

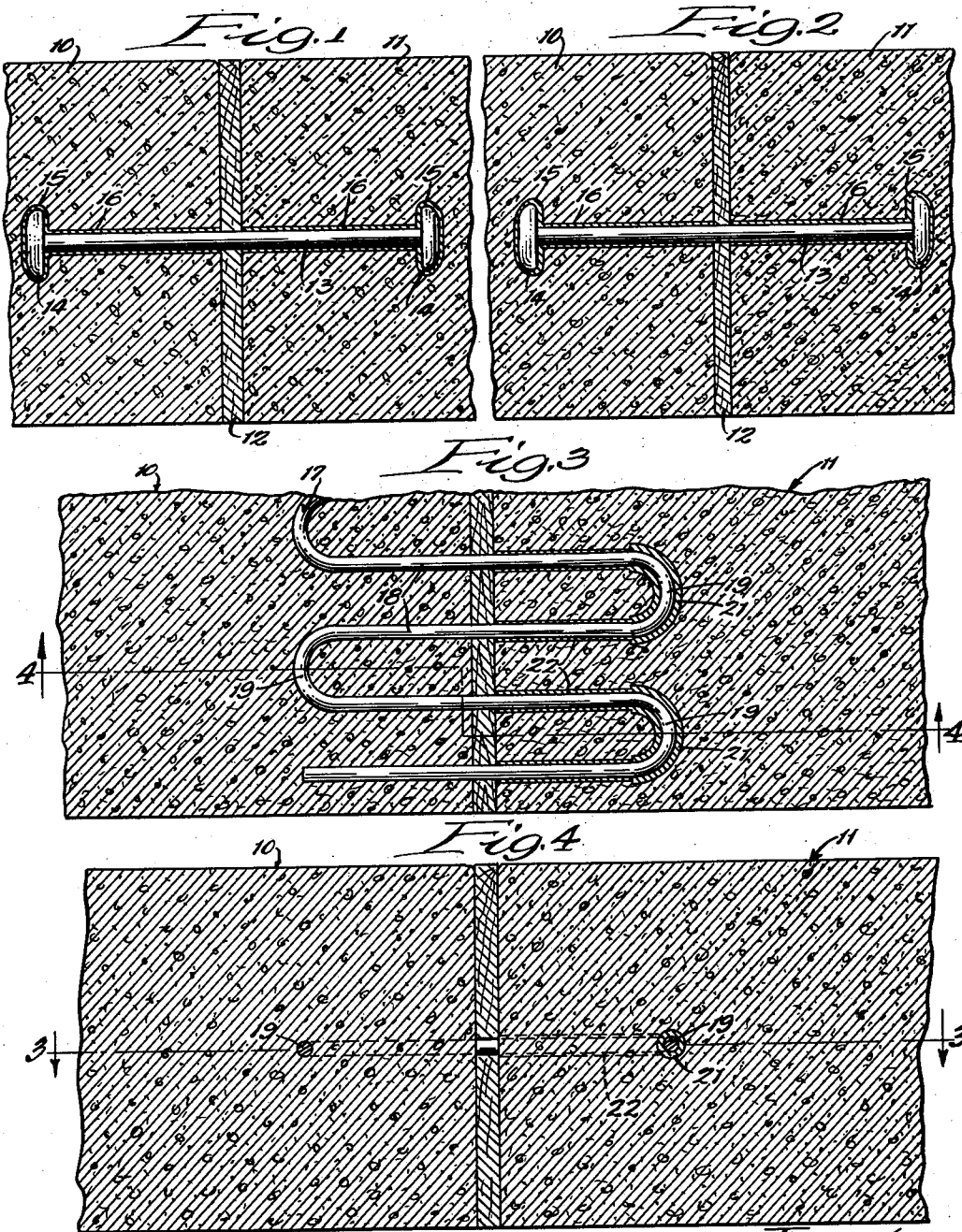
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LOAD TRANSFER DEVICE

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LOAD TRANSFER DEVICE

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This invention relates to load transfer devices and more particularly to devices for transferring loads between adjacent slabs of concrete or the like. In laying concrete pavings, aircraft landing strips, factory floors and the like of concrete, it is desirable to break the concrete structure up into slabs to prevent cracking or splitting thereof due to expansion and contraction. It has long been the practice to utilize dowel structures of various kinds imbedded in the slabs and spanning the joint therebetween to transfer loads from one slab to the other. It is highly desirable that joints of this character be so constructed as to permit relative horizontal movement between the slabs while maintaining the load transmission characteristics of the joints in order that the slabs may separate and move relatively together under temperature changes so that they will not buckle or crack.

It is one of the objects of the present invention to provide a load transfer device which will effectively transfer vertical loads between adjacent slabs and by which the relatively horizontal movement of the slabs is restricted.

Another object is to provide a load transfer device which is simple and inexpensive to construct and install.

Still another object is to provide a load transfer device incorporating yielding means which will yield to permit limited horizontal movement between the slabs.

A further object is to provide a load transfer device formed with an elongated dowel portion to transmit vertical loads between the slabs and with a laterally extending anchor portion covered with yielding material to provide for a limited horizontal movement in the slabs.

A still further object is to provide a load transfer device in which an elongated strip or rod is sinusously formed to provide a plurality of dowel parts extending across the joint between adjacent slabs to transfer loads therebetween.

The above and other objects and advantages of the invention will be more readily apparent from the following description when read in connection with the accompanying drawing, in which:

Figure 1 is a sectional view through a joint between adjacent slabs showing a load transfer device embodying the invention;

Figure 2 is a view similar to Figure 1 illustrating a different position of the parts;

Figure 3 is a horizontal sectional view of an alternative construction on the line 3-3 of Figure 4; and

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Figure 4 is a section on the line 4-4 of Figure 3.

As shown in Figures 1 and 2, adjacent concrete slabs 10 and 11 meet at a joint which is filled with an expansive filler 12 abutting against the adjacent faces of the slabs. The filler 12 may be any desired type of material which will yield under pressure and which will expand slightly when the pressure is relieved in order to maintain a tight fit against the adjacent slab faces as the slabs expand and contract. One type of material which is suitable for this purpose is compressed wood although any desired type of filler might be employed.

In order to connect the slabs together to transfer loads therebetween as, for example, when a load passed from one slab across the joint to the other slab, a plurality of load transfer devices are employed extending across the joint and imbedded in the slabs. As shown, the load transfer devices comprise elongated rods or dowels 13 preferably formed of steel or like material which extend into the slabs adjacent the joint. The rods or dowels 13 are formed at their ends with headed portions 14 forming laterally extending anchor parts. The anchor parts 14 are covered with yielding material 15 such as rubber or other similar non-hardening plastics.

In installing the load transfer devices, the rod or dowel 13 is preferably coated with grease or the like as indicated at 16 to prevent the concrete from adhering to it. The load transfer devices may be assembled with the joint material 12 before the plastic concrete is poured so that they will be imbedded in the concrete during pouring or they may be inserted in the plastic concrete by vibration or similar means after it has been poured and before it has set. In either case the devices when installed occupy a position adjacent the central part of the joint, preferably in the neutral plane of the slab ends, and may be spaced as closely as necessary to carry the load to be transmitted between the slabs.

When the devices are installed any vertical load on the end of either slab will be transmitted from one slab to the other through the rod or dowel portions 13 so that the slabs will be held in proper alignment to provide a smooth surface and so that the edge portions thereof will not easily be cracked or broken away. The slabs are shown in Figure 1 in their normal positions with the yielding covering material 15 substantially uniformly distributed around the heads 14. If the slabs should expand as, for example, under an increase in temperature, the joint material

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12 will be compressed as indicated in Figure 2 and the heads 14 of the load transfer devices will tend to move further into the slabs. This compresses the elastic material 15 at the outer ends of the head portions 14. If a flowable material such as rubber is used, it will flow around the head portions to produce the condition illustrated in Figure 2. Similarly, on contraction of the slabs causing the joint to separate, the material will compress at the inner side of the head portions or will flow around the heads 14 to the outer surfaces thereof. During this motion, the dowel portions 13 of the devices will slide freely in the slabs due to the coating or covering thereon which prevents the concrete from adhering thereto.

With this construction, a limited horizontal movement between the slabs is permitted which is yieldingly opposed by the covering material over the heads of the devices. By properly proportioning the thickness of the covering material any desired amount of movement can be provided for to permit the slabs to expand and contract to the maximum expected extent without breaking at the joints. At the same time, this construction prevents excessive movement at one or more joints which might cause the joints to separate completely such as might occur in a highway or the like where certain of the joints tend to accommodate the entire expansion and contraction in a relatively long stretch of road. With the present construction, the expansion and contraction is distributed more or less evenly throughout the several joints so that the center of each slab remains substantially fixed and no substantial bodily movement of any one slab is produced.

In the alternative construction illustrated in Figures 3 and 4, an elongated rod or strip 17 of steel or the like is sinuously bent to form a series of substantially straight dowel portions 18 connected by loop portions 19. The loop portions 19 provide anchor parts extending transversely of the dowel portions so that the device is firmly anchored in the slabs.

In order to provide for limited movement between the slabs, the loop portions on one or both sides of the device are covered with a yielding covering 21 of rubber or the like and the dowel portions adjacent the covered loop portions are greased as indicated at 22 to prevent adherence of the concrete thereto. This construction functions in substantially the same manner as that of Figures 1 and 2 during expansion and contraction of the slabs to provide limited yielding movement between the slabs.

While two embodiments of the invention have been shown and described in detail, it will be understood that these are illustrative only and are not intended as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A load transfer device adapted to be imbedded in adjoining concrete slabs for transferring loads therebetween and for limiting separation thereof comprising an elongated dowel

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member of uniform section throughout its length adapted to extend across the joint between the adjacent slabs and into the adjacent slabs, laterally projecting heads on the ends of the dowel member adapted to anchor the dowel member in the adjacent slabs, and a covering of yielding material of appreciable thickness enclosing at least one of the laterally projecting heads and providing limited longitudinal movements of the head within the space occupied by the covering for controlling relative longitudinal movement of the slabs.

2. In combination with a pair of adjoining concrete slabs, a load transfer device imbedded in the adjoining slabs and comprising an elongated member of uniform section throughout its length extending across the joint between the adjacent slabs and into the adjacent slabs, the member being provided with parts projecting laterally from the ends thereof to anchor the member in the adjacent slabs, and a yieldable material disposed in a substantially thick layer all about the laterally projecting parts to permit limited movement of the part within the space occupied by the yieldable material for controlling relative longitudinal movement between slabs.

3. A load transfer device adapted to be imbedded in aligned concrete slabs for limiting separation thereof and for load transfer, comprising an elongate member dimensioned to span the space between the slabs and to extend a substantial distance into the end portions of adjacent slabs in unbonded relation with the set concrete, the surface of the elongate member being treated to prevent a bonding relation with the set concrete, a projection extending laterally from the ends of the elongate member for anchoring engagement with the cement, and a thickness of yieldable material all about the laterally extending projection permitting limited longitudinal movement of the projection within the space occupied by the yieldable material thereby limiting relative longitudinal movement between the slabs.

4. A load transfer device as claimed in claim 3 in which a lubricant is provided on the surfaces of the elongate rod to prevent bonding relation with the set concrete.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,039,775	Burgess	May 5, 1936
2,094,853	Shaw	Oct. 5, 1937
2,167,423	Nigro	July 25, 1939
2,205,810	Carter	June 25, 1940
2,244,337	Isett	June 3, 1941
2,305,979	Mitchell	Dec. 22, 1942
2,308,677	Dalley	Jan. 19, 1943
2,330,214	Heltzel	Sept. 28, 1943
2,358,328	Heltzel	Sept. 19, 1944
2,419,022	Heltzel	Apr. 15, 1947