

(No Model.)

F. W. MILLS.
RAILWAY GATE.

No. 488,322.

Patented Dec. 20, 1892.

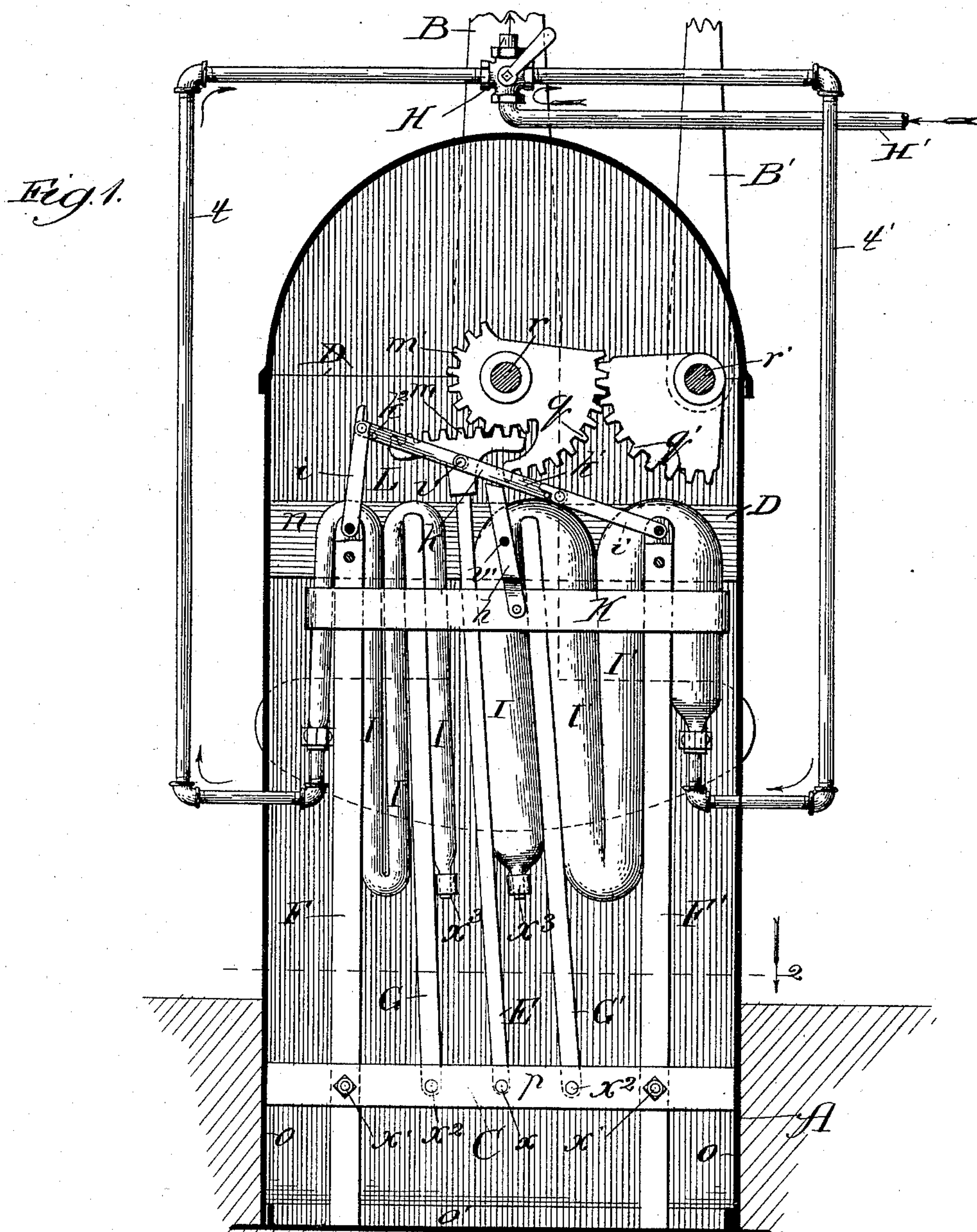
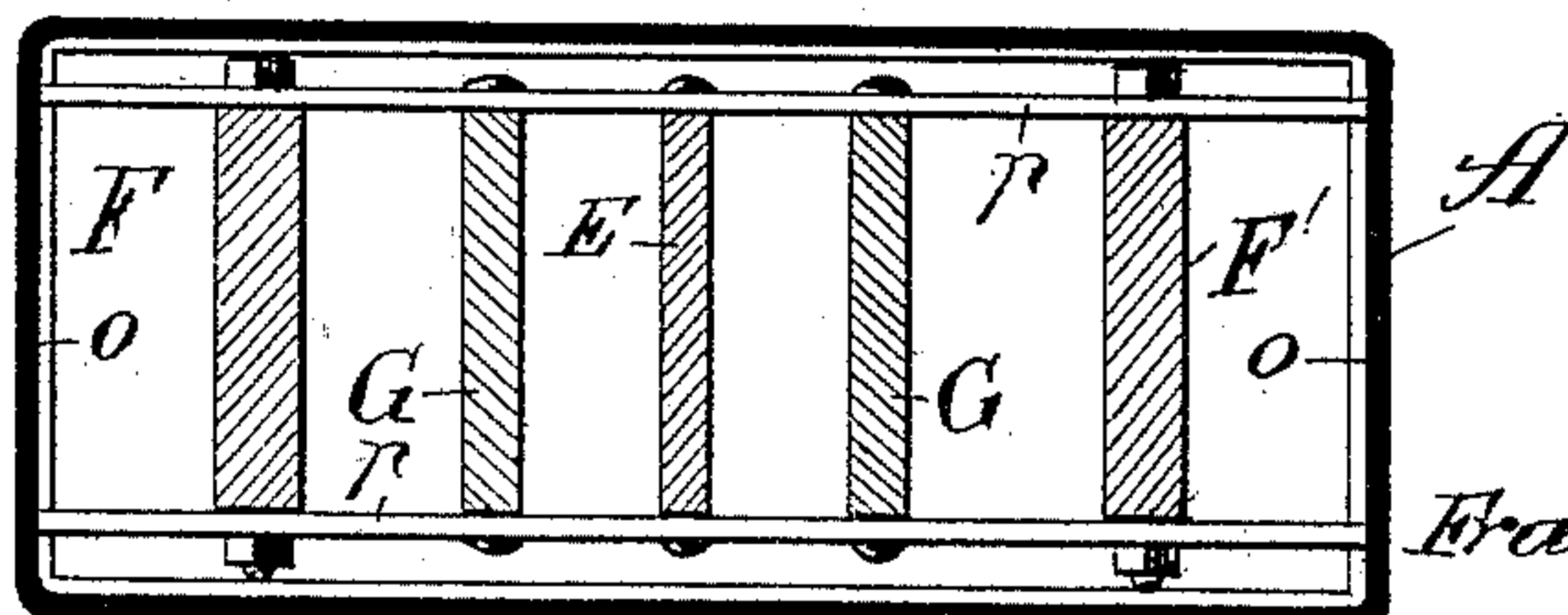


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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RAILWAY-GATE.

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To all whom it may concern:

Be it known that I, FRANK W. MILLS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Railway-Gates, of which the following is a specification.

My invention relates to an improvement in the pneumatic operating mechanism for air-gates of the class adapted for use as railroad crossing barriers.

My objects are to provide an air-gate having reliable, durable, easily operative, simple and comparatively inexpensive pneumatic mechanism for actuating it; and to provide a peculiarly simple and effective automatic lock to cooperate with the gate-actuating mechanism in locking and unlocking the gate arm or arms.

In the accompanying drawings, Figure 1 is a broken view in sectional elevation representing a gate-post supporting a swinging road and a swinging side-walk barrier-arm and provided with my improved actuating and locking mechanism; and Fig. 2 is a section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow.

A is a hollow gate-post of usual or any suitable form and material, supporting on a pivotal axis r a gate-arm B, to afford the road-barrier. The gate may also, but not necessarily, have a side-walk barrier which is represented as comprising an arm B' on a pivotal axis r' journaled in the post and carrying a segmental series of gear-teeth q' meshing with a similar series of corresponding teeth q on the axis r . Inside the post, near its base, is frame C rigidly united by its side bars p with the ends o of the post; and in the upper portion of the post is a similar frame D, the sides n of which should, however, be vertically wider than those of the lower frame.

E is a lever pivotally supported at its lower end, as at x , between the side-bars p of the frame C, extending thence upward through the frame D, and carrying at its upper end a segmental rack m meshing with a pinion or segment m' of a pinion on the shaft r .

As shown and as will hereinafter appear, the gate-arm actuating mechanism is duplicated in one post, one part being adapted to effect lowering of the barrier and the other to

effect raising thereof. The arrangement may, however, be otherwise, as hereinafter suggested.

F and F' are bars fitting edgewise between the frame-bars p near the opposite sides o of the post, and bearing on the base o' of the post, being fastened, as by bolts at x' , between the side-bars p and extending thence upward between the sides of the frame D to which they are also bolted.

G and G' are levers fulcrumed, as at x^2 , between the sides of the rigid frame C respectively adjacent to the bars F and F', and extending thence upward between the sides n of the rigid frame D.

An air-pressure supply which may be in the form of an air-pump, (not shown, but supposedly located in the cabin of the gate operator) has its outlet H' controllable through the medium of a suitable valve H, in the present instance a four-way valve though it may under some conditions of the mechanism be a three-way valve; but the construction of neither form is shown in detail in the drawings, because it is old and well-known, in connection with air-gates. From the valve H proceed two outlets t and t' , between which is the pipe H'; and the valve is adjustable to produce communication of the pipe H' with either outlet and of the other outlet with the open air. The outlets t and t' connect with or terminate in collapsible and inflatable tubes I and I' of material impervious to air, such as rubber hose, each being closed at its extremity, as represented at x^3 . The tube I passes from the pipe t up one side of the stationary bar F, then over the latter and down its opposite side, thence up the adjacent side of the lever G, over the latter and down its opposite side, the terminal length of the tube being thus confined between the levers E and G and the folded double length thereof between the lever G and stationary bar F. The tube I' passes from the pipe t' up one side of the bar F', then over the latter and down its opposite side, thence up the adjacent side of the lever G', over the latter and down its opposite side, the terminal length of this tube being confined between the levers E and G' and the folded double length thereof between the lever G' and stationary bar F'.

K is a band or ring extending, free, trans-

versely about the bars F and F' below the frame D, and thereby closely embracing the hose and all intermediate parts of the mechanism.

5 As thus far described, the mechanism operates as follows: The gate-arms B and B' are represented as up, to which position they may have been brought by turning the valve H to open communication with the pump of the
10 outlet t' and to open that of the outlet t with the open air. Then, on working the pump, air-pressure will have been forced into the tube I' inflating it to an extent sufficient to turn the lever G' in the direction toward the
15 lever E, thereby also forcing the terminal length of the tube against the lever E to turn it sufficiently to cause it, by engagement between its rack m and the pinion m' , to turn the gate-axis and raise the arms. The tube
20 I is meantime collapsed (being open to the outer air,) by the consequent pressure of the lever E against it, whereby it compresses the folded double length of the tube I between the lever G and the bar F. To lower the gate-
25 arms the valve H is adjusted to open the tube I' to the outer air and admit air-pressure into the tube I, when the effect on the parts is the reverse of that described.

L is an automatic lock shown as involving
30 the following described details: A jointed bar k is pivoted near its joint v to the lever E near its segment-head end; and links i and i' connect the jointed bar from its opposite ends with the upper ends, respectively, of the bars
35 F and F', the connection between each link and the end of the bar k being of a stop-joint form to prevent downward bending of the link-joint when the link is brought into alignment with the bar. A trip-finger h is piv-
40 otally supported between its ends, as at v' , in the frame D and is pivotally connected at its lower end with the frame K, extending at its upper end under the bar k .

In the relations of the parts as represented
45 the gate-arms are locked in their raised positions, since the bar k and link i' form a straight line from the pivotal connection of the bar with the lever E to the connection of the link with the rigid stop-bar F'.

50 To unlock the arms prior to lowering them the operation is as follows: The frame K is horizontally movable, being moved in either direction by inflating one tube while collapsing the other. As the end length of a tube
55 into which the air-pressure is forced will expand first, obviously the frame K will be moved slightly before the lever E begins to act to turn the gate-bar B. Thus, when the valve H is turned to admit the pressure into the inlet-end of the tube I, with the parts in
60 the relative positions illustrated, the frame K will be pulled in the direction (toward the left, facing Fig. 1) that will cause the trip-finger h to move, at its free end, in the con-
65 trary direction against the part k' of the jointed bar k in a manner to bend upward the joint with the link i' , which had been

previously straight to resist any strain on the arms (as from the wind) tending to lower them, which strain will be effectually resisted
70 because exerted through the lever E in a straight line from its pivot to the rigid bar F'. When the gate-arms are down, the operation of lowering them will thus have
75 straightened the joint between the link i and part k^2 of the jointed bar k thereby causing any strain of lifting them to be resisted by being exerted, then, in a straight line from the pivot of the bar k against the rigid stop-
80 bar F; and in the then relative positions of the parts, the shifting of the frame K toward the left and turning of the lever E toward the right will have brought the trip-finger h
85 under the part k^2 (then inclining upwardly from its link) of the bar k . Forcing air then into the tube I to raise the gate-arms will cause the primary action to be that of shift-
90 ing the frame K toward the right, causing the free end of the trip-finger h to move toward the left against the part k^2 of the bar k and thus break the joint with the link i and per-
95 mit the lever E to be turned in the desired direction.

Obviously, one tube I or I' and its attendant parts will suffice for my purpose provided
95 other means (such as a weight) be employed for working the gate in one direction, or, where the gate involves two or more arms connected together in a manner whereby rais-
100 ing or lowering of one raises or lowers with it the other, the post of one gate-arm B may contain one of the sets of actuating means comprising an air-tube and attendant parts and that of another, or companion-arm B may
105 contain the other set, the two sets being arranged to operate accordingly; and the application of my improvement may be changed in various ways too obvious to require illus-
110 tration without thereby departing from the spirit of my invention. Of course, also, my lock may be single-acting, or operative to un-
lock in one direction only by omitting one section of the bar k and the link connected with it.

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

1. In combination with a gate-post and a swinging arm thereon, a lever E in the post geared directly to the axis of the arm to operate it by turning on its fulcrum, a suitable
120 stop in the post, a lever fulcrumed in the post adjacent to the lever E, a collapsible and expansible tube closed at one end and extended and confined between the said levers and be-
125 tween the stop and adjacent lever, and air-pressure mechanism for directing air under pressure into the said tube, substantially as and for the purpose set forth.

2. In combination with a gate-post and a swinging arm thereon, a lever E in the post
130 connected with the arm to operate it by turning on its fulcrum, a suitable stop in the post, a lever fulcrumed in the post adjacent to the lever E, a collapsible and expansible tube

closed at one end and extended and confined between the said levers and between the stop and adjacent lever, air-pressure mechanism for directing air under pressure into the said tube, a band K surrounding the tube and intermediate parts and movable therewith, and a lock comprising a jointed bar connected at opposite ends respectively with the lever E and adjacent stop and a trip-finger *h* on and actuated by the movement of the frame K, substantially as and for the purpose set forth.

3. In combination with a gate-post A and an arm B journaled thereon and having a gear *m* on its journal, frames C and D respectively in the base and upper portion of the post, levers E and G fulcrumed on the lower frame and extending upward therefrom, the lever E terminating in a segmental rack *m* meshing with the gear *m'*, a stop F fastened toward its opposite ends between said frames, rubber hose I closed at one end and passed over the said stop and lever G and folded and confined between them and extended and confined between the two said levers, and air-pressure mechanism for directing air under pressure into the said tubes, substantially as and for the purpose set forth.

4. In combination with a gate-post A and an arm B journaled thereon and having a gear

m' on its journal, frames C and D respectively in the base and upper portion of the post, a lever E fulcrumed on the lower frame and flanked by levers G and G' also fulcrumed thereon, the lever E terminating in a segmental rack *m* meshing with the gear *m'*, stop-bars F and F' confined on the said frames near opposite sides of the post, sections of rubber hose I and I', each closed at one end and each passed over a stop and adjacent lever and folded between the two and extended between the lever E and adjacent lever, air-pressure mechanism for directing air under pressure into either tube at will and thereby opening communication of the other tube with the outer air, and an automatic lock L comprising the band K surrounding the tubing and carrying the pivotal trip-finger *h* fulcrumed on the post, a jointed bar *k* pivotally connected with the lever E, and links *i* and *i'* connecting the bar *k* from its opposite ends respectively with the stops F and F', the whole being constructed and arranged to operate substantially as described.

FRANK W. MILLS.

In presence of—

J. W. DYRENFORTH,
M. E. WINN.