

PATENT SPECIFICATION

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(54) JOINT SEAL

(71) We, SCHLEGEL (UK) LIMITED, a British company, of Ring Road, Seacroft, Leeds, LS14 1LY, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a joint former and/or crack inducer for use in slabs of concrete to provide expansion and contraction joints.

When large areas of concrete are laid, for example for use as roadways, aircraft runways and the like, it is necessary to provide regular expansion and contraction joints in the concreted area, otherwise the concrete will break up in a random fashion making it substantially useless. It is now well known to insert what are known as joint formers or crack inducers into the concrete as it is being laid or immediately after it has been laid to form the necessary expansion and contraction joints. The joint former or crack inducer may be made of a stiff rubber or plastics material which may be extruded in a continuous extrusion operation and which has a depth many times greater than its width and the joint former or crack inducer is provided with suitable keying means so that it will not work out of the concrete. Because concrete does expand and contract and contracts to a certain extent after it has set hard, it is difficult to obtain a waterproof joint at the surface of the concrete even if a resiliently deformable or expandable upper portion is provided on the joint former or crack inducer.

Accordingly, it is well known to remove the upper portion of the joint former or crack inducer a certain period of time after laying the concrete and subsequently to fill the void left with a joint sealant or a deformable seal.

The present invention provides a joint former or crack inducer which can be used in the manner described above.

According to the present invention, we

provide a joint former or crack inducer strip suitable for use as a seal for contraction joints in concrete roadways and the like comprising a first longitudinal edge portion and a second longitudinal edge portion, which second longitudinal edge portion is generally hollow and is adapted to be disposed at the surface of a joint in a slab of concrete, said first and second longitudinal edge portions being joined together by one or more strips of a material which is or are softer than the material of said first and second longitudinal edge portions.

The first longitudinal edge portion is usually in the form of a substantially planar flange portion though it may taper outwardly i.e. increase in thickness at its inboard edge where it is joined to the second longitudinal edge portion. It may also be formed with keying means on each side face to assist retention of it in the concrete when tearing out the second longitudinal edge portion. The first longitudinal edge portion will also usually be substantially thinner than the second longitudinal edge portion and/or more rigid. Conveniently it may be solid and if desired can include additional stiffening means such as a zig-zag wire carrier.

In a preferred embodiment the second longitudinal edge portion comprises a pair of spaced apart side walls having their outboard edges joined together at an outer edge of the joint former or crack inducer strip by a shallow V-shaped edge wall, and their inboard edges each joined to said first longitudinal edge portion by a said strip of softer material.

The strip of the present invention may be made of any conventional material known in the art for use in joint formers or crack inducers and conveniently is a rigid or semi-rigid polymeric material such as rigid or semi-rigid PVC. The strips of softer material joining the edge portions may be of a resiliently deformable polymeric material which may be elastomeric and/or a soft plastics material. Suitable materials include

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soft PVC and Nitrite modified PVC. Most conveniently the strip of the present invention is manufactured by a dual durometer extrusion process.

5 In a further aspect the present invention provides a method of joint forming or crack inducing in concrete roadways and the like comprising introducing a joint former or crack inducer strip as claimed in any of
10 claims 1 to 15 into a wet concrete surface and allowing the wet concrete to set. After the concrete has set the second longitudinal edge portion can be torn out, the strip tearing at the strips of softer material. To
15 facilitate insertion of the strip into the wet concrete surface a groove for accommodating the strip may be formed in the wet concrete surface before or as the strip is introduced into the wet concrete surface.

20 A short length of joint former and crack inducer in accordance with a preferred embodiment of the invention is now described with reference to the accompanying drawings, in which:—

25 FIGURE 1 is a perspective view, and FIGURE 2 is an end elevation to a slightly larger scale than Figure 1.

Referring to the drawings, the joint former and crack inducer is formed of a
30 rigid PVC (polyvinyl chloride) material and includes a first or lower edge portion 1, a second or upper edge portion 3, both of which are preferably made of the same material, and two strips 5 and 7 of a softer material joining the edge portions 1 and 3
35 together. The edge portion 1 may extend from about once to about twice the depth of edge portion 3 and over the majority of its depth has parallel side faces interrupted by
40 keying formations 9. As shown, these keying formations are generally V-shaped but many other constructions would be acceptable, their main purpose being to prevent the joint former or crack inducer from working
45 out of the concrete in which it is inserted. The upper part of the lower edge portion 1 tapers outwardly as shown at 11 so as to have a maximum width where it is joined to the strips 5 and 7.

50 The second or upper edge portion 3 has diverging spaced side walls 13 and 15 connected at their lower ends to the strips 5 and 7 respectively and their upper ends are connected together by a shallow V-shaped
55 edge wall 17, the walls 13, 15 and 17 defining a hollow interior 19.

60 It will be appreciated that the plastics or rubber material from which the two edge portions are made can be solid or with air holes in it so that it is in the form of a foam. Normally, the strips 5 and 7 would be of a solid material which could be extruded by means of a single dual durometer extrusion process with the material of the edge
65 portions 1 and 3. It is however envisaged

that foam material could be used.

The joint former or crack inducer can be introduced into the concrete slabs to provide expansion and contraction joints to meet the necessary requirements by hand or
70 by using a mechanical method. Most mechanical methods incorporate a plough to produce a groove in the wet concrete and means to insert the joint former or crack inducer immediately downstream of the
75 plough. In some cases, the apparatus used for laying the concrete slab can itself incorporate means to insert the joint former or crack inducer. In certain instances, it is even envisaged that a joint could be
80 machined into the surface of the concrete so that the joint former or crack inducer can then be inserted into this groove.

Once the joint former or crack inducer has been inserted into the concrete and the concrete has set, the upper edge portion 3
85 may be torn out of the concrete, tearing occurring along the line of the strips 5 and 7 of the softer material. This will leave a void in the concrete which can then be filled with a joint sealant in known manner to provide
90 a waterproof joint in the concrete.

It is anticipated that the joint former and crack inducer will be manufactured in
95 varying sizes to cope with all joint designs to meet the varying needs of the construction industry. In some instances, it is envisaged that the lower edge portion 1 may be stiffened by a suitable carrier such as our well-known woven zig-zag wire carrier.
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WHAT WE CLAIM IS:—

1. A joint former or crack inducer strip suitable for use as a seal for contraction joints in concrete roadways and the like comprising a first longitudinal edge portion
105 and a second longitudinal edge portion, which second longitudinal edge portion is generally hollow and is adapted to be disposed at the surface of a joint in a slab of concrete, said first and second longitudinal
110 edge portions being joined together by one or more strips of a material which is or are softer than the material of said first and second longitudinal edge portions.

2. A joint former or crack inducer strip as claimed in claim 1 wherein said first longitudinal edge portion is formed as a
115 substantially planar flange portion.

3. A joint former or crack inducer strip as claimed in claim 1 or claim 2 wherein said
120 first longitudinal edge portion is substantially thinner than said second longitudinal edge portion.

4. A joint former or crack inducer strip as claimed in any of claims 1 to 3 wherein said
125 first longitudinal edge portion is more rigid than said second longitudinal edge portion.

5. A joint former or crack inducer strip as claimed in any of claims 1 to 4 wherein said

soft PVC and Nitrite modified PVC. Most conveniently the strip of the present invention is manufactured by a dual durometer extrusion process.

In a further aspect the present invention provides a method of joint forming or crack inducing in concrete roadways and the like comprising introducing a joint former or crack inducer strip as claimed in any of claims 1 to 15 into a wet concrete surface and allowing the wet concrete to set. After the concrete has set the second longitudinal edge portion can be torn out, the strip tearing at the strips of softer material. To facilitate insertion of the strip into the wet concrete surface a groove for accommodating the strip may be formed in the wet concrete surface before or as the strip is introduced into the wet concrete surface.

A short length of joint former and crack inducer in accordance with a preferred embodiment of the invention is now described with reference to the accompanying drawings, in which:—

FIGURE 1 is a perspective view, and FIGURE 2 is an end elevation to a slightly larger scale than Figure 1.

Referring to the drawings, the joint former and crack inducer is formed of a rigid PVC (polyvinyl chloride) material and includes a first or lower edge portion 1, a second or upper edge portion 3, both of which are preferably made of the same material, and two strips 5 and 7 of a softer material joining the edge portions 1 and 3 together. The edge portion 1 may extend from about once to about twice the depth of edge portion 3 and over the majority of its depth has parallel side faces interrupted by keying formations 9. As shown, these keying formations are generally V-shaped but many other constructions would be acceptable, their main purpose being to prevent the joint former or crack inducer from working out of the concrete in which it is inserted. The upper part of the lower edge portion 1 tapers outwardly as shown at 11 so as to have a maximum width where it is joined to the strips 5 and 7.

The second or upper edge portion 3 has diverging spaced side walls 13 and 15 connected at their lower ends to the strips 5 and 7 respectively and their upper ends are connected together by a shallow V-shaped edge wall 17, the walls 13, 15 and 17 defining a hollow interior 19.

It will be appreciated that the plastics or rubber material from which the two edge portions are made can be solid or with air holes in it so that it is in the form of a foam. Normally, the strips 5 and 7 would be of a solid material which could be extruded by means of a single dual durometer extrusion process with the material of the edge portions 1 and 3. It is however envisaged

that foam material could be used.

The joint former or crack inducer can be introduced into the concrete slabs to provide expansion and contraction joints to meet the necessary requirements by hand or by using a mechanical method. Most mechanical methods incorporate a plough to produce a groove in the wet concrete and means to insert the joint former or crack inducer immediately downstream of the plough. In some cases, the apparatus used for laying the concrete slab can itself incorporate means to insert the joint former or crack inducer. In certain instances, it is even envisaged that a joint could be machined into the surface of the concrete so that the joint former or crack inducer can then be inserted into this groove.

Once the joint former or crack inducer has been inserted into the concrete and the concrete has set, the upper edge portion 3 may be torn out of the concrete, tearing occurring along the line of the strips 5 and 7 of the softer material. This will leave a void in the concrete which can then be filled with a joint sealant in known manner to provide a waterproof joint in the concrete.

It is anticipated that the joint former and crack inducer will be manufactured in varying sizes to cope with all joint designs to meet the varying needs of the construction industry. In some instances, it is envisaged that the lower edge portion 1 may be stiffened by a suitable carrier such as our well-known woven zig-zag wire carrier.

WHAT WE CLAIM IS:—

1. A joint former or crack inducer strip suitable for use as a seal for contraction joints in concrete roadways and the like comprising a first longitudinal edge portion and a second longitudinal edge portion, which second longitudinal edge portion is generally hollow and is adapted to be disposed at the surface of a joint in a slab of concrete, said first and second longitudinal edge portions being joined together by one or more strips of a material which is or are softer than the material of said first and second longitudinal edge portions.

2. A joint former or crack inducer strip as claimed in claim 1 wherein said first longitudinal edge portion is formed as a substantially planar flange portion.

3. A joint former or crack inducer strip as claimed in claim 1 or claim 2 wherein said first longitudinal edge portion is substantially thinner than said second longitudinal edge portion.

4. A joint former or crack inducer strip as claimed in any of claims 1 to 3 wherein said first longitudinal edge portion is more rigid than said second longitudinal edge portion.

5. A joint former or crack inducer strip as claimed in any of claims 1 to 4 wherein said

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first longitudinal edge portion is generally solid.

5 6. A joint former or crack inducer strip as claimed in any of claims 1 to 5 wherein said first longitudinal edge portion is provided with keying means on each of its side faces.

10 7. A joint former or crack inducer strip as claimed in any of claims 1 to 6 wherein said first longitudinal edge portion includes stiffening means.

8. A joint former or crack inducer strip as claimed in claim 7 wherein said stiffening means comprise a zig-zag wire carrier.

15 9. A joint former or crack inducer strip as claimed in any of claims 1 to 8 wherein said second longitudinal edge portion comprises a pair of spaced apart side walls having their outboard edges joined together at an outer edge of the joint former or crack inducer strip by a shallow V-shaped edge wall, and their inboard edges each joined to said first longitudinal edge portion by a said strip of softer material.

25 10. A joint former or crack inducer strip as claimed in any of claims 1 to 8 wherein said first longitudinal edge portion tapers outwardly towards its inboard edge at which inboard edge it is joined to said second longitudinal edge portion by said one or more strips of softer material.

30 11. A joint former or crack inducer strip as claimed in any of claims 1 to 10 wherein said first and second longitudinal edge portions are of a rigid or semi-rigid polymeric material.

35 12. A joint former or crack inducer strip as claimed in claim 11 wherein said polymeric material is rigid PVC.

40 13. A joint former or crack inducer strip as claimed in any of claims 1 to 12 wherein said strips of softer material are of a resiliently deformable polymeric material.

14. A joint former or crack inducer strip as claimed in claim 13 wherein said

resiliently deformable polymeric material is an elastomeric material. 45

15. A joint former or crack inducer strip as claimed in claim 13 wherein said resiliently deformable polymeric material is a soft plastics material. 50

16. A joint former or crack inducer strip as claimed in any of claims 1 to 15 when made by a dual durometer extrusion process.

17. A method of joint forming or crack inducing in concrete roadways and the like comprising introducing a joint former or crack inducer strip as claimed in any of claims 1 to 16 into a wet concrete surface and allowing the wet concrete to set. 55

18. A method as claimed in claim 17 wherein after the wet concrete has set, the second longitudinal edge portion is torn out of the concrete, said joint former or crack inducer strip tearing at said strips of softer material. 60

19. A method as claimed in claim 17 or claim 18 which includes the preliminary step of forming a groove in said wet concrete surface into which groove said joint former or crack inducer strip is inserted. 65

20. A joint former or crack inducer strip according to claim 1 substantially as described hereinbefore with particular reference to Figures 1 and 2 of the accompanying drawings. 70

21. A method of joint forming or crack inducing according to claim 17 substantially as described hereinbefore with particular reference to Figures 1 and 2 of the accompanying drawings. 75

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