

[54] EXPANSION JOINT COVER ASSEMBLY

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[51] Int. Cl. E04b 1/68

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[57]

ABSTRACT

An expansion joint cover assembly for mounting on structural sections disposed in spaced relation to define an elongated joint therebetween includes a rigid bridging member which is generally arch-shaped in cross section and of sufficient width to span the joint to be covered and the bridging member has opposite side edge portions each slidingly engaging an inclined surface of a base wall of a respective one of a pair of base members each secured to a respective structural section and having an end wall extending from the respective base wall thereby defining a cavity to receive joint filler material having opposite side edges each bonded to the end wall of a respective one of the base members and the joint filler material has a center portion thereof supported on the bridging member whereby the bridging member is moved relative to an exposed surface of the joint filler material in response to movement of the structural sections to accommodate flow of said joint filler material.

11 Claims, 3 Drawing Figures

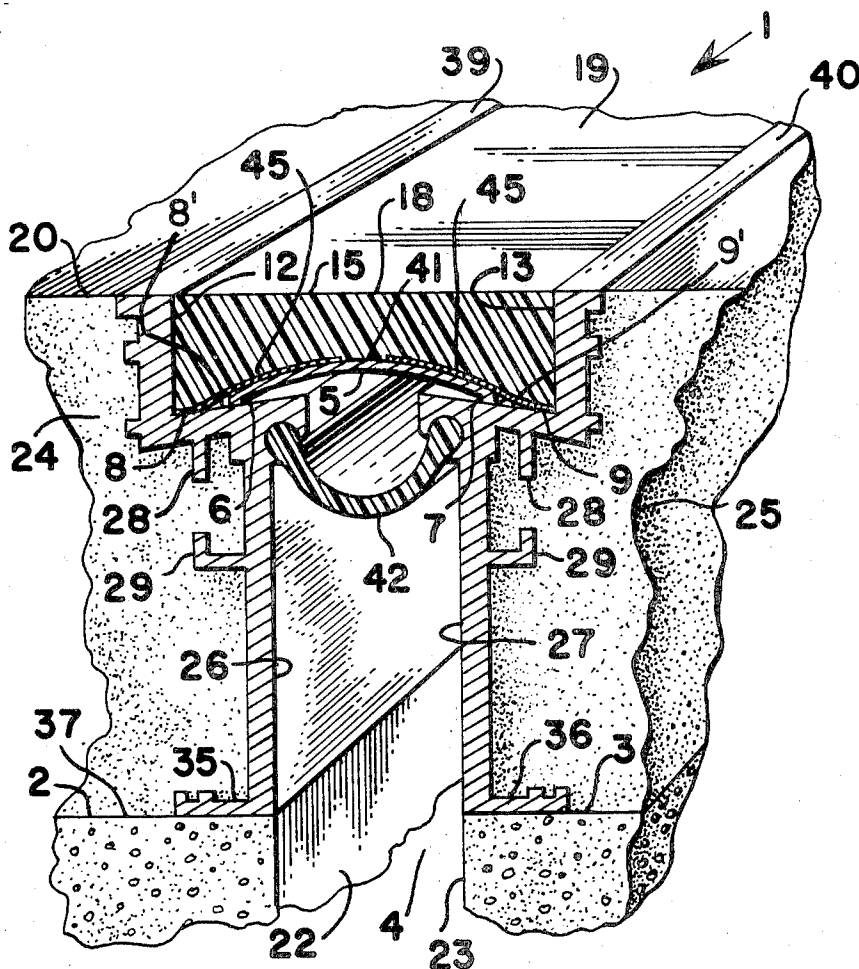


Fig. 1.

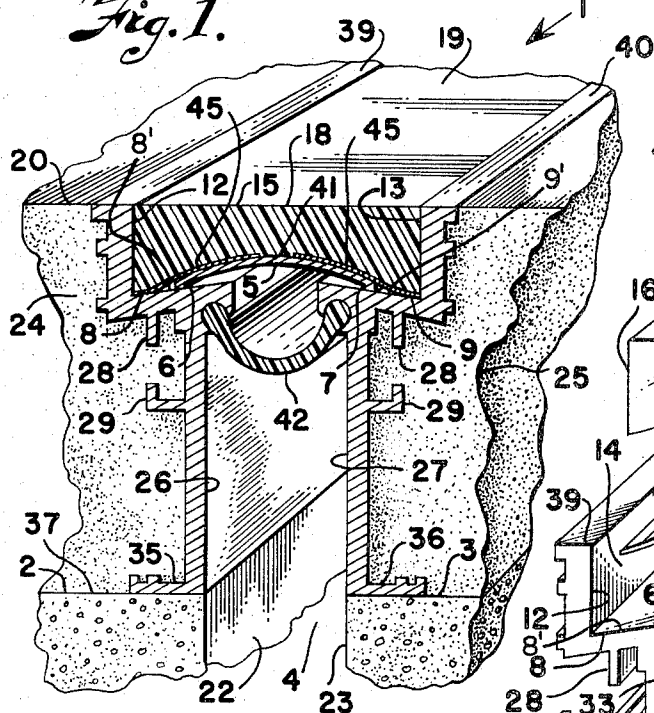


Fig. 2.

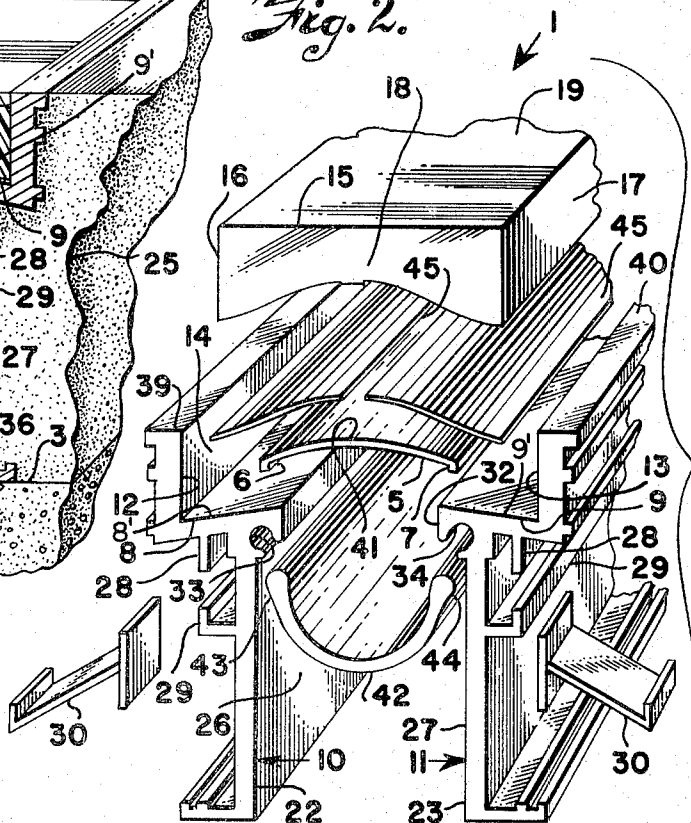
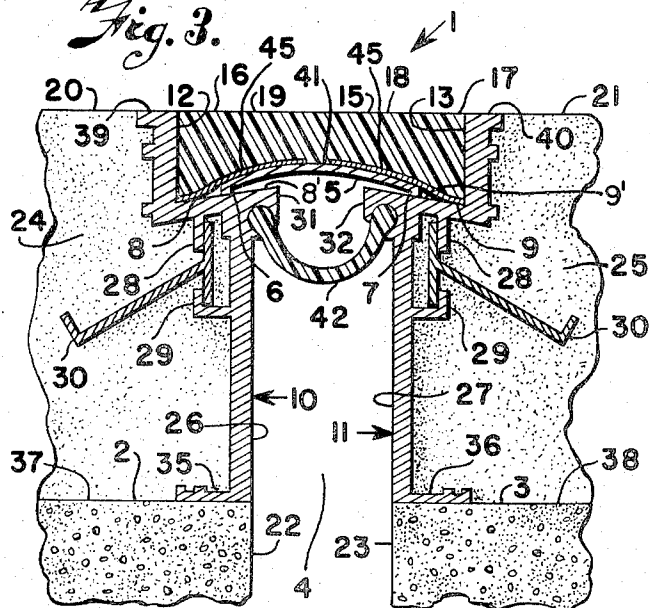


Fig. 3.



EXPANSION JOINT COVER ASSEMBLY

The present invention relates to expansion joint cover assemblies for buildings and more particularly to an expansion joint cover assembly for covering adjacent portions of spaced structural sections which are prone to vary in position relative to each other.

It is well known that in building sections of monolithic concrete, concrete blocks, bricks, and the like, relatively long walls, floors, and ceilings must have expansion joints to prevent cracks due to expansion and contraction. Earth movement also necessitates making portions of such building structures in sections with expansion joints therebetween to accommodate expansion, contraction, and movement, even those caused by earthquake tremor.

It has been the practice in the construction field, in constructing buildings using a plurality of structural sections, to space the individual sections of the building from each other whereby portions of the structural sections confront each other across an intermediate zone. Such an intentional zone or space is commonly known as an expansion joint and allows relative movement of the structural sections in response to temperature changes, earth movement and the like, and thereby prevents stress in the sections with the resulting cracking. The expansion joint or space between the sections, if left exposed, is unsightly and prevents a complete closure to the weather, therefore, it is desirable that an expansion joint cover be provided which seals out weather, deleterious material, and accommodates the relative movement of the adjacent sections.

The principal objects of the present invention are: to provide an expansion joint cover assembly for mounting on structural sections disposed in spaced relation to define an elongated joint therebetween wherein the assembly has a polyurethane elastomer joint filler having a center portion thereof supported on a bridging member having a raised center portion and opposite side edge portions slidably supported on inclined surfaces so that relative movement of the structural sections effects movement of the center portion of the bridging member relative to an exposed surface of the joint filler material to accommodate flow thereof; to provide such an expansion joint cover assembly adapted to maintain substantial surface continuity across the elongated joint between adjacent structural sections; to provide such an expansion joint cover assembly adapted to support loads passing across the elongated joint; to provide such an expansion joint cover assembly having points of weakness adjacent the bond of a center portion of the joint filler material to the enlarged center portion of the bridging member to permit stretching of the filler material without breaking bond at the side edges thereof; to provide such an expansion joint cover assembly wherein as the joint contracts the bridging member is moved along the slopes of the respective base members to move the center portion of the bridging member away from the exposed face of the joint filler material and thereby increasing the space available for the center portion of the joint filler material to flow; to provide such an expansion joint cover assembly such that when the joint expands the joint filler material stretches adjacent the center area thereof and the bridging member moves along the slopes of the base member to move the center portion of the bridging member toward the exposed face of the joint filler ma-

terial and thereby maintain constant support for the joint filler material; and to provide such an expansion joint cover assembly which is economical to manufacture, easily installed, convenient to repair or replace, which can be mounted on exterior or interior surfaces, which is decorative when installed, which permits multiple, directional relative movement of the building sections at the joint therebetween and which is particularly well adapted for the proposed use.

Other objects and advantages of this invention will become apparent from the following description taken into connection with the accompanying drawings wherein are set forth, by way of illustration and example, certain embodiments of this invention.

The drawings constitute a part of this specification and include an exemplary embodiment of the present invention and illustrate various objects and features of the expansion joint cover assembly.

FIG. 1 is a partial perspective view of an expansion joint cover assembly embodying features of the present invention and shown in place of spaced structural sections and in covering relation to an expansion joint between the spaced structural sections.

FIG. 2 is an exploded perspective view showing the components of the expansion joint cover assembly.

FIG. 3 is a transverse sectional view taken on line 3-3, FIG. 1.

Referring more in detail to the drawings:

As required, detailed embodiments of the present invention are disclosed herein, however, it is to be understood that the disclosed embodiments are merely exemplary of the invention which may be embodied in various forms, therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure.

In the disclosed embodiment of the present invention, the reference numeral 1 generally designates an expansion joint cover assembly for mounting on structural sections 2 and 3 disposed in spaced relation to define an elongated joint 4 therebetween. The expansion joint cover assembly 1 includes a bridging member 5 of sufficient strength and width to span the joint 4 to be covered and the bridging member 5 has opposite side edge portions 6 and 7 slidably engaging inclined surfaces 8' and 9' of base walls 8 and 9 respectively of a pair of base members 10 and 11 respectively which are secured to the structural sections 2 and 3. End walls 12 and 13 extend from and substantially normal to the base walls 8 and 9 respectively and cooperate with the bridging member 5 to define a receptacle or cavity 14 adapted to receive joint filler material 15 having opposite side edges 16 and 17 bonded to the end walls 12 and 13 respectively of the base members 10 and 11. The joint filler material 15 has a center portion 18 thereof supported on an enlarged center portion of the bridging member 5 and the bridging member 5 is moved relative to an exposed surface 19 of the joint filler material 15 in response to movement of the structural sections 2 and 3 to accommodate flow of said joint filler material 15.

Expansion joints in building construction are used primarily to permit expansion and contraction of the structural sections which result from changes in temperature and to accommodate earth movement and the

like. Expansion joints are used between sections of floors, between sections of walls, between sections of ceilings, between walls and ceilings, and at the intersection of walls and floors. The expansion joint cover assembly of the present invention is capable of being used for all the various types of expansion joints. The expansion joint cover assembly must be capable of expanding and contracting throughout a selected design range.

In the illustrated structure, the end walls 12 and 13 of the base members 10 and 11 are substantially perpendicular or normal to exposed surfaces 20 and 21 of the structural sections 2 and 3 respectively and the end walls 12 and 13 are substantially parallel with joint faces or surfaces 22 and 23 of the structural sections 2 and 3 respectively. A rear or hidden face of each of the end walls 12 and 13 is adapted to be anchored to the respective structural section as by a plurality of spaced projections extending into the respective sections.

The base walls 8 and 9 intersect the joint faces 22 and 23 respectively and the base walls 8 and 9 have respective surfaces 8' and 9' which slidably support the side edge portions 6 and 7 of the bridging member 5 and the illustrated surfaces 8' and 9' are inclined relative to the exposed surfaces 20 and 21 of the structural section 2 and 3 respectively. The inclined surfaces 8' and 9' of the base walls 8 and 9 may be any desired shape, such as planar, convex, or the like, which varies the spacing of the respective surface relative to the exposed surface 19 of the joint filler material 15 and relative to the exposed surfaces 20 and 21 of the structural sections 2 and 3 respectively. In the illustrated embodiment, the surfaces are planar and define an acute angle between same and the respective end walls 12 and 13 whereby a center portion of the bridging member 5 is moved relative to the exposed surface 19 of the joint filler material 15 in response to movement of the structural sections 2 and 3 to thereby accommodate flow of the joint filler material 15.

When the exposed surfaces 20 and 21 of the structural sections 2 and 3 are to be formed of finishing or surfacing materials 24 and 25 respectively, face portions 26 and 27 are formed in the base members 10 and 11 respectively and the face portions 26 and 27 extend from the base walls 8 and 9 and are adapted to be substantially coplanar with the joint faces 22 and 23 of the structural sections 2 and 3 respectively. The face portions 26 and 27 of the base members 10 and 11 are substantially parallel with the end walls 12 and 13 whereby the inclined surface of the base walls 8 and 9 define an acute angle with the face portions 26 and 27 respectively, which is equal to the acute angle between the base walls 8 and 9 and the end walls 12 and 13 respectively.

The base members 10 and 11 are adapted to be secured to the structural sections 2 and 3 or to the finishing materials 24 and 25 respectively applied thereto. In the illustrated structure, spaced flanges or ribs 28 and 29 extend from the rear or hidden face of the respective base walls and face portions and cooperate to define an elongated groove in each of the base members 10 and 11 which is adapted to receive suitable longitudinally spaced anchors 30 therein. The anchors 30 are positioned so that they will be covered by the material forming the respective structural section or finishing material thereon and, therefore, maintain the respective base member rigidly in place at the edge of the elongated joint 4.

The face portions 26 and 27 have enlarged portions 31 and 32 respectively to define extensions of the base walls 8 and 9 into the elongated joint 4 between the structural sections 2 and 3. The enlarged portions 31 and 32 each have surfaces defining elongated grooves 33 and 34 respectively therein. The grooves 33 and 34 are positioned in opposed relation, for a purpose later described.

Flanges 35 and 36 extend from a free end of the face portions 26 and 27 respectively and are adapted to engage interfaces 37 and 38 between the structural section 2 and the finishing material 24 and the structural section 3 and the finishing material 25 respectively. The spacing between the flanges 35 and 36 and exposed or free edges 39 and 40 of the end walls 12 and 13 respectively corresponds with the thickness of the finishing materials 24 and 25 on the structural sections 2 and 3.

The bridging member 5 is adapted to support a load applied to the joint filler material 15, such as a wheel or the like passing over the elongated joint 4. The bridging member 5 is preferably a substantially rigid member having sufficient strength and width to span the elongated joint 4 throughout a selected design range and has the side edge portion 6 and 7 thereof in sliding engagement with the base walls 8 and 9 respectively of the base members 10 and 11. The center portion of the bridging member 5 may be any desired shape extending toward the exposed surface 19 of the joint filler material 15. The illustrated bridging member 5 has a generally arch-shaped cross section with the side edge portion 6 and 7 depending from an arcuate portion which defines the arch-shape. A center portion 41 of the bridging member 5 is centered between the structural section 2 and 3 and is thereby positioned at the center of the elongated joint 4. The center portion 41 of the bridging member 5 supports the center portion 18 of the joint filler material 15 and the center portion 18 is bonded to the center portion 41.

The joint filler material 15 is supported by and positioned in engagement with the bridging member 5 and has the side edges 16 and 17 thereof bonded to the end walls 12 and 13 of the base members 10 and 11 respectively. The joint filler material 15 has the exposed surface 19 thereof substantially coplanar with the exposed surfaces 20 and 21 of the structural sections 2 and 3 to thereby provide surface continuity across the elongated joint 4. The opposite side edge portions of the joint filler material 15 have a greater thickness than the center portion 18 of the joint filler material 15. The joint filler material 15 is preferably an elastomer or a synthetic elastomer having good resistance to abrasion, oil and other chemicals, and having a high tensile strength, such as polyurethane rubber. The joint material also preferably has a shore A durometer value in the range of 60 to 70.

It is desirable to prevent bond between the joint filler material 15 and the bridging member 5 except between the center portion 41 of the bridging member 5 and the center portion 18 of the joint filler material 15, therefore, suitable means are positioned between adjacent surfaces of the joint filler material 15 and the bridging member 5 to prevent bonding therebetween except at the center portions thereof. Paper, plastic thin metal, and like strips have been found to be sufficient to prevent bond between the joint filler material 15 and the bridging member 5.

A suitable flexible moisture shield 42 may be included in the assembly and has side edges 43 and 44 adapted to be received in the grooves 33 and 34 respectively of the base members 10 and 11.

The bridging member 5 and the base members 10 and 11 are preferably formed of metal by extrusion through suitable dies. The anchors 30 are also preferably metal and may also be formed by extrusion or any other suitable method. Aluminum has been found to provide sufficient strength and lightness in weight for the rigid components of the expansion joint assembly 1.

Assembly of the expansion joint cover assembly may be in a factory or during construction of a building. When the base members 10 and 11 are to be installed on a structural section without finishing material thereon, the base members 10 and 11 are suitably positioned in forms for the structural sections and suitable anchors 30 are longitudinally spaced along the grooves defined by the ribs 28 and 29. After the structural sections have cured and the forms have been removed, the moisture shield 42, when used, has the edge portions 43 and 44 thereof installed in the grooves 33 and 34 in the enlarged portion 31 and 32 respectively. The bridging member 5 is then positioned with the edge portions 6 and 7 thereof in engagement with the base walls 8 and 9 respectively and the center portion 41 of the bridging member 5 is centered between the face portions 26 and 27. Suitable bond preventing material 45, such as paper, plastic, thin metal or like strips, is positioned to cover all of the bridging member 5 except the center portion 41 thereof. The bond preventing material may also cover exposed surfaces of the walls 8 and 9. The center portion 41 of the bridging member 5 and the end walls 12 and 13 of the base members 10 and 11 are preferably cleaned and primed with a suitable compound or adhesive. The joint filler material 15 is then poured into the cavity 14 defined by the end walls 12 and 13, exposed portions of the base walls 8 and 9, and the bridging member 5. When finishing material 24 and 25 is to be placed on the structural sections 2 and 3, the flanges 35 and 36 are positioned in engagement with the interfaces 37 and 38 respectively and the anchors 30 are properly positioned in the grooves defined by the ribs or flanges 28 and 29. The base members 10 and 11 are suitably spaced apart, as by blocking or the like, (not shown) and the finishing material is installed on the structural sections 2 and 3 respectively. The moisture shield 42, bridging member 5, bond preventing material, and joint filler material 15 are then installed as previously described.

It is to be understood that while I have illustrated and described one form of my invention, it is not to be limited to the specific form or arrangement of parts herein described and shown.

What we claim and desire to secure by Letters Patent is:

1. An expansion joint cover assembly for structural sections disposed in spaced relation and defining an elongated joint therebetween, at least one of said sections including a horizontal upper surface said assembly comprising:

- a. first and second elongated base members each adapted to be secured to a respective one of a first and second spaced structural sections in opposed relation, said base members each having a surface spaced below said upper surface and intersecting a

joint face of the respective structural section, said base member surface being inclined relative to said upper surface;

- b. an elongated bridging member for spanning a joint for the length thereof between the structural sections, said bridging member having opposite side edge portions each slidably engaging said surface of a respective one of said base members; and
 - c. a cured resilient joint filler material positioned for supporting engagement by said bridging member and having opposite side edges thereof each bonded to a respective one of said base members, said joint filler material having an exposed surface coplanar with said horizontal upper surface; said inclination of the surfaces of the base members and the sliding engagement of said side edge portions of bridging member therewith cooperating in response to movement of the structural members for maintaining of the upper surface of the filler material substantially level with said horizontal upper surface of said sections.
2. An expansion joint cover assembly as set forth in claim 1 wherein:
- a. said surface of each of said base members is inclined at an acute angle relative to the exposed surface of the respective structural section; and
 - b. said bridging member has a center portion positioned closer to the upper surface of said joint filler material than said opposite side edge portions thereof whereby the center portion of said bridging member is moved relative to the exposed surface of said joint filler material in response to relative movement of the structural sections to accommodate flow of said joint filler material and substantially maintain said upper surface level with said upper surfaces of the sections.
3. An expansion joint cover assembly as set forth in claim 2 wherein:
- a. said joint filler material has a center portion thereof bonded to the center portion of said bridging member; and
 - b. means are positioned between adjacent surfaces of said joint filler material and said bridging member to prevent bonding of said joint filler material to said bridging member except at the respective center portions thereof.
4. An expansion joint cover assembly for structural sections disposed in spaced relation and defining an elongated joint therebetween said sections including a horizontal upper surface, said assembly comprising:
- a. a pair of elongated base members each adapted to be secured to a respective one of a pair of spaced structural sections in opposed relation, said base members each having an end wall extending substantially parallel with a joint face of the respective structural section and a base wall intersecting the joint face of the respective structural section, said base walls having upper surfaces inclined at an acute angle to said upper surface of the sections;
 - b. an elongated bridging member for spanning a joint between the structural sections, said bridging member having opposite side edge portions each slidably engaging said upper surfaces of the base wall of a respective one of said base members; and
 - c. a cured resilient joint filler material positioned in engagement with said bridging member and having opposite side edges thereof each bonded to said

end wall of a respective one of said base members, said joint filler material substantially filling the cavity between said end walls and the bridging member and said upper surfaces of the sections and having an exposed surface substantially coplanar with respective upper surfaces of the structural sections.

5. An expansion joint cover assembly as set forth in claim 4 wherein:

- a. said bridging member has a center portion positioned closer to the exposed surface of said joint filler, material than said opposite side edge portions thereof; and
- b. said base wall of each of said base members is angularly inclined to define an acute angle with said end wall of said respective base member whereby the center portion of said bridging member is moved relative to the exposed surface of said joint filler material in response to relative movement of the structural sections to accommodate flow of said joint filler material.

6. An expansion joint cover assembly as set forth in claim 4 wherein:

- a. said joint filler material has a center portion thereof bonded to a center portion of said bridging member; and
- means are positioned between adjacent surfaces of said joint filler material and said bridging member to prevent bonding of said joint filler material to said bridging member except at the respective center portions thereof.

7. An expansion joint cover assembly as set forth in claim 6 wherein:

- a. each of said base members has a face portion extending from said base wall thereof and adapted to be substantially coplanar with the joint face of the respective structural section;
- b. said base wall of each of said base members is angularly inclined to define an acute angle with said respective face portion; and
- c. said bridging member has a generally arch-shaped cross section whereby the center portion of said bridging member is moved relative to the exposed surface of said joint filler material in response to relative movement of the structural sections to accommodate flow of said joint filler material.

8. An expansion joint cover assembly for structural sections disposed in spaced relation and defining an elongated joint therebetween, said sections including a horizontal upper surface, said assembly comprising:

- a. a pair of elongated base members each having an end wall extending substantially parallel with a joint face of a respective one of a pair of spaced structural sections in opposed relation and a base wall having an upper surface intersecting the joint face of the respective structural section, said upper surface of the base wall being spaced below said upper surface of the structural section and inclined relative thereto;
- b. means for securing each of said base members to a respective one of the structural sections;
- c. an elongated bridging member for spanning a joint between the structural sections, said bridging mem-

ber having opposite side edge portions and each slidably engaging the upper surface of the base wall of a respective one of said base members, said bridging member having a generally arch-shaped cross section; and

- d. a cured resilient joint filler material positioned in engagement with said bridging member and having opposite side edges thereof each bonded to said end wall of a respective one of said base members, said joint filler material substantially filling the space between said end walls, bridging member and upper surfaces and having an exposed surface substantially coplanar with respective exposed surfaces of the structural sections, the opposite side edges of said joint filler material, said inclination of said upper surfaces of the base wall and sliding engagement of side edge portions of the bridging member therewith cooperating to substantially maintain the coplanar relationship of the exposed surface of the filler material and upper surfaces of the sections through expansion and contraction of the joint.

9. An expansion joint cover assembly as set forth in claim 8 wherein:

- a. said joint filler material is a polyurethane elastomer;
- b. the center portion of said joint filler material is bonded to the center portion of said bridging member; and
- c. means are positioned between adjacent surfaces of said joint filler material and said bridging member to prevent bonding of said joint filler material to said bridging member except at the respective center portions thereof.

10. An expansion joint cover assembly as set forth in claim 9 wherein:

- a. each of said base members has a face portion extending from said base wall thereof and adapted to be substantially coplanar with the joint face of the respective structural section;
- b. said face portions each are adapted to be secured to the respective structural section; and
- c. said base wall of each of said base members is angularly inclined to define an acute angle with said respective face portion whereby the center portion of said bridging member is moved relative to the exposed surface of said joint filler material in response to relative movement of the structural sections to accommodate flow of said joint filler material.

11. An expansion joint cover assembly as set forth in claim 8 including:

- a. a face portion for each of said base members and extending from said base wall thereof, said face portions each being adapted to be substantially coplanar with the joint face of the respective structural section; and
- b. a flange extending from a free end of each of said face portions and adapted to engage an interface between the respective structural section and finishing material thereon.

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