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PREFABRICATED SEALING SYSTEM

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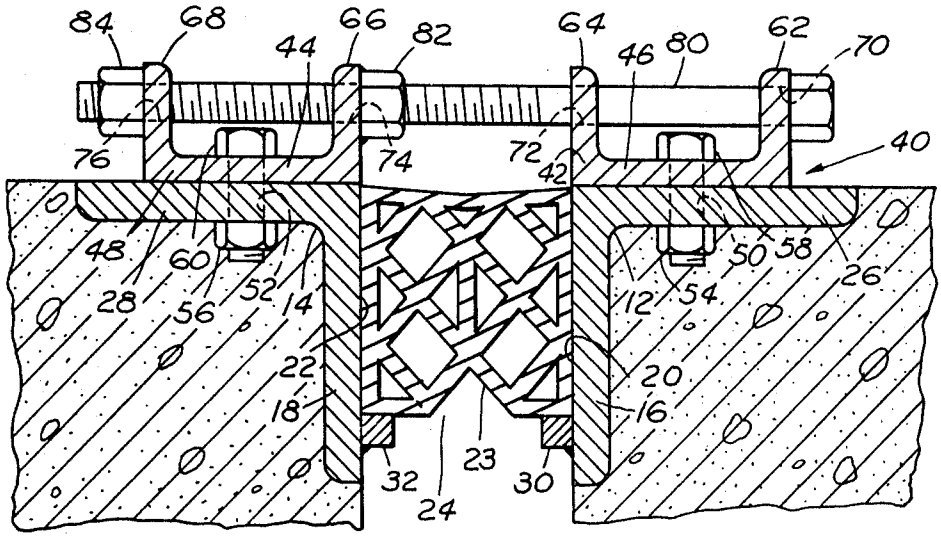


FIG. 1

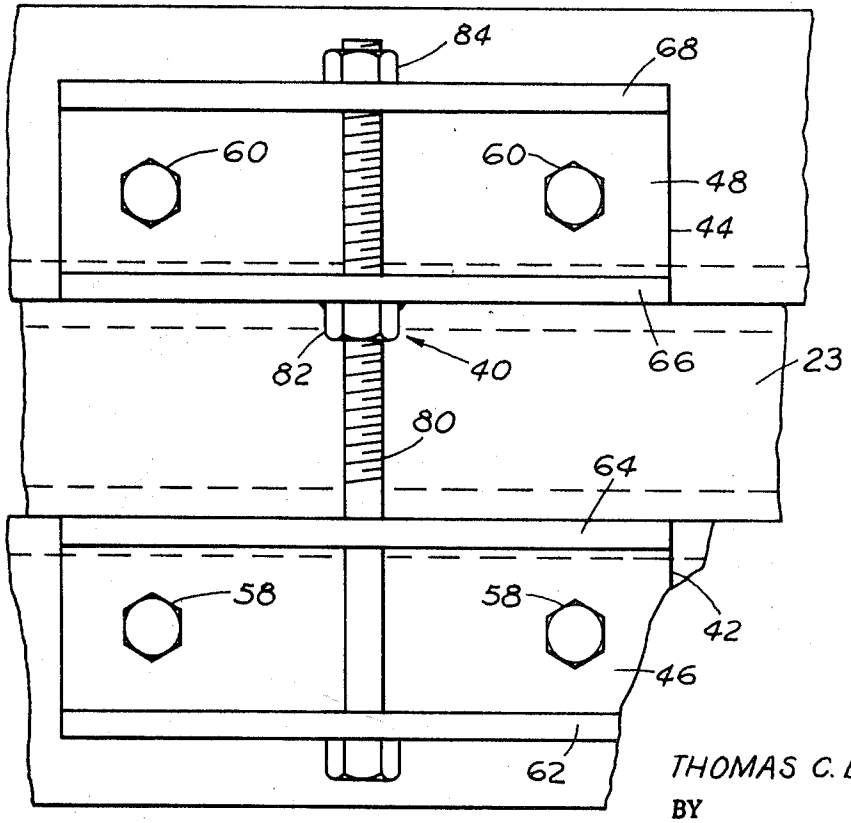


FIG. 2

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PREFABRICATED SEALING SYSTEM

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ABSTRACT OF THE DISCLOSURE

An apparatus for prestressing a resiliently yieldable seal adhesively bonded to opposed faces of a pair of angle members comprising a pair of spaced apart channel members detachably mounted on the angle members. Openings are provided in leg portions of the channel members are receiving a bolt extending therethrough and spaced above the angle members. A nut is secured to one of the legs in alignment with the openings for receiving the threaded portion of the bolt. Rotation of the bolt effects relative movement between the angle members to adjustably prestress the seal therebetween.

BACKGROUND OF THE INVENTION

This invention relates to sealing devices and, more particularly, to prefabricated sealing systems having means for prestressing monolithic or modular compression sealing arrangements in structural expansion joints.

In the field of highway and bridge construction, it is generally known to insert elongated compression seals of resilient, elastomeric material into grooves formed between adjacent blocks or slabs of concrete or other building material exposed to variations in temperature causing expansion and contraction of the same and resulting in variations in the width of the grooves between such blocks or slabs.

Very often, these seals are precompressed in armor plated joints in factories and then shipped to the construction site to be integrally cast along with the armor plated joints into the pavement or deck. Normally, the entire armor plated joint assembly and related accessories such as anchor rods or bolts are permanently embedded in the concrete or other building material resulting in excessive costs. Another problem encountered is in accurately prestressing the seal at the time of fabrication in order to coincide with the temperature at the time of installation. Attempts have been made to solve this problem by employing prestressing adjusting means used at the time of installation, such means having elements which contact portions of the seal supporting plates below their upper edges. As a result, concrete can initially be poured only up to the level of these elements. After a time lapse in which the concrete is permitted to be partially cured, the adjusting means are removed and more concrete is poured over the hardened portion up to the desired level. Thus, efficiency and production are seriously impaired.

SUMMARY OF THE INVENTION

The present invention, as hereinafter described, obviates the above disadvantages by providing an improved adjustable prestressing clamp assembly for an expansion joint which is simple and strong in construction, low in cost, rugged and durable in use, and incorporates components that can be salvaged and reused without sacrificing production time and labor. The clamp assembly of the present invention is detachably mounted on portions of the expansion joint and is spaced outwardly beyond the area to be filled by building material.

Generally speaking, the prestressing clamping assembly of the present invention comprises a pair of spaced-apart channel members detachably mounted on spaced-apart angle members which support a resilient seal therebetween. Openings are provided in the respective legs of the channel members to receive a bolt. One of said legs is provided with a fixed nut attached thereto having a threaded bore in alignment with the openings so that rotation of the bolt effects axial movement of the angle members relative to each other for adjustably prestressing the seal positioned therebetween.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view of the prestressing clamping assembly of the present invention shown mounted on angle members of an expansion joint assembly; and

FIG. 2 is a top plan view of the structure shown in FIG. 1, 90° relative thereto.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, there is shown an expansion joint comprising a pair of angle members **12** and **14** having vertical legs **16** and **18**, respectively, provided with opposed faces **20** and **22** defining a groove **24** therebetween for receiving an elongated, resilient, yieldable monolithic seal **23**. It should be understood that a modular compression sealing arrangement can be used instead of a single seal within the purview of this invention. Angle members **12** and **14** are adapted to be partially imbedded in concrete as it is poured during construction to form the upper corner edges of adjacent concrete slabs with the horizontal legs **26** and **28** of angle members **12** and **14** being flush with the upper surfaces of the slabs.

The term "slab" refers to pavement sections which can be used to cover highways, roadways, bridges, sidewalks and the like and which can be formed of building materials other than concrete. As used herein, the terms vertical, horizontal, top, bottom, upper, lower and the like are applied only for convenience of description with reference to FIG. 1 and should not be taken as limiting the scope of this invention.

Stop shoulders, in the form of metal strips **30** and **32**, are suitably secured along the lower ends of faces **20** and **22** as by means of welding for example, for supporting the bottom wall of seal **23** in correct relation to the groove between adjacent slabs. Strips **30** and **32** also prevent downward movement of seal **23** into the groove below the desired position. Seal **23** is fastened to faces **20** and **22** of angle members **12** and **14** by means of a suitable adhesive.

In order to properly space vertical opposed faces **20** and **22** of angle members **12** and **14** to prestress seal **23** therebetween in accordance with a forecasted or existing temperature, prestressing means in the form of a clamping fixture generally designated **40** is provided in accordance with the present invention. Clamping fixture **40** comprises a pair of spaced-apart brackets in the form of U-shaped channel members **42** and **44** having bases or bight portions **46** and **48** engageable with the upper surfaces of legs **26** and **28** of angle members **12** and **14**. Legs **26** and **28** are provided with paired openings **50** and **52** respectively, aligned with the threaded bores of nuts **54** and **56** welded or otherwise fixedly disposed on the undersides of legs **26** an **28**. Bolts **58** and **60** extend through openings **50** and **52** and threadably engage nuts **54** and **56** for detachably securing channel members **42** and **44** to angle members **12** and **14**.

Channel members **42** and **44** are provided with upright legs **62**, **64** and **66**, **68** having openings **70**, **72** and **74**, **76** therein, respectively, for receiving an elongated adjusting fastener or bolt **80** therethrough. Openings **70**, **72**, **74** and

76, and therefore bolt 80, are spaced above the upper surfaces of horizontal legs 26 and 28. A fastener receiving means such as a nut 82 is welded or otherwise fixed to leg 66 of channel member 44 and has a threaded bore in axial alignment with opening 74 for receiving the threaded portion of bolt 80. The head of bolt 80 bears against leg 62. Since nut 82 is fixed, rotation of bolt 80 effects axial movement of nut 82 together with relative movement of channel member 44 and angle member 14 to adjust the spacing between the opposed faces 20 and 22 of angle members 12 and 14. The extension of bolt 80 through all four legs of channel members 42 and 44 maintains the legs in vertical alignment and precludes them from buckling. A lock nut 84 is threaded on the end of bolt 80.

The expansion joint assembly is fabricated and assembled in a manufacturing facility and the seal is prestressed in accordance with the anticipated temperature forecast for a given day of installation. Normally, the expansion joint is shipped to the construction site with clamping fixture 40 attached thereto. An advantage of transporting the assembly in the fixture is that the prestressed condition is maintained until installation without the necessity of extraneous clamping forms and obviating detachment and attachment of fixture 40 at the respective fabricating and construction sites. Of course, the expansion joint may be shipped without clamping fixture 40. The assembly is positioned in place in concrete curing forms and, if necessary, the sealing strip is prestressed in accordance with the temperature existing at the time of installation by rotating bolt 80. Thus, any final adjustments can be made at the installation site, if necessary. Concrete is poured into the forms up to the level of the upper surfaces of legs 26 and 28 which lie in a common plane with the upper surface of the resultant slabs. Thus, clamping fixture 40 is spaced upwardly out of the way above the level to which concrete is poured so that the pouring process can be completed in one step. After the concrete has hardened sufficiently, bolt 80 is withdrawn and bolts 58 and 60 are withdrawn to remove channel members 42 and 44. Openings 50 and 52 are closed by suitable filler means, such as an epoxy, a pin, or by welding the openings closed. It should be appreciated that bolts 58 and 60, paired in spaced relation, firmly secure the channel members to the angle members to preclude any relative movement therebetween when bolt 80 is turned to prevent the upright legs of the channel members from bending or tending to rotate relative to the angle members. Accordingly, openings 70, 72, 74 and 76 of the upright legs are maintained in true alignment to accurately receive bolt 80 and eliminate any binding therebetween.

Seal 23 is composed of a resiliently yieldable material and preferably is of the type having a top wall, a bottom wall, and side walls forming a tubular structure with an internal truss structure integrally formed therein. The truss structure comprises interconnected cross bars having spaces therebetween which permit the cross bars to collapse into the spaces when the side walls are laterally compressed. Such seals are disclosed in U.S. Patents 3,179,026 and 3,276,336.

As a result of this invention, a clamping assembly of a simple and rugged design is provided for prestressing a seal used in an expansion joint. The clamping assembly is detachably mounted on spaced-apart expansion joint members for easy removal therefrom after the building material has been completely poured up to the desired level and hardened. Thus, the seal can be properly stressed in accordance with the existing temperature at the time of installation and the prestressing clamping assembly can be salvaged for reuse.

A preferred embodiment of the principles of this invention having been described and illustrated in the drawing, it is to be understood that modifications thereof can be made without departing from the broad spirit and scope of this invention as defined in the appended claims.

What I claim is:

1. An adjustable clamp assembly for use in an expansion joint comprising a pair of spaced-apart members having opposed portions and resiliently yieldable sealing means positioned between said opposed portions, a pair of spaced apart bracket means detachably secured to said spaced-apart members, each bracket means having legs extending upwardly away from said spaced-apart members and above said sealing means, said legs having aligned openings, a nut secured to a leg of one of said bracket means and extending through said aligned openings thereby maintaining said legs in vertical alignment during relative linear movement thereof, said bolt threadably engaging said nut whereby rotation of said bolt effects relative movement between said spaced-apart members to compress said sealing means.

2. An adjustable clamp assembly according to claim 1 wherein said bracket means comprise channel members, each of said channel members having a pair of legs provided with aligned openings.

3. An adjustable clamp assembly according to claim 1 including means for detachably securing said spaced-apart bracket means to said spaced-apart members, said detachable securing means comprises nuts fixed to said spaced-apart members and bolts extending through said bracket means and threadably engaging said nuts on said spaced-apart members.

4. An adjustable clamp assembly according to claim 1 wherein said spaced-apart members are angle members each having vertically and horizontally extending legs, said vertically extending legs having opposed faces for adhesively receiving said resiliently yieldable sealing means therebetween, said spaced-apart brackets means being channel members having base portions abutting said horizontal legs on the sides opposite said vertical legs, and means detachably securing said channel members to said horizontal legs.

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24—263; 94—18; 248—201; 249—9