No. 671,064. Patented Apr. 2, 1901.

C. A. CARDOT.

LOCK.

(Application filed Jan. 15, 1901.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

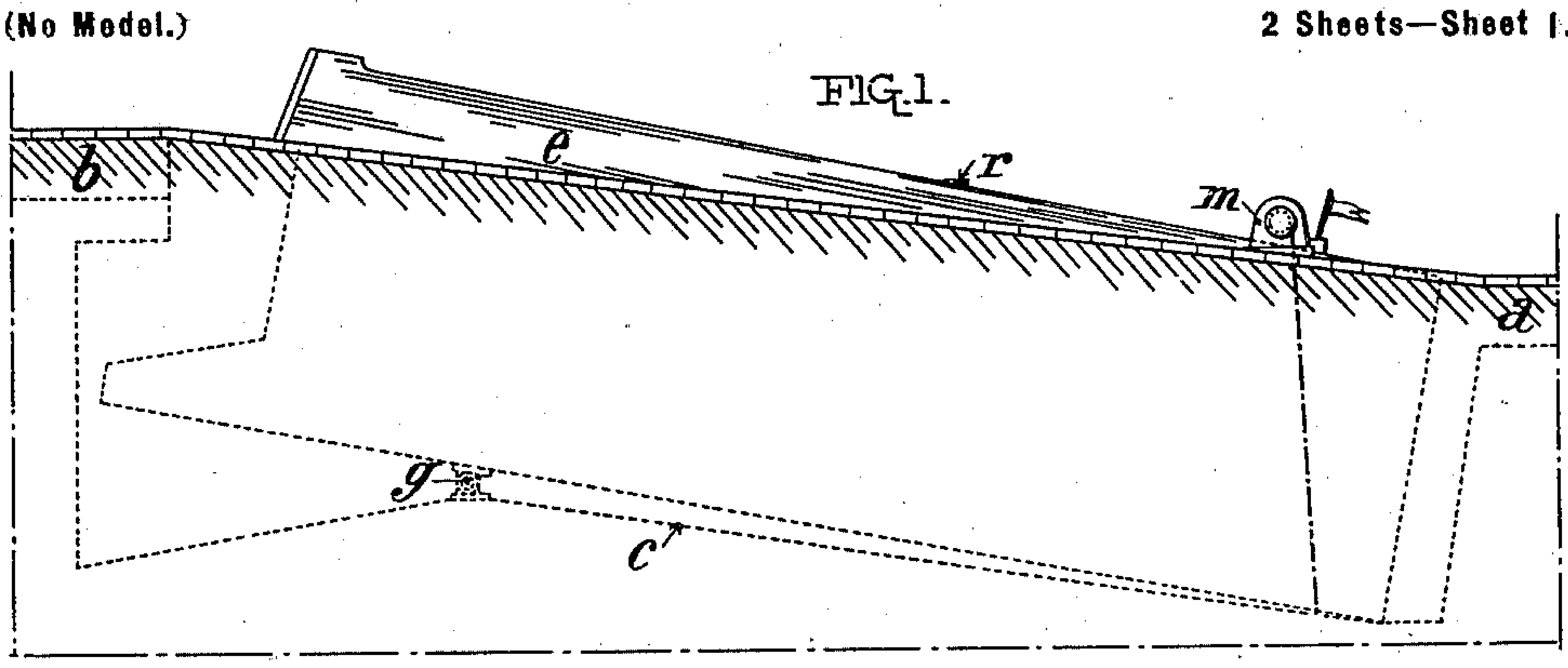


FIG. 2.

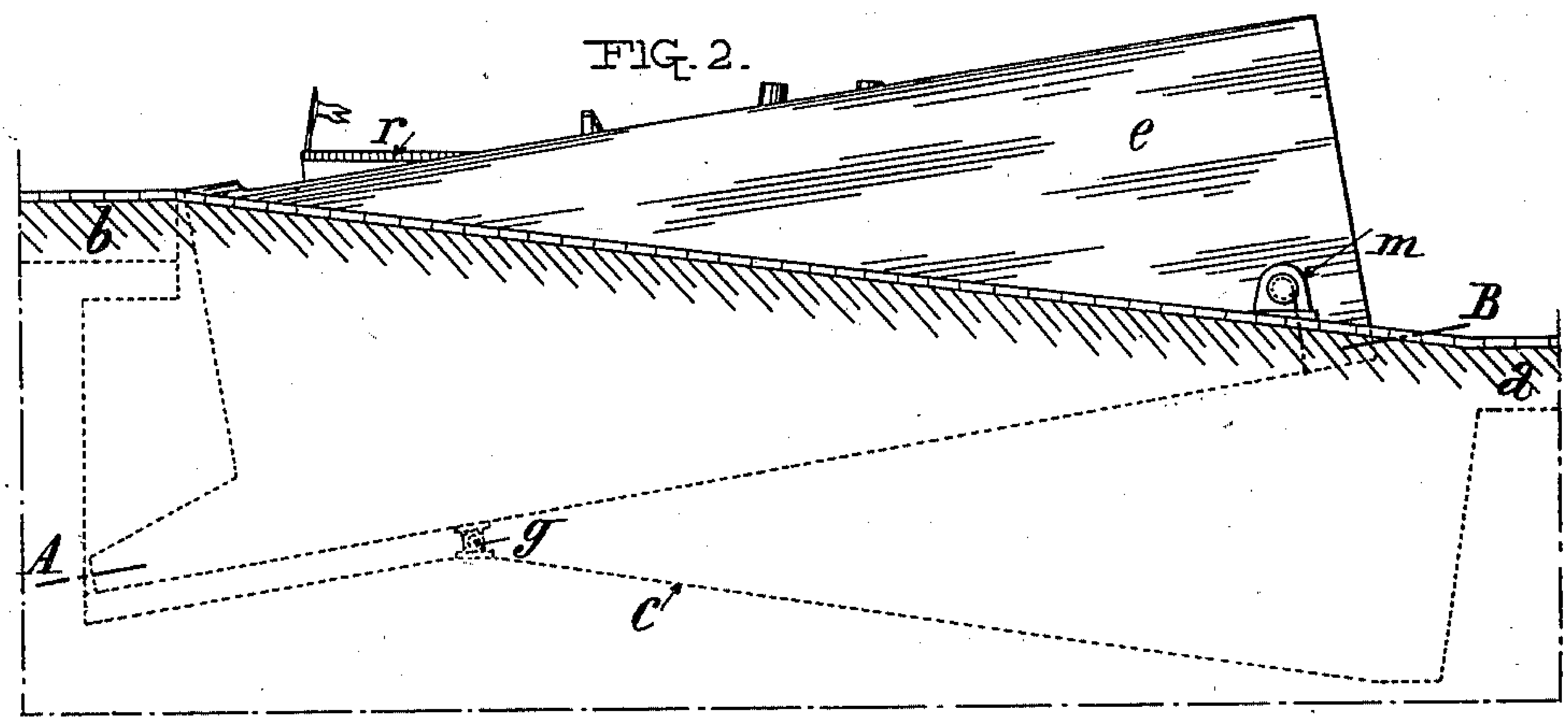


FIG. 5.

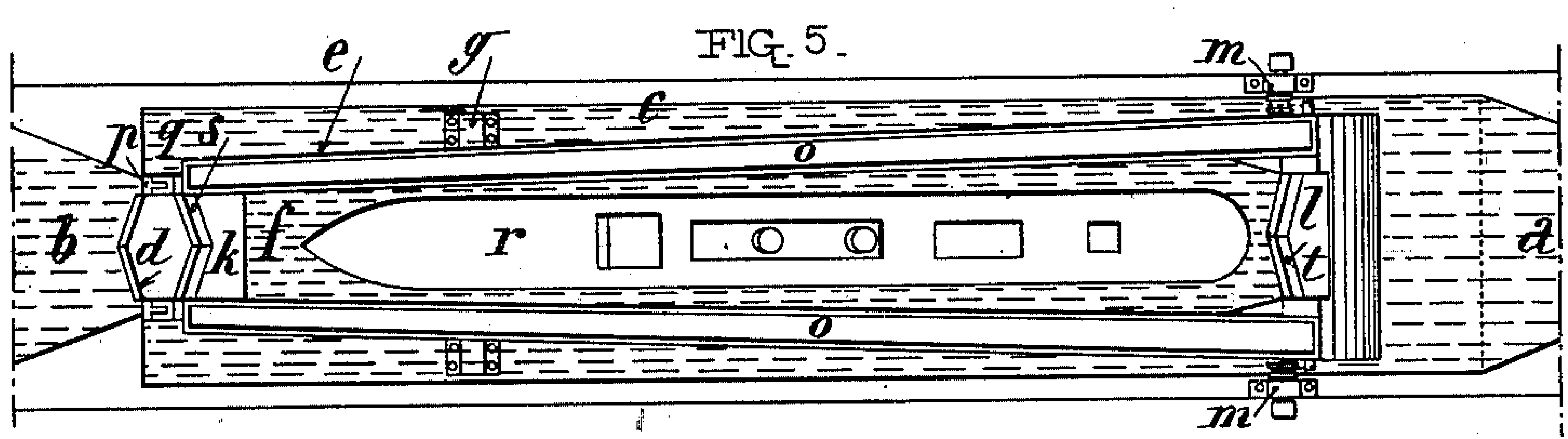
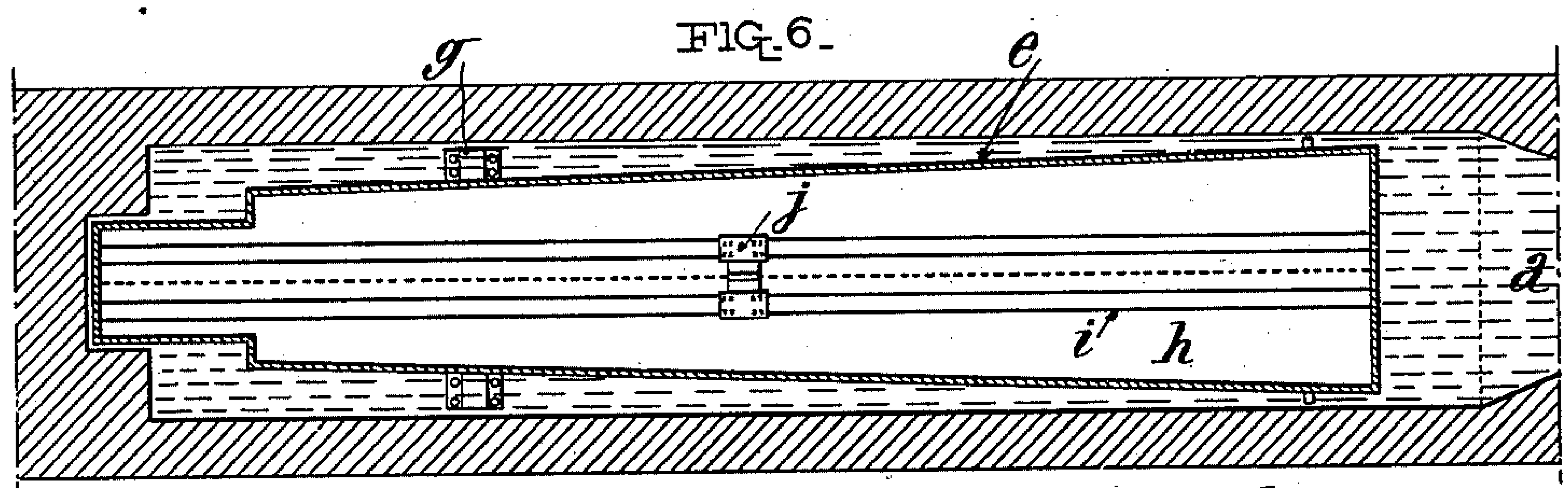


FIG. 6.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 2 Sheets—Sheet 2.

FIG. 3.

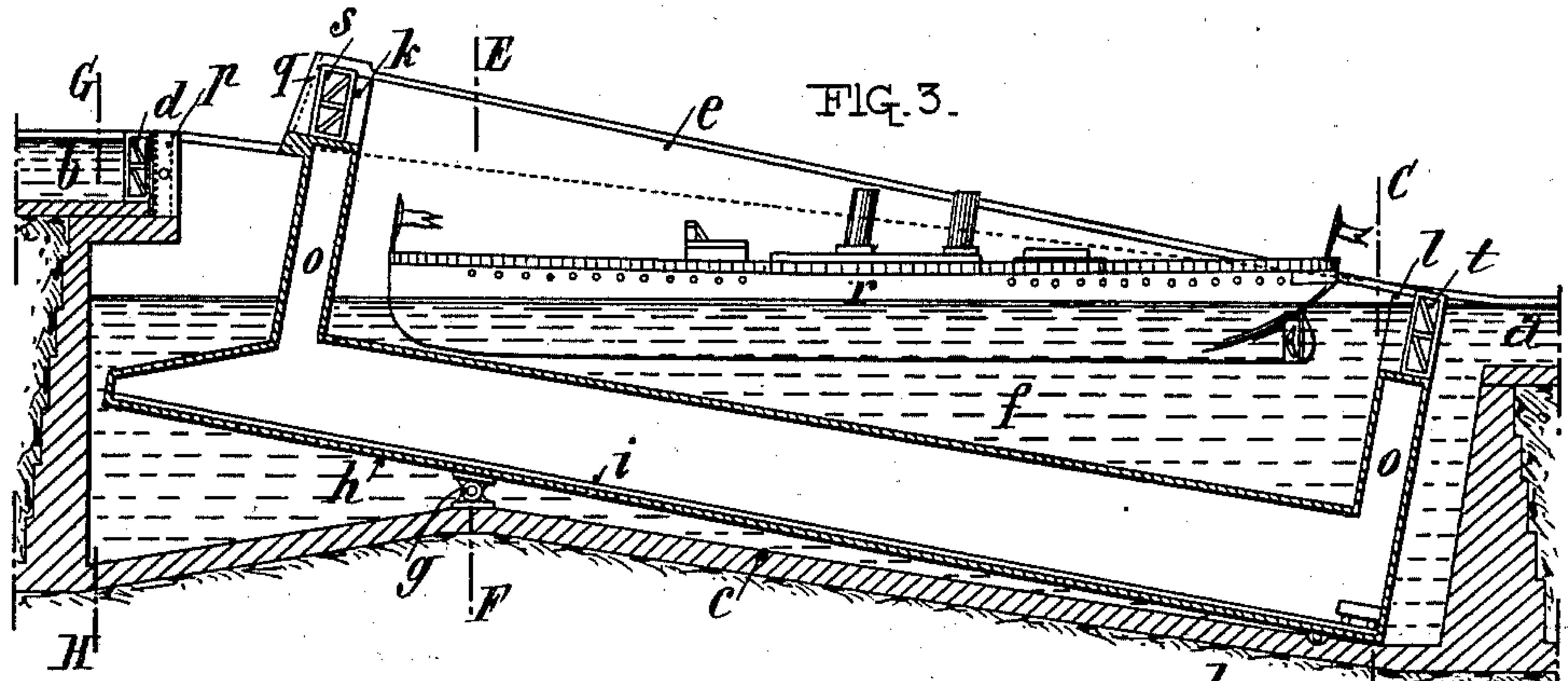


FIG. 4.

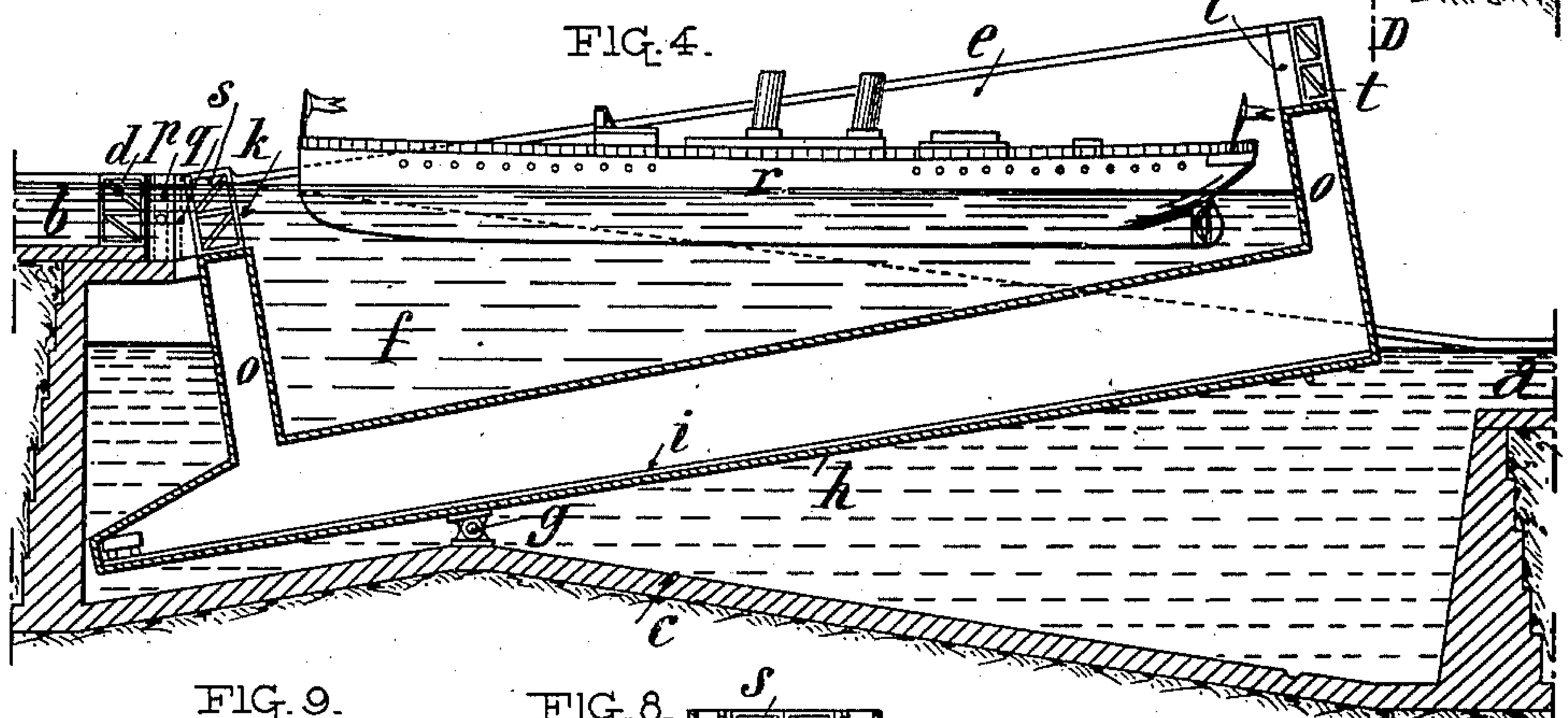


FIG. 9.

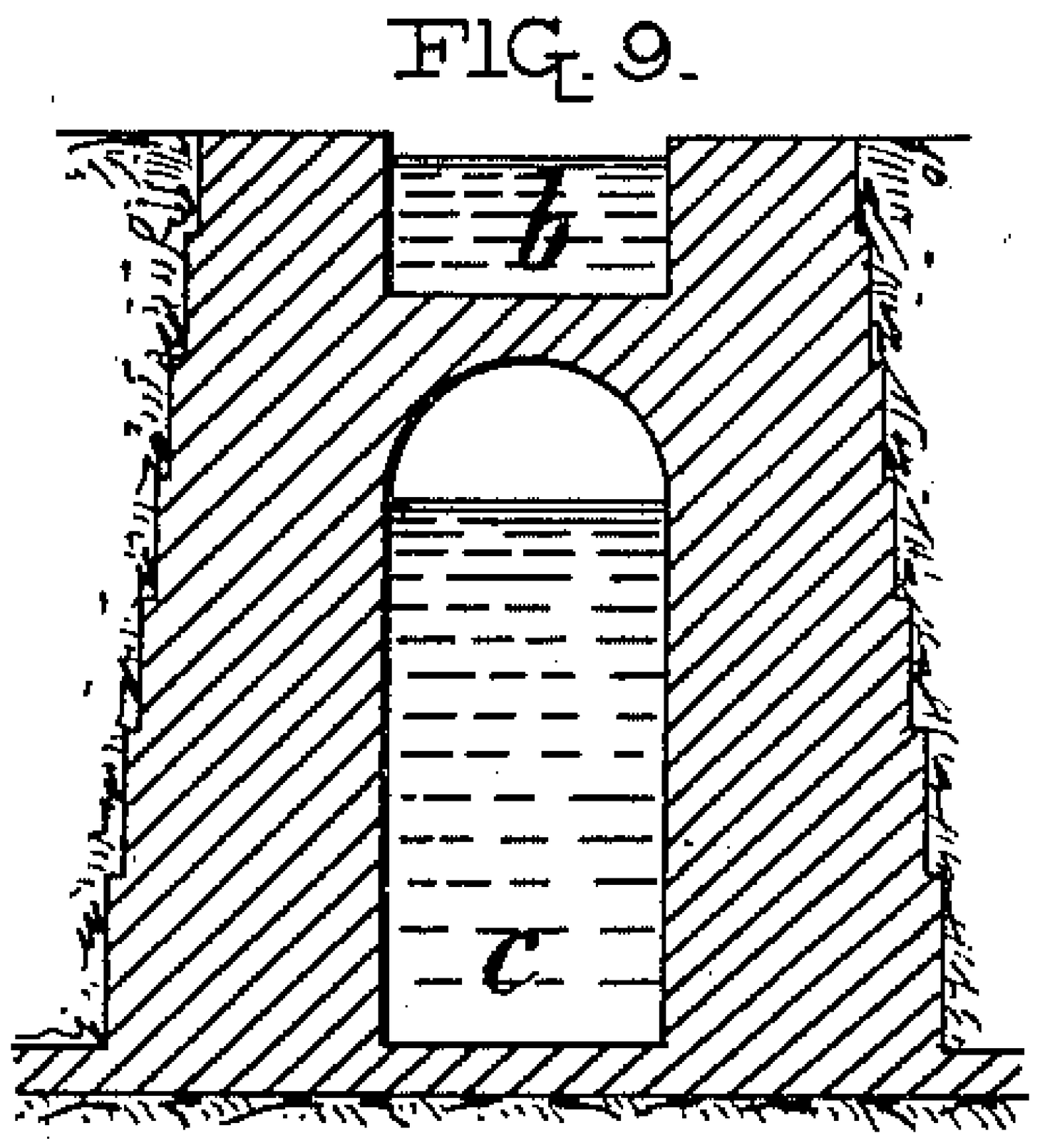


FIG. 8.

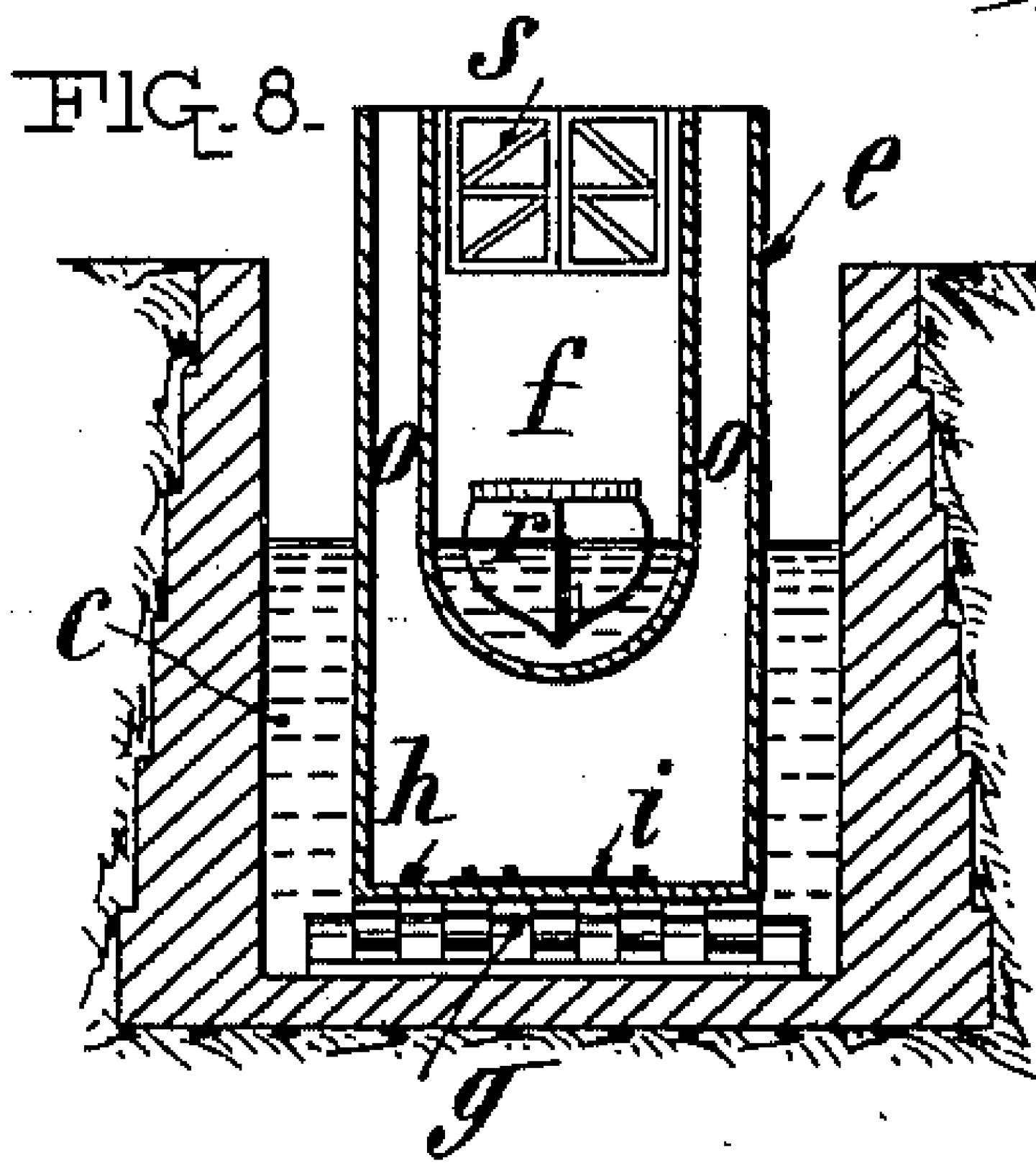


FIG. 7.

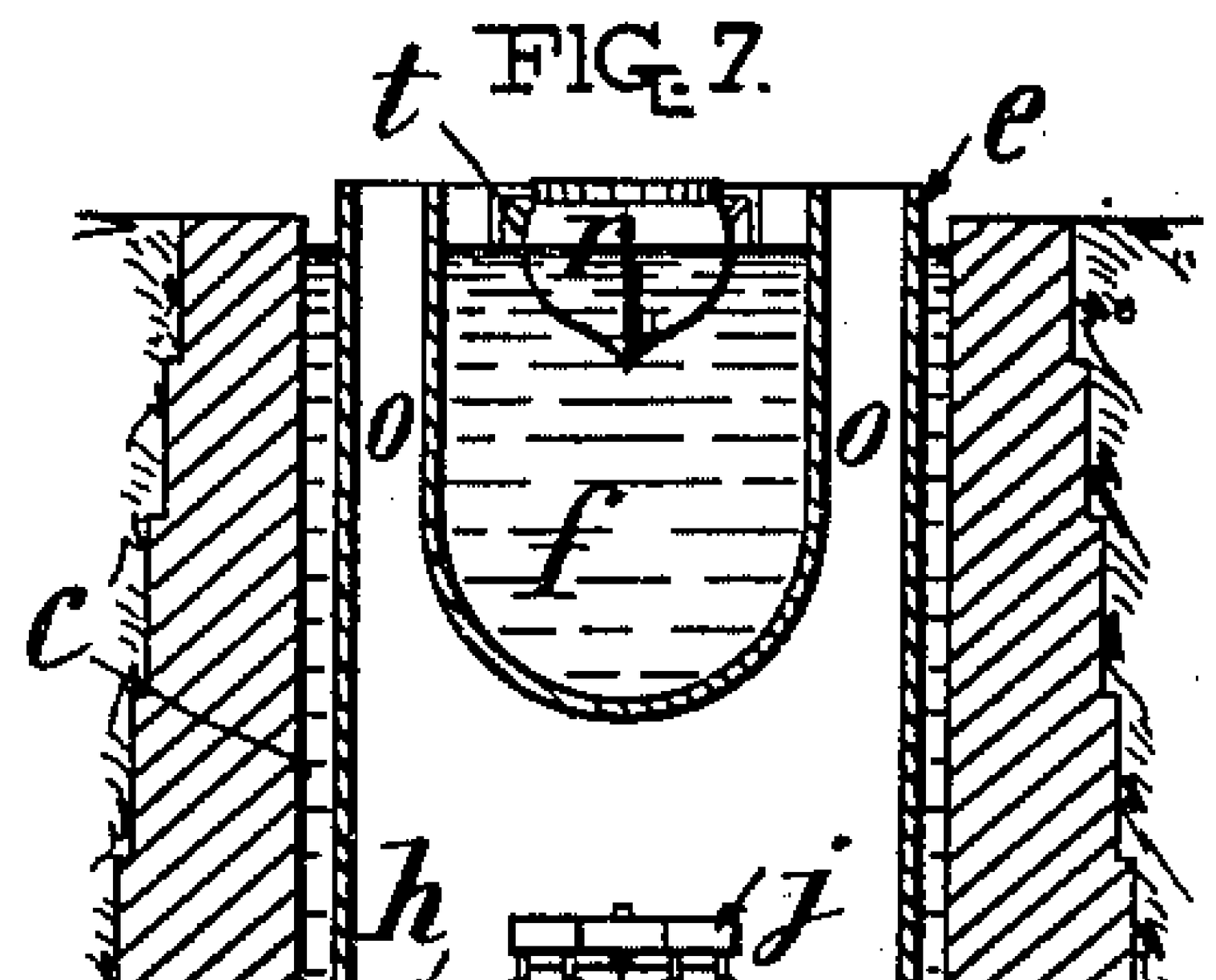


FIG. 10.

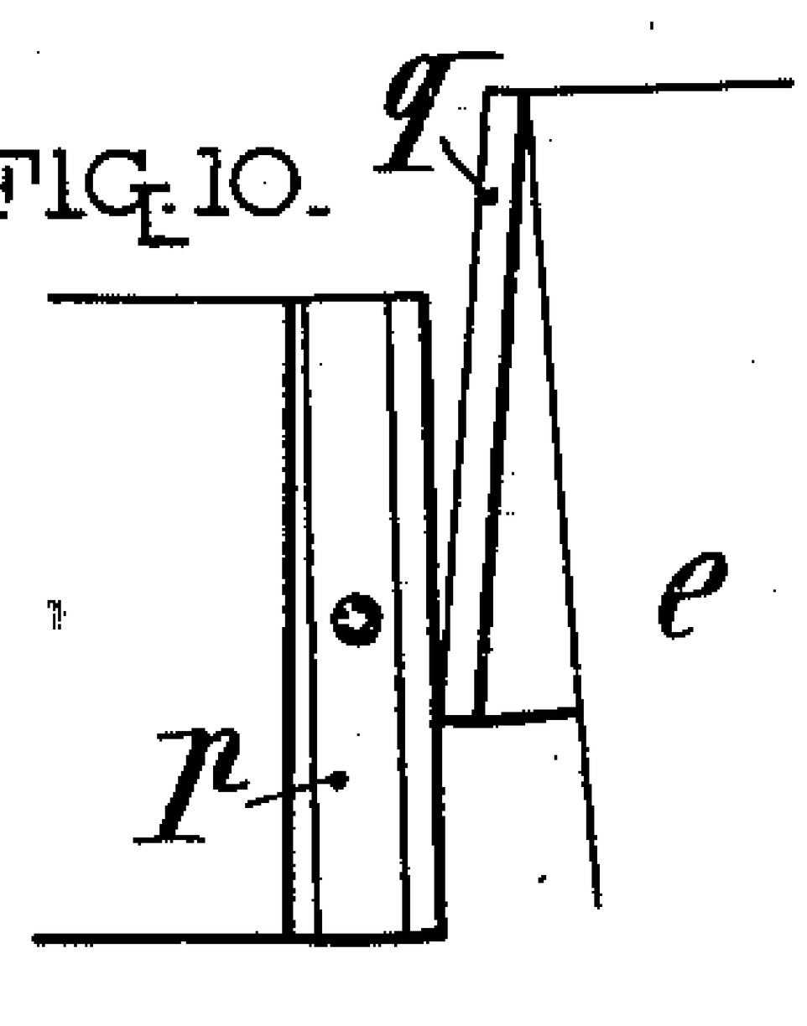
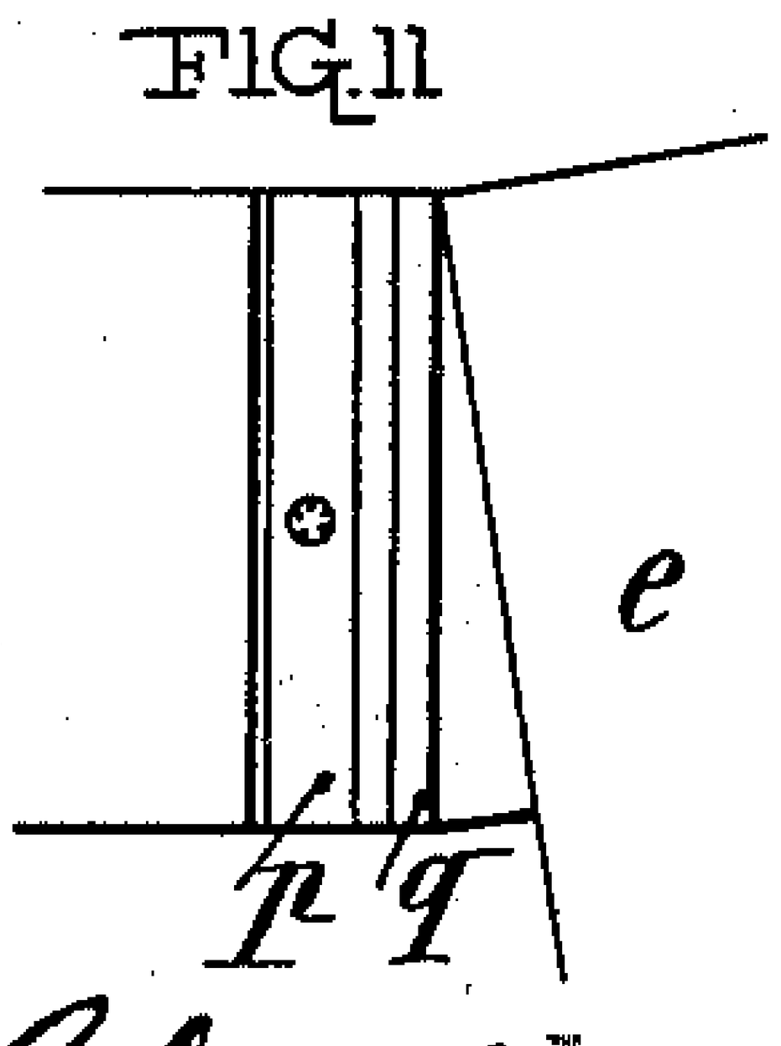


FIG. 11



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES ANTOINE CARDOT, OF PARIS, FRANCE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 671,064, dated April 2, 1901.

Application filed January 15, 1901. Serial No. 43,387. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ANTOINE CARDOT, a citizen of the Republic of France, residing at Paris, France, have invented certain new and useful Improvements in or Relating to Locks or the Like, (for which application for Letters Patent has been made in Great Britain under No. 23,604, dated December 24, 1900, and in France, No. 301,672, dated June 27, 1900,) of which the following is a specification.

The present invention relates to improvements in locks whereby in a few moments a vessel of any tonnage may be raised to a height of more than thirty yards without loss of water by a simple oscillating or tilting movement of the lock-chamber in which the vessel floats, the pivot being arranged at a point near one end of the chamber, so that the whole forms a lever device with unequal arms.

In order to render the nature of the invention clearer, it will be described with reference to the accompanying schematic drawings, in which—

Figure 1 shows a view of the whole of the lock-chamber when in communication with the low level. Fig. 2 is a similar view when in communication with the high level. Fig. 3 is a longitudinal section of the whole lock device, the lock-chamber containing a vessel and being in communication with the low level. Fig. 4 is a similar view with the lock-chamber in communication with the high level of water. Fig. 5 is a plan view of the lock device. Fig. 6 is a horizontal section on the line A B of Fig. 2, the lock-chamber being supposed to be in its horizontal position. Fig. 7 is a section on the line C D of Fig. 3. Fig. 8 is a section on the line E F of Fig. 3. Fig. 9 is a section on the line G H of Fig. 3. Fig. 10 is a detail of the parts for forming a water-tight connection between the lock-chamber and the high level. This figure shows the lock-chamber at the moment of contact with the high level. Fig. 11 is a similar view of the parts when the lock-chamber and upper level are in complete contact.

Between the low level *a* and the high level *b* is a cutting or bed *c*, which is always in communication with the low level *a*. The level of the water in this bed is always the same as that of the low-level water. The communication between the high level *b* and the bed *c* can always be closed by a lock gate or gates *d*. In this bed *c* is arranged a movable lock-chamber *e*, consisting of a hollow double-walled structure of suitable metal, which is conveniently mounted and fitted, there being sufficient empty air-space between its walls to enable it to float when its inner reservoir or lock is charged with water.

The lock-chamber *e* is pivoted to the bottom of the bed on a transverse hinge device *g* in a line which divides the lock-chamber into two parts of unequal length, the shorter side being at the high-level end.

The bottom of the lock-chamber *e* is flat and is provided with longitudinal rails *i*, on which a carriage *j*, loaded with heavy weights, can be moved. This carriage *j* can be moved in one or the other direction along the bottom of the lock-chamber *e* by some suitable mechanical device.

Passages *k* and *l* are formed at the ends of the lock-chamber and provided with gates to retain the water in the lock-chamber during its oscillatory movements. These passages *k l* are so arranged as to communicate with the high or low level passages.

Winch devices or the like are mounted at the side banks of the cutting or bed and serve, by means of chains or cables fixed to the bottom of the lock-chamber *e*, to secure and hold fast the latter when it is in communication with the high level.

The reservoir or water-compartment *f* is narrower at the front end than at the back in order to increase the height of the water contained in it when it is turned into the high-level position. The connection between the lock-chamber *e* and the high level *b* is effected in a water-tight manner by means of movable frames *p*, hinged at their centers on the walls of the high level and at the sides of the gate.

The lock-chamber itself is provided with fixed frames *q*, adapted to come in contact with the movable frames *p*.

On account of the movability of the frames *p* they can place themselves parallel to the ends of the frames *q*, and thereby form a water-tight joint with them.

It will now be readily understood that the

lock-chamber *e* is simply a large floating reservoir of such dimensions as to enable it to receive vessels of large tonnage, the whole being so arranged as to oscillate on a fixed line. This movement is also facilitated by the arrangement of hollow air-chambers *o*, formed around the reservoir *f*, the dimensions of which are so calculated as to insure to the lock-chamber *e* a certain ascensional force or buoyancy sufficiently to make it float horizontal and to raise the level of the water which it contains above that of the water upon which it floats if it were not held down by the hinge device to the bed *c*. As this articulation is situated outside the center of gravity of the lock-chamber, the latter under the action of its ascensional force tends to take up an inclined position by raising its end which is farthest away from its point of oscillation—*i. e.*, to come into the position shown in Figs. 2 and 4.

As has been already stated, the reservoir *f* is of less width or sectional area at the high-level end, which condition contributes to cause a proportionately higher level of water at the high-level end when the lock-chamber is in communication with the latter. The lock-chamber would stop in this position if the weighted carriage did not counteract its ascensional force. The carriage, which may be a motor, by traveling toward the low-level end of the lock device will by its weight depress or keep down the latter in an inclined position opposite to that which it would otherwise occupy owing to its normal ascensional force, and consequently will keep the water in the reservoir *f* at the height of the water in the bed *c* at low level. The lock-chamber *e* having come into this position—*i. e.*, the position shown in Figs. 1 and 3—the gates *t* of the reservoir can be opened and a vessel can then enter the lock-chamber *e*, and the door *t* is then closed. If now the carriage *j* is moved toward the point of oscillation of the level chamber, the excess of weight of the carriage which previously held down the end of the lock-chamber becomes gradually less, in consequence of which the end of the lock-chamber will gradually rise into the horizontal position. As soon as the carriage passes beyond the center of gravity, which tends to keep the chamber in its horizontal position, the latter gradually assumes an opposite inclination, and thereby displaces its water contents toward the high-level end. As soon as the center of the volume of the water in movement in the reservoir *f* passes the center of gravity of the lock-chamber the weight of the volume of water is gradually added to that of the carriage *j* and causes the lock-chamber to be further inclined. During this movement the main part of the water in the reservoir passes into the narrow portion, thereby enabling it to raise the level, and consequently the vessel, to the high-water level *b*. When the lock-chamber arrives at the high-level position, it is secured by the winch devices *m*, the gates *s* and *d* are opened, and the vessel can pass to the high level.

In order to bring the vessel from the high level *b* to the low level *a*, the operations described are carried out in the reverse order.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A lock device or the like comprising a double-walled lock-chamber forming a central water-reservoir surrounded by an air-reservoir said chamber being transversely pivoted to its bed at a point beyond the center and nearer the high-level end of the bed whereby the low-level end of the chamber normally tends to occupy a raised position, and means for depressing said ends substantially as described.

2. A lock device or the like comprising a double-walled chamber consisting of a water-reservoir and a surrounding air-chamber the said chamber being transversely pivoted to the bed at a point toward its high-level end, movable gates at the front and rear of the water-reservoir and a frame adapted to form a water-tight joint with a movable frame arranged on the side of the high level cutting a traveling weight device on the bottom of the pivoted chamber and means for securing the chamber in position when in communication with the high level substantially as described.

3. A lock device or the like comprising a double-walled chamber consisting of a water-reservoir *f* an air-chamber *c* a pivot *g* gates *k l* and a traveling weight device such as *j* substantially as described.

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

CHARLES ANTOINE CARDOT.

Witnesses:
LOUIS FULLIGER,
EDWARD P. MACLEAN.