

Feb. 1, 1938.

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2,107,130

MEANS FOR PREVENTING THE FORMATION OF CONTINUOUS VOIDS IN CONCRETE MASSES

Filed May 25, 1937

Fig. 1.

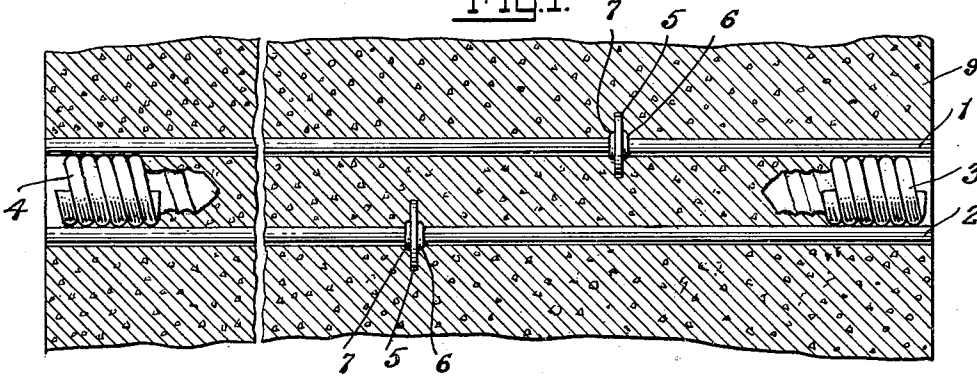


Fig. 2.

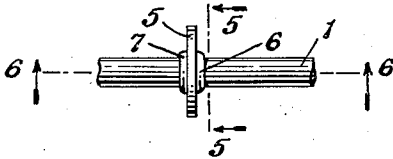


Fig. 3.

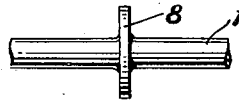


Fig. 4.

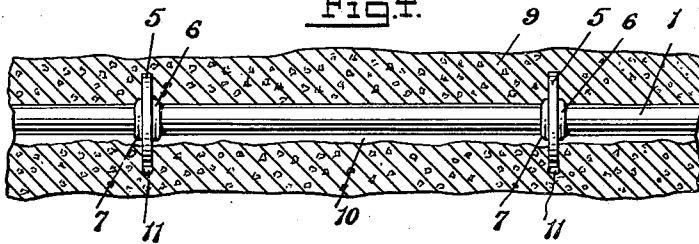


Fig. 5.

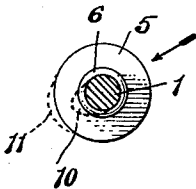
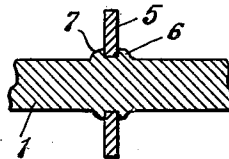


Fig. 6.



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2,107,130

MEANS FOR PREVENTING THE FORMATION
OF CONTINUOUS VOIDS IN CONCRETE
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Application May 25, 1937, Serial No. 144,623

1 Claim. (Cl. 72-71)

This invention relates to ties for concrete forms and has for its object the provision of means by which the formation of continuous voids or passages through which leakage may occur particularly in waterproof concrete work is avoided.

Metal rods are used in concrete work for various purposes. Some rods are used as parts of anchorages for lag screws for supporting form boards and for attaching boards or timbers to the subsequently formed concrete structure, while other rods originally used for holding form ties are permitted to remain in the concrete structure after the forms are dismantled. In each case, the rods employed usually pass through the structure from points at or near the faces of the structure. It has been found that in pouring concrete there is often a tendency for the concrete to fail to closely pack around these rods, particularly on a line co-extensive with the rod and directly in back of or at one side of the rod, so that as a result there is often a continuous void or passage formed through the concrete structure and extending substantially co-extensively with the rod and through which leakage may occur particularly when water directed against the concrete structure is under pressure.

It is therefore desirable to prevent the formation of these continuous voids or passages through the concrete adjacent the rods which extend therethrough. I attain this desired result by the use of portions formed directly upon, or by elements attached upon the rods, which elements are of greater diameter than the diameter of the rods and which accordingly interrupt or break up the continuity of uniform diameter of the rod and form stops or abutments. Therefore any voids formed in back of or at one side of the rod (the position of such voids being determined by the direction of flow of the concrete) will be interrupted or broken up to such an extent as to prevent the passage of water or leakage through the concrete structure.

In the accompanying drawing, wherein several embodiments of the invention are shown, Fig. 1 is a sectional view through a concrete structure, showing a form tie or anchorage in place, and provided with my improvement; Fig. 2 is a side elevation of a short section of rod formed with a disk-like enlargement; Fig. 3 is a similar view of a short section of rod provided with an integrally formed disk-like enlargement; Fig. 4 is a sectional view through a concrete structure showing a rod with several enlargements in position and indicating in exaggerated form how voids sometimes appear; Fig. 5 is a sectional view on

the line 5-5 of Fig. 2, looking in the direction of the arrows; and Fig. 6 is a sectional view on the line 6-6 of Fig. 2, looking in the direction of the arrows.

In the structure shown in Fig. 1 a device is shown which is used as a form tie prior to the pouring of the concrete, and as a screw anchorage thereafter. The same consists of a pair of spaced parallel rods 1 and 2 between the ends of which are secured the helixes 3 and 4 which receive lag screws for holding the form boards in place, and after the concrete structure has been formed, receive lag screws for holding timbers onto the concrete structure.

It has been found that when concrete is poured in and around rods extending transversely of a concrete structure such as is the case with rods 1 and 2, there is a tendency for voids to form at one side of the rods as shown in exaggerated form at 10 in Fig. 4. The location of these voids is dependent upon the direction of flow of the concrete while being poured. For example, as shown in Fig. 5, when the concrete flows in the direction of the arrow, voids such as shown at 10 will be likely to form in the position there indicated in dotted lines at one side of the rod 1. When the rods extending through the concrete are of uniform diameter, there is a possibility that the voids will be in continuous form extending co-extensively with the rods and thus continuing for the entire length of the rod through the concrete. In waterproof concrete structures, this creates the formation of a substantially continuous passage along the rods through which water, and particularly when under pressure, is likely to proceed and thereby create leakage. My invention therefore, contemplates the provision of means by which the continuity of such voids will be interrupted, so that the formation of a continuous passage through the concrete will be thereby avoided.

In the structures of Figs. 1, 2, 4, and 6 the rods are provided with disk-like members or washers 5 which are held rigidly in position on the rods by the formation of integral shoulders 6 and 7 on the rods between which the washers 5 are securely clamped. These shoulders 6 and 7 are formed by distortion of the body of the rod while the washer is on the rod and they securely clamp the washer in position thereon. The washer is of substantial diameter and therefore provides surfaces extending radially of the rod, and these washers may be placed on any one rod at such spaced apart intervals as may be desired. When several parallel rods are used together, such as

the rods 1 and 2, the washers located on one rod may be placed in staggered relationship with respect to those on the other rod, if desired.

When one or more washers is used on a rod, it will be clear, as seen in Fig. 4, that any void formed at one side of the rod and following along the body of the rod will be stopped or interrupted by the washers. There may, of course, be a small void formed at one side of each washer as indicated at 11 in Fig. 4, but these voids 11 will be disaligned from that shown at 10. The disk-like members or washers 5 may be altered in shape or diameter to suit various requirements and may be secured on the rod in any suitable manner.

15 As a matter of fact, the same may be formed as an integral part of the rod if desired, as shown at 8 in Fig. 3.

As previously explained, the members 5 or 8 may be located on rods of any kind extending through a concrete structure, for the purpose of interrupting the formation of continuous voids through the structure, without regard to the uses or purposes of the rods used therein. In other words, I do not limit my invention to the use of

25 these void-interrupting elements in combination

with form tie rods or other particular types of rods, as the same will function wherever a lengthy rod or other element extends through a concrete structure and where the formation of a continuous void through the structure is to be avoided.

What I claim is:

A rod for incorporation in a concrete structure, having a body portion of substantially uniform diameter extending from one side of the concrete structure to the other and provided with at least one disk tightly positioned on it and extending radially of it whereby said disk will be completely embedded in and surrounded by the concrete structure and will interrupt the formation of voids in concrete around the rod, which voids normally follow the body of the rod, and means for holding said disk in position on the rod comprising an annular raised rib integrally formed on the rod on each side of the disk whereby the disk is tightly gripped between said annular ribs and any space between the disk and rod is sealed and leakage between the disk and body of the rod is thereby prevented by said ribs.

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