Aug. 6, 1940. C. H. BAUER 2,210,356

FORM FOR USE IN THE FORMATION OF EXPANSION JOINTS

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Fig. 1

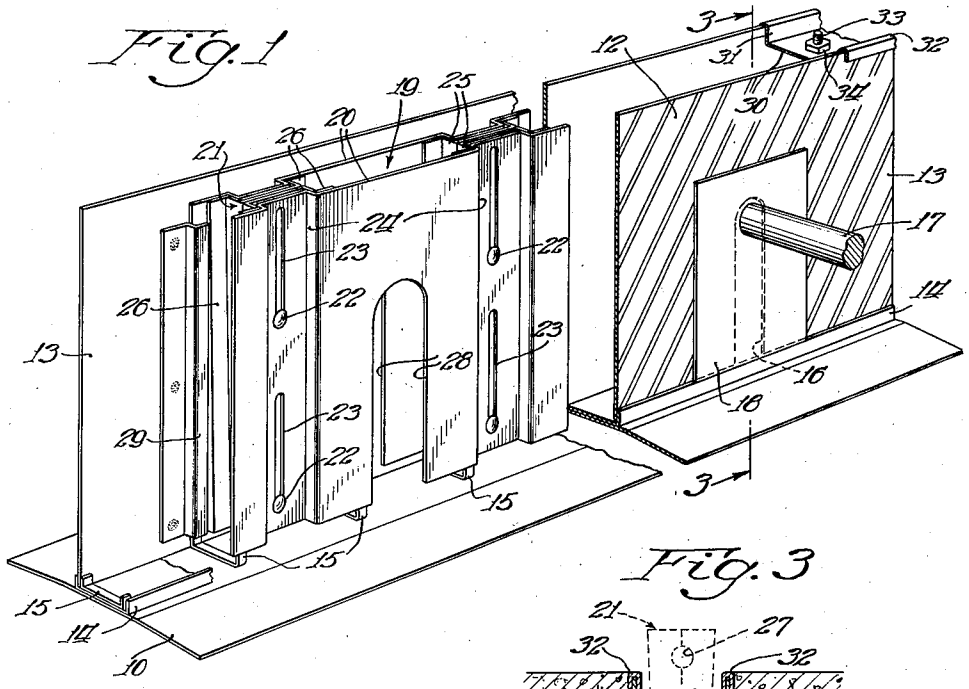

Fig. 2

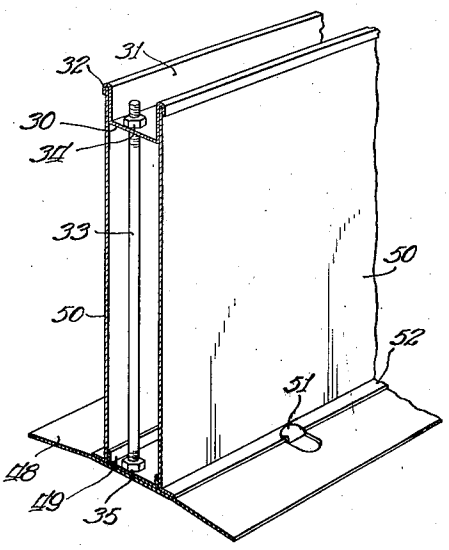

Fig. 3

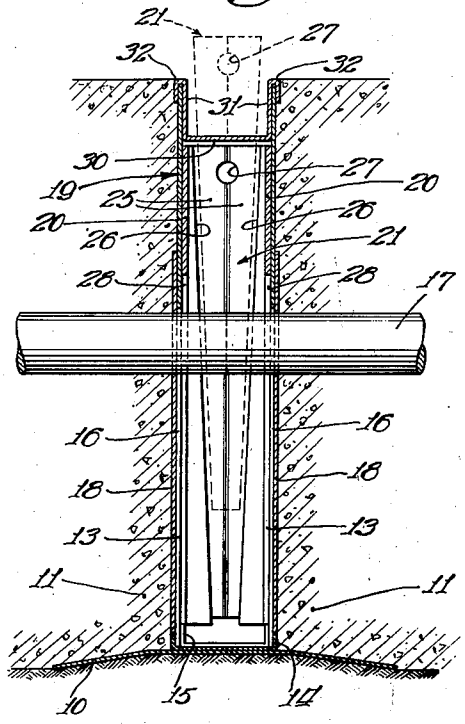

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Fig. 5

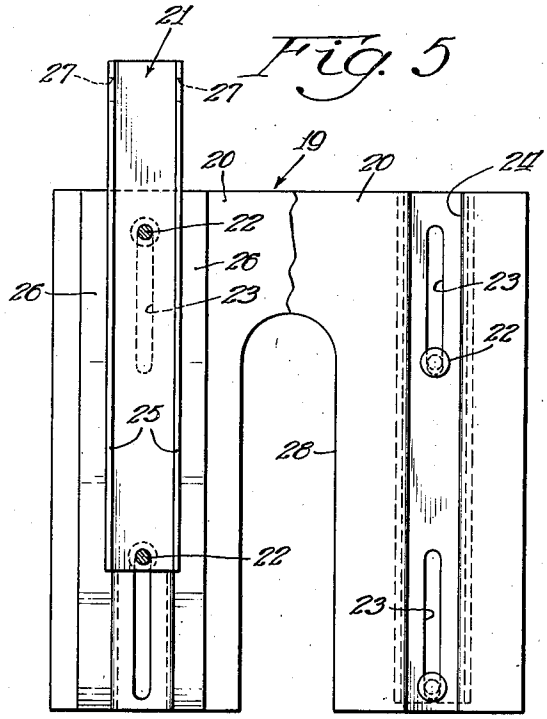


Fig. 4

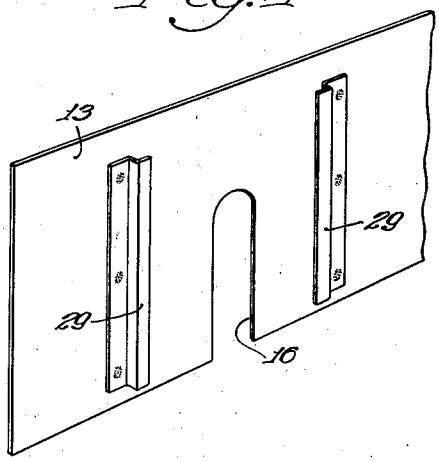


Fig. 6

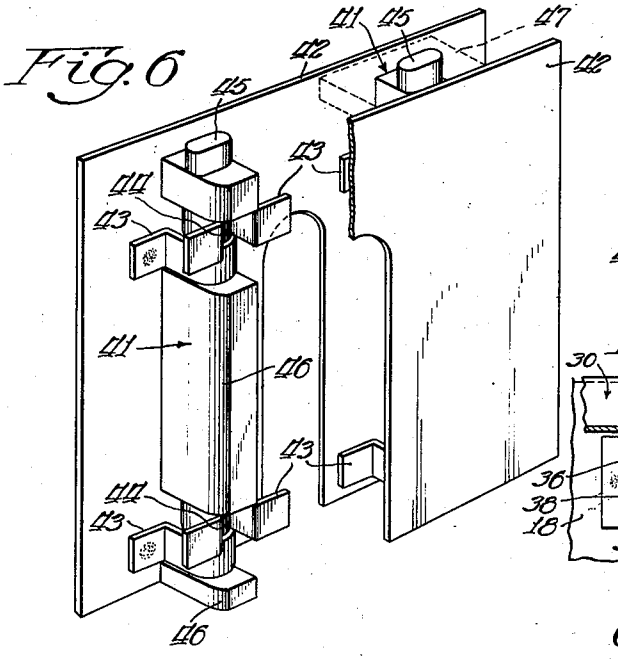


Fig. 7

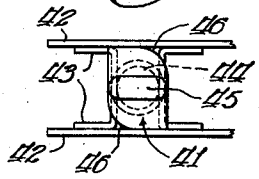


Fig. 9

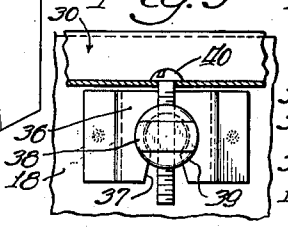
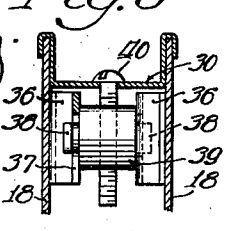


Fig. 8



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UNITED STATES PATENT OFFICE

2,210,356

FORM FOR USE IN THE FORMATION OF EXPANSION JOINTS

Carl H. Bauer, Evanston, Ill.

Application June 12, 1937, Serial No. 147,818

4 Claims. (Cl. 94—18)

This invention relates to the formation of expansion joints, particularly in concrete structures such as roads, sidewalks, buildings, etc.

The nature of the invention may be readily understood by reference to an illustrative construction embodying the invention and shown in the accompaying drawings.

In said drawings:

Fig. 1 is a perspective view, partly broken away, showing an assembly for forming a joint;

Fig. 2 is a perspective view of a construction similar to that of Fig. 1 but slightly modified in respects hereinafter described;

Fig. 3 is a transverse section taken on the plane 3—3 of Fig. 1;

Fig. 4 is a perspective view of a portion of a removable form;

Fig. 5 is an elevation of a form supporting member;

Fig. 6 is a perspective view of a different form supporting member;

Fig. 7 is a plan view of a detail of the form supporting member of Fig. 6; and

Figs. 8 and 9 illustrate a modified method of securing a form cover in place.

The invention is here illustrated in connection with the formation of an expansion joint in a concrete road. In such roads, it has been the practice to form narrow transverse slots (generally about ¾ of an inch in width) in the concrete at such intervals as may be necessary to prevent damage upon an expansion of the pavement. After the removal of the forms used in molding the concrete to provide the slot, the latter is filled with some compressible filling material such as asphalt.

The forms used in prior practice have not, however, satisfactorily prevented the entrance (from below) of water, concrete, or other solid material into the slot; and these (including the ice formed by freezing of the water) have interfered with the expansion of the concrete slabs, frequently resulting in rupture or cracking of the concrete. It has been difficult moreover to remove such portions of the forms as require removal, after setting of the concrete.

Various devices have been proposed to facilitate removal of form elements but these are of such character as not to be practical for the narrow slots generally formed for expansion joints.

In the illustrative apparatus, entrance of foreign material into the slot during or after formation is prevented by a plate 10 which constitutes not only the bottom of the forms but extends laterally under the body of concrete 11 adjacent the slot to seal the latter against seepage of moisture into the slot. The plate or strip 10 is preferably of light gauge non-corrodible material, such as copper, which may be bent to follow the contour of the sub-pavement or the desired contour of the bottom of the pavement itself. The side plates 13 of the mold are seated inside channel members 14 extending longitudinally of and secured in any appropriate manner to the bottom plate 10. The plates 13 are held against the flanges of the channels by an inner member which may be in the form of a small channel, or, as here shown, short channel sections 15 located at intervals inside the channel 14 and appropriately secured thereto. Leakage of grout into the joint space is thereby prevented. The side plates are slotted as at 16 to straddle the usual dowel bars 17 (which extend across the joint) and to permt removal of the side plates after the concrete has set. Preferably the outer faces 12 of the side plates are scored or otherwise formed to roughen the face of the concrete and thereby to improve the anchorage of the compressible joint material thereto. If thinner sheet metal be employed for side plates, it may be corrugated or embossed (except preferably its upper and lower edges) for reinforcement and to provide a roughened surface on the concrete. Plywood may also be employed for side plate material. While neither plywood nor light gauge sheet metal would have as long life (as regards reuse) as heavy gauge side plates, their lower cost would compensate for shorter life.

Small plates 18 having openings therein to accommodate the dowel bars are placed on the outer faces of the side plates to cover the slot 16 to exclude grout and other materials. The plates 18 remain in the structure and are not removed with the side plates.

The side plates are supported in appropriately spaced relation against the pressure of the concrete by supporting members 19 comprising a pair of spaced face plates 20 separated by devices which are contractible to reduce the spacing of the face plates in order to facilitate their removal from the joint space. The contractible devices must be of such character as to be capable of operation in a relatively narrow slot which may in certain structures be very substantially less than ¾ of an inch, the usual spacing in road joints. The contractible devices are here shown in the form of cooperating wedge members 21 slidable relative to the face plates and capable of being partly withdrawn to permit contraction of the spacing between the face plates. As illus-

trated, particularly in Fig. 1, the wedge members 21 carry guide pins 22 which travel in guide slots 23 in each of the face plates. The guide pins are preferably headed and thereby serve to connect the various elements of the supporting members. The face plates may advantageously be formed with channels or grooves 24 in which the slots 23 are located. The wedge devices in the present instance have an H section provided with flanges 25 which are inclined to the axis of the wedge device to provide the wedging surfaces. The latter cooperate with wedging surfaces 26 carried by the face plates. The upper portions of the wedge devices are provided with means such as a hole 27 in which a hook or other tool may be inserted to elevate the wedge device (see Fig. 5) when it is desired to contract the face plates.

The face plates are preferably also slotted as at 28 to straddle the dowel bars 17 which may be employed to hold the supporting members in place prior to the pouring of the concrete. However, if desired, the side plates may additionally be provided with Z bars 29 spaced apart a distance equivalent to the width of the supporting members to provide guide channels for receiving the side margins of the supporting members (Figs. 1 and 4). The bars 29 are preferably spot-welded or otherwise connected to the face plates. For many structures such guide channels are unnecessary.

The joint spaces are preferably covered during the pouring of the concrete and until removal of the forms for insertion of the joint compound. In the present instance, the cover is shown in the form of a sheet metal channel 30 whose side flanges 31 are bent over as at 32 to embrace the upper edges of the side plates (see Figs. 1 to 3). The cover may also comprise a strip of wood which rests upon the tops of the supporting members. The cover may advantageously be held in place against accidental removal by any appropriate means, such as bolts 33 which pass through openings in the cover and receive nuts 34. The bolts are advantageously removably connected to the forms, in this instance by nuts 35 welded or otherwise secured to the base strip 10, thereby to permit removal of the bolts from the joint space after they have served their purpose.

In Figs. 8 and 9 is illustrated an alternative method of holding down the cover which may advantageously be employed in structures where no bottom strip is necessary. As there shown, the side plates 18 are provided with inwardly projecting brackets 36 which are slotted as shown at 37 to receive the wings 38 of a nut 39. The wings 38 are thinner than they are wide, thereby to permit their entrance into the slot 37 when turned at 90° from the position shown. After insertion they may be rotated 90° to bring the opening in the nut uppermost to receive the bolt 40 by which the cover is held in place. After use, the nut may be rotated and removed from the slots 37 to release the side plates.

The side plates may be made in any length convenient for handling and preferably their lower edges are given a contour which corresponds with the contour of the underface of the pavement. They may be reused so long as they resist distortion in handling and removal. After the supporting members are withdrawn, the side plates are released and they may be forced inwardly slightly to clear the face of the concrete and then lifted from the joint space.

In Figs. 6 and 7, a different form of contracting device for the face plate is illustrated. Such device comprises cam members 41 of a generally rectangular section mounted between the face plates 42 by yokes 43 which embrace cylindrical portions 44 on the cam member. The yokes 43 are made of sufficient height to permit the maximum spacing of the face plates. The yokes 43 are connected by spot-welding or in any other appropriate way to the respective face plates. The upper ends of the cam members are provided with non-circular extremities 45 which may be engaged by a socket wrench or other tool for rotating the cam members either to spread or permit the face plates to contract. Preferably alternate corners 46 of the cam member are slightly rounded to facilitate a rotation of the cam members. The narrow dimension of the cam members is made small enough to insure adequate contraction of the face plates. The wide dimension of the cam members is adjusted to the desired width of the joint space. To prevent accidental rotation of the cam members, a rectangular keeper 47 may be fitted over the extremities 45 to hold the latter in the position illustrated in Fig. 6. After use, the keepers 47 are lifted out to permit rotation of the cam members.

If, for any reason, it is impractical or undesirable to remove the side plates, they may be connected permanently to the base strip. A form of this character is illustrated in Fig. 2 wherein the base strip 48 carries a channel 49 against which the side plates 50 are seated. The latter are thereupon connected to the base strip by bendable tongues 51 struck up from the base strip and bent over the flanges 52 of the side plates. It will be understood that in a form of this character the side plates may be made of much thinner sheet metal and reinforced, if necessary, by corrugations or pressed ribs. Unless desired in any particular case, they need not be noncorrodible but may be of inexpensive sheet iron.

After removal of the forms, the joint space may be immediately filled with the joint compound. It will be unnecessary to clean the joint space since the forms prevent the entrance of grout or other material. The joint compound by its efficient bond with the roughened face of the concrete (produced by the scored side plates) effectively prevents the entrance of water into the joint space.

The forms are preferably fully assembled prior to installation. It is then only necessary to place them over the dowel bars and to adjust the cover pieces 18 (which are placed over the dowel bars prior to their installation) to cover the slots 29.

Obviously the invention is not limited to the details of the illustrative construction since they may be variously modified. Moreover it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention, I claim:

1. A form for making narrow slots in concrete structures and the like comprising in combination, a pair of relatively thin separate side plates, a support for spacing said side plates, a cover for closing the space between the side plates at the top and located between said side plates, a bolt engaging the cover and lying below the upper edge of the side plates for holding the

cover in place, and means for removably connecting said bolt to the side plates.

2. A joint form for making narrow slots for expansion joints in concrete structures comprising in combination an imperforate base strip substantially wider than the joint and adapted to extend under and engage the concrete adjacent the joint in all positions of contraction and expansion of the concrete, opposite separate removable side plates seated on said base plate, expansible and contractible means directly engaging the inner faces of said plates for holding said side plates apart, a cover seated on said side plates to close the joint space, and means lying below the upper edges of said side plates for removably holding the cover in place.

3. A joint form for making narrow slots for expansion joints in concrete structures comprising in combination an imperforate base strip substantially wider than the joint and adapted to extend under and engage the concrete adjacent the joint in all positions of contraction and expansion of the concrete, opposite separate removable side plates seated on said base plate, expansible and contractible means directly engaging the inner faces of said plates for holding said side plates apart, a separate removable cover seated on said side plates to close the joint space, said covering having portions depressed below the upper edge of said side plates, and a removable bolt in such depressed portions for holding said cover on said side plates.

4. A form for making narrow slots for expansion joints in concrete structures comprising in combination an imperforate flexible base strip of non-corrodible sheet metal substantially wider than the joint and adapted to extend under the concrete adjacent the joint and lie in contact therewith to seal the joint, opposite separate removable side plates, said strip provided with means for seating the lower edges of said side plates to prevent entrance of cement and other material into the joint space, and collapsible supports provided with face plates for engaging said side plates to hold the same in properly spaced relation, said supports including contractible means for allowing said face plates to retract to permit said supports to be removed independently of said side plates.

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