J. GILLIGAN.

REINFORCED CONCRETE CONSTRUCTION.

APPLICATION FILED MAR. 11, 1910.

979,285.

Patented Dec. 20, 1910.

Fig. 1.

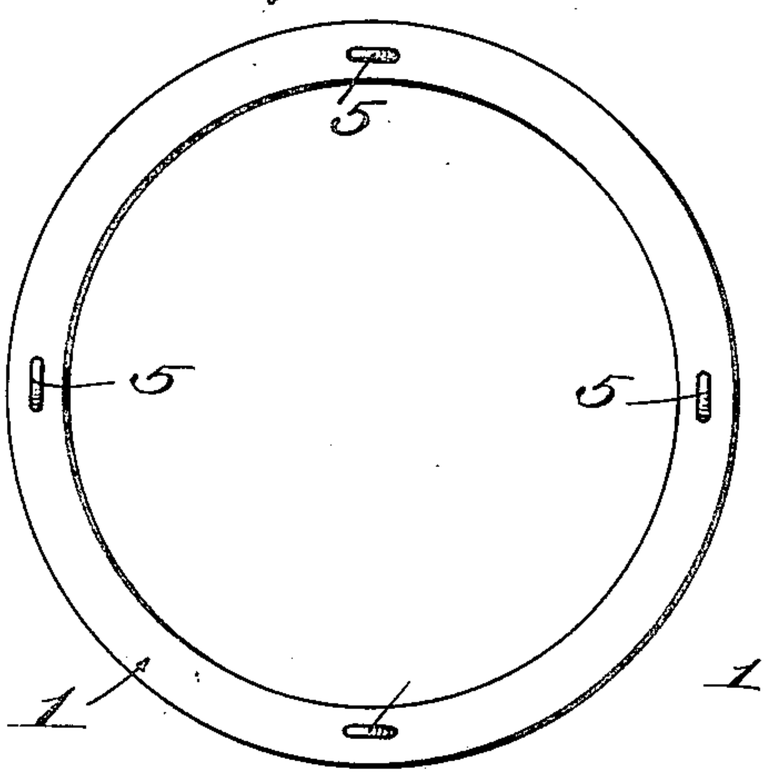


Fig. 2.

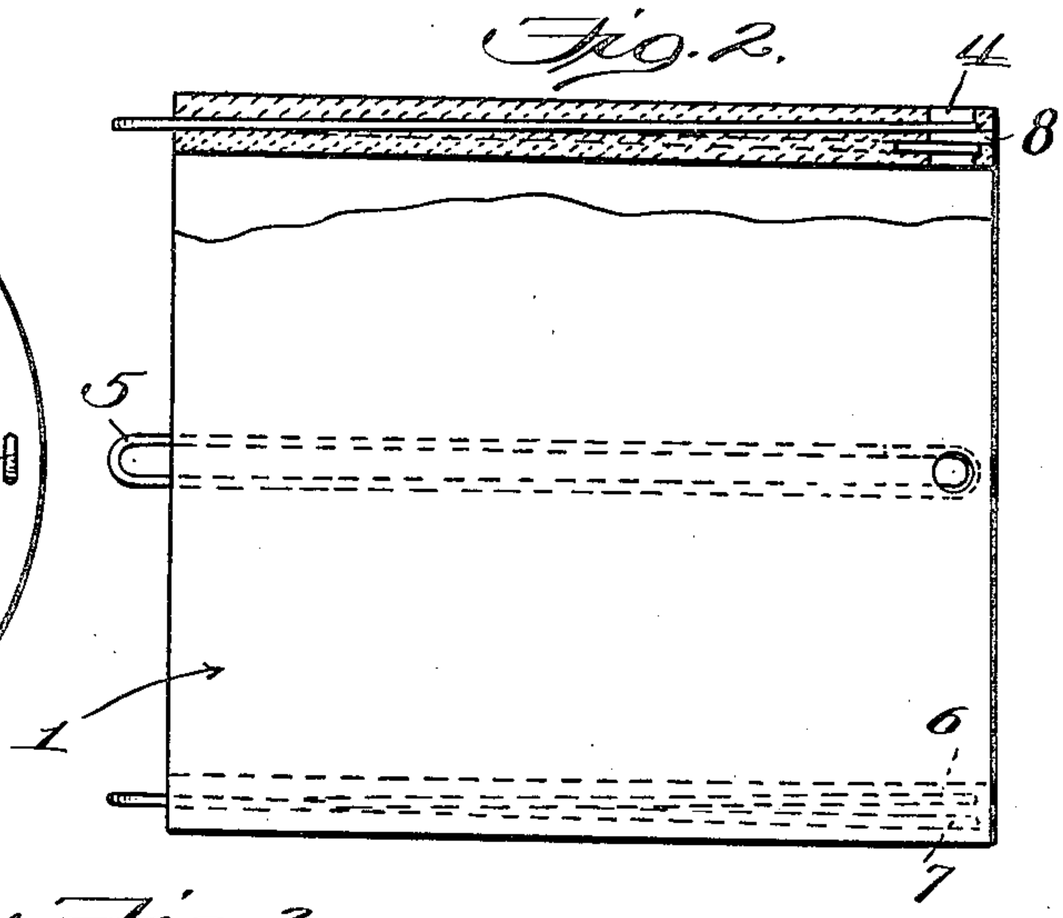


Fig. 3.

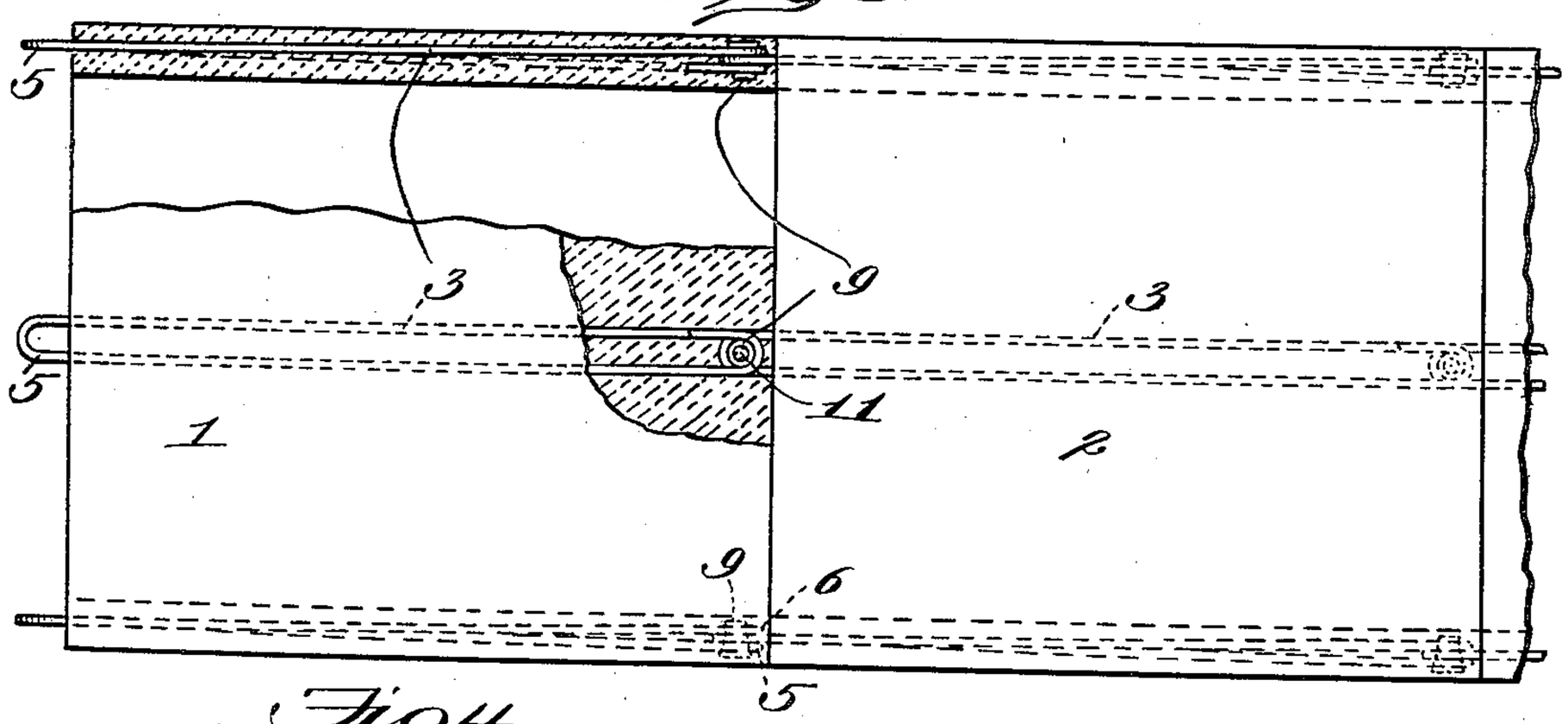


Fig. 4.

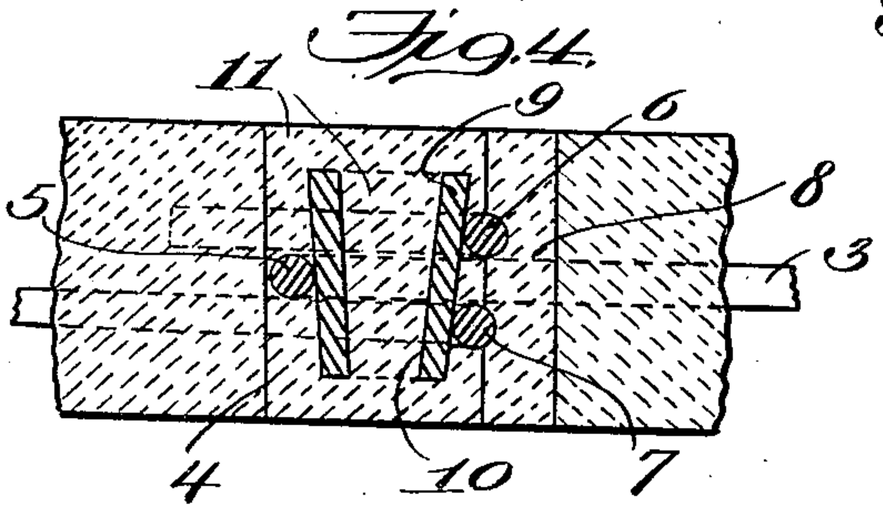
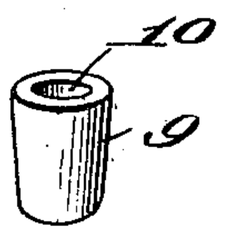


Fig. 5.



Witnesses:

Inventor

By John Gilligan

James L. Morris. Jr. Atty.

UNITED STATES PATENT OFFICE.

JOHN GILLIGAN, OF NEBRASKA CITY, NEBRASKA.

REINFORCED CONCRETE CONSTRUCTION.

979,285. Specification of Letters Patent. Patented Dec. 20, 1910.

Application filed March 11, 1910. Serial No. 548,724.

To all whom it may concern:

Be it known that I, JOHN GILLIGAN, a citizen of the United States, residing at Nebraska City, in the county of Otoe and State of Nebraska, have invented new and useful Improvements in Reinforced Concrete Constructions, of which the following is a specification.

The present invention relates to reinforced concrete constructions, and more particularly to a construction wherein a series of concrete sections arranged end to end are joined together through the medium of metal bars embedded therein and having their presented terminals interengaged, which bars thus constitute not only the requisite reinforcements for the sections, but also the means whereby the same are united to form the complete structure.

In effecting the connection of the sections, considerable difficulty has been experienced in obtaining a close fit of the presented ends thereof against each other, particularly where the completed structure is designed for use as a fluid conduit, and a water-tight joint is, in consequence, essential. This is due primarily to the fact that no provision is ordinarily made either for taking up the play between the ends of the bars when the latter are loosely coupled, or for securing an abutting relationship between the presented ends of adjacent sections. It has, therefore, been found necessary in most instances to make use of an additional connecting medium in the nature of a grout or joint of concrete which is interposed between the section ends, a proceeding which manifestly involves considerable time and expense, thereby increasing proportionately the cost of manufacture.

My invention aims to completely obviate this defect by connecting the sections together by bars so constructed that not only is the desirable abutting relationship of the sections insured, but there is, in addition, a positive tension exerted upon the sections, whereby the same are actually drawn toward each other and thus forcibly maintained in such relationship.

A practical embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is an end elevation of one section of a monolithic concrete structure provided with the improved reinforcing draw-bars. Fig. 2 is a side elevation of said section. Fig. 3 is a side elevation of two sections coupled together. Fig. 4 is an enlarged detail sectional view illustrating the connection between the presented ends of two draw-bars, and the locking device associated with the same. Fig. 5 is a collective view showing one of the draw-bars complete, the adjacent end of the next bar, and the locking device, the various elements being separated from each other. Figs. 2 and 3 are shown partly in section.

In said drawings, 1 and 2 indicate in a general manner two adjacent counterpart sections of a monolithic concrete structure, said sections being reinforced and coupled together by the improved draw-bars 3 in the particular construction of which latter my invention primarily resides. These bars are embedded in the sections, as shown, and in actual practice are arranged in the molds wherein the latter are cast, the number of bars employed in connection with each section depending upon the particular shape and size of the section, as well as the character of the ultimate employment of the finished structure. The arrangement of the bars is such that one end thereof projects beyond the corresponding end wall of the section, while the other end terminates short of the opposite end wall and is disposed within a recess 4 formed in said wall. The first-mentioned end of each bar is designed to constitute a male coupling member, and the other end a female coupling member, the size of the recess in which the latter end lies being but very slightly greater than that of said end itself.

In its preferred construction, illustrated in Fig. 5, the bar is shown as in the form of a single rod or rounded strip of mild steel doubled upon itself to provide a loop 5 at one end of the finished bar, the terminals of the rod or strip being bent to form the oppositely-turned hooks 6 and 7 at the other end thereof. The two legs formed by the initial or doubling operation are diverged or sprung slightly away from each other, whereby the hook 7 is caused to lie directly beneath the hook 6, the bill of each hook and the stem of the other hook occupying a common plane which, in the case of the bar shown in Fig. 5, is vertical. This divergence also enables the loop 5, (which constitutes the male coupling member) of the succeeding bar, to pass between the two hooks 6 and 7, constituting the female member, when the

sections are coupled together, to which end there is formed in the front wall of the recess 4 an opening 8, which leads thereto. Through said opening the male member or loop is inserted during the coupling operation. Owing to the fact that both the hooks and the loops are of skeleton formation, it will be apparent that when the same are interengaged in the manner above described, there will be an open space between the members thereof through which a locking device may be forced.

The locking device employed in connection with the coupling members is in the nature of a wedge, and is shown in Fig. 5, wherein it is designated by the numeral 9, as in the form of an inverted truncated cone having a correspondingly-shaped bore 10 extending completely therethrough.

In assembling the sections to form the monolithic structure, they are arranged in endwise abutting relation, the projecting male members 5 at the left-hand end of each section being passed through the openings 8 of the preceding section into the recesses 4 and between the spaced hook-like parts 6 and 7 of the female members, as shown in Figs. 3 and 4. As regards the latter members, it may be stated, in this connection, that the same do not project into said recesses throughout their entire extent, but that on the contrary the free ends of their bills and the corresponding portions of their stems are embedded in the concrete of which the sections are composed. These members may, therefore, be regarded as closed. When the arrangement above described has been carried out, the locking devices 9 are then inserted in the recesses and are forced through the interengaged coupling members, the wedging action of said devices causing them to exert a positive tension in opposite directions upon said members, and thereby forcibly draw the presented ends of the sections directly together, so as to maintain their end walls flush against each other and in the requisite abutting relation. At the completion of this operation plastic concrete is poured into the recesses so as to surround the locking devices and to fill the bores thereof. The concrete, on hardening, forms keys which positively preclude any displacement of the locking devices, these keys being indicated by the numeral 11. The component sections of the finished monolithic structure are thus permanently and rigidly locked together by the draw-bars and their associated wedges, the action of the latter upon the former exerting a constant tension upon the sections and insuring a joint of the required tightness at the contacting ends thereof by reason of the fact that said ends fit squarely against each other.

By reason of the construction of the draw-bars from rounded strips or rods of steel, the expense of production is materially decreased, since the initial cost of such strips is considerably less than that of flat strips, and the latter may be shipped in a "raw" state from the mills, the subsequent bending of the strips being readily accomplished at a slight cost, as compared to the punching and other operations to which the flat strips must of necessity be subjected.

I claim as my invention:

1. A reinforcing draw-bar for concrete blocks having a loop at one end thereof, and a pair of spaced superposed eyes at the other end.

2. A reinforcing draw-bar for concrete blocks comprising a rod doubled upon itself to provide a loop at one end of the finished bar, the terminals of said rod being re-bent to provide a pair of spaced superposed eyes at the other end of the finished bar.

3. A concrete block having embedded therein a longitudinally arranged reinforcing bar formed at one end with a loop, and at the other end with a pair of spaced eyes disposed directly adjacent to each other and occupying different planes, one end of said bar projecting beyond the corresponding end wall of the block, and the other end terminating short of the opposite end wall.

4. A concrete block having embedded therein a longitudinally arranged reinforcing bar comprising a rod doubled upon itself to provide a loop at one end of the finished bar, the terminals of said rod being re-bent to provide a pair of spaced superposed eyes at the other end of the finished bar, said loop projecting beyond the corresponding end wall of the block, and said eyes terminating short of the opposite end wall.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN GILLIGAN.

Witnesses:
PAUL JESSEN,
EMMA ULMSCHNEIDER.