Sept. 8, 1953

A. LE P. GUILLE

2,651,243

JOINT BAR DEVICE

Filed March 24, 1951

2 Sheets-Sheet 1

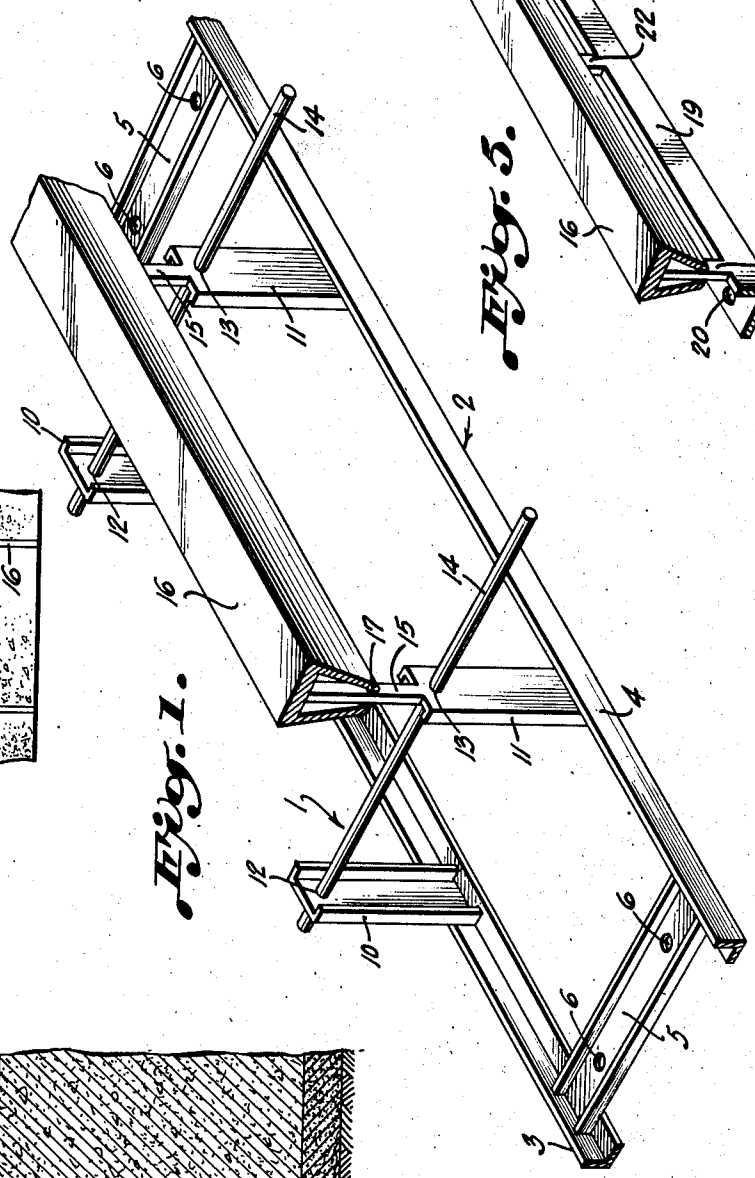


Fig. 1.

Fig. 5.

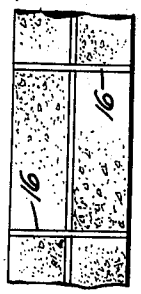


Fig. 7.

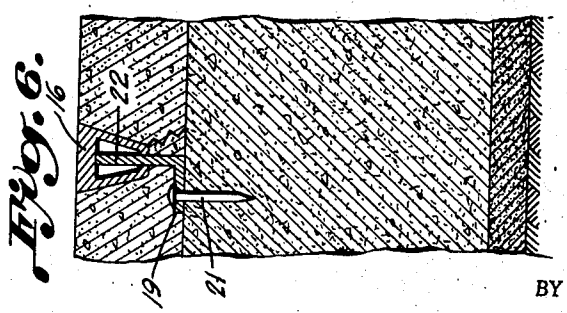


Fig. 6.

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2 Sheets-Sheet 2

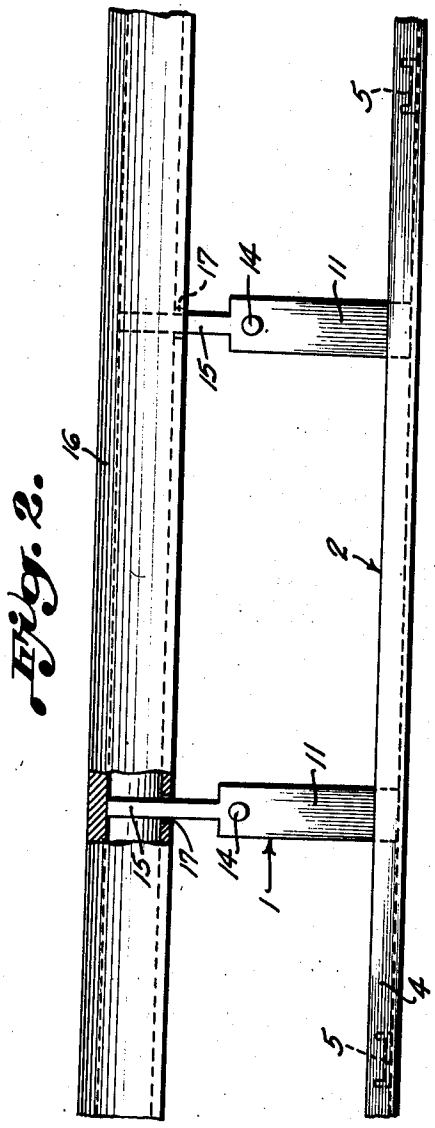


Fig. 2.

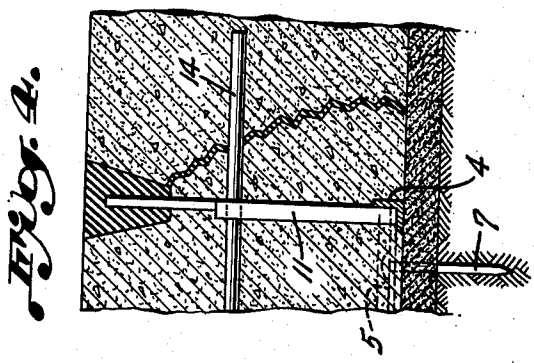


Fig. 4.

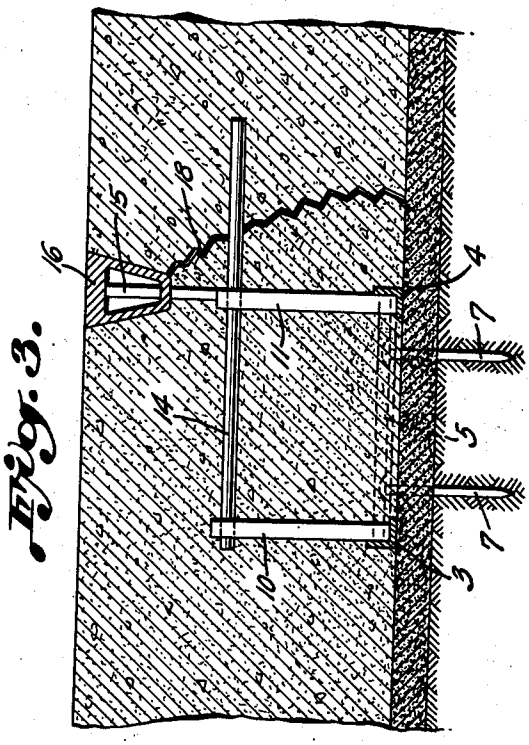


Fig. 3.

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JOINT BAR DEVICE

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3 Claims. (Cl. 94—17)

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This invention relates to a new and useful improvement in a joint bar device and more particularly to such devices used in connection with the construction of concrete roads or highways for the reception of traffic.

The usual concrete highway is provided with concrete slabs mounted upon a sub-grade disposed upon a road bed; all of which is well known in the road building art. Each concrete slab adjoins another to form spaced joints for the accommodation of lateral contraction and expansion of each independent adjoining slab or section of concrete.

However, it is well known in the concrete road building art that the concrete used to build a road will crack, and at the present time no one has any remedy for preventing such cracking. Since the problem of concrete cracking has not been overcome to the present time the only solution, under the circumstances, is to provide a device which will cause the concrete to crack at a desired point. In other words, many engineers have concluded, since concrete will crack, and such cannot be avoided, they will direct the point where it is to crack.

By providing devices which will predetermine cracks in concrete supports may be placed at such weakened points; whereas, unless this is done the cracking will be haphazard and the concrete will soon break into innumerable pieces resulting in an "alligator" effect which soon causes the road or highway to disintegrate and become unusable.

The best known method of predetermining a crack in a concrete road is by the creation of a plane or zone of weakness. This is done by machine or manual means. The expensive machine now used rides over the rail concrete road building form and cuts a groove in the soft concrete. A V-bar is then pressed into the soft concrete to form a groove and said bar remains until the concrete is hard, and then it is removed and the groove filled with asphalt or tar. The V-bar is not connected with any dowel supporting structure and merely rests in the concrete groove until removed. It is this groove which creates the plane of weakness and the concrete will crack at such zone. These planes of weakness are spaced at suitable intervals; for instance, they may be every thirty or fifty feet apart, depending upon the width, depth and various other road building conditions. The zones of weakness or grooves may be transverse or longitudinal; either or both.

As heretofore stated, by the provision of such zones of weakness the cracking of the concrete

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can be predetermined, and such cracks can be reinforced by dowel rods well known in the art. In other words, since one cannot tell where the concrete of a road will crack it can be made to crack at a desired point so that the crack is anticipatively reinforced.

The concrete cracks are jagged in their pattern and interlock so that when closed tend to prevent vertical displacement with respect to each other; but when lateral displacement takes place, due to contraction of the slabs, the dowel rods tend to support as well as keep the cracked sections of concrete in plane alignment, and upon expansion the jagged edges will tend to interlock and thus maintain a smooth surfaced highway.

One of the disadvantages of the present method of forming the grooves or zones of weakness in the soft concrete is that when the bar is placed in the soft concrete it displaces or packs the concrete thereby causing the latter to form ridges along each side of the bar which rise above the surface of the road and when heavy trucks, for instance, pass over these hardened ridges or hit them, they impart a terrific force to the cracked portion and due to such frequent "beating" the force causes the concrete to eventually crack, crumble or come apart, in spite of the dowel rod supporting device.

The V-bar as illustrated in this application is a removable unit; however, it may be secured to the supporting dowel structure by welding or the like, so that when the said dowel supporting structure is permanently secured to the sub-grade it may remain as a permanent fixture in the concrete slab or road. Of course, it is to be understood that in such permanent V-bar structure the V-bar may be substituted for a thin metal or composition strip thereby eliminating the necessity of removing the V-bar and filling the groove with asphalt or tar.

As previously pointed out, the method of installing the V-bar for a plane of weakness is now handled as a separate device and is installed after the concrete has been poured and finished. By such present method there is nothing to hold the bar in position; consequently it often slips from its proper position. It is therefore important that some stability be given the V-bar, since the crack formed in the concrete by the V-bar must occur between the length of the dowel bars and any improper positioning of the V-bar in relation to the dowel bars may prevent proper cracking of the concrete. By applicant's invention the foregoing disabilities are overcome by the means of a V-bar secured in fixed position prior to the pour-

ing of the concrete by fastening or attaching it to the dowel bar assembly anchored to the sub-grade.

Another disadvantage is that at present the V-bars are now set over the dowel device manually after the latter is covered with concrete. The laborers only have a mark on the rail concrete forms to indicate where such devices are located and in cutting the grooves or placing the bars therein they must do so by this mark; even then the V-bars may not be positioned properly. A V-bar must be perpendicular to the sub-grade; for if it is placed at an angle the concrete is most likely to crack at an angle which will extend beyond the dowel rods and thus fail to provide adequate support with respect to the adjoining cracked sections.

The V-bars are so shaped as to be readily removed from the concrete after it has hardened. In other words, by the provision of a V-shaped grooved making bar, surface resistance is minimized and this permits easy removal of the bars from the hardened concrete. The concrete will crack shortly after the bars are placed in the grooves, and when the latter are removed asphalt or tar is poured into the groove to seal it as well as the crack.

In order to overcome the humps and provide an even surfaced road one of the objects of this invention is the provision of a device for accommodating a V-bar so that when concrete is poured upon the device it will not displace the concrete and thereby prevent a ridge forming about said bar.

Another object of this invention is the provision of a device adapted to eliminate the present manual or mechanical groove making method and installation.

A further object of this invention is the provision of a device to insure the correct positioning of the V-bar structure by visual observation.

A still further object is the provision of a device adapted to maintain proper road surface alignment at determined cracked portions of a concrete highway.

Other objects and features will more fully appear from the following description and accompanying drawings in which:

Fig. 1 is a perspective of the device;

Fig. 2 is a longitudinal vertical sectional side view;

Fig. 3 is a sectional end view showing V-bar mounted upon device;

Fig. 4 is a sectional end view showing device with V-bar removed;

Fig. 5 is a perspective of a modification;

Fig. 6 is a vertical sectional end view of the device; and

Fig. 7 is a top plan view showing the V-bar disposed in concrete.

Referring to the drawings, the embodiment of this invention is designated by the number 1, and consists of a base 2, formed by a pair of angle irons 3—4 which are secured in spaced and parallel relation to each other by beams 5. The beams are preferably of U- or V-shaped construction to provide greater rigidity and strength against stresses and strains and may be welded or otherwise secured to the angle or inner portion of the irons as clearly illustrated.

Apertures 6 are respectively disposed in the beams for the reception of spikes or anchor pins 7 which are driven into the earth or roadbed and thereby securing the device firmly against the sub-grade 8 of a roadbed 9.

Pairs of companion supports 10—11 are respectively secured in vertical fashion to angle irons 3—4 in the same horizontal plane and are provided with orifices 12—13 similarly positioned in each support near their free ends.

Dowels 14 are respectively disposed in orifices 12—13 and secured to supports 10—11. Each of the dowels has one of its ends projecting substantially beyond its support 11. Projecting upwardly and in vertical fashion from each support is a lug 15, and it is thought obvious that these lugs are in alignment with each other.

A V-bar 16 is closed at its top portion and provided with a plurality of apertures 17 through its base which are respectively adapted to register with lugs 15 whose heads contact the inner base of closed top portion and thereby support said bar.

In Fig. 3 an end sectional view has been drawn embedded in concrete upon a sub-grade of a roadbed and a crack 18 in the concrete extends from the groove throughout the concrete. In Fig. 4 the V-bar has been removed and the groove and crack are shown filled with asphalt. In Fig. 7 the V-bars are shown both transversely and longitudinally disposed in a highway.

Frequently a concrete surface is recovered with another thickness of concrete; which latter is usually a thin covering and Fig. 6 is a modification showing an angle iron 19 having apertures 20 into which spikes 21 are driven through and into the old concrete surface. Lugs 22 project vertically from said angle iron and are adapted to accommodate the V-bar in similar fashion as previously described.

It is obvious from the foregoing that when the device with the V-bar attached is secured to the bed upon which the concrete is to be poured the V-bar will form the groove by its disposal therein, and no displacement is possible since the concrete is equally distributed and seeks its own level, and the surface may be smoothed and no bumps or ridges will form about or near the V-bar.

It is also thought obvious that when the device is covered with concrete if it is accidentally displaced, as is sometimes the case when tons of concrete are poured upon and about the device, such displacement may be detected by observing the top of the V-bar which is supposed to be flush with the surface of the concrete. If such is not the case, then the supporting V-bar structure has pulled from its anchorage and may be easily replaced while the concrete is soft.

The foregoing is a very important feature since highway contractors are charged considerable amounts for the improper placement of the V-bar and supporting structure and this amount is deducted from their contract price, and so far as is known this inventor is the first one to provide a timely method of detecting this error in time to correct it before the concrete becomes hard.

Having described this invention, what is claimed is:

1. In a device of the character described, the combination of a base in the form of a longitudinal supporting member, spaced vertical support secured to said member and provided with lug portions at the terminals thereof and a removable V-bar of triangular cross section having a lower edge, inclined side walls, and an upper horizontal wall, there being spaced apertures along the lower edge thereof, said lug portions projecting upwardly through said apertures and

into contact with the lower face of the horizontal wall of said V-bar for supporting and positioning the same.

2. In a device of the type set forth in claim 1, the longitudinal supporting member being formed from an angle-iron shaped bar, one flange extending horizontally for resting upon a road bed or other adjacent surface, and the other flange extending vertically as a supporting means for the spaced vertical supports.

3. In a device of the character described, the combination of a base, a pair of vertical supports secured to each side of said base and provided with horizontal orifices, arranged coaxially in pairs, dowel rods secured respectively in said orifices, the supports on one side of said base provided with lugs at the terminals thereof, and a V-bar of triangular cross section having a lower edge, inclined side walls, and an upper horizontal wall, there being spaced apertures along the lower edge thereof, said lugs projecting through said apertures and into contact with the lower face of the horizontal wall of said V-bar for supporting and positioning the same.

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