

(No Model.)

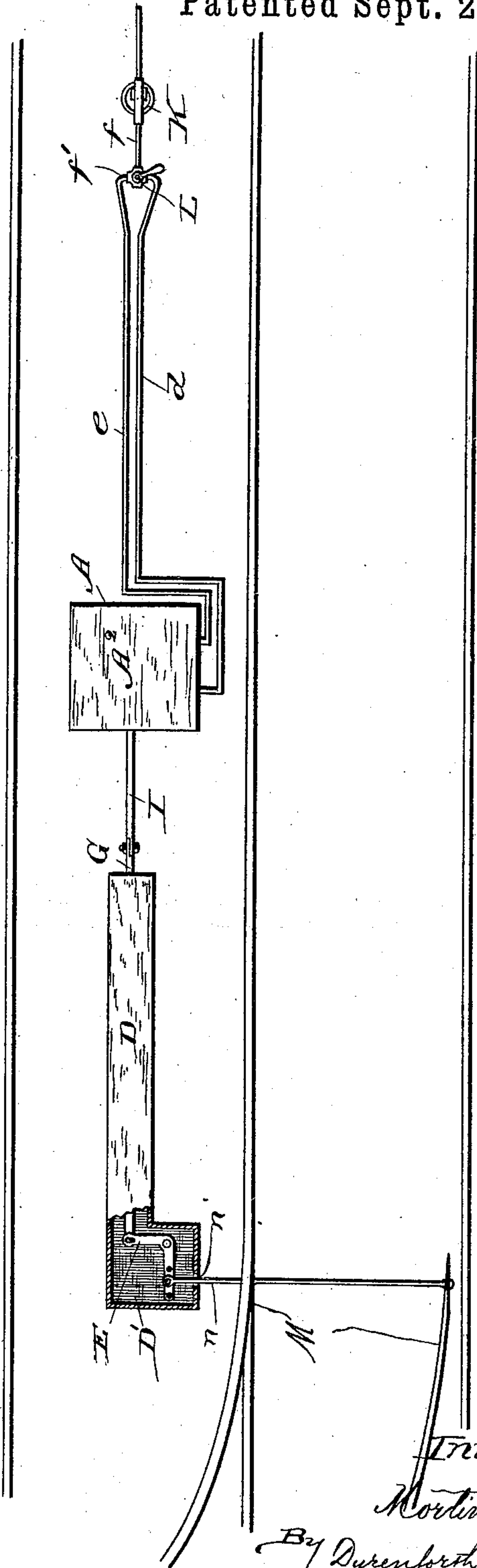
4 Sheets—Sheet 1.

M. B. MILLS.
RAILROAD SWITCH.

No. 370,642.

Patented Sept. 27, 1887.

Fig. 1.



Witnesses:
Chas. E. Gaylord.
Edward Thorpe.

Inventor:
Mortimer B. Mills,
By *Dyrenforth & Dyrenforth,*
Attys.

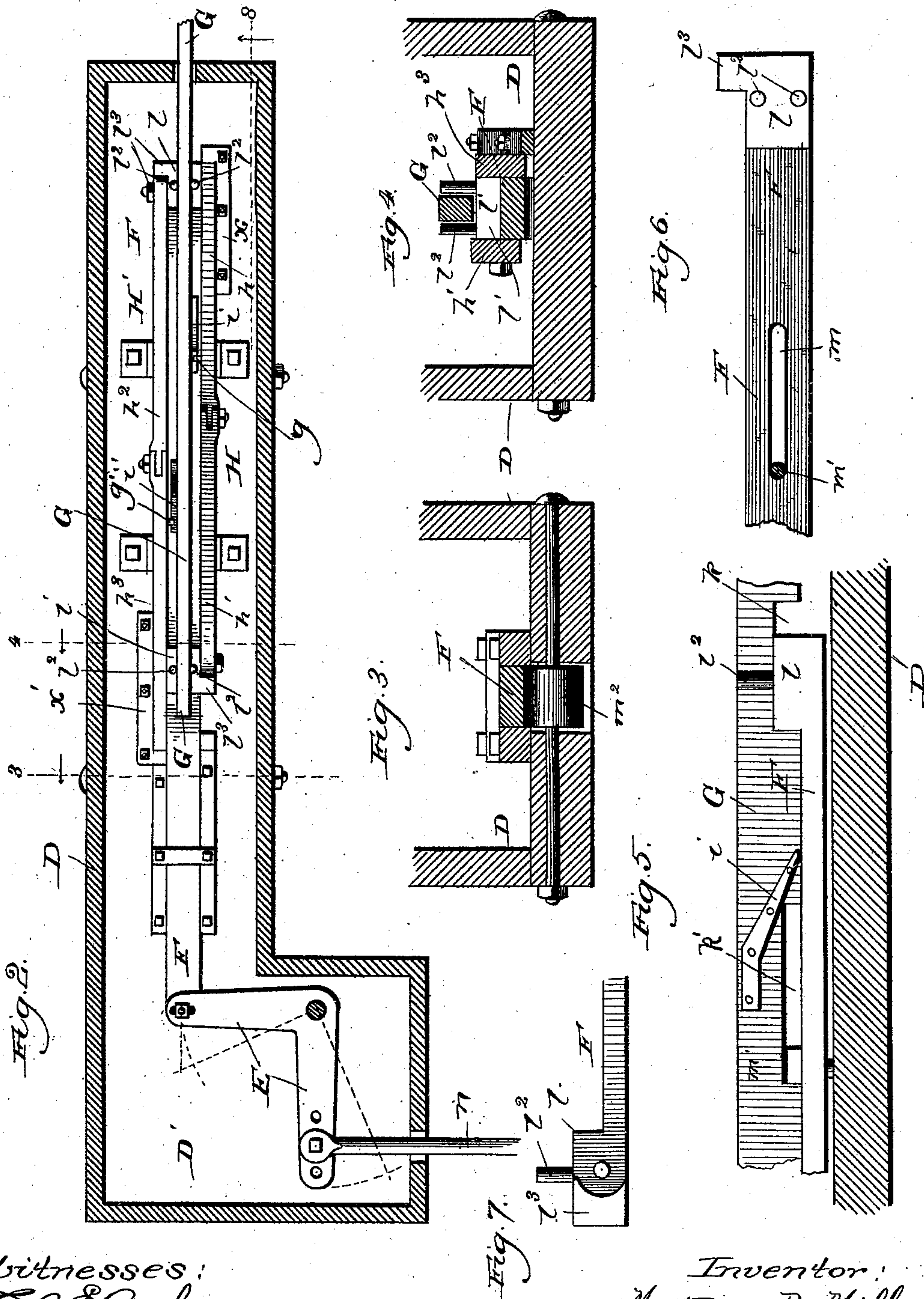
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4 Sheets—Sheet 3.

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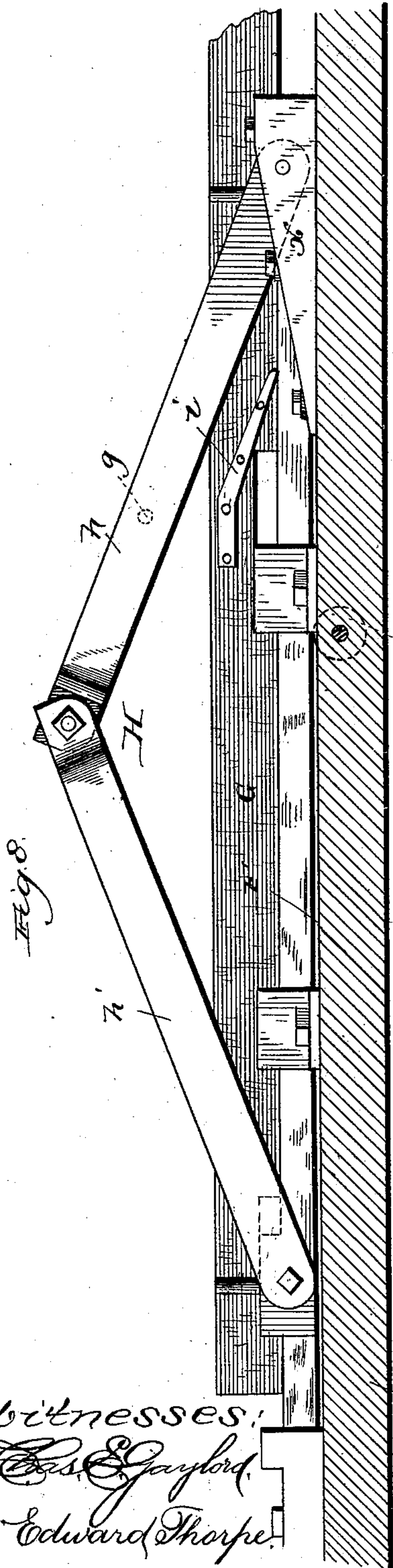


Fig. 8.

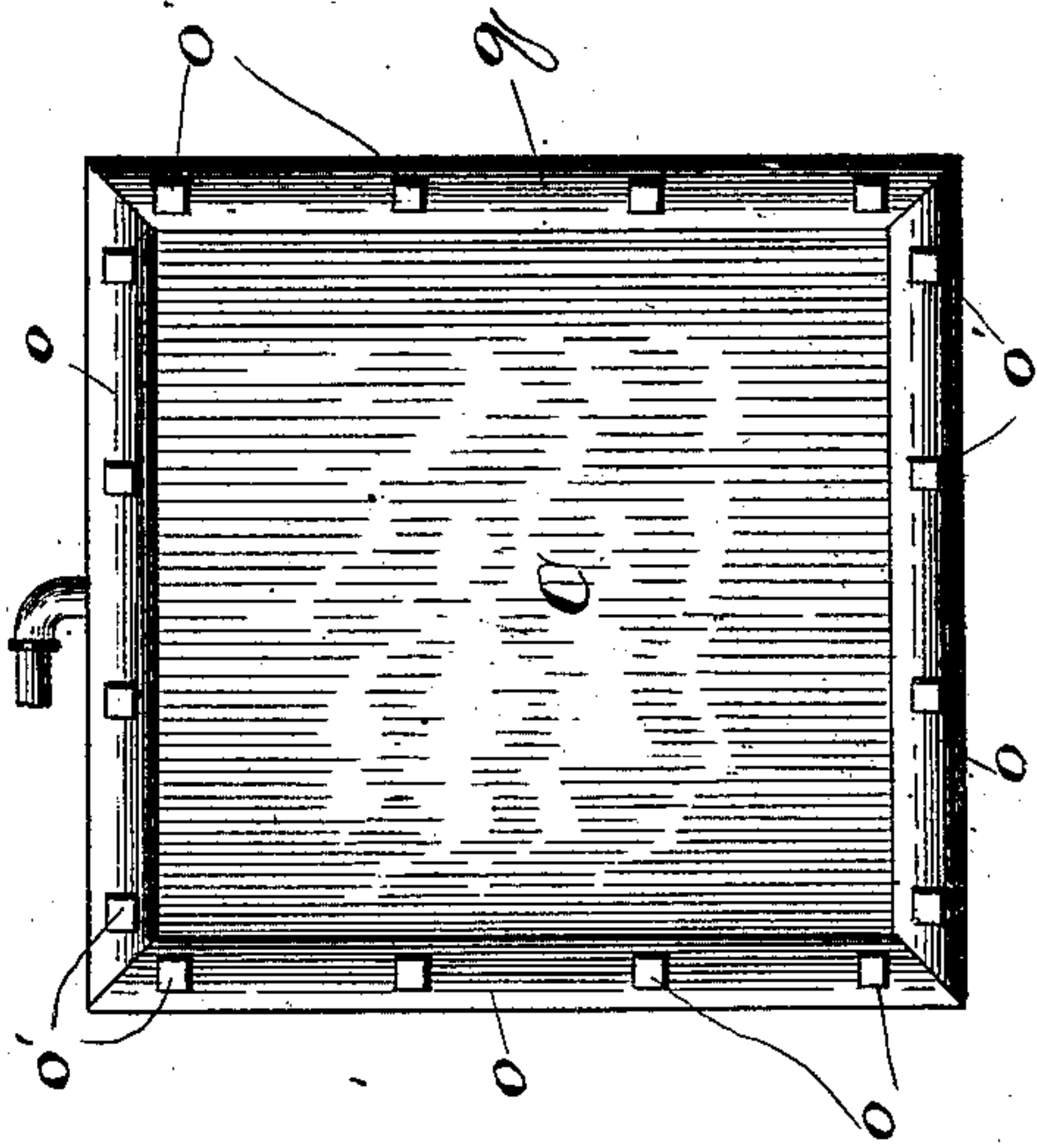


Fig. 10.

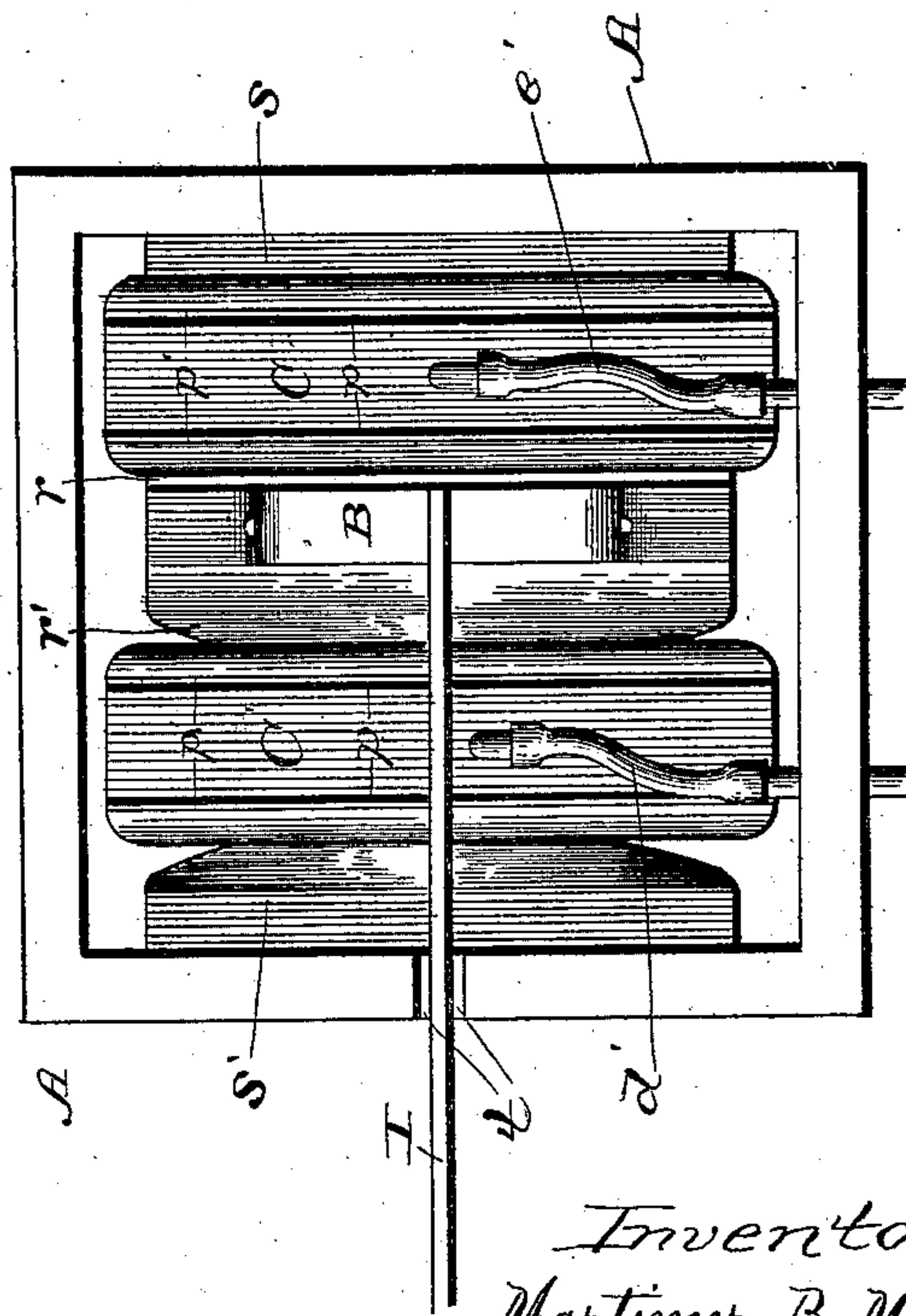


Fig. 9.

Witnesses:
Chas. E. Gaylord,
Edward Thorpe.

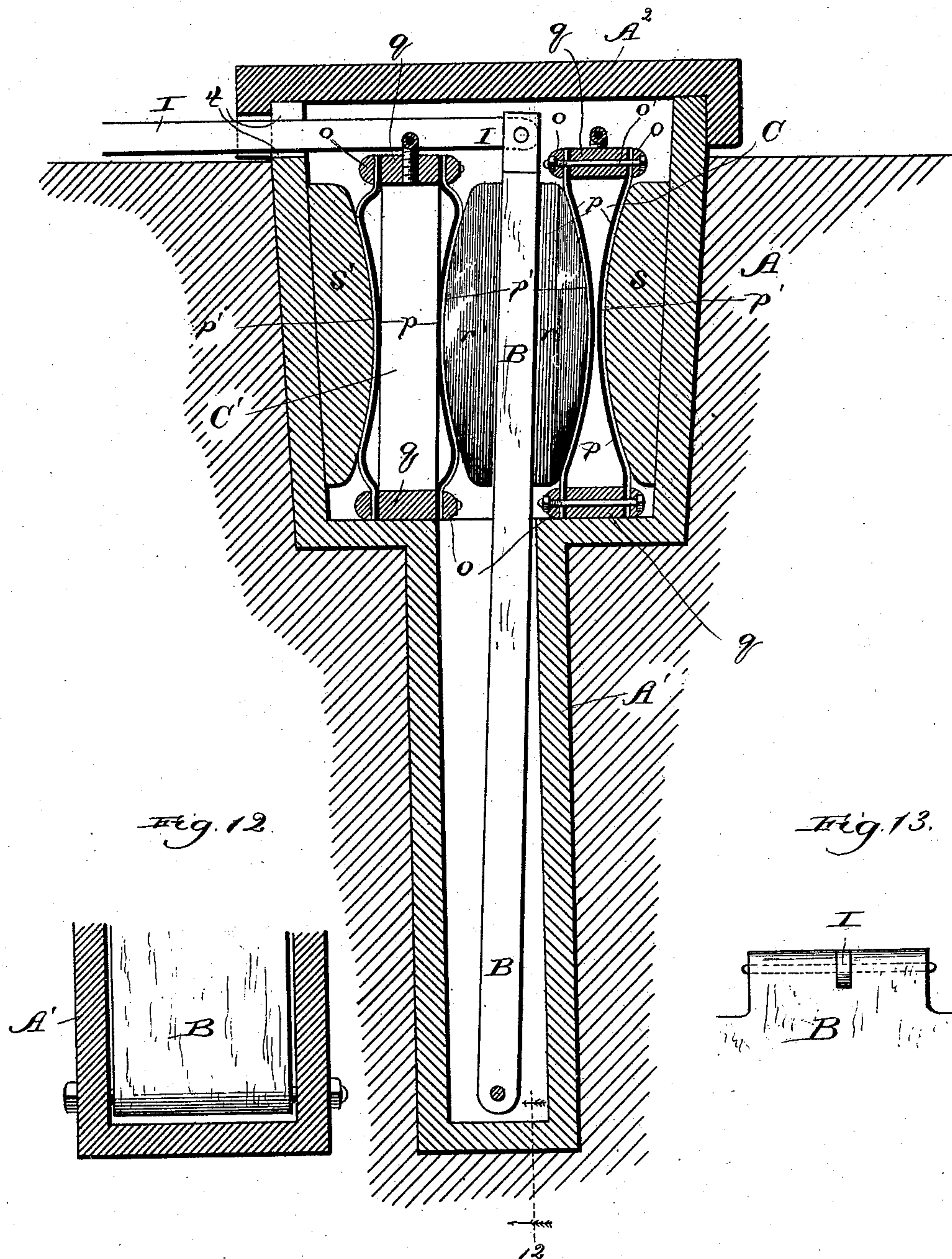
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4 Sheets—Sheet 4.

No. 370,642.

Patented Sept. 27, 1887.

Fig. 11.



witnesses:
 Jas. Gaylord.
 Edward Thorpe.

Inventor:
Mortimer B. Mills,
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UNITED STATES PATENT OFFICE.

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

RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 370,642, dated September 27, 1887.

Application filed March 25, 1887. Serial No. 232,380. (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 certain new and useful Improvements in Railroad-Switches; and I hereby declare the following to be a full, clear, and exact description of the same.

It is the object of my present invention to provide for the operation of railroad-switches by utilizing fluid-pressure as the actuating force, whereby the inconvenient method of moving the switches from switch-stands, now so commonly practiced, may be supplanted with advantage, and whereby systems of lever-connections with numerous switches from a single inclosure or "lookout house" (another method of more recent adoption) may be dispensed with for the more reliable and simple means involved in my invention.

In Letters Patent of the United States No. 348,856, granted me on the 7th day of September, 1886, I refer to my purpose of utilizing the mechanical movement therein set forth for operating switches, having in mind the subject of the present application, wherein I employ collapsible-receiver mechanism communicating with a suitable fluid-pump and operated to actuate a railroad-switch.

In connection with my present switch-actuating mechanism, I also provide novel means for automatically locking the switch in the positions to which it is moved, and which forms a very important feature for use with the fluid-actuating mechanism, though it is also capable of advantageous employment for locking switches actuated otherwise than by fluid-pressure.

My invention consists in collapsible-receiver mechanism communicating with a suitable fluid-pump and confined against an oscillatory lever connected with a switch, and an automatic lock for the switch actuated by the collapsible-receiver mechanism.

My invention also consists in details of construction and combinations of parts, all as hereinafter more fully set forth.

In the drawings, Figure 1 shows a plan view, partly broken, of my improvement between tracks of a railroad. Fig. 2 is an enlarged plan view of the automatic locking

mechanism and immediate connections, with the switch for moving it, in a box having its cover removed to display its contents. Fig. 3 shows a transverse section taken on the line 3 of Fig. 2, and viewed in the direction of the arrow. Fig. 4 is a similar view taken on the line 4 of Fig. 2, and viewed in the direction of the arrow; Fig. 5, a broken sectional view in side elevation of a portion of the locking mechanism shown in Fig. 2; Fig. 6, a broken plan view of a portion of the mechanism shown in Fig. 5; Fig. 7, a broken view in side elevation, showing a detail of construction; Fig. 8, a sectional view taken on the line 8 of Fig. 2, and viewed in the direction of the arrow; Fig. 9, a plan view of the collapsible-receiver mechanism in a receptacle having its cover removed; Fig. 10, a side elevation of a collapsible receiver or bag; Fig. 11, a sectional side elevation of the collapsible-receiver mechanism in operative position; Fig. 12, a section taken on the line 12 of Fig. 11, and viewed in the direction of the arrow; and Fig. 13, a side elevation of the top portion of the lever against which the collapsible-receiver mechanism is confined, showing its connection with the pivotal rod or bar leading to the locking mechanism.

A (see particularly Fig. 11) is a box or receptacle having an extension, A', with which it communicates at its lower end. Within the extension A', near its lower extremity, is pivoted a lever, B, in the form of a flat board, which extends into the box A near a height in line with a lateral opening, *t*, in the box, which is provided with a cover, A². Upon opposite internal sides of the box A, facing the opposite surfaces of the lever B, are blocks *s* and *s'*, having longitudinally convex or curved surfaces, and upon opposite surfaces of that portion of the lever B which is within the box are corresponding blocks, *r* and *r'*. Collapsible receivers or bags C and C' are confined in the box A, respectively, between the blocks *s* and *s'*, being supported on the base of the box at opposite sides of the opening to the extension A'. These bags, which are both alike, comprise each a rectangular frame, *q*, correspondingly-shaped sheets of rubber, *p*, coated about their edges with white lead, sheets of cotton duck or other suitable fabric, *p'*, coated

about their edges, imposed upon the rubber sheets, and clamped with the latter at the coated edges between the frame on opposite sides, and beading *o*, by bolts and nuts *o'*.

5 D, Fig. 2, is an oblong rectangular box having a head or enlargement, *D'*, at one end, as shown, and containing the immediate connections for operating and locking the switch, all as hereinafter described. The box D is
10 placed alongside of the track, as shown in Fig. 1, to bring the head or enlargement *D'* in line with the connecting-bar *n*, which enters it through an opening, *n'*, and is connected with one end of a bell-crank lever, *E*, placed hori-
15 zontally and pivoted at its angle in the head *D'*. To the opposite end of the bell-crank lever, at the elongated opening therein, as shown, is pivoted one end of a bar or rod, *F*, confined laterally and on its upper surface, as
20 shown in Figs. 2, 3, and 8, and provided with a longitudinal guide-slot, *m*, (see Fig. 6,) equal in length to the distance of throw of the switch, or to the desired extent of movement on its pivot of the bell-crank lever for throw-
25 ing the switch, as hereinafter described; and the longitudinal play of the bar *F* is limited to the length of the slot *m* by a bolt, *m'*, passed through the latter into the base of the box D, in which are friction-rollers *m''* at de-
30 sired intervals, upon which the bar *F* is supported to be moved longitudinally.

The bar *F* is provided, as shown in Fig. 2, on its upper side at one extremity with a shoulder or abutment, *l*, and a predetermined distance
35 from the same with a similar shoulder or abutment, *l'*, each shoulder carrying two parallel vertical guide-pins, *l''*, and a lateral extension or lip, *l'''*, curved or concaved on its inner face, as shown in Fig. 7, for a purpose here-
40 inafter described, the lips *l'''* on the two shoulders extending from opposite edges of the bar *F*.

G is a rod or bar imposed lengthwise upon the bar *F* between the guide-pins *l''*, and pro-
45 vided on its under side with recesses *k* to fit over the shoulders *l* and *l'* (see Fig. 5) and cause the under surface of the bar *G* to have contact with the upper surface of the bar *F*, except at a recess, *k'*, in the under side of the
50 bar *G*, which fits over the head of the bolt *m'*. The length of the recess *k'* is greater—that is, at least to the extent of the width of the head of the bolt *m'*—than that of either of the recesses *k*, which are equal in length, for a pur-
55 pose hereinafter stated. On opposite sides or lateral edges of the bar *G* are inclined planes or wedges *i* and *i'*, inclined in opposite direc-
tions and diagonally opposite each other.

H and *H'* are toggle-levers, one comprising
60 the pivotally-connected arms *h* and *h'* and the other the pivotally-connected arms *h''* and *h'''*. The arm *h* is pivoted at its rounded extremity to a strip or bracket, *x*, secured in the box D, and carries an inwardly-projecting pin, *g*, and
65 the arm *h'* is pivoted at its rounded extremity to the shoulder *l'* of the bar *F*, and fits into the concave surface of the lip *l'''* thereon. The

arm *h''* is pivoted at its rounded extremity to a strip or bracket, *x'*, secured in the box D, and carries an inwardly-projecting pin, *g'*; and
70 the arm *h'''* is pivoted at its rounded extremity to the shoulder *l* of the bar *F* and fits into the concave surface of the lip *l'''* thereon.

The box A A' is planted in the ground in line with the box D D', as shown in Fig. 1,
75 and any desired distance away from the last-named box, by burying it to a depth which allows the upper extremity of the part A and cover A' to project above the surface and bring the opening *t* in line with the rod *G*,
80 which is pivotally connected with the lever B, in the manner shown in Fig. 13, by a rod or bar, *I*.

K is an air-pump, located at any desired po-
sition and communicating with the bags C
85 and C' by means of a pipe, *f*, entering a cross-pipe, *f'*, containing a three-way cock, *L*, from which extends a pipe, *e*, entering the side of the box A and connected therein by flexible
tubing *e'* (see Fig. 9) with the bag C at its top,
90 and a pipe, *d*, entering the side of the box A and connected therein by flexible tubing *d'* with the bag C'.

The three-way cock *L* is of the well-known
kind, having a discharge-outlet through which
95 the air escapes from one of the bags C or C' while air is being forced into the other bag. A four-way cock will answer the same purpose, however.

The operation of the device is as follows:
100 Inspection of the drawings illustrating the toggle-lever-locking device will show that, owing to the connection of the two levers *H* and *H'* at their relatively opposite ends to the longi-
tudinally-reciprocating bar *F* and to the box
105 D (a stationary object) to straighten one of the levers the other must be bent or tripped. When the bar *F* is moved from the position shown in Fig. 1 inward, or into the box D to-
ward the enlargement *D'* thereof, it turns the
110 bell-crank lever to move the switch *M*, so as to connect the main with the siding until further movement is prevented by the straightening of the toggle-lever *H*. This inward movement
of the lever *F*, which thus straightens the tog-
115 gle-lever *H* to lock the switch in one position, trips the toggle-lever *H'* to release the switch in its other position. Movement subsequently
of the bar *F* in the opposite direction, as to
120 separate the main from the siding, will trip the toggle-lever *H* and straighten the toggle-lever *H'* to lock the switch in the position shown.

The tripping of one toggle-lever to permit the
straightening of the other to lock the switch is
125 produced by the engagement of the pin *g* or *g'* on the rod or bar *G*, with the inclined surface of the wedge *i* or *i'* in its path by longitudinal movement of the rod or bar *G*, which
moves a certain distance—the extent of the
130 difference between the length of the equally-long slots *k* and the width of the respective heads *l* and *l'*—before the necessary abutment of the slots *k* against the heads *l* is produced

to move the bar F. Thus before the bar F is moved the straight one of the toggle-levers is tripped, when movement of the bar F ensues with the attendant straightening of the other toggle-lever, and consequent movement and ultimate locking of the switch. Movement of the rod or bar G is produced by expanding one of the receivers C or C' with air forced into it from the air-pump K, which is attended with the collapse of the other receiver by the exhaustion of its contents through the escape in the cock L. Thus, to move the bar G inward, air is forced into the bag C, expanding it against the lever B and moving the latter in the direction in which it is desired to move the bar G; and to move the bar G outward air is forced into the bag C' with the opposite effect upon the lever B, the cock L being turned in either instance to produce communication of the pump with one bag and of the other bag with the open air.

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

1. The combination, with a switch, of a collapsible-receiver mechanism, a fluid-pump communicating with the said collapsible-receiver mechanism, an oscillatory lever against which the said collapsible-receiver mechanism is confined, and an automatic lock for the switch actuated by the said collapsible-receiver mechanism, substantially as described.

2. The combination, with a switch, of an oscillatory lever, B, collapsible receivers C and C', confined against opposite sides of the said lever and communicating controllably with a fluid-pump, and an automatic lock connecting the said lever with the switch and actuated by the said collapsible receivers, substantially as described.

3. The combination, with a switch, of bags C and C', each comprising a frame, *g*, and sheets of rubber covered with fabric secured near the edges to the frame, an oscillatory lever, B, confined between the bags C and C' and connected with the switch, and a fluid-pump controllably communicating with the said bags, substantially as described.

4. The combination, with a switch, of a box, A, planted in the ground, an oscillatory lever pivotedly supported in the box and connected with the switch and provided with blocks *r* and *r'* on opposite sides, blocks *s* and *s'* on opposite sides of the box A, respectively, adjacent to the blocks *r* and *r'*, bags C and C', confined in the box on opposite sides of the lever B, between the blocks *s* *r* and *s'* *r'*, and com-

prising each a frame, *g*, and sheets of rubber covered with fabric secured near the edges to opposite sides of the frame, and a fluid-pump controllably communicating with the said bags, substantially as described.

5. The combination, with a switch, of a reciprocating bar, F, toggle-levers H and H', secured at opposite ends to opposite sides of the bar F, and at their other ends each to a stationary object, and a bar directly connected to the bar F to reciprocate it and to trip the said toggle-levers alternately before moving the said bar F, substantially as and for the purpose set forth.

6. The combination, with a switch, of a reciprocating bar, F, a lever, E, connecting the said bar with the switch, toggle-levers H and H', having lateral pins *g* and *g'*, and secured at opposite ends to opposite sides of the bar F and at their other ends each to a stationary object, and a bar, G, having wedges *i* and *i'* on opposite sides and inclining in opposite directions to be engaged by the said pins, the said bar G being connected with the bar F to be reciprocated thereon a desired distance independently of the same and trip a toggle-lever, and, after tripping a toggle-lever, move the bar F, substantially as and for the purpose set forth.

7. The combination, with a switch, of a reciprocating bar, F, having heads *l* and *l'*, a lever, E, connecting the said bar with the switch, toggle-levers H and H', having lateral pins *g* and *g'*, and secured at opposite ends to opposite sides of the heads *l* and *l'* and at their other ends each to a stationary object, and a bar, G, having recesses *k* and imposed upon the bar F, substantially as and for the purpose set forth.

8. The combination, with a switch, of a reciprocating bar, F, having heads *l* and *l'*, a lever, E, connecting the said bar with the switch, toggle-levers H and H', having lateral pins *g* and *g'*, and secured at opposite ends to opposite sides of the heads *l* and *l'* and at their other ends to a stationary object, a bar, G, having recesses *k* and imposed upon the bar F, an oscillatory lever, B, connected at its free end with the bar G, and collapsible receivers C and C', confined against opposite sides of the lever B and communicating with a fluid-pump, substantially as described.

MORTIMER B. MILLS.

In presence of—

GRANVILLE W. BROWNING,
J. W. DYRENFORTH.