No. 886,594. PATENTED MAY 5, 1908.

C. E. GILLETTE.

HYDRAULIC VALVE.

APPLICATION FILED AUG. 22, 1907.

FIG. 1.

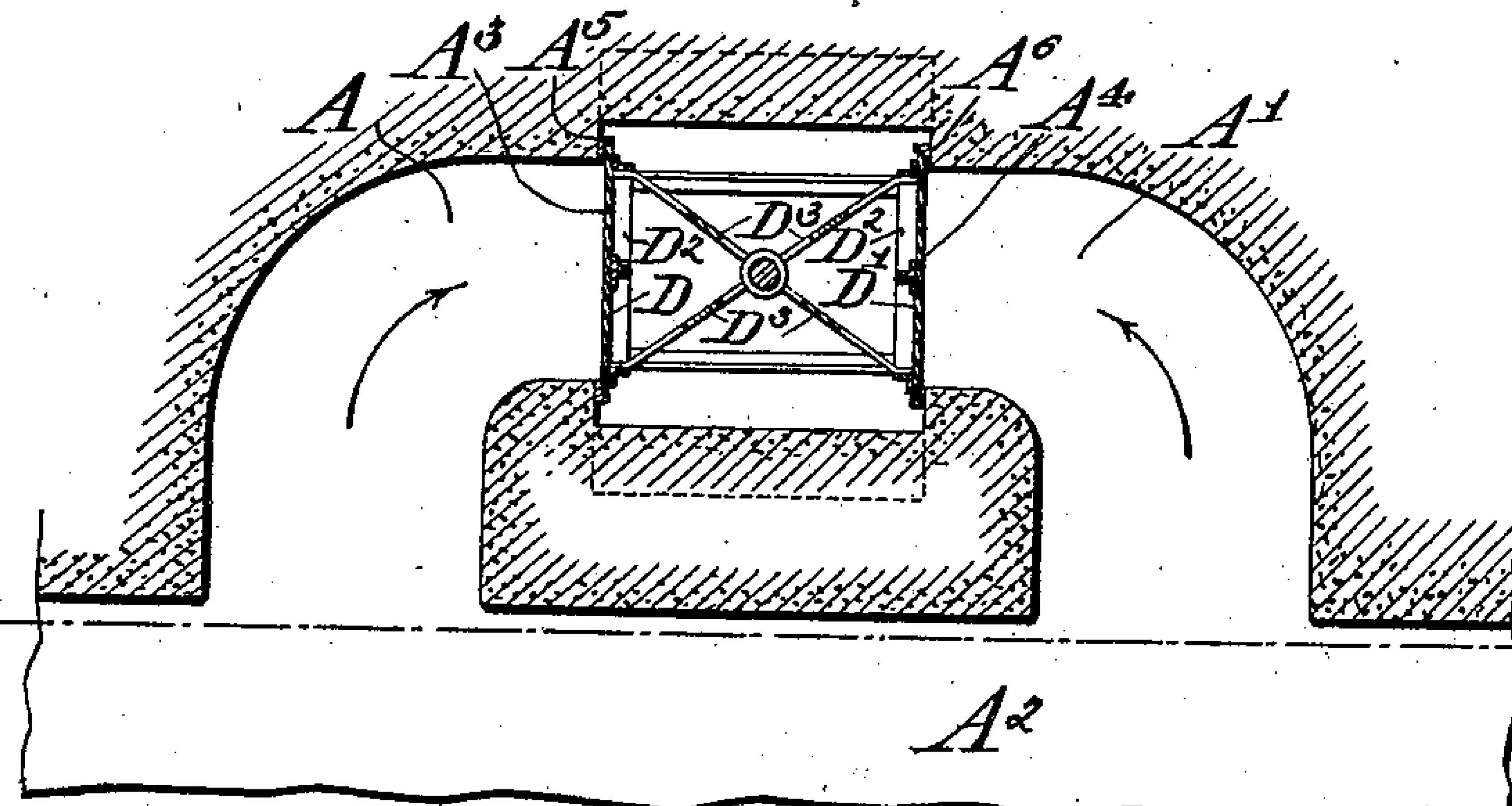


FIG. 6.

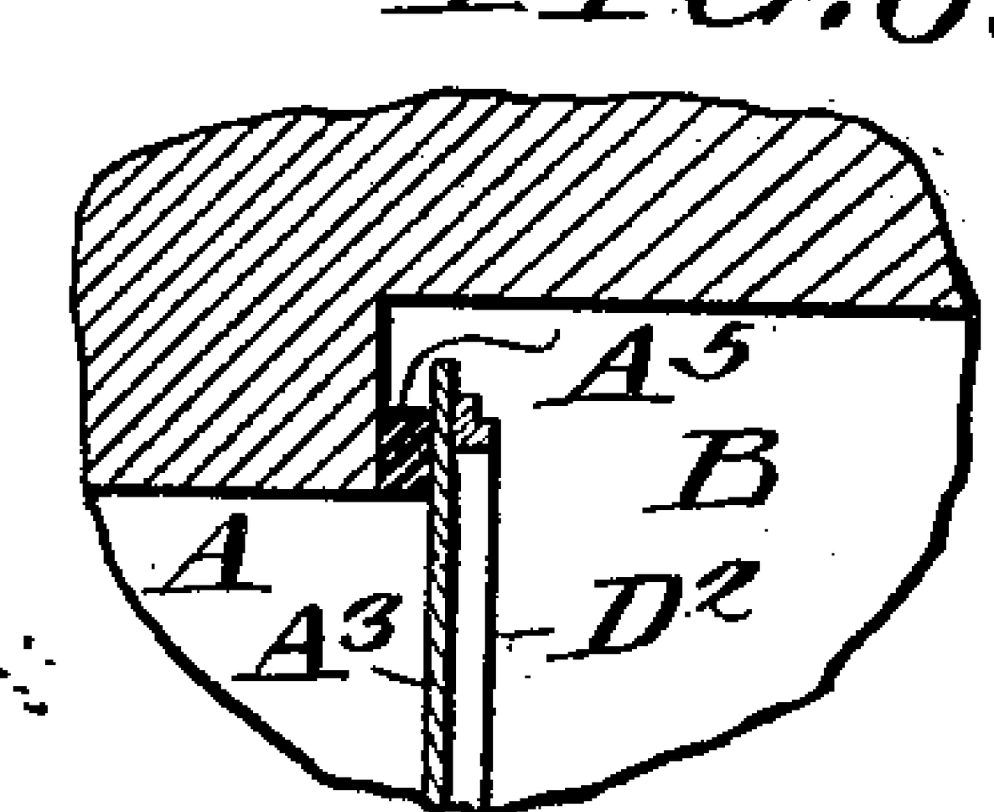


FIG. 2.

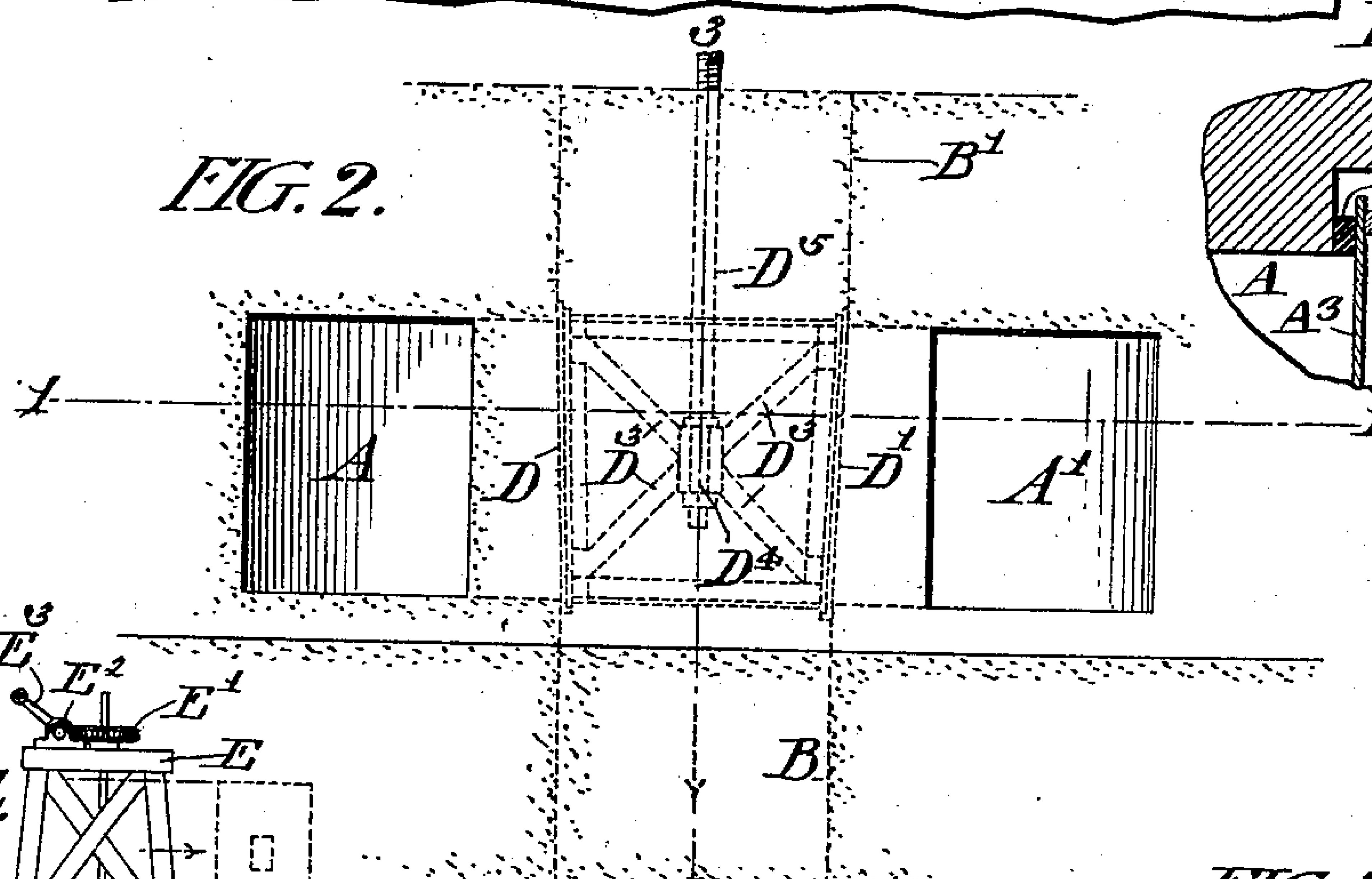


FIG. 4.

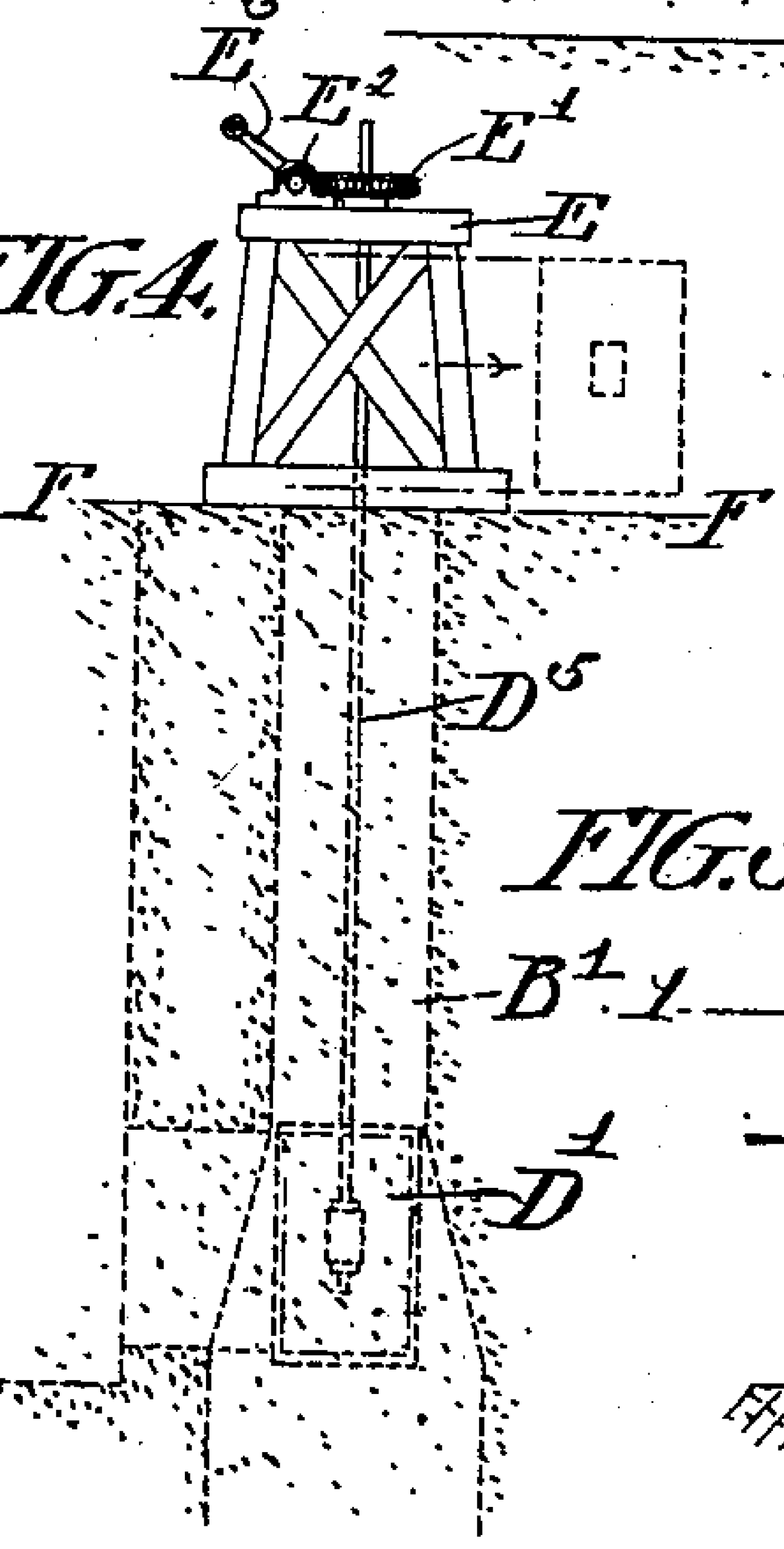


FIG. 3.

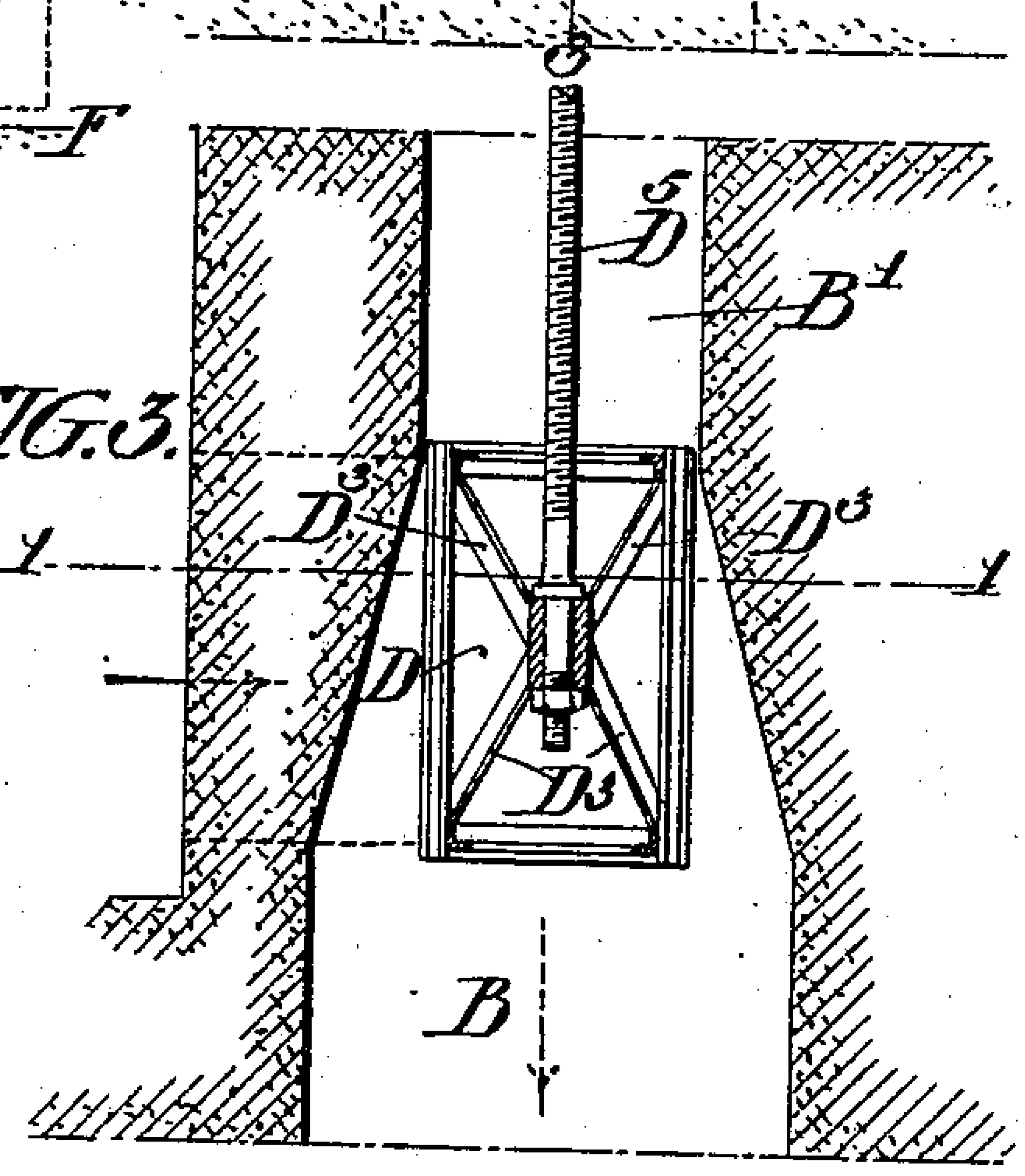
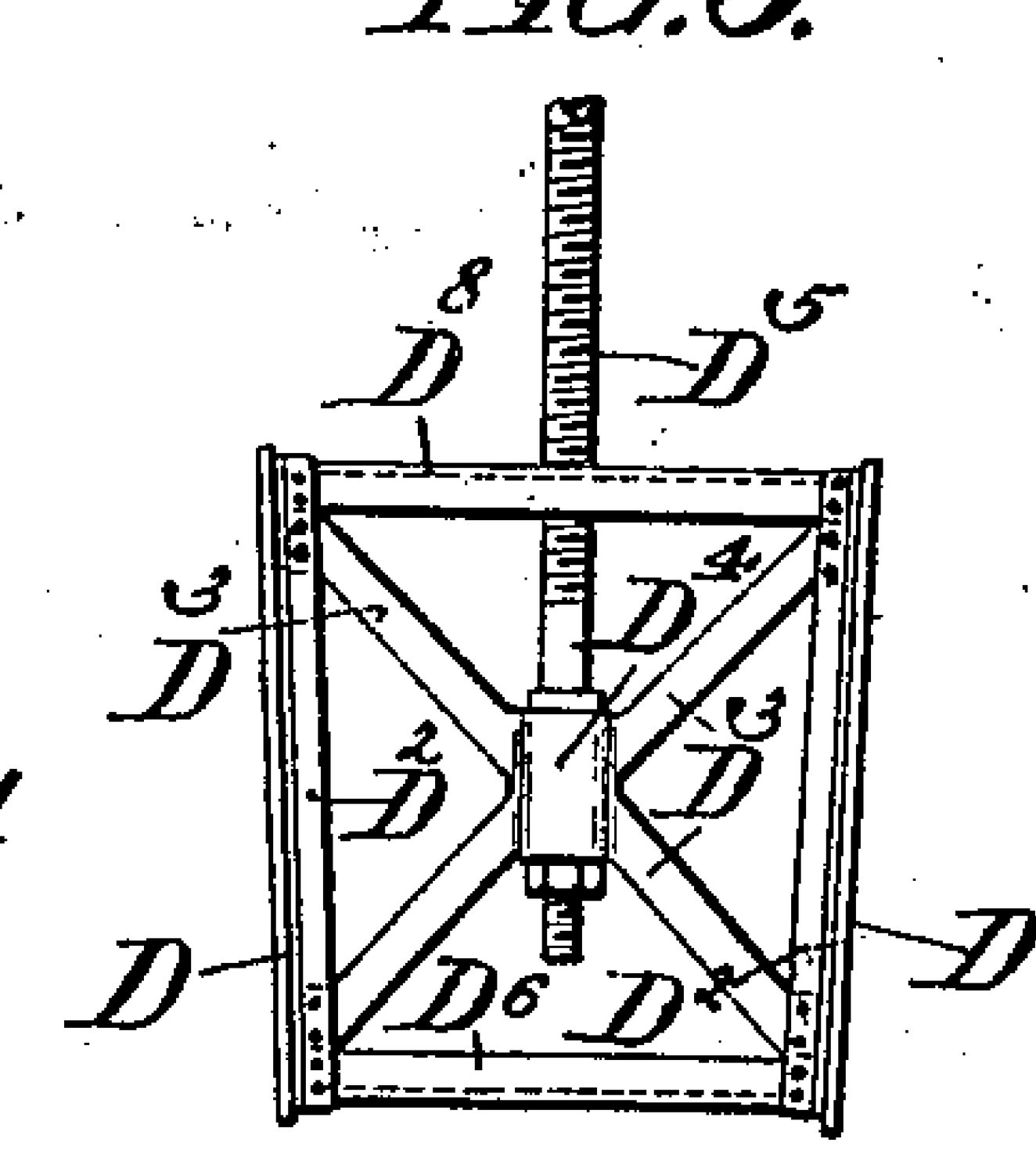


FIG. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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HYDRAULIC VALVE.

No. 886,594. Specification of Letters Patent. Patented May 5, 1908.

Application filed August 22, 1907. Serial No. 389,633.

To all whom it may concern:

Be it known that I, CASSIUS E. GILLETTE, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Hydraulic Valves, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

The present invention relates to hydraulic valves or gates, and particularly to valves or gates employed in controlling the flow of water through the conduits or sluices connected with canal systems for irrigation or navigation, water powers, etc., in which the volume of water controlled is large, and in which also the pressure per unit of area is large.

The object of the present invention is the production of a valve mechanism which is simple and relatively inexpensive in construction, and which is so arranged that it may be easily and effectively operated and is readily removable when necessary for repairs.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, and the advantages possessed by it, reference may be had to the accompanying drawings and descriptive matter in which I have illustrated and described one of the forms in which my invention may be embodied.

Of the drawings, Figure 1 is a sectional plan taken on the line 1—1 of Figs. 2 and 3. Fig. 2 is a sectional elevation taken on the line 2—2 of Fig. 1. Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 2. Fig. 4 is an elevation of the complete apparatus with the under surface portion shown in dotted lines. Fig. 5 is an elevation of the valve gate proper, and, Fig. 6 is a partial sectional plan taken similarly to Fig. 1 but showing a slightly modified construction.

In the drawings, A and A′ represent two horizontal inlet passages leading from a reservoir or conduit or channel A^2 through ports A^3 and A^4 respectively into the common discharge passage B, which is shown as leading downward but may lead laterally or upward. The walls of the passages A, A′, and B may be formed of any suitable material, such as metal, brickwork, concrete or the like. The walls surrounding the inner ends of the ports A^3 and A^4 form valve seats, which may be faced with metal strips as indicated at A^5 and A^6. The valve or gate proper comprises valve faces D and D′, preferably formed of metal plates stiffened with metal bars D^2, and connected together by metal bars D^6 and by arms D^3 extending from a collar D^4 surrounding the operating stem D^5. In the form shown, each valve face is in the form of a rectangular parallelogram, and is inclined from top to bottom toward the vertical plane between it and the other valve faces. The valve seats A^5 and A^6 are of course similarly inclined.

The valve stem D^5 extends upward through an extension B′ of the discharge passage B, which forms a well running to the surface or platform level F, F. On the surface or platform is located a stand E carrying suitable operating connections for the valve stem D^5, which in the form shown consist of a nut E′. The nut is provided with external gear teeth which are rotated by a worm gear E^2 mounted on the stand and operated in a suitable manner as by the crank arm E^3.

In the construction described, the valve faces seat against the valve seats with a wedging action when the valve is moved downward. The water pressure then acting on the valve faces tends to raise the valve, thus assisting in the following opening movement. It should be observed that the inclination of the valve faces to the vertical should be great enough on the one hand so that the wedging action in seating will not result in locking the valve in the closed position, and, on the other hand, should not be so great that the upward pressure of the water on the valve when closed overbalances the weight or rigidity of the valve and connections. As soon as the initial opening movement of the valve permits the pressure on the two sides of the valve faces to be largely released, the upward lift due to the inclination of the valve faces is of course done away with, but this upward pressure has by that time accomplished its purpose, viz: to assist in overcoming the friction between the valve faces and their seats.

In consequence of the arrangement described, the valve may be easily moved toward and away from its seats, and comparatively tight joints are readily obtained between the valve faces and seats. The wear

between the faces and seats, due to the repeated opening and closing of the valves, assists of course in obtaining tight closures and preventing leakage. By arranging the well as shown, the valve may be easily moved above the surface when necessary, as for inspection and repairs. After the valve is raised above the surface the stand may be moved laterally away from the mouth of the extension B′ if desired to enable the latter to be got at.

Instead of the rigid valve seats proper formed by the metal bars A^5 and A^6, yielding valve seats may be provided if desired to insure tight joints between the valves and their seats. This may be accomplished by making the strips A^5 and A^6 of rubber, as indicated in Fig. 6 or other elastic or compressible material.

While I have described the valve faces as in the form of similar rectangular parallelograms, it will be understood that the form of the valve faces is immaterial, except that the effective areas of the two valve faces and of the two ports should be approximately equal so that lateral pressure on the valve as a whole is avoided, and also the valve faces should be symmetrically disposed with respect to the line of movement of the operating stem.

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

1. A water flow controlling structure, having a discharge passage, and having two oppositely disposed ports of substantially equal area opening into said discharge passage, each port being surrounded at its discharge passage end by a valve seat, in combination with a valve movable transversely of and controlling said ports, said valve comprising a pair of valve faces, one for each port, each valve face being rigidly connected to the other and being slightly inclined from top to bottom toward a vertical plane between the two faces, and the valve seats being similarly inclined, whereby the valve is seated with a wedging action, and when seated the pressure on the inlet sides of the valve faces assists in opening the valve.

2. A water flow controlling structure, having a discharge passage, and having two oppositely disposed ports of substantially equal area opening into said discharge passage, each port being surrounded at its discharge passage end by a yielding valve seat, in combination with a valve movable transversely of and controlling said ports, said valve comprising a pair of valve faces, one for each port, each valve face being rigidly connected to the other and being slightly inclined from top to bottom toward a vertical plane between the two faces, and the valve seats being similarly inclined, whereby the valve is seated with a wedging action, and when seated the pressure on the inlet sides of the valve faces assists in opening the valve.

3. An underground water flow controlling structure, having a discharge passage, and having two oppositely disposed ports of substantially equal area opening into said discharge passage, each port being surrounded at its discharge passage end by a valve seat, in combination with a vertically movable valve controlling said ports, said valve comprising a pair of valve faces, one for each port, each valve face being rigidly connected to the other and being slightly inclined from top to bottom toward a vertical plane between the two faces, and the valve seats being similarly inclined, whereby the valve seats with a wedging action, and when seated the pressure on the inlet sides of the valve faces assists in opening the valve, said discharge passage being an extension leading to the surface through which the valve may be removed.

4. An underground water flow controlling structure, having a discharge passage, and having two oppositely disposed ports of substantially equal area opening into said discharge passage, each port being surrounded at its discharge passage end by a valve seat, in combination with a vertically movable valve controlling said ports, said valve comprising a pair of valve faces, one for each port, each valve face being rigidly connected to the other and being slightly inclined from top to bottom toward a vertical plane between the two faces, and the valve seats being similarly inclined, whereby the valve seats with a wedging action, and when seated the pressure on the inlet sides of the valve faces assists in opening the valve, said discharge passage having an extension well leading to the surface through which the valve may be removed, a stand located above the surface and laterally movable toward and away from said passage extension, and operating connections between said stand and valve for opening and closing the latter and for moving the valve above the surface when desirable.

CASSIUS E. GILLETTE.

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