

July 21, 1942.

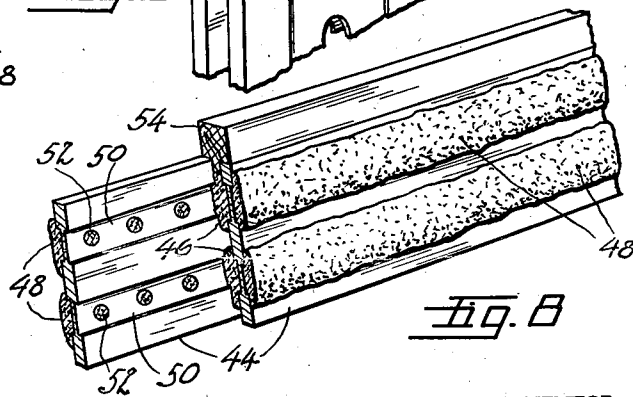
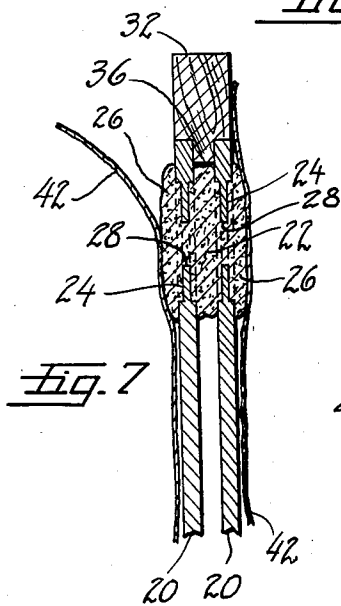
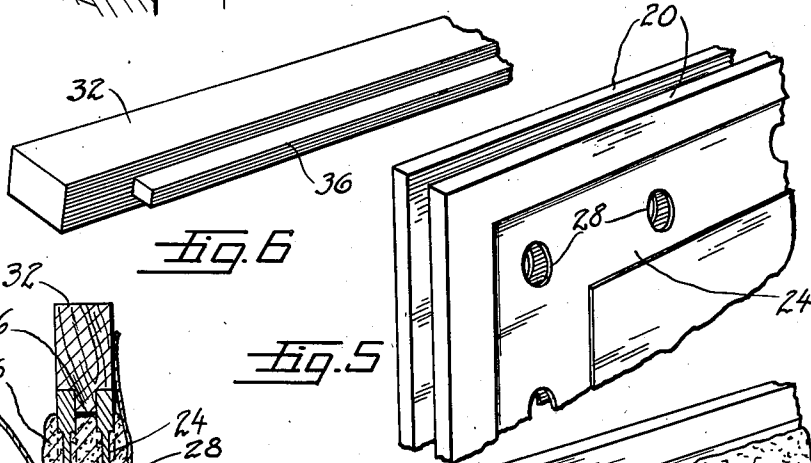
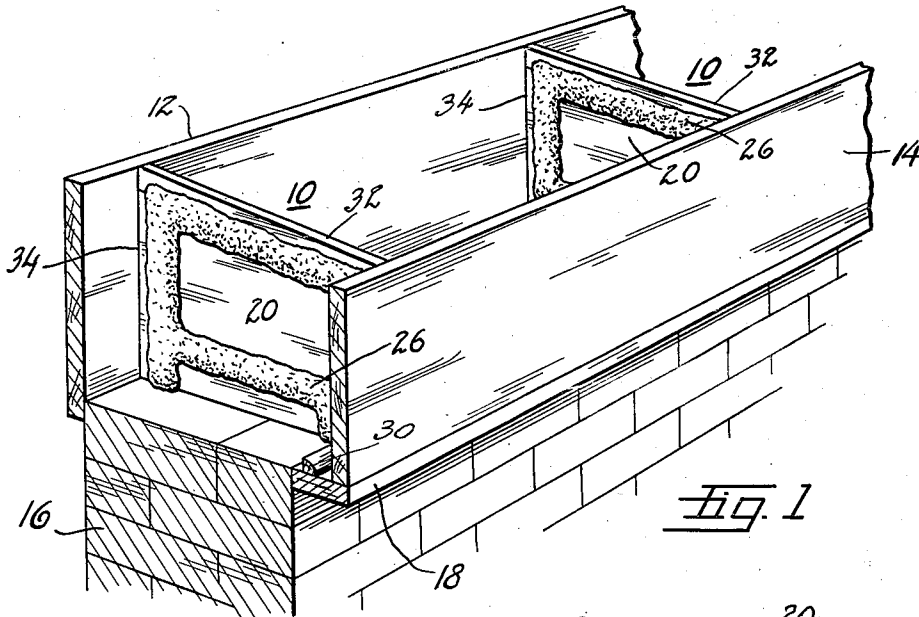
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2,290,424

EXPANSION JOINT

Filed March 28, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

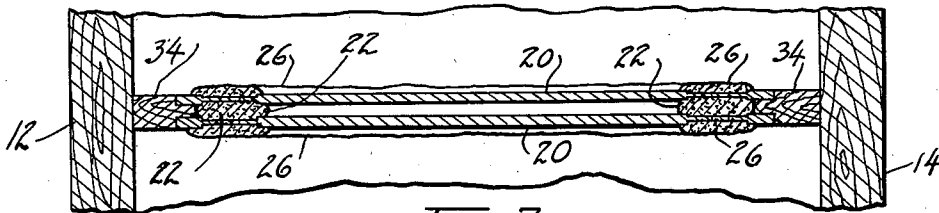


Fig. 2

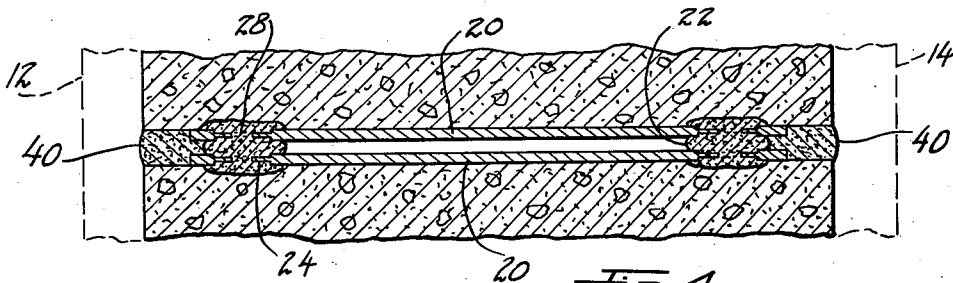


Fig. 4

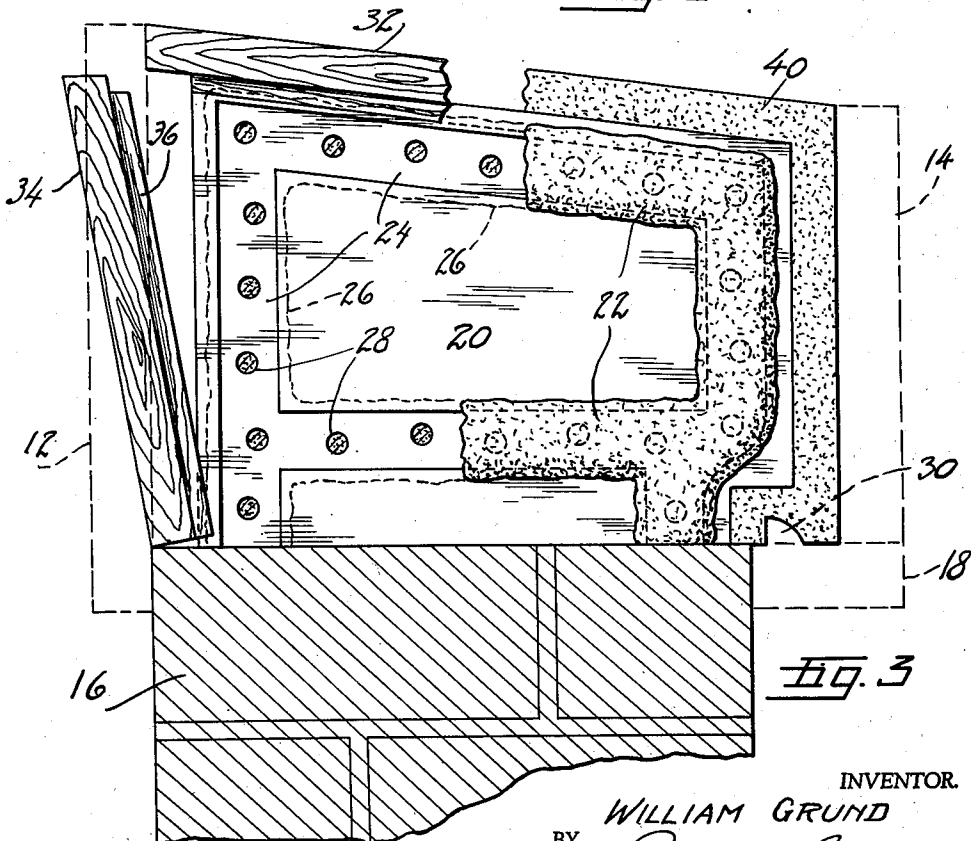


Fig. 3

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UNITED STATES PATENT OFFICE

2,290,424

EXPANSION JOINT

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Application March 28, 1938, Serial No. 198,358

14 Claims. (Cl. 72-107)

My invention relates to an expansible and contractible joint and the method of employing the same, and particularly to such a joint especially adaptable in the erection of poured concrete structures and the like. This invention constitutes a further development of my invention described and claimed in my Patent No. 1,990,323.

It is the general practice in the construction art to provide clearances at spaced intervals between structural units in order to allow for the natural expansion and contraction of the units due to variations in the temperature. These clearances were usually filled with a compound which resisted the penetration of water between the structural units, yet allowed the units to expand and contract. The invention described in my aforesaid patent is particularly adaptable for use between cut or precast structural units which are in their final shape or formation.

The present invention, however, is especially adapted for structural units which are not in their complete formation at the time of the erection of the structure, such as poured concrete bodies which must be allowed to harden before they take their final or permanent formation.

In the past it has been the general practice when poured concrete structures were formed to simply place wooden or metal strips at spaced intervals in the casting form into which the concrete was poured. After the concrete had been poured and hardened, the strips were removed to form the clearances for expansion and contraction of the concrete. Into this joint various types of plastic caulking compound were introduced for the purpose of sealing the joints against the penetration of moisture.

Heretofore, considerable trouble and expense has been encountered in removing the separating strips after the concrete had hardened. In the case of wooden strips, the workmen usually had to chisel out the strip because the wood would absorb moisture and swell into a tight bond with the concrete structure. The usual result was that portions of the wooden strips were left in the joint where they interfered with the expansible movement of the concrete structure. In either case where wood or iron separating strips were used, additional time and labor was lost in removing the strips from the joints. The removal of the strips had to be performed very carefully otherwise the act of removing the strips would chip and crack the adjoining portions of the hardened concrete and spoil the appearance of the work as well as cause damages which

might result in the leakage of moisture through the concrete structure.

An important object of this invention is to provide a novel expansion joint which is particularly adaptable for forming a permanent expansible and contractible medium between poured concrete units. As distinguished from the general practice heretofore employed, the expansion joints of the present invention are left between the cast concrete units and form a permanent part of the structure. This saves in time and labor heretofore necessary for removing the separating strips. The improved joint of this invention forms a moisture proof seal adhering to the sides of the hardened concrete units and is variable in thickness to accommodate the expansion and contraction of the units as they are affected by the temperature.

Another object of the invention is to provide a novel process for forming an expansion joint between structural units which permanently seals the space between the structural units against the penetration of moisture yet is variable in width during the life of the structural units to allow for the normal expansion and contraction thereof.

A further object of the invention is to provide a novel expansion joint which is constructed so that it cooperates with the forms utilized for casting the structural units to provide a barrier between adjacent bodies of plastic material and when the latter have hardened to form a permanent expansible and contractible joint between solid mono-lithic units. The joint is provided with novel sealing means or plugs which prevent the entrance of plastic material into the joint during the casting operation. These plugs are so constructed that they are removable after the bodies of plastic material have hardened. Their removal forms crevices into which caulking compound may be pressed so that after the operation is completed the joint has an outside appearance which is similar to that of the customary construction.

Various objects, advantages and meritorious features of this invention will become more apparent from the following specification, appended claims and accompanying drawings, wherein:

Fig. 1 is a perspective view of a coping wall showing the manner of positioning the joints of the invention in the forms for casting concrete copings on a building structure,

Fig. 2 is a horizontal cross-sectional view through one of the joints assembled in the casting form of Fig. 1 showing the duplex charac-

ter of the joint and the clearance provided therein which allows for the natural expansion of the cast concrete units,

Fig. 3 is a horizontal cross-sectional view along the same line as in Fig. 2 showing the construction of the joint after the concrete units have been poured and hardened, and after caulking compound has been forced into the exposed crevices formed when the sealing plugs of the joints have been removed,

Fig. 4 is an inside elevation of the joint showing the interior construction of the two panel members forming the side walls of the joint and the manner of removing the sealing plugs therefor,

Fig. 5 is a perspective view of one corner of a coping joint with the sealing plugs and elastic adhesive gasket material omitted,

Fig. 6 is a detail perspective view of the sealing plug for the joint,

Fig. 7 is a vertical cross-sectional view through part of a joint showing the joint in completely assembled condition and including a removable cover over the gasket material utilized in shipping the articles, and

Fig. 8 is a perspective view of a modification of the invention broken away to show the interior of the construction.

Referring to the drawings, the primary embodiment of the invention illustrated herein relates to a joint particularly adapted for use between poured concrete coping units on a building wall. It is understood, however, that the principles of this invention are adapted for other types of joints for use between structural units, such as the embodiment of the invention illustrated in Fig. 8.

In Fig. 1, expansion joints especially constructed in accordance with this invention for use between coping units on a building wall are generally indicated at 10 arranged in a form for casting coping units. These joints are supported in upright position at spaced intervals in this form and act as barriers to the flow of the plastic material which will be poured into the forms. The forms in Fig. 1 comprise spaced side members 12 and 14 disposed on opposite sides of a wall 16 which may take the form of a brick wall as shown. The bottom form member 18 may be provided to form an overhang on the coping units after they have hardened. The joints generally indicated at 10 may be supported in upright condition in any suitable way but the preferred way is to pack a small amount of the plastic material which is to be poured into the form around the bottom edges of the joints to support the same in upright position.

The construction of the joints 10 is shown in detail in the remaining figures. Each joint comprises a pair of side members or panels 20 positioned in parallel slightly spaced apart relationship as shown in Fig. 2. These panels are preferably formed of material which is moisture-proof, rust-proof, and rot-proof. A compound 22 of a yieldable nature is positioned between these panels and yieldingly spaces these panels from one another. This compound is preferably of an elastic adhesive water-resisting quality which adhesively secures the two panels 20—20 together into a self-supporting unit.

The opposite face of each panel 20 is recessed as at 24 (Figs. 3 and 5) to form a continuous channel adjacent to but slightly spaced from the edges of the panels. These channels preferably extend along those edges of the joint

which will be exposed when the structure is completed. The channels 24 are formed in corresponding positions on opposite sides of each panel. The compound 22, heretofore described, is preferably positioned in these recesses as shown. A compound 26 of similar nature as that at 22 is positioned in the channels 24 on the outer faces of the panels 20. This compound projects as shown beyond the plane of the outer faces of the panels and may overlies slightly upon the faces of the panels.

The bottom portions of the channels in each panel 20 are pierced at spaced intervals to form the series of apertures 28. These apertures allow the compound material on one side of the panel to pass through the apertures and engage with the compound material on the opposite side of the panel. These apertures in this manner act to interlock the various strips of compound material and secure the various parts of the joint together.

In order to prevent the plastic material which is poured into the casting forms from flowing around the edges of the panels 20 and into the space therebetween, certain sealing elements or plugs are employed for temporarily closing this space during the casting operation. These plugs may be of any suitable material but a very desirable form is that shown in the drawings wherein the plugs are shaped from wooden strips. A plug 32 is provided along the top edge of the panels 20. Similarly shaped plugs 34 are provided for the opposite sides of the panels 20. There is no need for a sealing plug along the bottom edge of the joints because the joints rest directly upon the coping bed 16 and is never exposed when the structure is completed. Each plug is provided with a projecting flange 36 along one edge thereof which is insertable between the panels 20 as shown in Figs. 2 and 3. This projecting part of each plug is of a size to tightly fit the space between the panels so that the plugs will not fall out of the joint unless a special effort is made to remove them. The juncture of the flange 36 to the main body portion of the plug forms shoulders on opposite sides thereof which are adapted to bear upon the edges of the panels as shown in Fig. 7. The maximum width of the wooden plug is preferably such that its opposite sides extend substantially flush with the outside faces of the panels as shown.

The panels of the coping joint are of a size slightly less in width and height to that of the side form members 12 and 14 for casting the coping units. The top plug 32 and the opposite side plugs 34, however, increase the height and width of the joint so that it extends the full width and height of the coping unit to the form. This is indicated in Figs. 1 and 2 and shows the opposite side plugs 34 contactly bearing against the form members 12 and 14.

Plastic material such as concrete is poured into the form prepared as shown in Fig. 1. After it has hardened and taken a permanent set, the side form members 12 and 14 and the overhang bottom form members 18 are removed. The sealing plugs 32 and 34 are then very easily removed by working them loose from the edges of the panels 20 in the manner shown at the left of Fig. 3. After these plugs have been removed a crevice is formed along the top edge and along the opposite side edges into which caulking compound 40 is worked. This caulking compound seals the crevices from the in-

gress of moisture and improves the outside appearance of the structure.

When shipping the joints it is desirable to provide some removable covering material for the exposed portions of the compound 26. A desirable covering material which has been found highly desirable is a Cellophane wrapping material. It is easily peelable upon removing as indicated at 42 in Fig. 7.

The modification of the invention illustrated in Fig. 8 is particularly adapted for poured concrete floors or other structural units of hard plastic material which are of relatively small height. The expansion joint illustrated in Fig. 8 is similar to that heretofore described except that it is shorter in height and the channels provided therein extend continuously in a horizontal line rather than turning to follow the side edges of the joint as in the joint heretofore described. Two members 44, similar in composition to the panels 20, are mounted side by side in slightly spaced parallel relationship and sandwiched therebetween is elastic adhesive compound 46 which allows these two members to move variable distances toward and away from one another. The outer faces of the members 44 carry compound material 48 similar to the material 46 between the members. The members, as in the coping joint, are provided with channels 50 into which the compound materials 46 and 48 are positioned. Apertures 52 are provided for allowing the compound material to pass through the channels and interlockingly secure the same together. The top edge only of these members 44 is temporarily sealed against the entrance of foreign material by a plug 54 similar to the sealing plugs 32 and 34 heretofore described.

The method of using the modified joint illustrated in Fig. 8 is similar to that described in connection with the coping joint. A plurality of these modified joints are laid across a bed in spaced apart upright condition and preferably extend to the side walls rising from this floor. The concrete or other material which is used is poured upon the floor between these joints until it approaches the top side of the sealing plugs 54. After the bodies of plastic material thus poured have taken a set, the plugs 54 are removed. The exposed crevices formed by the removal of the plugs are filled with caulking material in the same manner as the caulking compound 40 is worked between the hardened concrete coping units as described above.

It should be noted that in either embodiment of the invention disclosed herein the adhesive elastic material on the opposite sides of each panel 20 or 44 extends in an unbroken line adjacent to those edges of the joint which will be exposed when the structure is completed. In this manner a positive barrier is provided on all sides of the panels to the seepage of water into the joint. The elastic adhesive material is preferably of heavy-bodied character retaining its elasticity and adhesiveness as long as the life of the structure.

What I claim is:

1. A waterproof expansion joint comprising, in combination, a flat relatively thin member recessed to form channels in corresponding positions on each face thereof, bodies of waterproof elastic adhesive gasket material positioned in said channels and projecting outwardly from the channels beyond the plane of the faces of the member, said member provided with a plurality of apertures through the recessed portions there-

of from the base of the channel on one side of the member to the base of the channel on the other side of the panel, said gasket material extending through said apertures and interlockingly securing the gasket material in the channel on one side of the member to that in the channel on the other side of the member.

2. An expansion joint for use between cast structures of hardened plastic material comprising, in combination, a pair of relatively stiff thin flat members of substantially the same size, heavy bodied material of elastic adhesive water-resisting qualities positioned between said members securing the same together into a structural unit yet yieldingly separating the members in slightly spaced apart relationship, said material arranged in an unbroken continuous strip adjacent to but slightly spaced from an edge of the members to form a seal against the passage of moisture between the members, heavy bodied material of similar quality secured to the outer surfaces of said members, and means removably insertable between the marginal portions of the edge of said members adjacent to which said inside material is positioned and when thus inserted therebetween forming a seal against the inflow of plastic material during the casting operation.

3. An expansion joint for use between cast structures of hardened plastic material comprising in combination, a pair of relatively stiff thin flat members of substantially the same size, heavy bodied material of elastic adhesive water-resisting qualities positioned between said members securing the same together into a unitary structure yet yieldingly spacing the same a slight distance apart from one another, said material arranged in an unbroken continuous strip adjacent to but slightly spaced from an edge of the members to form a seal against the passage of moisture therebetween, heavy bodied material of similar qualities secured in a continuous unbroken strip to the outside faces of said members in position corresponding to that of the inside positioned material, said strips of heavy bodied material being interlockingly secured to one another through apertures formed in the portion of the members under said material, and an element of relatively rigid material removably insertable between the two marginal portions of said members adjacent to said strips of material and forming when thus inserted a plug for sealing the space between the members from the inflow of plastic material during the casting operation.

4. An expansion joint for use between cast structures of hardened plastic material comprising, in combination, a pair of panels composed of relatively stiff material, and being of substantially the same size and formation, said panels provided with channels on their respective opposite faces adjacent to but spaced from the top and opposite side edges of said panels, continuous strips of heavy bodied material of elastic adhesive water-resisting qualities positioned in said channels and projecting outwardly beyond the planes of the panels, said panels mounted in side-by-side slightly spaced relationship and secured together into a unitary structure by the bonding action of the strips of material projecting from the adjacent faces of the panels, and elements corresponding in length to respectively the lengths of the top and the opposite sides of the panels and shaped for a tight fit between the marginal portions of the top and sides of the

panels, the elements when thus inserted forming a seal against the entrance of the plastic material during the casting operation.

5. In a structure, the combination of two slightly spaced structural units of hardened plastic material, a pair of members between said units bonded on their outer surfaces to said structural units and spaced from one another by a body of elastic adhesive water-resisting substance, said substance extending in a continuous unbroken formation adjacent to but spaced from the exposed edge of the members forming a seal against the ingress of moisture, and caulking material disposed between the exposed marginal portions of said members adjacent to said substance also acting as a seal to the ingress of moisture.

6. In the erection of a building, a form for casting mono-lithic structures of hardened plastic material including a bottom and spaced side elements forming a channel into which the plastic material is poured, an expansion joint to be formed between the hardened structures to be formed comprising a pair of members of relatively thin flat stiff material disposed transversely in the channel in upright position on the bottom element thereof, said members having a width less than the distance between the side elements and a height less than that of the side elements, a strip of elastic adhesive material between said members acting to secure the same together yet yieldingly spacing the same apart to form a joint of variable widths, means of relatively rigid material temporarily sealing the spaces between said members against the inflow of plastic material during the casting operation positioned between the side edges of said members and said side elements of the casting form and along the top edges of the members to increase the height of the members to that of the side elements, said sealing means being removable after the casting operation is performed.

7. An expansion unit for use between cast structures of hardened plastic material comprising, in combination, a pair of relatively stiff thin flat members mounted in side-by-side slightly spaced apart relationship, said members provided with channels on their adjacent faces disposed opposite one another and substantially parallel to but slightly spaced from an edge of the unit, a continuous strip of heavy bodied material of elastic adhesive water-resisting qualities positioned in said channels and acting to space the members apart a slight distance yet bonding the two members together into a unitary structure, said members provided with channels on their outer faces, and continuous strips of heavy bodied material of elastic adhesive water resisting qualities positioned in said channels and projecting beyond the outer faces of said members.

8. An expansion joint comprising, in combination, a pair of relatively stiff thin flat members of substantially the same size, heavy bodied material of elastic adhesive water-resisting qualities positioned between said members securing the same together into a unitary structure yet yieldingly spacing the same a slight distance apart from one another, said material arranged in an unbroken continuous strip adjacent to but slightly spaced from an edge of the members to form a seal against the passage of moisture therebetween, and heavy bodied material of similar qualities secured in a continuous unbroken strip to the outside faces of said members in position corresponding to that of the inside positioned ma-

terial, said strips of heavy bodied material being interlockingly secured to one another through apertures formed in the portion of the members under said material.

9. A waterproof expansion joint comprising, in combination, a pair of flat relatively thin members, a body of waterproof elastic adhesive gasket material positioned between said members securing the members together into a structural unit but yieldingly maintaining the same in slightly spaced apart relationship, and bodies of waterproof elastic adhesive gasket material on the outside surfaces of said members extending in a continuous unbroken line from substantially one end of the joint to the other.

10. A compressible filler for use as a pressure relieving joint between structural units comprising, in combination, a pair of surfacing sheets spaced apart from one another by a yielding mass of material bonded to the inner faces of the sheets, and a continuous layer of adhesive water resisting material on the outer face of each of said sheets adapted to engage the adjacent sides of the structural units between which the joint is positioned and prevent ingress of moisture past the opposite sides of the joint.

11. A compressible filler for use as a pressure relieving joint between structural units comprising, in combination, a pair of surfacing sheets spaced apart from one another by a yielding mass of material bonded to the inner sides of the sheets, said sheets provided with channels on the outer surfaces extending substantially from one end of the sheets to the other, and continuous strips of adhesive water resisting material in said channels projecting beyond the outer surfaces of said sheets for engagement with the adjacent sides of the structural units between which the joint is positioned to prevent the ingress of moisture past the opposite sides of the joint.

12. An expansion joint for use between cast structures of hardened plastic material comprising, in combination, a pair of relatively stiff thin flat members of substantially the same size, heavy bodied material of elastic adhesive water-resisting qualities positioned between said members securing the same together into a structural unit yet yieldingly separating the members in slightly spaced apart relationship, said material arranged in an unbroken continuous strip adjacent to but slightly spaced from an edge of the members to form a seal against the passage of moisture between the members, heavy bodied material of similar quality secured to the outer surfaces of said members, and an elongated element removably insertable between the marginal portions of the edge of said members adjacent which said inside material is positioned and when thus inserted therebetween forming a seal against the inflow of said plastic material during the casting operation, said element being formed with a shoulder adapted to bear upon the edge of one of said members between which it is inserted.

13. An expansion joint for use between cast structures of hardened plastic material comprising, in combination, a pair of relatively stiff thin flat members of substantially the same size, heavy bodied material of elastic adhesive water-resisting qualities positioned between said members securing the same together into a structural unit yet yieldingly separating the members in slightly spaced apart relationship, said material arranged in an unbroken continuous strip

adjacent to but slightly spaced from an edge of the members to form a seal against the passage of moisture between the members, heavy bodied material of similar quality secured to the outer surfaces of said members, and an elongated element removably insertable between the marginal portions of the edge of said members adjacent which said inside material is positioned and when thus inserted therebetween forming a seal against the inflow of said plastic material during the casting operation, said element having two longitudinal sections of different widths, a narrow section which enters the space between the members and engages the inside surfaces thereof, and a wider section which projects beyond both sides of said narrow section such that the sides of the wider section extend substantially flush with the outside surfaces of said members.

14. In a structure, the combination of two slightly spaced structural units of hardened plastic material, a pair of members between said units arranged in parallel slightly spaced apart relation and each having on its outside face a continuous unbroken body of an elastic adhesive water resisting substance bonded to the adjacent faces of said structural units, a body of elastic adhesive water-resisting substance between the panels extending in a continuous unbroken formation adjacent to but spaced from the exposed edge of the members forming a seal against the ingress of moisture, and caulking material disposed between the exposed marginal portions of said members adjacent said last substance also acting as a seal to the ingress of moisture.

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