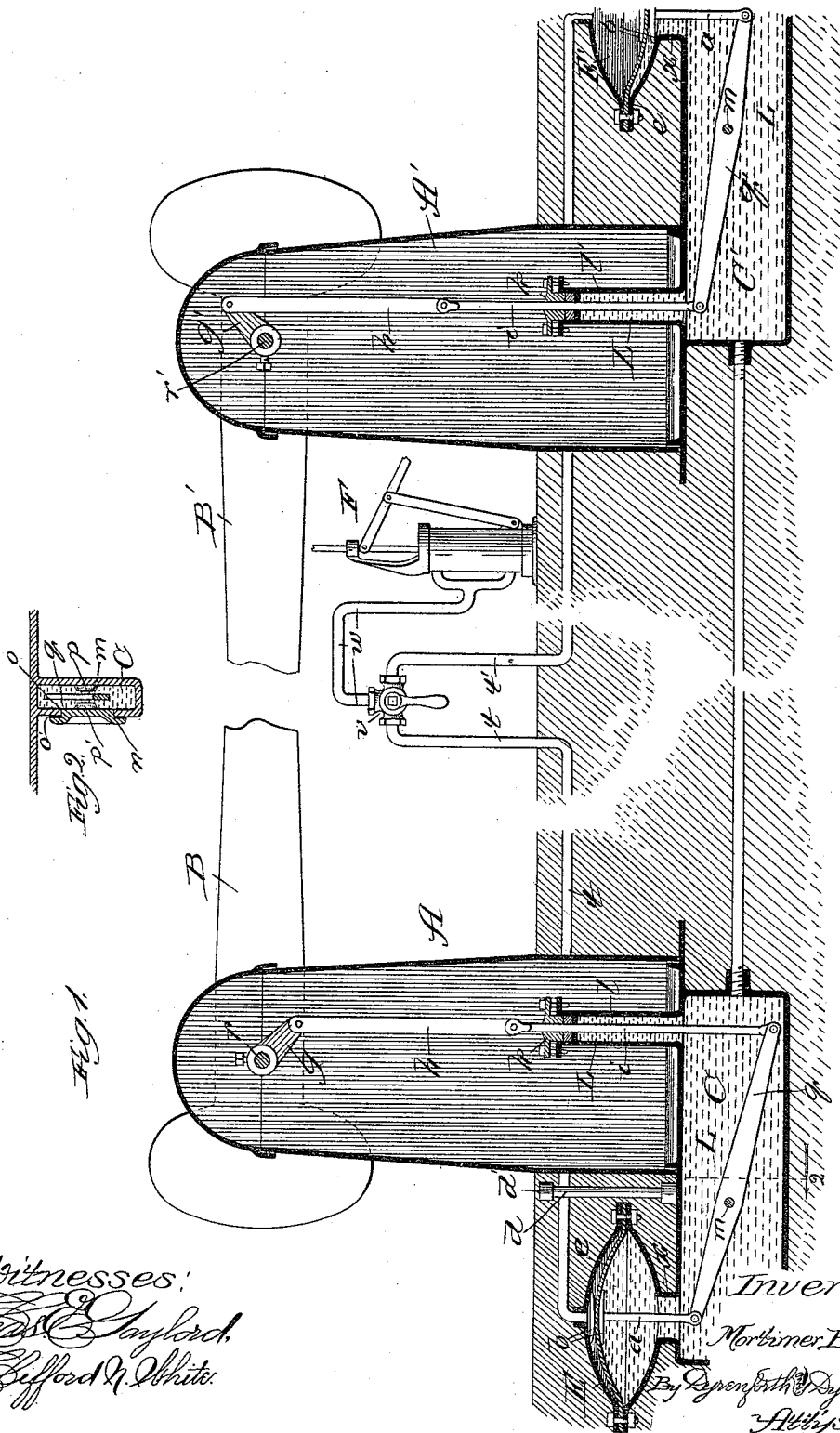


(No Model.)

M. B. MILLS.
GATE.

No. 442,756.

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UNITED STATES PATENT OFFICE.

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GATE.

SPECIFICATION forming part of Letters Patent No. 442,756, dated December 16, 1890.

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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 new and useful Improvement in Gates, of which the following is a specification.

My invention relates to an improvement in the class of pneumatically-operated gates of the kind commonly employed at railroad-crossings and comprising arms supported on posts to be swung toward and from each other to form and raise the barrier and air-pressure mechanism for operating the gate-arms. A gate of this class commonly has its arms connected together by an underground tie to cause the rise or fall of one arm to raise or lower with it the other.

The object of my invention is to provide an effectively and reliably operative liquid underground tie for the gate-arms.

In the accompanying drawings, Figure 1 represents a gate of my improved construction in broken sectional elevation; and Fig. 2 is a section taken on the line 2 of Fig. 1, viewed in the direction of the arrow, and showing details of the construction.

A and A' are the gate-posts, supposed to be located at or near the opposite sides of a street at a railroad-crossing, and having arms B and B', (preferably counterbalanced,) supported on shafts *r* and *r'*, to be swung toward each other to form the barrier and from each other to raise it. Below the posts are liquid-receptacles C and C', buried in the ground. These receptacles, which are best formed of cast-iron, are preferably of the general rectangular shape illustrated, being sufficiently long and high to receive and permit unobstructed play of the rocking arms or levers *q* and *q'*, each of which is pivotally supported between its extremities, as shown, in opposite sides of its respective receptacle.

As each of the receptacles contains liquid, it must be water-tight; so to avoid leakage I form the bearings for the levers as represented in Fig. 2—namely, by providing on one inner side of each receptacle a socket *p* and an opening *o* in the opposite side to receive a flanged cover *n*, having packing *o'* provided between the flange and edge of the cover, the cover having a socket-bearing *p'* on its inner

side. Thus the levers are supported on their pivots *m* in the sockets *p* and *p'*, and, owing to the narrow dimensions of the levers, the receptacles C and C' need not be wider in proportion than indicated.

From near the inner ends of the receptacles and coinciding with the corresponding ends of the levers therein branches *l* and *l'* extend vertically into the gate-posts, and are provided with stuffing-boxes *k* at their upper ends to prevent leakage around the reciprocating rods *i*, passing through them and pivotally connected at their lower ends with the adjacent ends of the levers *q* and *q'*. The rods *i* are connected from their upper ends by links *h*, respectively, with cranks *g* and *g'*, extending from corresponding sides of the gate-arm shafts *r* and *r'*.

Near the outer ends of the receptacles C and C' are collapsible receivers E and E', which (though they may be ordinary cylinders containing pistons) are preferably constructed, as shown, to involve each a chamber *f*, of elliptical shape in cross-section, formed in two flanged sections bolted together at their flanges, between which is secured a flexible (rubber and canvas) diaphragm *e*, the manner of securing the diaphragm thus also packing the junction between the sections of the chamber. Each chamber E and E' communicates from below its diaphragm with its respective receptacle, as shown at *x*, and the diaphragms *e*, which should be provided centrally on opposite sides with metal strengthening-plates *b*, are connected from the lower plates by rods *a* with the outer ends of the levers C and C'. One of the receptacles is provided with a filling-pipe *d*, closed by a suitable cap *d'*, through which to fill the receptacles C and C', which intercommunicate, through a connecting-pipe *c*, with liquid L.

F is an air-pump to be located in a convenient position, as in the operator's cabin. Its outlet-pipe *w* leads to a valve *v*, which may be of the ordinary three or four way variety, from which lead the pipes *t* and *t'*, respectively, to the collapsible receivers E and E' above the diaphragms.

The receptacles C and C' are supplied through the filling-pipe *d* with liquid L, preferably of a non-freezing kind, like alcohol, the quantity of which introduced should be

sufficient to fill both receptacles C and C' and their branches *l* and *l'*, and besides one of the two collapsible receivers, as E, to force its diaphragm to the position illustrated, the quantity of the liquid being only sufficient to reach the under surface of the diaphragm of the other collapsible receiver in its lowest position, as shown.

The operation is as follows: With the parts in the relative positions in which they are represented in Fig. 1 the gate-arms B and B' are down. To raise them, the valve *v* is turned to open communication, through the pipes *w* and *t* of the air-pump, with the collapsible receiver E, and of the pipe *t'* with the outer air. By then actuating the pump air is forced under pressure against the diaphragm *e*, to which the pipe *t* leads, thereby forcing it downward and turning the lever *q* in a direction to cause it to raise the rod *i* and link *h*, connected with it, and through the medium of the adjacent crank *g* turn the shaft *r* in a direction to raise the arm B. The pressure against the diaphragm *e* of the receiver E is necessarily also exerted against the liquid L, forcing it out of that receiver and causing it to exert the pressure against the under side of the diaphragm in the receiver E', filling the latter the same as the other said receiver was filled and raising that diaphragm, whereby the lever *q'* is actuated through the intermediate rod *i*, link *h*, and crank *g'* to turn the shaft *r'* in the direction to effect raising of the arm B'.

As will be readily understood, to produce lowering of the gate-arms the operation described is reversed, the receiver E being then caused to communicate through the valve *v* with the outer air and the receiver E' with the air-pump, operating which then effects turning of the lever *q'* in a manner to cause the arm B' to be lowered, when the resultant liquid-pressure against the diaphragm in the receiver E causes the mechanism controlled by it to lower also the gate-arm B.

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

1. In combination, a gate having posts supporting vertically-swinging arms B and B' and operated by air-pressure, and a liquid tie connecting the gate-arms and actuated by the air-pressure force exerted to cause the raising or lowering of one arm to exert the pressure required to raise or lower with it the other, substantially as described.

2. In combination with a gate having posts supporting vertically-swinging arms B and B', a liquid tie for the arms to cause the raising or lowering of one to raise or lower with it the other by pressure exerted against the liquid, and comprising intercommunicating liquid-receptacles C and C' below the posts, collapsible receivers E and E', connected through

the said receptacles by lever mechanism with the gate-arm axes at corresponding sides thereof, and air-pressure mechanism controllably communicating with the collapsible receivers, substantially as described.

3. In a gate having posts supporting vertically-swinging arms B and B', cranks *g* and *g'*, extending from the axes of the gate-arms, intercommunicating receptacles C and C' for a liquid L below the posts, collapsible receivers E and E', communicating from their lower sides with the receptacles and containing diaphragms *e*, lever mechanism, substantially as described, connecting the diaphragms, respectively, through the said receptacles with the cranks on the axes *r* and *r'*, and air-pressure mechanism controllably communicating with the collapsible receivers above their diaphragms, substantially as set forth.

4. In a gate having posts supporting vertically-swinging arms B and B', cranks *g* and *g'*, extending from the axes of the gate-arms, intercommunicating receptacles C and C' for a liquid L below the posts, having vertical branches *l* and *l'*, collapsible receivers E and E', communicating from below their diaphragms with the said receptacles, levers *q* and *q'*, pivotally supported in the receptacles C and C' and connected from their inner ends through the said branches with the cranks and from their outer ends with the diaphragms in the collapsible receivers, and air-pressure mechanism controllably communicating with the collapsible receivers above their diaphragms, the whole being constructed and arranged to operate substantially as described.

5. A gate comprising, in combination, posts A and A', supporting vertically-swinging arms B and B', having cranks *g* and *g'* extending from their axes, intercommunicating receptacles C and C', containing a liquid L, below the posts, and provided with branches *l* and *l'*, extending vertically into the posts, collapsible receivers E and E', communicating from their bases with the receptacles, levers *q* and *q'*, pivotally supported between their extremities in the liquid-receptacles and connected from their outer ends with the diaphragms in the collapsible receivers, links *h*, connected with the cranks, rods *i*, connecting the said links with the inner ends of the levers and passing through the said branches, and air-pressure mechanism controllably communicating with the collapsible receivers above their diaphragms, the whole being constructed and arranged to operate substantially as described.

MORTIMER B. MILLS.

In presence of—

J. W. DYRENFORTH,
M. J. FROST.