

[54] EXPANSION JOINTS FOR ROOFS

[76] Inventor: William T. Mullen, 65 West Street
Road, Wyncote, Pa. 18974

[22] Filed: May 7, 1971

[21] Appl. No.: 141,271

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 848,251, Aug. 7,
1969, abandoned.

[52] U.S. Cl.52/403, 52/573

[51] Int. Cl.E04b 1/68

[58] Field of Search52/573, 403, 409, 393; 94/18,
94/18.2

[56] References Cited

UNITED STATES PATENTS

1,885,391 11/1932 Thompson.....94/18.2

Primary Examiner—John E. Murtagh

Attorney—Zachary T. Wobensmith

[57]

ABSTRACT

A roof joint construction is provided which includes an insertable precompressed expansible elongated filler or core element of open cell polyurethane or the like, with an impregnant, for insertion at joints in a roof deck for engagement with the roof, the insulation on the roof and the roof deck. The filler or core is preferably held, prior to use, in a compressed condition in any desired manner, such as by a cartridge, cartridge and cap or by a vacuum packing, with interposed release sheets, if desired. Upon removal for installation the filler or core element is inserted to the desired depth at the space at the joint, and restrained against further downward movement while the expansion in the space and above the space takes place. The top of the strip may have an elastic and flexible cover thereon to protect the filler or core. Before or after the removal of the cap, if a cap is employed, the roofing covering is applied. A final roofing covering may be used over the joint, if desired.

3 Claims, 7 Drawing Figures

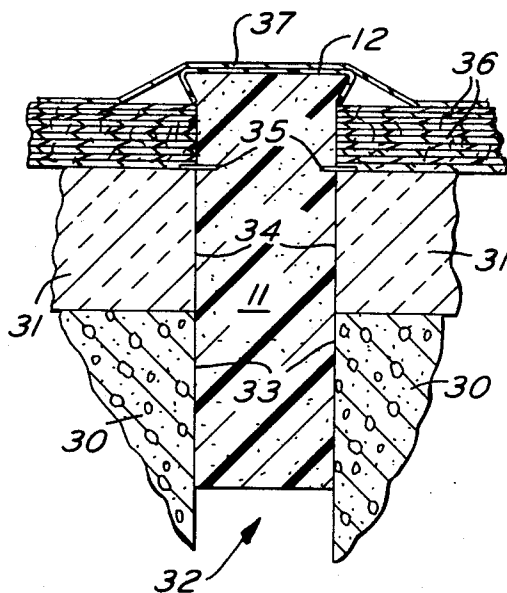


FIG. 1

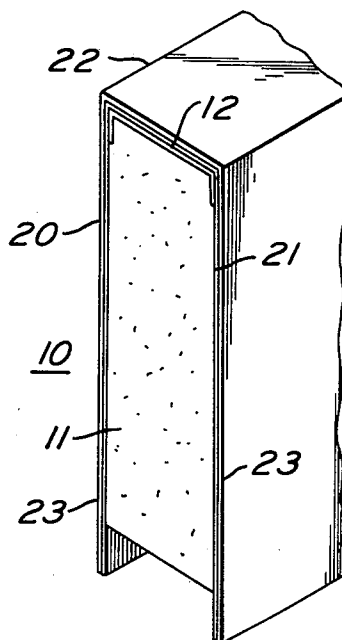


FIG. 3

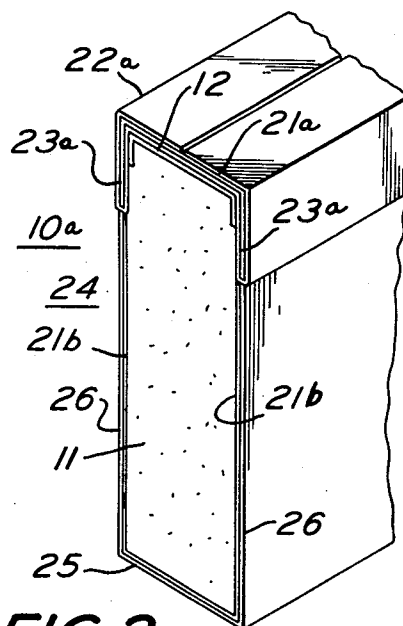
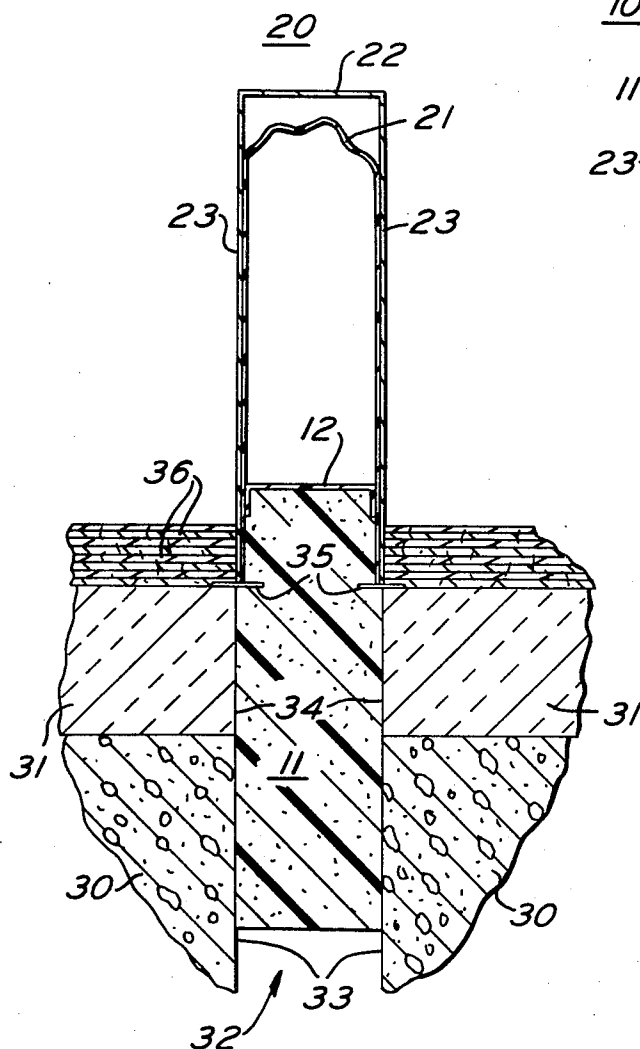


FIG. 2

INVENTOR
WILLIAM T. MULLEN

BY

J. T. Wobersmith

ATTORNEY

EXPANSION JOINTS FOR ROOFS

REFERENCES TO RELATED APPLICATION

This application is a continuation in part of my prior U.S. application for Expansion Joint for Roof, filed Aug. 7, 1969, Ser. No. 848,251, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to expansion joints for roofs and more particularly to an improved insertable expandable filler or core element for use in roof joints and the joint construction.

2. Description of the Prior Art

Large roof areas must have provisions to accommodate expansion.

Many different methods and materials have heretofore been proposed and these usually rely on some waterproof but elastic material that will stretch to handle the expansion of the joint and then contract when the joint contracts. Many of the materials proposed are adversely affected by strong sunlight and other exposed weathering conditions including the action of ozone and air so that the materials lose elasticity and otherwise age and deteriorate. The most acceptable systems employ a curb built up above the insulation but these systems are expensive and involve many steps or operations for completion.

One expansion joint of the character referred to above is shown in U.S. Pat. No. 3,093,934 to Underhill, which includes angles and fillet strips with an inverted U-shaped flexible insert and a cover strip of flexible plastic and covering tapes.

Numerous expansion joints similar to the Underhill joint are also available and many other expansion joints have been proposed.

The patent to Thompson, U.S. Pat. No. 1,885,391, shows an expansion joint for concrete pavements in which, in one form a plastic noncompressible filler material, preferably bituminous, fills the lower portion of the space between the slabs and the upper portion of the space is closed but only partially filled by a strip of compressible vulcanized sponge rubber which is flush with the upper faces of the slabs.

In another form of the Thompson disclosure the sponge rubber strip is vulcanized to a pair of sheet metal strips with stamped out anchorage members to be embedded in the concrete slab. Paper strips to prevent entry of wet concrete below the rubber strip are provided and wires may be employed to hold the sponge rubber in compressed condition until the concrete has set when the wires may be cut and withdrawn. Thompson does not have a joint for roofs and cannot obtain any comparable ease of use, multiple seal and protection of the sealing strip as attained by applicant.

Fischer, in U.S. Pat. No. 2,431,385, shows an expansion joint for concrete pavements with the use of a sponge rubber strip with a seepage proofing elastic surface filler around the body but with the filler disposed wholly below the upper and outer surfaces of the pavements. No provision is made in Fischer for a projecting sealing element expanded at its exposed portion to a greater extent than the remaining portion so that the only sealing by the sponge rubber is within the space between the ends of the concrete slabs.

Cooper, in U.S. Pat. No. 3,255,680, shows a joint for cement pavements which comprises an elongated metal strip with flanges for retention in the concrete and an elongate block secured to the top of the strip which block is of compressible but slow recovery material such as a polyurethane foam. The top of the block in the finished construction is flush with the top of the pavement.

Rhodes, in U.S. Pat. No. 3,276,334, shows a joint filler strip of expansible material which also has no provision for expansion externally of the slab and thus has only a limited character of seal.

My prior U.S. Pat. No. 3,446,340, shows the use of a central highly compressed sealing strip with a finished C-shaped cover or binder strip thereon which are wholly within the space between the panels. The strip and cover do not project therebeyond and if they did could still not expand to provide additional sealing outside the space.

SUMMARY OF THE INVENTION

In accordance with the invention an expansion joint is provided which includes an insertable elongated precompressed and reexpandable filler or core element for insertion at joints in a roof deck to a predetermined depth, the lower part and inserted part expanding to fill the space between deck sections and the top part upon release expanding to a greater extent for further sealing with the exposed upper edge protected against sunlight, ozone and air.

It is accordingly the principal object of the invention to provide an expansion joint for roofs which includes a precompressed and reexpandable insertable element which can expand to fill the space at the joint and thereabove for engagement with applied roofing.

It is further object of the invention to provide a precompressed expandable sealing element which can be readily transported to the place of use, which will be relatively inexpensive, and which will be easy to use.

It is a further object of the invention to provide a sealing element of the character aforesaid which will provide an effective seal and which will facilitate the construction of an expansion joint for roofs and the like.

It is a further object of the invention to provide an improved expansion joint for roofs in which an expansible filler or core element is employed which simultaneously presses against the roofing, the insulation and the roof deck in sealing relation.

Other objects and advantageous features of the invention will be apparent from the description and claims.

BRIEF DESCRIPTION OF THE DRAWING

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawings forming part thereof, in which:

FIG. 1 is a fragmentary perspective view of a portion of one form of sealing element in accordance with the invention prior to use;

FIG. 2 is a fragmentary perspective view of another form of sealing element in accordance with the invention prior to use;

FIG. 3 is a vertical sectional view showing an intermediate stage of installation of the sealing element of FIG. 1;

FIG. 4 is a vertical sectional view showing a later stage than FIG. 3 in the installation of the sealing element of FIG. 1;

FIG. 5 is a vertical sectional view showing an intermediate stage of installation of the sealing element of FIG. 2;

FIG. 6 is a vertical sectional view showing a later stage of installation of the sealing element of FIG. 2; and

FIG. 7 is a vertical sectional view showing a completed expansion joint employing the element of FIG. 2.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings and particularly FIG. 1 thereof, a portion of a filler element employed in connection with the invention is shown at 10 and includes an interior soft highly compressed sealing strip 11. The strip 11 is preferably composed of an open cell polyurethane plastic or similar cellular material which in fully expanded condition is preferably impregnated with a waterproofing and water repellant material which may also be adhesive. Asphalt, butyl and waxes are suitable impregnants. The extent of compression after impregnation will be determined by the nature of the seal which is desired upon subsequent reexpansion, but is such that the joint is at all times sealed by the strip 11 against the passage of water and is capable of responding to changes in the width of the space in which it is used upon either expansion or contraction of the roof deck. A compression of the order of two and one half to one and up to five to one can be employed, depending upon the conditions of use.

The sealing strip 11 is shown as rectangular in cross section, and, along one edge, which is the exposed, edge and a short distance down each side, is provided with a flexible and transversely extensible covering 12, which may be a polyurethane or acrylic coating, to protect the impregnant and the strip 11 from the action of ozone, oxidation by the air, and ultra-violet rays from the rays of the sun.

The sealing strip 11 shown in FIG. 1, is preferably retained in compressed condition prior to use by an elongated inverted U-shaped holding or retainer channel 20, with an interposed release sheet 21 to prevent adherence of the strip 11 to the retainer channel 20. The holding or retainer channel 20 can be made of metal or of synthetic plastic but must have adequate strength to effect its holding action for the sealing strip 11 in compressed condition until release thereof is desired.

The retainer or holding channel 20 preferably has a top section 22 and side legs 23 extending therefrom, preferably of greater depth than that of the strip 11.

The mode of use of the filler strip 10 illustrated in FIG. 1 will now be pointed out.

In FIGS. 3 and 4, a roof deck of relatively rigid roof panels 30, which may be of concrete or any other desired material, having insulating panels 31 superposed thereon is shown, with a space 32 therebetween at which an expansion joint is desired. The roof panels 30 have spaced faces 33 and the insulating panels 31 have spaced faces 34.

A filler element 10 shown in FIG. 1, in compressed and unexpanded condition, is prepared for insertion by partial removal of the holding or retainer channel 20 which permits initiation of expansion of the previously confined portion of the strip 11 into sealing engagement with the roof panels 30 and insulating panels 31.

Before expansion occurs the filler element 10 is inserted in the space 32 to the desired depth and limit pins 35 inserted therein at the desired depth locations. As expansion occurs the strip 11 expands outwardly until it engages the faces 33 and the faces 34.

A plurality of layers 36 of roofing felt with asphalt or pitch, or the like, can be applied over the panels 31, as illustrated in FIG. 3, with asphalt application if desired in the manner well known for built up roofing.

The holding or retainer channel 20 is then completely removed and the removal of the channel 20 will permit the expansion of the unrestrained portion of the strip 11 above the space 32 to expand into sealing engagement with the roofing layers 36 at their edges and flare outwardly thereabove as shown in FIG. 4. The upper edge covering 12 does not prevent this flaring nor the sealing engagement of the portion of the strip 11 therebelow.

Upon change of dimension of the space 32 by expansion and contraction the strip 11 in the space 32 will expand and contract without disruption of the sealing with the roofing, the insulation or the roof deck.

Referring now more particularly to FIG. 2 of the drawings, a portion of another filler element in accordance with the invention is there shown at 10a and includes a compressible and reexpandable sealing strip 11 as previously described.

The filler element 10a preferably has a covering 12 and is retained in compressed condition by a lower elongated U-shaped retainer channel 24 having a bottom wall 25 and side legs 26. A lower release sheet 21a is interposed between the strip 11 and the channel 24 to facilitate removal of the channel 24 when desired.

An upper cap 24a having a top wall 22a and side legs 23a contains the upper portion of the strip 11 in compressed condition until it is removed. An upper release sheet 21b is interposed between the strip 11 and the cap 24a to facilitate removal of the cap 24a when desired.

The mode of use of the filler strip 10a illustrated in FIG. 2 will now be pointed out.

In FIGS. 5, 6 and 7 roof panels 30 and insulating panels 31 are shown as before.

The filler element 10a as shown in FIG. 2 in precompressed and unexpanded condition is prepared for insertion by removal of the retainer channel 24 and, before expansion occurs, is inserted into the space 32 to the desired depth as determined by limit pins 35 inserted therein. The expansion of the portion of the strip 11 in the space 32 occurs until it engages the faces 33 and the faces 34, as illustrated in FIG. 5.

A plurality of layers 36 of roofing felt with asphalt or pitch are applied as illustrated in FIG. 6 and the cap

5

6

24a removed to permit the strip 11 to expand into sealing engagement with the roofing layers 36.

The remaining portions of the strip 11 above the roofing paper 36 will expand into a flared shape as before.

If desired, an additional cap layer of roofing felt 37 with asphalt or pitch can then be applied, to cover the exposed and coated upper edge of the strip 11.

Upon change of dimension of the space 32 by expansion and contraction the strip 11 in the space 32 will expand and contract without disruption of the sealing with the roofing, the insulation and the roof deck.

I claim:

1. An expansion joint for roofs and the like comprising roof panels with spaces therebetween, insulation panels superposed on said roof panels with spaces therebetween corresponding to the spaces between the roof panels,

an elongate filler strip of precompressed and reexpandable cellular material with an adhesive impregnated inserted in said spaces and in sealing engagement with said roof panels and with said insulation panels and extending above said insulation panels,

said insulation panel having built up roofing superposed thereon with which said strip is in sealing engagement,

said strip above said roofing being flared outwardly.

2. The combination defined in claim 1 in which said strip has members in engagement therewith for limiting the depth of insertion of said strip in said spaces.

3. The combination defined in claim 1 in which said strip along an exposed edge having a flexible and elastic protective covering.

* * * * *