

June 11, 1946.

E. M. JENKINS ET AL
EXPANSION JOINT FILLER

2,401,936

Filed May 29, 1943

Fig. 1.

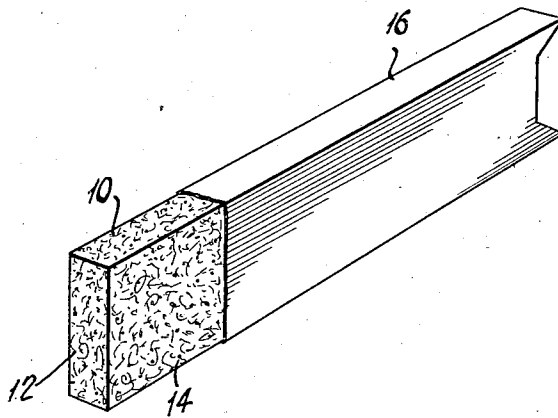
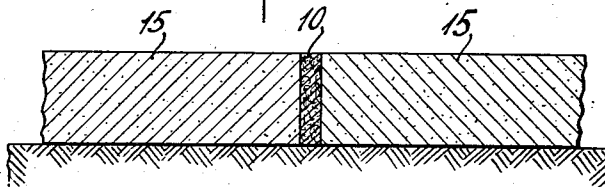


Fig. 2.



INVENTOR
EDWARD M. JENKINS.
DAVID LOETSCHER.
BY
Virgil C. Kline
ATTORNEY

UNITED STATES PATENT OFFICE

2,401,936

EXPANSION JOINT FILLER

Edward M. Jenkins and David Loetscher, Somerville, N. J., assignors to Johns-Manville Corporation, New York, N. Y., a corporation of New York

Application May 29, 1943, Serial No. 488,992

7 Claims. (Cl. 94-18)

1

Our invention relates to an improved expansion joint filler, for use in connection with structures of various types which are subject to expansion and contraction, and particularly to structures such as concrete roadways. Heretofore it has been conventional in the construction of concrete roadways and the like to divide the roadway into slabs or sections with spaces therebetween to permit of the expansion and contraction of the slabs under varying temperature conditions. Such spaces, which are conventionally termed "expansion joints," are filled with a suitable compressible material to prevent dirt and like substantially uncompressible matters from entering the space, and also to provide continuity of the roadway surface. Heretofore such expansion joint fillers have been made of various materials, including bituminous compositions and the like. Also fibrous preformed filler strips of fiberboard, cork, and the like have been used. The present invention is directed to preformed filler strips of a felted fibrous material and has for its primary object the provision of an improved strip of this type, which will completely fill the expansion joint spaces under all service conditions.

As will be understood, concrete is not usually laid in the coldest weather and also is in a more or less wet and expanded condition at the time the filler strips are inserted. Consequently the spaces will, due to initial concrete shrinkage and the later normal contraction of the slabs, increase in width after insertion of the strips. Where the ordinary fibrous strips are employed a gap is left between the strip and the slab which destroys the continuity of surface and also permits the filler strip to work out of the joint as well as the entry of dirt and soil carrying water into the space. Another object of the invention is the provision of a preformed fibrous filler strip adapted to expand beyond its initial thickness to insure a tight fit in the joint under all conditions.

Another object of the invention is the provision of a filler strip of the character referred to, composed of felted wood or like relatively inexpensive, fibrous materials.

A further object of the invention is the provision of a filler strip which is resistant to deterioration and which will provide satisfactory service over relatively long periods.

A further object of the invention is the provision of a filler strip composed of felted fibrous materials, which, during fabrication is compressed to a thickness less than its normal thick-

2

ness and which in the absence of moisture will retain such reduced thickness.

A still further object of the invention is the provision of a method of making filler strips of the type referred to above.

Our invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description which is to follow and to the accompanying drawing, in which;

Fig. 1 is a perspective view, with parts broken away for clearness of illustration, of an expansion joint filler strip in accordance with the invention; and,

Fig. 2 is a sectional view, taken transversely of the expansion joint through a roadway pavement or the like, illustrating the filler strip in operative position.

Referring to the drawing, there is shown a filler strip 10 for roadways and similar structures, the strip comprising a compressed felt of ligneous vegetable fibers 12, particularly wood fibers, and an interspersed binding and preserving agent 14. Fibers 12, which may be of any suitable ligneous wood, are of a special character. More particularly, they are long, relatively coarse, curly, resilient fibers produced preferably by the known "Asplund" process, involving mechanical defiberization or grinding of wood chips, softened by being subjected to a steaming treatment in which the steam penetrates into the pores of the wood. Fibers formed by this process, employing a relatively coarse setting of the "Asplund" defiberizer, have the curly, resilient characteristics required for the instant invention. It will be understood that the invention is not limited to the use of fibers produced by the Asplund process, as they may be obtained in any way that will give them similar characteristics with respect to curliness and resiliency.

The felted strip of fibers containing the intermingled binder, when ready for use as an expansion joint filler strip (see Fig. 1) is substantially compressed, as will hereafter be more fully explained, so that it may be easily fitted into the expansion space between concrete paving slabs 16 or the like. (See Fig. 2.) At the same time the strip, due to the type of fibers employed and the manner of fabrication, when so positioned and subjected to normal weathering influences, particularly to the action of rain and other moisture, is capable of increasing its thickness by $\frac{1}{3}$ to $\frac{1}{2}$ or more. In consequence, further contraction of the concrete slabs after insertion of the filler strip will not produce unfilled por-

tions of the expansion space, but rather the strip will fit snugly within the space at all times. Due to the resilient characteristics of the fibers the strip may be compressed by expansion of the concrete slabs and will reexpand upon contraction of the slabs substantially indefinitely. The binding and preservative ingredient 14 may constitute any conventional waterproofing and binding material, such as asphalt, waxes or the like, but preferably coal tar is employed because of its superior preservative qualities. The coal tars preferred for this purpose are those having a viscosity range of from a fluid state at room temperature to a softening point of 300° F.

In the manufacture of the filler strip, in accordance with the invention, relatively long, curly, wood fibers, preferably obtained by defiberizing wood by the Asplund process employing a relatively coarse setting of the machine, as referred to above, are combined with water to form a wet stock or furnish. The binding material, preferably coal tar, in proportions to provide, say, 5% to 20% binder in the finished product, in a molten, emulsified or pulverized condition, is added to the furnish. The furnish is then sheeted on a suitable type of paper machine, for example an Oliver filter, in a conventional manner. The wet mat thus formed is then dried until only slightly damp, that is, until it contains approximately 50% of water by weight of the dry materials. The damp mat is next placed in a hot press between screens and the press closed against stops set at the desired compressed thickness which is preferably approximately 50% of the unpressed thickness of the sheet. Alternatively hot press rolls may be employed. During the pressing operation the sheet is subjected to drying temperatures, say, from 160° to 350° F. The pressure required will vary, as will be understood, with the particular fibers employed, but it may be stated that pressures from a relatively low pressure to pressures of the order of 500 lbs. per square inch may be used. As an example, good results were obtained with a drying temperature of 220° F. and a pressure of 50 lbs. per square inch for a mat of pine wood fibers defiberized by the Asplund process.

The sheet is maintained in the press under the temperature conditions referred to until thoroughly dried and the material is then preferably cooled while still in the press, although this is not necessary. The formed sheet is then removed from the press, and divided into strips of the size required for the use intended. During the compressing step apparently the lignins of the wood are softened by the heat and moisture. Upon complete drying of the material while still under compression the lignins take a set which is sufficient to hold the curly, resilient fibers in a compressed or distorted condition in the absence of any substantial amount of moisture. The subsection of the material to moisture-laden air causes relatively slow recovery, indicating that the grasp of the lignins is gradually released. Immersing the material in water or subjecting it to a wetting, such as would be produced by a relatively heavy rain, causes a very rapid recovery. The binding and waterproofing agent serves to increase the felted strength of the fibrous material to such an extent that the strips can be handled and shipped without danger of undue breakage. In addition the binder, particularly where coal tar or a similar product is employed, acts as a preservative and reduces rotting or deterioration of the fibers.

In order to maintain the filler strips in the compressed state during the shipping, handling and storage periods, they are preferably wrapped with a suitable moisture-proof wrapper, as indicated at 16, in Fig. 1. The strips may be individually wrapped as shown or, if desired, a plurality of the strips may be enclosed in a single wrapper. The wrapping material 16 may comprise wax paper, moisture-proofed Cellophane, moisture-proofed kraft paper, or the like. In lieu of wrapping the strips they may be maintained in a dry atmosphere during storage and then shipped for immediate use on the job. As previously pointed out, only a slow recovery of the strips occurs when subjected to normal humidity conditions and when they are not subjected to direct contact with water.

Having thus described our invention in rather full detail, it will be understood that these details need not be strictly adhered to, but that various changes and modifications will suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What we claim is:

1. A joint filler strip comprising a substantially dry, compressed slab capable of retaining its compressed state in the absence of moisture and of expanding to substantially its uncompressed dimensions when subjected to moisture, said slab comprising an interfelted mass of curly fibers which have been subjected to heating and thorough drying under compression, and a binder disseminated therein.

2. A joint filler strip comprising a substantially dry, compressed slab capable of retaining its compressed state in the absence of moisture and of expanding to substantially its uncompressed dimensions when subjected to moisture, said slab including a felted layer of curly, resilient wood fibers and an interspersed binder, said layer having been subjected to heat and pressure to reduce its thickness to substantially one-half its uncompressed thickness, and thoroughly dried while maintained under compression.

3. A method of making a joint filler strip comprising forming a felted layer of curly, resilient wood fibers and an interspersed binder, subjecting said layer to heat and pressure to reduce its thickness to substantially less than its uncompressed thickness, and thoroughly drying said layer while maintaining it under said compression.

4. A method of making a joint filler strip comprising wet felting curly, resilient wood fibers to form a layer containing an interspersed binding and preserving material, drying said layer until slightly damp, and subjecting said layer to heat and pressure to reduce its thickness to substantially less than its uncompressed thickness and until said layer is substantially dry.

5. A method of making a joint filler strip comprising wet felting curly, resilient Asplund fibers to form a layer containing an interspersed binding and preserving material, drying said layer until slightly damp, and subjecting said layer to temperatures of the order of 160° to 350° F. and pressure of the order of 50 lbs. per square inch to reduce its thickness to substantially less than its uncompressed thickness, said subsection to heat and pressure continuing until said layer is substantially dry.

6. A method of making a joint filler strip comprising forming a felted layer of coarse Asplund fibers and an interspersed binder, subjecting said

5

layer to heat and pressure to reduce its thickness to substantially less than its uncompressed thickness, and thoroughly drying said layer while maintained under compression.

7. A joint filler strip comprising a substantially dry, compressed slab capable of retaining its compressed state in the absence of moisture and of expanding substantially when wetted, said slab comprising an interfelted mass of coarse

6

Asplund fibers and an interspersed binder and formed by subjecting a layer of said fibers and binder to heat and pressure to reduce the thickness of the layer to substantially less than its uncompressed thickness and thoroughly drying said layer while maintained under compression.

EDWARD M. JENKINS.
DAVID LOETSCHER.