of the joint.

As a result of pressure applied to the crown of the joint the perforations will become elongated in a plane horizontal with the longitudinal surface of the concrete, and this result is clearly shown in Figure 4, the perforations in this case being oval shaped, as shown at 9.

With the joint constructed in accordance with the present invention I do not have to rely so much on the material itself to develop the cushioning effect, as the perforations will aid in bringing about the results required, at the same time it must be remembered that the perforations would only function when made in a strip, the material of which having the necessary qualities to cooperate with the perforations for this purpose.

In the event that any difficulty is experienced in the poured concrete entering the perforations 6 in the strip 5 necessary precautions may be taken to prevent the same, and in this connection I might call attention to the possibilities of using an installing device for this purpose, or else prior to installation the strip may be treated with a light film of some mastic adhesive softer than the material of the strip, so as to close the perforations at least so far as danger of the concrete entering the same is concerned, or else in lieu of this mastic layer a relatively thin sheet of any material suitable to seal the perforations, at least until the concrete is set, may be used.

I claim:

1. A rubber-like expansion joint having perforations in the thickness thereof, said perforations being deformable upon the application of pressure to the joint, and cooperating with the material of the joint as a cushioning means for compensating for expansion and contraction in the concrete construction in which the joint is installed.

2. Expansion joint, comprising a preformed rubber-like strip having perforations in the thickness thereof, said perforations providing air pockets in the joint when the same is installed between concrete sections.

3. A paving structure comprising rigid sections, and an expansion strip inserted between the ends of the rigid sections, said expansion strip being perforated with a series of openings extending through the thickness of the strip.

4. A paving structure comprising rigid sections, and a preformed bituminous joint strip inserted between the ends of the rigid sections, said expansion joint being perforated with a series of openings extending through the thickness of the strip.

5. A paving structure comprising rigid concrete paving sections, and a perforated elastic expansion joint inserted between the sections.

6. In a paving, adjacent construction members, a space between said members, means in said space closing the space adjacent to the top of the pavement and filler means below said first mentioned means filling a portion of the space between the adjacent members, all so arranged that there is a space between the first mentioned means and the second mentioned means so that both of said means may, under compression by

expansion of the adjacent members, be moved toward each other.

7. In a paving construction, adjacent paving blocks, a space between said adjacent blocks, means partially filling said space, all so arranged that there is a space between upper and lower portions of the filler, and means whereby movement toward each other may be permitted under compression by reason of expansion of the adjacent construction members.

Signed at Chicago, Illinois, this 17th day of August, 1926.

ALBERT C. FISCHER.