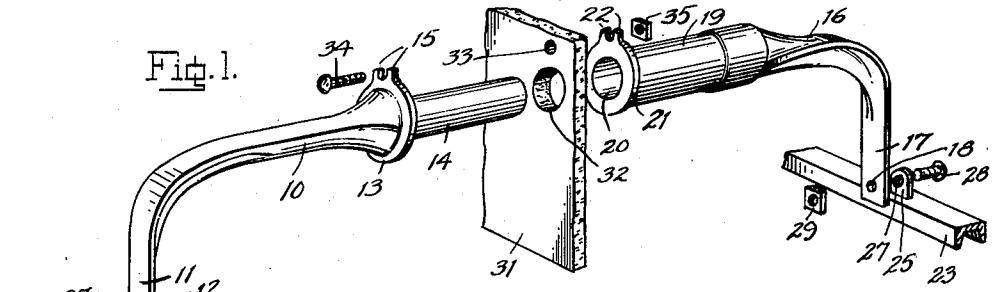
May 18, 1943 R. G. WILLIAMS 2,319,713

LOAD TRANSFER UNIT FOR PAVING JOINT STRUCTURES

Filed Sept. 30, 1939

Fig. 1.



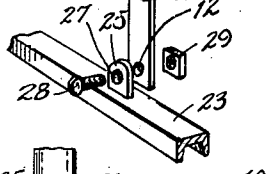


Fig. 2.

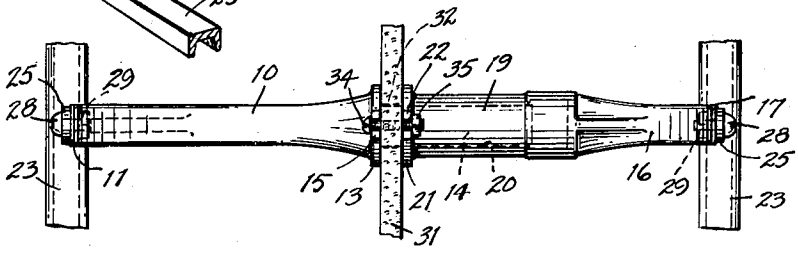


Fig. 6.

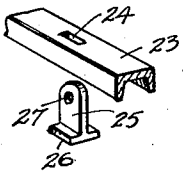


Fig. 3.

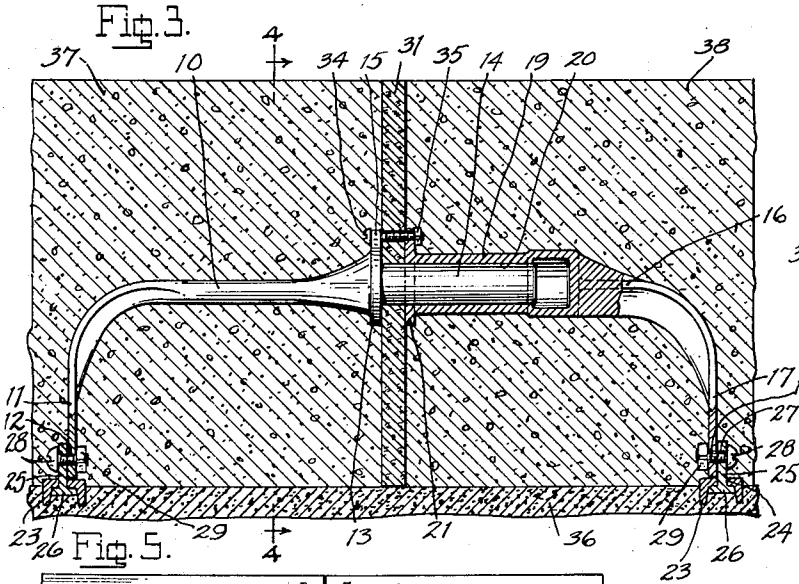


Fig. 4.

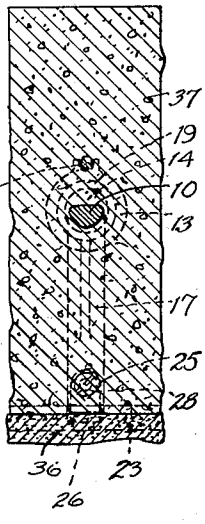
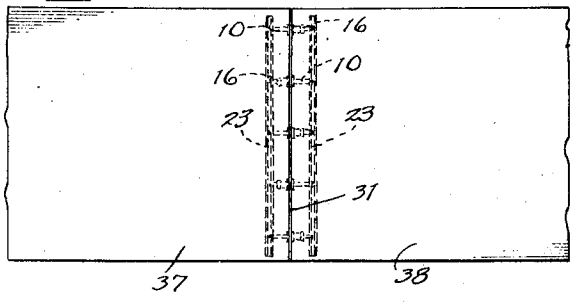


Fig. 5.



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Patented May 18, 1943 2,319,713

UNITED STATES PATENT OFFICE

2,319,713

LOAD TRANSFER UNIT FOR PAVING JOINT STRUCTURES

Rolland G. Williams, Fort Myers, Fla., assignor to Malleable Iron Fittings Company, Branford, Conn., a corporation of Connecticut

Application September 30, 1939, Serial No. 297,246

1 Claim. (Cl. 94—18)

The present invention relates to improvements in load transfer unit for paving joint structure, or other structures of similar nature, and has for an object to provide a load transfer unit which will effectually maintain the adjacent ends of pavement or other sections, which are separated by an expansion and contraction filler strip of cork or the like, in accurately aligned level relation with each other over the full width of the structure, and which will allow for the free expansion and contraction of the sections when subjected to extreme temperature changes. According to the invention a series of spaced load transfer units are adapted to be arranged across the width of the filler strip between adjacent sections, the load transfer units adapted to have expanding and contracting movement in parallel relation to the length of the pavement or other structure, and it is an object of the invention to provide a load transfer unit which may be assembled with similar load transfer units in such manner as to positively insure their parallel relation to each other, and thus prevent any possibility of breakage of the load transfer units or cracking of the pavement or other structure due to the locking or binding action of a joint which may not be in parallel relation. A further object is to provide a load transfer unit which may be assembled with the filler strip and with supporting bars in accurately aligned relation, and which will enable such assembly to be performed upon the pavement or other construction job by relatively unskilled workers, the assembly being such that accuracy of alignment will be assured without the necessity for any skill or judgment on the part of the person assembling the parts.

A further object is to provide a joint which when assembled in relation to the filler strip may be placed upon the subgrade of the road preparatory to pouring the concrete pavement surface, and which in such relation will be rigidly supported against displacement through impact therewith, such as may occur by a workman stepping upon the load transfer unit or dropping or placing objects thereon. Another object is to provide a load transfer unit which will be effectually sealed against the entrance of moisture and will be substantially free from the effects of corrosion.

A further object is to provide a load transfer unit consisting of two main parts, one of these parts being in the form of a socket member and the other in the form of a plunger member, thus providing for simplicity of construction and assembly, and increased strength. A still further object is to provide a joint support in which the main parts may be conveniently and economically produced from metal such as malleable iron, having relatively great strength against breakage and cracking and being highly resistant to corrosion, pitting and rust.

With the above and other objects in view, an embodiment of the invention is shown in the accompanying drawing, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claim.

In the drawing:

Fig. 1 is a perspective view showing the several parts of the load transfer unit in separated relation, and also showing in separated relation the supporting channel bars and the filler strip to be clamped between the members of the load transfer unit.

Fig. 2 is a plan view of the load transfer unit in assembled relation with the channel bars and the filler strip.

Fig. 3 is a longitudinal vertical sectional view of the adjacent ends of pavement sections showing the load transfer unit and the filler strip in operative relation therein, the load transfer unit being shown partially in side elevation and partially in longitudinal section.

Fig. 4 is a transverse vertical sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a plan view, on a reduced scale, of the adjacent ends of two pavement sections.

Fig. 6 is a perspective view showing a portion of one of the channel bars, and also showing in separated relation a load transfer unit attaching lug member.

Similar reference characters indicate corresponding parts throughout the several figures of the drawing.

Referring to the drawing, the load transfer unit, according to the exemplary embodiment of the invention illustrated therein, comprises two main members, one being a plunger member and the other a socket member to receive the plunger member. The plunger member consists of a horizontally disposed bar 10 provided with a downwardly extending mounting portion 11 having a bolt receiving hole 12 adjacent its lower end, the bar 10 being provided at its inner end with an annular clamping flange 13 and a cylindrical plunger extension 14. The flange 13 is provided at its upper side with a pair of upwardly projecting spaced lugs 15 for the purpose of receiving between them a positioning bolt as will hereinafter more fully appear. The plunger member is

preferably in the form of a casting of malleable iron, the plunger portion 14 being formed integral with the bar 10 and being then machined to give it a smooth cylindrical surface. The bar 10 is preferably flat at its upper side and curved at its lower side, as shown clearly in Fig. 4, this cross-sectional shape being such that the concrete forming the pavement structure will flow around it preventing the formation of voids beneath the bar.

The socket member comprises a horizontally disposed supporting bar 16 provided with a downwardly extending mounting portion 17 provided adjacent its lower end with a bolt receiving hole 18, the arm 16 having formed upon its inner end a cylindrical socket portion 19 which is machine-bored, as at 20, to receive the plunger 14 with a relatively snug slide fit. The socket portion 19 is provided at its inner end with a clamping flange 21, provided at its upper side with a pair of spaced lugs 22 for the purpose of receiving a positioning bolt, as will presently more fully appear.

The supporting portions 11 and 17 of the plunger and socket members are secured to identical spaced parallel foot bars 23—23 of channel cross-section having their flanges projecting downwardly. These bars 23—23 extend substantially the full width of the pavement, preferably terminating a short distance from the side edges, as shown in Fig. 5, and each provided with a plurality of slots 24 correspondingly and exactly spaced. In each slot there is secured an upwardly projecting lug member 25 having an integral rectangular base 26, and a bolt receiving hole 27, each lug being assembled with the bar by forcing it upwardly through the slot 24 with such pressure as to swedge the lug in the slot, the bases 26 being forced tightly into the channel of the bar. The supporting portions 11 and 17 are secured to the lugs 25 of the pair of bars 23—23 by means of bolts 28 and nuts 29, so that the pair of bars has a series of load transfer units mounted thereon, the accurate position of the slots 24 and lugs 25 insuring the exact parallel relation of the units to each other. It will be understood that the load transfer units may be spaced any desirable distance apart, and that any desired number may be employed, depending upon the width of the pavement.

The filler strip 31, which is adapted to permit of expansion and contraction of the adjacent sections of pavement, extends the full width of the pavement and corresponds in width to the thickness of the road surfacing material. This strip is provided substantially along its center line with a series of apertures 32 spaced in correspondence with the spacings of the slots 24 and lug 25 along the channel foot bars 23—23 and being of a diameter to receive the plungers 14 of the joint supports. The filler strip 31 is preferably formed of compressed cork composition or other suitable material, the use of such material being standard practice in paving construction.

In spaced relation above each of the holes 32 there is provided a hole 33 for receiving a clamping bolt 34 engaged with the lugs 15 and 22 and secured by a nut 35 to clamp the two members of the load transfer unit with respect to the filler strip 31. This bolt 34 is for the purpose of clamping the flanges 13 and 21 and insuring proper vertical alignment of the two members of the load transfer unit. It also enables the person assembling the load transfer units with the filler strip and channel foot bars 23—23 to accurately position the several load transfer units so that they will be in true parallel relation prior to placing the same upon the road subgrade. The bars 23—23 may be secured in place by means of the bolts and nuts, either before or after the assembly of the load transfer units with the filler strip, and this operation may either be carried out upon the paving construction job or the load transfer members may be secured to the bars before delivery to the paving job. It will be understood that any suitable means may be employed to secure the load transfer members to the channel foot bars, as for instance rivets or eyelets, and that the workmen on the paving job may be provided with the necessary tools to secure them.

The filler strip with the load transfer units mounted thereon is laid in its proper position upon the subgrade 36 of the road bed, the downwardly projecting flanges of the channel foot bars being preferably embedded in the subgrade, as shown in Fig. 3. Thereupon the concrete forming the adjacent pavement sections 37 and 38 is poured thus embedding the two members of the load transfer units, which thereupon become fixedly set in the respective sections. The several load transfer units disposed along the width of the pavement provide an effective joint connecting the two sections of the pavement and supporting them against vertical or sidewise displacement, so that one section cannot drop or lift up or shift sidewise with respect to the other. The joint between the pavement sections will therefore effectually maintain level relation irrespective of uneven loads upon the two sections, or sinkage of the road bed at one side of the joint to a greater extent than the other.

Upon expansion and contraction of the pavement sections when subjected to extreme changes of temperature the plunger of the load transfer unit forming a rigidly set part of one pavement section, and due to the manner in which the sev- forming a rigidly set part of the other pavement section, and due to the manner in which the several load transfer units along the width of the pavement are accurately positioned the parallel relation of the plungers and sockets of each unit will be maintained, so that there will be no possibility of binding or locking. The parts being preferably formed of malleable iron there will be little tendency to corrode or rust, and also the machined surfaces of the plunger and socket will be substantially free from pitting, as distinguished from cold rolled steel, or other such metal, heretofore employed in joint supports. The plunger may if desired be coated with a suitable lubricant, both for the purpose of making it slide easily in the socket and to resist corrosion.

The bolt 34 and nut 35 are such that upon contraction of the road sections and spreading of the joint the threads of the bolt and nut will strip or the bolt will break. This bolt and nut has no function in the joint when it is embedded in the concrete, its function being simply to primarily position the load transfer unit with respect to the filler strip.

As shown in Fig. 5 the several load transfer units may be alternately disposed in opposite directions, that is, the plunger members of the alternate units may project in one direction and those of the other units in the other direction. This is an alternative arrangement however, and the units may if desired all extend in the same direction.

While the invention has been described par-

ticularly with reference to pavement construction, it may be adapted, without materially changing the fundamental features outlined herein, to construction of retaining walls, dams, reservoirs and other concrete structures requiring expansion and contraction joints.

I have illustrated and described a preferred and satisfactory embodiment of the invention, but it will be understood that changes may be made therein, within the spirit and scope thereof, as defined in the appended claim.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

In a load transfer unit for the joint between adjacent sections of sectional construction in which a filler strip is disposed vertically between the ends of the sections, a one-piece socket member comprising a horizontal socket portion adapted to be embedded in the end of one section of the construction having a cylindrical axially extending socket open at one end and closed at the other end and having a peripheral flange at its open end adapted to be embedded in said section with its outer surface substantially in the vertical plane of the end of said section, and a downwardly extending supporting and anchoring leg integral with the closed end of said socket part, and a one-piece plunger member comprising a supporting part adapted to be embedded in the end of an adjacent section of the construction and having a peripheral flange adapted to be embedded in said last mentioned section with its outer surface substantially in the vertical plane of the end of said section, a downwardly extending supporting and anchoring leg integral with said supporting part, and a horizontal cylindrical plunger part integral with and projecting from said flanged supporting part, said plunger part having freely slidable closely fitting engagement with said cylindrical socket of said socket part, whereby relative movement between said socket and plunger members occurs entirely within one section of the concrete.

ROLLAND G. WILLIAMS.

CERTIFICATE OF CORRECTION.

Patent No. 2,319,713. May 18, 1943.

ROLLAND G. WILLIAMS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 42, for "section, and due to the manner in which the sev-" read --section will move back and forth in the socket--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of July, A. D. 1943.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)