United States Patent [19]

Reeve

[11] **3,712,016**

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[54] **METHOD FOR SEALING GROOVES IN STRUCTURE CONCRETE SEALING**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.**.....**52/741**, 94/18.2

[51] **Int. Cl.**.....**E01c 11/06**, E04b 1/68

[58] **Field of Search**.....52/741, 396, 459, 366, 573; 94/18, 18.2

[56] **References Cited**

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[57] **ABSTRACT**

The method involves the laying along each groove or space, a longitudinal sealing element having an inverted flexible channel which bridges the groove or space and having lateral flange parts extending over adjacent portions of the concrete structure. A junction sealing element is disposed at each interconnection of the grooves or spaces, the junction sealing elements also having, like the longitudinal sealing elements, inverted flexible channels and lateral flanges, the channels of the junction sealing elements being in "L," "T" and "X" form for the sealing of the intersections of said grooves or spaces.

5 Claims, 9 Drawing Figures

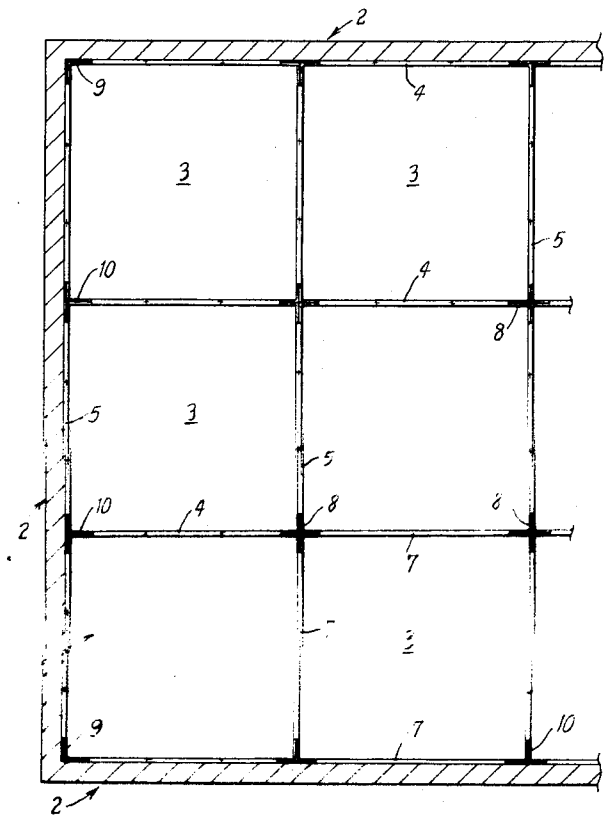

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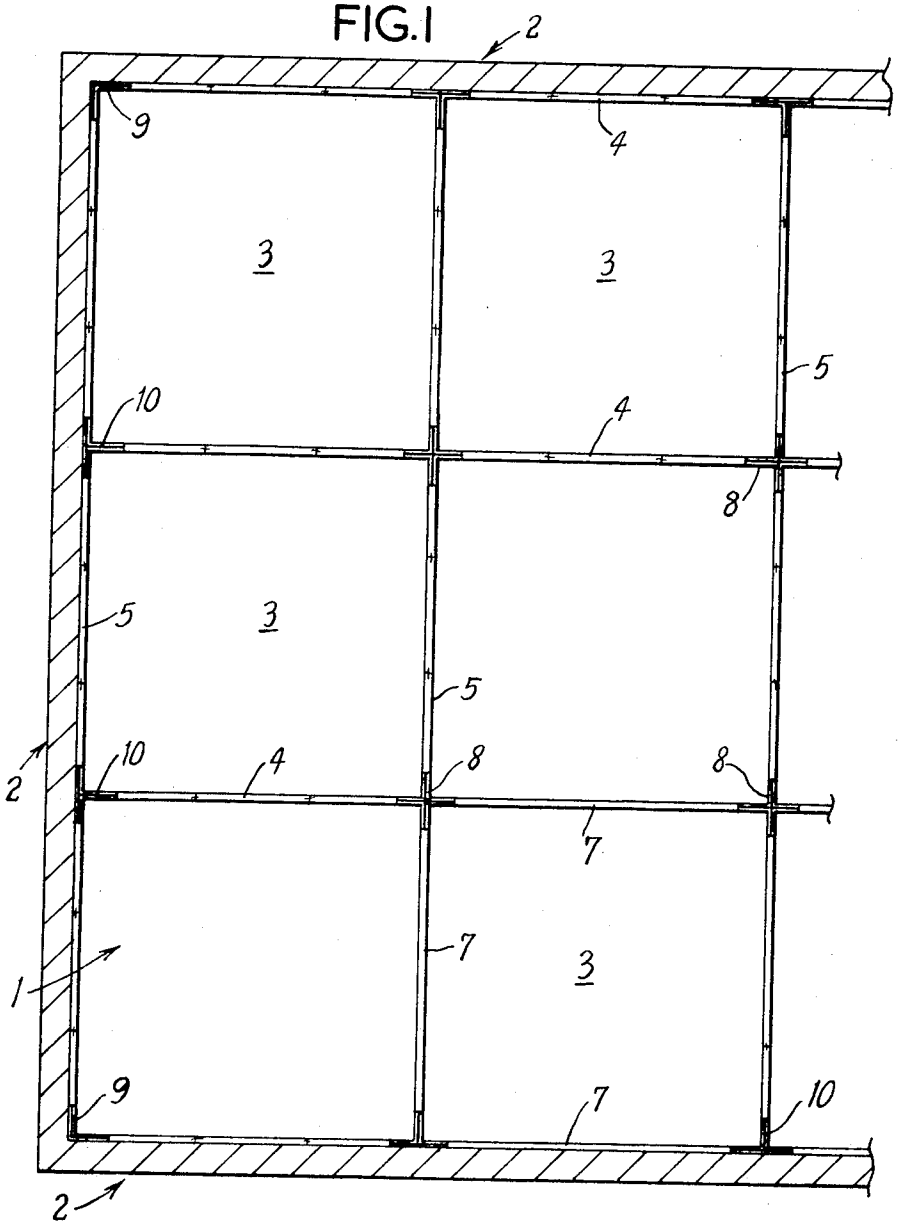
FIG. 1



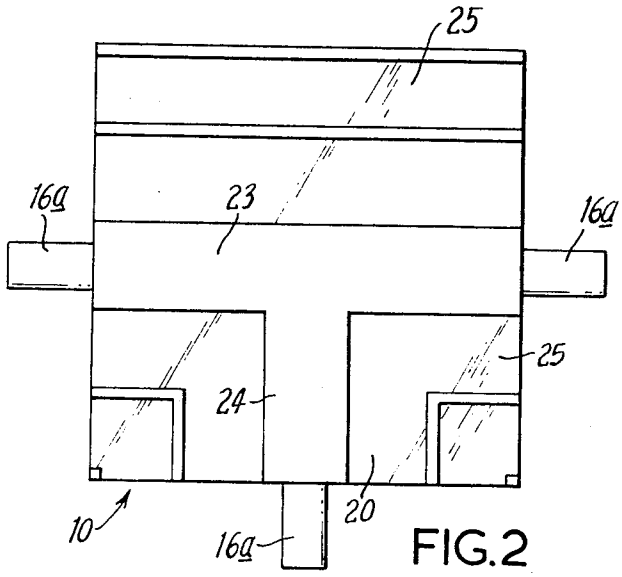


FIG.2

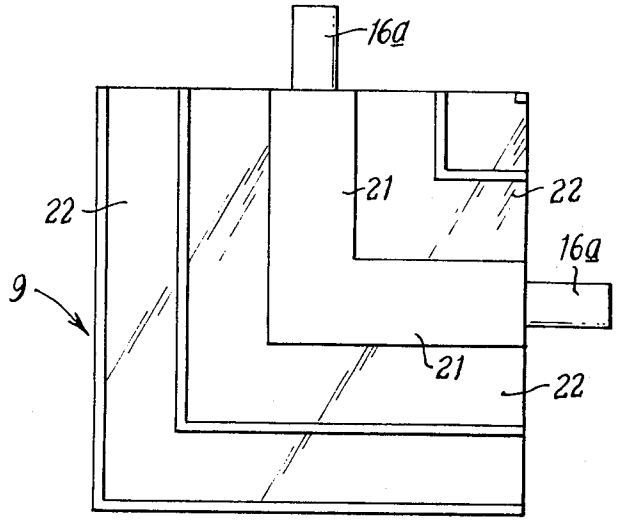
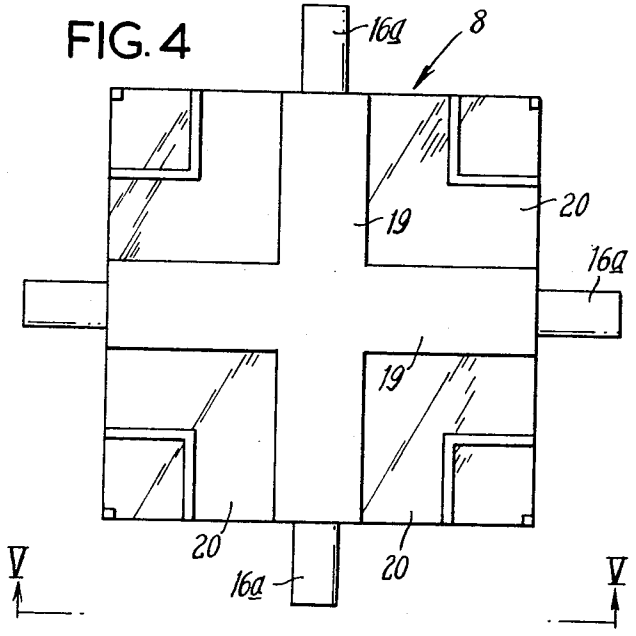


FIG.3

FIG. 4



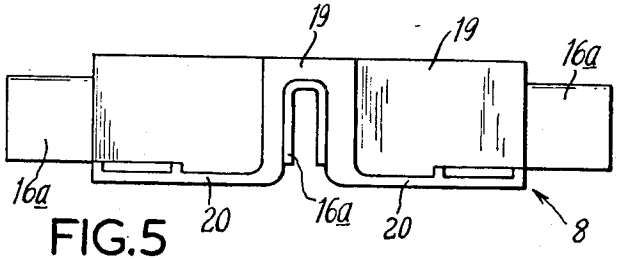


FIG. 5

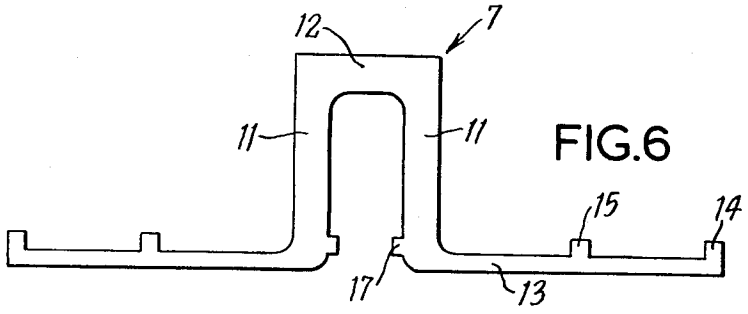


FIG. 6

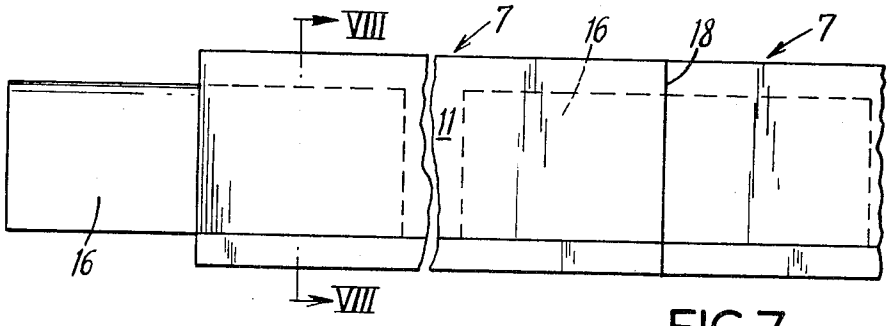


FIG.7

FIG.8

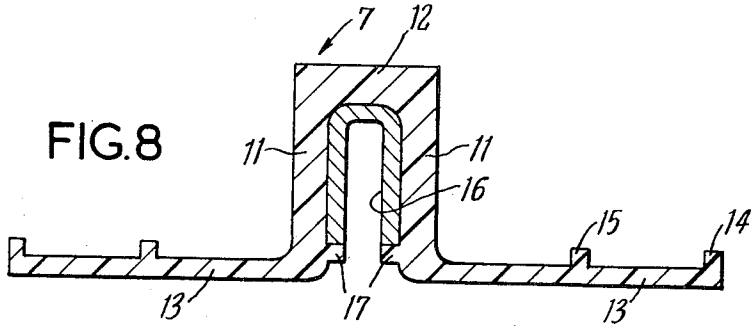
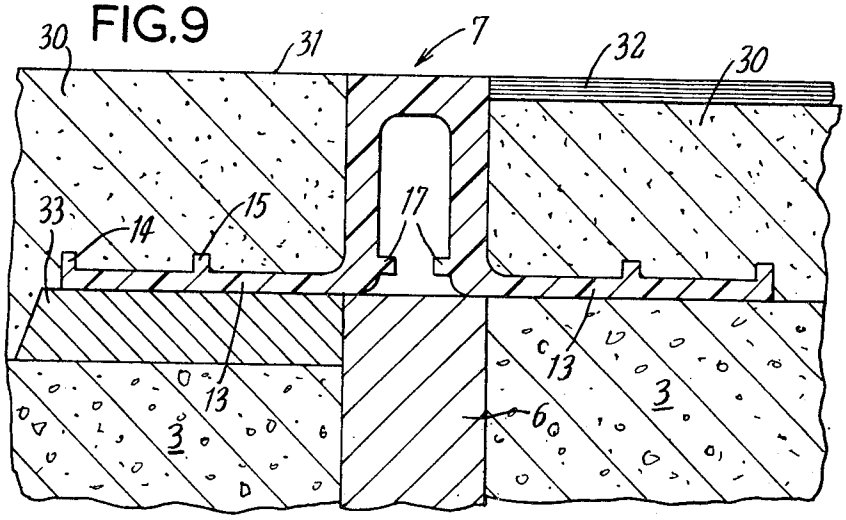


FIG.9



METHOD FOR SEALING GROOVES IN STRUCTURE CONCRETE SEALING

This invention relates to concrete structures, such as concrete rafts incorporated in floors, roofs, or the like, and to a method and means for the sealing of grooves or spaces in such structures.

Concrete rafts such as are employed in floor construction, are usually laid in sections, known as bays, and these bays are separated from one another by grooves or spaces to allow for expansion, contraction, or differential settlement, to prevent damage to the structure.

An object of the invention is to provide an improved sealing of such grooves or spaces in concrete structures.

Accordingly, there is provided a method of sealing grooves or spaces between sections of a concrete raft, or like structure, the method including steps of arranging along each groove or space, a longitudinal sealing element, and arranging at each connection and/or intersection of adjoining grooves or spaces, a junction sealing element, so that hollow flexible channel parts of said longitudinal and junction sealing elements are disposed above corresponding parts of the grooves or spaces and lateral flange parts of said elements extend over adjacent portions of the raft or structure, connecting the sealing elements one to another to provide a generally continuous seal, and applying a screed to the raft so as to cover the flange parts of the sealing elements.

The invention further provides sealing means for the sealing of grooves or spaces between sections of a concrete raft or the like structure, comprising sealing elements including longitudinal sealing elements for location along the grooves or spaces and junction sealing elements for location at the connection and/or intersection of the grooves or spaces, said sealing elements being formed of a flexible rubber or rubber-like material and having hollow channel parts and flange parts extending laterally from the channel parts, said sealing means comprising also joining elements which can be fitted to or formed integrally with the channel parts, of the or certain of the, sealing elements, the joining elements protruding from the associated channel parts for connection to other sealing elements so that when assembled said elements provide a generally continuous seal for said grooves or spaces.

The invention further provides a concrete structure having expansion or the like grooves or spaces which are provided with sealing means incorporating a plurality of individual sealing elements located and interconnected in accordance with the foregoing method, to form a generally continuous seal for said grooves or spaces.

For a better understanding of the invention, and the method by which it may be performed, an embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a fragmentary plan view of a concrete structure incorporating sealing means according to an embodiment of the invention,

FIGS. 2, 3 and 4 are enlarged detail views in plan illustrating parts of the structure shown in FIG. 1,

FIG. 5 is an elevational view taken along the lines indicated by arrows V in FIG. 4,

FIG. 6 is a transverse elevational view of a longitudinal sealing member incorporated in the structure of FIG. 1,

FIG. 7 is a side elevational view of a longitudinal sealing member,

FIG 8. is a cross-sectional view taken along the line VIII—VIII of FIG. 7, and

FIG. 9 is a vertical sectional view through a joint detail incorporated in the structure of FIG. 1.

Referring to the drawings, the illustrated embodiment comprises sealing means for a concrete raft which, as shown in FIG. 1, forms a floor 1 for a building, the external walls of the building being indicated at 2. The raft concrete is laid in bays or sections 3 which are square in plan, as illustrated, or which may be of other rectangular form. The bays are separated from one another and from the building walls 2, by longitudinal grooves or spaces 4 and transverse grooves or spaces 5, the grooves or spaces 4, 5 being of a width sufficient to allow for the expansion, contraction or differential settlement of the concrete. The grooves or spaces are filled with a dry filler 6 (FIG. 9) comprising, for example, sugar-cane fiber, cork, expanded rubber, polystyrene.

A jointing system or assembly is located in position directly above the grooves or spaces 4, 5 between the bays 3. The jointing system or assembly comprises sealing elements formed of neoprene. Alternatively, the sealing elements could be formed of other elastomerical material such as polyurethane, polyvinyl-chloride or other rubber-like material. The sealing elements include generally straight pieces 7 for location along the grooves or spaces at the sides of each bay, cross-over pieces 8 for location at the intersection of the grooves or spaces, "L" pieces 9 for location at corners of the structure, and "T" pieces 10 for location at joins between the outer boundary grooves or spaces of the raft and the intermediate grooves or spaces between the bay.

Each straight piece 7 is of substantially uniform shape throughout its length and comprises an inverted generally U-shaped central channel part having side walls 11 and a top wall or web 12. The channel section is open along its lower side, and the side walls 11 are formed integrally with laterally extending flange parts 13 each formed along its outer free edge with an upstanding rib 14 and formed also with an intermediate rib 15. The straight sealing pieces 7 may be formed as extrusions and provided in short lengths or relative long continuous lengths, for example, lengths of 10 feet. Where joining is necessary, a mechanical joining and locating element 16 is provided at the join (FIG. 7), this joining element being of inverted U-shape channel section, flexible and preformed to locate in and protrude from the interior of the central channel part of an element 7. The joining element 16 is located along its lower edges by ribs 17 formed along and integral with the sides 11 of the central channel part of the element 7. In FIG. 7, two lengths of the sealing section 7 have their ends abutting at 18, the two lengths being joined together by a joining element 16. The latter may be formed as extrusions of the same material as the sealing elements.

Each cross-over junction piece 8 (FIGS. 4 and 5) is of moulded construction and has two centrally located

inverted channel parts **19** disposed in cross-wise relation and formed with lateral flange parts **20**, these parts **19**, **20** corresponding to the central channel part and lateral flanges of the longitudinal sealing section **7**. In FIGS. **4** and **5**, the channel parts **19** are formed at their ends with integral joining elements **16***a*, for connection to adjacent lengths of the sealing section **7**.

Each "L" junction piece **9** comprises, as shown in FIG. **3**, two inverted channel parts **21** at right-angles to each other, and each formed with lateral flange parts **22**, these parts **21** and **22** corresponding again to the corresponding central channel part and the lateral flanges of a longitudinal channel section **7**. The channel parts **21** are also formed with integral joining elements **16***a*.

Each moulded "T"-junction piece **10** also has inverted channel parts **23**, **24** perpendicular to each other in T-shaped formation and formed with flange parts **25**, **26** corresponding to the central channel and side flange parts of the longitudinal sealing sections.

The channel parts **23**, **24** also have integral joining elements **16***a*.

The junction pieces of FIGS. **2** and **5**, could have separately fitted joining elements, as shown at **16** (FIGS. **7** and **8**) instead of integral elements **16***a*.

The central channel part of each sealing element or component conveniently corresponds in width to the spaces or grooves between the concrete bays of the floor so that, when the several elements of the jointing system are assembled on the concrete structure, the flange parts such as those shown at **13** (FIG. **9**) will extend laterally over the adjacent marginal parts of the concrete bays to act as water barriers at each side of the joint. The various straight pieces **7** of the sealing elements are connected to the appropriate junction pieces **8**, **9** and **10**, as indicated in FIG. **1**, to complete a continuous gasket at the joints between the concrete bays. If desired, the connections between the various pieces **7** and the junction pieces, may be sealed by an adhesive.

Moreover, upon assembly of the sealing elements or components to form in effect a continuous gasket overlying the spaces between the concrete bays, the exposed surface of each bay is screed over with an appropriate cement mix **30**. The surface of the screed may be brought to the level of the top of the sealing elements as shown at **31** in FIG. **9**. Alternatively, the depth of the screed may be less than that of the central channel parts of the sealing elements for the reception of, for example, vinyl floor tiles, as indicated at **32** on FIG. **9**. The upstanding ribs of the flanges, such as ribs **14** and **15** of flanges **13**, provide a positive keying of the sealing elements to the screed.

Where the depth of the screed is to exceed the depth of the channel parts of a sealing element, the flange part of the element may be positioned on a datum insert **33** (FIG. **9**) of dry mortar, wood, or other appropriate material.

The jointing system may be arranged to provide a flexible means for the sealing of expansion, contraction or differential settlement joints between adjacent sections of a road, building or the like construction. The system may comprise sealing components assembled and installed as an endless gasket system as previously described, or the components may be arranged in open ended lengths.

In the previously described embodiment, the cooperating sealing elements, incorporating the moulded corner and intersection pieces provide an endless gasket system for sealing purposes at the groove or spaces between adjacent sections of a concrete raft. The moulded corner and intersection pieces are adapted, by virtue of the cooperating joining elements, to give a mechanical location to the adjacent ends of the associated longitudinal sealing elements. The joint system can be positioned to provide a datum for the screeds to be applied to the various sections of the concrete raft. In the completed floor structure, the flange and channel parts of the sealing elements can cooperate to provide water barriers in the region of the grooves or spaces of the concrete raft. Moreover, the channel parts may be sufficiently resilient to permit expansion, contraction or other relative movement between the various sections or bays of the raft but nevertheless the exposed top portions of the channel parts of the sealing elements may be made sufficiently rigid to present surface wearing joints between the screed sections of the structure.

I claim:

1. A method of sealing interconnected grooves, gaps or other spaces between sections of a concrete structure, the method including the steps of arranging along each space a flexible longitudinal sealing element having a longitudinal inverted flexible channel part open along its lower side and having also integral flexible flanges extending laterally outwardly from the lower open side of said channel part, said flange at one side at least of said longitudinal sealing element being disposed substantially flat upon the concrete structure, arranging at each interconnection of adjoining spaces, a junction sealing element having angularly related flexible channel parts and associated integral flexible flanges corresponding to the flexible channel part and flexible flanges of said longitudinal sealing element, the flexible channel parts of said longitudinal and said junction sealing elements extending over corresponding parts of the spaces and the flanges of said elements extending over adjacent portions of said concrete structure, connecting the channel parts of said sealing elements together to provide a generally continuous seal, and applying screed to the concrete structure so as to cover the flange parts of the sealing elements.

2. A method as claimed in claim **1**, wherein a longitudinal sealing element is connected to a junction sealing element by engaging in one end portion of the channel part of said longitudinal sealing element, a joining element which protrudes from a channel part of said junction sealing element.

3. A method as claimed in claim **1**, wherein the screed is so applied to a section of the concrete structure that the screed has an exposed surface which is substantially level with the top of the channel part of each adjacent sealing element.

4. A method as claimed in claim **1**, wherein the screed is so applied that the depth thereof is less than the depth of the channel parts of the sealing elements, and wherein floor covering material is applied to the exposed surface of the screed so as to be substantially flush with the tops of said channel parts.

5. A method as claimed in claim **1**, wherein said sealing elements are assembled on the concrete structure, in the form of an endless gasket system, the hollow in-

terior of the channel part of the longitudinal sealing element communicating with the hollow interior of the associated channel part of the junction sealing element to which said longitudinal sealing element is connected.

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