Feb. 17, 1931. E. J. GREEN 1,793,083

EXPANSION JOINT FOR CONCRETE OR LIKE STRUCTURES

Filed April 12, 1930 2 Sheets-Sheet 1

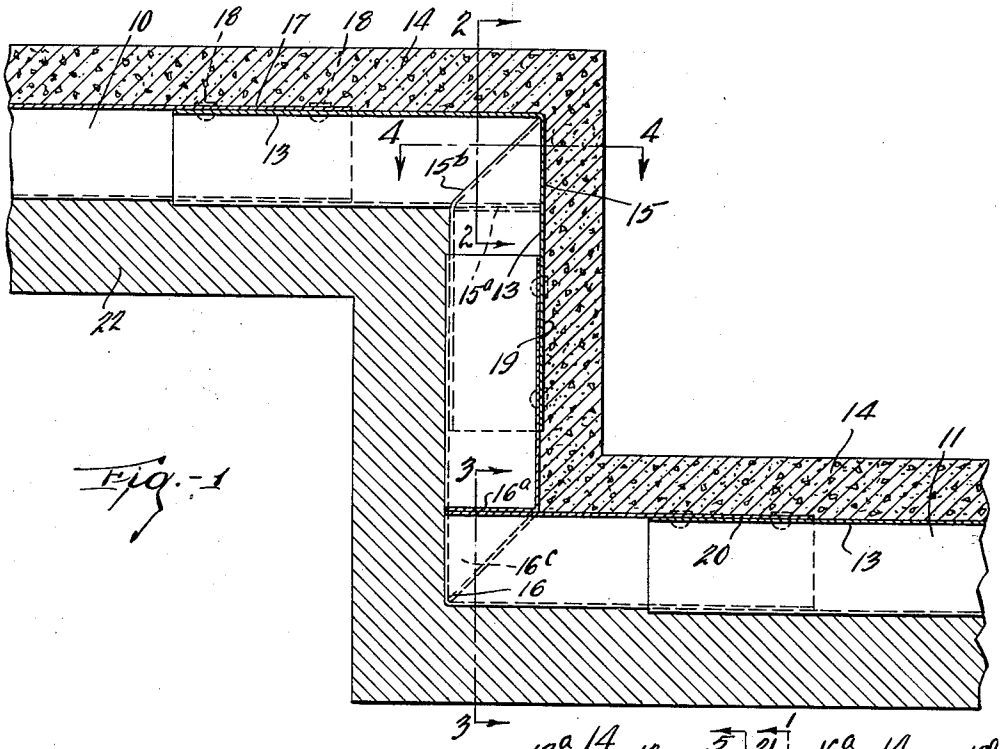


Fig.-1

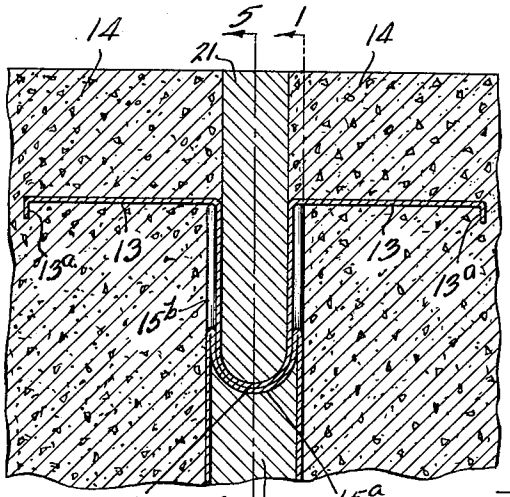


Fig.-2

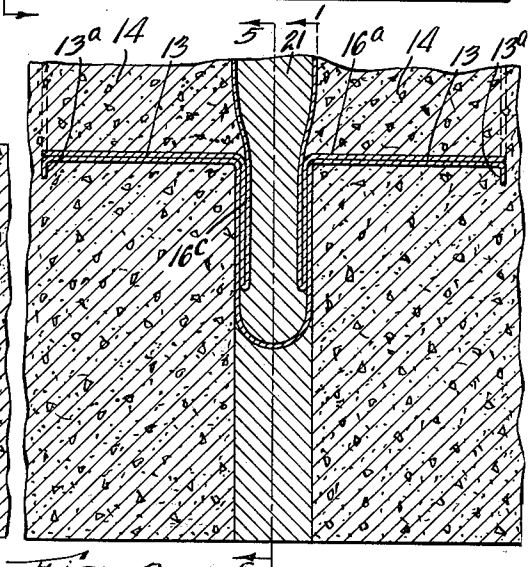


Fig.-3

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EXPANSION JOINT FOR CONCRETE OR LIKE STRUCTURES

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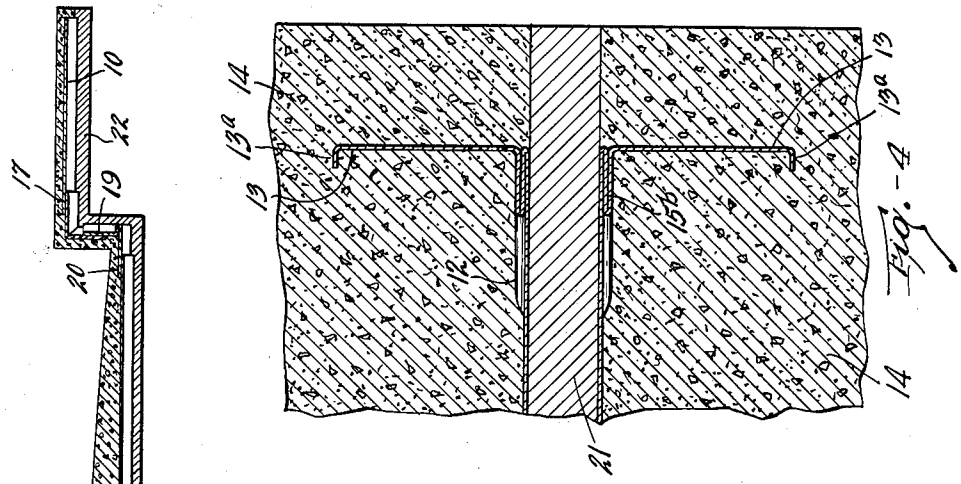


Fig. -4

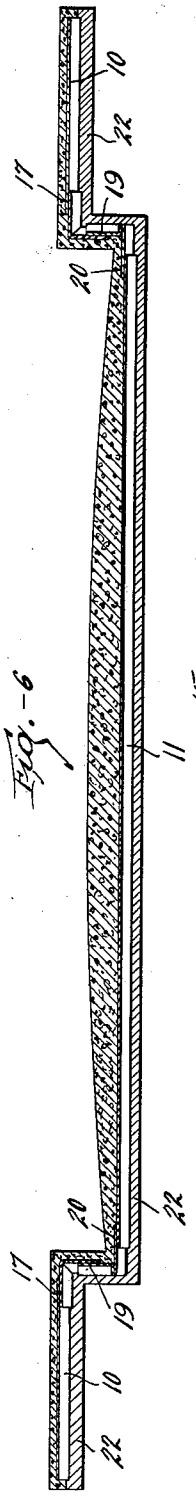


Fig. -6

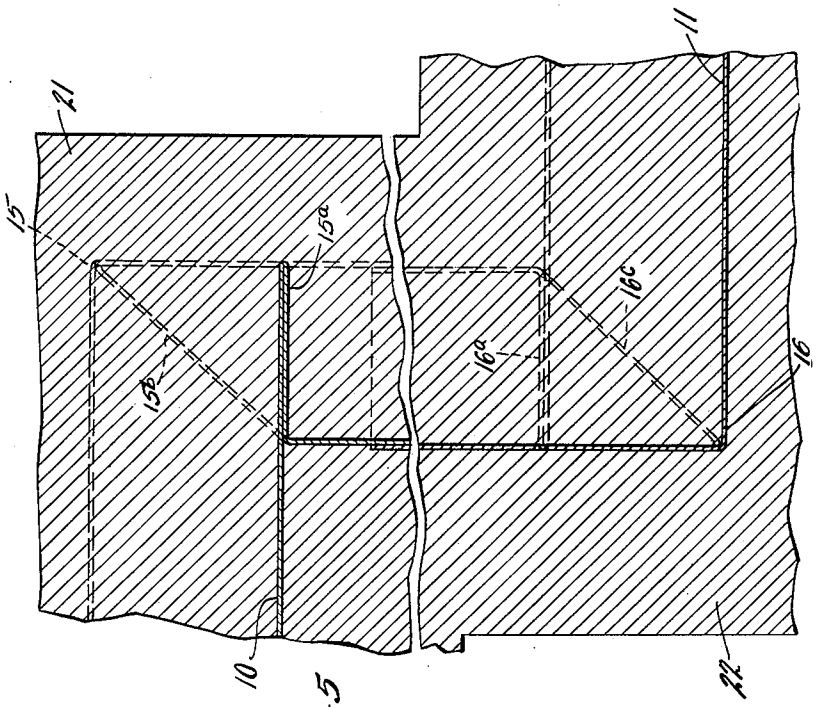


Fig. -5

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UNITED STATES PATENT OFFICE

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EXPANSION JOINT FOR CONCRETE OR LIKE STRUCTURES

Application filed April 12, 1930. Serial No. 443,666.

This invention relates to expansion joints or water stops such as used in the construction of bridges, sewers, conduits, dams, culverts, settling tanks, reservoirs and other similar constructions of concrete or the like.

The general purpose of the invention is to provide an expansion joint or water stop which will prevent water from leaking through and into the structure at the point provided for expansion and contraction, which leakage of water into the structure is detrimental to the structure; and particularly, to make such expansion joint or water stop efficient in this respect at the corners or angles of the structure.

Heretofore, the expansion joints at the corners of such structures have not been efficient and have resulted in deterioration of the structure at the joint due to leaking of water therein. On bridges, for example, expansion joints have been used across the roadway, from curb to curb, the expansion joint usually stopping at the curbs or at best being mitered to another piece extending vertically to the top of the curb. It is more or less common knowledge that the leaking through of water at the point of expansion, particularly at the corners thereof, or at the curb, has been one of the problems of bridge engineering, because the movement caused by expansion and contraction in time pulls loose the mitered joint, and the efficieny of the expansion joint, insofar as its ability to prevent leakage is concerned, is thus destroyed.

Expansion joints of the type used in this structure are usually made from sheet metal such as copper, lead, etc. of sufficient pliability to bend or give with the expansion and contraction of the structure, the metal preferably having rust-resisting or non-corrosive properties.

Now, by bending or folding the metal so as to form these angles or corners from one piece of metal, at the same time maintaining the complete expansion-joint-shape, but without any mitering or cutting or in any manner piecing together of the metal in any manner such as to provide joints which may pull apart and leak, a one-piece angle or corner is obtained that will be found to be absolutely leak-proof, or water-tight.

With these one-piece angle or corner members, still using bridge construction as an example, one can start at the bridge railing with the expansion joint, extend the same across the sidewalk, down the curb, across the roadway, and so on to the opposite railing, and thus have, from one edge of the bridge to the other, what in effect is one continuous expansion joint in which all joints between strips of the joint are effectively made by lapping in the straight parts of the joint. What has been said here in respect to bridges, may be said with equal force with regard to other structures.

The foregoing and other purposes or objects of the invention are attained in the expansion joint construction shown in the accompanying drawings and briefly described below. It is to be understood that the invention is not limited to the form thereof shown and described.

Of the accompanying drawings,

Figure 1 is a section on lines 1—1 of Figures 2 and 3 through an expansion joint construction wherein two corner pieces embodying the invention are required, such as at the curbing in a bridge structure;

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is a section on line 3—3 of Figure 1;

Figure 4 is a section on line 4—4 of Figure 1;

Figure 5 is a section along lines 5—5 of Figures 1 and 2; and

Figure 6 is a transverse section through the pavement and sidewalks of a bridge showing the improved joint construction therein.

Referring to the drawings, the numerals 10, 10 and 11 indicate strips of joint material such as may constitute an expansion joint in the sidewalks and street portions respectively of a bridge (see Figure 6).

As will be seen from inspection of Figures 2, 3 and 4, these strips may comprise sheet metal such as copper, lead, zinc or the like formed with a central portion or tongue 12 of substantially U-shape in section or other suit-

able shape adapted to flex under expansion or contraction so that the walls thereof may be relatively movable. At the sides of the central portions means are provided such as flanges 13, 13 by which the joint strips may be embedded at opposite sides in the concrete or other sections 14, 14 of the structure in which the joint strips are used in such a way as to seal the joint between the section against the flow of water through or into the structure. The flanges 13 may be apertured or formed with suitable flanges 13^a thereon or otherwise formed to interlock with the concrete or other sections as the structure is being built.

Where corners occur in a structure, one-piece corner members such as 15 and 16 are employed. These members are made by bending or folding strip joint material, preferably without any cutting whatever and certainly without any cuts in the material which can pull apart or loosen so as to permit leakage. For example, a member 15 may be formed in which the central or tongue portion 12 is doubled upon itself as at 15^a, 15^b, (see Figures 2 and 5), the flanges 13 being formed with right angle bends and a member 16 may be formed in which the flanges 13 may be doubled upon themselves as at 16^a to provide a right angle formation with the central portion 12 doubled upon itself as at 16^c (see Figures 3 and 5).

The corner piece 15 may be lapped jointed to a straight piece 10 as at 17, the joint being secured by rivets 18, 18 or soldering or preferably both, the rivets being driven through the flanged portions thereof. Members 15 may be secured to member 16 by a similar joint at 19 if an additional strip is not required by the spacing of members 15 and 16 in the structure, and member 16 may in turn be similarly jointed to member 11 as at 20.

The usual resilient strips of bituminous or other yielding or flowable material may be inserted in the joints between sections 14 as indicated at 21, 22.

It will appear from the foregoing that a simple effective expansion joint and water stop has been provided for concrete and like constructions by the invention. It will be apparent also that bent or folded one-piece members may be provided for corners in structures at various angles and in various directions as may be required, it being understood that such members should be made with little or no cutting.

Modifications of the invention obviously may be resorted to without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:—

1. An expansion joint for a concrete or like structure, comprising expansion joint strip material formed of non-corrosive sheet metal with a central yielding portion and flanges adapted to be embedded in the adjacent concrete sections to secure said joint material in place, said joint including strips of said materials for straight portions of a joint, and one-piece members formed of said material by bending or folding for fitting at corner portions of said joint, said strips and members being lap-jointed along straight portions of the joint whereby the joint is effectively sealed against leakage of water therethrough.

2. An expansion joint for a concrete or like structure, comprising expansion joint strip material formed of non-corrosive sheet metal with a central yielding portion and means adapted to be embedded in the adjacent concrete sections to secure said joint material in place, said joint including strips of said materials for straight portions of a joint, and one-piece members formed of said material by bending or folding for fitting at corner portions of said joint, said strips and members being lap-jointed along straight portions of the joint whereby the joint is effectively sealed against leakage of water therethrough.

3. An expansion joint for a concrete or like structure, comprising expansion joint strip material formed of flexible sheet material with a central yielding portion and flanges adapted to be embedded in the adjacent concrete sections to secure said joint material in place, said joint including strips of said materials for straight portions of a joint, and one-piece members formed of said material by bending or folding for fitting at corner portions of said joint, said strips and members being lap-jointed along straight portions of the joint whereby the joint is effectively sealed against leakage of water therethrough.

4. An expansion joint for a concrete or like structure, comprising expansion joint strip material formed of flexible sheet material with a central yielding portion and means adapted to be embedded in the adjacent concrete sections to secure said joint material in place, said joint including strips of said materials for straight portions of a joint, and one-piece members formed of said material by bending or folding for fitting at corner portions of said joint, said strips and members being lap-jointed along straight portions of the joint whereby the joint is effectively sealed against leakage of water therethrough.

5. The combination with sections of a concrete or like structure of an expansion joint therebetween, said joint comprising strips of material formed with yielding portions adapted to be arranged between the sections and with other portions adapted to be embedded in the sections, said strips being formed by bending or folding into one-piece

corner members for fitting between corners of sections and said strips being jointed only in straight portions thereof.

6. The combination with sections of a concrete or like structure of an expansion joint therebetween, said joint comprising strips of material formed with yielding portions adapted to be arranged between the sections and with other portions adapted to be embedded in the sections, said strips being formed by bending or folding into one-piece corner members for fitting between corners of sections.

7. The combination with sections of a concrete or like structure of an expansion joint of flexible, non-corrosive sheet metal arranged therebetween to prevent passage of water into or through the joint, said sheet metal being shaped to accommodate expansion and contraction of the concrete structure and being bent or folded upon itself at corners in the structure to provide one-piece corner members.

8. The combination with sections of a concrete or like structure of an expansion joint of flexible material including a tongue portion adapted to flex to accommodate expansion and contraction in said structure, said joint including a corner member formed of one piece of said material with said tongue portion therein and jointed to adjacent expansion joint material in a straight portion only thereof whereby said joint will not leak at said corner.

ELMER J. GREEN.