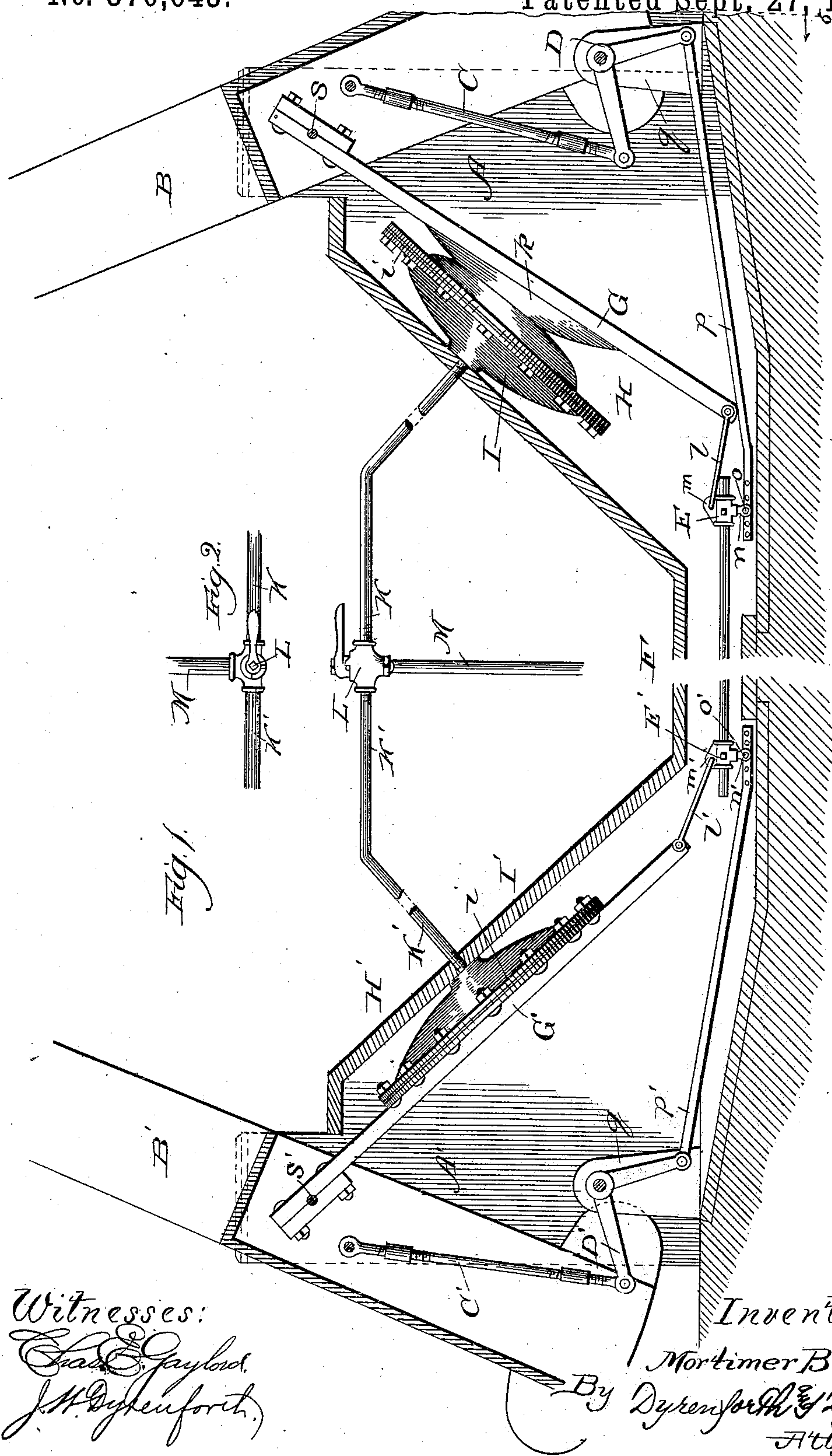


2 Sheets—Sheet 1.

GATE.

Patented Sept. 27, 1887.



Witnesses:
 Chas. E. Gaylord.
 J. H. Dykenforth.)

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(No Model.)

2 Sheets—Sheet 2.

M. B. MILLS.

GATE.

No. 370,643.

Patented Sept. 27, 1887.

Fig. 3.

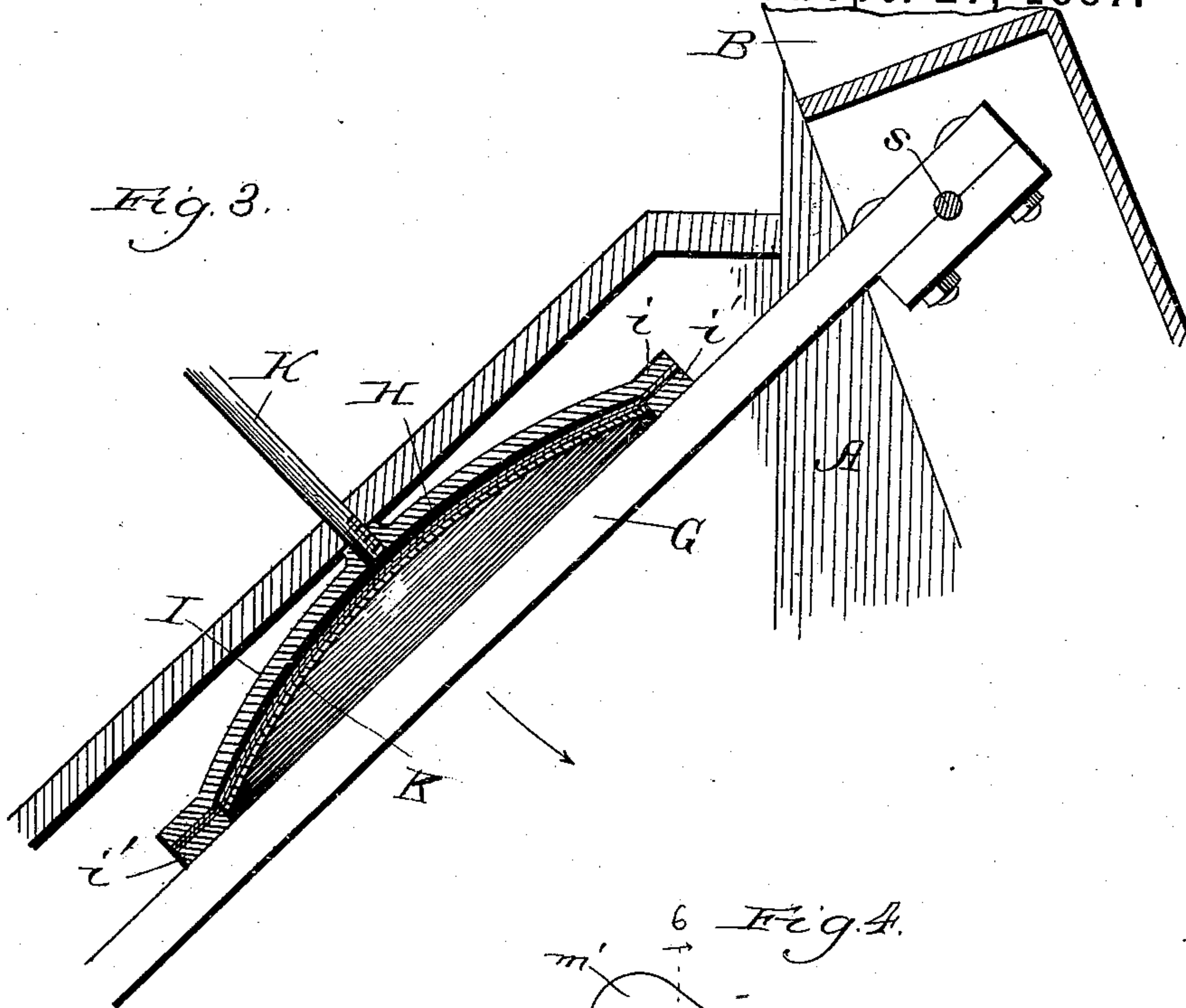


Fig. 4.

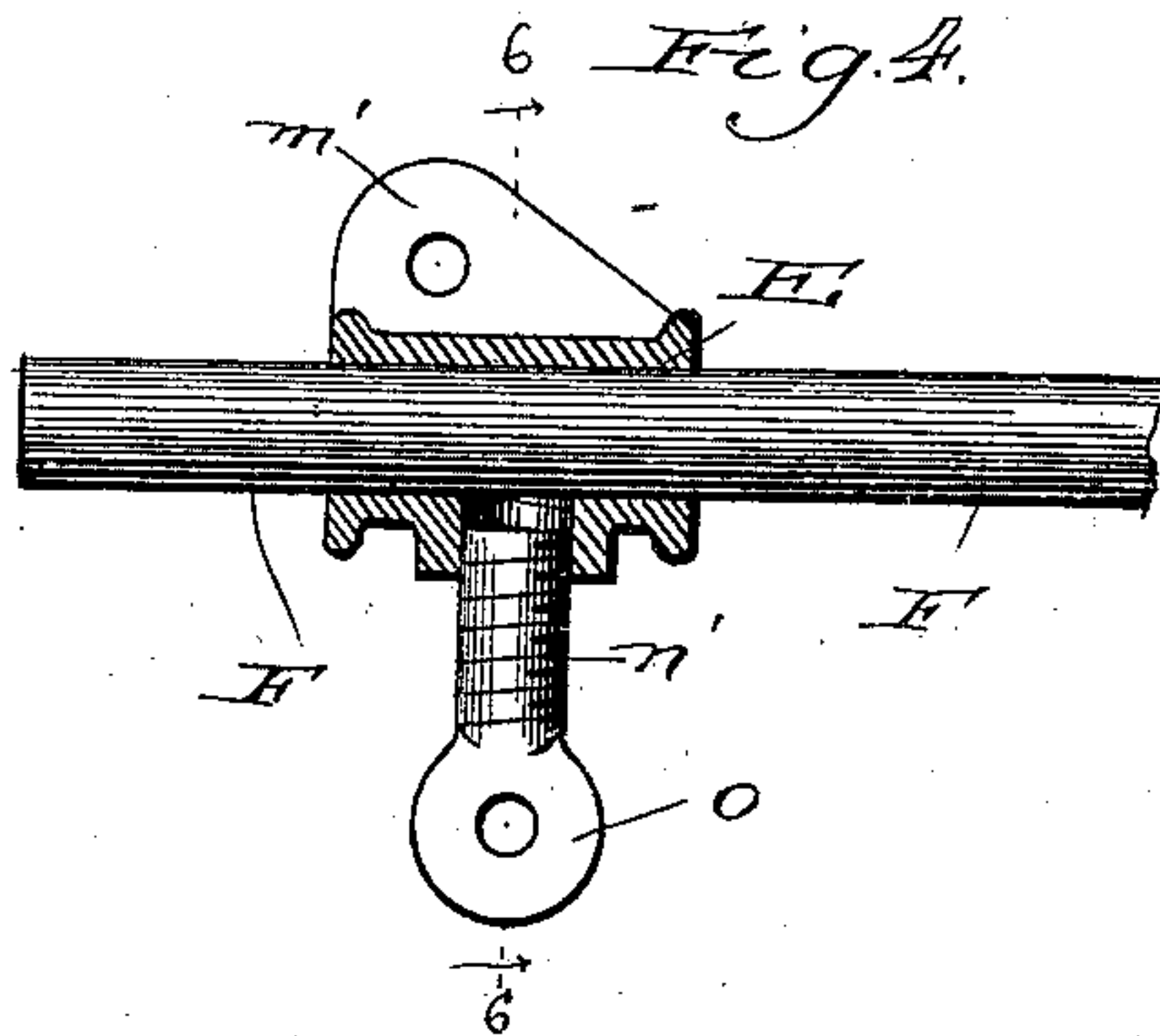


Fig. 5.

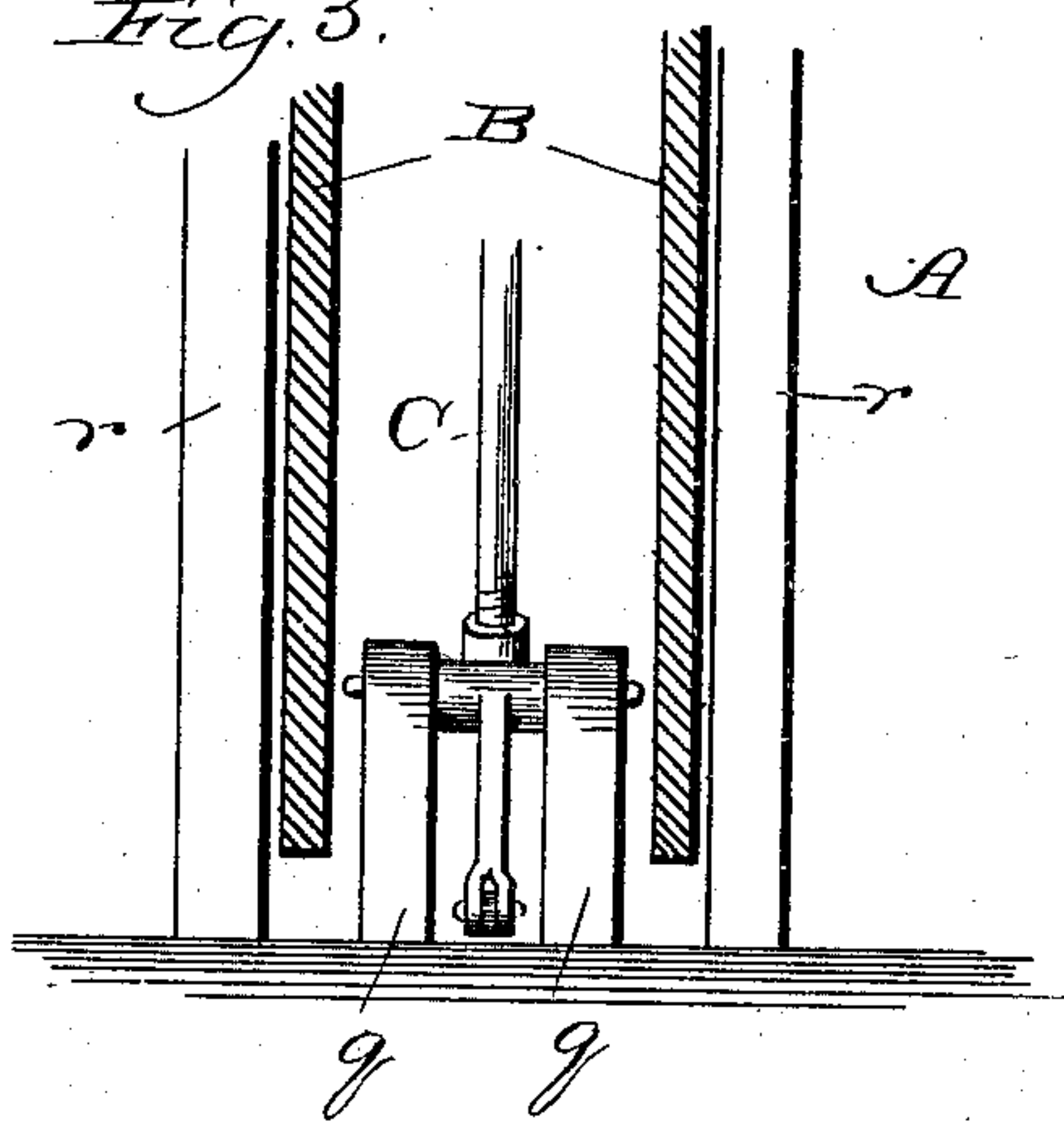
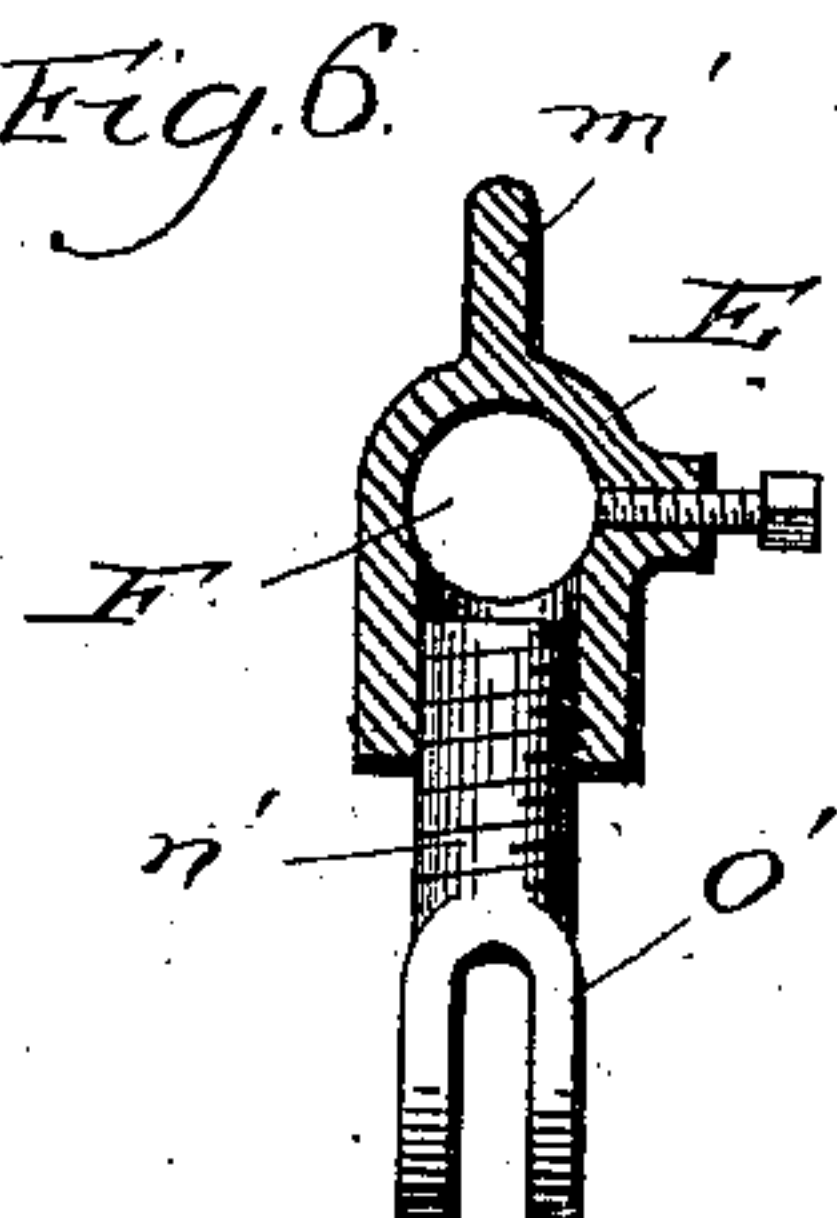


Fig. 6.



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UNITED STATES PATENT OFFICE.

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

GATE.

SPECIFICATION forming part of Letters Patent No. 370,643, dated September 27, 1887.

Application filed May 25, 1887. Serial No. 239,308. (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 invention relates to an improvement in the mechanism for operating the swinging bars of gates of the kind used most commonly at railroad-crossings and actuated by fluid-pressure—ordinarily air-pressure.

A difficulty encountered in the use of gates of the foregoing character consists in a tendency in the bars forming a pair which produce the barrier by being swung toward each other to lack uniformity in their movements, whereby one rises and falls to its extreme positions before the other, the difficulty referred to being increased by wind blowing in the direction of the movement of a bar, and being especially noticeable where long bars are required to form the barrier. To overcome this difficulty, various means have been provided for tying together the bars forming a pair to cause the rise or descent of one to raise or lower with it the other and thereby occasion uniformity in their movements, notwithstanding the wind.

My present improvement relates particularly to novel means for tying together, for the purpose stated, the bars forming a pair, although it is also useful, as will hereinafter be more fully explained, for a single swinging bar, when used to form the barrier, to raise or lower it. Being designed particularly, however, for connecting the swinging arms forming pairs, as and for the purpose aforesaid, I confine my description in the main to its application to such purpose, as illustrated in the drawings, in which—

Figure 1 is a broken sectional side elevation of a pneumatic railroad-crossing gate comprising swinging bars on posts and provided with my improvement. Fig. 2 is a broken plan view of the pipes communicating with the air-pump, and showing the three-way cock; Fig. 3, an enlarged view in broken side elevation of the collapsible-receiver and lever mechanism applied to a bar; Fig. 4, a broken sectional

plan view of a detail; Fig. 5, a section taken on the line 5 of Fig. 1, and viewed in the direction of the arrow; and Fig. 6, a section taken on the line 6 6 of Fig. 4, and viewed in the direction of the arrows.

A and A' are posts, each of the kind formed of two parallel uprights, *r*, Fig. 5.

B and B' are the swinging bars, of ordinary construction with a view to lightness, supported, respectively, between the uprights forming the posts to swing in a vertical plane toward and from each other on shafts *s* and *s'*.

C and C' are links, composed, for the sake of lightness, of gas-pipe, pivoted at their upper ends, respectively, to the bars B and B', to corresponding sides of the axes, preferably, as shown in Fig. 1, toward the rear ends of the bars, or behind the axes thereof. The link C is pivotally connected at its lower end to one end of a bell-crank lever, D, supported at its angle to hang between bearings *q* between the uprights forming the post A at the base of the latter, and the link C' is similarly connected to a bell-crank lever, D', supported like the bell-crank lever D.

Links *p* and *p'* are pivoted, as shown in Fig. 1, to the opposite ends of the respective bell-crank levers, and extend toward each other to the transversely-perforated slotted heads *o* and *o'* of threaded shanks *n* and *n'*, screwed laterally into sleeves E and E', connected by a rod, F, (formed preferably of gas-pipe,) secured toward its opposite ends in the sleeves by means of set-screws, as shown. The links *p* and *p'* extend at their adjacent ends through the slots in the heads *o* and *o'*, and are secured therein by means of pins inserted through openings in the ends of the links made to coincide with the transverse openings in the heads. Several openings are provided along the end of each link *p* and *p'*, to permit them to be lengthened and shortened. From the sides of the sleeves E and E', opposite the points at which the threaded shanks *n* and *n'* are inserted, perforated ears *m* and *m'* extend.

G is a lever in the form of a flat board pivotally connected at its upper end, as shown, to the axis *s* of the arm B, to swing loosely on such axis, being between the side bars of the arm, and extending from its fulcrum obliquely downward toward the end of the connecting-

rod F, provided with the sleeve E, with which it is connected at the ear *m* by a link, *l*.

G' is a lever exactly like the lever *G* in form and in the manner of its connection to the axis *s* of the arm *B* and ear *m'* of the sleeve *E'* by means of a link, *l'*. Upon the adjacent surfaces of the levers *G* and *G'* are convex bearings *k*, Fig. 3, and respectively over the bearings *k* collapsible receivers *H* and *H'* are supported flatwise. The receivers *H* and *H'* comprise concavo-convex shields *I* and *I'* and diaphragms, each formed preferably, for the sake of strength, of two sheets or thicknesses of material, as shown—I employ rubber and canvas—clamped at their edges between flanges *i* on the shields, and frames *i'* underneath the flanges, to which they are bolted, as shown in Fig. 1, to secure the diaphragms around their edges to the shields and render the collapsible receivers thus formed by the shields and diaphragms air-tight.

The operating mechanism thus described is boxed in, as shown in Fig. 1, and the links *p* *p'* and mechanism directly connecting them may be below the surface of the ground to a depth that will permit the imposition of a cover over them flush with the surface of the same, as represented, to avoid obstructing the street.

Pipes *K* and *K'* enter the upper sides of the shields *I* and *I'* and boxing, and support the collapsible receivers in position with relation to the levers *G* and *G'*, to which, however, the collapsible receivers are in no way fastened, and the pipes communicate controllably through a three-way cock, *L*, conveniently located, with a supply-pipe, *M*, leading to an air-pump of ordinary construction (not shown) and with the open air—that is to say, the construction of the three-way cock (which is old) is such that when one pipe *K* or *K'* communicates through it and the supply-pipe with the pump the other communicates through the three-way cock with the open air.

From the foregoing description it will be seen that by pulling the connecting-rod *F* in one direction both bars will be lowered simultaneously and uniformly, and by pulling it in the opposite direction they will be raised in the same way. The direction of the pull for either purpose of lowering or raising depends of course upon the location of the connection of the links *C* and *C'* to the arms, whether in front of the axes or behind them. In either case the location is such as to avoid a dead-center, being nearest the outer sides or backs of the arms, as shown.

The pulling alternately in opposite directions of the connecting-rod *F* is effected from the levers *G* and *G'* by expanding and collapsing the receivers *H* and *H'*. Thus, when it is desired to lower the bars with the mechanism arranged as shown, the three-way cock *L* is turned to open communication of the receiver *H'* with the pump and of the receiver *H*, through the three-way cock, with the open air. By operating the air-pump the bag *H'* is expanded against the lever *G'*, thereby turn-

ing the latter toward the post *A'* on its fulcrum *s'* and pulling the connecting-rod *F* and incidentally the links *p'* and *p* in a direction to turn the bell-crank levers *D'* and *D* to raise the links *C'* and *C*, and thereby tip the arms *B* and *B'* toward each other. The movement of the lever *G*, which is in a direction opposite to that of the lever *G'*, forces out the contents of the receiver *H*, introduced by the previous operation to raise the bars. This last-named operation pulls the connecting-rod *F* and links *p* and *p'* in the direction opposite to that described, thereby turning the bell-crank levers in a direction to pull the links *C* and *C'* downward. The convex bearings *k* on the levers are useful, particularly in serving to thoroughly collapse the receivers when the adjacent levers *G* and *G'* are forced against them.

The tying mechanism affords means for operating with ease the gate-bars uniformly and simultaneously, which means transmit great force with comparatively little exertion, and the same advantage is attained when a single gate-bar disconnected from any other—that is, devoid of the connecting-bar *F*—is operated by a bag, *H*, and lever *G*, connected with a link, *p*, bell-crank lever *D*, and link *C*, connecting the link *p* with a gate-bar, *B*. When the mechanism is confined to a single gate-bar, inasmuch as the latter is then actuated only in one direction by air-pressure, the side of the axis *s* opposite to that at which the link *C* is connected should be weighted to cause it to assume the desired position automatically when the bag is collapsed.

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

1. In a gate having a vertically-swinging bar, the combination, with the swinging bar, of a bell-crank lever pivoted at its angle to move in a vertical plane, and connected from one end with the swinging bar to one side of its axis, a lever fulcrumed near one end to a stationary support, and connected from its opposite end with the opposite end of the bell-crank lever, and a collapsible receiver confined against the said lever and communicating with a fluid-pressure supply, substantially as and for the purpose set forth.

2. In a gate having a vertically-swinging bar, the combination, with the swinging bar, of a bell-crank lever pivoted at its angle to move in a vertical plane, and connected from one end with the swinging bar to one side of its axis, a lever provided on one side with a convex projection, and fulcrumed near one end to a stationary support and connected from its opposite end with the opposite end of the bell-crank lever, and a collapsible receiver confined against the said lever and communicating with a fluid-pressure supply, substantially as and for the purpose set forth.

3. In a gate having a vertically-swinging bar, the combination, with the swinging bar, of a bell-crank lever pivoted at its angle to move in a vertical plane, a link connecting one end of the bell-crank lever with the swinging bar

to one side of its axis, a lever fulcrumed near one end to a stationary support, a collapsible receiver confined against the said lever and communicating with a fluid-pressure supply, and a link connecting the free end of the said lever adjustably with the opposite end of the bell-crank lever, substantially as and for the purpose set forth.

4. In a gate, the combination of two vertically-swinging bars, B and B', and means for connecting the bars together to cause the rise or descent of one to raise or lower with it the other, comprising bell-crank levers D and D', connected from corresponding ends with the gate-bars to corresponding sides of their axes, levers G and G', fulcrumed near their upper ends to stationary supports, and connected together from their lower ends and with the opposite ends of the bell-crank levers, and collapsible receivers H and H', confined against the levers G and G', and controllably communicating with a fluid-pressure supply, substantially as and for the purpose set forth.

5. In a gate, the combination of two vertically-swinging bars, B and B', and means for connecting the bars together to cause the rise or descent of one to raise or lower with it the other, comprising bell-crank levers D and D', links C and C', connecting the bell-crank levers from corresponding ends with the swinging bars to corresponding sides of their axes, levers G and G', fulcrumed near their upper ends to stationary supports, a connecting-rod, F, carrying toward opposite ends sleeves E and E', with which the free ends of the said levers are connected, links p and p', connecting the said sleeves with the opposite ends of the bell-crank levers, and collapsible receivers H and H', confined against the levers G and G', and controllably communicating with a fluid-pressure supply, substantially as and for the purpose set forth.

MORTIMER B. MILLS.

In presence of—

GEORGE C. COOK,
J. W. DYRENFORTH.