Jan. 3, 1928. 1,654,793

E. B. COWEN

EXPANSION JOINT

Filed Sept. 8, 1926

Fig. 1.

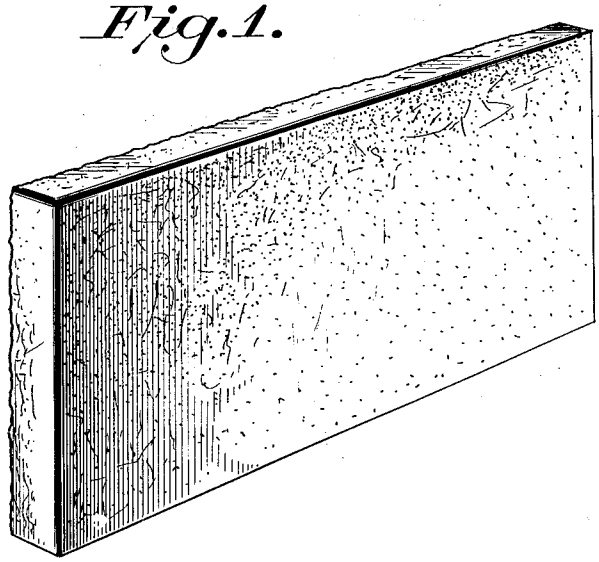
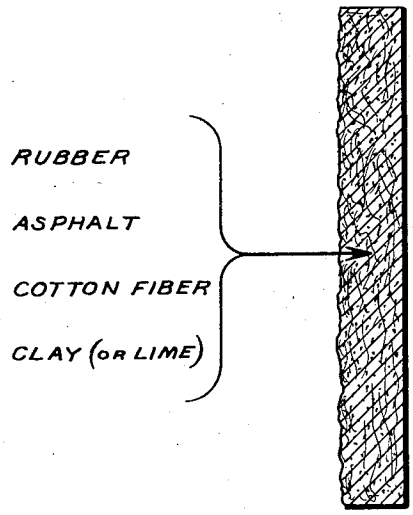


Fig. 2.



Inventor
Esban Bizzle Cowen
By Davis & Davis
Attorneys

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ESBON BEZZLE COWEN, OF TULSA, OKLAHOMA.

EXPANSION JOINT.

Application filed September 8, 1926. Serial No. 134,333.

The object of this invention is to furnish an expansion joint for concrete roads or sidewalks or other concrete structures, steel structures and like uses, to take up and care for the expansion in the concrete and steel of which the structures are manufactured by a solid joint which may be compressed without destruction or misplacement. This joint is intended to and will remain in place and will not be misplaced by oozing either from above or below the concrete and will remain in place between the joints of the steel structure and take up the natural expansion of the concrete or steel. This joint eliminates the use of steel or wooden strips between the joints and may be placed as the concrete is laid or as the steel work is erected. The joint is also intended to prevent the possibility of cracks between a joint caused by the oozing of the usual liquid joint containing material which liquefies when exposed to heat.

In the drawing annexed—

Fig. 1 is a detail perspective view of my joint-strip;

Fig. 2 is a vertical sectional view taken therethrough.

My expansion joint consists of a composition of rubber, cotton fiber, clay or lime and high test asphalt. The rubber gives the joint elasticity and permits compression. The clay or lime and asphalt insure wearing qualities and the cotton fiber acts as a binder for the other three materials.

These ingredients are milled and mixed in the proper proportions as hereinafter set out on a special kind of machine made for that purpose and pressed out to make it a solid material, sufficiently rigid to hold its shape but sufficiently elastic to permit the compression necessary to take up the expansion to which concrete or steel is subject.

The expansion joints are manufactured from one-fourth to one and one-half inches in thickness dependent upon the heat or cold to which the structure is to be subjected and dependent upon the locality in which it is used. The joints may be made the width and length desired but in concrete road work we would make them of width equal to the thickness of the concrete work and from one foot to ten feet in length, but they may be manufactured a greater length, and in steel work we would manufacture the joints to fit the joints between the steel girders. In concrete road work the expansion joint should be between sections 35 to 50 feet apart according to location and in side walks in sections the usual length, around five feet.

The expansion joint is so manufactured that one side thereof will be rough so that the abutting concrete or steel will hold it in place while the other side is made smooth in the manufacture so that the concrete or steel may work more or less freely on that side. This method of manufacture of the joint, rough on one side and smooth on the other will have a tendency to prevent the tearing of the expansion joint by the expansion of the concrete or steel between the sections or joints of which it is used. It will be understood that the cement of the roadbed will mold itself to the rough side of the slab and thus in a measure be interlocked with it so that the slab will rise and fall with this section of the roadbed body, while the adjacent section of the roadbed body, since it is molded against the smooth side of the slab, will be free to rise and fall independently of the slab.

The above ingredients in my expansion joint are milled and mixed under a special process used by me and in three grades to be used according to the nature of the work and the necessity of each case to obtain the best results. The composition of the three grades of my expansion joint is as follows:

Grade #1—New or used rubber 30 pounds; asphalt 210 degrees 27 pounds; clay or lime 34 pounds; cotton fiber 9 pounds.

Grade #2—New or used rubber 35 pounds; asphalt 210 degrees 48 pounds; clay or lime 12 pounds; cotton fiber 5 pounds.

Grade #3—New or used rubber 40 pounds; asphalt 210 degrees 44 pounds; clay or lime 11 pounds; cotton fiber 5 pounds.

On account of cheapness, I may use in producing my product cast-off tire casings and inner tubes. The casings are particularly desirable because they contain, invariably, the desired quantity of cotton fibers. The casings and tubes are put through shredders and grinders, well known in the rubber trade, which step reduces the material to very fine particles. I then add the high-test asphalt and clay (preferably what is known as guilders' whiting), and then this mixture is put through the regular rubber-working machines known as the rolls. These rolls are first warmed up by applying steam thereto, and after this initial warming no further application of extraneous heat is

needed, as the friction produces sufficient heat to keep the mass in a semi-molten condition, this high degree of friction being caused by one roll traveling faster than the other, as usual in this class of machines. Cold water is run through these rolls to keep them at an even temperature of the desired degree. After the material is run through these rolls a sufficient number of times to thoroughly mix and knead the mass, it emerges in the form of fine sheets of various sizes. The material in this form is then put through a calender mill, which is a mill having large heavy rolls that are adjusted with any desired space between the rolls. The rolls are set to produce the desired thickness in the final product. These heavy rolls compress the slab or sheet into the desired density, and, while the sheet is still warm, it is cut up into long strips of the desired width; and, subsequently, while still warm, it is cut into the desired lengths, and then laid aside to cool. When cool, the slabs are stiff enough to be handled easily and, in order to prevent the slabs sticking together when piled or baled, they are desirably rolled in soapstone dust. When reclaimed rubber is used in place of cast-off tires and tubes, the process is identical with the foregoing except that the cotton lint is added to the mass at the time the body-forming material and the asphalt are added. I use high-test asphalt in order to obtain a high melting point. If a low-test asphalt were used, the sun's rays in hot weather would melt the strip sufficiently to cause the asphalt to run and thus be squeezed out of the joints and run over upon the surface of the road-bed by expansion of the sections of the road-bed; and then when the road-bed cools and contracts, the squeezed-out asphalt also cools and thus is prevented from running back into the joints.

I claim:

A preformed expansion-joint-strip consisting of a mass of comminuted intimately-mixed rubber, cotton fiber, high-test asphalt and a body-forming wearing substance, the whole being compacted to form a solid elastic slab sufficiently rigid to hold its shape.

Witness my hand this 1st day of September, 1926.

ESBON BEZZLE COWEN.