Nov. 21, 1939. K. C. JORGENSEN 2,180,904

EXPANSION JOINT FOR ROOFING AND THE LIKE SURFACES

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Fig. 1

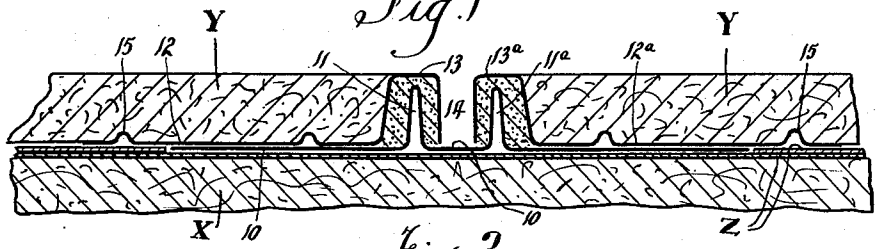


Fig. 2

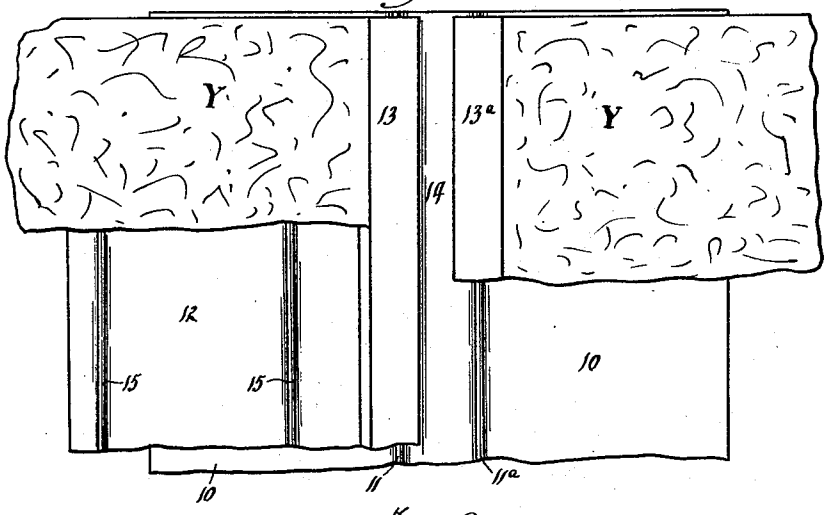
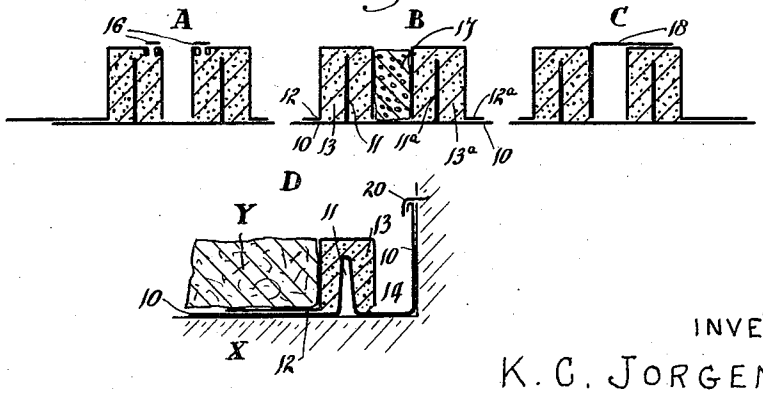


Fig. 3



INVENTOR

K. C. JORGENSEN

By

Young, Emery & Thompson

ATTYS.

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EXPANSION JOINT FOR ROOFING AND THE LIKE SURFACES

Knud Christian Jorgensen, Auckland, Auckland, New Zealand

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6 Claims. (Cl. 108—12)

This invention relates to an improved expansion joint for roofing and other flat areas where it is desired to make such roof, or the like, waterproof and weatherproof. In the construction of concrete and brick structures having flat roofs, it is usual to superimpose on the ordinary concrete, or the like mixture forming the roof, a waterproofing layer of asphalt, or the like. Due to the extremes in temperature, such areas are subject to considerable contraction and expansion in this top asphalt layer, and after a period of use, such layer tends to either crack or buckle. If the former fault develops, then the roof will leak, while if the latter fault develops, then the flat contour of the roof is spoilt.

The present invention is designed with the purpose of constructing an expansion joint for insertion in such flat roof surfaces at any desired intervals, which jointing will enable the asphalt layer thereof to contract or expand independently of the material on which it is laid without in any way affecting the waterproof properties of such layer and without any buckling thereof. This expansion joint is so formed that it will not allow water to enter past a joint and seep into the concrete or other material below it. In addition, the joint will also lie flush with the top surface of the asphalt so that there will be no interference in the flat nature of the roof. The joint will also be reasonably foolproof and require little or no attention after it has been incorporated in the roof.

In fully describing the invention, reference will be made to the accompanying drawing, in which:

Figure 1 illustrates a sectional view of the joint in position on the roof.

Figure 2 illustrates a plan thereof, but in the bottom half of the figure the joint is shown without the associated asphalt covering or the roofing materials below such joint.

Figure 3 shows in diagrammatic form various modifications of the joint which will be hereinafter explained.

In the drawing, X is the top portion of the concrete or the like roof upon which an asphalt or the like waterproofing layer Y is to be laid, extending over the whole area of the roof and interposed between such layers X and Y are separators Z comprising one or more sheets of fabric such as Malthoid or the like waterproofed material.

At regular intervals across the width and length of the roof surface, a number of expansion joints are interposed in the material Y so that the layer may expand and contract, sliding on the separator sheet below it. The expansion joint, according to this invention, comprises three sections of shaped metal which may advantageously be bent or stamped out of flat sheet metal. The base sheet 10 is made with two upwardly extending projectors or tongues 11 and 11*a* towards the centre line of that sheet 10 and extending for its length. Resting on top of this length 10 are two lengths 12 and 12*a*, the inner end of each of which is bent up to extend forwardly and then down to form an inverted U shaped channel member 13—13*a*, hereinafter to be referred to as "channels," which also extend for the length of the section. These channels enclose respectively the tongues 11 and 11*a*, but leave a clear space between them and the sides and top of such tongues 11 and 11*a*.

In use, fabric or the like separators Z are laid on top of the concrete or the like section X, the plate 10 is then laid down on the separator at the desired position of the expansion joint. The channels 13 and 13*a* of the lengths 12 and 12*a* are then filled with grease which should be of such a quality that it will not melt, even at a temperature well above the highest normal temperature the roof would be subject to.

The length 12 is with the contained grease then placed over one side of the length 10, so that its channel 13 envelops the tongue 11, and thus there is a grease seal around the sides and top of such tongue. Similarly, the plate 12*a* is laid over the other portion of the length 10, so that its channel section 13*a* envelops the tongue 11*a*. To clearly illustrate this assembly, a plan of the plate 10 is shown in the right-hand bottom quarter of Figure 2, while a plan of the plate 12 in its position on that plate 10 is shown in the left-hand bottom quarter of that Figure 2.

These plates 12 and 12*a* are so constructed and adjusted in relation to the tongues 11 and 11*a*, which are themselves such a distance apart, that when the tongues are enveloped centrally in the inverted U channels 13 and 13*a* respectively, leaving a clear space all around these respective tongues, there is also a clear space or gap 14 between the adjacent sides of the sections 12 and 12*a*. In order that the relative positions of these portions 12 and 12*a* may be maintained while the asphalt is being laid, the space 14 is temporarily filled, as for instance, with a fillet of wood. Asphalt or other waterproof material is now laid down on the roof, preferably to a depth corresponding to the height of the sections 12 and 12*a*, so that the top of such sections are level and form one with the finished roof level. The fillets

are then removed from the gap 14, and the roof is in its finished condition. The number of expansion joints in each roof area will depend upon the extremes in temperature such roof is liable to be subject to.

When the heat of the sun causes the sections to expand they may do so without cracking or buckling, for the sections 12 and 12a will move in towards each other, reducing the width of the gap 14. Similarly, when the roof contracts, the gap 14 will be widened. The grease in the inverted channels 11 and 11a will form a waterproof seal, so that no water can leak from the gap 14 between the plates 10 and 11, or 10 and 11a, and into the space between the layers X and Y. As the joint moves, the area of the space filled with grease on either side of one of the tongues will vary, but there will be no resistance to the movement of that joint by the compression of the grease to any one particular side of the tongue as when the space right of the tongue is reduced in area, a corresponding portion of the grease therein will be transferred over the top of the tongue into the correspondingly enlarged space to the left of the tongue, and vice versa.

To assist in keeping the asphalt to the top faces of the plates 12 and 12a, corrugations such as 15 may be formed therein, which corrugations, if desired, may also be filled on their undersides with grease to form further waterproof seals between the moveable plates and the fixed plate. Other forms of keying may be used equally effectively, and in addition the contact surfaces between the moveable plates and the fixed one may be coated with a non-drying tacky, bitumen, or bituminous emulsion. The tongue projections 11 and 11a are preferably made double, as illustrated in Figure 1 which gives the plate 10 freedom to expand or contract sliightly conversely without affecting the efficiency of the joint. In addition, when laying several lengths of this jointing end to end, the fixed lengths 10 are preferably welded end to end, but the ends of the moveable lengths overlap each other with a short distance which enables the moveable lengths to expand and contract longitudinally without opening up a gap between their ends.

If high quality grease is used, the seals should last indefinitely, but if desired, covered openings, as for instance as shown at 16 in Figure 3A, may be made at intervals in the length of the jointing, through which openings grease may be forced into the channels to keep them at their full capacity. In use, the jointing needs to be inspected at regular intervals in order to ensure that no dirt or accumulated dust has blocked the gap 14, which would naturally destroy the efficiency of the joint. If, however, it is desired to dispense with the necessity for such regular inspections, the gap 14 may be filled with a strip of easily compressible material, as for instance a strip of sponge rubber which is shown at 17 in Figure 3B of the drawing.

Other means of preventing the filling of this gap with accumulated waste may be used, as for instance, as illustrated in Figure 3C, where the channel 13 is continued, being bent up and then outwardly to form a cover plate 18 for such gap 14. If such a cover plate is used, then it is preferable that instead of being formed in one, with one of the moveable sections of the joint, as is illustrated in the drawing, the plate is loose, being connected to the top of the channel of one of the moveable sections by any approved means that will preferably not form a projection extending up above the level of the roof. With such a plate in use, it may be lifted from time to time to inspect and, if necessary, clean the gap 14.

A joint of this nature inserted at intervals in the roof surface and lying flush with it, will not interfere with the use of such roof in the playing of games thereon and will also not be damaged by people walking on the actual joint. When it is desired to insert an expansion joint close to the edge of a wall, one of the moveable plates may be dispensed with, in which case the fixed plate 10 is turned upwardly at one end to join the wall surface, as is illustrated diagrammatically in Figure 3D of the drawing, its upper edge being overlaid by a flashing 20 let into the wall.

I claim:

1. An expansion joint for asphalt or like surface coverings consisting in the combination with a break line formed in such covering, of a metal sheet arranged beneath the covering to extend across the break and which sheet is shaped with two vertically disposed ribs arranged to project upward within the break and in parallel alignment at a spaced distance from each other, and a metal sheet for each side of the break arranged to extend with one edge in beneath the said covering on such side and above the first mentioned sheet, and shaped along an outer edge extending into the break to envelop the sides and top of the aforesaid rib adjacent to its sides of the break, to leave a space between them and which space is filled with grease or like commodity.

2. An expansion joint according to claim 1, in which one or more separator sheets of waterproof fabric, or the like, is, or are, interposed between the asphalt or like covering and the surface upon which it is laid.

3. An expansion joint according to claim 1, in which the two upper sheets of the joint are each so shaped and united with the asphalt or like covering that the undersurface of the said sheet rests and slides on the lower sheet for the majority of the former's width, the asphalt or the like covering being keyed to the top face of this portion of such top sheet and such upper sheet at its outer or free end being turned up for the width of the covering, then out therefrom and finally down to the original level to form an inverted channel section extending along the edge of the covering and adapted to contain grease, and separated from the opposing grease channel in the other top member by a gap.

4. An expansion joint according to claim 1, in which the two upper sheets of the joint are each so shaped and united with the asphalt or like covering that the under surface of the said sheet rests and slides on the lower sheet for the majority of the former's width, the asphalt or the like covering being keyed to the top face of this portion of such top sheet and such upper sheet at its outer or free end being turned up for the width of the covering, then out therefrom and finally down to the original level to form an inverted channel section extending along the edge of the covering and adapted to contain grease, and separated from the opposing grease channel in the other top member by a gap, and in which the lower sheet of the joint has two tongue-like members projecting up therefrom in parallel longitudinal alignment and each of which tongues is adapted to enter and be enveloped by the inverted grease-filled channel of one of the upper sheets, in a manner to leave a clear space between its sides and top and the sides and top of the channel section.

5. An expansion joint according to claim 1, in which the two upper sheets of the joint are each so shaped and united with the asphalt or like covering that the under surface of the said sheet rests and slides on the lower sheet for the majority of the former's width, the asphalt or the like covering being keyed to the top face of this portion of such top sheet and such upper sheet at its outer or free end being turned up for the width of the covering, then out therefrom and finally down to the original level to form an inverted channel section extending along the edge of the covering and adapted to contain grease, and separated from the opposing grease channel in the other top member by a gap, and in which the gap between the free ends of the two upper members is covered over by a fixed or removeable plate.

6. An expansion joint according to claim 1, in which the two upper sheets of the joint are each so shaped and united with the asphalt or like covering that the under surface of the said sheet rests and slides on the lower sheet for the majority of the former's width, the asphalt or the like covering being keyed to the top face of this portion of such top sheet and such upper sheet at its outer or free end being turned up for the width of the covering, then out therefrom and finally down to the original level to form an inverted channel section extending along the edge of the covering and adapted to contain grease, and separated from the opposing grease channel in the other top member by a gap, and in which the gap between the free ends of the two upper members is filled with an easily compressible material.

KNUD CHRISTIAN JORGENSEN.