Aug. 13, 1946. G. C. MORTENSON 2,405,844

EXPANSION AND CONTRACTION JOINT

Filed Nov. 29, 1944

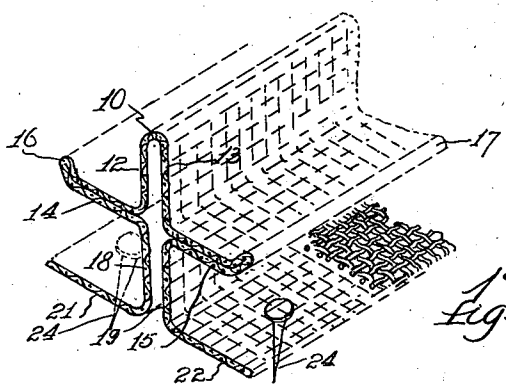


Fig. 1.

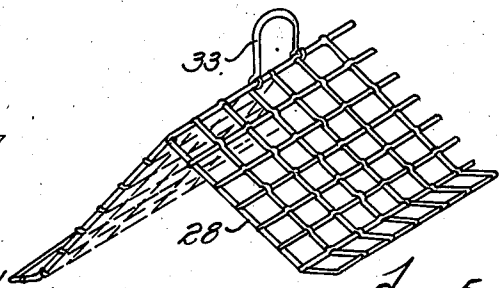
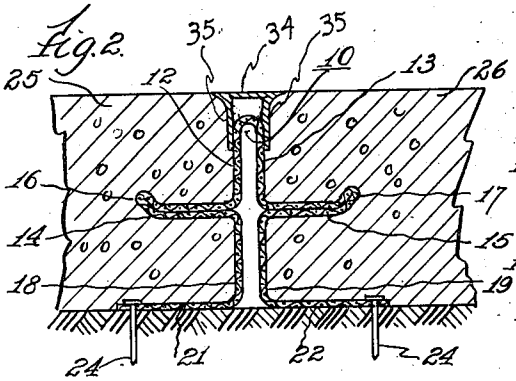


Fig. 5.

Fig. 2.



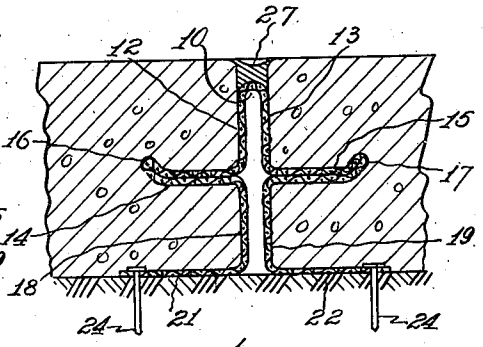


Fig. 3.

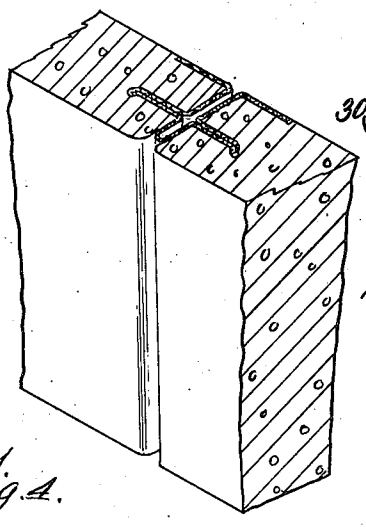


Fig. 4.

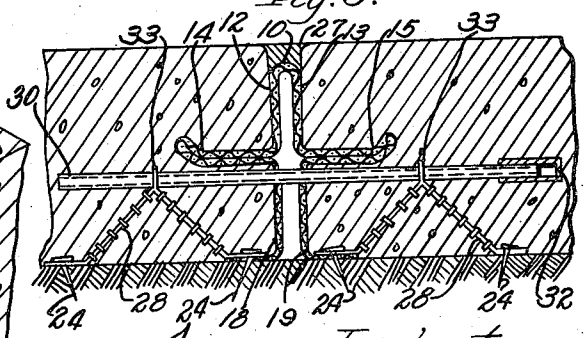


Fig. 6

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Patented Aug. 13, 1946 2,405,844

UNITED STATES PATENT OFFICE

2,405,844

EXPANSION AND CONTRACTION JOINT

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Application November 29, 1944, Serial No. 565,673

6 Claims. (Cl. 94—8)

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My invention is directed to expansion joints for concrete or composition pavements or for walls, the illustration in the drawing exemplifying one particular form thereof adapted for concrete pavements, roads or the like.

One of the objects of my present invention is the provision of an expansion joint unit or structure which is adapted to be manufactured, packed and shipped with its respective parts maintained separately and unassembled, and which have structural features providing for quick and easy assembly on the location of the job with a minimum amount of labor and adapted to meet varying conditions of particular jobs.

A further object of my invention is the provision of an inexpensive expansion joint for roads, pavements or walls which is formed of a novelly bent and fabricated strip member made of a continuous single piece of metal fabric, or of a foraminated sheet having spaces therein of sufficient size to permit inflow and locking engagement of sand, gravel or other particles of the wet poured concrete. The said novel expansion joint includes a pair of oppositely directed integral base members formed from the edge portions of the metal fabric strip, and through the spaces of which suitable spikes, stakes or the like may be driven to engage into the ground or other supporting surface to temporarily support and secure the expansion joint in its desired position preceding the pouring of the concrete.

A further object of my invention is provision of an expansion joint having the aforesaid base elements or members as well as oppositely and transversely extending anchoring flanges or anchoring webs which are preferably formed integral with the intermediate part of the sheet or strip of metal fabric, the said joint having a doubled back central portion or vertex which is normally disposed in a position a short distance below the upper level of the pavement or road so as to provide space for reception of a sealing plastic or equivalent material to seal the joint against entry of water and moisture.

Other and further objects of my invention will be apparent from the following description and amended claims:

On the drawing:

Fig. 1 is a perspective view of a relatively short section of one embodiment of my invention and which normally may be made from a single fabric strip.

Fig. 2 is a short section of a form of my metal expansion joint shown as anchored in and between two adjacent end portions of concrete road slabs.

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Fig. 3 is a cross sectional view of a road joint showing the adjacent end portions of two concrete slabs and illustrating a sealing element thereabove having a substantially concave surface.

Fig. 4 is a perspective and cross sectional view of a fragment of a vertically or upwardly extending wall illustrating one manner in which my novel joint may be mounted and anchored in the adjacent end sections of a concrete wall or the like.

Fig. 5 is a perspective and fragmentary view of an arch or dowel support made from a section of metal fabric and illustrating the position of the originally flat metal fabric after the same has been bent along a transverse line in the course of manufacture of the expansion joint illustrated in Fig. 6.

Fig. 6 is a cross sectional view illustrating my metal fabric expansion joint in normal positions in the adjacent end sections of typical concrete slabs and wherein such joints include connected metal fabric supports which are adapted to hold a dowel rod in supported position extending from one concrete slab to the other and extending through the substantially central portion of my metal fabric expansion joint.

Referring to the drawing, particularly Figs. 1 to 3 inclusive, reference numeral 10 generally designates the rounded ridge which is formed by folding or doubling back adjacent sections of the metal fabric, preferably woven fabric, and reference numerals 12 and 13 designate the integral downwardly extending wall sections. The metal fabric is then bent horizontally in opposite directions as indicated and then doubled back upon themselves to form transversely and substantially horizontally extending anchors, webs, wings or flanges 14 and 15 respectively.

As illustrated in Figs. 1 to 4 inclusive, the doubled back outer edges of the webs or anchoring flanges 14 and 15 are preferably though optionally bent or crimped upwardly along longitudinal lines a short distance inward from the doubled back edges to thereby form upturned flanges 16 and 17 respectively. The upwardly extending direction of these facilitate running or flowing of wet concrete into the spaces therebelow.

As shown in Figs. 1, 2 and 3 respectively, reference 18 and 19 designate upwardly and downwardly extending integral wall sections which preferably form a continuation of the doubled back webs 14 and 15 respectively, that is, ex-

tending from the underside of the anchoring webs or flanges 14 and 15 respectively. Said downwardly extending wall section 18 and 19 extend a short distance, preferably in substantial alignment with the upper wall sections 12 and 13 respectively, and extend to corners which may vary perceptibly in angle, though which are illustrated in Figs. 2 and 3 as being substantial right angles. The wall sections 18 and 19 merge into the substantially horizontally bent and directed oppositely extending base flanges or wings 21 and 22 which comprise the lateral edge areas of the entire unit and which are of a dimension so that the same preferably extend at least as far as the outer edge portions of the anchoring webs or flanges 14 and 15.

When it is desired to mount or position the said expansion joint upon the support ground or other base which has been leveled to the desired degree, the said expansion joint unit is placed in upstanding position, as illustrated in Figs. 1 to 3 inclusive, and the same preferably secured by spikes, stakes or the like which are designated as 24 and which are driven through apertures of the edge portion of the bases or flanges 21 and 22 at suitably spaced apart intervals to thereby mount said expansion joint unit so that the same will not move when the concrete mix is poured from either or both sides thereof. Reference numerals 25 and 26 designate or illustrate slabs of concrete only the fragmentary end sections of which are illustrated.

When the wet concrete mix is poured the same will readily run into the spaces between the bases 21 and 22 and the respective flanges 14 and 15, and as the expansion joint unit is formed of either woven wire fabric or foraminated metal, the stone, gravel and rock of the concrete mix readily position themselves in the spaces or apertures of the metal fabric and upon setting the anchoring webs or flanges 14 and 15 become firmly embedded and anchored in the adjacent slabs, and also as the concrete mix runs partially into the apertures of the metal fabric of the remaining parts of the expansion joint other than the ridge, the said respective parts upon setting of the mix, become secured to the respective slabs.

Preliminary to the pouring of the concrete mix about, adjacent and upon the joint which normally extends from one edge of each slab to the other edge, it is desirable to place suitable strips of wood or the like directly upon the ridge 10 so as to prevent the wet concrete mix from running over and upon the said ridge and so that upon later removal of said strip a relatively shallow space will be thereby provided for the reception of any suitable yieldable bituminous or mastic composition, or of a preformed sealing strip of yieldable mastic material which is generally designated Figs. 3 and 6 by the reference in numeral 27. The object and accomplishment of yieldable sealing element 27 is to prevent the entry of water into the space between the concrete slabs. In the case of uses of my expansion joint in vertical walls the said sealing element or strip 27 may be suitably mounted in the space between the ridge 10 and the corners of the slabs at the side surface of said slabs, as illustrated in Fig. 4.

In Fig. 6 I have illustrated one embodiment of my invention wherein the expansion joint unit includes a plurality of or pair of arched supports or chairs 28 which may be formed of wire or metal rods or fabric bent into the shape of an

inverted V. As illustrated in Figs. 5 and 6 the said arched supports are formed of a woven metal fabric bent substantially in the manner illustrated in Fig. 5 to form an upper apex extending longitudinally. The lateral edges thereof are bent forming ground engaging flanges which rest on the supporting ground or other surface. Only a fragment of the entire metal fabric support is illustrated in Fig. 5, it being understood that the same may extend from one lateral edge of the pavement or slab to the opposite lateral edge. One of said arched supports is positioned each side of the expansion joint member as shown in Fig. 6, preferably with the flanges thereof overlapping the base flanges 21 and 22 respectively. As is shown in Fig. 6, spikes 24 which hold or secure the central expansion joint member also are driven through the overlapped lateral edge areas of the adjacent arched support edges. One of the edge flanges of each arched dowel rod support is superposed upon the base flanges of said expansion joint. The said arched supports or stools 28 provide supporting means for suitable dowel rods 30 which extend from within one concrete slab into the other as illustrated in Fig. 6. Said dowel rods 30 extend through suitable holes or interstices in the downwardly extending wall sections 18 and 19. As in the case where the spaces of the wire fabric are sufficient the dowel rods are merely inserted therethrough.

As illustrated in Fig. 6, and in order to provide for longitudinal movement and of the dowel rods, or of the concrete slabs with respect to said dowel rods, a suitable substantially cylindrical sleeve-like cap 32 is mounted over one end and over each of said dowel rods 30 preliminary to the pouring of the concrete, and the cylindrical caps 32 are so positioned that a space remains between the ends of each dowel rod and the closed end of its metal cap. Such space is sufficient to provide for any normal expansion of the concrete slab. The end of each dowel rod fits reasonably snugly though to such degree that it forms a slidable bearing with the interior surface of the metal cap 32 mounted thereon.

As illustrated in Figs. 5 and 6, arched metal bails 33 are provided which are secured upon the apices of the arch supports 28 respectively at such spaced apart intervals as is desired in order to temporarily mount and retain the respective dowel rods 30 preliminary to the drawing and pouring of the concrete mix. The said bails 33 may be formed of wire or the like and will prevent rolling or undesirable movement of the dowel rods before or during the pouring of the mix.

As shown in cross section in Fig. 2, I provide a channel-like metal cap or sealing element 34 which is preferably pressed from a single strip of sheet metal of the desired length and which is quickly and easily positioned upon and about the ridge 10 of the expansion joint and so that the respective depending integral edge flanges 35 thereof either rest upon or engage the upper portion of said expansion joint substantially. Sealing caps 34 such as exemplified in Fig. 2 are positioned upon the respective expansion joints by merely pressing the same thereon so that the side flanges 35 pinch and frictionally engage the upper portion of the respective expansion joints during the form-making operation and prior to the pouring of the said mix. When the said mix is poured the position and the upper surfaces of the sealing caps 34 provide guides which aid in

the levelling of the upper surface of the concrete to the desired height. The said sealing caps 34 may be suitably corrugated, if desired or perforated (not shown) in instances where the builder desires to leave them in position permanently to form part of the expansion joint. It will be understood that the expansion on the adjacent slabs will likewise compress the side portions of said sealing caps simultaneously with the compression of the remaining parts of the entire expansion joint.

In instances where it is desired to mount a sealing cap of a suitable mastic composition, the builder may readily remove the metal sealing caps 34 by pulling the same upwardly and then pouring or pressing in the desired mastic material to form sealing caps such as illustrated at 24, for example, in Figs. 3 and 6.

My invention provides a satisfactory means wherein the sealing effect of the expansion joint and cooperating cap between the respective adjacent ends of road slab sections is maintained regardless of the change of size of the space between said slab sections to the expansion and contraction.

The present invention has been described herein more-or-less previously as to details. Yet it is to be understood that it is not to be limited thereby, as changes in proportions and substitution of equivalents may be made without departing from the spirit and scope of the invention.

I claim:

1. In a device of the kind described, an expansible joint for providing a space between the ends of adjacent slab sections, said joint being composed of metal fabric comprising a stool-like member formed of a single metal fabric strip and having downwardly extending spaced apart wall sections merging in an upper ridge; an outwardly extending anchoring flange formed integral with each of said wall sections; and base flanges extending oppositely and outwardly from the lower portions of said wall sections to temporarily support said expansion joint units.

2. In combination with a pair of concrete sections located substantially adjacent each other, an expansion joint formed of a metal fabric comprising a doubled back stool-like member formed of continuous metal fabric strip and having spaced apart flexible side walls depending from a common ridge; the lowermost edge areas of said joint being outwardly bent at substantially right angles to provide base flanges; and oppositely and transversely extending anchoring webs extending from the intermediate portions of said depending side walls and adapted to be embedded in said slabs respectively; and a channel-like cap member superposed upon said expansion joint ridge and having its upper surface in substantial alignment with the upper surface of said slabs.

3. In combination with a pair of concrete sections located substantially adjacent each other, an expansion joint formed of a metal fabric comprising a doubled back stool-like member formed of continuous metal fabric strip and having spaced apart flexible side walls depending from a common ridge; the lowermost edge areas of said joint being outwardly bent at substantially right angles to provide base flanges; and oppositely and transversely extending anchoring webs extending from the intermediate portions of said depending side walls and adapted to be embedded in said slabs respectively.

4. In combination with a pair of concrete sections located substantially adjacent each other, an expansion joint formed of a metal fabric comprising a doubled back stool-like member formed of continuous metal fabric strip and having spaced apart flexible side walls depending from a common ridge; the lower-most edge areas of said joint being outwardly bent at substantially right angles to provide base flanges; oppositely and transversely extending anchoring webs extending from the intermediate portions of said depending side walls and adapted to be embedded in said slabs respectively, and dowel rods extending through said side walls and adapted to be embedded in the adjacent concrete slabs.

5. In combination with a pair of concrete sections located substantially adjacent each other, an expansion joint formed of a metal fabric comprising a doubled back stool-like member formed of continuous metal fabric strip and having spaced apart flexible side walls depending from a common ridge; the lower-most edge areas of said joint being outwardly bent at substantially right angles to provide base flanges; oppositely and transversely extending anchoring webs extending from the intermediate portions of said depending side walls and adapted to be embedded in said slabs respectively, dowel rods extending through said side walls and adapted to be embedded in the adjacent sections, and expansion caps slidably mounted on ends of said dowel rods respectively.

6. In a device in the kind described, an expansible joint for sealing a space between the ends of adjacent slab sections, said joint being composed of metal fabric comprising a stool-like member formed of a single metal fabric strip and having downwardly extending spaced apart wall sections merging in an upper ridge; an outwardly extending anchoring flange on each of said wall sections and formed by bending outwardly and doubling back said wall sections respectively and base flanges extending oppositely and outwardly from the lower portions of said wall sections and adapted to temporarily support said expansion joint units.

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