

(No Model.)

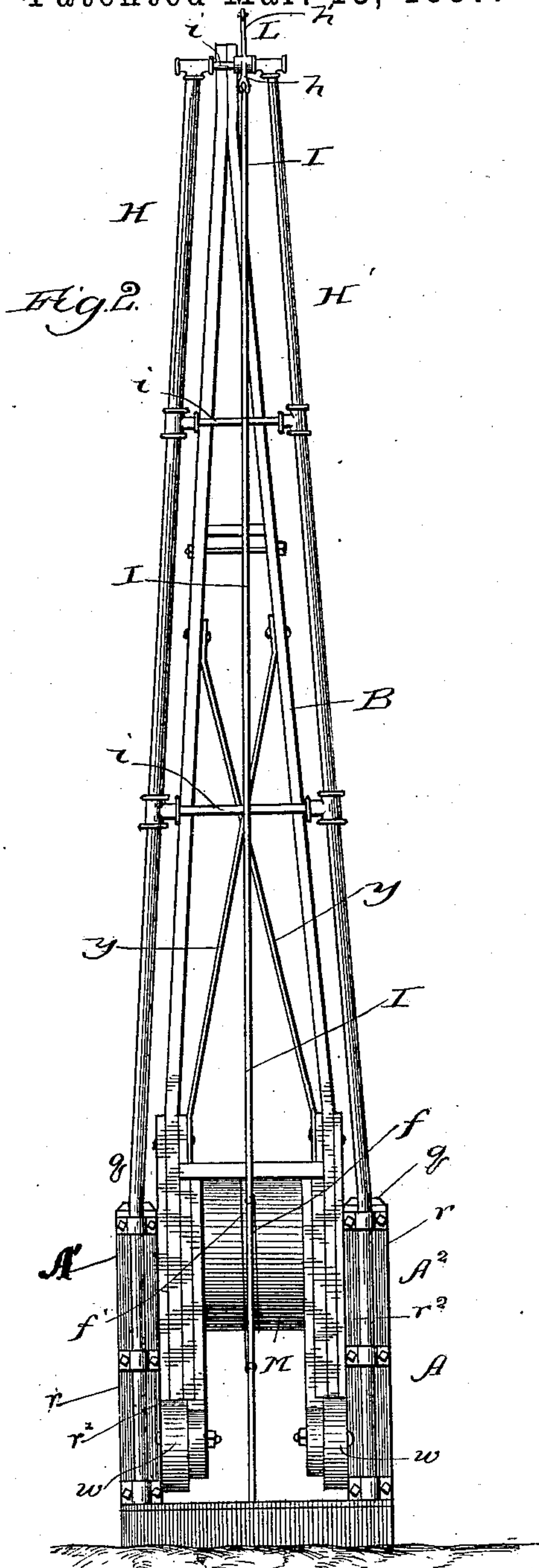
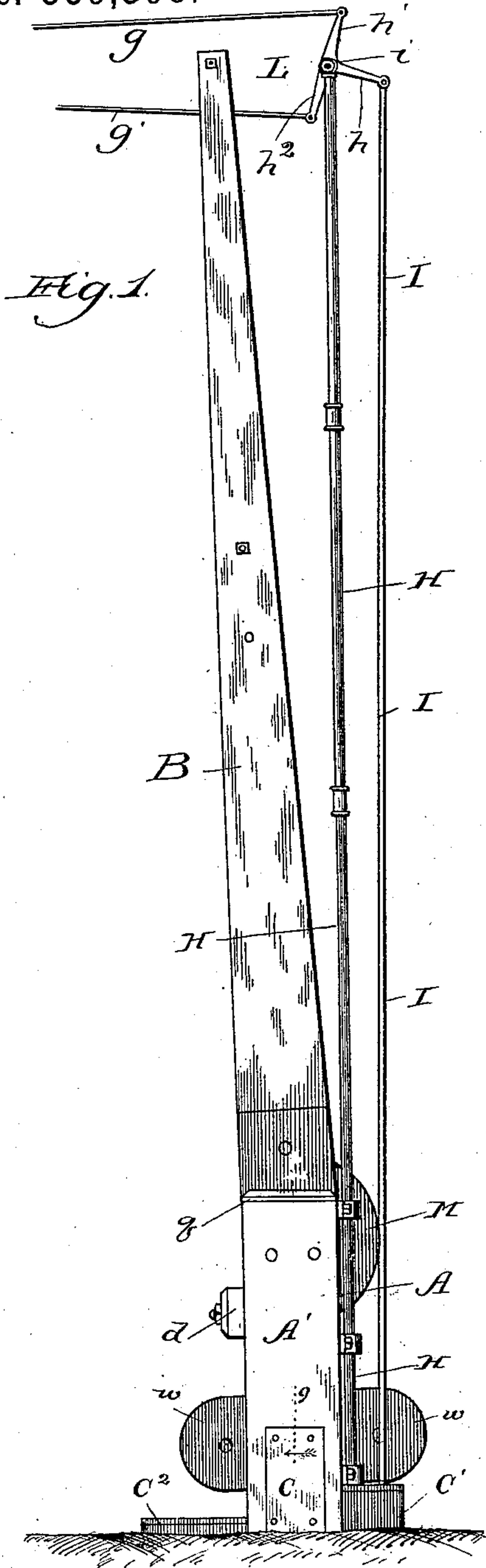
4 Sheets—Sheet 1.

M. B. MILLS.

GATE.

No. 359,398.

Patented Mar. 15, 1887.



Witnesses:
Eas. E. Gaylord,
J. H. Dyrenforth.

Inventor:
Mortimer B. Mills
By Dyrenforth & Dyrenforth
Att'ys.

(No Model.)

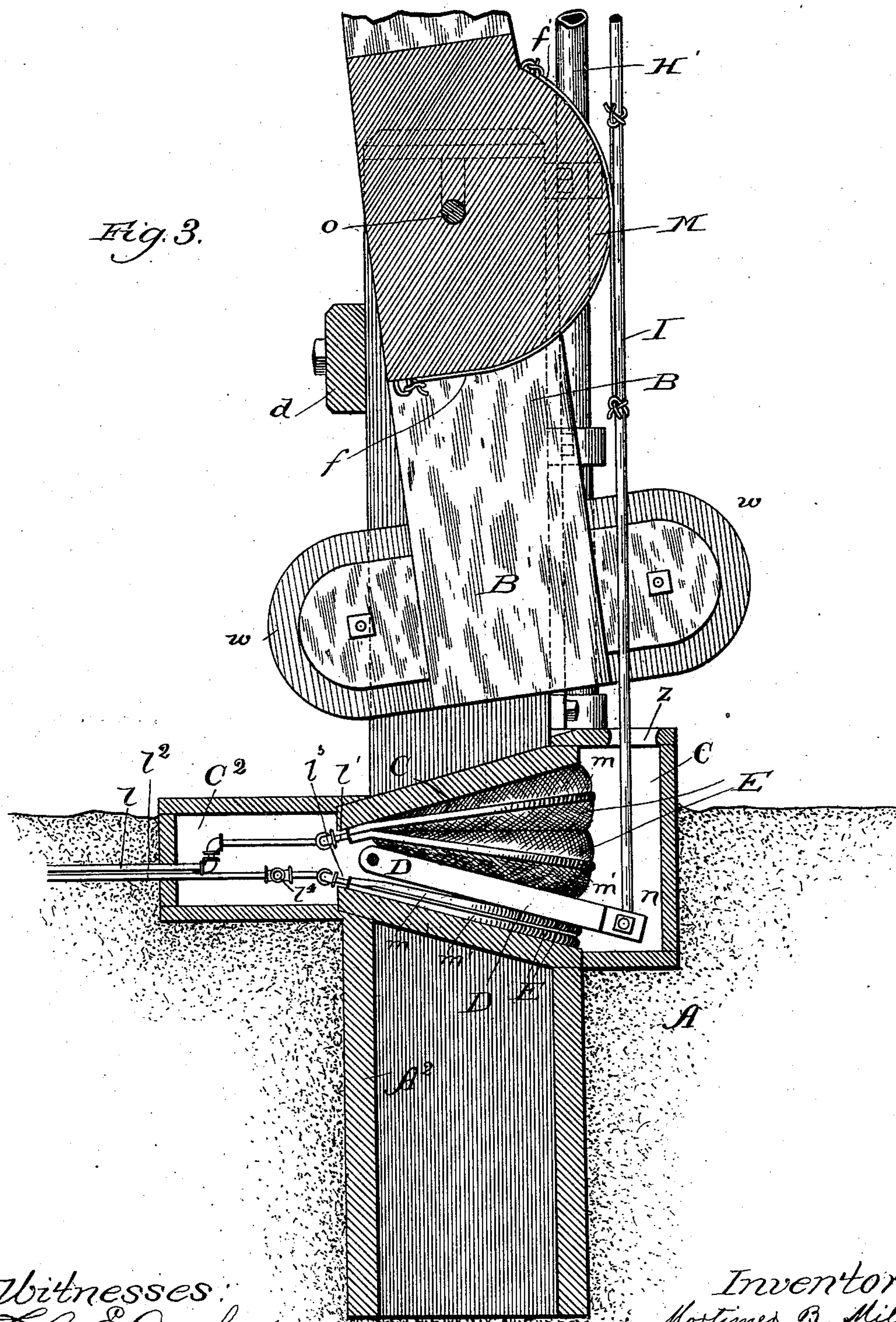
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4 Sheets—Sheet 3.

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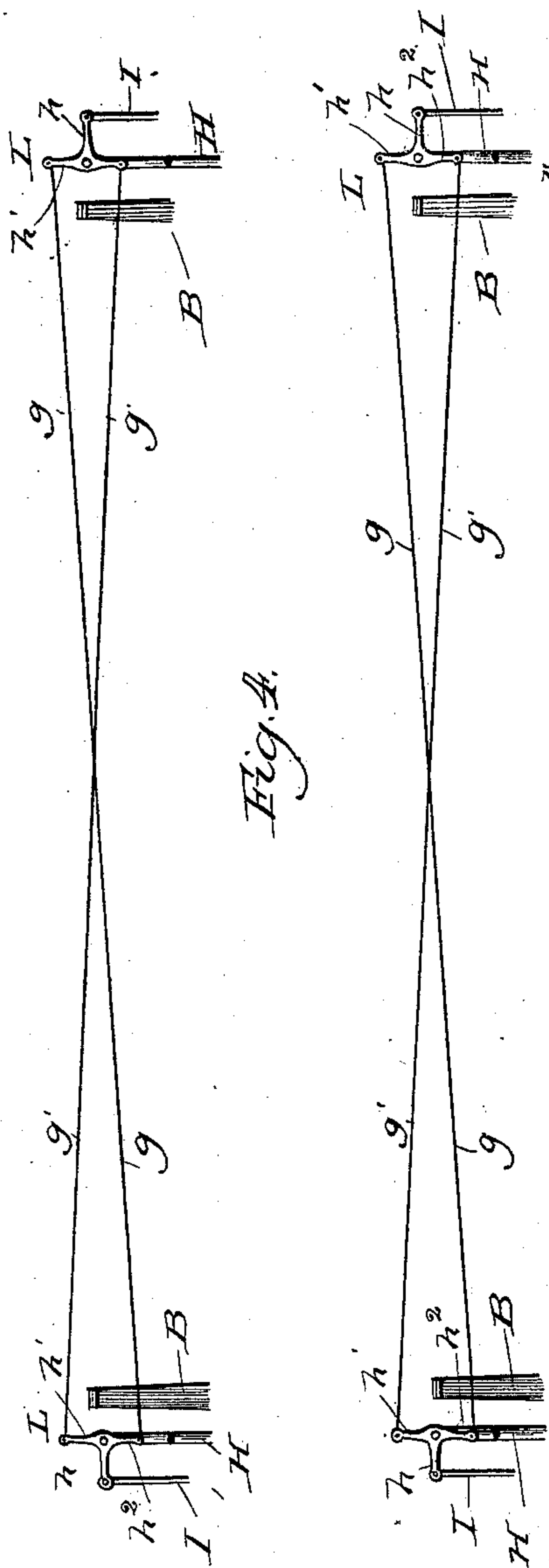


Fig. 4.

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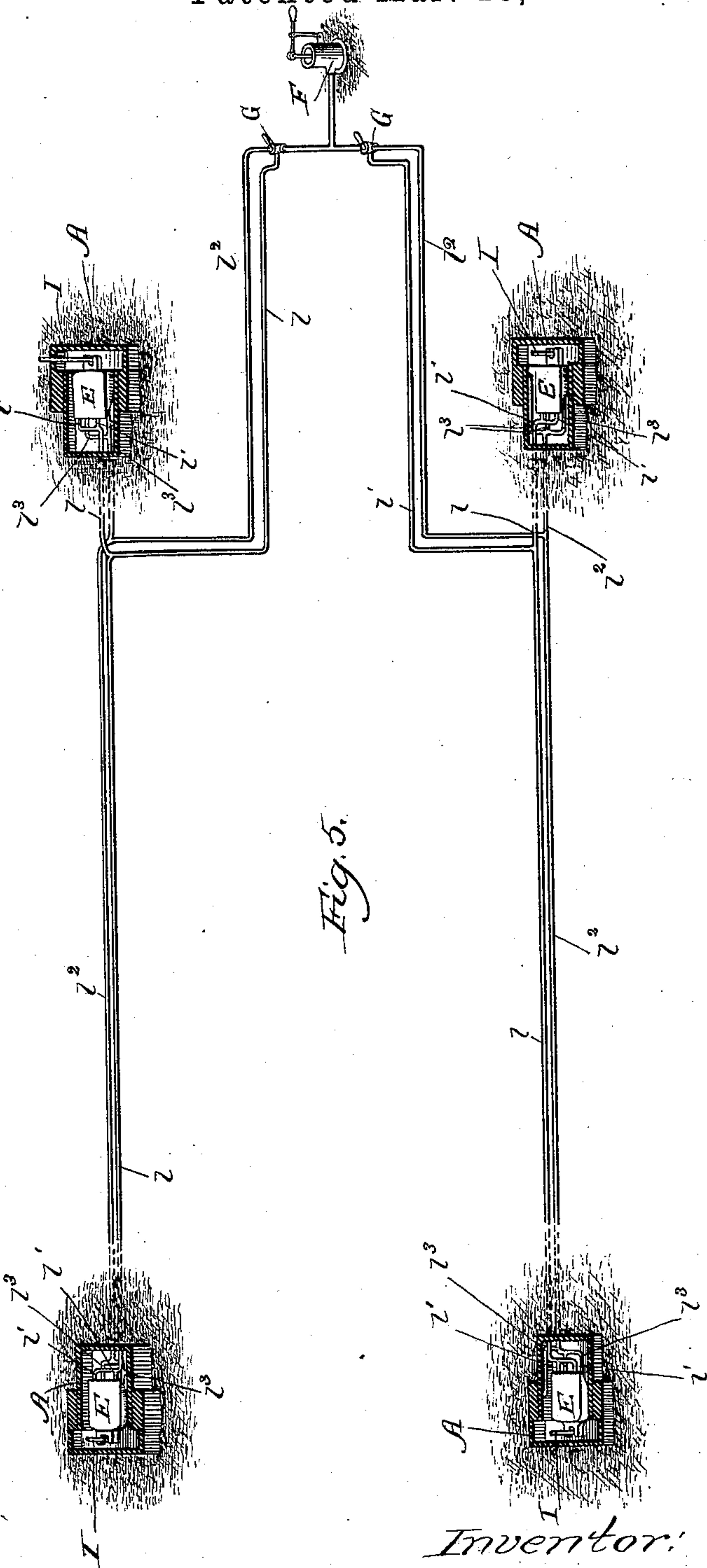


Fig. 5.

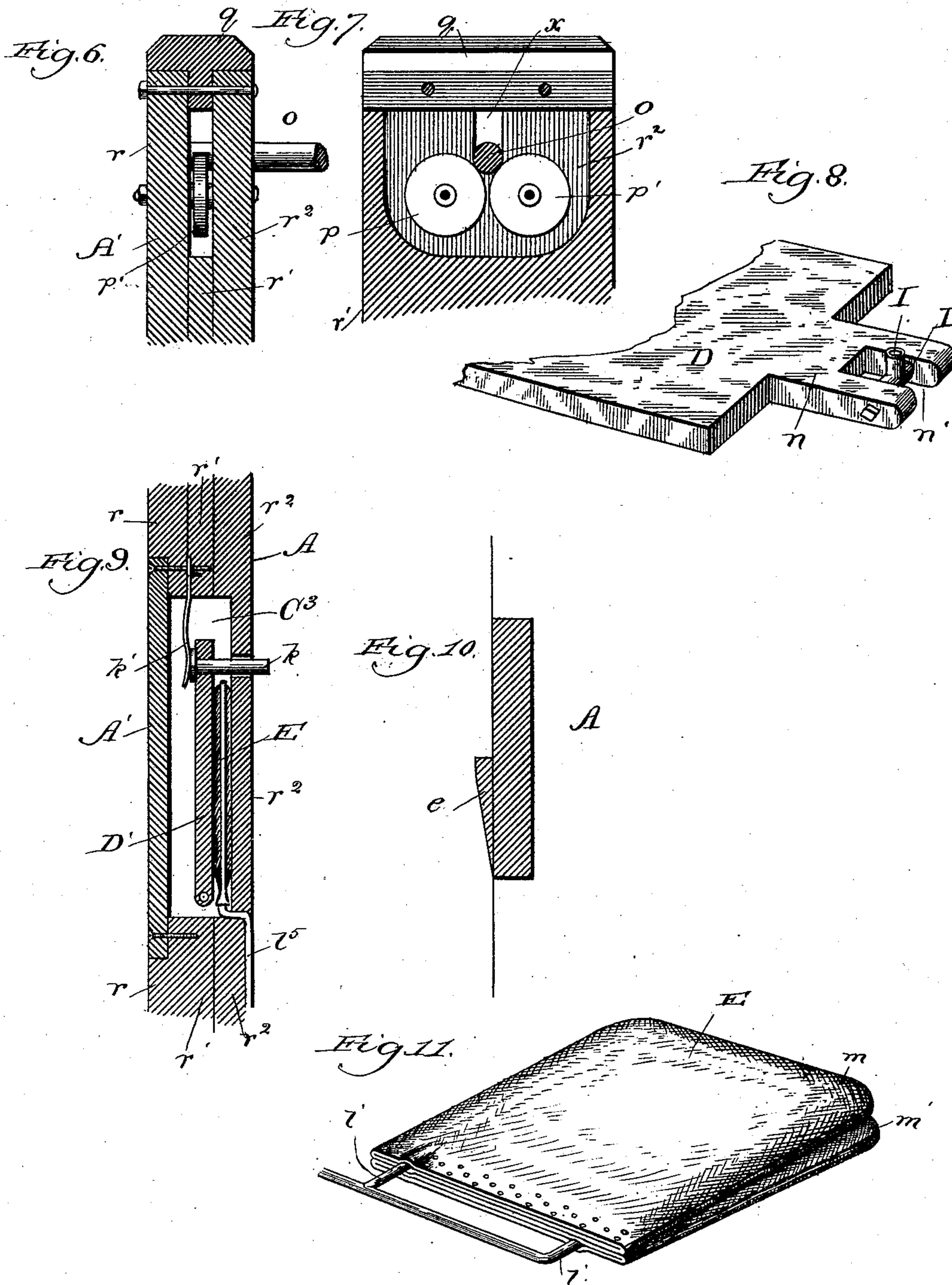
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UNITED STATES PATENT OFFICE.

MORTIMER B. MILLS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE RAILROAD SWITCH SIGNAL AND GATE COMPANY, OF SAME PLACE.

GATE.

SPECIFICATION forming part of Letters Patent No. 359,398, dated March 15, 1887.

Application filed January 3, 1887. Serial No. 223,260. (No model.)

To all whom it may concern:

Be it known that I, MORTIMER B. MILLS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Gates; and I hereby declare the following to be a full, clear, and exact description of the same.

My improvement relates to the class of gates used to form barriers at railroad-crossings, and having one or more vertically-swinging arms or gate-bars actuated by fluid-pressure.

The objects of my present improvement are principally to render the movements of the gate-bars easy, smooth, and regular; to counteract the strain of the wind blowing while the gate-bars are being actuated, and, generally, to provide a gate of novel construction possessing advantages peculiar to it.

My improvement consists, first, in the gate-bar-actuating mechanism, comprising, broadly, a post, an arm pivotally supported thereon, a lever fulcrumed near one end to the post and connected near its opposite end with the pivot arm, and a collapsible fluid-receiver confined between one side of the lever and a stationary bearing-surface and communicating with a suitable fluid-pump.

It further consists in means I employ to counteract the strain, particularly upon the collapsible receiver device, of the wind blowing while the gate-bars are being actuated, and in the lock for securing a gate-bar in its raised position; and it still further consists in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

In the drawings, Figure 1 is a side elevation of a railway-crossing gate of my improved construction, showing the gate-bar raised and the means I employ for connecting it overhead to a companion gate-bar; Fig. 2, a front elevation of the same; Fig. 3, an enlarged broken sectional view of the device as shown in Fig. 1, displaying details; Fig. 4, a broken diagrammatic view, showing the manner of connecting overhead gate-bars to occupy positions on opposite sides of a railroad-track, with their respective companion-bars on the same side of the railroad-track; Fig. 5, a sectional diagrammatic view showing the connection of the collapsible receiver mechanism in the four

posts as commonly arranged, in pairs, on opposite sides of a railroad-track, with a common fluid-pump; Fig. 6, a broken sectional rear elevation of one half of a gate-post, (the other half being of the same construction,) taken to the right side of the friction-pulleys shown in Fig. 7, and illustrating the manner of and mechanism for hanging the gate-bar; Fig. 7, a sectional side elevation of the same; Fig. 8, a broken perspective view of the lever which is actuated by the collapsible receiver mechanism in each gate-post, and showing the manner of pivoting the tubular rod or bar at which it is connected with the gate-bar, and the latter is tied to its companion gate-bar; Fig. 9, a sectional side elevation of the mechanism for locking a gate-bar in its raised position, the section being taken on the line 9 of Fig. 1 and viewed in the direction of the arrow; Fig. 10, a sectional view of a cross-sectional portion of the base of a gate-bar with a transverse stationary cam on one side to be engaged by the yielding bolt of the locking device for holding the gate-bar in its raised position, and Fig. 11 a perspective view of an improved form of collapsible receiver.

Although the term "railway-crossing gate," when applied to devices of the present nature having a post supporting a bar pivoted thereon to swing in a vertical plane, ordinarily implies two such posts and bars on the same side of a railroad-track to be swung toward each other in forming the desired barrier for narrow crossings—that is, narrow in the direction of the bar when lowered—a single bar is sufficient for the purpose of a barrier.

As the mechanism I employ to operate the gate-bars is the same for each, the following description is confined to a gate formed of a single post and bar and the mechanism for operating the bar, except in referring to the means for connecting overhead two gate-bars in line with each other on the same side of a railroad-track, and except where the connection of all the gate-bar-actuating mechanisms with a single fluid-pump is set forth.

A is the gate-post, comprising two uprights, A' and A², each buried to a desired depth in the ground a sufficient distance apart to permit the gate-bar B, supported in the manner hereinafter described, to swing between them,

and composed of three parts or boards, r , r' , and r'' , secured flatwise together and surmounted by an ornamental cap, q . The central board, r' , of each upright A' and A'' is recessed, as shown in Fig. 7, to receive pulleys p and p' , journaled to be supported adjacent to each other—one pair in each upright part of the post—to afford anti-friction bearings for the ends of the shaft o , passing through and supporting the gate-bar B between the uprights, near its base, as shown, and the inner boards, r'' , are provided with slots x , Fig. 7, extending from their upper edges, through which (before adjusting or upon removing the caps q , which are secured in position by readily-removable means) the shaft supporting the gate-bar is lowered into contact with the anti-friction bearings p and p' for its opposite ends, the construction affording means for permitting the ready adjustment into position and removal of the gate-bar, while also producing easy working of the same.

The gate-bar B is of a common form, being constructed with a view to lightness and requisite strength, while also presenting the smallest area of surface to the action of wind blowing in the direction of its movement, and formed, as shown, of two sides or boards converging toward one end and diverging toward the base, the sides of which, however, are strengthened by side pieces, and parallel, and provided near their adjacent extremities with weights w , to counterbalance the arm, and suitable braces, y , hold the converging sides in juxtaposition to afford the tapering form of gate-bar, which, as hereinbefore stated, is supported in the manner described by the shaft o , extending transversely through it near its base, to swing in a vertical plane between the uprights A' and A'' of the post A .

Between the uprights A' and A'' of the post is a transverse chamber, C , by preference mainly underground, as shown in Fig. 3, and flaring toward the rear of the post, where it is capped by a vertically-oblong extension, C' , having an opening, z , in its upper side, a horizontally-oblong extension, C'' , being provided at the opposite end of the chamber C , and on the outer side, A' , of the post A , above the surface of the ground, is a chamber, C^3 , (clearly illustrated in Fig. 9,) to receive the locking device hereinafter described.

Within the chamber C is a lever, D , formed of an oblong square block, fulcrumed toward one extremity near the narrow end of the chamber C , as shown in Fig. 3, and provided at its opposite end with a rectangular extension, n , having a slot, n' , (see Fig. 8,) the extension n projecting into the extension C' of the chamber C , below the opening or slot z therein.

It is not absolutely necessary and I do not limit myself to fulcruming the lever D to the post A , as it may obviously be pivoted to any adjacent rigid support.

Between each surface of the lever D and the

adjacent inner side of the flaring chamber C is a double air-tight collapsible fluid-receiver, E , each comprising two bellows-shaped or substantially bellows-shaped bags, m and m' , (see Fig. 11,) secured or adjusted flatwise together, those of the upper double receiver communicating, respectively, by branch pipes l' , with a pipe, l , leading to a fluid-pump, F , Fig. 5, and those of the lower one communicating, respectively, by branch pipes l'' , with a pipe, l'' , leading to the pump, communication with which of the pipes l and l'' is controlled by a three-way valve, G , of common construction, (hence not shown in detail,) to permit the escape of the contents of one pipe, l or l'' , and its connections, while the other is being supplied from the pump.

The pipe l'' , leading to the lower receiver, E , (through the inflation of which, as will be hereinafter shown, the gate-bar B is lowered,) is tapped, as shown at l^t , Fig. 3, to lead a branch, l^b , Fig. 9, to the locking device in the chamber C^3 , which comprises a vertical flat lever, D' , fulcrumed near its lower end, and carrying near its upper end a transverse bolt, k , extending normally through an aperture in the inner board, r'' , of the upright A' of the post, in which position it and the lever D' are normally held by a flat spring, k' . Between the lever D' and the adjacent surface of the board r'' is a collapsible receiver E' , in form like one of the bags of a receiver E , and communicating at its base with the branch pipe l^b .

The construction of the bags of the fluid-receivers E and E' is not set forth in detail in this connection, as I do not claim such construction, and because it is substantially the same as that of the fluid-receiver shown and described in Letters Patent of the United States No. 348,856, granted me on the 7th day of September, 1886.

At the rear side of the gate are two bars, for the sake of lightness in the form of tubes, H and H' , extending from the post, to which their lower ends are secured, to a height controlled by municipal or other requirement, converging toward their upper ends and connected by cross-bars i , forming rungs, which constitute the bars H H' , as a secondary purpose, a ladder, by means of which to render it an easy matter to climb to the top to attend to the mechanism, hereinafter described, for connecting together two companion gate-bars.

Centrally between the bars H and H' is a vertical narrower bar, I , also, for the sake of lightness, in the form of a tube, provided at its lower end with a cross-head, I' , (see Fig. 8,) supported to turn in bearings afforded by opposite sides of the slot n' in the extension n of the lever D , and at its upper end the bar or tube I is pivotally connected with the central backward-projecting arm, h , Fig. 1, of a three-armed lever, L , comprising, besides the arm h , arms h' and h'' , and pivoted at the point of junction of the three arms to the uppermost cross-bar, i , or rung of the ladder H H' . Owing

to the form and adjustment of the lever L, the arm h forms, as will readily be seen, a bell-crank lever with each arm h' and h'' , and the device is used when a gate is formed of two companion bars, B, supported on posts to swing in vertical planes toward and from each other in being lowered and raised, and provided each with the parts H, H', I, and L, the arm h' of one being connected at its extremity with that of the arm h'' of the other by a line, g , and the arm h' of such other being connected at its extremity with that of the arm h'' of the first by line g' .

A portion, nearly segmental, as shown, of a drum, M, (see particularly Fig. 3,) having the shaft o of the bar B for its center, is secured within the frame or between the sides of the bar, and connected by a strap, f , from near the extremity of its lower or rear surface below or behind the pivotal support of the gate-bar, with the vertical bar I toward its upper end, and from the upper or forward extremity of the drum M above or forward of the pivotal support of the gate-bar by means of a strap, f' , with the vertical bar I toward its lower extremity. Thus, whenever the vertical bar I is raised, its connection with the gate-bar in the manner described, through the strap f , effects the lowering of the gate-bar from a raised position, and when the vertical bar I is lowered the connection with the gate-bar through the strap f' effects the raising of the gate-bar from its lowered position.

The raising of the bar I to lower the gate-bar B is produced by the simultaneous inflation of the receiver E below the lever D and collapse of that above the said lever, and the lowering of the bar I to raise the gate-bar is produced by the simultaneous inflation of the receiver E above the lever D and collapse of that below the said lever, the double form of the receivers being preferable to single bags for the purpose, owing to the material increase in power thereby obtained. The inflation of one receiver and collapse of the other are effected from the pump F on turning the three-way cock G to the desired position for the purpose. The lower of the two receivers E being the one which is collapsed when the vertical bar I is lowered to raise the gate-bar B, the receiver E' of the locking device, which communicates with it in the manner described, is also then in a collapsed condition, permitting the spring k' to maintain the bolt k in its normal position, extending through the aperture in the part a' of the upright A' of the post, where it is in the path of the transverse cam e on the rising gate-bar, which cam forces the bolt inward against the resistance of the spring k' , which sends it back as soon as the end of the cam passes the bolt, to engage with the end of the cam and hold the bar against any foreign force which may tend to lower it. When this last-named movement of the gate-bar is desired, the three-way cock G is turned to produce communication of the receiver E below the lever D and

the receiver E' with the pump, and of the receiver E above the lever D with the external atmosphere, and the pump worked—a single stroke is generally sufficient to raise or lower the gate-bar—to inflate the two first-named receivers and collapse that last named, thereby releasing the locking device and raising the vertical bar I. The gate-bar, when lowered, rests on a support or bar, d , secured transversely in proper position upon the post.

While the companion bars of a gate having two barriers, as heretofore described, are being raised or lowered, wind of any considerable force blowing in the direction of motion of one bar retards the other in such a degree as to render tying of the bars necessary to counteract the retarding effect. This tying is effected in the manner already described by connecting the gate-bars overhead from the vertical bars I and levers L.

As the operation by a single pump, F, of two gates on opposite sides of the railroad-track, each having two vertically-swinging bars on posts on the same side of the track, is obvious from the foregoing description and the drawings, further description of the same is not necessary.

If a gate-bar be heaviest at either end, only one collapsible receiver E is necessary to operate it, since its unbalanced condition will cause it to move in one direction, depending upon which end is the heavier, when relieved from the expansive force of the receiver.

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

1. In a gate, the combination of a post, a gate-bar pivotally supported thereon, a lever fulcrumed near one end to the post and connected near its opposite end with the pivotal arm, and a collapsible fluid-receiver confined between one side of the lever and a stationary bearing-surface and communicating with a suitable fluid-pump, substantially as described.

2. In a gate, the combination of a post, a gate-bar pivotally supported thereon, a lever fulcrumed near one end to the post, a vertical bar pivotally connected near its lower end with the free end of the lever, and having connected with it the gate-bar, to lower the same by its rise and raise the same by its descent, and a collapsible fluid-receiver confined against one side of the lever and communicating with a suitable fluid-pump, substantially as described.

3. In a gate, the combination of a post, a gate-bar pivotally supported thereon, a lever fulcrumed near one end to the post, a vertical bar pivotally connected near its lower end with the free end of the lever, a drum device, secured to the gate-bar about its supporting-shaft, straps connecting the drum device in opposite directions with the vertical bar, and a collapsible fluid-receiver confined against one side of the lever and communicating with a suitable fluid-pump, substantially as described.

4. In a gate, the combination of a post, a gate-bar pivotally supported thereon, a lever fulcrumed near one end to the post, a vertical bar pivotally connected near its lower end with the free end of the lever, and having connected with it the gate-bar, to lower the same by its rise and raise the same by its descent, and collapsible fluid-receivers confined against opposite sides of the lever, and comprising each two bags, m and m' , and controllably communicating, substantially as described, with a suitable fluid-pump, substantially as set forth.

5. In a gate having its bars actuated to swing in a vertical plane by fluid-pressure, a lock for the gate-bar, comprising a cam, e , on the gate-bar, in combination with a lever, D' , fulcrumed toward one end, and carrying near its free end a bolt, k , normally extending into the path of the cam e , a spring, k' , tending to maintain the bolt in its normal position, and a collapsible fluid-receiver, E' , confined against the lever D' in opposition to the spring and communicating with a suitable fluid-pump, substantially as described.

6. In a gate, the combination of a post, a gate-bar pivotally supported thereon, a lever, D , fulcrumed near one end to the post, a vertical bar, I , pivotally connected near its lower end with the free end of the lever D , and having connected with it the gate-bar, to lower the same by its rise and raise the same by its descent, collapsible fluid-receivers E , confined against opposite sides of the lever D , and comprising each two bags, m and m' , controllably communicating, substantially as described, with a fluid-pump, F , and a lock comprising a cam, e , on the gate-bar, a lever, D' , fulcrumed toward one end, and carrying near its free end a bolt, k , normally extending into the path of the cam e , a spring, k' , tending to maintain the bolt in its normal position, and a collapsible fluid-receiver, E' , confined against the lever D' in opposition to the spring and communicating with the fluid-pump, to be actuated by the latter while it is actuating the lower fluid-receiver E , substantially as set forth.

7. In a gate having two posts carrying bars B , pivoted to swing toward and from each other in vertical planes, the combination, with each bar B , of a vertically-reciprocating bar, I , to which the adjacent bar B is connected,

to rise and fall by the rise and descent of the said bar I , and two levers, L , supported in position substantially as shown and described, each having arms h , h' , and h^2 , the arm h of each being connected with the adjacent bar I near its upper end, and the arms h' and h^2 of the two levers being respectively tied together, substantially as and for the purpose set forth.

8. A gate comprising, in combination, two posts carrying gate-bars pivoted to swing toward and from each other in vertical planes, two levers, D , each fulcrumed near one end to a post, two vertical bars, I , each pivotally connected near its lower end with the free end of a lever, D , and having connected with it the adjacent gate-bar, to lower the same by its rise and raise the same by its descent, two collapsible fluid-receivers, E , one confined against a side of each lever D and communicating with a suitable fluid-pump, and a double bell-crank lever, L , for each gate-bar, pivotally supported in position, having one arm connected with an adjacent vertical rod, I , near its upper end, and having the remaining two arms of the two levers tied together at opposite extremities, substantially as described.

9. A gate comprising, in combination, two posts carrying gate-bars pivoted to swing toward and from each other in vertical planes, two levers, D , each fulcrumed near one end to a post, two vertical bars, I , each pivotally connected near its lower end with the free end of a lever, D , and having connected with it the adjacent gate-bar, to lower the same by its rise and raise the same by its descent, two collapsible fluid-receivers, E , one confined against a side of each lever D and communicating with a suitable fluid-pump, bars H and H' near each post, connected together by cross-bars i , and two levers L , one upon the uppermost cross-bar i of each two bars H and H' , having each an arm, h , connected with the adjacent vertical bar I , and arms h' and h^2 , connected together on the opposite levers, substantially as described.

MORTIMER B. MILLS.

In presence of—

J. W. DYRENFORTH,
FRANK L. DOUGLAS.