

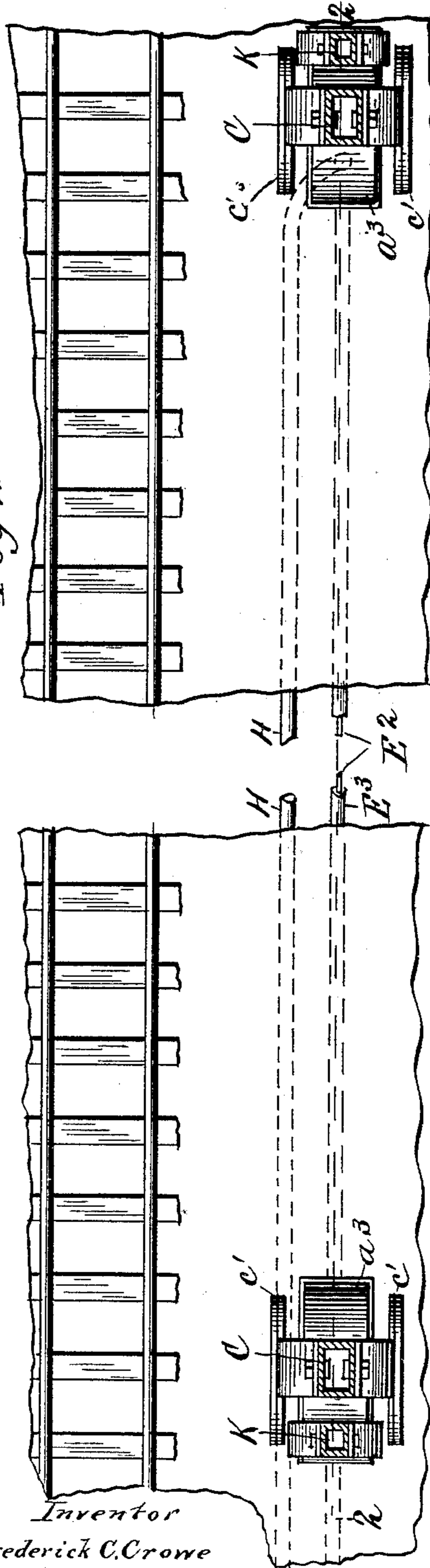
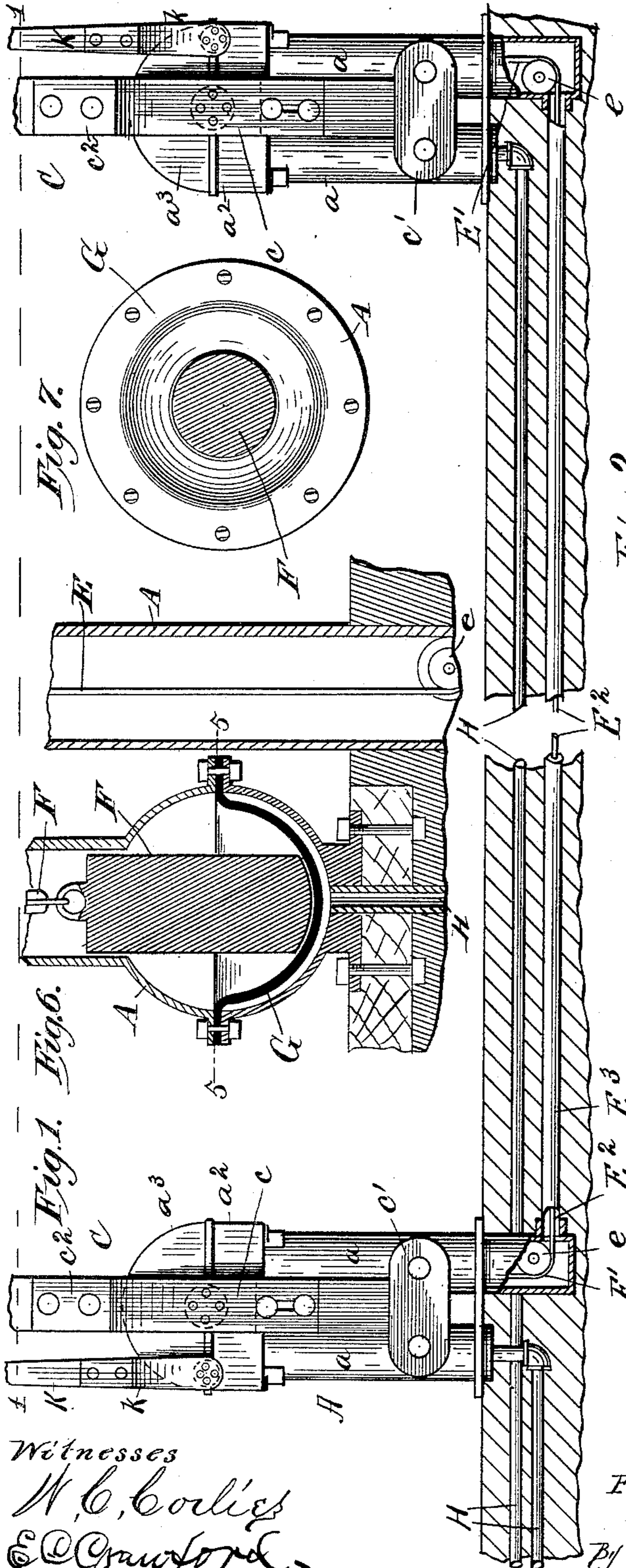
(No Model.)

2 Sheets—Sheet 1.

F. C. CROWE.
RAILWAY CROSSING GATE.

No. 462,216.

Patented Oct. 27, 1891.



Witnesses
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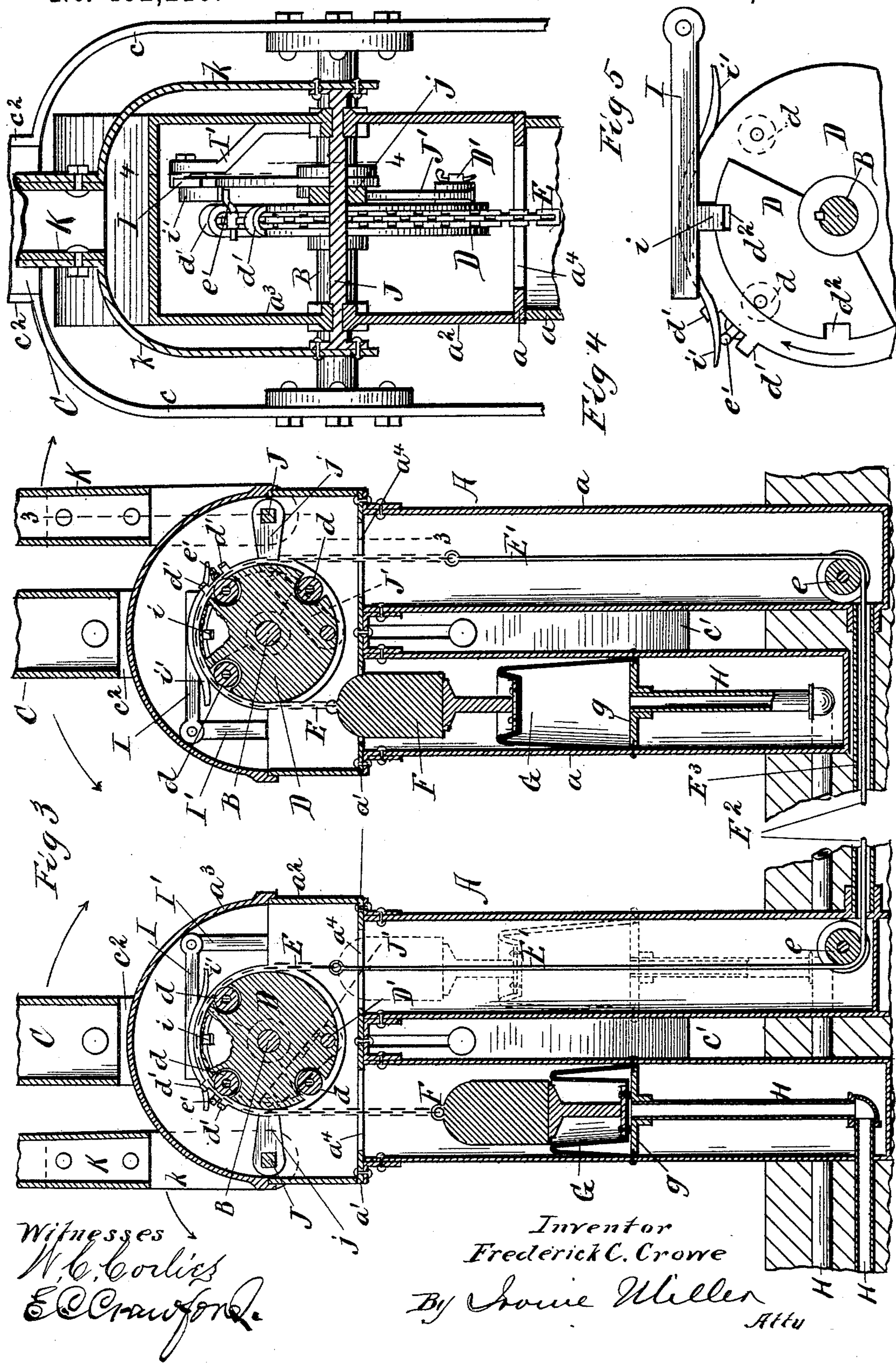
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UNITED STATES PATENT OFFICE.

FREDERICK C. CROWE, OF CHICAGO, ILLINOIS, ASSIGNOR TO FRANCIS W. PARKER, TRUSTEE, OF SAME PLACE.

RAILWAY-CROSSING GATE.

SPECIFICATION forming part of Letters Patent No. 462,216, dated October 27, 1891.

Application filed October 3, 1889. Serial No. 325,840. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK C. CROWE, 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 Railway-Crossing Gates, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents an elevation, partly in section, of a structure embodying my invention in one form; Fig. 2, a plan section of the same, taken on the line 1 1 of Fig. 1; Fig. 3, a vertical sectional view taken on the line 2 2 of Fig. 2; Fig. 4, a detail sectional view taken on the line 3 3 of Fig. 3, and Fig. 5 a detail sectional view taken on the line 4 4 of Fig. 4. Fig. 6 is a detail section of the lower part of a hollow upright, showing a diaphragm therein instead of a rubber bag. Fig. 7 is a detail cross-section of the same, taken on the line 5 5 of Fig. 6. Figs. 1 and 2 are on the same scale, Fig. 3 on a somewhat larger scale, and Figs. 4 and 5 on a still larger scale.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to railway-crossing gates, and more particularly to that class known as "pneumatic gates," in which air under pressure is employed to control the gate-arms, although I wish to state that other fluids than air may be employed, or that a vacuum may be used instead of pressure.

The object of my invention is to produce an apparatus which shall be extremely simple in construction and free from complicated parts or gearing, and therefore cheap, while at the same time it will be effective in operation and possess various features of advantage, which will be hereinafter pointed out.

To these ends my invention consists in certain novel features, which I will now proceed to describe, and will then particularly point out in the claims.

In the drawings, A represents a frame or standard which supports a gate-arm, these standards being arranged, as usual, on each side of the roadway, one pair on each side the track, and forming housings containing the operating mechanism of the gate proper. Each standard consists, preferably, of two hol-

low uprights a , which may be of gas-pipe or the like, surmounted by a plate a' , carrying a hood a^2 , which has a removable cover or cap a^3 . The plate a' is apertured, as shown at a^4 , above the standards a , for the passage of the operating chain or cable.

B represents a shaft mounted in suitable bearings in the hood a^2 , and having secured to its projecting ends the yoke-arms c , which carry the main or street gate-arm C. The yoke-arms c are provided with the usual adjustable counter-balance weights c' at their lower ends, and have at their upper ends parallel lugs or plates c^2 , between which the inner or lower end of the gate-arm C is placed, and to which it is secured by bolts or otherwise. Each gate-arm C consists, preferably, of a hollow box constructed of wood or other light material, rectangular in cross-section, as shown, and tapering gradually from butt to tip. This is the form which I have devised and prefer; but any other approved form may be employed.

Centrally upon each shaft B is secured a sheave or pulley D, provided with a grooved periphery, in which are mounted anti-friction rollers d . This sheave is also provided with two apertured radial lugs d' , arranged a short distance apart on its periphery, and has two peripheral recesses d^2 , arranged on opposite sides of these lugs at a distance of ninety degrees from each other, as shown in Fig. 5.

E represents chains or cables, one of them passing over each sheave D, and having a bearing on the anti-friction rollers d thereof, said chain passing through the apertured lugs d' . Each chain has attached to one of its ends a rope or cable E' , which passes down one of the hollow uprights a and around a guide-roller or pulley e at the bottom thereof, the ends of the ropes or cables E' being attached to a connecting or tie rod E^2 , arranged in an underground-pipe E^3 under the roadway. Of course, a single chain or cable may be employed to connect the two gate-arms; but I prefer the construction just described on account of its mechanical advantages.

To each chain E, at the other end thereof, there is attached a weight F, the said weights being equal, so as to counterbalance each other, and being arranged within the uprights

a not occupied by the cables E' . It will be observed that the weights are arranged on the same side of each sheave D and not on corresponding sides, the chains E passing over the two sheaves in the same direction, so that when movement is imparted to the apparatus the sheaves and their attached arms will move in opposite directions.

Under each weight F and preferably attached thereto, as shown, is arranged within the upright a a bag or receptacle G , constructed, preferably, of rubber, although any other suitable flexible and air-tight material may be used. As shown, this bag is attached at its lower end to a base or plate g , secured within the upright a .

H represents a pipe leading from the bag G to the point from which the gate is to be operated, and adapted to admit air under pressure or any suitable substitute to the bag G and to permit its egress therefrom. A separate pipe leads to each bag, as shown.

I represents a locking-arm pivoted to a suitable standard I' within the head, and provided with a projection i' to engage with either one of the recesses d^2 in the sheave D . This locking-arm is also provided with a yoke-shaped cam i^4 , arranged in the path of a projecting pin e^3 , with which the chain E is provided at a point between the lugs d' .

J indicates a supplementary shaft mounted parallel to the shaft B within the hood a^2 , and having secured to its projecting ends the yoke-arms k of the sidewalk-arm K . Upon the shaft J there is secured within the hood a^2 an arm j , which is connected by a link J' to a crank-pin D' on the sheave D .

The apparatus thus constructed operates in the following manner: In the position of the parts shown the gate is open, the arms being raised and locked in position by the engagement of the projections i of the locking-arms I with the recesses d^2 of the sheaves D . To close the gate air under pressure or any other suitable medium is admitted to the bag G at the left. The upward pressure thus exerted on the weight F above said bag lifts said weight and virtually lessens its gravitating force, thus destroying the balance between the two weights F and permitting the other weight on the right to descend. Motion is thus imparted simultaneously through the connecting devices to the chains E , which move at first freely over the sheaves D upon the anti-friction rollers d thereof, the sheaves being, as just stated, locked. The extent of this motion of the chains is determined by the distance separating the lugs d' , between which the pin e' moves. This pin during this movement first comes in contact with the cam-yoke i' and thereby lifts the locking-arm I until its projection i is clear of the recess d^2 . The pin then comes into contact with the lug d' , toward which it is moving, and the sheaves being unlocked further motion of the chains causes the sheaves to rotate and with

them the shafts B , thus turning the street-arms C downward toward a horizontal position. At the same time the crank-pins D' on the sheaves D through the links J' and arms j rotate the shafts J in the opposite direction, thus throwing down the sidewalk-arms K . At the limit of these motions the lugs i of the locking-arms I will drop into the other recesses d^2 , thus locking the arms in their downward position. During this operation the air is of course permitted to escape from the other bag G through its pipe H . To raise the arms, air under pressure is admitted to this other bag, when an operation the same as that just described, but in the reverse direction, will result. The arms will stop at any desired position, since when the pressure is removed the weights F counterbalance each other and only operate when their equilibrium is disturbed in one direction or the other. In either its open or closed position the gate is automatically locked and automatically unlocked when operated from the proper source.

The form of standard shown is easily and cheaply constructed and entirely incloses and protects all the operating mechanism.

It is obvious that various modifications in the details of construction may be made without departing from the principle of my invention. For instance, in addition to those already pointed out, I would state that the lock and sidewalk arm, either or both, may be dispensed with, although I prefer to employ these adjunctive devices. An elastic diaphragm (shown at G' in Figs. 6 and 7) or other suitable device may be substituted for the bag shown and described, and the form and attachment of this latter may be varied. Moreover, each arm may be provided with two operating-weights and be independently operated, dispensing with the connection between the two arms, and this construction will of course be adopted where but a single arm is used. I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore set forth, and shown in the drawings.

The essential feature of my locking device is found in the relation between the actuating mechanism, the lock, and the arm, whereby the lost-motion movement involved in the operative connection established between the gate-arm and the driving mechanism is utilized to unlock the gate. The chain at the first movement in raising or lowering slides over the sheave or rather over the friction-rollers in the edge thereof, and thus has a certain lost motion with reference to the arm or moves a certain distance before it actuates the arm, and while this lost motion is going on or while the chain is thus moving about the fixed and locked sheave the projecting lug or the portion on the chain is brought in contact with the locking dog or pawl and it is freed from the sheave, so that at the end of such lost-motion movement the

chain is operatively connected with the sheave and moves it and the arm into the desired position.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a gate, the combination, with the gate-arm, of weights operatively connected to the same and normally counterbalancing each other, and the inverted rubber bags *G G*, secured upon the apertured plates *g g* in the uprights *a a* and respectively designed to lift one or the other of said weights, and thereby destroy their equilibrium, substantially as and for the purposes specified.

2. In a gate, the combination, with the gate-arm, of weights operatively connected to the same and normally counterbalancing each other, a bag or its described equivalent placed under each weight, and a pipe for carrying air or other fluid under pressure to or from each bag, substantially as and for the purposes specified.

3. In a gate, the combination, with a gate-arm and its sheave, of a lock adapted to engage said sheave at the limits of its motion, and a chain passing over said sheave and sliding thereon for a short distance at each operation and provided with a projection to free the lock.

4. The combination, with the pivoted locking-arm *I*, having projection *i* and cam *i'*, of the gate-arm *C* and its sheave *D*, provided with recesses *d²*, anti-friction rollers *d* and apertured lugs *d'*, and the operating-chain *E*, having pin *e'* arranged between said lugs and adapted to engage said cam, substantially as and for the purposes specified.

5. The combination, with the hollow uprights *a* and the apertured plate *a'*, of the hood *a²*, substantially as and for the purposes specified.

6. The combination, with a gate-arm, of weights operatively connected to the same and normally counterbalancing each other, receivers connected to each weight, and a

pipe carrying fluid under pressure to and from such receiver.

7. In a railway-gate, the combination, with the gate-arms, of weights operatively connected one to each and normally counterbalancing each other, receivers associated one with each weight, and a fluid-pressure pipe connected with each receiver.

8. In a gate, the combination, with the gate-arm, of weights operatively connected to the same and normally counterbalancing each other, and a part placed under each weight adapted to be raised pneumatically, and a pipe for carrying fluid under pressure to or from each of said parts.

9. In a gate, the combination of two opposite arms with a chain-connecting device for operating said arms simultaneously in opposite directions, sheaves secured upon the gate-arm shafts and adapted to receive said chains, and weights, one at each end of such chain-connecting device, said weights normally counterbalancing each other, and operating mechanism for destroying the equilibrium of said weights in one direction or the other to move the gate-arms.

10. In a railway-crossing gate, the combination, with the gate-arm and a lock which normally locks it in position, of a chain-connecting device for operating the arm, and a lost-motion connection between the chain-connecting device and the arm consisting of a sheave with which the chain-connecting device engages and a shaft on which the sheave is mounted connected with the gate-arm, there being between the chain-connecting device and the gate-arm a certain amount of lost motion, and a movable connection between the chain-connecting device and the lock, whereby the lock is freed when the lost motion is being taken up.

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Witnesses:

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