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EXPANSION JOINT

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In the casting of concrete and other similar materials it is well known in the art that these structures must be protected against excessive compression due to expansion of the materials under varying climatic conditions, and this invention relates to improvements in the method and means used in joining sections of concrete or the like which will permit of the movement of the respective slabs; and whereas this invention is applicable to many fields of work and various types of construction, for purposes of description only I elect to describe my invention as it is applied to the concrete pavement of today.

The objects of this invention are to provide in a joint the combination of a flexible seal and a resilient preformed filler which being placed between adjacent slabs will, upon being compressed due to the longitudinal movement or action of the slabs, develop a minimum extrusion of the filler above the finished surface of the roadway slab; and

To provide a filler with sufficient resiliency to return to its original shape after once being compressed and the compressing forces removed, keeping the vertical portions of the flexible seal in constant or uninterrupted contact with the vertical edges of the adjacent concrete sections; and

To provide a preformed filler or cap which by virtue of its shape and contour is locked into the bowl or bulblike portion of the flexible seal, and there retained against accidental displacement during the handling and setting of the joint as well as throughout the expected life of the installation; and

To provide a seal, the design of which includes the specific arrangement of its side-walls and their respective relationship to the receptacle for the capping, whereby their specific contour offers a very definite course for the walls to pursue when the seal is under compression and also a very definite course for the vertical members of the wall to pursue during the period of contraction.

The advantages of this seal and filler over the various forms now in common use are:—

The advantages of a pre-cast filler or capping over those of a poured seal, which construction eliminates excessive costs of form work, the cleaning out of the joint prior to the pouring of the seal, the actual pouring of the seal, and the ultimate finishing of the joint after it has been poured; and

The specific positioning of the horizontal anchors of the flexible seal lessens and eliminates to

a large degree the possibility of the spalling of the concrete adjacent to the joint; and

The locking of the filler or capping into the seal prevents its working loose and being forced out of the joint proper under the continued pounding of the traffic; and

The rounding or beading of the sockets in the seal at the junction of the upper edge of the vertical walls of the stool eliminates any possibility of the copper seal being destroyed or crystallized due to excessive and repeated movements, and the further possibility of the stool for the seal cutting into or injuring the copper seal at any point.

I have the foregoing objects and advantages in mind, and others as will be more specifically pointed out in the following specification and appended claims and as illustrated by the structures shown in the accompanying drawing, in which:—

Fig. 1 is a transverse section through a structure embodying my invention showing the joint as it is embedded between the ends of adjoining concrete sections at the time of installation;

Fig. 2 is a similar view of the top or seal of the joint as shown in Fig. 1 after the adjoining sections of concrete have expanded or moved toward one another, thus putting the seal under compression; and

Fig. 3 is a view similar to Figs. 1 and 2 showing the same seal after the concrete sections have contracted and the joint expanded into place.

Similar reference characters refer to similar parts throughout the respective views.

I am well aware of the fact that the application of an air cushion sealed with a water tight seal when placed between adjoining sections of a concrete road, as a broad idea, is old, and that there are many types of such joints and many types of seals employed for sealing these joints against the infiltration or intrusion of water or foreign materials. I appreciate that such a disclosure in a broad sense is not new; however, the specific arrangement of locking the seal to the stool of the joint as herein disclosed and the capping of this seal in the manner shown, perform very definite functions not found in practice today. In the following description I have endeavored to eliminate the detailed reference to joint structures and their specific arrangements and placements in various slabs and will describe only the details involved in my specific type or form of seal.

With reference to Fig. 1, the adjoining slabs are designated by the reference characters 4 and 5. In casting these slabs an air space 6 is established

between the adjoining ends by means of a stool, which stool comprises a pair of spaced walls 7 and 8 connected at the bottom by a transverse wall 9 and being offset at the top at 10, extending upwardly therefrom at 11, and being rolled or beaded at the top at 12.

Closing the top of the space over and above the stool, is a resilient metallic seal, preferably of copper or non-corrosive material which has a pair of walls 13 and 14 lying adjacent to the vertical walls of the stool and terminating at their bottom in outstanding webs or gutters 15 and 16, which are perforated at intervals, forming apertures 17 and 18, through which the concrete is adapted to pass and form a bond for anchoring these members into their respective slabs. The walls 13 and 14 extend upwardly and are formed around the beads 12 of the stool in the form of sockets 19 and from there are brought downwardly on the inside of the walls of the stool to form a bulblike receptacle 20.

A preformed capping 21 of a water-proof and resilient nature is forced down into the bulblike section of the receptacle and is adapted to extend over and above the sockets 19 of the seal so as to protect the sockets against direct contact with either the elements or the traffic on the road.

The joint just described is installed preferably as a unit at the time of the pouring of the concrete. After the concrete has set the stool supporting the seal and capping has served its purpose, that is, it has created an air cushion below the seal and between the adjoining slabs. The seal itself, however, is adapted to remain intact throughout the expected life of the pavement, and should the capping or filler become damaged or destroyed, it may be easily removed and replaced with a like filler, which, being compressible, may be readily forced into place and expand into the position as shown at Fig. 1.

The operation of the joint:—

I have shown in Fig. 1 the relative position of the various parts of this unit at the time of installation; and in Fig. 2 I have shown the same parts under compression, showing how the bulblike receptacle is guided downwardly during this movement, the seal remaining intact and preventing the intrusion of foreign materials; and in Fig. 3 the reverse action is shown and wherein the slabs have contracted and the joint opened, the particular character or nature of the filler or capping 21 causing it to expand and fill the receptacle and seal the joint tight. In this connection it might be well to mention that in case the filler or capping material should fail to be resilient enough to carry the walls of the seal back with the movement of the slabs, the continual pounding of the traffic over this filler will drive and force the same down to a position similar to that as shown in Fig. 3 and assist in maintaining the vertical walls 13 and 14 of the seal in

constant and uninterrupted contact with their respective slabs.

It is believed upon reference to the drawing and the above description that I have presented a specific type of seal which differs from others in the peculiarity of its design, its side walls by their shape offering at once both a definite course for the walls to pursue under compression and also a definite course to pursue under contraction, and that I have obtained a definite lock for holding the capping or filler in place in the seal at all times.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A seal for closing the space intervening between the ends of adjoining concrete sections, said seal comprising two elements, namely an expansion strip and a plastic filler, the expansion strip consisting of a pair of side walls joined together to form an expansible fold, anchors extending therefrom and affixed to each of said concrete sections, a pair of substantially cylindrical beads joining said walls with said anchors, said beads extending into the space between the walls and over and above the expansible fold, and said plastic filler being placed within the fold and extending both above and below the beads and further indented to receive the beads and thereby retained in place and against accidental displacement.

2. A seal for closing the space intervening between the ends of adjoining concrete sections comprising an expansion strip and a plastic filler, the expansion strip consisting of a pair of side walls joined together to form an expansible fold, anchors extending therefrom adapted to be affixed to each of said concrete sections, a pair of substantially cylindrical beads joining said walls with said anchors, said beads extending into the space between the walls and over and above the expansible fold, and said plastic filler extending into the space between the walls and recessed to receive the beads and thereby retained in place and against accidental displacement.

3. In a joint for closing the space intervening between the ends of adjoining concrete sections, a seal comprising an expansion strip and an associated plastic filler, the expansion strip consisting of two pairs of side walls each pair of walls being joined together to form an intermediate expansible fold, anchors extending from each pair of walls, a pair of substantially cylindrical beads joining each pair of walls, said beads extending into the space between the walls and over the expansible fold, and said plastic filler being located within the confines of the expansible fold and extending below and protruding above the beads and further recessed to receive the beads and thereby retained in place and against accidental displacement.

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