

No. 780,098.

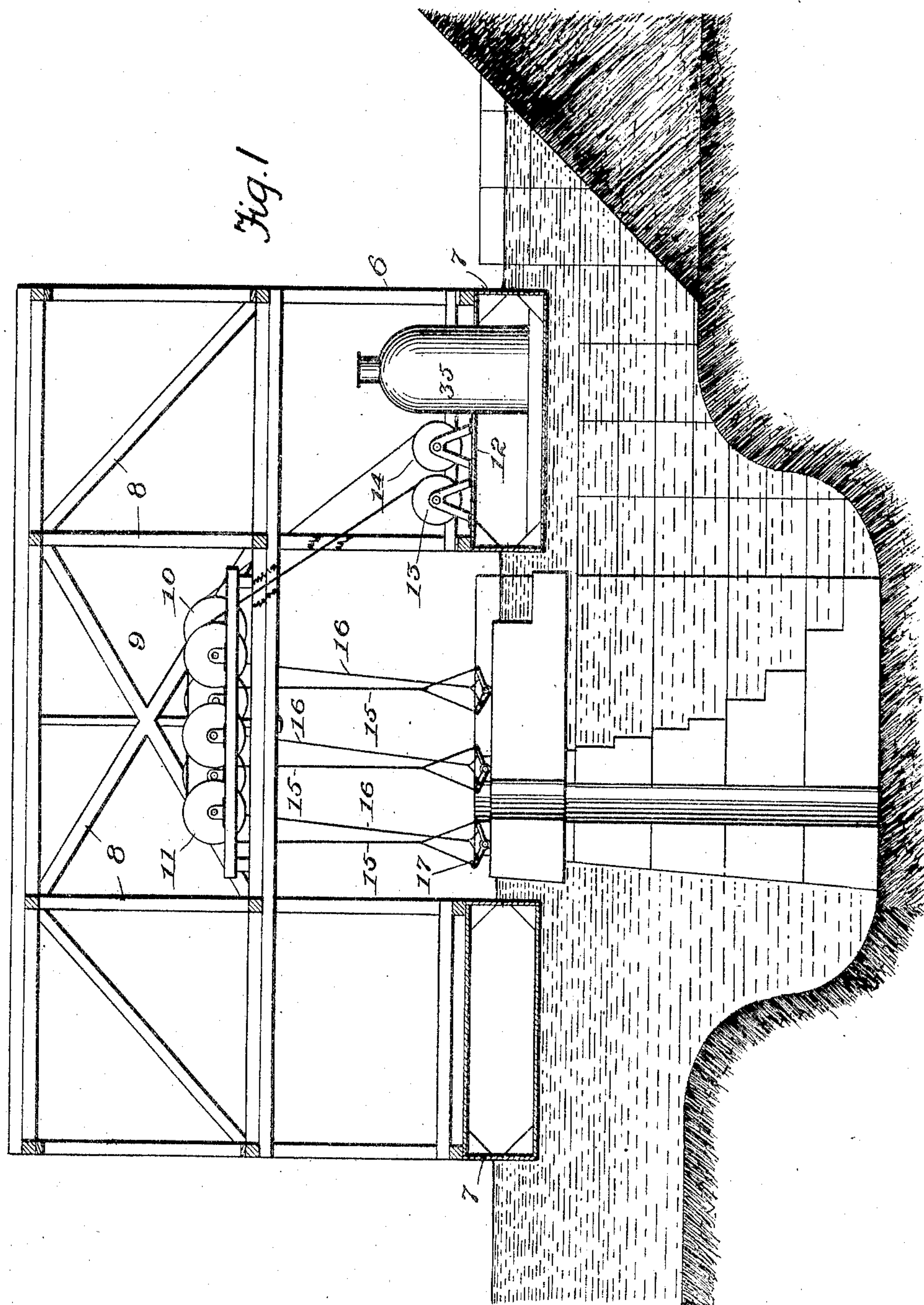
F. J. GILMAN.

PATENTED JAN. 17, 1905.

APPARATUS FOR BUILDING SUBMERGED CONCRETE WORKS FROM
ABOVE THE SURFACE OF WATER.

APPLICATION FILED JAN. 18, 1902.

3 SHEETS—SHEET 1.



Witnesses.
Wm. Darling
Mr. J. Darling

Inventor
Fredrick Joseph Gilman

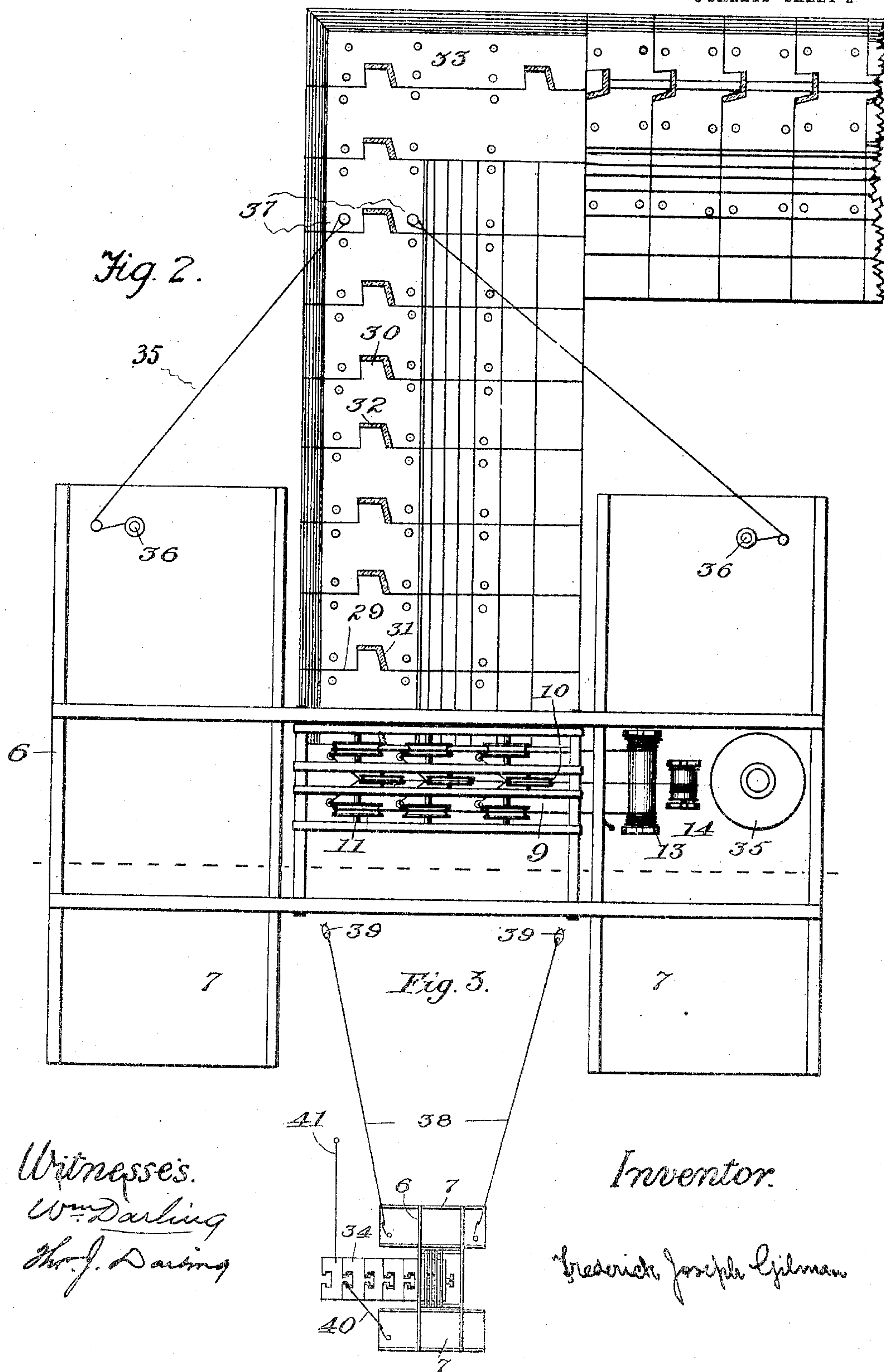
No. 780,098.

PATENTED JAN. 17, 1905.

F. J. GILMAN.
APPARATUS FOR BUILDING SUBMERGED CONCRETE WORKS FROM
ABOVE THE SURFACE OF WATER.

APPLICATION FILED JAN. 18, 1902.

3 SHEETS—SHEET 2.



No. 780,098.

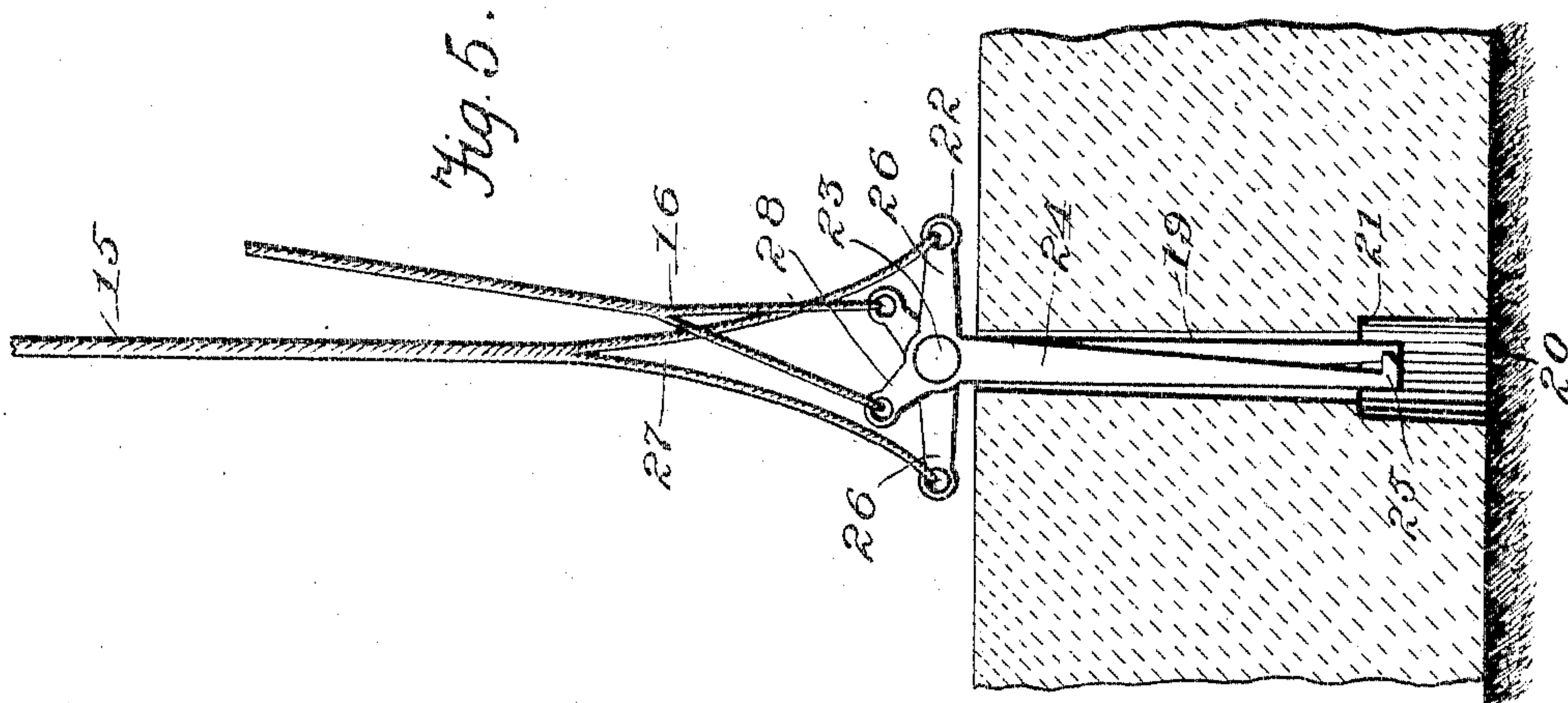
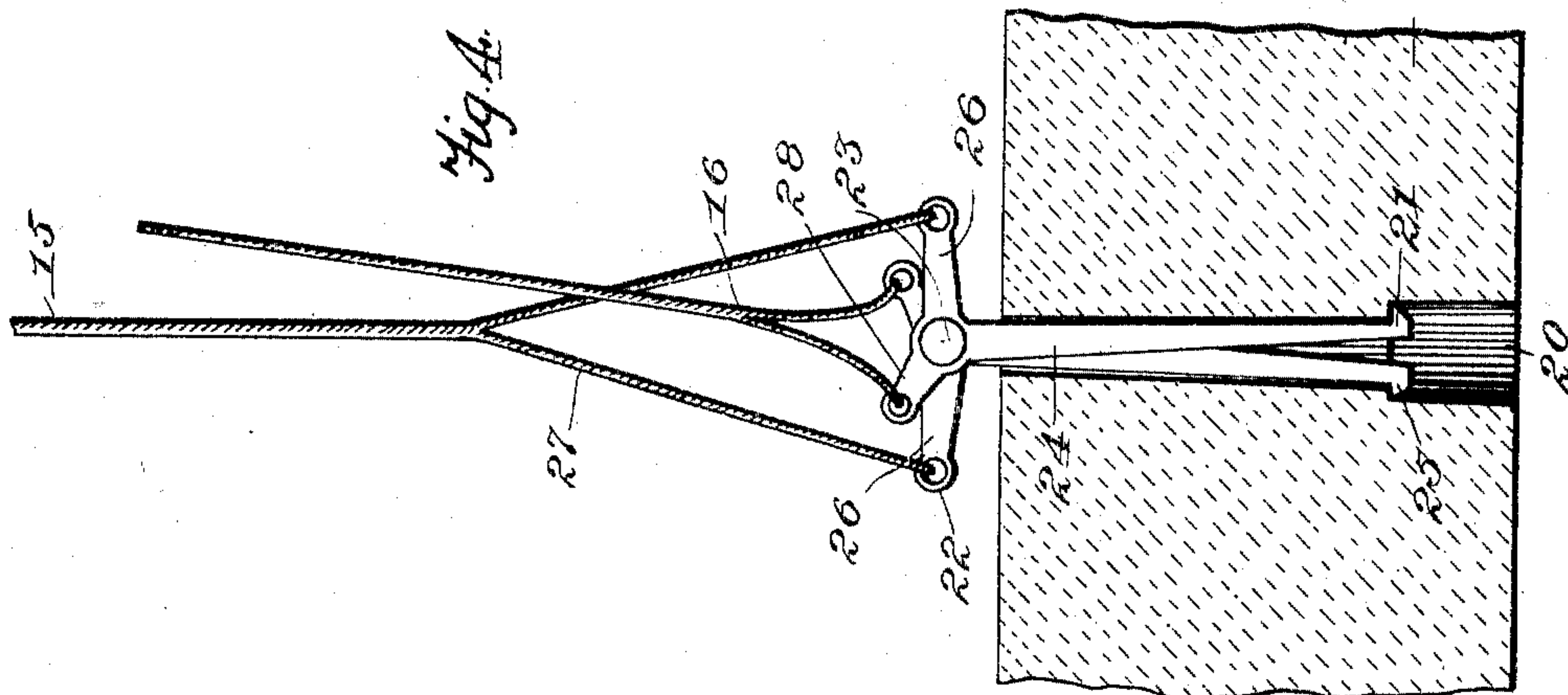
PATENTED JAN. 17, 1905.

F. J. GILMAN.

APPARATUS FOR BUILDING SUBMERGED CONCRETE WORKS FROM
ABOVE THE SURFACE OF WATER.

APPLICATION FILED JAN. 18, 1902.

3 SHEETS—SHEET 3.



Witnesses
Wm Darling
Geo. J. Darling

Inventor
Frederick Joseph Gilman

UNITED STATES PATENT OFFICE.

FREDERICK JOSEPH GILMAN, OF MONTREAL, CANADA.

APPARATUS FOR BUILDING SUBMERGED CONCRETE WORKS FROM ABOVE THE SURFACE OF WATER.

SPECIFICATION forming part of Letters Patent No. 780,098, dated January 17, 1905.

Application filed January 18, 1902. Serial No. 90,316.

To all whom it may concern:

Be it known that I, FREDERICK JOSEPH GILMAN, a Canadian citizen, residing in the city of Montreal, county of Hochelaga, Province of Quebec, Canada, have invented a certain new and useful Method of and Apparatus for Building Submerged Concrete Works from Above the Surface of the Water, of which the following is a specification.

My invention relates to apparatus especially adapted for constructing submerged masonry, such as retaining-walls, dams, piers, bridge-abutments, &c.

It has been my object to provide simple apparatus which will enable blocks of concrete or similar material to be laid with great precision, and for this reason the invention is particularly well adapted for use where the concrete blocks have such a configuration as enables them to become interlocked when laid.

A further object has been to adapt the apparatus especially for the purpose of laying submerged masonry in a river or stream where a swift current prevails, laying stone under such circumstances usually being a hazardous undertaking and extremely difficult where great nicety is necessary in adjusting the blocks into their desired position.

The invention consists in the construction and combination of parts, to be more fully described hereinafter and definitely set forth in the claims.

In the drawings, which fully illustrate my invention, Figure 1 represents in cross-section my apparatus in the act of building a retaining-wall and showing the profile of a portion of the bed of the harbor or river. Fig. 2 is a plan of the apparatus, showing in connection with the same a marine wall which the apparatus is supposed to be building. Fig. 3 is a plan view upon a reduced scale, representing the apparatus in the act of constructing a dam under conditions where a swift current prevails. Fig. 4 represents in section one of the concrete blocks especially adapted to be laid by my apparatus and showing a portion of the hoisting-tackle which I use. Fig. 5 is a similar view to Fig. 4, representing the tackle, however, in a position adapted to release the concrete block.

Throughout the drawings and specification the same numerals of reference indicate like parts.

Referring to the parts of the apparatus more particularly, 6 represents a barge, which comprises a pair of substantially similar hulls 7, preferably constructed of wood. These hulls may carry propelling machinery for the barge or the barge may be moved about from place to place by tugs or winches. These hulls are connected by a superstructure 8 or framework, constituting, as it were, a bridge or beam securely uniting the two hulls. It should appear that this bridge is of great width as compared with the length of the hulls, whereby very great rigidity is given to the connected parts, and the hulls are adapted to withstand the violent strains to which they will be subjected for all intents and purposes as if they constituted a single hull.

Upon the beam or bridge 8, between the two hulls, there are mounted a plurality of sheaves 9. I have shown nine of these sheaves disposed in three rows, as indicated, the middle row 10 being somewhat out of alinement with the two side rows 11. It may be stated at this point that the sheaves carried in the side rows are main sheaves—that is, they are intended to carry tackle which actually does the hoisting—while the sheaves in the central row are intended to carry the auxiliary tackle for controlling the hoisting operation. It should be observed that the corresponding sheaves in the two outside rows are disposed opposite to each other.

One of the hulls is provided with a donkey-engine 35 for hoisting, and on the deck 12 are provided a pair of drums 13 and 14, the former of which is adapted to receive and have wound upon it the ends of six independent cables 15, which pass, respectively, over the sheaves 11, it being understood that the three cables from one row occupy one extremity of this drum, while the three cables from the other row occupy the opposite extremity of the drum. A similar arrangement is adopted with respect to the auxiliary lines 16. These pass, respectively, over the sheaves 10, having their extremities wound upon the drum 14. The cables 15 support suitable lifting or holding

tackle 17, which tackle will be more fully described hereinafter. Before proceeding to a detailed description of this tackle a brief description will be given of the blocks which the tackle is especially adapted to lay, and attention is called especially to Figs. 4 and 5 of the drawings in this connection. In these figures, 18 represents a block supposed to have been formed of concrete or similar material in a suitable mold, provided with a core adapted to form in the body of the block a vertically-disposed opening 19, which opening is enlarged, as indicated at 20, so that an annular shoulder 21 is formed within the body of the block, as shown. The tackle 17, to which reference has been made briefly, consists substantially of a pair of tongs 22, the members of which are pivotally connected together at 23 and comprise substantially vertical arms 24, which are adapted to be inserted in the opening 19 and to extend into the enlarged portion 20. At their extremities these arms 24 are provided with nibs or heads 25, which may engage with the aforesaid shoulder 21, as will be readily understood. The tongs comprise also substantially horizontally-disposed arms 26, to the extremities of which are attached the ends of one of the cables 15, which cables bifurcate at this point, as indicated at 27. The tongs also comprise auxiliary arms 28, to which are attached the bifurcated extremity of one of the lines 16, as will be readily understood. It should appear that the arrangement is such that when the lines 16 are slack the tongs or hooks 22 will dispose themselves substantially into the position in which they are shown in Fig. 4, so that their lower extremities may engage the shoulder 21. When such an engagement has taken place, the block can of course be readily raised and lowered again in any position desired, and when it is necessary to release the tackle this is accomplished simply by hauling in upon the lines 16. It should be understood that each of the concrete blocks is provided with at least four of the openings 19 already described and that these openings are disposed upon the block so that they will lie substantially vertically beneath their corresponding tackles or tongs.

In Fig. 1 I have shown six main hoisting-cables; but in many instances, especially where the blocks to be laid are of small size, only four of the main cables would be employed, dispensing with the necessity for more than four openings through the block. It should be understood that the cables 15 are so disposed upon the drum 13 that they will all maintain their corresponding tongs at substantially the same height, so that when the operation of hoisting or laying stone is in progress the block would be supported in a substantially upright or plumb position. Such a state of affairs is most desirable in laying all kinds of stone, but it is especially nec-

essary where the configuration of the stone is such as to enable adjacent blocks when laid to interlock. Such an interlocking arrangement as I suggest is shown, respectively, in Figs. 2 and 3 in the walls 33 and 34, where it should appear that the adjacent vertical faces 29 of the stones are respectively provided with projections 30 and enlarged recesses 31, which receive the projections, as will be readily understood. The allowance or difference in size between the projections and the recesses is for the purpose of facilitating the laying of the stone, for if an accurate register were attempted laying such stone would become impossible. At the same time a substantially equivalent effect is arrived at eventually by filling the intervening space with cement or finely-broken stones, as indicated.

In Fig. 2, as briefly stated above, the barge is represented as constructing a marine wall. The conditions are supposed to be quite normal, no powerful disturbing currents existing at the point where the work is being conducted. It should be understood that the barge constitutes means for transferring stone from a pier to the point where the work is being conducted, and in laying the first portion of the wall the barge would be warped into position by means of hawsers or winches in a manner well known to persons familiar with this class of work. It should be stated that the blocks are laid by the barge so that the length of the wall progresses in a direction parallel with the fore-and-aft line of the barge, the hulls lying on either side of the building wall, as will be readily understood. It should be stated, further, that in order to facilitate the taking of the stone from the pier or wharf it is desirable to construct, if necessary, a temporary pier projecting into the water from the wharf-line, so that the bridge of the barge can be brought directly over the pier, the hulls then occupying a position on each side of this temporary pier similar to the position which they occupy with relation to the wall, which is represented as building in Fig. 3. After the work has progressed sufficiently, bringing the barge into position for laying succeeding stones may be materially assisted by means of lines or cables 35, carried by capstans or bits 36 and connecting the same with fixtures 37 in the wall.

Where a swift current exists in the river, a plan such as that indicated in Fig. 3 is adopted. In this case the barge is maintained in a position transversely of the direction of the current by means of lines 38, which lead from each extremity of one of the hulls to moorings or buoys 39, located up the stream, the position of which may be changed as the work progresses. The operation of warping the barge into position may be facilitated by an auxiliary line 40, connecting the other hull with the already-constructed wall.

Where the current is extremely swift, it

may be necessary to anchor or guy the wall on the upstream side by means of a plurality of cables, such as that indicated at 41, the extremity of which would be attached to the top 5 of the wall, as will be readily understood.

While I have shown in the accompanying drawings the preferred form of my invention, it will be understood that I do not limit myself to the precise form shown, for many of 10 the details may be changed in form or position without affecting the operativeness or utility of my invention, and I therefore reserve the right to make all such modifications as are included within the scope of the follow- 15 ing claims or of mechanical equivalents to the structures set forth.

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

20 1. In an apparatus of the character described, a plurality of floats, a bridge the extremities of which are connected rigidly to said floats, a plurality of sheaves disposed in opposite rows supported by said bridge, ca- 25 bles passing over said sheaves, and means for lowering said cables at substantially the same speed.

2. In an apparatus of the character described, a plurality of floats, a bridge connecting said floats, a plurality of sheaves supported by said bridge and supported in oppo- 30 site rows, cables passing over said sheaves, and means for lowering and raising said cables at substantially the same speed.

35 3. In an apparatus of the character described, a plurality of floats, a bridge connecting said floats, a plurality of sheaves disposed in opposite rows supported by said bridge said sheaves being arranged in series, 40 hoisting-cables passing over some of said sheaves, releasing-cables passing over other of said sheaves, and winding-drums on and off

of which said cables may be fed at substantially the same speed.

4. In an apparatus of the character de- 45 scribed, a float, a rigid extension supported thereby, a plurality of sheaves disposed in opposite rows supported by said extension, said sheaves being arranged in series, hoist- 50 ing-cables passing over one series and releasing-cables passing over the other series of said sheaves, and hoisting-drums to which said cables extend, said drums being arranged to feed said cables at substantially the same speed. 55

5. In apparatus of the class described, in combination, a pair of oppositely-disposed hulls, a bridge the extremities whereof are rigidly attached to said hulls, said bridge con- 60 stituting a beam, a plurality of sheaves carried upon said beam and disposed in opposite rows, cables passing over said sheaves, lift- ing-hooks carried respectively by said cables, and means for taking up said cables at sub- 65 stantially the same rate.

6. In apparatus of the class described, in combination, a pair of oppositely-disposed hulls, a bridge, the extremities whereof are rigidly attached to said hulls, said bridge con- 70 stituting a beam, a plurality of sheaves carried upon said beam and disposed in opposite rows, a plurality of cables passing over said sheaves, lifting-hooks respectively carried by said cables, a drum upon which said cables wind, whereby said cables may be taken in at 75 substantially the same rate.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK JOSEPH GILMAN.

Witnesses:

GEO. D. ROE,
E. A. BAYNES.