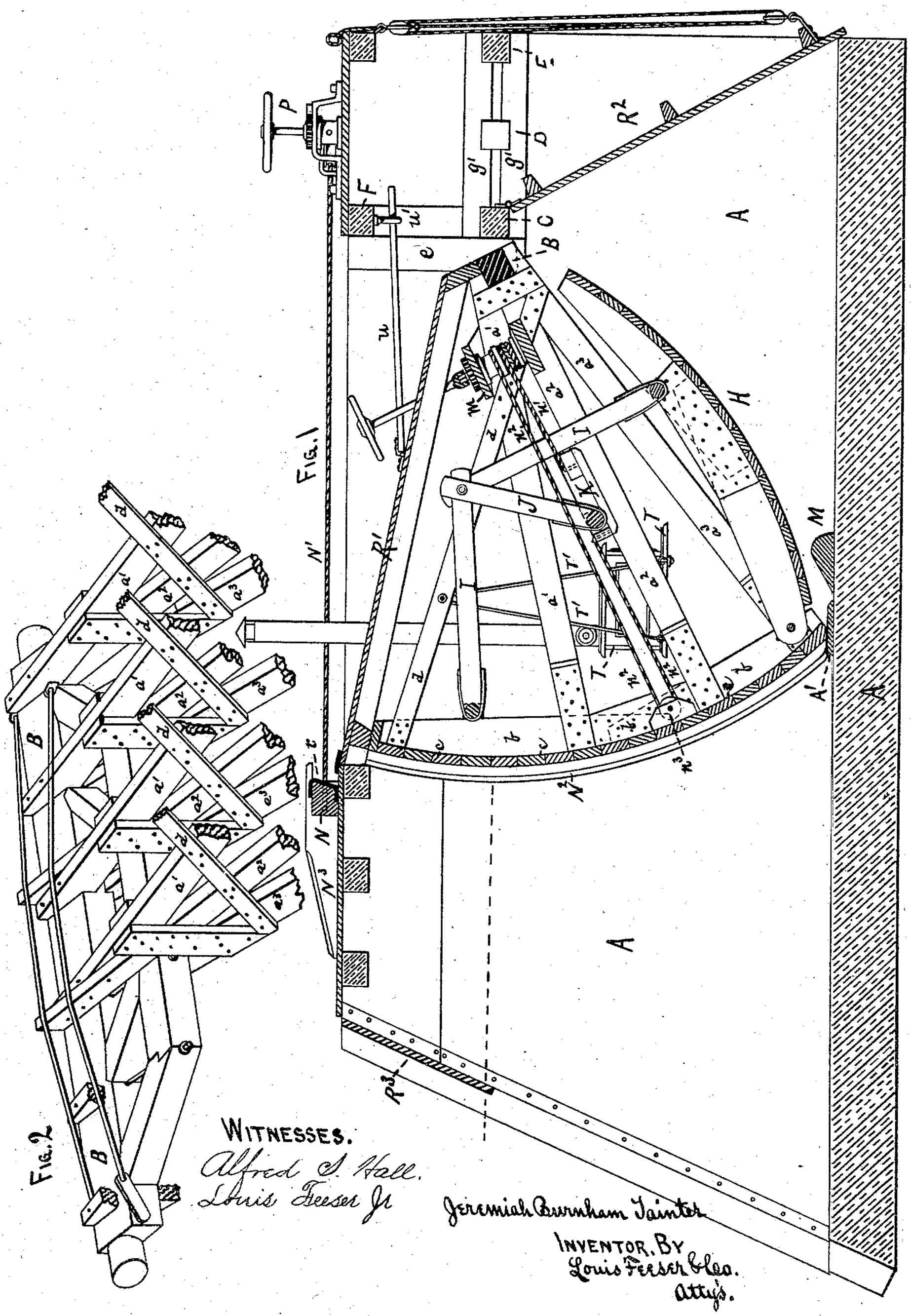
(No Model.) 3 Sheets—Sheet 1.

J. B. TAINTER.

Automatic Sluiceway Gate.

No. 241,444. Patented May 10, 1881.



WITNESSES.
Alfred S. Hall.
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Jeremiah Burnham Tainter
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(No Model.)

3 Sheets—Sheet 2.

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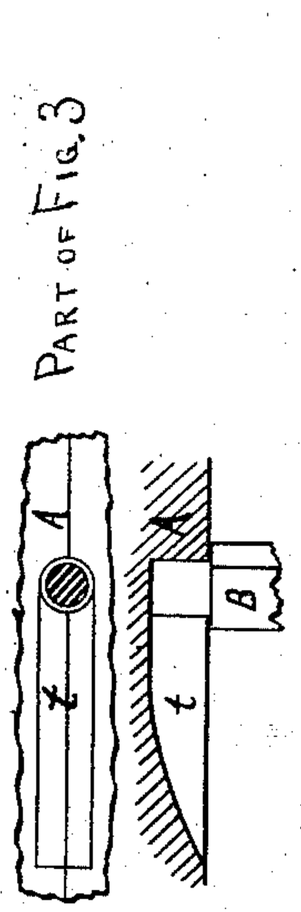

PART OF FIG. 3

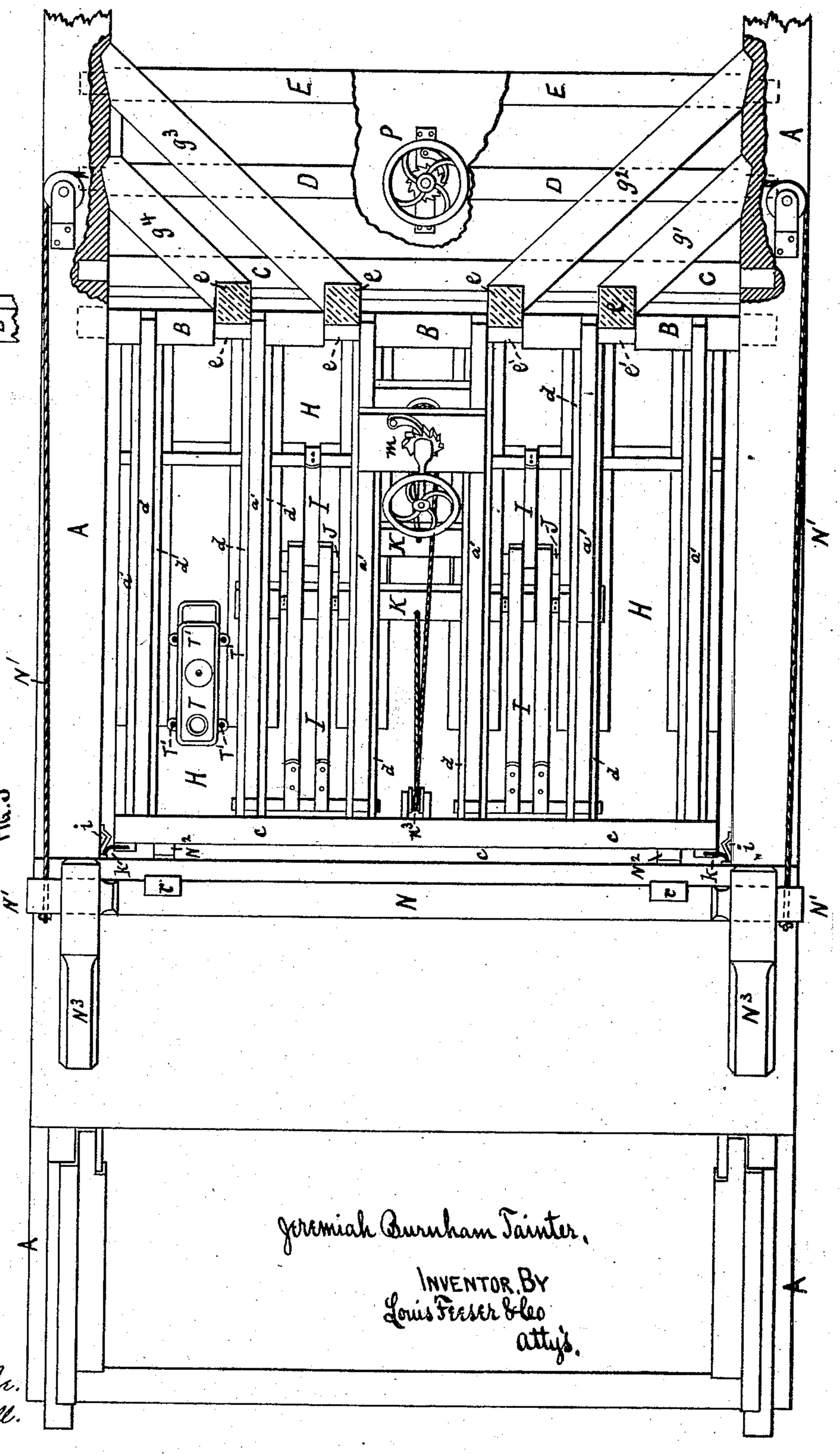

FIG. 3

WITNESSES.

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(No Model.)

3 Sheets—Sheet 3.

J. B. TAINTER.

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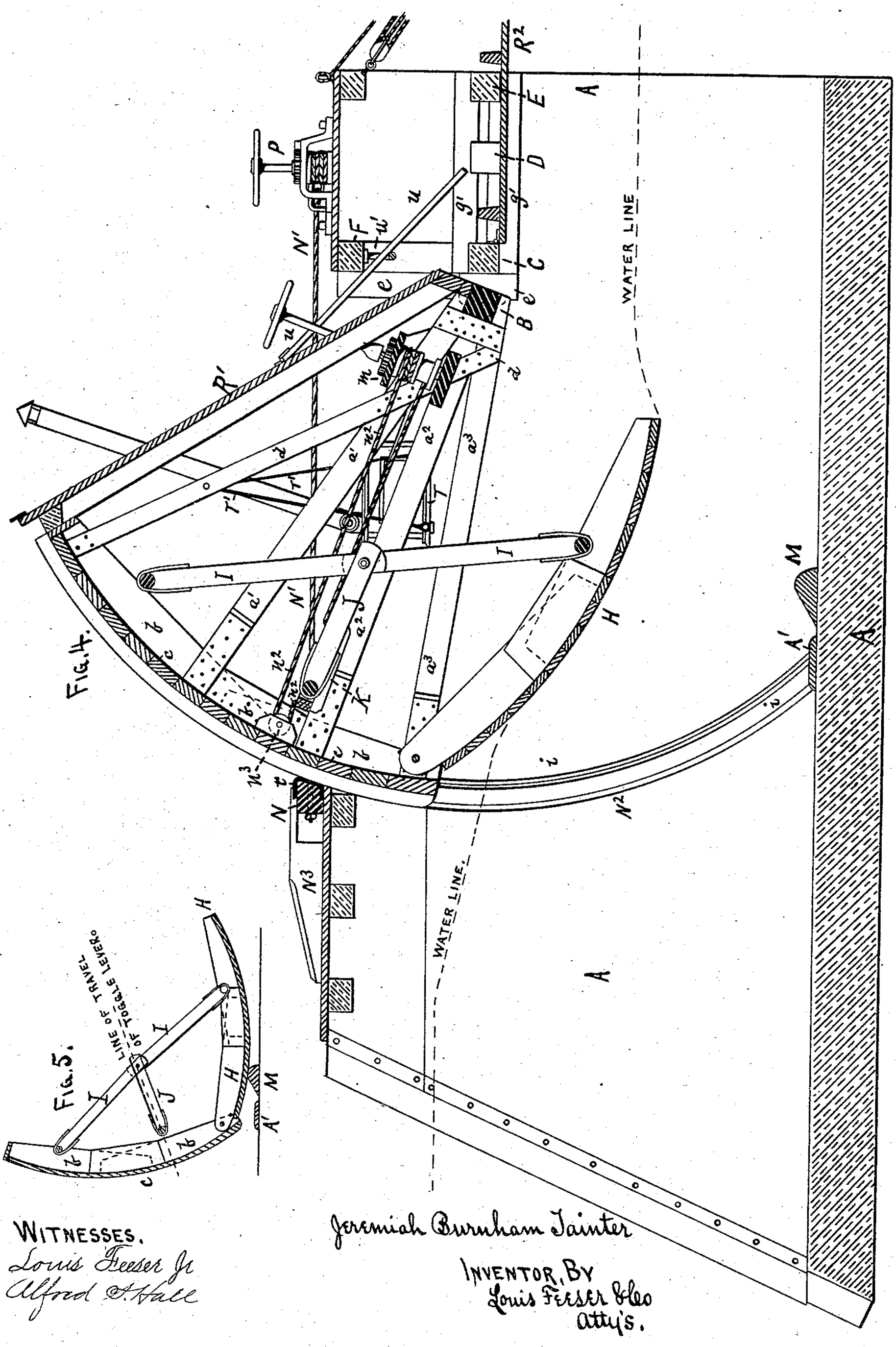

FIG. 4.

FIG. 5.

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UNITED STATES PATENT OFFICE.

JEREMIAH B. TAINTER, OF MENOMONEE, WISCONSIN.

AUTOMATIC SLUICEWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 241,444, dated May 10, 1881.

Application filed September 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH BURNHAM TAINTER, of Menomonee, in the county of Dunn and State of Wisconsin, have made certain Improvements in Automatic Sluiceway-Gates, of which the following is a specification.

This invention relates to the sluiceway-gates of mill-dams, &c.; and it consists in hinging to the lower edge of the gate a float or apron provided with suitable raising and lowering mechanism, whereby the float may be forced down upon a fulcrum extending across the floor of the sluiceway a short distance back from the leveling-plank, to raise the gate a few inches to admit the water underneath it, to act upon the float and raise the gate from that point by the action of the water passing underneath it, as hereinafter set forth.

The invention further consists in forming a truss-shaped frame-work in the rear of the main gudgeon timber or shaft, to support it and prevent its springing, as well as to dispense with the necessity of cross-bracing, as hereinafter set forth.

The invention further consists in forming the gate "ways" or "facings" of hollow angular metal strips, whereby a space is left between them and the sides of the sluiceway, into which hot water, steam, or other agent may be introduced to remove frost in winter, as hereinafter set forth.

The invention further consists in the application of artificial heat to the interior of the gate, to prevent the formation of ice, as hereinafter set forth.

The invention further consists in combining, with the gate, covers for the front, rear, and top of the gate, whereby it may be protected from the weather, frost, &c., as hereinafter set forth.

The invention further consists in a brake attached to the front of the gate, whereby it may be held at any desired point, as hereinafter set forth.

I obtain these results by the use of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation with the gate closed. Fig. 2 is a detached perspective view of the gudgeon timber or shaft and a portion of the arms and braces, showing a variation in the manner of forming the truss-timbers. Fig. 3 is a plan view. Fig. 4 is a longitudinal sectional elevation with the gate raised; Fig. 5, a reduced detail view of the gate, apron, and fulcrum, illustrating the manner of admitting the water beneath it.

A is the cribbing or timber-work of the sluiceway, arranged in the ordinary manner, and B a timber running across the opening and journaled in its sides, as shown, forming the gate-shaft. Springing forward from this shaft are a series of arms, a' a^2 a^3, in sets of three each, at equal distances apart along the shaft, each set being attached to a segment, b, across which the planking c, forming the face of the gate, is bolted. These segments b extend upward some distance above the upper arms, a', and are each provided with two braces, d d, running backward and downward upon either side of the arms a' a^2 a^3, and are spiked or bolted thereto, as shown.

It will be observed that the center arms, a^2, are nearer the lower arms, a^3, than to the upper arms, a', and that the braces d d are lighter than the arms a'. This is because the greater amount of strain and pressure comes upon the lower part of the gate; hence the heaviest bracing and support is required for the lower part.

A short distance from the rear of the shaft B is a stationary timber, C, with its ends dovetailed into the sides of the sluiceway A, and at equal distances back from this timber are two similar timbers, D E.

Along the first timber, C, are uprights e e, with semicircular notches cut in their faces opposite the shaft B, and adapted to fit upon circular portions e' of the shaft, and thus form a number of bearings along the shaft, to prevent its springing.

g' g^2 g^3 g^4 are a series of braces connecting the timbers C D E to each other, and thus forming a truss, to support the timber C and prevent its springing when the pressure is brought to bear upon the gate. By this means the gate is firmly supported across its whole width, so that no cross-bracing is required between the arms a' a^2 a^3, but the spaces between them are left unobstructed for the insertion of the float-operating mechanism.

Above the timber C is another timber, F, upon which the upper ends of the uprights e e

are secured, to prevent the upward spring of the timber C.

All the timbers, C D E F, will be dovetailed or otherwise secured in the sides of the sluiceway, and thus act as tie-beams.

Fig. 2 shows a perspective view of the shaft B, and portions of the arms a' a^2 a^3 detached, showing a variation in the manner of arranging the truss forward of the shaft B; but in either, the means used and the result obtained are substantially the same.

Secured to the sides of the sluiceway, in a curve corresponding to the ends of the planking *c*, are hollow angular metal strips *i*, forming facings, against which rubber or other suitable strips, *k*, upon the edge of the gate, are pressed by the water to form "stop-waters," or packing to prevent leakage. By being formed hollow, with openings at the top and bottom, hot water, alcohol, or steam may be introduced to remove frost in winter.

Hinged to the lower edge of the gate is a float or apron, H, extending backward, and with its rear end connected to the upper part of the gate by one or more systems of jointed levers I. Pivoted to the joints of these levers are arms J, extending forward and pivoted to a frame, K, arranged to slide back and forth on the center arms, a^2.

Journaled in the rear part of the gate-frame is a windlass, *m*, with a rope or chain, n', running from its lower part to the rear of the frame K, and with another rope or chain, n^2, running from its upper part forward and over a pulley, n^3, secured to the gate, and backward to the front of the frame K, so that by turning the windlass to the left the frame K will be drawn backward, and, carrying the arms J with it, will force the levers I backward and upward, and thus elevate the rear end of the apron H, and cause it to assume the position shown in Fig. 1; or by turning the windlass *m* to the right the frame K will be drawn forward and the apron H depressed, as shown in Figs. 4 and 5.

Running across the bottom of the sluiceway, a short distance back from the leveling-plank A′, is a projection, M, upon which the apron H will strike when forced downward by the levers I, and thus act as a fulcrum to raise the gate a short distance, as shown in Fig. 5, its object to be hereinafter explained.

Across the upper part of the deck of the sluiceway is a bar, N, sliding in guides N^3, connected by ropes or chains N′ to a windlass, P, above the rear timber-work, F, to form a brake, which may be drawn up against the gate to hold it in any desired position.

Strips N^2 will be attached to the face of the gate, upon which the rubber or leather shoes *r* will act to secure the requisite friction.

When it is desired to open the gate the windlass *m* will be turned to the right, and the apron H forced down upon the fulcrum M, and the gate raised a short distance, as shown in Fig. 5. This will admit the water beneath the gate, and the apron H, acting as a float, the pressure of the water will raise it upward and carry the gate with it, and thus raise the latter without the use of any other power.

When the gate is to be lowered it is only necessary to raise the apron H by turning the windlass *m* to the left, when the gate will sink back into place.

By adjusting the apron H higher or lower the gate may be poised at any desired point, the angle of the apron perfectly controlling the buoyancy of the gate. This is a very important feature of my invention, as the largest gates may be handled with the expenditure of a small amount of force, one man only being required to open and close the largest gate.

Should it be necessary to run logs, &c., through the gate, the gate is allowed to rise to its full height, and set at that point by the brake N. The float H is then raised, and the water, which has been held back somewhat by the float, will resume its level, and thus leave space enough beneath the gate and apron for the passage of logs, &c.

To raise the gate higher than the water will raise it, the brake-bar N is removed and placed against the gate above the guides N^3, and the windlass P set up. This will cause the brake to raise the gate upward (the line of the draft of the cords N′ being above the shaft B) as far as may be required, or until the arms a' strike the tie-beam F.

The gate may be allowed to fall at any speed by means of the brake N.

To remove the gate from the cribbing it is elevated until the lower edge of the face *c* is above the line of the cribbing A, the bolts or rods connecting it to the float or apron H removed and the latter taken out, which leaves only the lower parts of the arms a' a^2 a^3 and the shaft B between the walls of the gate.

It will be seen that the rear ends of the bearings to the gudgeons of the shaft B are cut away in curved slots *t*, and that the outside sets of arms a' a^2 a^3 are some distance from the ends of the shaft, so that when the apron is removed and the face *a* elevated above the cribbing A, as above described, the whole gate may be swung around until the gudgeons are out of the slots *t* and then lifted out.

Great annoyance is experienced in cold weather by the freezing of the water around the gate, rendering it necessary to cut the ice away; but this is a slow tedious process and liable to injure the gate. To obviate this difficulty I provide a roof, R′, for the top of the gate, so arranged as to rise and fall with it and not interfere with its action, and hinge to the rear a cover, R^2, adapted to be raised up out of the way when the gate is being used.

Inside the gate I suspend a stove, T, by rods T′, so that it will always remain level, no matter in what position the gate may be, whereby artificial heat may be generated to prevent the formation of ice.

Steam or hot air may be substituted for the stove, if desired.

Across the front of the sluiceway a cover, R^3, will be placed in winter, with its lower edge

in the water, where it is allowed to freeze, and thus form a natural packing, to prevent the formation of ice beneath the deck.

The covers R^2 R^3 will only be used in winter; but the roof R′ will be a permanent attachment, to protect the gate from the weather.

A man-hole or hatch will be left in the roof R′, to provide access to the interior of the gate.

Slots or mortises will be cut in the bottom of the forward edge of the sluiceway and the lower forward edge of the deck-timbers for upright pieces to be set in, upon which plank may be laid up to form a dam when it is necessary to repair the gate.

A foot-board, *u*, will be hinged to the roof R′, and suspended by one end loosely upon a hanger, *u′*, beneath the tie-beam F, to form a level standing-place for the attendant when first operating the windlass *m*.

The hand-wheels to the windlasses *m* P will be removable, so that when the gate is set at any desired point the hand-wheels may be removed to prevent the gate being tampered with.

A system of levers and cords may be substituted for the windlass P, if desired, and any other suitable mechanism used in place of the toggle-levers I J, to operate the apron H.

The apron H may be made straight instead of curved, as shown, or in any other suitable form, and may be applied to straight instead of segmental gates.

What I claim as new is—

1. In combination with a sluiceway-gate, an apron, H, attached adjustably thereto, whereby the force of the water is utilized to raise the gate, substantially as set forth.

2. The combination and arrangement, with a sluiceway-gate having a float, H, hinged thereto, of a fulcrum, M, whereby the gate may be elevated slightly to admit water beneath it, substantially as set forth.

3. The combination and arrangement, with a sluiceway-gate having the float H hinged thereto, of the levers I I J and windlass *m*, substantially as set forth.

4. The combination, with a sluiceway-gate having the shaft B, and arms *a′* a^2 a^3, of the truss-shaped timbers and braces C D E F *g′* g^2 g^3 g^4, substantially as set forth.

5. A sluiceway-gate having the facings *i*, of hollow metallic strips open at top and bottom, to receive hot water, steam, alcohol, &c., to remove frost, substantially as set forth.

6. The combination and arrangement, with a sluiceway-gate, of a brake, N, substantially as set forth.

7. The combination, with the gudgeon-timber B, of the open slotted bearings *t*, whereby the gate may be removed, substantially as set forth.

8. The combination, with a sluiceway-gate, of a stove, T, or other means of producing artificial heat, so suspended therein as to retain its equilibrium at all points of elevation of the gate, substantially as set forth.

9. The combination and arrangement of the shaft B, arms *a′* a^2 a^3, face *c*, and removable roof R′, substantially as set forth.

10. The combination and arrangement, with the shaft B, arms *a′* a^2 a^3, face *c*, and roof R′, of the adjustable front and rear covers, R^2 R^3, substantially as set forth.

11. The combination and arrangement of the gudgeon-timber B, arms *a′* a^2 a^3, segments *b*, planking *c*, and braces *d d*, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JEREMIAH BURNHAM TAINTER.

Witnesses:

C. N. WOODWARD,

LOUIS FEESER.