J. F. LE BARON.

EXPANSION JOINT FOR CONCRETE STRUCTURES.

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1,090,158.

Patented Mar. 17, 1914.

Fig. 1.

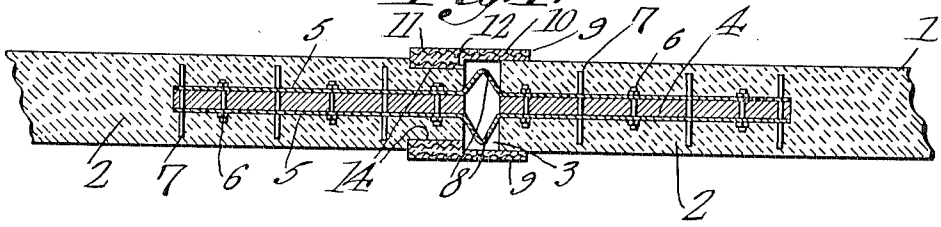


Fig. 2.

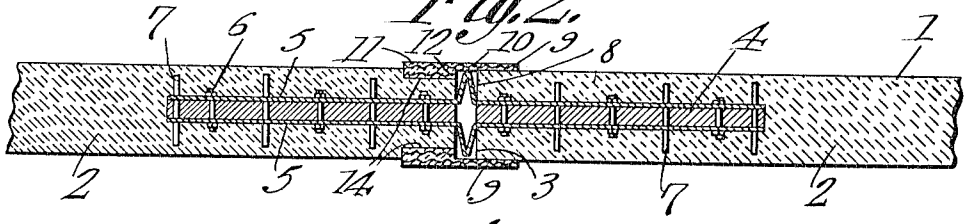


Fig. 3.

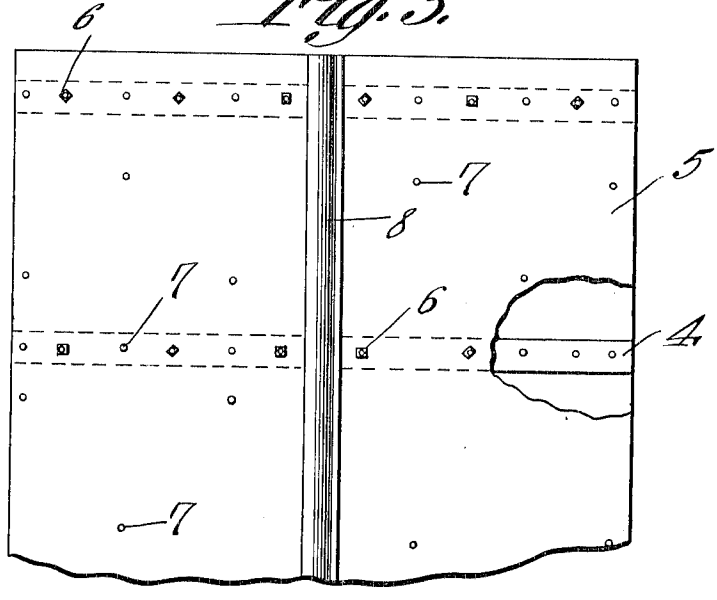
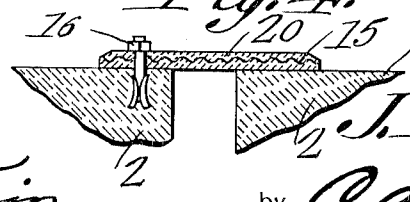


Fig. 4.



Witnesses

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EXPANSION-JOINT FOR CONCRETE STRUCTURES.

1,090,158. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed July 19, 1913. Serial No. 780,048.

To all whom it may concern:

Be it known that I, JOHN FRANCIS LE BARON, a citizen of the United States, residing at Chardon, in the county of Geauga and State of Ohio, have invented a new and useful Expansion-Joint for Concrete Structures, of which the following is a specification.

The device forming the subject matter of this application is adapted to be employed for facilitating the expansion and contraction of concrete structures under varying temperatures.

One object of the invention is to provide a novel form of connection, adapted to be employed with spaced concrete structures, to permit the same to expand and contract.

Another object of the invention is to provide a novel form of joint closure.

It is within the scope of the invention to improve generally and to enhance the utility of, devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing: Figure 1 shows the invention in transverse section, the parts being positioned as they will appear when set in the winter time, or at a maximum contraction; Fig. 2 is a similar view illustrating the parts as they will appear set in the summer time or under a considerable degree of expansion; Fig. 3 is an elevation of the expansion tie employed in connection with the structure shown in Figs. 1 and 2; Fig. 4 is a sectional detail showing a modified form of joint closure.

By way of explanation it may be stated that, as commonly known, concrete and cement expand and contract, due to temperature changes, in about the same ratio as iron. This expansive and contractile action of concrete forms cracks in walls and other structures built of that material, and as a consequence it has been the custom to leave open joints in such walls, about every forty feet. These open joints are objectionable in that they weaken the wall, and render what otherwise would be a continuous structure, a succession of practically independent and separate elements. In addition to weakening the wall, the spaces at the joints above referred to serve as places of filth accumulation, and in the joints, the seeds of plants, trees and the like, lodge and germinate, the roots of the vegetation penetrating the structure and frequently disrupting the same. In the case of building, these open joints form objectionable openings in the wall, admitting wind and rain, which openings must be closed. Further, the joints above referred to permit water to enter, which, freezing in the winter season, forces the wall apart. Even in a monolithic wall, cracks will appear and these cracks must be closed, notably in the case of tanks and conduits.

The invention herein disclosed may be employed upon piers, abutments and concrete structures of all sorts. For convenience in description, it will be presupposed that the present structure is embodied in a wall, and the term "wall" will be used hereinafter without prejudice, to avoid unnecessary repetitions.

In the accompanying drawings there is shown a wall 1 comprising parts 2, fashioned from concrete or cement. The parts 2 are spaced apart as indicated at 3.

Pairs of reinforcing elements 4 are shown, the same preferably being metal bars of any desired cross section. To the outer faces of the reinforcing elements 4, expansion members 5 are applied, the expansion members being held in place by bolts 6 or in any other suitable manner. The expansion members 5 which may be fashioned from galvanized sheet iron, lead, copper, zinc or any other suitable material are folded or bulged laterally, as indicated at 8. The reinforcing elements 4 are embedded in the parts 2 of the wall 1 and the folded or expansible portions 8 of the members 5 are disposed in the space 3 between the parts 2. If desired, the elements 5 and 4 may carry anchor rods 7 projecting laterally into the constituent parts 2 of the wall.

When the wall or other structure is erected in cold weather, the parts are positioned as shown in Fig. 1, the folded portions 8 of the members 5 being expanded to a considerable degree. As the temperature rises, and the space 3 closes up due to an expansion of the parts 2, and the folded portions

8 of the expansion members 5 assume more acute angles as shown in Fig. 2. It is obvious that if the wall or other structure is built in warm weather, the parts will be set as shown in Fig. 2, and, thereafter, in warm weather will contract into the positions shown in Fig. 1.

Recalling that the space 3 between the parts 2 is to be closed under all temperature conditions, a cap or joint closure 9 is provided, the same comprising a concrete or cement body 10 in which a reinforcement 11 is located. The cap 9 is provided with an offset 12 received, and, if desired, anchored, in a recess 14 of the parts 2, the cap or joint closure being overlapped slidably upon the outer face of the other parts 2. Obviously, no matter how much the structure may expand or contract, the closure 9 will exercise its function, without subjecting either the closure or the wall to stress. If desired, the joint closure 20 may be fashioned as indicated at 15 in Fig. 4 and be secured by bolts 16 or otherwise to one of the parts 2.

A wall or other concrete structure, fashioned as above described will expand and contract readily under temperature changes, but, at the same time, will be perfectly water tight, provided that a continuous sheet metal expansion joint extends from the top of the structure to the bottom thereof.

It is obvious that the folded portion 8 of the expansion member 5 may be fashioned in any desired manner, so long as there is provided, at the point indicated, sufficient material to afford the necessary expansion and contraction.

In practice, the extent of the space 3 between the parts 2 may be determined readily by the engineer in charge, data derived from meteorological records, and coefficients of expansion, being the constants in equation. The computations, however, although not of a complicated nature, should be carefully and intelligently made, in order that the fold indicated at 8 may not be too short, upon the one hand, and in order that the space 3 need not be unnecessarily large upon the other hand. If the wall is built in cold weather, the joints should be set well open, whereas, if the wall is built in warm weather, the space may be decreased accordingly.

It is obvious that the joint structure hereinbefore described, although set forth in connection with walls, is not limited to use therein, and it is to be understood that the invention may be used in any part whatsoever of any structure wherein the device may be of use.

The number of expansion members 5 used at any one joint, may be decreased or increased within any proper limits, and it is obvious that the invention may be embodied in the form of a continuous sheet metal expansion joint extended from the top of the wall to the bottom thereof; likewise the invention may take the form of a plurality of separated, vertically spaced sections.

Having thus described the invention, what is claimed is:—

1. In a device of the class described, a pair of concrete members separated at their ends; a reinforcing element embedded in each of the concrete members; plates located upon opposite sides of the reinforcing elements and separated thereby, the plates being terminally embedded in the concrete members and having flexed portions located between the ends of the concrete members and constituting closures for the spaces defined by the reinforcing elements and the plates.

2. In a device of the class described, spaced concrete members; bars embedded in the concrete members; plates applied to the opposite faces of the bars, the plates having opposed folded portions lying between the concrete members; securing device uniting the plates with the bars; and pins inserted through the plates, between the bars, and terminally embedded in the concrete members.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN FRANCIS LE BARON.

Witnesses:

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MAY A. HARRISON.