

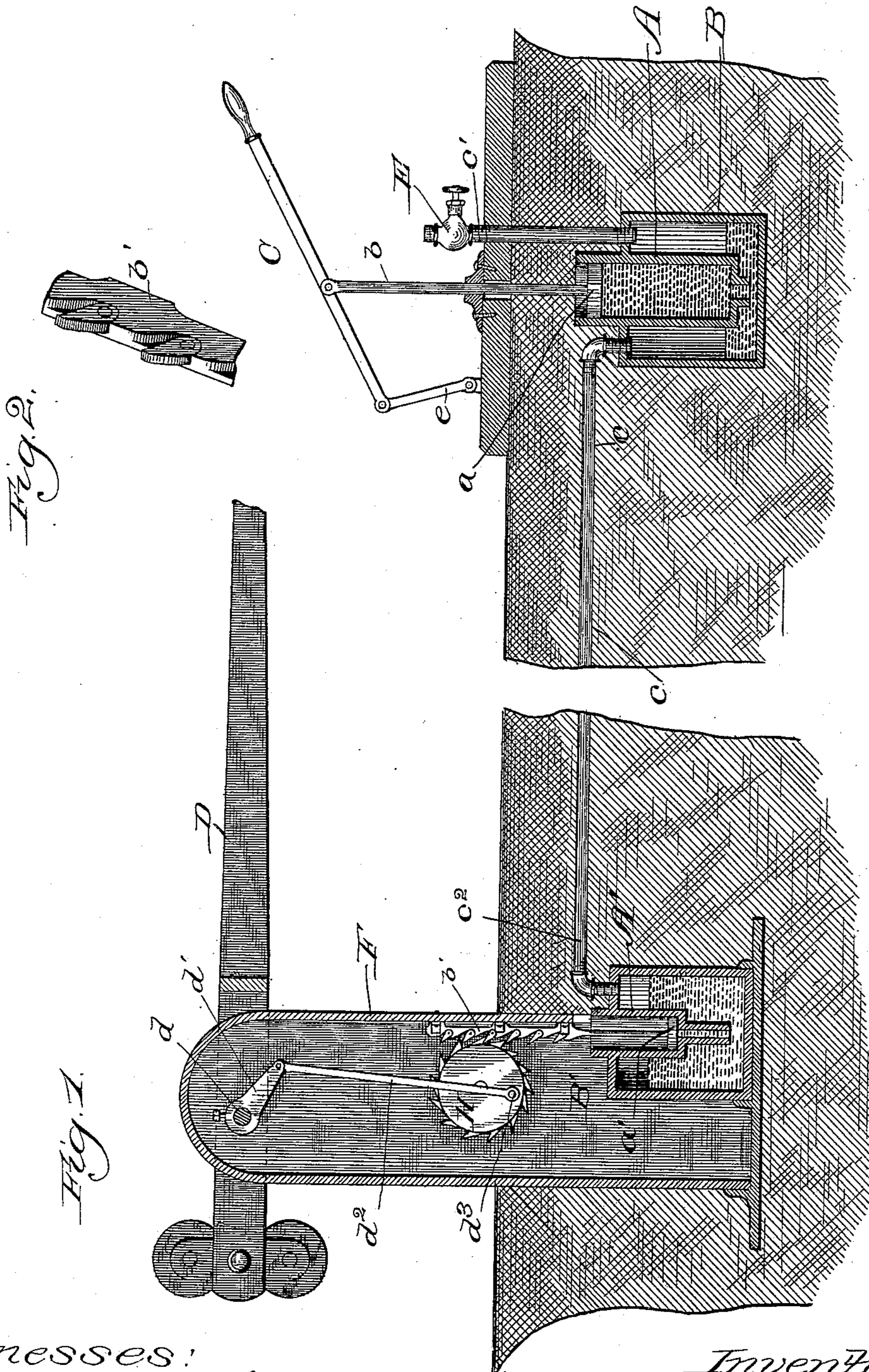
(No Model.)

M. B. MILLS.

GATE FOR RAILWAY CROSSINGS.

No. 333,242.

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GATE FOR RAILWAY-CROSSINGS.

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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 certain new and useful Improvements in Gates for Railroad - Crossings; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of gates formed with bars constructed to be swung in vertical planes upon posts properly located at opposite sides of a railroad-track by the application of pneumatic or other force to open and close them, the swinging of the bars, which are suitably connected to be actuated in pairs upon the same side of the track, being effected from a single point.

Gates of the foregoing description have hitherto been constructed to be operated by means of pneumatic pressure alone, exerted from a pump, or by liquid-pressure alone, similarly exerted. The first-named medium of power, while it affords very good results, is subject to the objection that it requires more perfect confinement within the parts through which it is caused to operate than can be provided without the exercise of great care and undesirable expense, and even if these parts are originally formed perfectly air-tight they are liable to and apparently of necessity do become leaky, whereby the operation of the gates to be actuated is rendered more or less defective, or they become practically, and sometimes even entirely, inoperative. This tendency to leakage from use is mainly attributable to the fact that the pistons in the cylinders employed become dry and loose, permitting the air to leak to an extent which renders it almost, and sometimes quite, impossible to produce sufficient pressure to raise or lower the bars. The use of a liquid as the medium of power is objectionable, principally for the reason that it is too heavy for practical purposes, and therefore uncontrollable, and also unreliable for accuracy of operation.

I find that by using a liquid (preferably oil, since it is not liable to freeze and affords a desirable lubricator) in immediate contact with the pistons and air intermediately, whereby forcing downward the piston in the operating-pump causes it to compress the liquid against air, which in turn compresses the liquid against

the piston operating the gate-bar to actuate the latter, the objections attendant upon the use of either a liquid or air alone are completely overcome.

To this end my invention consists in the general construction of my device; and it also consists in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

Referring to the drawings, Figure 1 is a vertical section through one gate-post and the pump used in operating the same, and showing the preferred form of mechanism for operating the bar; and Fig. 2, a perspective view of a portion of a detail.

The drawings illustrate the application of my invention to a single gate-bar, and the following description is confined to such application, though, obviously, by providing several posts—such as the one illustrated—and the mechanism shown to be connected therewith and hereinafter described, for actuating the bar of each, the air-pipe may be caused to communicate with the proper feature in each post, and all the bars may be actuated from a single pump.

F is a gate-post, shown as sunk into the ground, though it and the other parts hereinafter described may, if preferred, be entirely above-ground without entailing disadvantages. A gate-bar, D, is supported upon the post F by means of a shaft, d , to which the bar is rigidly secured to swing in a vertical plane, and is balanced to remain in any position to which it is moved. A crank, d' , is fastened to the shaft d toward its center, and a rod, d^2 , pivotally attached at one end to the crank d' , connects the latter with a crank or pin, d^3 , provided eccentrically upon a ratchet-wheel, H, supported to rotate upon a suitable bearing within the post, which is preferably hollow, as shown, since if solid the parts already described and to be hereinafter described would have to be exterior to it.

From the foregoing it will readily be seen that a complete revolution of the ratchet-wheel H from the position shown in Fig. 1 of the drawings will raise the bar D to a vertical position and lower it through the same arc to a horizontal position.

The raising and lowering of the gate-bar is accomplished by mechanism, of which the fol-

lowing is a description: Within the post F, or partly within it, as shown, is a reservoir, B', containing a piston-cylinder, A', open at its lower end, and preferably so at its upper end. The rod *b'* of the piston *a'* within the cylinder A' terminates in a rack having loose pawls, pivoted, as already shown in Fig. 2 of the drawings, to engage with the teeth of the ratchet-wheel H when the piston *a'* rises, but to slide over them when the piston falls. A pipe, *c c'*, forms a conduit affording communication between the reservoir B' and a similar reservoir, B, containing the pump mechanism. The latter comprises a cylinder, A, resembling the cylinder A', but larger and extending into the reservoir B, being preferably cast with the latter, as shown, and a piston, *a*, and rod *b*, pivoted to a handle, C, to form of the latter a lever of the second class, having one end pivoted to a fulcrum-bar, *e*. A desired quantity of liquid, preferably oil, though water or other liquid may be used, is introduced into the reservoirs B and B'—into the former through a stand-pipe, *c'*, provided with an ordinary stop-cock, E. The quantity of liquid employed, while it should not, under any circumstances, be sufficiently great to cause it to pass through the pipe *c c'* from one reservoir B or B' to the other, should be enough to cover the openings on the under sides of the cylinders A and A', and is preferably sufficient within the reservoir B to fill the cylinder A, and within the reservoir B' to fill it more than half, as shown.

By forcing down the piston *a* through the medium of the handle C the pressure upon the liquid within the pump-cylinder A operates to compress the air or any gas contained within the reservoir B and pipe *c c'* upon the liquid contained within the reservoir B', causing it to rise within the piston-cylinder A' and raise the piston therein, whereby the pawls on the rod *b'* engage with the ratchet-wheel H, turning it, and thus causing the connecting-rod *d'* to raise the gate-bar. A single stroke of the pump-handle C may be sufficient to raise the gate-bar from a horizontal to a vertical position, though this is not material, since, as the gate-bar is balanced, it will remain in any position to which it is forced, and if only partly raised by one stroke of the pump, raising the handle C will relieve the pressure, causing the liquid below the piston *a* to rise with it, and the piston *a'* to fall by its own weight, since it is not materially obstructed by the pawls upon the rod C', which, as hereinbefore stated, are constructed to slide over the teeth of the ratchet-wheel H. In this condition of the parts the bar may be raised farther by again forcing down the handle C, and the operation of the pump may be continued till the gate-bar is raised to a vertical position.

The gate-bar is lowered from its vertical position by actuating the handle C in the same manner as to raise it, since, to perform the latter operation, the wheel H is caused to make

a half-revolution, and by continuing its rotation, owing to the crank-connection of the rod *d'*, the bar will be pulled down in the same arc described by it in its ascent by the rise of the pawls and their consequent engagement with the ratchet-wheel incident to the forcing upward of the piston *a'*. The stop-cock E must of course be closed to permit the gate to be operated.

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

1. In a swinging gate, the combination, with the gate-bar D, of a crank, *d'*, a ratchet-wheel, H, a rod, *d'*, connecting the ratchet-wheel eccentrically with the crank *d'*, a cylinder, A', having a piston, *a'*, and rod *b'*, provided with loose pawls to engage with the ratchet-wheel, and means, substantially as described, for raising the piston to turn the ratchet-wheel through the medium of the pawls and actuate the gate-bar, as set forth.

2. In a swinging gate, the combination, with the post F and swinging bar D, supported thereon, of a crank, *d'*, secured upon the bearing of the gate-bar to move with it, a ratchet-wheel, H, supported to rotate upon the post and connected with the crank *d'* by means of a rod, *d'*, attached to a crank or pin, *d'*, provided eccentrically upon the ratchet-wheel, a reservoir, B', to contain a liquid, a cylinder, A', communicating with the reservoir B', and having a piston, *a'*, and rod *b'*, provided with loose pawls to engage when the piston is raised with the ratchet-wheel, and to slide over the same in falling, and a pump communicating with the reservoir B', and operating to force air or other gaseous fluid against the liquid contained therein, to raise the said piston, as set forth.

3. The combination, with the swinging bar of a gate, of a reservoir, B', to contain a liquid, a cylinder, A', communicating with the reservoir B' and provided with a piston, means, substantially as described, connecting the said piston with the gate-bar to actuate the same, a reservoir, B, to contain a liquid, and communicating by an air-conduit with the reservoir B', and a pump communicating with the reservoir B, and operating to compress the liquid contained therein through the medium of the air in the conduit against the liquid contained in the reservoir B' and raise the piston *a'*, as and for the purpose set forth.

4. In a swinging gate, the combination, with the post F and swinging bar D, supported thereon, of a crank, *d'*, secured upon the bearing of the gate-bar to move with it, a ratchet-wheel, H, supported to rotate upon the post and connected with the crank *d'* by means of a rod, *d'*, attached to a crank or pin, *d'*, provided eccentrically upon the ratchet-wheel, a reservoir, B', to contain a liquid, a cylinder, A', communicating with the reservoir B', and having a piston, *a'*, and rod *b'*, provided with loose pawls to engage, when

the piston is raised, with the ratchet-wheel,
and slide over the same in falling, a reservoir,
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an air-conduit with the reservoir B', and a
5 pump communicating with the reservoir B,
and operating to compress the liquid con-
tained therein through the medium of the air

in the conduit against the liquid contained in
the reservoir B' and raise the piston a' , as and
for the purpose set forth.

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