Sept. 30, 1958 J. B. COMPTON 2,853,871

EXPANSION JOINTS FOR INSULATION STRUCTURES

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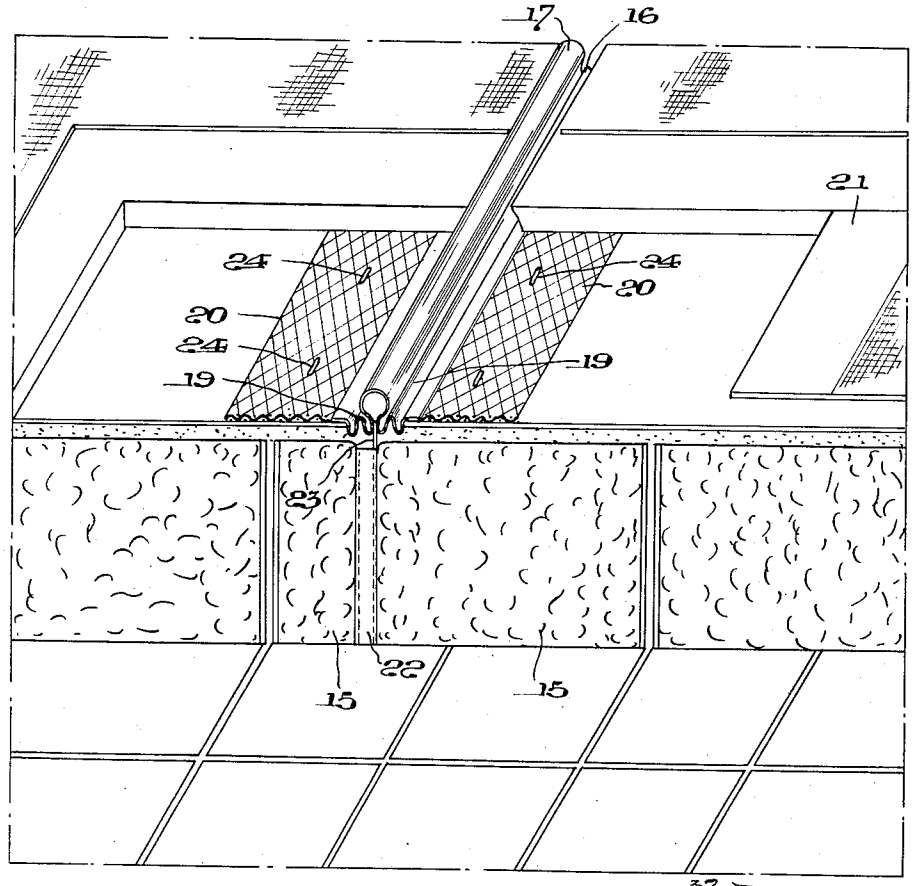


Fig. 1.

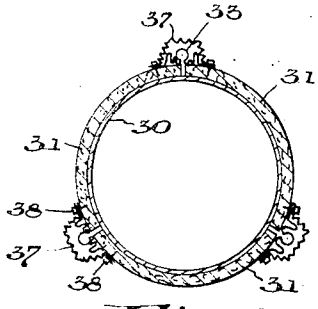


Fig. 2.

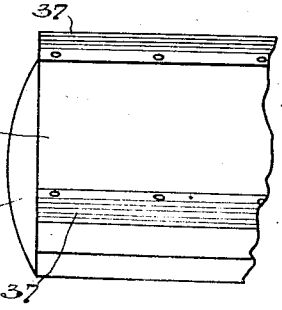


Fig. 3.

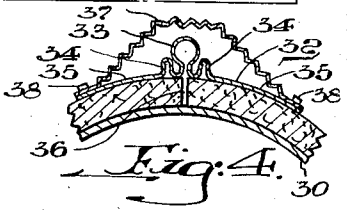


Fig. 4.

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EXPANSION JOINTS FOR INSULATION STRUCTURES

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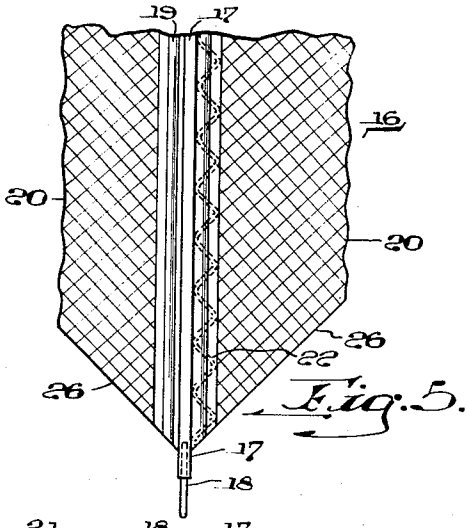


Fig. 5.

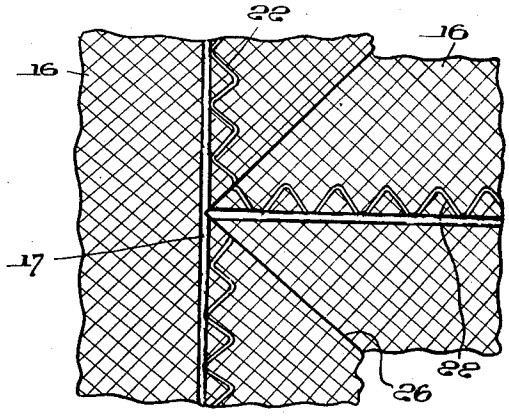


Fig. 6.

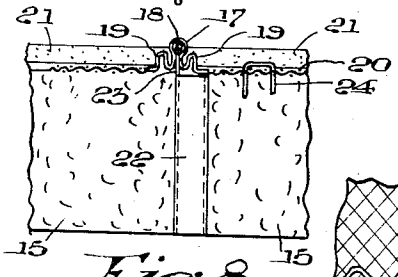


Fig. 8.

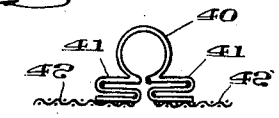


Fig. 9.

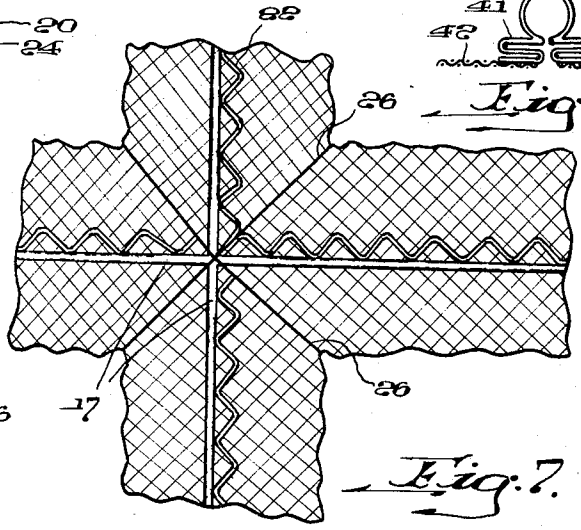


Fig. 7.

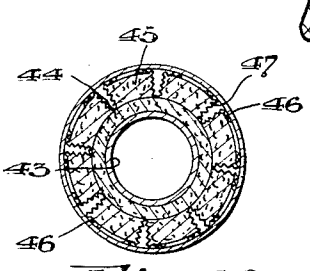


Fig. 10.

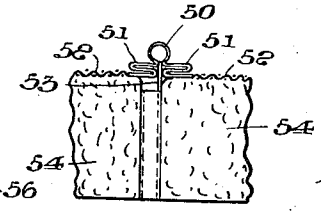


Fig. 11.

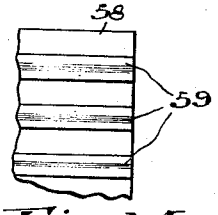


Fig. 14.

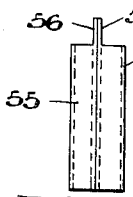


Fig. 12.

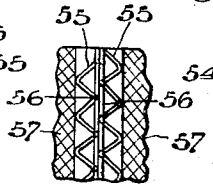


Fig. 13.

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2,853,871

EXPANSION JOINTS FOR INSULATION STRUCTURES

Jerry B. Compton, Pittsburgh, Pa.

Application September 14, 1954, Serial No. 455,950

2 Claims. (Cl. 72—28)

My invention relates to expansion joints for use with heat-insulating covers on hot-water tanks, boilers, steam pipes, ducts, flues, smokestack lining, breeching for stacks and ovens, and concrete and brick work generally, where wide ranges of temperature may be encountered.

An object of my invention is to provide an expansion joint structure of such form that it will readily expand and contract with materials of the character mentioned, as such material is expanded and contracted through temperature changes.

Another object of my invention is to provide, in connection with heat-insulating blocks or slabs, means for maintaining uniformity of spacing between the slabs, and resisting shifting of such slabs relative to one another to such extent as will result in excessively wide spaces between their opposed edges.

As shown in the accompanying drawings, Figure 1 is a perspective view showing one form of the invention in a partially completed structure;

Fig. 2 is a cross sectional view showing the invention as employed with insulating material on a tubular body;

Fig. 3 is a side view thereof:

Fig. 4 is an enlarged cross sectional view of a portion of the structure of Fig. 2;

Fig. 5 is a plan view showing a manner in which cap strips may be formed for interconnection with other cap strips, where joints meet at an angle;

Fig. 6 shows an arrangement wherein cap strips similar to those of Figs. 1 and 5 may be interconnected, where one joint extends at right angles to another joint;

Fig. 7 is a view similar to that of Fig. 1, but showing a manner in which the cap strips may be employed in connection with joints that extend in crosswise relation to one another;

Fig. 8 is a view on a reduced scale, showing a completed joint structure;

Fig. 9 shows a modification of the cap strip of Fig. 8;

Fig. 10 shows a modification of the structure of Fig. 2, without the employment of the pleated or corrugated spacing strips of Figs. 1 to 8;

Fig. 11 shows a modification of the structure of Fig. 8, with a different arrangement of expansion beads or folds on the sealing strip;

Fig. 12 is a view showing a manner in which two corrugated spacers may be used together;

Fig. 13 is a horizontal sectional view through a joint, having two of the spacers of Fig. 12, and

Fig. 14 is a fragmentary view of a spacing strip wherein the corrugations extend longitudinally of the joint instead of vertically as in Fig. 8.

My joint structure is adapted for use in connection with insulating bricks or slabs **15** of conventional form that are applied to the exterior surfaces of containers or other bodies that are to be heat insulated. Owing to the wide ranges of expansion and contraction, calking or filling material interposed between opposed edges of blocks of this character will not maintain a close fit with the edges or side walls of the blocks, under repeated temperature

changes. Also, the blocks will sometimes shift relative to one another, so that there will be non-uniform spacing between the blocks with consequent excessive spaces and ruptured or weakened joints at some locations.

Instead of simply placing calking material within and overlying the joint, I provide a metal joint structure that will not only maintain the blocks in approximately their original relative positions, but will more effectively seal the joints and prevent forming of cracks or fissures that would allow escape of heat.

When the blocks **15** are placed in position upon a container or the like that is to be insulated, their opposed edges are spaced apart slightly to permit of expansion without buckling.

As shown in Figs. 1 and 8, my device comprises a sheet metal cap strip **16** bent to bead form at **17** and aligning pins **18** snugly fitting within these beads for telescopic connection with beads of adjacent strips, to maintain them in alignment. Additional folds or bends **19** are provided in the strip and have wing-like extensions **20** that are of foraminous or mesh form. They may simply constitute extensions of the body portion of the strip slitted and stretched as expanded metal or may have numerous holes punched therethrough, or be of other mesh-like material welded to the edges of the body portion of the strip, these wings being embedded in plastic insulation covering **21** as shown more clearly in Fig. 8.

A corrugated strip **22** of springy sheet metal has an upper approximately-straight flange **23** that is welded to or simply extends into the strips, between the bends **19**. Since the blocks **15** are of porous or relatively soft material, staples **24** can be driven through the wings **20** to hold the strips and blocks in place for the application of the covering **21** of plastic material.

The flange **23** is secured to the strip **22** at the crests of the corrugations on one side of the strip, by welding or otherwise. While compression of the corrugated strip through expansion of the blocks **15** tends to elongate the strip and this tendency to elongation is resisted somewhat by the flange **23**, the corrugations can nevertheless be compressed somewhat toward a flattened shape or to flex somewhat, because their crests at one side of the strip are free of any rigid connections to a straight strip.

Shifting of the blocks **15** under temperature changes will be yieldably resisted by the corrugated strips **22**, and such strips will tend to move each block back to its original position during a cooling period. The beaded portions of the strip **16** will, of course, expand and contract, and because of the embedment of their wing portions by the plastic **21**, they will prevent leakage into the spaces between the blocks **15**.

Along a straight-line seam, the strips **16** will, of course, be placed in end-to-end relation with the pins **18** telescoping into the beads **17** of adjacent strips. At the corners of the blocks, sealing members **16** have to extend in directions at right angles to one another, and therefore, the edges of the wings **20** are mitered as indicated at **26**, so as to get a good fit at these joints.

Where joints intersect one another as in Figs. 6 and 7, the pins **18** in a joint strip lying in one direction will extend through the side of a cap strip that extends at right angles thereto or into the hollow bead of such a strip, to maintain alignment of the sealing strips at such joints.

Referring now to Figs. 2, 3 and 4, I show a tank **30** that has an insulating covering **31** in the form of arcuate slabs. Provision for expansion and contraction at the joints between the slabs is made by using a cap strip **32** having a central hollow bead **33**, smaller beads or folds **34** and wings **35**. Spacing strips **36** of corrugated form are welded at their upper edges to the cap strips **32** and have their body portions corrugated as in the case of the strips **22** of Fig. 8.

Cover strips **37** are placed in overlying relation to the cap strips **32** and are connected at their edges to the pipe covering material by screws **38** that also extend through the wings **35** of the cap strip.

Referring now to Fig. 9, I show an arrangement that is particularly suitable for sealing the corners where walls meet one another at right angles and where no corrugated spacing strip corresponding to the corrugations **22** is used. In this case, a sealing strip **40** has an enlarged central hollow bead, with laps or folds at **41** which, in turn, have mesh-like wings **42** that can be bent at right angles to each other and be embedded in the plaster or cement of adjoining slabs at the corner of a structure, and the strip **40—41** will have ample expansive and contractive ranges and thereby maintain a seal at the corner where the slabs meet.

In Fig. 10, I show a pipe or conduit **43** covered by an insulating sleeve **44** and blocks **45**. In this case, sheet metal sealing strips **46** are employed at the various joints, with wing portions overlying the outer faces of the blocks **45**, and their grooved or channeled portions corrugated as shown at **47**, so that they will maintain close fit with the blocks **45** under expansion and contraction. A covering sleeve of asbestos or other suitable material surrounds the sealing strips **46**.

In Fig. 11, I show a joint wherein a cap strip **50** has lateral folds or pleats **51** and wing portions **52** as in Fig. 9. In this case however, a corrugated spacer strip **53** is employed, of the form shown in Figs. 1 to 8, to maintain uniformity of spacing between the blocks **54** at the various joints throughout a complete structure, and to also assist in maintaining the cap strip in proper relation to the blocks with which it is employed.

In Figs. 12 and 13, I show a pair of strips **55** such as the strip **22—23** used in connection with one another, in a single cap strip, to which their flanges **56** are welded. This arrangement permits of greater expansion and contraction movements of the blocks or slabs **57** relative to each other, without the necessity of using a deeply corrugated single strip.

Referring now to Fig. 14, I show a spacing strip having a flange portion **58** for welded connection to a cap strip such as the strip **16**. In this case however, the body portion of the spacing strip has corrugations **59** that extend longitudinally of the space between the slabs instead of perpendicularly to the plane of the slabs as is the case of Fig. 8.

I claim as my invention:

1. A wall structure which is subjected on the inner side thereof to temperature changes substantially higher than those resulting from atmospheric changes, said structure comprising an inner base member and an insulating covering on the outer side of said base member, said covering including a plurality of preformed slabs of insulating material slidably supported on said base, the adjacent edges of adjacent slabs being spaced apart to compensate for the expansion and contraction in said covering, resilient and flexible metallic strips disposed between the slab edges and extending the length of the slabs, each strip being corrugated throughout its length with the axes of the corrugations extending transversely of the length of the strips, the edges of adjacent slabs abutting the crests of the corrugation on the opposite sides of the strip, each strip extending from said base to substantially the outer surfaces of said slabs, an outwardly projecting flange secured to the outer edge of each strip at the crests of the corrugations on one side of the strip and projecting beyond the outer surfaces of said slabs, metal cap strips covering the spaces between adjacent slabs and overlying the corrugated strip, each cap strip including a substantially circular medial rib and integral wing portions on opposite sides of the medial rib, said rib having an access slot opening toward the spaces between adjacent slabs, said wing portions overlying the outer surfaces of adjacent slabs and being secured thereto, said outwardly projecting flanges extending through said slots and disposed within said medial ribs, a cementitious insulating layer covering the outer faces of said slabs, whereby upon expansion of said slabs said corrugated strips are compressed and upon contraction of said slabs the corrugated strips tend to shift said slabs during the cooling thereof.

2. A wall structure as recited in claim 1 with each cap strip wing portion including a corrugated section therein adjacent the rib, the axes of the corrugations of the wing portions extending parallel with the axis of the circular ribs.

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