2 Sheets—Sheet 1.

# A. R. SHERMAN.

## Barrier for Draw Bridges.

No. 230,203. Patented July 20, 1880.

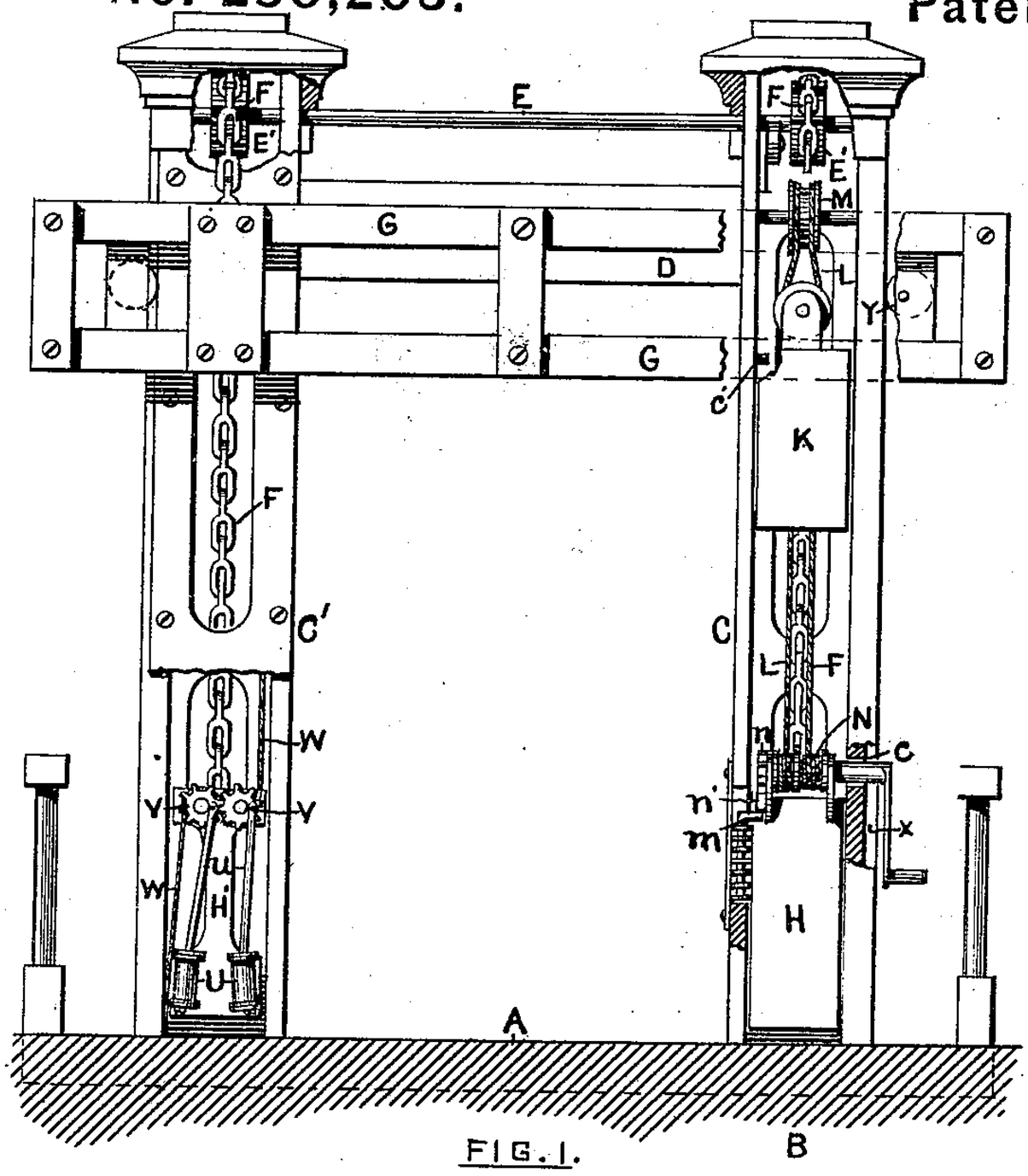


FIG. 1.

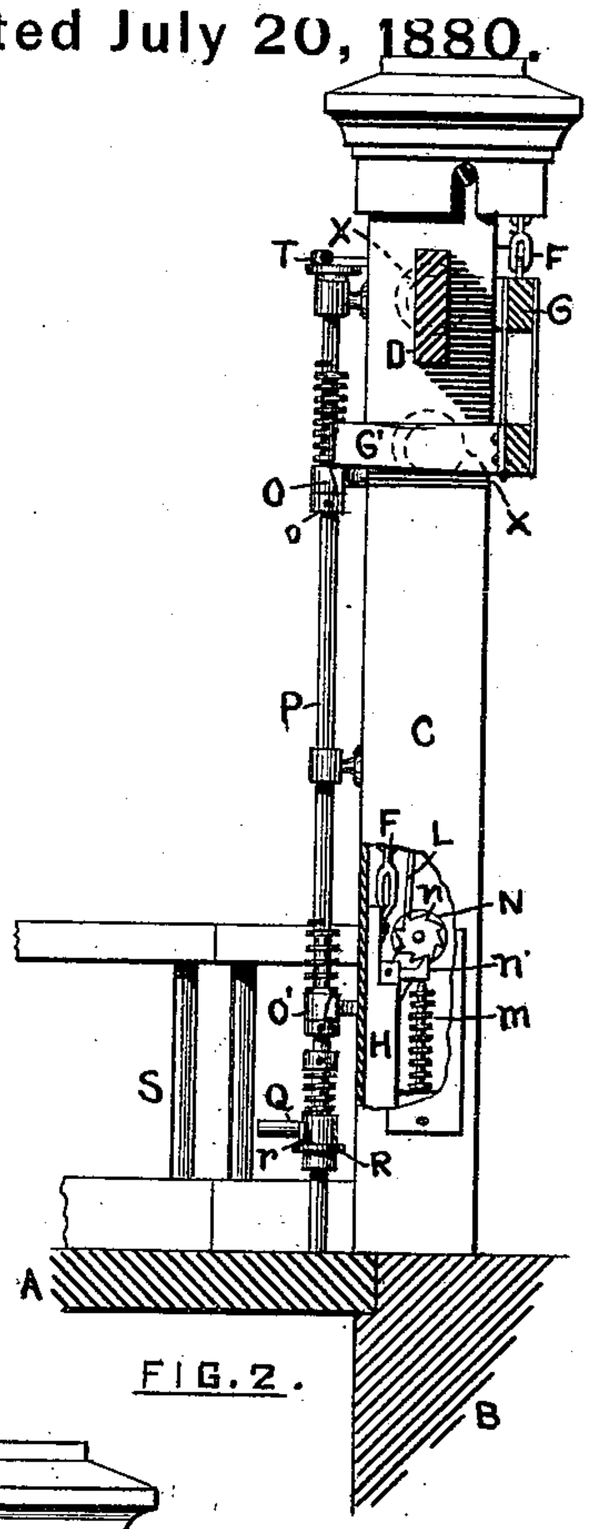


FIG. 2.

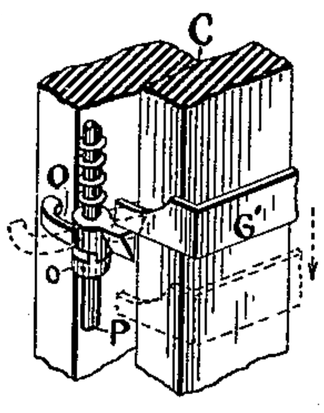


FIG. 4.

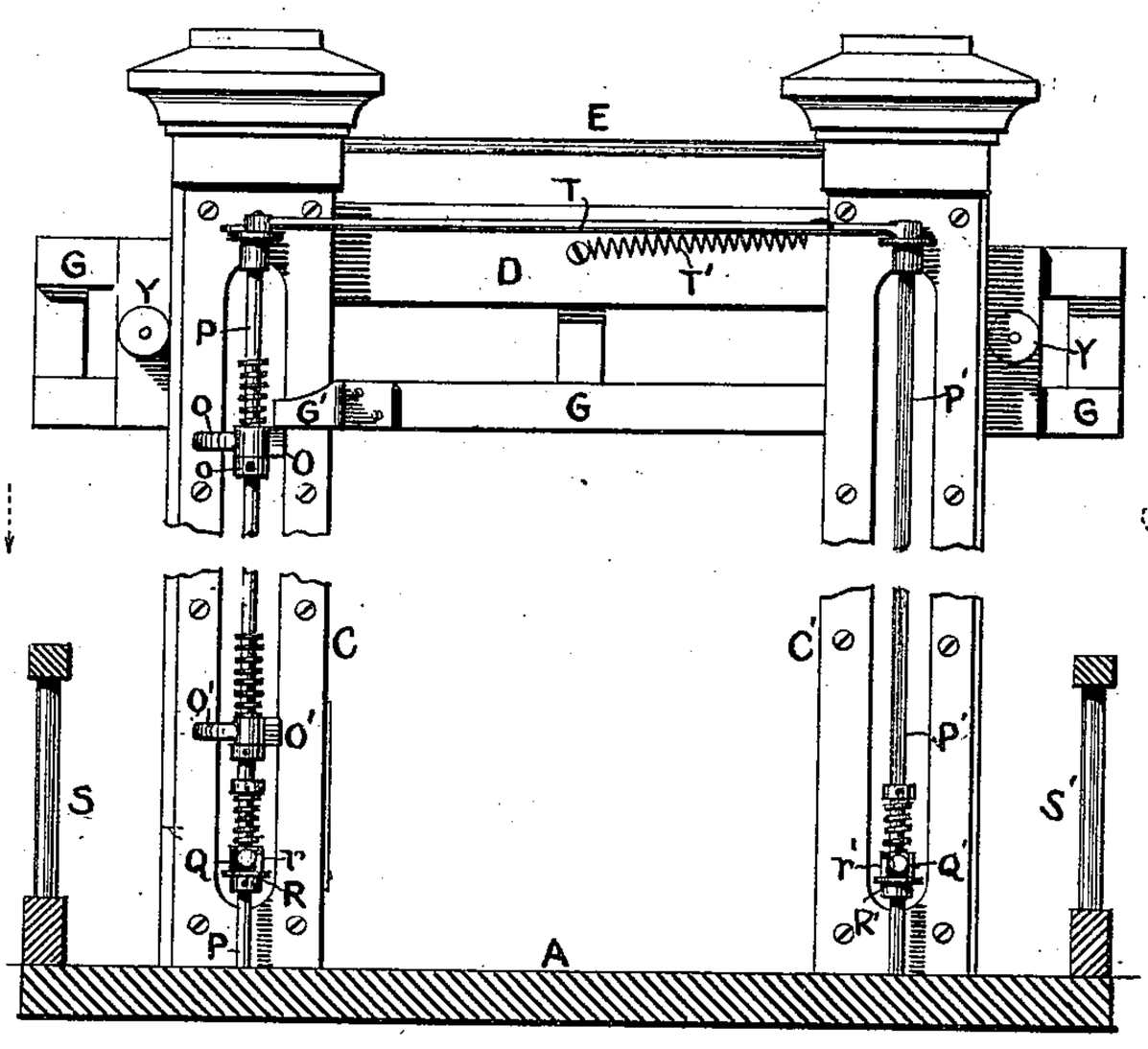


FIG. 3.

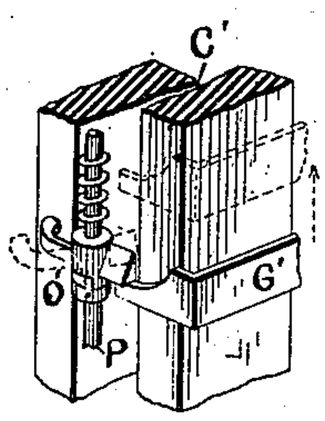


FIG. 5.

WITNESSES.

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INVENTOR.

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2 Sheets—Sheet 2.

# A. R. SHERMAN.

## Barrier for Draw Bridges.

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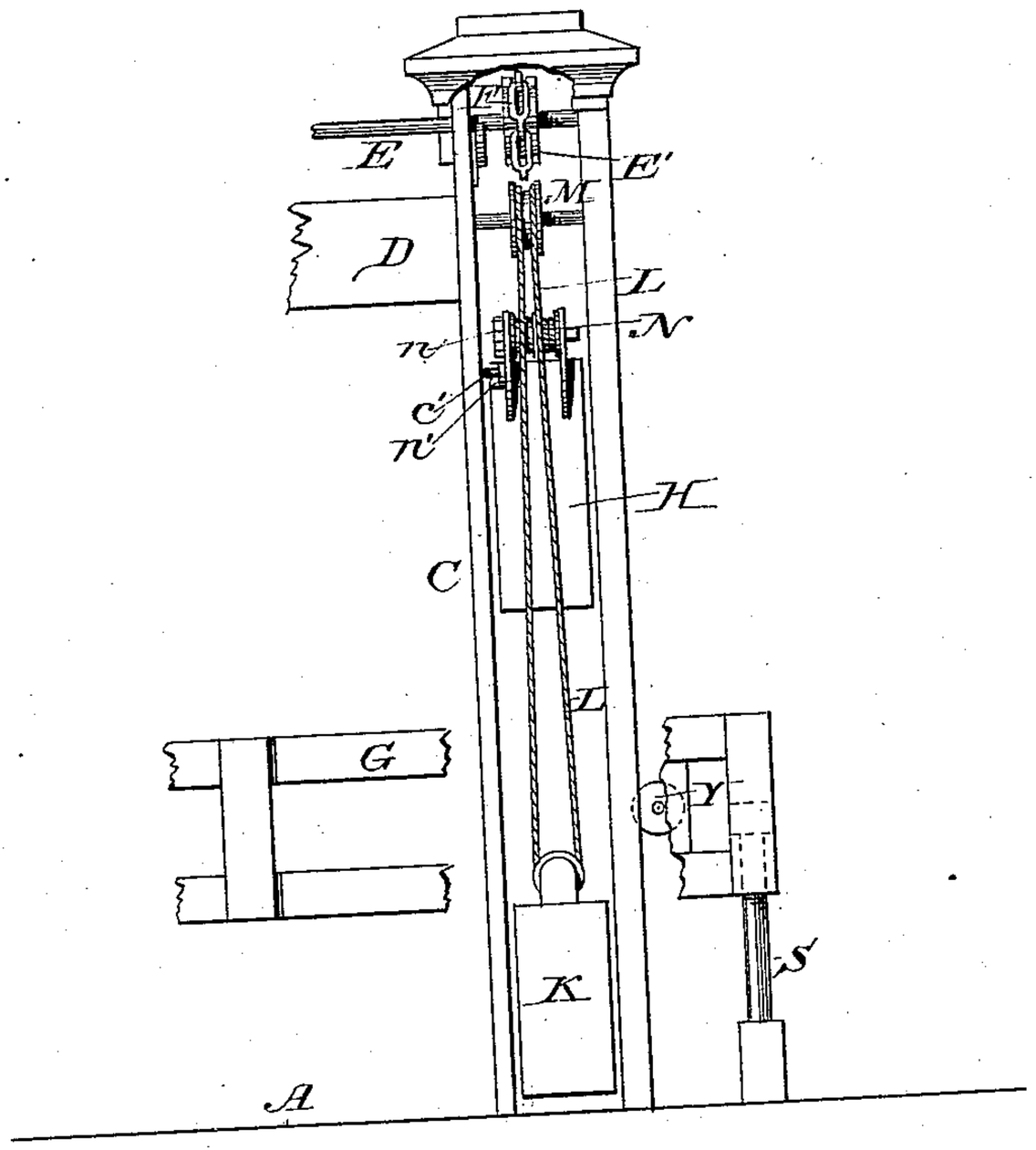


FIG. 6

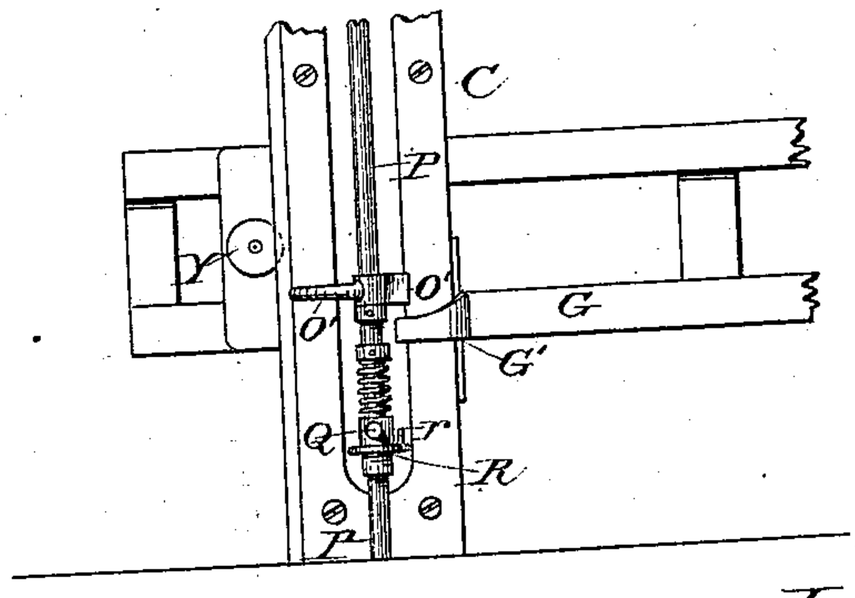


FIG. 7.

Witnesses:

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Inventor:

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by

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Attorney.

# UNITED STATES PATENT OFFICE.

ALBERT R. SHERMAN, OF NATICK, ASSIGNOR TO STEPHEN A. JENKS, OF LINCOLN, RHODE ISLAND.

## BARRIER FOR DRAW-BRIDGES.

SPECIFICATION forming part of Letters Patent No. 230,203, dated July 20, 1880.

Application filed October 9, 1878.

*To all whom it may concern:*

Be it known that I, ALBERT R. SHERMAN, of Natick, in the county of Kent and State of Rhode Island, have invented certain new and useful Improvements in Barriers for Draw-Bridges; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, making a part of the same, is a full, clear, and exact description thereof.

The improvements in barriers hereinafter described are applicable to that class of draw-bridges which are moved in a horizontal plane; and they relate to arrangements for lowering the said barriers to close the thoroughfare leading to and from the bridge, and for raising the said barriers and suspending the same when the bridge is closed, the said operations of lowering and raising being performed automatically by the mechanism employed when the bridge is opening to allow of the passage of vessels, and closing to its normal position, that travel by land may proceed.

Devices of various kinds have been in use for closing the thoroughfare leading to and from a draw-bridge; but they have usually required to be operated by attendants located upon the abutments, or have been moved from the center of the draw by an attendant in that position previous to the swinging of the draw.

The object, therefore, of my invention is to so arrange the barriers that they may operate automatically when the draw is being opened and closed, and thereby to do away with any attention to the said barriers at the time the bridge is to be swung.

At Figure 1 of the drawings is represented a front elevation of a draw-bridge furnished with my improved devices, portions being cut away the better to show the working parts. Fig. 2 shows a longitudinal section of the bridge. Fig. 3 represents the same in rear elevation; and Figs. 4 and 5 represent, in perspective, details of the parts, showing how the barrier is held in and released from its upper and lower positions, respectively. Figs. 6 and 7 show, in elevation, portions of the barrier and one of the uprights when the said barrier is in its lowest position.

In working my improved barrier advantage is taken of the force of gravity by so arranging counter-weights whose weight is greater than that of the barrier that they will raise the said barrier from its lowered position to open the thoroughfare, and by the use of an auxiliary weight properly arranged, when brought into service, to give to the barrier the balance of power to overcome the force of the counter-weights, and thereby cause the barrier to descend, the upward and downward movements of the barrier being initiated by the swinging bridge, as will hereinafter appear.

Referring to the drawings, A represents the draw-bridge, and B the abutment. Uprights, as at C C′, are erected upon the abutments, the said uprights being braced by a cross-piece, as at D.

A shaft, as at E, preferably mounted on rollers to reduce friction, is placed at the top of the uprights and furnished with sprocket-wheels, as at E′, over which run chains, as at F, whose outer ends are connected to the barrier G, and whose inner ends suspend weights, as at H H′, which are heavier than the barrier, the said weights having a position within the uprights.

For the purpose of illustrating the principle upon which the barrier is operated, let it be supposed that its weight is four hundred pounds. The counter-weights H H′ would then be furnished with a force of gravity equal to, say, four hundred and seventy-five pounds, which, when allowed to act, would raise the barrier from its lowered position.

For lowering the barrier an auxiliary weight, K, is employed, which is suspended by a rope or chain, as at L, passing over a pulley, as at M, and then to a windlass, as at N, located on the weight H, the windlass being supplied with a ratchet, *n*, and a pawl, *n′*. When the weight H is in its lowest position the pawl takes bearing on a spring-pin or equivalent device, as at *m*, which operates to keep the said pawl in engagement with its ratchet when the weight H is down.

The windlass-shaft is squared upon one end to receive a crank, which is to be inserted through an opening, as at *c*, in the side of the upright C, for the purpose of turning the windlass to raise the weight K. This auxil-

iary weight K weighs, say, one hundred and fifty pounds, so that when its force is brought into action—that is, when the said weight is in a raised position—it practically reduces the gravity of the counter-weights H H′ by such amount and changes the balance of power in favor of the barrier, which would immediately descend after the winding-crank was removed but for an arm, G′, attached to the barrier G and projecting rearward therefrom. When the barrier is in a raised position and the weight K in force this arm bears upon one end of a dog, O, mounted loosely on a vertical shaft, P, attached to the upright C, and so controlled by a spring as to cause it to engage with a collar, *o*, secured to the shaft P, so that when the said shaft is rotated the dog will move therewith. When the barrier is in its lowered position it is prevented from rising by the engagement of the arm G′ with a dog, O′, mounted and controlled like its fellow O. Those ends of the dogs O O′ upon which the barrier-arm rests are beveled in relatively opposite directions to allow the arm G′ to pass over them and take up its position above or below them respectively.

To release the barrier-arm G′ so that the barrier may rise and fall, the shaft P is supplied with an outwardly-projecting arm, Q, loosely mounted on the shaft P, and so controlled by a spring as to cause it to bear against a pin, *r*, on a disk-collar, R, secured to the said shaft. When the arm Q is moved in the proper direction it causes a partial rotation of the shaft P and a movement of the dogs O O′, thereby releasing the arm G′ and allowing the barrier to rise or fall, according to its position, the shaft P, dogs O O′, and arm Q being returned to their original positions by a spring, T′.

The rotation of the shaft P, and consequent movement of the dogs, may be produced by hand; but, as before stated, it is intended that the movements of the barrier shall be initiated by the swinging bridge, and this is accomplished by such an arrangement at the end of the draw as that, for instance, the upright S shall engage the arm Q, when the bridge is swung in the proper direction.

Now, as the bridge in opening or closing may move in either of two directions, and as the tripping mechanism above described can only be operated from one, the upright C′ is supplied with a vertical shaft, P′, which is connected at the top to its fellow P by a rod, T, so that the rotation of the shafts is in opposite directions. This shaft P′ is supplied with an arm, Q′, mounted the same as its fellow Q, and so arranged in engagement with the pin *r′* on the collar R′ that its movement to produce a rotation of the shafts P P′ by contact with the upright S′ must be opposite in direction to that of its fellow. By this arrangement the opening or closing of the bridge in either direction will move the dogs O O′ and allow the barrier to rise or fall.

From the foregoing description it readily will be seen how, by raising the auxiliary weight K, the balance of power is transferred to the barrier, and it now becomes necessary to state how the force of the said weight is annulled and the counter-weights allowed to have their full force to raise the barrier. Suppose the weight K to have been raised and the dog O to have been tripped, the barrier and auxiliary weight would descend and the weights H H′ would rise. During the rise of the said counter-weights the pawl *n′* would be kept in engagement with its ratchet by the force of the weight K. To annul the force of this weight, that the barrier may be raised by the counter-weights, it is necessary to loose the pawl from its ratchet, that the windlass may freely revolve and deliver the rope or chain L during the descent of the weights H H′. For this purpose the upright C is provided with a pin or arm, as at *c′*, located at such a distance above the foot of the upright as that, just before the weight K becomes seated upon the abutment, the said pin will engage the pawl on the rising counter-weight H and force it out of the ratchet. The force of the weight K will then be annulled and the balance of power transferred to the counter-weights H H′, which will cause the arm G′ to engage the dog O′, the said arm during the descent of the barrier having passed a little below the dog, and the barrier will be suspended, ready when the dog O′ is tripped to be raised by the counter-weights H H′.

It now only remains, before proceeding to a description of the complete operation of my invention, to describe the means employed to prevent the barrier from acquiring an undue momentum during its movements, and thereby strain the parts. To accomplish this the weight H′ is supplied with two air-pumps, as at U, Fig. 1, having cocks in their bottoms to govern the ingress and egress of air, their piston-rods *u* being connected to gears, as at V, whose rear portions are pulleys, around which runs a rope or equivalent, W, the upper end of said rope being attached to the upright C′ near its top and the lower end supplied with a weight to insure the rotation of the gears and consequently the working of the pumps. If preferred, however, the rope W may be dispensed with and a rack be so located on the interior of the upright as to engage with one of the gears V and insure their rotation. During the movement of the barrier and counter-weights, therefore, the pumps U will be in operation and secure the rising and falling of the barrier with any desired rapidity, since said rapidity of movement will be governed by the entrance of air to and discharge of air from the pumps.

Finally, to secure the barrier from swinging by the force of the wind or other causes, it may be provided with rollers, as at X, running in grooves *x* in the sides of the uprights, and rollers Y, bearing upon the said sides, as shown in all the figures.

Having described my invention, I will now proceed to its complete operation. Let it be

supposed that the barrier is in its raised position and the thoroughfare open. The counter-weights H H′ will be found at their lowest point, as will likewise the auxiliary weight K, and the arm G′ will be located slightly above the dog O. An attendant now proceeds to raise the weight K by means of the crank and windlass, the pawl *n′* being kept in engagement with its ratchet by the spring-pin *m*. When the weight K has reached its highest point the crank is removed, and, the balance of power being with the barrier, it descends slightly until the arm G′ rests upon the dog O. Here the barrier remains suspended, ready to be operated by the swinging draw, which, in opening from either direction, strikes one of the arms Q Q′ and trips the dog O by a partial revolution of the shaft P, when the barrier and auxiliary weight K will descend and the counter-weights H H′ will rise, the air-pumps working to prevent the barrier from acquiring too great momentum, and the shafts P P′ and dogs O O′ being returned to their original positions by the spring T′ on the rod T. The instant before the weight K seats itself on the abutment—that is, just when the arm G′ has passed over the beveled end of the dog O′, as shown in Fig. 7—the pawl *n′* strikes the pin *c′*, as shown in Fig. 6, releasing the weight K and transferring the balance of power to the counter-weights H H′, which immediately act to bring the arm G′ up in contact with the dog O′. When the bridge returns the dog O′ is tripped and the barrier rises into its original position. The weight K is then again raised by the attendant, and the barrier is ready to move, as above described.

To protect the mechanism for working the barrier from the weather it may be housed and the end of the bridge made to engage the arms Q Q′ by extending them.

In the foregoing description and in the drawings I have only shown a barrier and mechanism at one end of the bridge; but it is to be understood that both ends are similarly supplied.

Although I have described definite mechanism for holding the barrier in a raised and lowered position and tripping the same, it is within the province of the mechanic to vary the same in many ways without departing from the spirit of my invention.

I am also aware that the air-pumps may be placed in a position other than on the counter-weights, and be worked by the moving barrier to produce the desired result—as, for instance, by placing them upon the uprights and working them from a gear or pulley on the shaft E. Therefore,

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

1. In combination with a barrier for closing the thoroughfare leading to a draw-bridge, counter-weights which are heavier than the barrier and are attached thereto, and mechanism independent of said weights for holding the barrier in a position to block the highway whether the bridge is open or closed, and which can be tripped by the swinging bridge or independently thereof, and regardless of the position of the bridge, to allow the barrier to rise, substantially as herein set forth.

2. In combination with a barrier for closing the thoroughfare leading to a draw-bridge, counter-weights which are heavier than the barrier and are attached thereto, an auxiliary weight which, when in a raised position, will make the barrier heavier than its counter-weights, and mechanism for holding the barrier in its raised position, and which can be tripped by the swinging bridge or independent thereof, to allow the barrier to descend, substantially as described and shown.

3. The combination, with a barrier, weights attached thereto which cause the barrier to ascend, and an auxiliary weight which causes the barrier to descend, of air-pumps which are worked by the moving barrier, substantially as and for the purposes specified.

ALBERT R. SHERMAN.

Witnesses:
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WM. A. CADY.