March 2, 1937. F. O. PARKER 2,072,647

JOINT FORMING MEANS AND CONSTRUCTION MAKING USE THEREOF

Filed Jan. 12, 1935

Fig. 1.

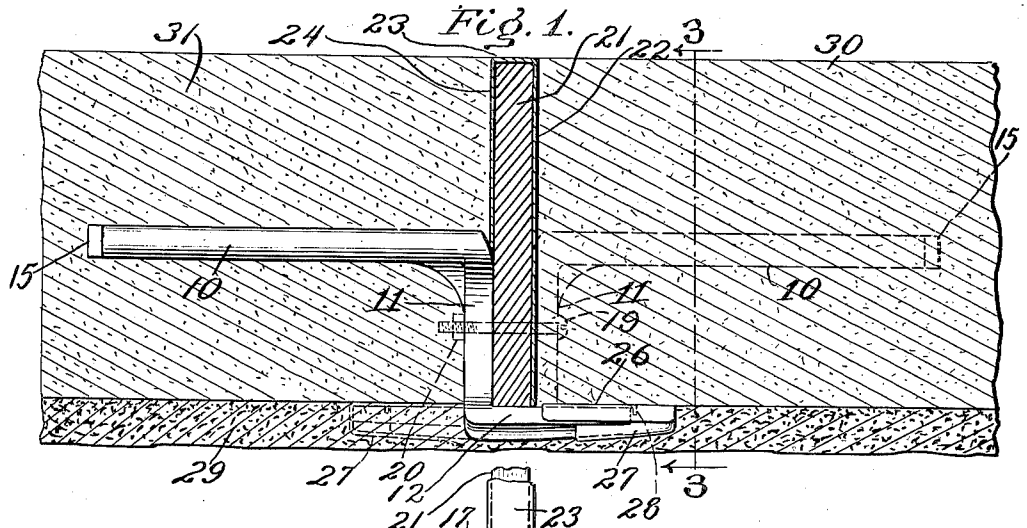


Fig. 2.

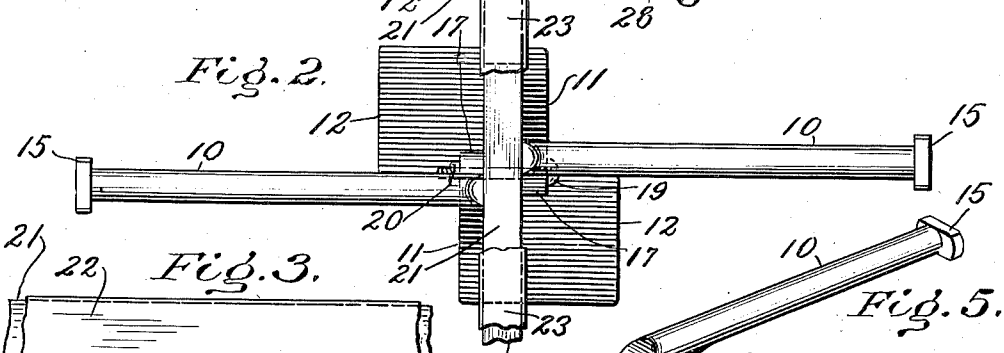


Fig. 3.

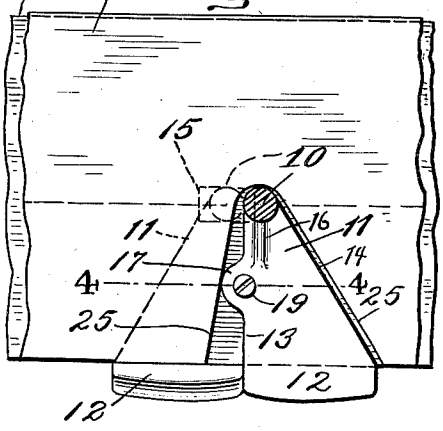


Fig. 4.

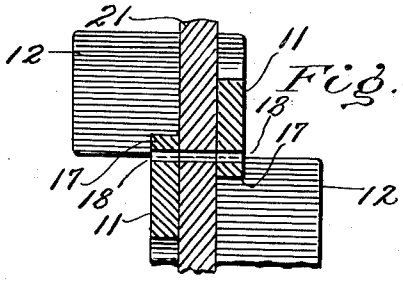


Fig. 5.

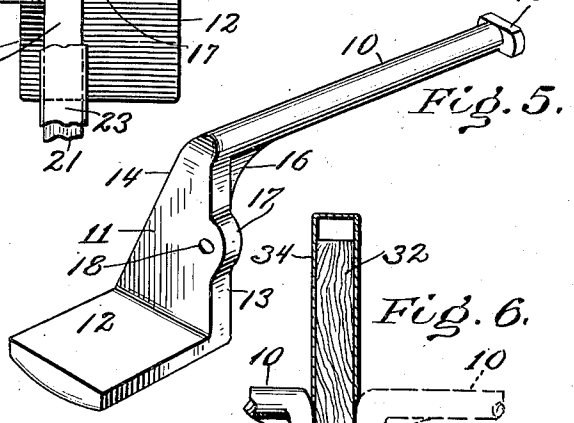


Fig. 6.

INVENTOR.

Frank O. Parker

BY

Geo. Sheelock

ATTORNEY.

Patented Mar. 2, 1937 2,072,647

UNITED STATES PATENT OFFICE

2,072,647

JOINT FORMING MEANS AND CONSTRUCTION MAKING USE THEREOF

Frank O. Parker, Buffalo, N. Y., assignor to Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y., a corporation of New York

Application January 12, 1935, Serial No. 1,482

5 Claims. (Cl. 94—18)

The invention relates to joint forming means to be used in roadways, pavements, floors and the like and to roadways, pavements, floors and the like provided with joint forming means according to the present invention.

A type of joint support and pavement to which the invention is well applicable is disclosed in the co-pending application of Carl C. Ahles, Serial No. 673,199, but as will appear from the present description the invention has a wider range inasmuch as it may be applied to other adaptable types and constructions wherein, as in the type disclosed in that application, metallic members are to be embedded in the adjacent ends of slabs or road sections, such as concrete, at opposite sides of a joint filler between the slabs. Where such is the case it is generally desirable to provide some means for supporting such members in proper position from the sub-grade or foundation and maintaining them in that position while concrete or the like is being poured around them, so that when the concrete has sufficiently set they will be in their original position. The means heretofore generally resorted to for accomplishing these ends are found to be costly as such and costly to apply, as well as not always reliable.

Therefore, to provide more economical means for such purpose the present invention contemplates a more simple and more easily applied provision for sustaining metallic members such as joint supporting members, for example, in proper position during the construction work in laying pavements, floors and the like, to which end the metallic members may be said to be temporarily mechanically connected across the joint between the slabs in such way that the contraction or expansion of a slab at either side of the joint is not interfered with. When contraction or expansion of the slabs takes place the effect is to weaken or break the temporary connection, so that particularly in the case where the metallic members take the form of joint supports, which may be and preferably are of the type disclosed by the Ahles application before mentioned, such joint supports will function as required, inasmuch as the temporary connection either no longer exists or is rendered ineffective to prevent the ultimate end in view.

To these ends the invention as regards improvements in a roadway, pavement, floor or the like comprehends slabs or sections separated by a joint filler, members anchored in the adjacent ends of the slabs or sections, and a temporary bond or the like between the members for connecting them during the construction work and which becomes ineffective when the roadway contracts or expands.

When the metallic members take the form of joint supports having portions extending down for positioning at opposite sides of a joint to be formed between the slabs or road sections, and the lower ends of which portions are to extend under the slabs, the temporary connection or bond preferably but not necessarily directly unites the downwardly extending portions, and may reside in a slight bolt and a nut, the bolt passing through opposed points of such portions and being adapted to be broken by the stresses which take place in the slabs or road sections after the road is constructed for use. Such a provision for connecting the two joint supports together provides means for passing through a preformed expansion filler or a board-like member which is to ultimately fill the joint, and the assembled parts may thus be held in proper position relatively to the roadway to be constructed, especially if suitable precautionary measures be taken to hold and guard the filler when a concrete mix is being poured.

These being among the aims and objects of the present invention, the same consists of certain features of construction and combinations of parts to be herein fully described and then claimed with reference to the accompanying drawing showing preferred embodiments of the invention and wherein

Fig. 1 is a vertical section of a concrete pavement of the usual type provided with the improved joint forming means, which are shown in elevation in the form of joint supports, one of them being in full lines and the other in broken lines;

Fig. 2 is a plan of the joint supports shown in Fig. 1, the bulkhead being broken away for the sake of clearance;

Fig. 3 is a section of the joint supports, bulkhead and joint filler on the line 3—3, Fig. 1, as viewed in the direction of the arrows;

Fig. 4 is a detail horizontal section on the line 4—4, Fig. 3, parts being broken away;

Fig. 5 is a perspective view of one of the preferred joint supports, and

Fig. 6 is a sectional and broken detail view illustrating a modified construction.

Referring to Figs. 1 to 5 inclusive there are illustrated two supports each including an anchoring member 10 preferably in the form of a bar or rod, a depending or abutment member 11 and a supporting member 12, all formed as a

rigid piece, preferably from a malleable steel casting.

The anchorage member 10 may be of any suitable dimensions, but when it is in the form of a bar or rod it is preferably about nine inches in length, having an approximate diameter of three quarters of an inch. The member 11 extends perpendicularly to the end of the bar or rod 10 so as to constitute means for connecting the latter with the supporting member 12 which is preferably in the form of a blade extending perpendicularly to the connecting or abutment member 11, as shown, described and claimed in co-pending application of Carl C. Ahles, Serial No. 693,199. When the joint supports are connected together in some suitable way they constitute load transmitting means as hereinafter described.

Preferably under the present invention one edge 13 of the connecting member 11 stands vertically when each joint support is in use, while the opposite edge 14 is inclined with respect thereto as shown in Figs. 3 and 5, thus disposing the supporting member or foot 12 asymmetrically with respect to the anchoring member 10, the purpose of which is to enable the edges 13 of a pair of the joint supports to be arranged close together when the supports are arranged in pairs. A head or enlargement 15 is formed on the outer end of the bar or rod 10, while a web 16 is formed in the inner corner between the bar or rod 10 and the connecting member 11.

If the joint supports such as described and shown are to be used in pairs, it is desirable to provide a laterally extending lug or ear 17 on the edge 13 and to provide a hole 18 therethrough, which extends parallel with the anchoring member 10. When the joint supports are to be used in pairs, the lugs or ears 17 may be lapped over each other so that a screw bolt 19 may be used to connect the two joint supports together when a nut 20 is screwed onto the bolt.

When the joint supports are connected in a pair as shown, such a bolt if of slight diameter will ultimately give way in use. In other words, the bolt 19 is adapted to constitute a temporary connection between the paired joint supports so that in actual use there will be a strong tendency to break the slight bolt, or weaken or break whatever temporary connection may be used between the paired joint supports to connect them together for the time being. The bolt may be about or under a quarter inch in diameter.

In the construction shown in Figs. 1, 2, and 3 it is assumed that a preformed expansion filler 21 of somewhat bituminous character, that is consisting largely of bitumen and the like, is to be used. Such fillers for joints are well known, but they are rather flexible and are not at all stiff, so that means are resorted to in connection with the present invention to stiffen the same for use with the joint supports in the manner intended. To this end a bulkhead proper 22 may be used consisting of sheet metal such as iron or steel, or if desired non-corrosive metal, which may be one-quarter of an inch or less in thickness and which is bent longitudinally to form a top web 23 which connects the bulkhead proper 22 with an opposite wall 24, the width between the two walls 22 and 24 being approximately the same as the width of the expansion filler 21 which is to be used. The height of the bulkhead or wall 22 is approximately that of the height of the filler 21 so that the latter may be entirely covered by the wall 22 when the filler is inserted in between the walls 22, 24 to fill the space between them as shown in Fig. 1. The expansion filler 21 being therefore stiffened may be inserted between the paired joint supports and then the bolt or other temporary fastening is inserted through the ears 17 and at the same time through the filler which may, if desired, be provided with perforations for receiving the bolt or the like. Afterwards the nut 20 is screwed firmly onto the bolt so that the connected parts may be firmly connected together in the position shown in Fig. 1. In such position it will be seen that the supporting feet 12 extend in opposite directions underneath the filler and that the anchoring members 10 extend in opposite directions from opposite sides of the filler and the bulkhead 22.

It will be seen that if desired each rigid joint support or load transmitting member of a pair may be moved or adjusted pivotally with respect to the other support or member, the bolt 19 which forms the fastening between the members providing a pivotal connection one with the other.

Of course this may be done before the concrete has been poured, into which the supports are to be embedded, when the supports are connected in pairs without being attached to the filler 21, inasmuch as when one of the supports is attached to a filler, no material movement thereof relative to the filler is possible, in the best embodiment of the invention.

The assembly of the joint supports with the filler 21 may be accomplished in other ways as is apparent, the ultimate aim being to connect the parts in the position shown in Fig. 1, so that the filler and the bulkhead will define a transverse or other joint in the roadway after the same has been constructed. The bulkhead 22 is provided with a notch or recess 25 in its lower edge so as to clear and surround the connecting member 11 of one of the pair of joint supports on three sides, as shown clearly in Fig. 3, to enable the bulkhead to be removed after the concrete has become set. It will be seen that the bulkhead 22 extends down to the upper surfaces of the feet 12 and that the wall 24 extends down to approximately on a line with the anchoring members 10.

With joint supports of the type such as herein described, it is customary to make use of suitable means for covering and protecting the feet 12 against the adherence of the concrete to be used, and to provide means for the movement of each joint support relatively to the other joint support, or relatively to the other ultimately formed concrete slab than the one in which the particular joint support is embedded, and to this end such means may reside in a cover or cap formed from sheet metal, such as tin, which comprises a top plate 26 (see Fig. 1) and a bottom plate 27 connected therewith, the top plate being flanged downwardly so that an enclosing cap or case is provided to be inserted over each supporting foot 12. In order to limit the distance to which the cap or case 26, 27 may be slipped onto the end of a supporting foot 12, a stop projection 28 may be struck out of the metal of the top 26 to extend inwardly and downwardly toward the bottom plate 27. Such a stop projection 28 in limiting the extent to which the cap or case may be pushed into place enables the creation of a void within the mass of the pavement of the roadway to be constructed, and the concrete or the like is ready to be poured when the parts are in the position shown in Fig. 1.

The sub-grade 29 having been prepared so as to provide a suitable foundation, the parts and concomitants of the joint support are assembled together and united with the filler 21 and the bulkhead 22 in position to extend along the ultimate joint. The parts being in position, the concrete or the like is poured on that side of the bulkhead 22 which is to constitute the ultimate slab or section 30 of the roadway. It is of course to be understood that the desired number of joint supports are connected up along the length of the filler 21 and the bulkhead 22. When the next setting of the joint supports and concomitants have been assembled and set to the desired position as shown in Fig. 1, the concrete may be poured between the bulkhead 22 for that joint and the wall 24 to ultimately form a slab 31. When the concrete has set so as to form the hard roadway suitable for use by traffic, the bulkhead is removed from around the filler 21, the recesses 25 therein permitting such removal, and thereafter when suitable finishing steps have been performed, such as tooling at the top of the joints and on the surface of the roadway, the same is ready to be used as soon as the same can be opened for traffic.

It is to be understood that after the concrete has set, the anchoring members 10 will be firmly and solidly embedded in the slabs or sections 30, 31, at both sides of the joint, and that the supporting foot 12 from each of the joint supports in one slab will extend underneath and support the adjoining slab, so that with such a construction the tendency to the relative vertical displacement of the slabs at opposite sides of a given joint is substantially overcome and displacement precluded. The contraction and expansion of the slabs at opposite sides of a given joint is not prevented by the temporary connection by means of the slight bolt 19 between two paired joint supports, as the stresses during the same are so great as to render each such bolt 19 ineffective, and usually to break the bolt itself, so that the paired joint supports are no longer mechanically connected together in any such way. It is to be understood that any desirable practical means may be used for connecting each pair of joint supports together for a sufficient time at least until the concrete has been poured and set, and it is obvious that substitutes for bolts such as 19 may be employed. Each bolt, for example, may be made of soft metal or at least an alloy which will enable the nut 20 to strip off the thread of the bolt when the same is drawn away from the nut, say by the contraction of the slab 30; or, if desired, the nut may be made of softer metal than the bolt so that its thread will be stripped under similar conditions. Other means for connecting a pair of joint supports for the temporary use desired will readily occur. It is obvious that the joint supports may be arranged in other ways in connection with the filler 21 than as herein shown and described, as it is possible to make use of joint supports only at one side of the joint in some instances, although the full advantages of the present invention would not be obtained. In such cases the nuts 20 are screwed down against the filler, but the corresponding ends of the slight bolts or fastenings will be buried in the concrete. The fastening being slight or weak and temporary will soon become ineffective by the pull of the slabs of set concrete in opposite directions. In some instances it may be desired to alternate supports on one side of a joint with supports on the other side of the joint.

Referring to Fig. 6 a modification of the invention is illustrated, and in this view the parts corresponding with the parts in the previously described form of the invention have the same reference numerals. In Fig. 6 the filler 32 is assumed to be made of a strip or board of wood of a hard variety comparable perhaps with those hard varieties of wood which are suitable for railroad ties. In such case the filler 32 is self-sustaining as regards its own portions, that is to say it is a stiff member throughout, and its use does not require the use of a bulkhead such as previously described. In the modified form of the invention the stiff wooden filler 32 is provided with a hole 33 therethrough to receive the bolt or other temporary fastening 19, it being understood that there will be a series of such holes along the length of the wooden filler to correspond with the number of pairs of joint supports which are to be employed. To erect the joint forming and supporting means upon a sub-grade, such as 29, Fig. 1, the wood filler 32 is placed between the two supports of each pair and a bolt 19 is passed through an appropriate hole 33, and then the nut 20 is placed upon the bolt and the parts tightened up sufficiently so that the feet members 12 may be rested upon the subgrade, anchoring members 10 extending from opposite sides of the wooden filler and the latter extending sufficiently above the anchoring members. Then a hood 34 is placed over the projecting upper portion of the wooden filler which hood may consist of suitable iron or steel bent so as to form a hood that can be snugly fitted over the upper portion of the filler, with the lower edges of the hood approximately at the plane in which the anchoring members extend. The wooden filler 32 may extend to the surface of the ultimate roadway or pavement to be formed or its upper edge may be spaced a slight distance, say one inch from the top of the hood 31, and when the latter has been removed when the concrete has been set, a suitable bituminous composition may be poured into the top of the joint so as to finish it.

It will be readily understood that in connection with the modified construction shown in Fig. 6 it is easily possible and may be found quite desirable to support each joint support separately upon the wooden filler, that is to say as contradistinguished from uniting the joint supports in pairs. To this end the joint supports may be arranged alternately in succession at opposite sides of a joint filler 32, each joint support having its own temporary fastening for connecting it directly with the filler; or if desired in some cases these supports may be supported on the wooden filler by attaching them only to one side of the same. It may be understood in connection with the modified form of the invention that whatever may be the preferred means of attaching the joint supports to the wooden filler, the great stresses in the roadway due to contraction and expansion will soon render the fastening of each joint support and filler ineffective, so that there is perhaps the very weakest tendency to buck those great stresses. Therefore, the load transmitting means and joint supports will function just the same as if they had been assembled by much more expensive means and methods.

It is to be observed that one of the principal objects of the present invention is to assemble

all the parts such as described so that they may be handled as a single unit after assembly, enabling the building of a roadway in a more satisfactory manner than heretofore, inasmuch as it will be understood that thereby a more satisfactory road can be constructed by the road builders and authorities.

It is to be observed that when the rigid joint supports of the type specified and illustrated are properly assembled with the filler or expansion joint alternatingly or separately, the foot or supporting member 12 of each joint support is in engagement with the filler and the tightened up fastening or the like 19 is spaced away from the foot member, so that the latter and such fastening coact in particular in preventing the joint support from twisting and being laterally deflected out of the predetermined position thereon, which is of considerable importance in view of the fact that the foot member is to rest upon the sub-grade of a road in a desired position.

Obviously the invention is susceptible to more or less modification than what has been shown and described, and desirable changes may suggest themselves to those skilled in the art without departing from the invention as defined in the appended claims. For example: any suitably stiff member (even thin sheet metal) may be used as a separating member to define or separate the joint, and the joint supports may be attached thereto separately, or in pairs, as before explained; and also each foot member of a support may be embedded in the slab which it is intended to support.

What I claim as new is—

1. Road joint forming means, including a preformed joint filler, a rigid joint support or load transmitting part comprising an anchoring member, a foot member and means connecting such members in offset relation, and the two members extending from the connecting means in opposite directions, the foot member being engaged with and extending beyond the filler, and a fastening spaced from the foot member and positively connecting the filler and the joint support, such foot member and fastening coacting to hold the joint support in a predetermined position upon the filler, and the thus constructed and assembled joint forming means being adapted to be handled and installed as a unit.

2. Road joint forming means, including a preformed joint filler, a rigid joint support or load transmitting part comprising an anchoring member, a foot member and means connecting such members in offset relation, and the two members extending from the connecting means in opposite directions, the foot member being engaged with and extending beyond the lower edge of the filler, and a fastening located between the foot member and the anchoring member, and positively connecting the filler and the connecting means of the joint support, such foot member and fastening coacting to hold the joint support in a predetermined position upon the filler, and the thus constructed and assembled joint forming means being adapted to be handled and installed as a unit.

3. Road joint forming means, including a preformed joint filler, a rigid joint support or load transmitting part comprising an anchoring member, a foot member and means connecting such members in offset relation, and the two members extending from the connecting means in opposite directions, the foot member being engaged with and extending beyond the filler, and a fastening separate from the support and cooperating with the foot member and positively connecting the filler and the joint support, such foot member and fastening coacting to hold the joint support in a predetermined position upon the filler, and the thus constructed and assembled joint forming means being adapted to be handled and installed as a unit.

4. Road joint forming means, comprising a pair of separate rigid joint supports, each having an anchoring member, a foot member and means connecting such members in offset relation, the two members extending in opposite direction from the connecting means, the paired supports adapted to hold between them a filler for separating adjacent concrete slabs of a road, and the feet of such supports adapted to extend beyond the filler to support such adjacent slabs, and fastening means extending between and temporarily positively uniting said supports and filler when such filler is held between them, and adapted to then hold the supports together in definite assembled position with the supports maintained substantially parallel before the concrete is poured, and such temporary fastening means adapted to become ineffective to so unite the supports when the concrete sets and the slabs contract or expand.

5. Road joint forming means, comprising a filler, a pair of separate rigid joint supports, each having an anchoring member, a foot member and means connecting such members in offset relation, the two members extending in opposite direction from the connecting means, the paired supports holding between them the filler for separating adjacent concrete slabs of a road, and the feet of such supports extending beyond the filler and adapted to support such adjacent slabs, and fastening means extending between and temporarily positively uniting said supports and filler, and adapted to then hold the supports together in definite assembled position with the supports maintained substantially parallel before the concrete is poured, and such temporary fastening means adapted to become ineffective to so unite the supports when the concrete sets and the slabs contract or expand.

FRANK O. PARKER.