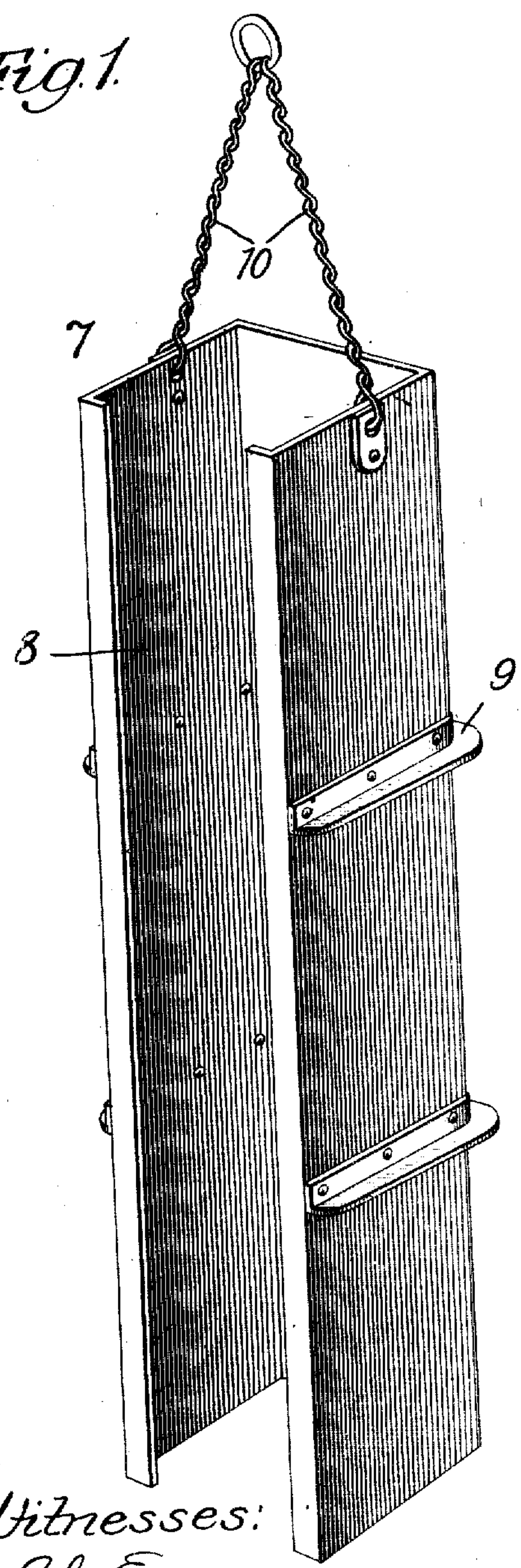
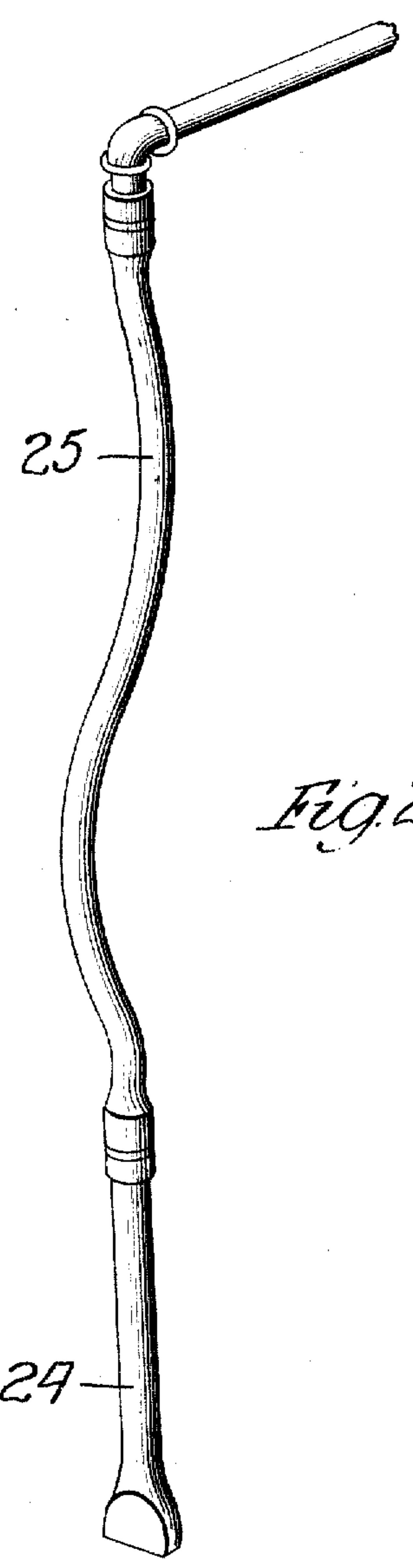


928,646.

*Fig. 1.*



Witnesses:  
 John Enders.  
 Chas. A. Bull.

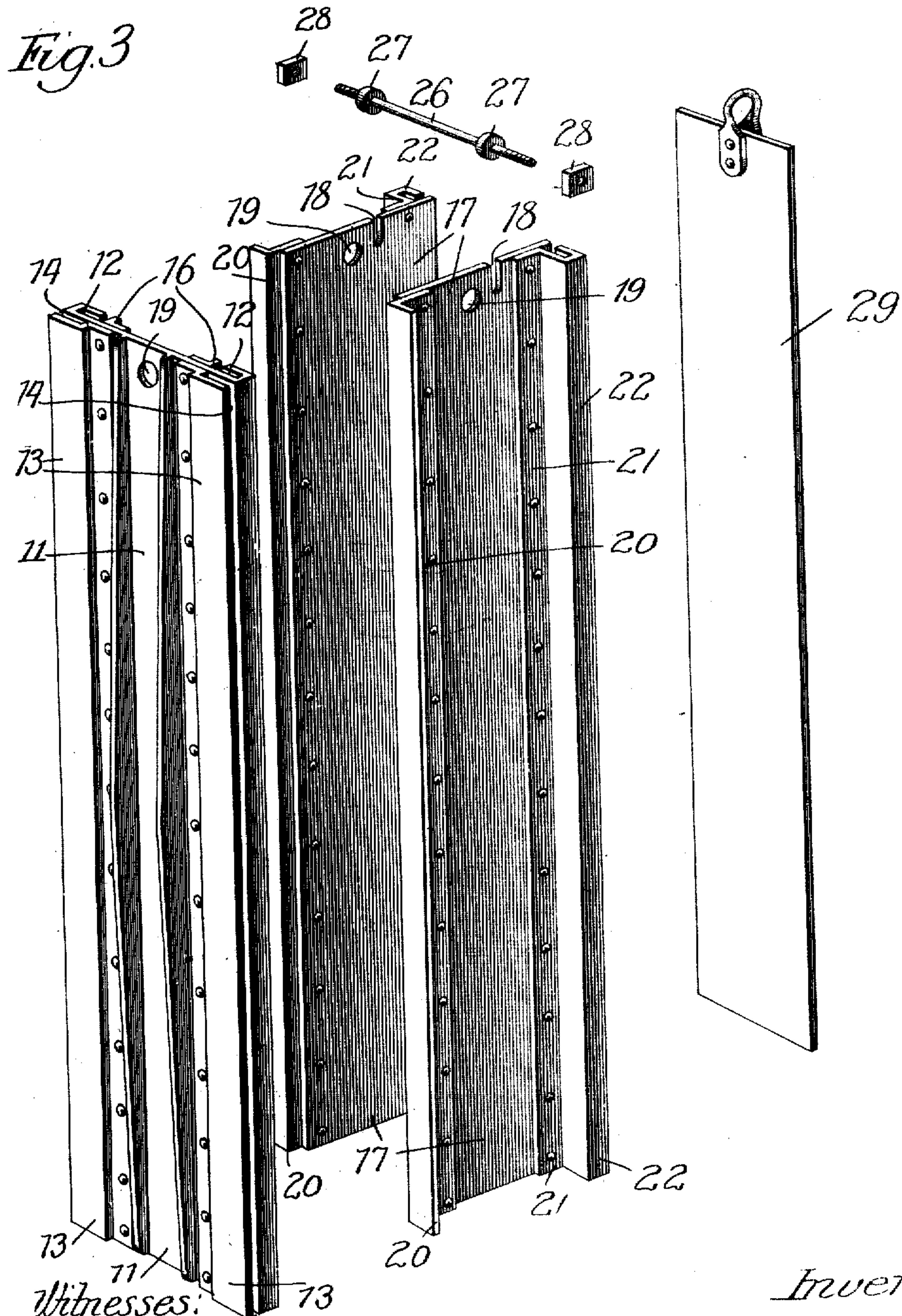


*Fig. 2.*

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4 SHEETS--SHEET 2.



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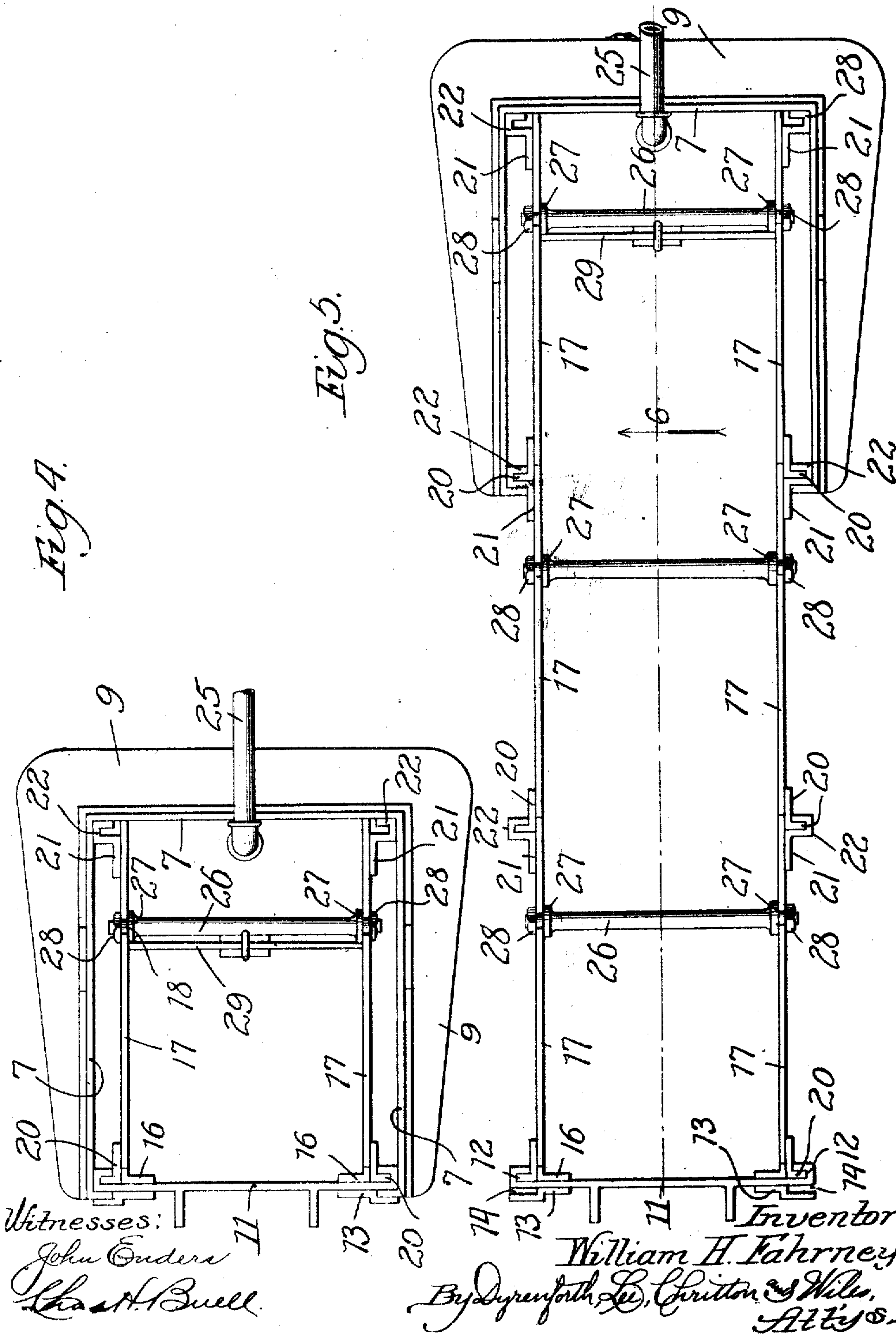
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W. H. FAHRNEY.  
METHOD OF CONSTRUCTING SUNKEN CONCRETE STRUCTURES.  
APPLICATION FILED AUG. 3, 1908.

928,646.

Patented July 20, 1909.  
4 SHEETS—SHEET 3.



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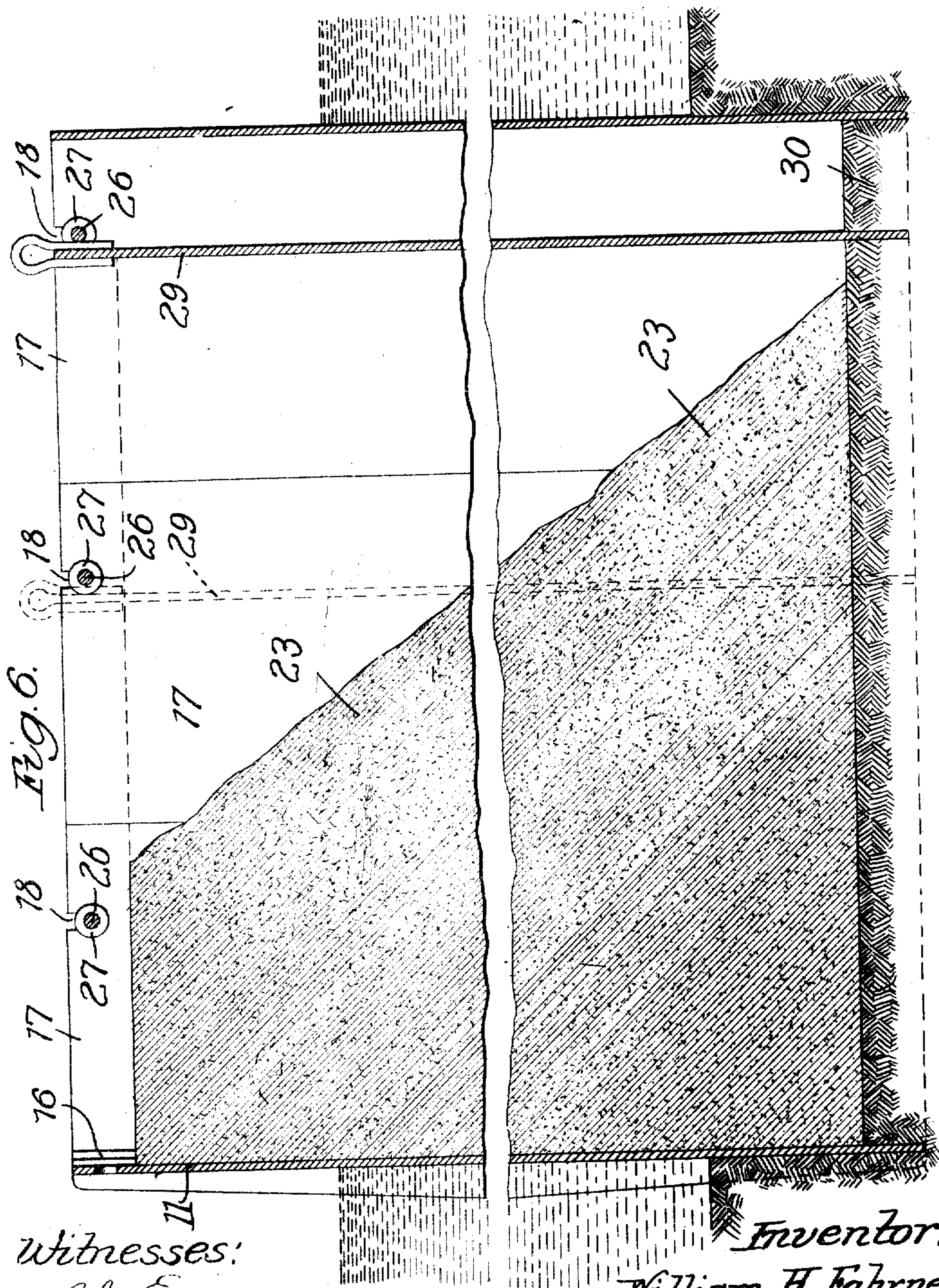
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# UNITED STATES PATENT OFFICE.

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## METHOD OF CONSTRUCTING SUNKEN CONCRETE STRUCTURES.

No. 928,646.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed August 3, 1908. Serial No. 446,594.

*To all whom it may concern:*

Be it known that I, WILLIAM H. FAHRNEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Methods of Constructing Sunken Concrete Structures, of which the following is a specification.

My invention relates to an improvement in the construction of sunken, and more especially submerged, concrete structures, such as sea-walls, foundations, piers, and the like.

Apparatus suitable for the practice of my invention, and which is set forth and claimed in my concurrent application for Letters Patent, Serial No. 446,593, filed on the third day of August, 1908, is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of the casing of the mold employed; Fig. 2 is a similar broken view of a suction-pipe and nozzle for emptying the mold of sand and water; Fig. 3 is a similar view showing the parts of the mold-lining or sheeting in their unassembled relation; Fig. 4 is a plan view showing the complete mold in the condition in which it appears in the first operation involved in my improved method; Fig. 5 is a similar view showing the condition of the apparatus in the progress of the work, and Fig. 6 is a broken section at line 6, Fig. 5, showing, by way of a diagram, the progress of the work.

The mold consists of a casing of suitable shape and dimensions, with one longitudinal section removed for closure by a gate in the first operation of the apparatus, and sectional sheeting in the casing from which the latter is separable. One form of the casing 7 suitable for my purpose, and which is that most commonly used, is best shown in Fig. 1. It is of rectangular cross-section, open at both ends; and formed, by preference, of sheet-steel with an opening 8 along one side. The casing is shown to be reinforced at intervals by strengthening ribs 9 extending about it and to be provided with a flexible hanger 10 by which to suspend it, for placing and withdrawing it, from a suitable crane, derrick or boom (not shown). The gate 11 (Figs. 4 and 5) is formed with sockets 12 along its inner lateral edges and has secured upon its outer face bars 13 of Z-shape in cross section forming guide-sockets 14 along its outer lateral edges; and it is also shown to be provided with stops 16

along its inner face adjacent to the sockets 12. Similar side sheets 17, 17, forming pairs, are provided in their upper ends with notches 18 and holes 19 and along their front outer edges with angle-irons 20 to engage the gate-sockets 12, and along their corresponding sides toward their rear edges with bars 21 terminating in socket-heads 22 also to be engaged, as hereinafter described, with the angle-irons 20.

To construct a concrete-wall 23, Fig. 6, in a body of water, the casing 7 is placed on end in the selected position, whereupon the gate 11 is adjusted with its sockets 14 in engagement with the in-turned flanges at the opening 8 to close the latter. Thereupon the nozzle 24 of a suction-pipe 25 is introduced into the casing through its upper end and suction-force is applied to the pipe to suck the sand and water out of the casing until the latter is thereby sunk to the desired depth in the bed of the body of water. The casing being thus emptied, the side-sheets 17 are introduced in place into it, being guided by the angle-bars 20 engaging the sockets 12, and the rear ends of the side-sheets abut against the back of the casing and are braced in the corner-portions thereof by the socket-heads 22 fitting the same. To brace the side-sheets and hold them in position, a cross-bar 26 provided with shoulders 27 near its opposite threaded ends is introduced into the opposite notches 18 and fastened by nuts 28 applied to said ends, whereupon the back-sheet 29 is introduced into the casing between the side-sheets, being sustained by sinking it, like the other portions of the structure, into the sand-bed 30 and by bearing at its upper end against the rod 26. The mold thus formed is then filled with concrete to fill the space between the parts 11, 17 and 29 and thus form the initial section of the wall to be constructed. When this is done, a derrick or crane is applied to the hanger 10 to raise the casing 7, leaving the sheeting, which forms the lining of the mold, and gate in place for supporting the section while the concrete is setting. Meantime, the casing is lowered into position adjacent to the first section, being guided into place by engagement of the in-turned flanges along its opening 8 with the backs of the socket-heads 22, as shown at 31 in Fig. 5. The sand and water are then sucked out of the casing in the manner already described.



when other side-sheets 17 are introduced into place and secured by a bar 26, and another back-sheet 29 is adjusted in place in the casing to form the mold, but with the open side 8 adjacent to the back-sheet 29 of the first-molded section. Before filling the mold the second time with concrete the back-sheet of the section previously molded is withdrawn and the mold is then filled with concrete. In thus repeating the filling of the mold, the still green concrete of the first section may fall down from it through the opening 8 and thus effect bonding of the first and second sections; and the filling with concrete is continued to the desired height in the mold and also to add to the first section what it has lost by the falling of a portion from it. The method thus described of producing the required bonding between molded sections is the most practical known to me, but the bonding may be produced in other ways without departure from my invention. With the second section of the wall thus formed, the casing is withdrawn and placed in position relative to the last-molded section, when the sand and water are sucked out of it, the sheeting placed in position within it, the back-sheet 29 of the second section is removed for the bonding purpose, and the mold is for the third time filled with concrete; and these operations are repeated until the desired number of wall-sections have been molded in succession to produce the required length of wall.

When the concrete of a molded section becomes set so that it will stand without the support of the sheeting, the latter is withdrawn to be used with the casing in forming a fresh section; and, as will be understood, when the sheeting of the first-molded section is thus removed the gate 11 used to cooperate with it is also withdrawn, the withdrawal being effected by applying the derrick or crane to the sheets, after first removing the bar 26.

In Fig. 6, which illustrates the bonding-method described, the position of a withdrawn back-sheet 29 is indicated by dotted lines.

In the use of the terms "bond" and "bonding" herein I define a structure built up from successive sections and which are united at their ends to the full height and width of each, thus producing a continuous and homogeneous structure, of uniform cross-sectional area.

What I claim as new and desire to secure by Letters Patent is—

1. The method of constructing a sunken concrete wall, and the like, which consists in sinking a mold into the bed of a body of water to extend above the surface thereof, filling concrete into said mold to form a section of the structure, similarly sinking adja-

cent to said section a mold while maintaining its interior closed to said section, removing the closing medium and thereby causing the still green concrete from said section to enter said last-named mold, filling concrete into the latter to form a second section and bond it with the first, and repeating the said operations of molding the second section and bonding in molding successive sections.

2. The method of constructing a sunken concrete wall, and the like, which consists in sinking a mold-casing into the bed of a body of water to extend above the surface thereof, lining said casing to form the mold, filling concrete into said mold to form a section of the structure, withdrawing said casing from its lining and again sinking it adjacent thereto and relining it to form a second mold, filling concrete into said second mold to form the second section of the structure and bonding the two sections, and repeating the said operations of molding the second section and bonding in molding successive sections.

3. The method of constructing a sunken concrete wall, and the like, which consists in sinking a mold-casing into the bed of a body of water to extend above the surface thereof, withdrawing water and sand from the casing and lining it to form the mold, filling concrete into said mold to form a section of the structure, similarly sinking adjacent to said section a mold-casing, withdrawing water and sand therefrom, lining it to form a second mold and filling the same with concrete repeating the said operation of molding the second section in molding successive sections and, during the progress of the work, removing the casing of each mold for repeated use and bonding the concrete of successive sections of the structure.

4. The method of constructing a sunken concrete wall, and the like, which consists in sinking a mold-casing into the bed of a body of water to extend above the surface thereof, lining said casing to form the mold, filling concrete into said mold to form a section of the structure, withdrawing the casing from its lining and again sinking it adjacent thereto and re-lining it to form a second mold, withdrawing that part of the first lining which closes the second mold to the first section to permit concrete from the latter to enter said second mold, filling the second mold with concrete to form a second section and bond it with the first, and repeating said operations of molding the second section and bonding in successive sections.

WILLIAM H. FAIRNEY.

In presence of—

CHAS. E. GAYLORD,  
RALPH A. SCHAEFER.