July 25, 1939. E. M. JENKINS 2,167,550

JOINT-CLOSING MEMBER AND METHOD OF MAKING THE SAME

Filed Dec. 31, 1935

Fig. 1.

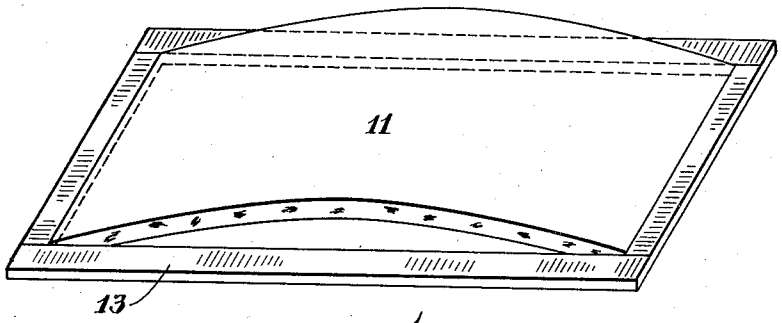
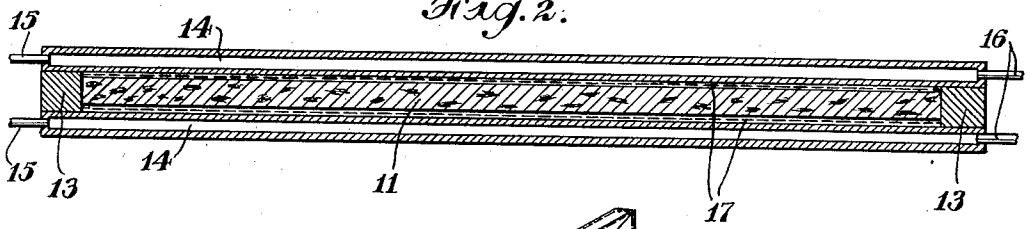


Fig. 2.



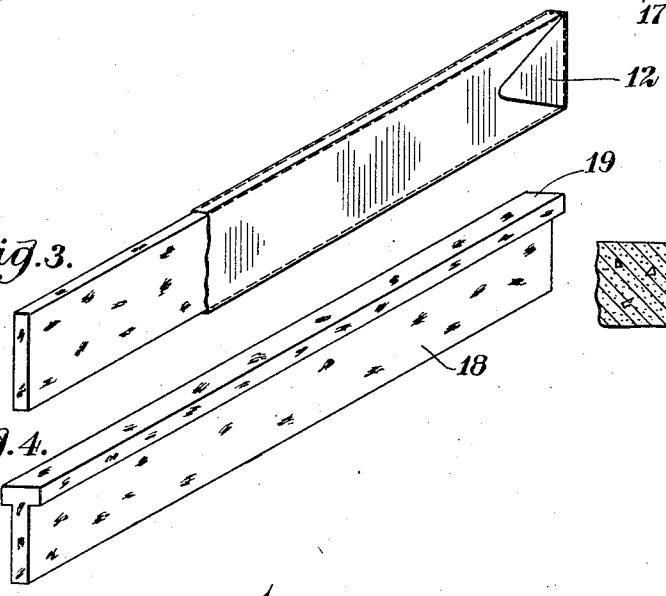


Fig. 3.

Fig. 4.

Fig. 5.

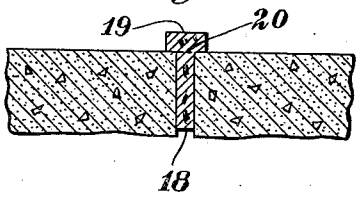
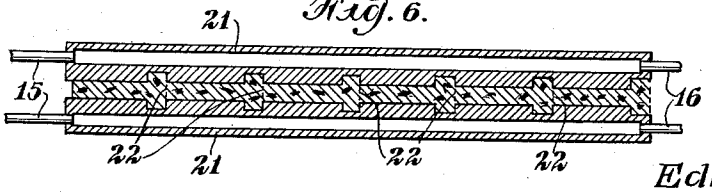


Fig. 6.



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JOINT-CLOSING MEMBER AND METHOD OF MAKING THE SAME

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Application December 31, 1935, Serial No. 56,899

8 Claims. (Cl. 18—48)

This invention relates to a joint-closing member and to the method of making and using the same.

The invention is particularly useful in connection with the filling of the joints between adjacent sections of concrete pavement, roofing, or flooring and will be described for the purpose of illustration in connection therewith.

A particularly successful composition for joint-filler strips is that made as described in United States Patent 1,960,374 issued to Edmonds on May 29, 1934, in the passage beginning with line 101 on page 2 and ending with line 5 of page 3. Such a composition includes resilient (compressible and reexpansible) particles, such as granules of cork, and a thermoset binder mixed therewith and bonding the particles into a unitary article. A satisfactory binder is a resinous phenol-aldehyde condensation product including a small proportion of diethylene glycol or like plasticizer.

In the said patent, Edmonds states that his filler strip, when compressed for a period of approximately twelve hours, undergoes a partial paralysis of resiliency or self-maintained deformation that is not permanent, the strip within less than one hour after its release from compression recovering a substantial part of its original normal thickness.

There is need of a precompressed cork filler strip that will retain substantially the thickness established by compression when the strip is in storage awaiting sale or installation and that may be transported to a remote location, say, across a continent, without expansion during such transportation to a width such as to interfere with the insertion of the filler within the joint.

The present invention comprises the novel features hereinafter described, particularly a joint-closing member meeting the above requirements and, also, a method of manufacturing such member. Other features and advantages of the invention will appear from the detailed description that follows.

A preferred embodiment of the invention is illustrated in the attached drawing and will be described in connection therewith.

Fig. 1 shows a perspective view partly diagrammatic of a sheet article of joint-filler composition at the stage of being inserted into a frame member for compression.

Fig. 2 shows a sectional view of the sheet assembled between press members in the process of manufacture.

Fig. 3 shows a perspective view of a finished joint filler strip, with the wrapper broken away, for illustration.

Fig. 4 shows a perspective view of a modified shape of filler strip.

Fig. 5 shows an assembly including adjacent members forming a joint therebetween and a filler strip, of the type illustrated in Fig. 4, closing the joint.

Fig. 6 shows a sectional view of an assembly for making compressed sheet material for use in forming a strip of shape illustrated in Fig. 4.

In making the improved filler strip of the present invention, the selected composition such as that described in the said patent to Edmonds is first shaped and bonded, as, for example, in the form of a compressible and reexpansible sheet 11. This sheet is then warmed to an elevated temperature adapted to soften the said sheet but below the temperature of scorching of the composition.

The shaped and bonded composition in warm condition is then compressed and is cooled, while still under compression, if it is desired to set quickly and effectively the dimensions established by the compression. The total time for compression of the warm material and cooling may be very short, as, for example, only fifteen minutes or so. In spite of the shortness of time during which the composition is subjected to compression, the compressed article will retain its established dimensions almost indefinitely if stored in a thoroughly dry environment or protected from moisture, as by a practically moisture-tight wrapper 12, say, one of waxed paper or the like, disposed suitably around the finished strip or filler member, as shown in Fig. 3, and protecting the strip from premature expansion.

In order to prevent shrinkage in length of the filler member, on long ageing, with attendant development of unfilled portions of the joint at the end of the filler, the composition of the strip is suitably compressed not only flatwise but also endwise, that is, in the direction of the longest dimension of the finished strip, as well as in thickness, so that the lengthwise reexpansion will offset at least the normal shrinkage of the composition of which the strip is composed.

Suitable equipment for use in making the compression is illustrated in Figs. 1 and 2.

There is provided a frame 13 of steel or the like, the thickness of which will determine the thickness to which the filler composition is ultimately compressed. Into this frame there is inserted the formed and bonded sheet 11 of filler

composition, the sheet being suitably bowed lengthwise, as illustrated in Fig. 1, so that, when later straightened by the press plates 14, there is endwise compression of the sheet 11.

A convenient form for the press plates 14 is a hollow plate having inlet 15 and outlet 16 that may be used for steam or hot water for warming the sheet 11, preparatory to compression, and for cold water during the subsequent cooling operation.

In the press assembly shown in Fig. 2, I have used to advantage woven wire screens 17 or like apertured members, placed between the faces of the sheet 11 and the plates 14, to expose a large proportion of the total exterior surface of the sheet 11 to communication with the atmosphere during the pressing operation and permit the escape of moisture as vapor from the hot composition. With such an assembly, a sheet, supplied to the press in air-dry condition and containing an amount of moisture varying with the humidity of the atmosphere, may be simultaneously dried and compressed. Also, the screen member in contact with the faces of the composition being compressed minimizes creeping or growing of the sheet 11 during compression, particularly if the sheet is not confined at all edges. Furthermore, they produce a desirable roughening or marking of the faces of the article that reduces slippage of the finished strip when in use as a joint filler.

When the assembly has been made, the press plates 14 are forced against the composition 11, as, for example, at about 150 to 200 pounds pressure to the square inch, while the composition is in warm condition, as, for example, at 200° to 300° F. When the thickness of the sheet has been reduced so that the plates 14 are distant from each other by the thickness of the frame 13, say, when the composition has been pressed to approximately half of its original thickness, the plates 14 are cooled, as by the circulation of cold water therethrough, and the compressed composition 11 is thereby cooled and set in preestablished thickness.

The compressed and thus set sheet material is then removed from the press and is sliced, for example, into strips, such as shown in Fig. 3. As stated, these strips are substantially less in thickness than the width of joints that are to be filled. Thus, the strips may be of thickness equal approximately to 60 to 80 per cent of the said width of the joints and adapted, on reexpansion, to fill the joint. Likewise, the length of the strips may be appreciably shorter than the length of the space to be filled, say, shorter by one inch for a strip of ten foot length.

The strip is formed from the article or composition compressed as described. That is, the strip may constitute the whole of an originally properly sized article. Or, more economically, the strip is produced from an article that is a wide sheet as compressed, by cutting of the sheet into strips of desired dimensions.

In using a finished strip such as shown in Fig. 3, the strip is delivered to the place of installation in as nearly moisture-free condition as possible, as, for example, inside the wrapper 12. After the wrapper is removed, the strip is inserted edgewise into the joint. Absorption of moisture will then cause the strip to expand and completely fill the joint and cause the strip to be anchored in position.

In instances in which the joint is not closed at the bottom, as, for example, when the joint occurs between adjacent sections or units of roofing material, special precautions are necessary to avoid falling, through or from the joint, of the filler material that is undersized with respect to the joint when initially placed therein. For this purpose, there may be formed a joint filler strip such as shown in Fig. 4 having a narrow portion 18 corresponding to the strip shown in Fig. 3 and an enlargement or wide portion 19 constituting a shoulder adapted to be engaged and thus maintained above the joint to be filled and to establish the position of the narrow portion 18 within the joint, as illustrated in Fig. 5. When the narrow portion has expanded in the usual manner and become tightly engaged within the joint, the large portion 19 may be cut away, as along the dotted line 20, to leave the filler member practically flush at its upper surface with the top of the adjacent sections of material forming therebetween the joint which is closed.

In making the filler member of shape shown in Fig. 4, a generally plane sheet similar to that designated by 11 may be pressed between dies 21 having irregularities of surface, such as illustrated in Fig. 6, and adapted to produce thick portions of such dimensions and so spaced that, when the shaped sheet is removed from the press assembly and cut along the dotted lines 22, there results a number of strips of generally T-shaped cross section.

In a modification of the general method of the invention, a filler strip including particles of cork and thermoset binder bonded and shaped, as described in the said patent to Edmonds, is softened and compressed at the time of installation in a joint. Thus, I may subject a strip of this composition to an elevated temperature, such as to dry heat at about 250° to 300° F. or to immersion in water that is at or near the boiling point, as, for instance, at or above 180° F., until the strip is warmed throughout.

The strip is then compressed, by any suitable means to a thickness less than the width of the space to be filled, and forced into position therein. After the compression is released, the strip expands to fill the space.

For some purposes, units of natural cork may be used in place of the composition described above. Thus, a strip of natural cork may be heated and subsequently cooled, while under compression, to give a precompressed article adapted to reexpand on absorption of moisture.

It is not necessary to the invention to explain the changes which the strip undergoes and the invention is not limited to any theory of explanation of the mechanism by which the desired changes are produced.

The natural cork and also the composition made according to Edmonds contain each a binding material, in the one case, the natural binder occurring in the cork and, in the latter case, added binder also. These binders are alike in being yieldable, so that the article containing the binder may be compressed at elevated temperatures and reexpanded at ordinary temperatures, with maintenance of the resiliency of the article.

In connection with the various embodiments of the invention described, it will be understood that the thickness of the filler strip in normal condition should be at least slightly greater than the width of the joint to be filled.

It will be understood, also, that the details given are for the purpose of illustration, not restriction, and that variations within the spirit of the invention are to be included in the scope of the appended claims.

What I claim is:

1. The method of preparing a joint filler which comprises heating a preformed resilient cork sheet consisting of granulated cork bonded with a thermoset binder to a temperature sufficient to soften the sheet, compressing the sheet while hot under a pressure of approximately 150 to 200 pounds per square inch to reduce the thickness of the sheet to approximately one-half of its original thickness, and cooling the sheet while in its compressed state, whereby a sheet is obtained capable of retaining its reduced thickness in the absence of moisture but capable of expanding to approximately its original thickness when subjected to moisture.

2. A method of preparing a joint filler which comprises heating a formed resilient cork sheet to a temperature sufficient to soften the sheet, compressing the sheet while hot under a pressure of approximately 150 to 200 pounds per square inch to reduce the thickness of the sheet to approximately one-half of its original thickness and cooling the sheet while in its compressed state, whereby a sheet is obtained capable of retaining its reduced thickness in the absence of moisture but capable of expanding to approximately its original thickness when subjected to moisture.

3. The method of preparing a joint filler which comprises heating a formed resilient cork body to a temperature sufficient to soften the body, subjecting the body while hot to a pressure sufficient to reduce its thickness to approximately one-half of its original thickness and cooling the body while in its compressed state, whereby a cork body is obtained capable of retaining its reduced dimension in the absence of moisture but capable of expanding to approximately its original dimension when subjected to moisture.

4. The method of preparing a joint filler which comprises heating a preformed resilient cork sheet to a temperature sufficient to soften the sheet, subjecting the sheet while hot to pressures sufficient to reduce the thickness of the sheet to approximately one-half of its original thickness and to substantially reduce a linear dimension of the sheet, and cooling the sheet while in its compressed state, whereby a sheet is obtained capable of retaining its reduced dimensions in the absence of moisture, but capable of expanding to approximately its original dimensions when subjected to moisture.

5. A joint filler member comprising a substantially dry compressed cork strip capable of retaining its compressed state in the absence of moisture but capable of expanding to substantially its uncompressed dimensions when subjected to moisture, said member resulting from a method comprising heating a preformed resilient cork sheet consisting of granulated cork bonded with a thermoset binder to a temperature sufficient to soften the sheet, compressing the sheet while hot under a pressure of approximately 150 to 200 pounds per square inch to reduce the thickness of the sheet to approximately one-half of its original thickness and cooling the sheet while in its compressed state.

6. A joint filler member comprising a substantially dry compressed cork strip capable of retaining its compressed state in the absence of moisture but capable of expanding to substantially its uncompressed dimensions when subjected to moisture, said member resulting from a method comprising heating a preformed resilient cork sheet to a temperature sufficient to soften the sheet, subjecting the sheet while hot to a pressure sufficient to reduce the thickness of the sheet to approximately one-half of its original thickness, and cooling the sheet while in its compressed state.

7. A joint filler member comprising a substantially dry cork strip compressed in two dimensions and capable of retaining its compressed state in the absence of moisture but capable of expanding to substantially its uncompressed dimensions when subjected to moisture, said member resulting from a method comprising heating a preformed resilient cork sheet to a temperature sufficient to soften the sheeet, subjecting the sheet while hot to pressures sufficient to reduce the thickness of the sheet to approximately one-half of its original thickness and to substantially reduce a linear dimension of the sheet, and cooling the sheet while in its compressed state.

8. A joint filler member comprising a substantially dry cork strip compressed over the greater portion of its width, said compressed portion being capable of retaining its compressed state in the absence of moisture but capable of expanding to substantially the thickness of the uncompressed portion when subjected to moisture, said member resulting from a method comprising heating a preformed resilient cork sheet to a temperature sufficient to soften the sheet, subjecting the sheet over the greater portion of its area and while hot to a pressure sufficient to reduce the thickness of the compressed portion of the sheet to approximately one-half of its original thickness, and cooling the sheet while said portion is in its compressed state.

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