United States Patent [19]

McDowell et al.

[11] **3,713,368**

[45] **Jan. 30, 1973**

[54] **ROAD JOINT SEAL AND END DAM CONSTRUCTION**

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[73] Assignee: **Felt Products Mfg. Co.**

[22] Filed: **Oct. 26, 1971**

[21] Appl. No.: **191,996**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 141,518, May 10, 1971, abandoned.

[52] **U.S. Cl.** **94/18**

[51] **Int. Cl.** **E01c 11/10**

[58] **Field of Search** 94/18, 18.2; 14/16

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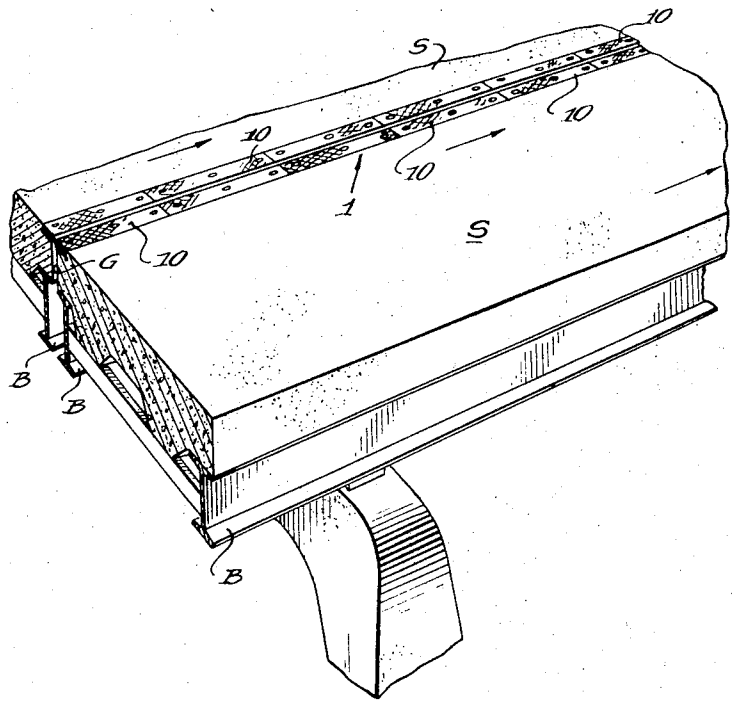
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Attorney—Max Dressler et al.

[57] **ABSTRACT**

A joint seal assembly for adjacent, slightly spaced slabs of roadway and deck structures. A joint seal and end dam includes a pair of elongate elastomeric side pads secured to the upper surfaces of the slabs, and an integral elastomeric bridging joint membrane spanning the gap between the slabs. The joint membrane assumes an upstanding arched configuration in transverse cross section. When the slabs move relative to each other, as at longitudinal, transverse or skewed joints, in all design positions of movement of the joint membrane and the slabs, substantially no reaction force is exerted on the slabs, and the side pads or on the means securing the side pads to the slabs. The end dam is self-cleaning. Such an end dam is made in sections configured to be sealingly secured in an end-to-end array, whereby an end dam assembly of substantial length may be formed.

28 Claims, 19 Drawing Figures



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Fig. 1

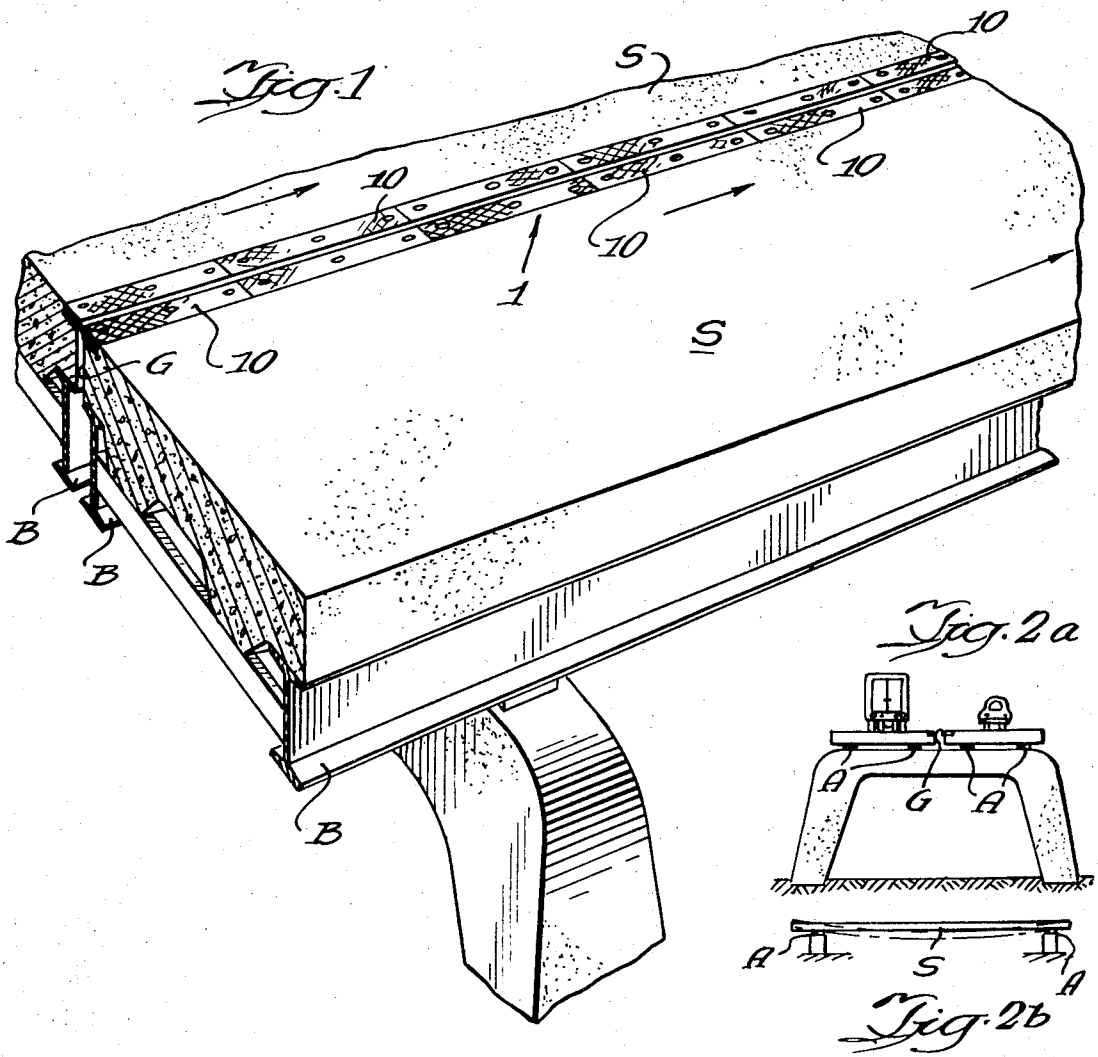


Fig. 2a

Fig. 2b

Fig. 3

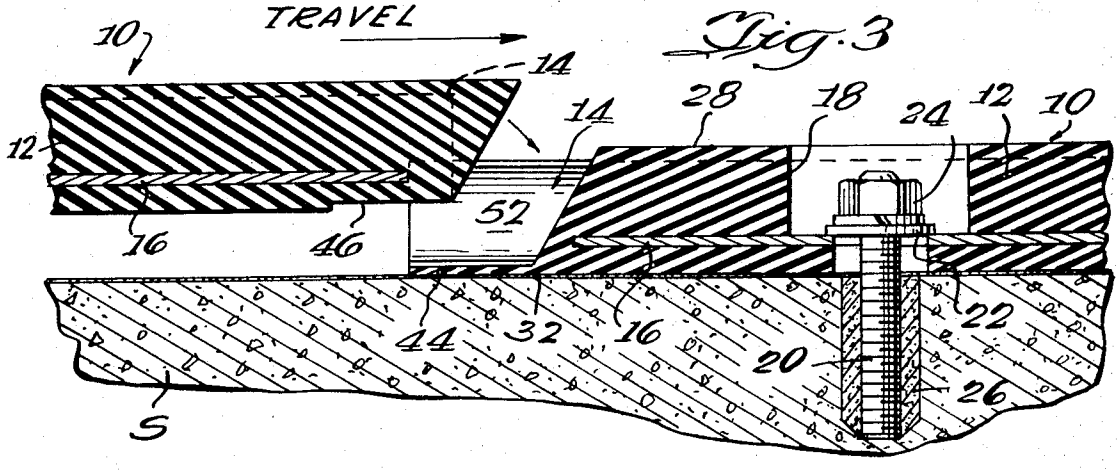


Fig. 6

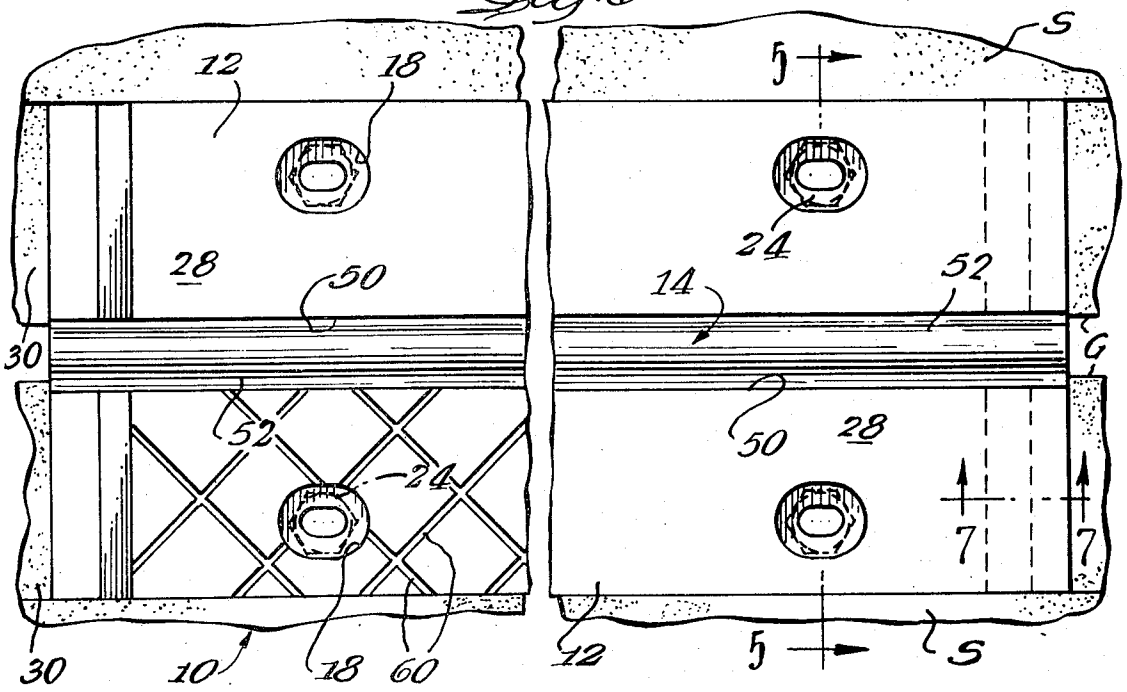


Fig. 4

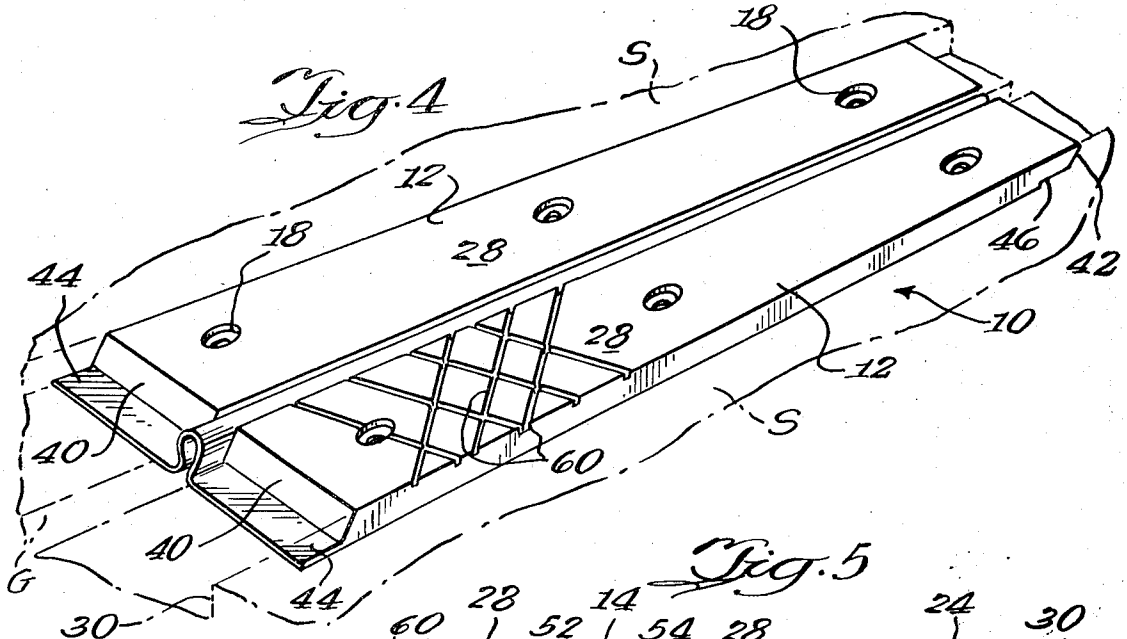
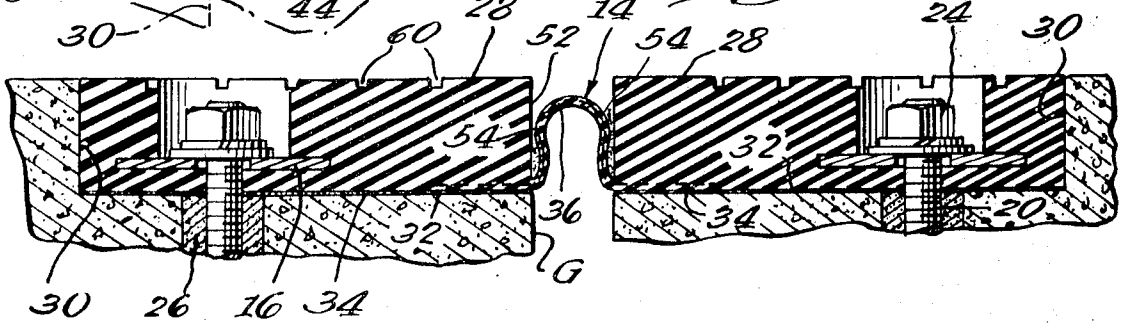


Fig. 5



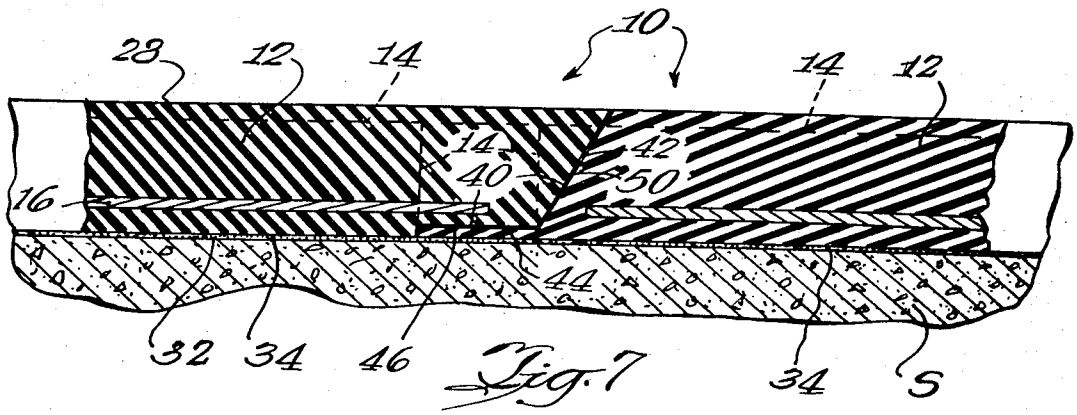


Fig. 7

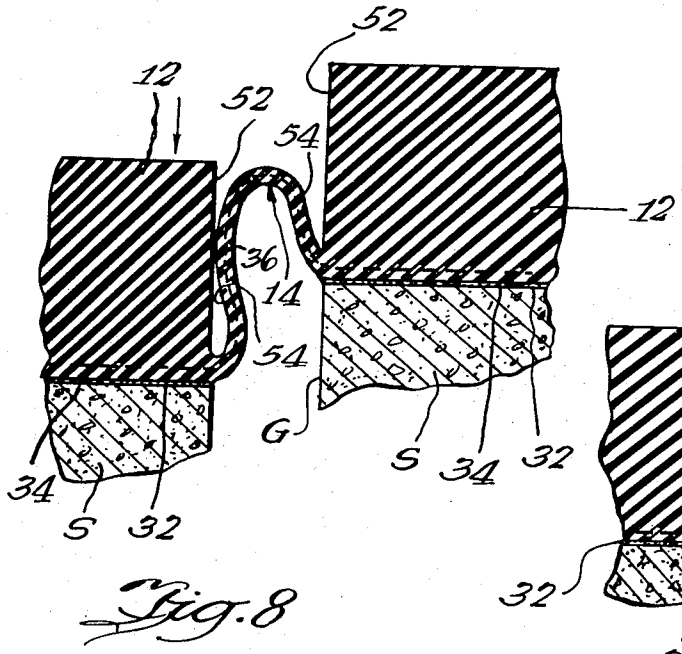


Fig. 8

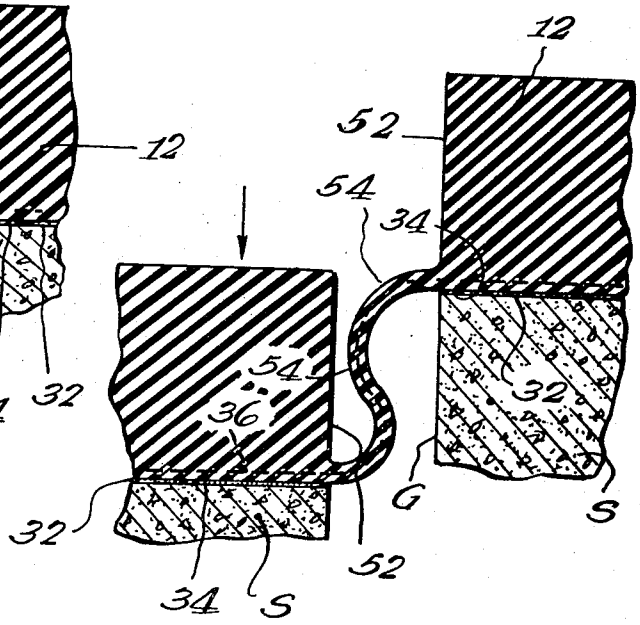


Fig. 9

FIG. 10

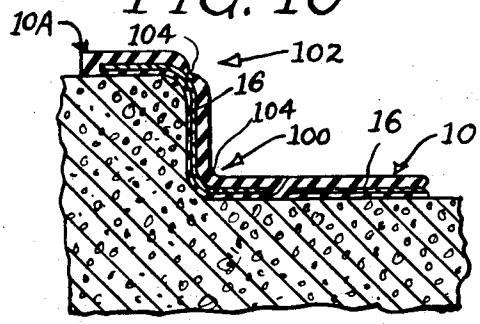


FIG. 12

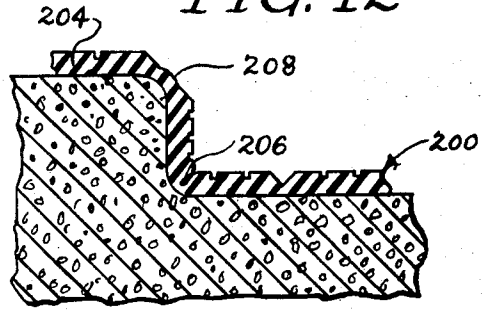


FIG. 13

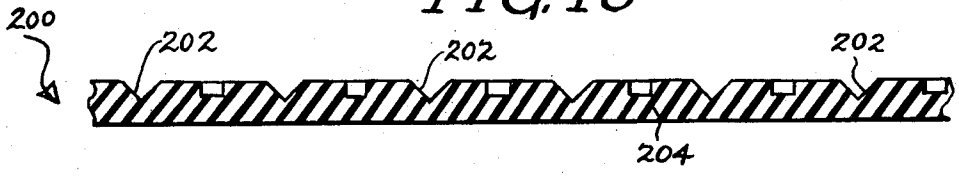


FIG. 11

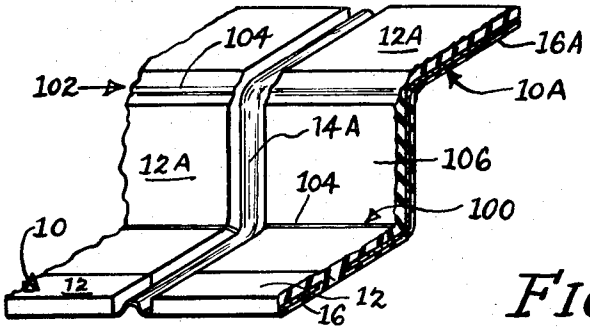


FIG. 16

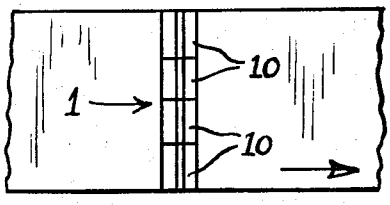


FIG. 18

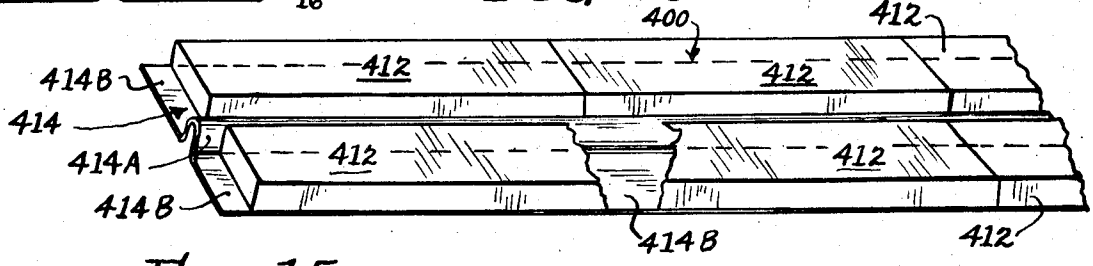


FIG. 15

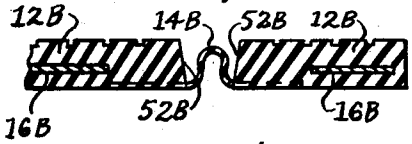


FIG. 17

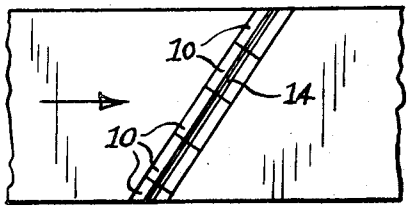
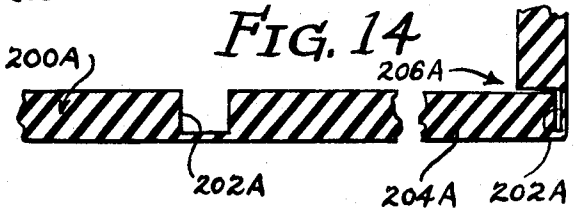


FIG. 14



ROAD JOINT SEAL AND END DAM CONSTRUCTION

This application is a continuation-in-part of U.S. Patent application Ser. No. 141,518 filed on May 10, 1971. and now abandoned.

This invention relates to an improved roadway joint assembly, and particularly to an end dam assembly for sealing a narrow gap between adjacent roadway or deck slabs, such as longitudinally disposed or transversely disposed gaps.

An increasing number of highways today are elevated and comprise deck structures supported on piers, archways, and the like. Such elevated deck structures are encountered on bridges as well. Because many such roadways and deck structures are multilane in width, and because it is not feasible to form a unitary slab equal to the width of the entire roadway or deck structure, many such deck structures today are made of a plurality of adjacent slabs, each being two or three lanes in width. The slabs are positioned next to each other, but are spaced slightly to provide a narrow, vertical, longitudinally extending gap between them.

In many environments it is desirable to seal that narrow gap. That is desirable, not only to protect the edges of the slabs themselves, as from spalling, but also to protect the slab supports, and to prevent passage of material from the deck surfaces to whatever may be beneath the deck structure.

Because such deck structures are frequently supported on flexible stringers (such as I-beams) on spaced bridge pads or the like, the deck slabs, which are generally horizontally disposed, may move longitudinally and vertically. They move longitudinally in response to temperature changes and the like. They move vertically, particularly between the longitudinally spaced pads or supports, due to different traffic loads in the various lanes. Because laterally spaced adjacent slabs are supported individually for such movement, adjacent slabs may move in a vertical direction relative to each other. Such differential movement may occur, for example, when one of a pair of adjacent slabs is heavily loaded with trucks, while the other may be carrying only automobiles.

Because of this differential vertical movement, great difficulties have been encountered in seeking to seal the gap between the adjacent slabs.

In accordance with this invention, a longitudinal end dam assembly is provided, which assembly is especially adapted to seal and bridge such a longitudinal roadway gap and which is adapted to accommodate differential vertical movement of adjacent roadway and deck slabs without injury either to the slabs themselves or to the end dam assembly. The end dam assembly may also be used in transverse joints as a gap joint seal.

The assembly includes a pair of spaced parallel pad members, one secured to each of the adjacent upper edges of adjacent slabs, and an interconnected joint membrane sealingly bridging the space or gap between the pads. The membrane is proportioned to accommodate the differential vertical movement and lateral movement between adjacent slabs. Preferably the pads and membrane are integrally molded of an elastomeric material, such as neoprene rubber. The end dam assembly is designed to be self-cleaning, in normal traffic usage, of debris and foreign particles.

To accommodate substantial lengths of roadway and deck slabs, the end dam assembly desirably comprises a series of end dam sections sealingly secured to each other in an end-to-end array, thereby to provide a continuous elongate end dam assembly commensurate in length with the length of any slabs which may be encountered.

Further objects, advantages, and features of this invention will become apparent from the following description and drawings, of which:

FIG. **1** is a fragmentary perspective view of a section of a deck structure incorporating a longitudinal end dam assembly of this invention;

FIGS. **2***a* and **2***b* are schematic end and side views, respectively, of a deck structure in which a longitudinal end dam assembly of this invention may be incorporated;

FIG. **3** is an enlarged fragmentary view of an installed end dam section with which the end of a next adjoining end dam section is to be juxtaposed;

FIG. **4** is an enlarged perspective view of an end dam section ready to be secured to adjacent deck slabs;

FIG. **5** is an enlarged cross-sectional view taken substantially along the line **5—5** of FIG. **6**;

FIG. **6** is a plan view of FIG. **5**;

FIG. **7** is a view similar to FIG. **3**, but taken substantially along the line **7—7** of FIG. **6**;

FIG. **8** is an enlarged fragmentary view similar to FIG. **5**, showing a position of relative vertical movement of adjacent deck slabs with respect to each other;

FIG. **9** is another view similar to FIG. **5**, showing further relative vertical movement from the position of relative vertical movement illustrated in FIG. **8**;

FIG. **10** is a cross-sectional view of an end dam assembly of this invention installed at a curb of a roadway;

FIG. **11** is a perspective view of the end dam assembly of FIG. **10**;

FIG. **12** is a cross-sectional view of a further end dam section installed at a curb of a roadway;

FIG. **13** is an enlarged cross-sectional view of the end dam section of FIG. **12** before installation;

FIG. **14** is a view similar to FIG. **12** of a further end dam section adapted to be installed at a roadway curb;

FIG. **15** is a cross-sectional view similar to FIG. **5**;

FIG. **16** illustrates an end dam assembly of this invention in a transverse roadway joint;

FIG. **17** illustrates an end dam assembly of this invention in a substantially skewed transverse roadway joint; and

FIG. **18** is a perspective view illustrating a further end dam assembly of this invention.

A longitudinally installed end dam assembly of this invention is generally illustrated in FIGS. **1** and **2**. The assembly is most beneficially used to form a longitudinal joint between adjacent, elongate deck slabs which are elevated and supported, as on beams resting on piers, arches or other supporting structures. Slabs of this character are most frequently encountered on bridges, on elevated highways and the like, and the need for selling longitudinal joints is most frequently encountered on multilane highways where it is either impossible or unfeasible to cast an entire width of multilane roadway or deck structure in one section. It is to be understood that the term "longitudinal" is used

herein in the sense of the direction of travel of vehicles using the roadway or deck structure.

On such highways, slabs S are spaced slightly apart and are generally horizontally disposed, although the upper surface may be somewhat inclined depending on the location of the road. The slabs S are supported for that movement which is necessary to accommodate changes in length due to temperature changes, and also to accommodate that vertical movement which occurs on bridge pads or on other suitable supports A. Because such slabs S are usually integrated with flexible stringers (such as I-beams B), which span longitudinally spaced supports A, the slabs will flex or bend, as schematically illustrated in FIG. 2*b*. That results in relative vertical movement, most noticeably intermediate supports A. Frequently vertical movement of slabs S of from about one-half to about 1½ inches (a very substantial movement to be accommodated by a seal) will occur, depending upon the nature of the supports A, upon the load carried by the slabs S, the location of the load, and the length of the slabs.

In FIGS. 1 and 2*a* it is seen that there is a vertical space or gap G between adjacent slabs S. This gap is formed during pouring of the concrete and may vary in width along its length. It is this gap which the longitudinal end dam assembly 1 bridges and seals.

End dam assembly 1 comprises a plurality of longitudinally disposed, elongate end dam sections **10**, each of which sections comprises a pair of spaced, longitudinally extending parallel side pads **12** joined centrally by a gap-bridging, longitudinally extending joint membrane **14**. Membrane **14** is very substantially thinner than the side pads **12** (as is seen in the drawings) and is secured to the side pads adjacent the lower edges of the side pads. Side pads **12** secure the sections **10** to the slabs S, and act as an armor or dams for the road surface edges to prevent crumbling, spalling, and the like.

Preferably each end dam section **10** is integrally formed, as by being extruded or molded of a suitable elastomeric material, such as rubber or a polychloroprene or neoprene rubber.

Each side pad **12** is generally rectangular in transverse cross section (see FIG. **5**) and embeds an elongate, longitudinally extending reinforcing plate **16**. Plates **16** extend substantially the entire length of side pads **12** and are parallel to the upper surfaces of the slabs. Plates **16** serve to distribute the anchoring stud load between the anchoring studs **20**. Each side pad defines a suitable plurality of bolt holes **18**, such as three, which are proportioned to accommodate and receive a threaded anchoring stud **20**, washers **22**, and a nut **24** to assist in bolting and securing side pads **12** to the edges of the deck slabs S adjacent gap G. Studs **20** may be suitably secured in deck slab S, as by an epoxy-cement grout **26**, in a known manner, and the bolt holes may later be filled with a suitable compound, such as a flexible epoxy or a vulcanizable liquid rubber, which will bring the holes up to the level of the lower surfaces of grooves **60** in the side pad upper surfaces **28**.

The upper surfaces **28** of the side pads **12** actually serve as roadway or deck surfaces. Accordingly, when finally, installed, the upper surfaces **28** of side pads **12** should desirably be parallel to and level with the upper surface of the slabs. Because of the manner in which adjacent slabs are formed, the gap may not be precisely centered along its entire length between the slabs. Accordingly, when the side pads are installed, their inner vertical surfaces will not necessarily be in precise alignment with the gap surfaces.

When the end dam sections are installed in preexisting or finished cast slabs, the edges of the slabs adjacent gap G must be scarified (and then built up to level if necessary) to form edge notches **30** substantially the same size and shape as the side pads (see FIG. **5**). After installation it may be necessary to back fill the notches to completely fill any space between the outer side pad edges and the confronting vertical notch edges. If the final road wearing surface is to be such as of asphalt or macadam, which is deposited on the surface of a concrete or asphaltic concrete slab, then end dam sections **10** may simply be secured in position, after which the road wearing or surfacing material, such as asphalt or the like is deposited up to the level of the upper surface **28** of the side pads and against the outer edges of the side pads.

Because the upper surfaces **28** form part of the roadway surface, to provide for maximum traction, surfaces **28** are suitably patterned or grooved as with grooves **60**. To minimize retention of water on those surfaces during wet weather, the grooves **60** are angularly disposed rather than longitudinally disposed with respect to the direction of travel of vehicles, thereby to direct water away from surfaces **28** and into the membrane area as quickly as possible, thereby to assist in cleaning and washing the gap area. The angular disposition of grooves **60** also enhance traction of vehicle tires, and the patterning may be such as to create an audible, alert or warning signal.

To secure the end dam sections to the slabs S most effectively, it is desirable to adhere them (as well as bolt them) to slabs S. As such, and as illustrated in the drawings, an adhesive layer **32**, such as a suitable neoprene adhesive, is applied intermediate the lower surfaces **34** of pads **12** and the confronting slab surfaces surfaces. Where the slab is notched, as at **30**, the adhesive layer **32** may also be provided on the vertical wall of the notch.

When so secured and positioned, side pads **12** not only seal against the passage of dirt and water under the pads and downwardly through the gap G, but also protect the edges of the slabs adjacent gap G from spalling, i.e., from breakage and crumbling.

As stated, in the embodiment illustrated, joint membrane **14** is integrally formed with side pads **12**, and when installed, generally assumes the configuration illustrated in FIG. **5**. Preferably, the joint membrane **14** embeds a fabric layer **36**, such as a woven polyester fabric, to enhance its tear strength, dimensional stability, wear, cut and abrasion resistance, and service life. The entire end dam section may be assembled of uncured rubber elements, appropriately embedding a fabric layer **36** and plates **16**, after which the uncured rubber is cured, as by vulcanizing it. More than one fabric layer may be used where desired.

Because deck slabs are frequently one hundred or more feet in length, it is not feasible, and frequently not desirable, to provide end dam sections **10** which are commensurate in length with such slabs. For example, an integral assembly **1** with one elongate reinforcing

plate **16**, one hundred or more feet in length, might tend to expand and contract in a manner which would destroy the joint seal. Accordingly, in a preferred embodiment, the longitudinal gaps between adjoining roadway slabs are bridged by and sealed with a plurality of end dam sections **10** disposed in an end-to-end array (see FIG. **1**). Each end dam section **10** is preferably formed so that each may be sealingly secured to the adjacent last preceding one, thereby to act cooperatively therewith to provide the necessary sealing effect at adjacent ends and across the gap G, and to provide for thermal expansion and contraction longitudinally of the array.

To so seal longitudinally adjacent sections **10**, preferably the end faces of the side pads are bevelled or tapered. One end of the side pads **12** has first tapered end faces **40** and the other end has second tapered end faces **42**, the tapers of which are complementary. Adjacent the end providing end faces **40**, joint membrane **14** projects outwardly and integrally with additional longitudinal seal segments **44**. The lower surfaces of side pads **12** at the end providing end faces **42** define notches **46** to receive the seal segments **44**. When adjacent section ends are juxtaposed from the position of FIG. **3** to assume the position, for example, of FIG. **7**, portions of joint membranes **14** of adjoining end dam sections will overlie each other, and seal segments **44** will underlie and fit within notches **46**. Then a suitable adhesive, such as neoprene adhesive layer **50**, is interposed between confronting end faces **40** and **42**, between overlapping areas of adjacent joint membranes **14**, and between seal segments **44** and notches **46**, a secure, watertight, and substantially permanent joint will be formed between adjoining end dam sections **10**.

As such, a suitable number of end dam sections **10** may be joined together to form a sealed, gap-bridging longitudinal end dam assembly commensurate in length with any usual length of deck slabs.

An end dam section **10** has been designed in accordance with this invention. It is four feet in length. The side pads **12** are approximately five inches by 1½ inches in transverse cross section. The joint membrane **14** is approximately three thirty-seconds inch thick, includes a woven polyester fabric layer **36**, and is formed integrally with the side pads adjacent the lower surfaces of the side pads. The joint membrane **14** is molded with a slight crown, thereby to insure flexing in the direction necessary to assume the position of FIG. **5**, i.e., the upstanding arched configuration, illustrated in this embodiment as a generally U-shaped configuration. When the side pads are installed with a spacing of approximately three-fourths inch between them, the width of the gap G between roadway slabs S, the apex of the joint membrane **14** reaches almost to the level of the upper surfaces **28** of the side pads, generally as illustrated in FIG. **5**. Steel reinforcing plates **16** are positioned one-fourth inch above the lower surface **34** of the side pads, are about one-eighth inch thick by three inches wide, and are positioned generally as illustrated in FIG. **5**.

The side pads and membrane are so configured, dimensioned and arranged that within the design range in all positions of movement of the slabs, hence of the membrane, the membrane is substantially untensioned, thereby transmitting no significant reaction load to the studs or adhesive, and exerting no significant load on the side pads or on the slabs. That makes it possible in many cases to install the assembly even when the roadway surface is in use.

Referring now to FIGS. **5**, **8** and **9**, an installed end dam section **10** will initially assume substantially the position illustrated in FIG. **5**. As the generally horizontal slabs S move vertically relative to each other, such as from the position of FIG. **5** to that of FIG. **8**, joint membrane **14** becomes distorted, such as in the manner schematically illustrated in FIG. **8**. Such distortion tends to lift out and elevate debris, dirt, gravel, water, and the like which has collected in the longitudinally trough-like spaces between the pad side edges **52** and the confronting membrane surfaces **54**. The discharge of these materials eliminates their continued packing into place, with the attendant potential of destruction of the end dam sections and impairment of their sealing function.

As has been pointed out, the end dam assembly of this invention serves both as an end dam and as a high quality joint seal. As seen in FIG. **5**, for example, the outer edges of the dam pads abut the roadway material (at notch **30**). The resilient end dam pads provide resilient surfaces against which the roadway material, such as asphalt or concrete or the like, acts to cushion shock loads, thereby to minimize spalling at the abutting surfaces. Because the end dam assembly of this invention does not transmit significant loads to the roadway, it anti-spalling characteristics are further improved as compared to existing dam and seal assemblies, such as those illustrated in U.S. Pat. Nos. 3,316,574, 3,324,774, 3,555,981 and Re. 26,733.

Indeed, the end dam assembly of this invention is adapted to seal not only longitudinal joints, but zero degree skew transverse joints (FIG. **16**) and substantially skewed transverse joints (FIG. **17**) as well, in all cases without transmitting significant loads to the side pads **12** or to the roadway surfaces to which they are secured. That fact enhances the utility of the end dam assembly in that it may frequently be installed on a roadway surface without the necessity of diverting traffic from both of the slabs to which the end dam assembly is to be secured. The relative movement which may be encountered will not, in the vast majority of cases, move or act upon the side pads sufficiently to disturb their securance to the roadway surfaces.

The use of elastomeric side pads integrated with the highly flexible bridging membrane provides an assembly which may be easily installed in longitudinal and transverse gaps, and even across a roadway gap and upwardly along adjacent curbing, unlike devices such as those illustrated in U.S. Pat. No. 3,570,378.

It should be noted that in a substantially skewed joint (FIG. **17**) transverse and longitudinal components of force act upon the membrane **14**. Within the design range for a given section **10**, those force components will not transmit substantial loads to the pads **12**, to the bolts or to the roadway surfaces when an assembly **1** is installed at a skew.

Referring now to FIGS. **10** and **11**, an end dam assembly of this invention when used as a seal in a transverse or skewed joint (FIGS. **16** and **17**), may comprise a suitable plurality of end dam sections **10** which ter-

minate at one side adjacent curbing. So that the gap between the adjacent curbing portions of the slabs may also be sealed, a suitably formed end dam section **10A** may be provided. End dam section **10A** is proportioned and constructed so that it may be bent transversely of its length into L-shaped configurations and generally to the shape illustrated in FIG. **10**, i.e., to form inside and outside corners **100** and **102**, respectively.

Section **10A** is proportioned so that it may be so bent even though the metal reinforcing plates **16A** are present. To facilitate bending the end dam section **10A** into the configuration illustrated in FIGS. **10** and **11**, particularly where metal plates **16A** are present, it is desirable to transversely notch the side pads **12A**, as with V-notches **104**. The notches **104** extend downwardly to just above the level of metal plates **16A** so that the plates **16A** remain embedded in the rubber. At inside corner **100** notch **104** will be closed. At outside corner **102**, notch **104** will be opened. In each case, the joint membrane **14A** will retain its integrity sufficiently to seal the gap at the corners **100** and **102** and in the vertical section **106**.

Because the roadway surface closely adjacent curbing is not normally traversed by traffic, as is the main body of a transverse end dam assembly, the joint membrane **14A** in the vicinity of the curb is not subjected to the same abuse to which a joint membrane **14** across or in the main roadway surface is subjected. Neither are the side pads **12A** subjected to the same abuse or the substantial stresses encountered in the main roadway surface. Accordingly, it is possible to utilize end dam sections **200** at the curb area which do not incorporate metal reinforcing plates **16** or **16A**, and that is illustrated in FIGS. **12** and **13**. End dam section **200**, except for the absence of metal plates, may be substantially identical to end dam section **10A** and, accordingly, is suitably notched (as with V-notches **202** transversely of the dam pads **204**) to facilitate bending into inside and outside corners. The side pads may provide suitable bolt holes (not shown) for securing the side pads to the curb. When the end dam section **200** is secured in place, as in the manner illustrated in FIG. **12**, at an inside corner **206**, the notches **202** close and, at an outside corner **208**, the notches **202** open.

At the left-hand side, FIG. **14** illustrates a further end dam section **200A** defining a rectangular notch **202A**. At the right-hand side of FIG. **14**, the side pad **204A** has been repositioned to form an inside corner **206A** at the intersection of a curb and a horizontal roadway surface, notch **202A** having provided the means whereby a sharp right angle bend or corner **206A** was obtained. As was the case with the embodiment of FIGS. **12** and **13**, no reinforcing metal plate is present.

FIG. **15** is a view similar to FIG. **5**. It illustrates an embodiment in which the side pad edges **52B** of pads **12B** taper slightly upwardly and away from the confronting joint membrane **14B**, as at an angle of about 10°, thereby to enhance the dirt and water discharging characteristics of an end dam assembly in which such an end dam section **10B** is used. Each pad **12B** incorporates a reinforcing plate **16B**.

FIG. **18** illustrates a further embodiment of this invention in which a longitudinal or transverse end dam assembly **400** is formed of a plurality of elongate side pad elements **412** and an elongate joint membrane member **414**. Joint membrane **414** includes a central upstanding arched portion **414A** and outwardly extending seal elements **414B**. In this embodiment, each pad element **412** is substantially identical to pad elements **12**, and each defines suitable bolt holes and includes a suitable metal reinforcing plate. The elongate joint membrane member **414** is separately formed. For example, where the side pad elements **412** may each be about 4 feet in length, the joint membrane member **414** may be as much as 40 feet or more in length. As such, its seal elements **414B** may be secured, as at an installation site, to a plurality of side pad elements **412**, to form an integrated end dam assembly **400**.

The end dam assemblies of this invention provide a number of advantages, many of which have been referred to, and others of which will be apparent from the foregoing description. It should be noted that the inner confronting edges of the side pads are free of metal, the metal plate **16** being located inwardly and downwardly of the upper inner side pad edges. As such, when vehicles cross a transverse end dam assembly of this invention, the rubber edges will deform, thereby eliminating the characteristic thumping sound in gap bridging constructions currently in vogue. Furthermore, the resiliency of the side pad rubber will cause it to deflect when contacted, as by a snow plow blade or the like, reducing the likelihood that a plow blade might lift the assembly out of place, as can be the case with rigid gap bridging constructions when they are contacted by a plow blade or the like.

The self cleaning characteristics of end dam assemblies in accordance with this invention have already been referred to. Indeed, especially in cold weather when the membrane has flattened somewhat due to the contraction of the slabs, if a stone is driven downwardly by a tire into the membrane, the resiliency of the membrane tends to spring the stone out of the joint and onto the roadway, cleaning the joint and increasing the life of the end dam assembly.

It will be apparent to those skilled in the art, from the foregoing description of several embodiments that modifications may be made without departing from the spirit and scope of this invention and, accordingly, it is intended that the scope of this invention shall be limited only in accordance with the claims.

What is claimed is:

1. A deck joint assembly comprising a pair of generally horizontally disposed elongate adjacent slabs supported for movement relative to each other, providing upper roadway surfaces, and being positioned beside each other, said pair of slabs being narrowly spaced from each other to define a narrow gap therebetween, and an end dam assembly secured to said slabs at adjacent edges sealingly bridging said gap, said end dam assembly comprising elongate end dam sections sealingly secured to each other in an end-to-end array, means sealingly securing said end dam sections to each other, each of said end dam sections comprising a pair of elongate elastomeric side pads having their lower surfaces sealingly secured to upper surfaces of said slabs and being secured at the edges of said slabs adjacent said gap, and having their upper surfaces generally level with the upper roadway surface of said slabs thereby to serve as a roadway surface, each said slab defining a notch at said gap edge within which a

side pad is disposed, said pads being generally parallel to each other and being spaced apart adjacent said gap, a thin elongate, elastomeric joint membrane sealingly secured to each of the side pads and sealingly spanning said gap, said joint membrane being substantially thinner than said side pads and being highly flexible and having a configuration in transverse cross section of an upstanding arch whereby in all design positions of movement of the membrane and the slabs, substantially no reaction force is exerted on the side pads or on the means securing said pads to said slabs, each said side pad including an elongate, expansive reinforcing member extending substantially along the length of the side pad, and anchoring means for anchoring said side pads to said slabs, each said side pad defining a resilient inner surface confronting a surface of said joint membrane, and said reinforcing members being spaced away from said resilient inner edges.

2. A deck joint assembly in accordance with claim 1, wherein each of said side pads has a reinforcing member of metal embedded therein, said member being substantially parallel to the upper roadway surfaces of said slabs.

3. A deck joint assembly in accordance with claim 1, wherein at one end of each section, thin membrane segments project longitudinally from the side pads to underlie and to be sealingly secured to lower surfaces of the next adjoining side pads, thereby sealingly securing said end dam sections to each other.

4. A deck joint assembly in accordance with claim 3, wherein opposite ends of the side pads define complementarily bevelled end faces, and said end faces of adjacent end dam sections are sealingly secured to each other.

5. A deck joint assembly in accordance with claim 1, wherein joint membranes of adjacent end-to-end, end dam sections overlap each other and are adhesively and sealingly secured to each other.

6. A deck joint assembly in accordance with claim 1, wherein said joint membrane embeds a fabric layer.

7. A deck joint assembly in accordance with claim 1, wherein said side pads and joint membrane are integrally formed of rubber.

8. A deck joint assembly in accordance with claim 7, wherein said side pads and joint membrane are integrally molded.

9. A deck joint assembly in accordance with claim 1 wherein said end dam sections are positioned at slab edges along a longitudinally extending roadway gap.

10. An elongate end dam section for securance to spaced, closely adjacent roadway slabs supported for relative movement with respect to each other, said end dam section being adapted to be sealingly secured to a next preceding end dam section and to the adjacent roadway slabs, said end dam section comprising a pair of generally parallel, spaced apart elongate elastomeric side pads, each side pad defining an expansive upper surface adapted to serve as a roadway surface and a lower surface adapted to be sealingly secured to a roadway slab, and each side pad including an elongate, expansive reinforcing member extending along the length of the side pad and defining means for securing said end dam section to slabs, a Thin elongate elastomeric flexible joint membrane sealingly secured to said side pads for sealingly spanning a gap between roadway slabs, said thin joint membrane having an upstanding arched configuration in transverse cross section, said membrane being highly flexible and very substantially thinner than said side pads and being proportioned to flex and to move without exerting substantial reaction forces on said side pads, each side pad defining a resilient inner edge confronting a surface of said joint membrane, said reinforcing members being spaced away from said resilient inner edges.

11. An elongate end dam section in accordance with claim 9, wherein each of said side pads embeds a said elongate reinforcing member, and said members are metallic, and each of said side pads and reinforcing members defines a plurality of aligned bolt holes for securing said end dam section to slabs.

12. An elongate end dam section in accordance with claim 10, wherein said side pads and said joint membrane are integrally molded of rubber.

13. An elongate end dam section in accordance with claim 10, wherein at one end, thin membrane segments project longitudinally from the side pads, said membrane segments being adapted to underlie and to be sealingly secured to lower surfaces of next adjoining side pads, thereby to facilitate sealing securance of adjacent end dam sections to each other.

14. An elongate end dam section in accordance with claim 10, wherein opposite ends of the side pads define complementarily bevelled end faces.

15. An elongate end dam section in accordance with claim 10, wherein said joint membrane embeds a fabric layer.

16. An elongate end dam section in accordance with claim 10, wherein said side pads and said joint membrane are integrally formed of rubber.

17. An elongate end dam section in accordance with claim 10 wherein said joint membrane is secured to said side pads adjacent their lower edges and the side pad edges confronting the upstanding arched section of said joint membrane taper upwardly and away from said membrane.

18. An elongate end dam section in accordance with claim 10, wherein each side pad contains a said elongate expansive reinforcing member of metal extending along substantially the entire length of the side pad and defining a plurality of aligned holes in said side pad and said reinforcing member for securing said side pad to a roadway slab, said reinforcing members lying generally parallel to the upper and lower surfaces of said side pads, said membrane lying entirely below the level of the upper surface of said side pads, the resilient inner edges of the side pads confronting surfaces of said joint membrane to define resilient, upwardly opening spaces from which debris may be discharged extending along the length of said end dam section, said metallic reinforcing members being spaced away from said resilient inner edges and away from said joint membrane.

19. An elongate end dam section in accordance with claim 18 wherein said reinforcing members lie closer to said lower surfaces than to said upper surfaces and wherein said joint membrane is sealingly secured to said side pads at said inner edges in the lower regions thereof.

20. An elongate end dam section in accordance with claim 18 wherein said joint membrane embeds a fabric layer and projects longitudinally beyond said side pads

wherein joint membranes of adjacent end-to-end dam sections are adapted to overlay each other and to be adhesively and sealingly secured to each other.

21. An elongate end dam section in accordance with claim 20 wherein said side pads and said joint membrane are integrally molded of rubber.

22. A joint assembly comprising a pair of generally horizontally disposed elongate adjacent slabs supported for relative movement and providing upper roadway surfaces, said pair of slabs being narrowly spaced from each other to define a narrow gap therebetween, and an end dam assembly secured to said slabs at adjacent edges sealingly bridging said gap, means sealingly securing said end dam assembly to said slabs, said end dam assembly comprising elastomeric side pads secured to the slab edges adjacent said gap, said pads being parallel and spaced apart adjacent said gap and being disposed within notches in said slabs at said gap edges, a thin elastomeric joint membrane sealingly secured to said side pads and sealingly spanning said gap, said joint membrane being substantially thinner than said side pads and assuming an upstanding arched configuration in transverse cross section, whereby in all design positions of movement of the membrane and the slabs, substantially not reaction force is exerted on the side pads or the means securing said assembly to said slabs, said joint membrane being integrally formed to span a very substantial length of said gap, said side pads being very substantially shorter than said membrane, each side pad being formed of a plurality of side pad elements sealingly secured in end-to-end relation.

23. A joint assembly in accordance with claim 22, wherein said joint membrane assumes an inverted, generally U-shaped configuration in transverse cross section.

24. A joint assembly in accordance with claim 22, wherein opposite ends of the side pad elements define complementarily bevelled end faces, and said end faces of adjacent end dam sections are adhesively secured to each other.

25. A joint assembly in accordance with claim 22, wherein said joint membrane embeds a fabric layer.

26. An elongate end dam section for securance to spaced, closely adjacent roadway slabs supported for relative movement with respect to each other, said end dam section being adapted to be sealingly secured to a next preceding end dam section and to the adjacent roadway slabs, said end dam section comprising a pair of parallel, spaced apart elongate elastomeric side pads, each defining an expansive upper surface adapted to serve as a roadway surface, a thin elongate elastomeric flexible joint membrane sealingly secured to said side pads for sealingly spanning a gap between roadway slabs, said thin joint membrane assuming an upstanding arched configuration in transverse cross section, said membrane being very substantially thinner than said side pads and being proportioned to flex and to move without exerting substantial reaction forces on said side pads, and wherein said section is bent transversely of its length into a generally L-shaped configuration to sealingly span a gap at the edges of said slabs and at adjacent curving.

27. An elongate end dam section in accordance with claim 26, wherein each of said side pads embeds an elongate metal reinforcing member, and each of said side pads and reinforcing members defines a plurality of bolt holes for securing said end dam section to slabs.

28. An elongate end dam section in accordance with claim 26 wherein said dam pads of said end dam section are transversely notched to facilitate bending into an L-shaped configuration.

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