March 19, 1940. E. S. CLARK 2,194,383

HIGHWAY JOINT

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Fig. 1.

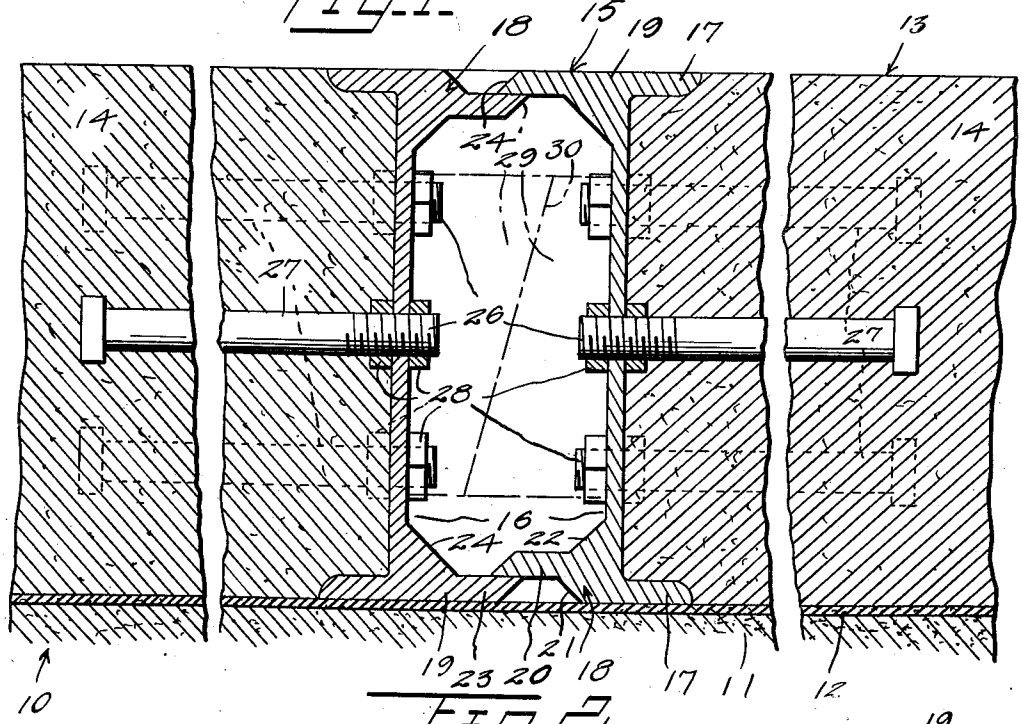


Fig. 2.

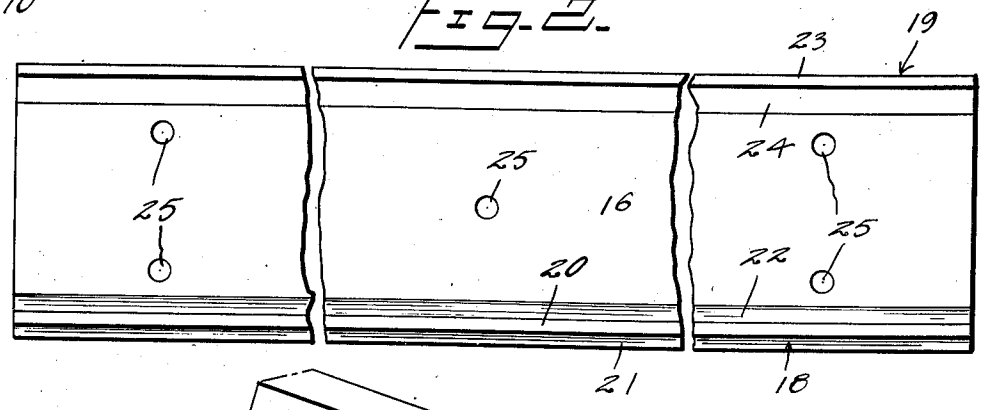
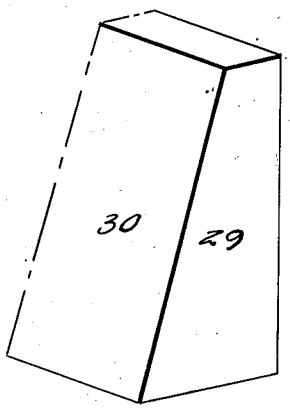


Fig. 3.



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HIGHWAY JOINT

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5 Claims. (Cl. 94—18)

This invention relates to an improved expansible joint for connecting adjacent portions of highway sections or slabs.

In the construction of highways formed from a plastic material such as concrete, it has been customary to form the top surface of the highway of a plurality of sections or slabs, which are spaced from each other to permit expansion of the sections in response to heat. The spaces between the sections are usually filled with tar or similar material which is elastic to allow the slabs to expand. However, the expansion of the slabs frequently squeezes this material out of the spaces between the slabs so that when the slabs again contract a space is left which gradually fills with gravel, dirt or the like which becomes embedded in the remaining binder material and is gradually hardened so that the binding material is no longer elastic, and as a result when the slabs are again expanded the pressure causes the slabs to crack and break open.

It is a particular aim of this invention to provide a joint to replace the binding material between roadway slabs formed of contractible sections which will contract or expand relatively to each other in response to the expansion or retraction, respectively, of the slabs.

More particularly, it is an aim of this invention to provide a joint formed of corresponding sections having inwardly projecting flanges, offset relatively to each other, and disposed in overlapping telescoping engagement, and yieldable means for initially retaining said sections in extended position while the slabs are being formed.

Still another object of the invention is to provide detachable means connected to said joint sections and adapted to be embedded in the ends of the slabs for connecting the slabs to the joints, said means being detachable from the sections for removing one or the other of the joint sections to repair or partially replace the roadway.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, which illustrates a preferred embodiment thereof, and wherein—

Figure 1 is a transverse vertical sectional view showing one of the joints in position between the adjacent ends of two roadway slabs,

Figure 2 is a side elevational view looking toward the inner side of one of the joint sections, and

Figure 3 is a perspective view of one of the wedges.

Referring more particularly to the drawing, wherein like reference characters designate like or corresponding parts throughout the different views, 10 designates generally a portion of a roadway including a foundation 11 provided with a sub-grade 12, of asphaltic felt or the like, and the upper surface 13 comprising a plurality of slabs or sections 14, portions of two of which are seen in Figure 1. These parts are of conventional construction forming a conventional road.

The joint, designated generally 15, and comprising this invention, includes the corresponding sections 16, preferably formed of steel, and in the shape of an I-beam, in cross section. The sections or I-beams 16 are provided with the outwardly projecting corresponding flanges 17, at their tops and bottoms and the inwardly projecting flanges 18 and 19. Flanges 18 each comprise a lip 20 which is offset inwardly from the edge of the I-beam or section 16, the sides of which connect with the inclined surfaces 21 and 22. The flanges 19 are each provided with a lip 23 the outer surface of which is flush with the corresponding surface of the adjacent flange 17 and the inner side of which terminates in the inclined surface 24. Lips 20 and 23 have the correspondingly beveled ends 24'. One of the sections 16 of the joint 15 is disposed with the flange 18 at its top and the other section is disposed with the flange 18 at its bottom so that the lips 20 and 23 of the two sections 16 are positioned in overlapping relationship to each other, and as best seen in Figure 1 the lips 20 are offset inwardly of the joint 15 a distance equal to the width of the lips 23 so that when the sections are assembled with the lips 20 and 23 in overlapping engagement the top and bottom surfaces of the sections 16 will be flush with each other. The flanges 18 and 19 are adapted to be disposed in overlapping engagement and are slidably disposed relatively to each other so that the sections 16 may be moved toward or away from each other, for a purpose which will hereinafter be described. The web portions of the sections 16 are provided with one or more series of openings 25, as best seen in Figure 2, through which are adapted to extend the threaded ends 26 of the headed bolts 27 which are adjustably and detachably connected to the sections 16 by the nuts 28 which are connected to the threaded ends 26 and disposed on either side of the web portions of the sections 16. The headed ends of the bolts 27 project outwardly and are adapted to be embedded in the roadway sections or slabs 14, as seen in Figure 1. The wedge block 29, as seen in Figure 3, has an inclined front face 30.

A plurality of pairs of the wedge blocks 29 are adapted to be disposed between the webs of the sections 16 with their inclined or cam faces 30 in abutting or partially abutting relationship, as seen in dotted lines in Figure 1.

The joint 15 is assembled in a roadway 10, as follows: the slabs or sections 14 of the upper surface of the roadway 10 are molded from a plastic material such as cement which is poured into conventional type forms, not shown. When these forms are positioned for molding a slab 14, a section 16 is placed at the ends or sides and these sections act as a part of the form so that when the cement is poured therein and molded the shanks and heads of the bolts 27 will be embedded in the cement constituting a slab or section 14. The forms are then placed for the adjacent slab or section 14 and the other section 16 of each joint 15 is positioned and held in an extended position relatively to the first section 16 by means of the pairs of wedge blocks 29 so that when the last mentioned slab is formed the joint 15 will be in an extended position, as seen in Figure 1. The wedge blocks 29 are preferably formed of an adhesive yieldable material or may be formed of a soft wood that can be readily crushed. When the wedge blocks 29 are positioned between the joint sections the surfaces 30 are positioned relatively to each other to adjust the pairs of blocks to the proper width desired, depending upon the temperature at the time the slabs are molded, and if these blocks are not inherently adhesive the surfaces 30 are preferably coated with an adhesive, not shown, to secure the pairs of blocks in properly adjusted position after which the back surface of one of the blocks is similarly coated and secured to the inner side of the web of the section 16 which has been secured to the slab 14 already formed, as heretofore described, so that when the other joint section is positioned it will be properly spaced by means of the wedge blocks 29. After the adjacent slabs 14 have been formed and hardened wedge blocks 29 may be knocked out of place in any suitable manner, or if left in place they will be readily compressed when the slabs 14 are expanded to permit the sections 16 to be moved inwardly of each other. It will thus be seen, that the sections of the joint 15 are in telescoping engagement to contract and expand in response to expansion and contraction, respectively, of the slabs 14. The upper flanges 17 bear the load of the vehicles passing over the joint 15 and the ends of the slabs 14 by being disposed beneath the flanges 17 are prevented from being cracked and broken by weight applied thereto. The sub-surface 12 of the road bed 11 is preferably formed of a material such as asphaltic felt to prevent the foundation, which is generally cement, from uniting with the base of the slabs 14 and with the bottoms of the sections 16.

One section or slab 14 can be readily repaired and replaced, if necessary, or a section of the joint 15 can be replaced, by tearing out an end of the slab 14 to be repaired or replaced thus releasing one of the sections 16 which can be detached from its bolts 27 by removing the nuts 28. If the other section 16 requires replacing, this can be done by removing its exposed nuts 28 thus releasing said section 16 so that it can be removed and replaced by another joint section and fastened by reapplying the nuts 28.

Various modifications and changes in the particular construction and arrangement of the parts forming the expansible joint are contemplated and may be resorted to and the right is reserved to make such variations as do not depart from the spirit and scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A device of the class described comprising a pair of I-shaped beams having inwardly projecting flanges offset relatively to each other and disposed in overlapping engagement, means secured to and projecting outwardly from said beams and adapted to be embedded in sections of a cement roadway, for connecting the adjacent ends of said sections to said I-beams, and means disposed between said sections for yieldably retaining them in extended relationship and for initially adjusting the sections relatively to each other.

2. A device as in claim 1, said first mentioned means comprising a plurality of bolts, said I-beams having spaced openings to receive the shanks of said bolts, said shanks being threaded, nuts engaging said threaded ends, on either side of said I-beams for adjustably mounting them relatively to the beams, and said bolts projecting outwardly from said beams and being provided with headed ends adapted to be embedded in the roadway sections.

3. A device as in claim 1, said last mentioned means comprising wedges formed of a yieldable material and disposed between said I-beams and having corresponding abutting cam shaped surfaces.

4. An expansible road joint comprising a pair of corresponding spaced sections having inwardly projecting flanges, the flanges at the top and bottom of said sections being offset relatively to each other and disposed in overlapping telescoping engagement, headed fastenings adjustably and detachably connected to said sections and projecting outwardly therefrom, said fastenings being adapted to be embedded in adjacent ends of sections of a plastic roadway, and wedge shaped members disposed between the sections of said joint for yieldably retaining them in extended relationship relatively to each other, said wedges being adjustable, relatively to each other, to initially adjust the sections.

5. A highway joint formed of I-beam sections, the inwardly projecting flanges of said sections being recessed to offset said flanges relatively to each other, said offset flanges being disposed in overlapping relationship to form a telescoping connection, and a pair of blocks having wedge shaped abutting faces disposed between the sections for spacing them relatively to each other, said blocks being adjustable relatively to each other to initially vary the space between the sections, and being resilient to yieldably position the sections relatively to each other.

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