(No Model.)

H. HARDING.

Canal and River Lock.

No. 241,651. **Patented May 17, 1881.**

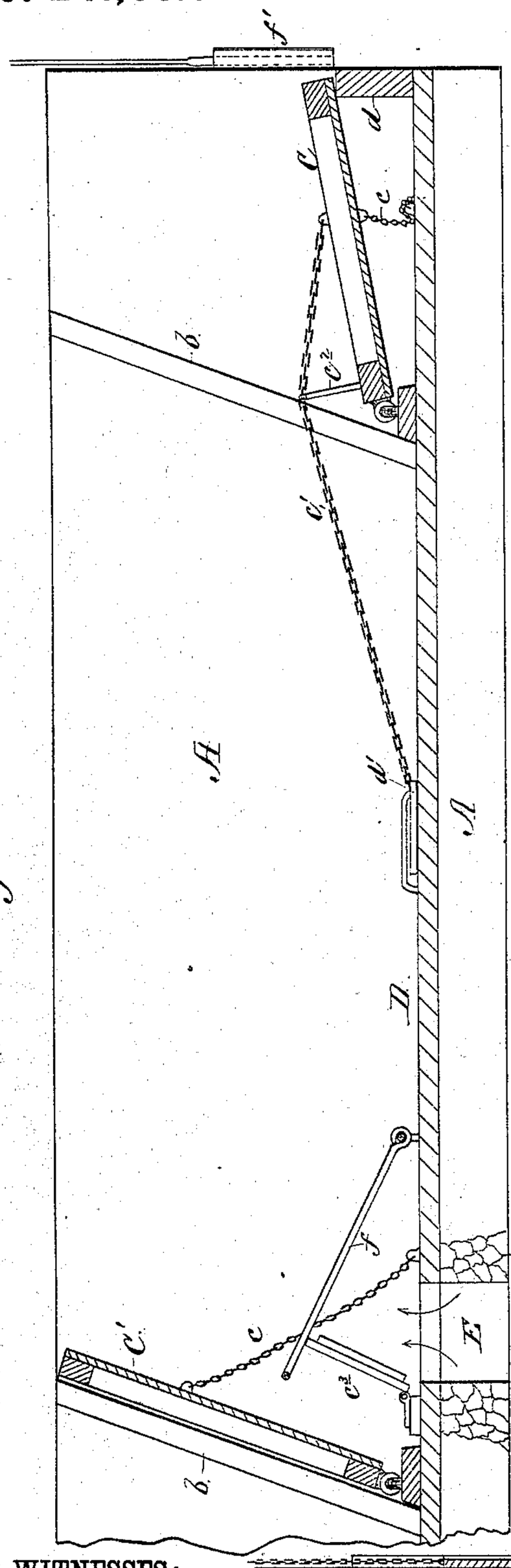

Fig. 1.

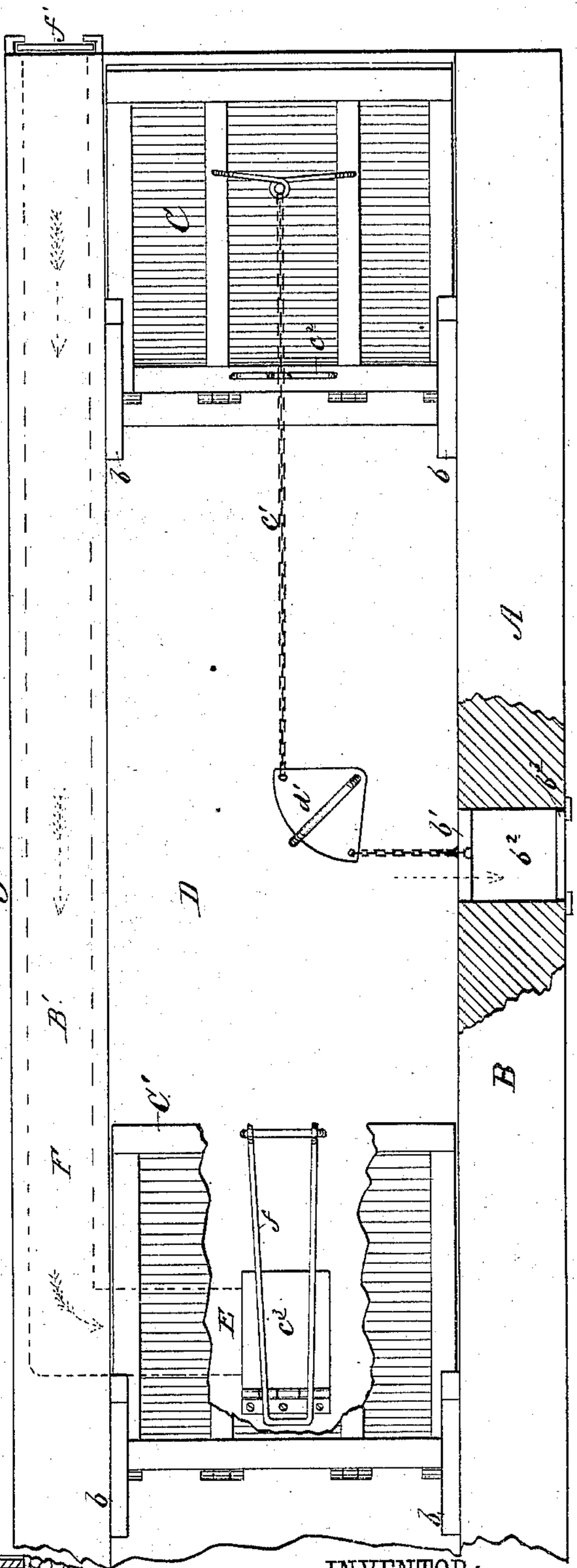

Fig. 2.

Fig. 3.

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HORACE HARDING, OF TUSCALOOSA, ALABAMA.

CANAL AND RIVER LOCK.

SPECIFICATION forming part of Letters Patent No. 241,651, dated May 17, 1881.

Application filed March 1, 1881. (No model.)

To all whom it may concern:

Be it known that I, HORACE HARDING, a citizen of the United States, residing at Tuscaloosa, in the county of Tuscaloosa and State of Alabama, have invented a new and useful Improvement in Canal and River Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is to provide an automatic lock that shall be adapted for use not only upon canals, but also upon rivers, where wide gates are required for passing tows, rafts, and large vessels, and where, in case of submergence from freshets, it is desirable that there shall be no levers or other lock fixtures exposed above the walls to damage from drift or floating ice.

In the accompanying drawings, Figure 1 represents a sectional view taken on a line passing through the two gates; Fig. 2, a plan view, showing one of the gates and one of the walls broken away in part; and Fig. 3 is a vertical section of part of one of the walls, taken through the outlet-valve.

The gates heretofore used in locks of great width have been heavy and costly, since the pressure upon them increased directly as the width, while their strength decreased in its inverse ratio. Moreover, they transmitted the whole pressure to the lock-walls, which had to be greatly strengthened to receive it. My invention would require the gate-timbers for a lock one hundred feet in width to be no stronger than those for one ten feet wide, nor would the lock-walls need to be stronger in the one case than in the other.

A represents a lock having gates C C′, which are hinged to the floor of chamber D, and supported at the ends by the forwardly-inclined ledges *b* in the walls B B′. Intermediate supports at suitable intervals are supplied by chains *c*, secured to floor of chamber D. The upper or forward gate, C, is placed far enough within the chamber to allow its forward edge, when down, to reach and rest upon the support *d*, which ordinarily would be the bottom of the canal or river above the lock. As stated, the ledges *b* incline forward, and, together with the chains above mentioned, support the gate in a slanting position when the latter is lifted by the pressure of the water, the object being to allow the gate (weighted just sufficiently for that purpose) to fall by force of gravity when not supported by the water, which would be when it had attained the same level on each side.

It is evident that gates hinged and supported as described would nowhere have increased pressure to sustain in consequence of increased width of lock, by reason of the properly-distributed intermediate support afforded by the chains, nor would any thrust be transmitted by them against the walls. Hence lighter framing or less masonry could be used than has heretofore been necessary, with a material saving in the cost of construction.

To the rear side of gate C a chain, c', is attached for lifting the gate, said chain being supported upon guide c^2 and secured to one arm of lever d', pivoted in any suitable manner to the floor of chamber and connected to swinging valve b' in the side of wall B by a chain. From said valve b' a culvert, b^2, extends transversely through wall B, and is closed by an outlet-valve, b^3, the object of which will be explained further on.

The rear gate, C′, near lower end of lock, is constructed in every particular like the forward gate, except that the mechanism for raising it is placed in front of it, and consists of hinged valve c^3 in the floor of chamber, so arranged that when it is lifted the lever *f*, which is hinged to the floor and lies across said valve, will bear upward against the gate C′, raising it until the force of the water entering at the valve is sufficient to complete the closing of the gate. The said valve c^3 communicates with a culvert, E, located underneath the floor, and connecting at right angles with culvert F in the wall B′, which is provided with an inlet-valve, f', in its forward end.

The operation of my invention is as follows: Suppose the lock-chamber empty, in which case the forward gate is raised and the rear one lying down, now, when valve f' in the upper end of wall B′ is opened the water flows through culvert F, passing down through culvert or pipe E under the recumbent gate, and lifts the flap-valve c^3 and lever *f* resting on same with a force due to the head, and from

the action of the lever the gate is partially raised. As the weight of the gate would be but little in excess of its buoyancy, a slight force would cause the gate to commence rising, when the current acting upon it would bear it up till checked by the chains and wall-supports. As soon as the lock-chamber is filled, the water being at a level upon each side of the upper gate, the latter falls by force of gravity, and boats from above can enter.

To empty the lock-chamber, the inlet-valve f' is closed and the outlet-valve b^3 in the outer side of wall B is opened, whereupon the water, pressing against the free oscillating lower end of valve b' as it escapes through culvert b^2, forces said valve to swing outwardly from its vertical position to draw lever d' by means of the chain which is attached to its free end, and lift gate C until the current strikes it underneath and bears it up to its position, as in the other case. The lock-chamber being emptied, the lower gate falls and the boat passes out.

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

1. An automatic canal or river lock consisting of two reciprocating hinged gates supported by chains attached to the floor of the chamber, and forwardly-inclined ledges secured to the walls, the upper gate being lifted by means of a chain and swinging valve and the lower by hinged valve and lever, substantially as shown and described.

2. In a canal or river lock, the gate C, having supporting-chains c, lifting-chain c', and chain-guide c^2, in combination with lock-chamber having support d, walls B B′, having ledges b, lever d', swinging valve b', culvert b^2, and outlet-valve b^3, substantially as shown and described.

3. In a canal or river lock, the gate C′, having supporting-chains c, in combination with lock-chamber having lever f, hinged valve c^3, culvert E, walls B B′, culvert F, and inlet-valve f', substantially as shown and described.

4. In a canal or river lock, the valve-operated gate C, in combination with the valve-operated gate C′, substantially as shown and described, said gates being arranged between two walls having a system of culverts and an inlet and an outlet valve, as set forth.

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