

(No Model.)

A. F. PUREFOY.
GATE.

3 Sheets—Sheet 1.

No. 299,581.

Patented June 3, 1884.

Fig. 1.

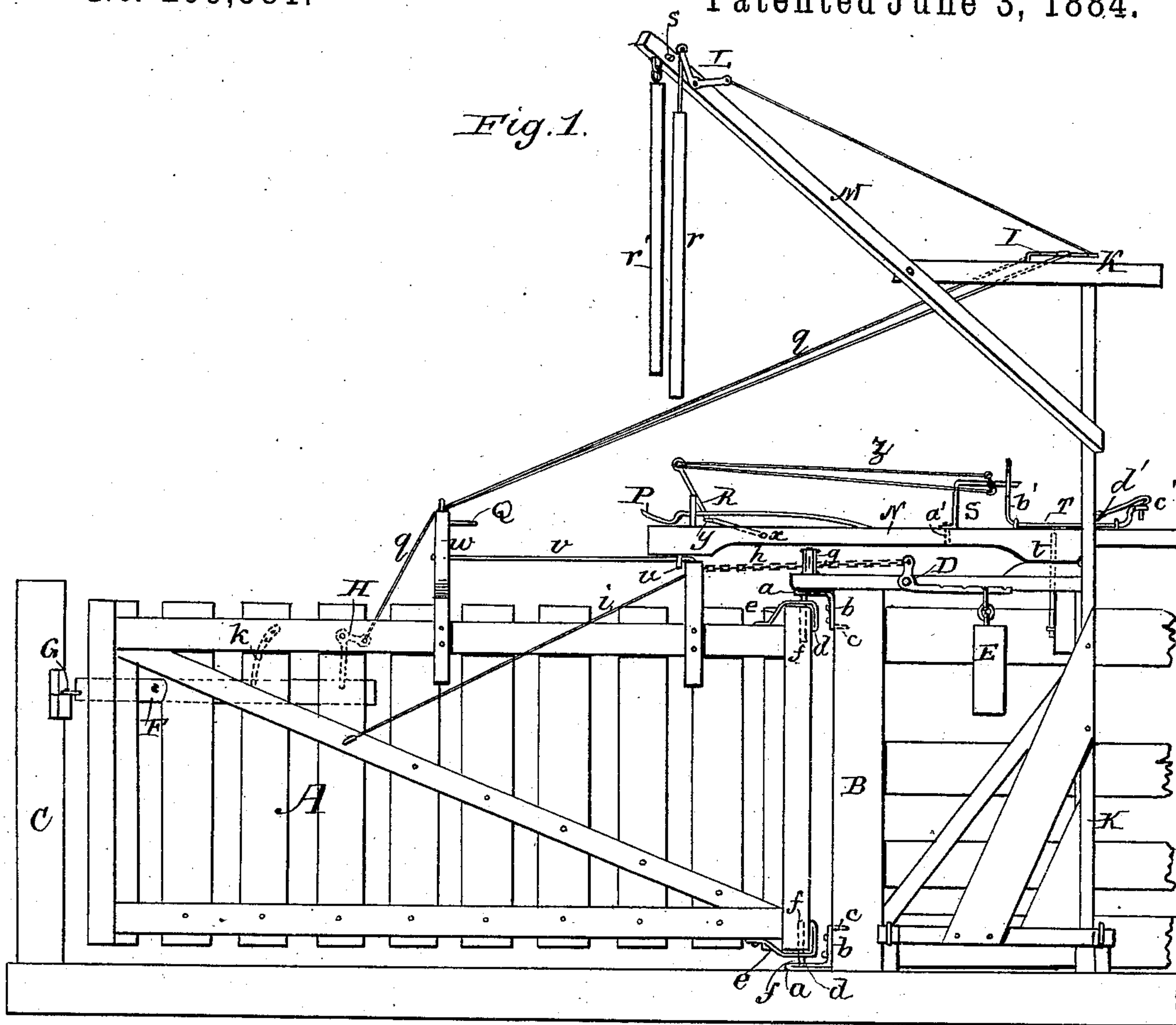


Fig. 2.

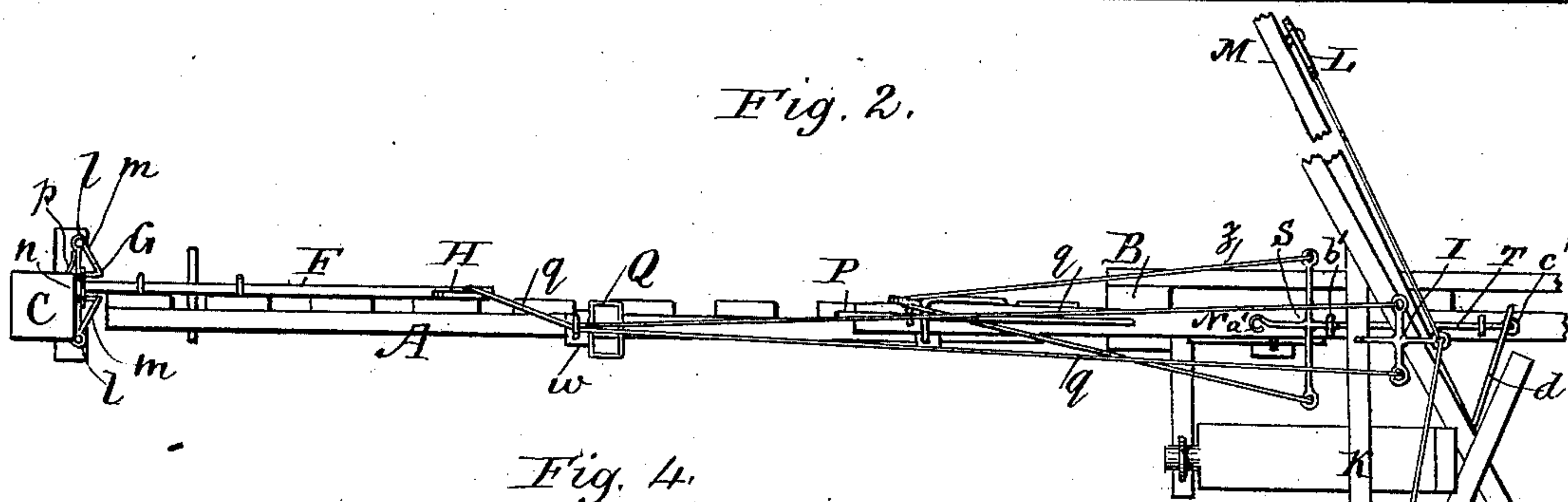
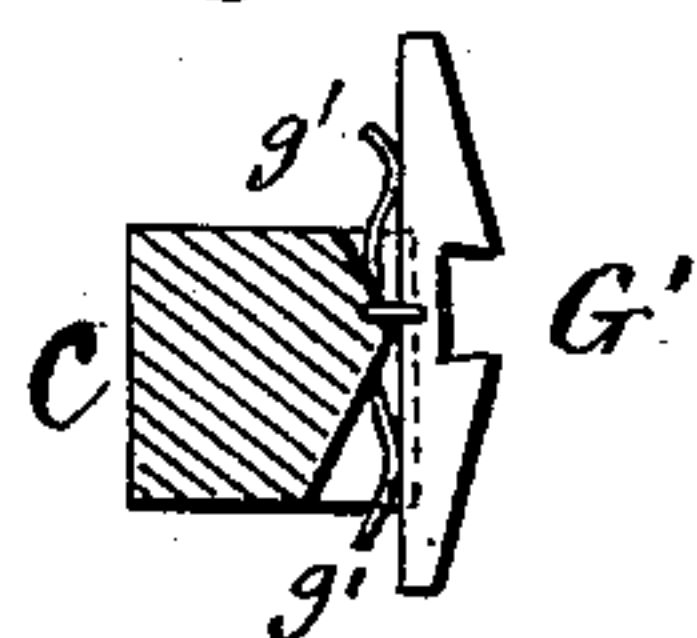


Fig. 4.



Witnesses
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W. Masson

Inventor:
Addison F. Purefoy
by Chas. J. Hedrick
his attorney in fact.

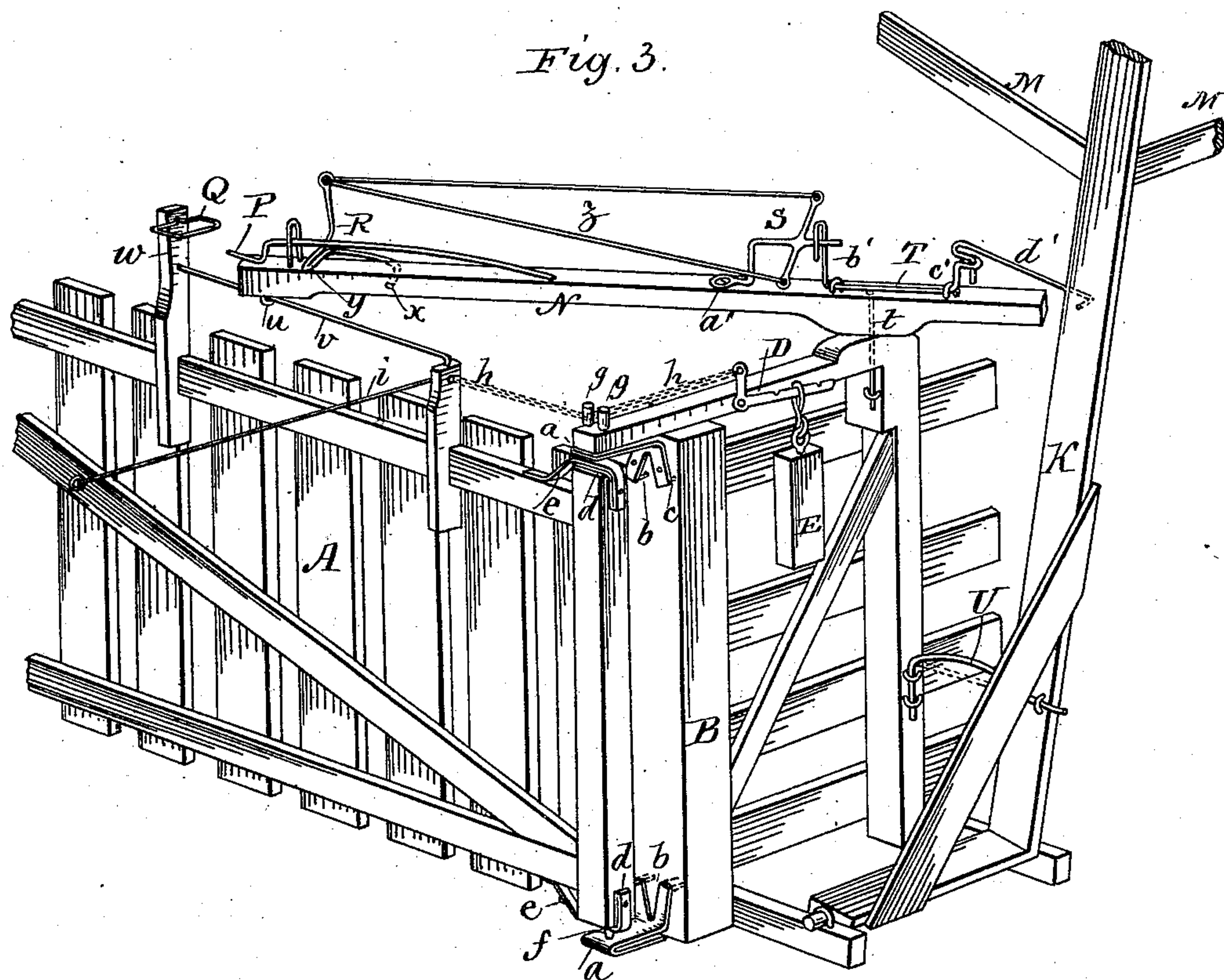
(No Model.)

3 Sheets—Sheet 2.

A. F. PUREFOY.
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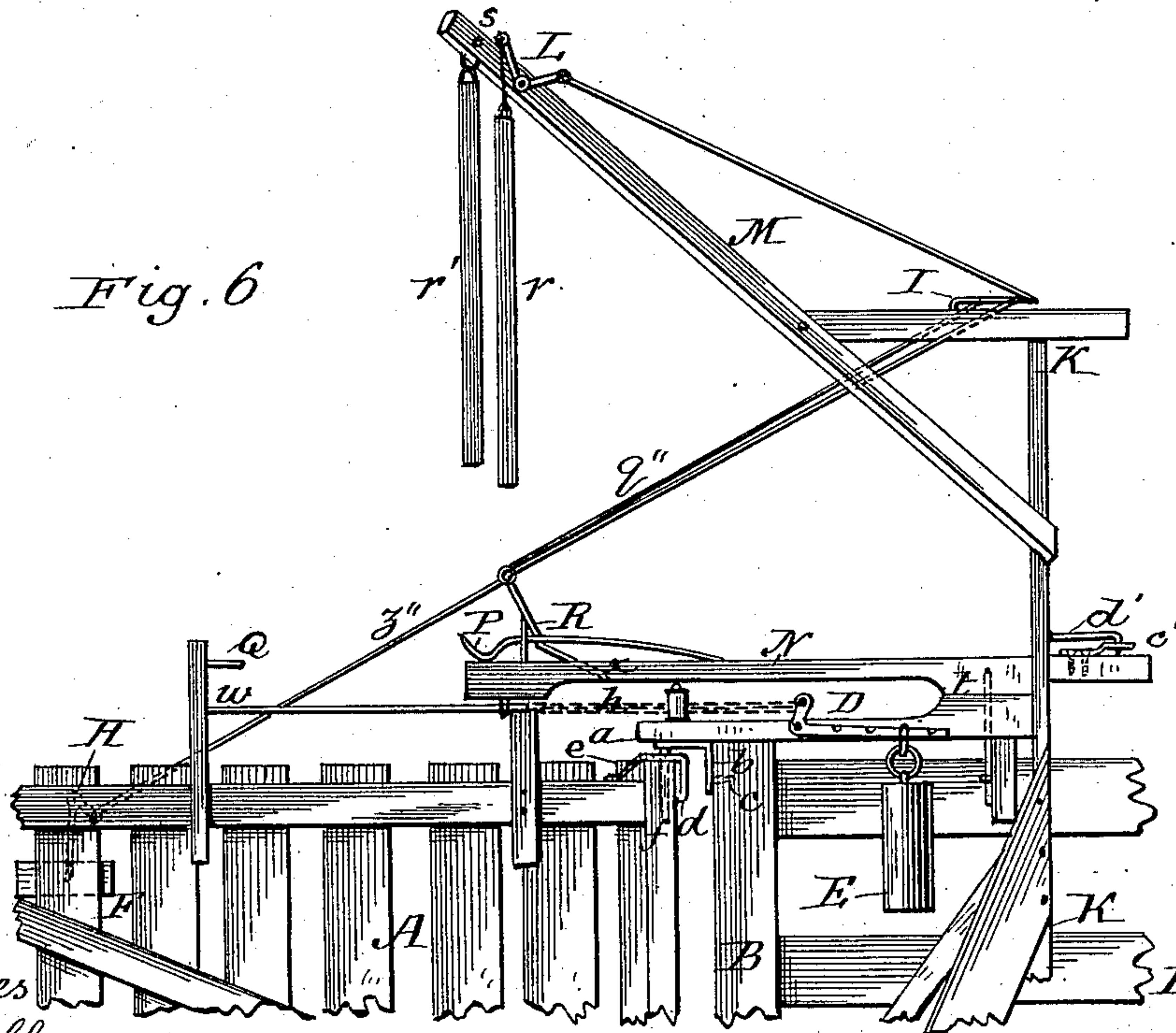
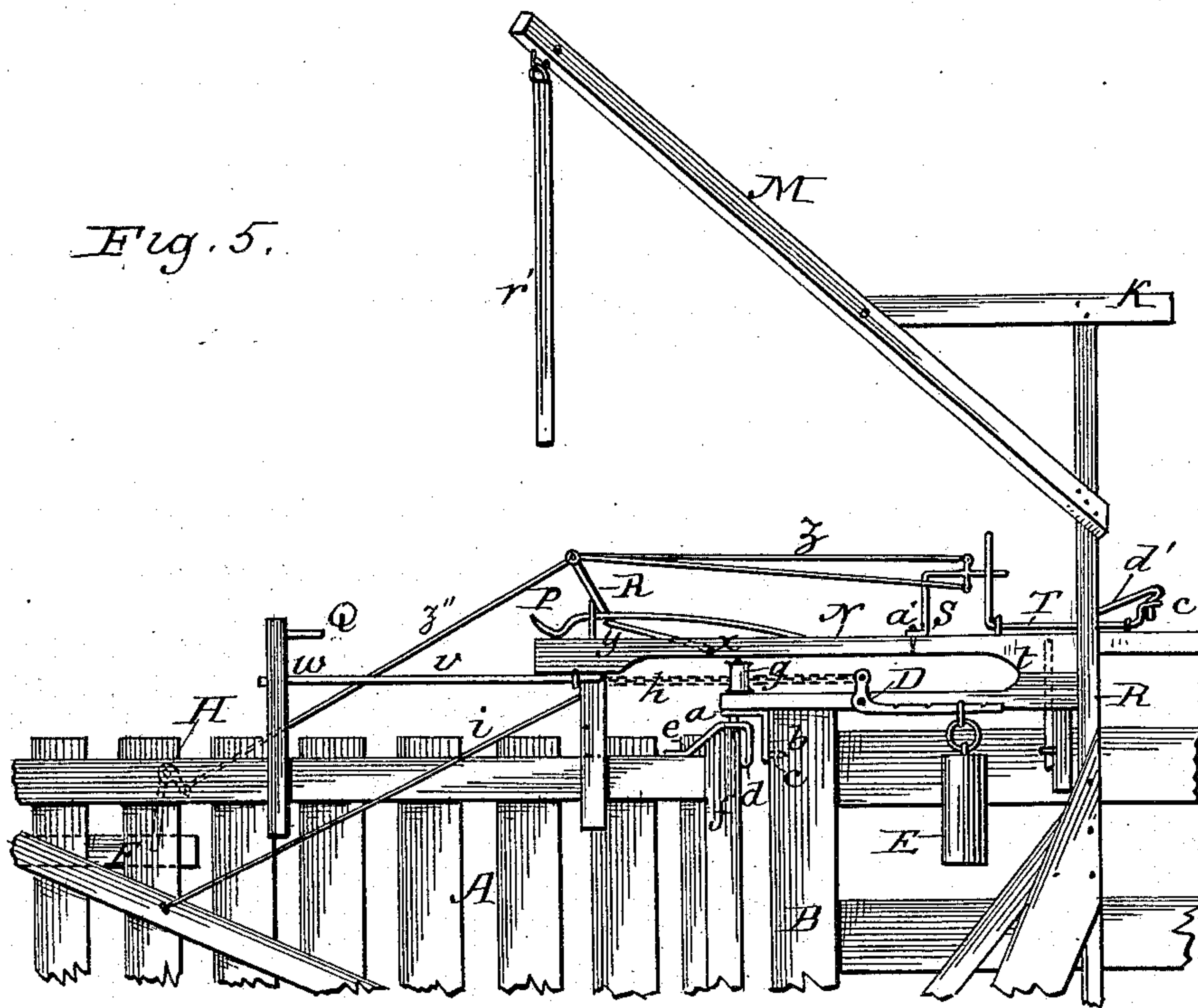
(No Model.)

3 Sheets—Sheet 3.

A. F. PUREFOY.
GATE.

No. 299,581.

Patented June 3, 1884.



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UNITED STATES PATENT OFFICE.

ADDISON F. PUREFOY, OF WAKE FOREST, NORTH CAROLINA.

GATE.

SPECIFICATION forming part of Letters Patent No. 299,581, dated June 3, 1884.

Application filed October 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, ADDISON F. PUREFOY, a citizen of the United States, residing at Wake Forest, in the county of Wake and State of North Carolina, have invented certain new and useful Improvements in Gates, of which the following is a specification.

This invention has reference more particularly to the gates commonly called "automatic," which are provided with means whereby a person passing may open and close the gate without dismounting from his horse or vehicle, and without handling the gate itself. The said invention is, however, in part applicable also to gates which are not automatic. It may be considered an improvement on the gate described in Letters Patent No. 257,894, granted to me May 16, 1882.

The invention comprises the following several improvements:

First. The horizontal lever, which acts upon the gate to open and close the same, instead of being pivoted to the post to which the gate is hung, is pivoted to a post or support in the rear of said gate-post, so that when the gate is open the oblique lever is at some distance from the hinge or axis about which the gate turns, and forms an efficient brace. When the horizontal lever is pivoted to the gate-post, the pivot is so close to the axis about which the gate swings that said lever can have but little effect in bracing or steadying the gate. Moreover, in the latter case, the strain of the operating mechanism is directly upon the gate-post; and, further, it requires the exertion of considerable power to start the gate, and it requires, also, the possession of strength in the apparatus to resist the momentum of the gate in bringing it to rest. With the new construction the gate-post is relieved of the strain, which is borne by the separate post or support in the rear of the same, and less power is required to move the gate, and the strain upon the lever in stopping the gate in an open position is diminished. The length of the lever is so proportioned with reference to the position of the posts (gate-posts and lever-posts) that it makes an angle of forty-five degrees, (45°,) more or less, with the open gate.

Second. It is highly desirable, if not absolutely necessary, to provide means for holding the gate open while the person using the

gate is passing through. In my patented gate there is a notched device held down by a weight, and the engagement of this notched device with a roller or pin when the gate is opened locks the gate-opening mechanism in the position which it then has. To release the gate, sufficient power must be applied to lift the weight aforesaid by the action of the inclined side of the notch against the roller or pin. It is obvious that this is not a positive protection, since a sufficient pressure—say of the wind—against the gate itself may close it. In the present invention a positive catch is provided, which can only be released by the proper releasing devices or by hand. The catch is adapted to lock the gate-closing mechanism, being attached to and carried by the same, and is combined therewith, so that the person passing may at will release it by acting upon said mechanism. It may be observed that heretofore a catch has been provided for holding a gate open; but it has been arranged directly to engage the gate itself, and it has ordinarily been placed on a post at the side of the roadway, and at a distance from the fence equal to the gate's length. In all cases it would be troublesome, and in many impracticable, to have this isolated post. Other arrangements of catch may have been made; but, so far as I am aware, in none is there a catch disposed and adapted to operate as above stated. The catch is preferably placed one part on the gate and the other on the end of the horizontal or gate-operating lever, and it is so shown herein.

Third. The end of the lever is so connected with the gate that it may slide lengthwise thereof. For example, an eye on the end of the lever travels along a rod fixed to the upper part of the gate, or an equivalent construction is adopted. Broadly, the connection of the lever and gate so that the end of the former slides on the latter or on a device fixed thereto is only claimed in combination with other elements, as hereinafter expressed, since heretofore a horizontal operating-lever has been provided with a fork which embraces the top rail of the gate and slides thereon.

Fourth. In many of the automatic gates which open in both directions the latch will not always engage, and the gate is liable to swing past the closed position. The difficulty arises from the manner in which the latch-releas-

ing devices and the gate-operating mechanism are combined—that is to say, the combination is often such that by acting upon the said mechanism to close the gate the latch is held back
 5 so that it will not engage the catch on the gate-post. In the present invention improved means are provided whereby this difficulty is avoided. These means will be hereinafter fully explained. This part of the invention also
 10 comprises other improvements, hereinafter specified, in the gate-operating and latch-releasing mechanism and in the latching means.

Fifth. An improved counterpoise is provided to prevent the gate from sagging. Heretofore counterpoises of various kinds have been
 15 provided; but for the most part they are deficient in that they do not properly balance the gate in all positions. This difficulty is overcome in the present invention by having the
 20 counterpoise attached to a flexible cord or chain which runs through an opening in a device or between devices carried by a stationary support just above the axis about which the gate swings, which cord, at the opposite
 25 end, is fastened to the gate or to a device thereto affixed. The counterpoise thus exerts its power always in the direction of the length of the gate, and tends to hold up the outer or front end, no matter in what position the gate
 30 may be. The weight is, by preference, not attached directly to the flexible cord or chain, but indirectly, through a lever of bell-crank or other suitable form, with arms of unequal length. The opening for the cord or chain to
 35 pass through may be a plain eye, but is preferably formed between two vertical rollers.

Sixth. A new form of hinge specially adapted for use in connection with the other parts of the invention is provided. It is fully described
 40 below.

The following description, which, in connection with the accompanying drawings, illustrates what is deemed the best mode of carrying the invention into effect, will enable those
 45 skilled in the art to which it appertains to make and use the said invention.

In the said drawings, Figures 1 and 2 are elevation and plan, respectively, of the gate closed; Fig. 3, a partial perspective of the gate open
 50 almost to the full extent; and Fig. 4, a plan of a modified form of catch to be used on the gate-post in place of that shown in Figs. 1 and 2, should the substitution be deemed desirable. Figs. 5 and 6 illustrate modifications of
 55 the gate-operating mechanism.

The same letters of reference indicate like parts in all the figures.

A is the gate, of any ordinary or suitable construction, hinged to the rear gate-post, B, and, when closed, latched to the front gate-post, C. Of the hinges, both upper and lower, the part attached to the post is formed of a single bent strip, and comprises a socket-plate,
 60 *a*, attaching-plate *b*, and holding-tangs *c*. The attaching-plate *b* is split and spread apart, so as to give a wide bearing-surface. The ends are pointed and bent to form the tangs *c*, which,

when the hinge is applied, are driven into the wood of the gate-post. The attaching-plate is further secured by screws, bolts, or nails. In
 70 the lower hinge the socket-plate *a* is bent on itself to form a bearing for the lower end of the pintle. In the upper hinge this bearing-piece is unnecessary, and may be omitted, although it can be used, if desired.

That part of the hinge which is carried by the gate comprises the angle-piece *d*, the flexible steady-plate *e*, formed of a single strip, and the pintle *f*, fixed in the angle-piece. The angle-piece is formed by bending the metal
 80 strip on itself, so as to form two or more layers, and the steady-plate is formed by a single layer of the strip, which is allowed to project. The object of the flexible steady-plate is this: Ordinarily-constructed gates made of wood,
 85 as the majority of gates are, have a horizontal top bar and a vertical rear end bar, on the top of which the hinge is to be placed. To secure the hinge it is desirable to attach it as well to the top bar as to the end bar. This is
 90 the object of the steady-plate, and as the distance which the end bar projects above the horizontal top bar, as well as the width of the end bar, varies in different gates, the steady-plate *e* is made flexible, so that the hinge can
 95 be applied to gates of all kinds and sizes. Practically, it is intended to bend the angle-piece and secure the pintle therein in the manufacture of the hinge, and to leave the steady-plate to be bent to fit the gate by the
 100 person using the hinge. The pintle may be fixed in the angle-piece by welding, by inserting it when cold in an opening in said piece, (the piece having previously been expanded by heat,) and allowing the said opening to
 105 close upon it, or in any suitable way. Preferably, it is secured at an intermediate point, so that it projects downward into the end bar as well as upward into the socket-plate *a*. The pintle thus aids in retaining the hinge in place.

Immediately above the pintle of the upper hinge, on an overhanging support, are a pair of vertical rollers, *g*. Between them runs a chain, *h*, attached at the front to a brace-rod,
 110 *i*, on the gate, and at the other end to the short arm of the bent lever D, to the longer arm of which the weight E is suspended. This weight is preferably made adjustable on the lever-arm, so that the tension exerted by it upon the chain can be increased or diminished. This
 120 weight balances the gate in all positions, and operates to prevent sagging.

The latch F is shown as a horizontal sliding bar pressed forward by the spring *k*. It engages with a catch, G, on the front gate-post.
 125 This is double. It may be formed of a centrally-notched lever, G', turning on a vertical pivot, and held in its normal position by springs *g'*, as shown in Fig. 4; or it may be of other suitable construction; but preferably it
 130 is made as shown in Figs. 1 and 2—that is to say, each of the two parts of the double catch is formed of a wire bent upon itself to make an eye, *l*, whereby it is pivoted to the gate-post,

and a triangular body portion, *m*. One arm of the triangle works through a staple, *n*. A spring, *p*, presses the catch outward, the play being limited by contact of the staple *n* with the inner side of the triangle or side next the gate-post C. The springs *p* are made weaker than the spring *k*, so that when the gate is closed one of them will give way, instead of obliging the latch to retreat. The latch F is loosely connected with the longer arm of the bent lever H, pivoted to the gate. The shorter lever-arm is connected by a flexible cord or chain, *q*, with the latch-releasing devices. These devices comprise a three-armed lever, I, carried by the pivoted upright K, which forms part of the gate-shifting mechanism. Bent levers L, pivoted near the ends of the arms M, for tilting the upright K, and provided with pendants *r*, for turning said levers, are connected by cords, rods, or chains with the rear arm of the lever I. The other two arms are each connected with the cord or chain *q*, which is divided or branched at the rear end. By pulling upon either of the pendants *r*, the effect will be to turn the lever L, and also the lever I, which latter pulls upon the chain or cord *q*, turns the lever H, and withdraws the latch F against the pressure of its spring. When the latch is withdrawn, further pulling upon the pendant tilts the upright K and opens the gate through connections described below. A stop, *s*, may be used to limit the movement of each lever L, and to take the strain required to open the gate. The upright K has a long horizontal pivot-piece, of which the ends turn in staple-bearings, separated by nearly the length of the pivot. Diagonal braces connect the upright and pivot-piece, a very strong yet light and easily-operated device being thus secured. The operating-arms M are attached to the upright K not only at an inclination, but also in a position oblique to the plane of motion of said upright, so that the said arms extend above or across the road the desired distance from the gate-post. The pendants *r* are simply fastened to the operating-arms, and are not connected with the latch-releasing devices. The horizontal swinging beam N turns on a pivot, *t*, on a post or support in the rear of the gate-post B. The said beam is of sufficient length to project over said post, and at its front end it is connected with the gate by a sliding connection, which admits also a slight turning. As shown, an eye, *u*, on the end of the beam N, embraces a rod, *v*, fixed to the gate. To allow of a slight turning, the eye is made large to admit of a slight lateral play on the rod, or its shank is adapted to turn in the beam.

It is obvious that the effect of swinging the beam N will be to turn the gate with it, the eye *u* sliding on the rod *v*. After a certain time the end of the beam N makes contact with the bar *w* on the gate and stops the latter. The bar *w* therefore serves as an arresting-stop.

The parts are so proportioned that the stoppage occurs when the gate is fully opened, the beam N then making an angle of about forty-five degrees with the gate. It is preferred to have the pivot of the swinging beam a distance in the rear of the axis upon which the gate swings about equal to half the length of the gate.

On the beam N is a spring-catch, P, which is adapted automatically to engage with a device, Q, on the bar *w*, when the gate is opened, and to hold it in that position until released. There are automatic releasing devices, which are adapted to be operated by the upright K by pulling upon the pendants *r*'. A bent lever, R, turning on a horizontal pivot, *x*, has a lateral projection, *y*, which passes under the spring-catch P. The said lever is connected by cords or chains *z* with the two opposite arms of the three-armed lever S, which turns on a vertical pivot at *a*'. The third or rear arm of this lever S is engaged by the arm *b*' of a short rock-shaft, T, which extends lengthwise of the beam N. The connection is by means of a hook on arm *b*' fitting over the small end of the lever-arm, so that the rocking of the shaft T turns the three-armed lever S on its pivot, and through one of the chains or rods *z* tilts the lever R and lifts the catch P out of engagement with the device Q. The rear end of the rock-shaft T has also a vertical arm, *c*', which is connected by a rod, *d*', with the upright K.

To assist in closing the gate, a spring, U, is combined with the upright K. As shown, it is a steel rod rigidly fastened at one end to the upright, and at the other playing loosely in an eye on the post. The tilting of the upright in either direction bends the spring, and its elasticity causes it to return the upright to its normal position.

The operation of the whole apparatus is as follows: The gate being closed and latched, a person who wishes to open it pulls upon one of the pendants *r*, which, notwithstanding the position of the upright K to the rear of the gate-post, is brought within easy reach from a vehicle by the oblique disposition of the operating-arms M. The act of pulling upon the pendant first draws back the latch, as already explained. Then motion is communicated to the upright K, which moves upon its pivot in one direction or the other, according to which pendant is pulled. Through the rod *d*' and rock-shaft T the motion of the upright K is communicated to the horizontal swinging beam N, which thereupon swings the gate upon its hinges. The spring-catch P will not ordinarily be lifted, because the spring is made so strong that the gate will swing before the spring will bend; but it would not interfere with the operation should the spring-catch be lifted. When the gate is opened, it is stopped by the beam N, and the catch P engages the device Q, to hold it open. After the person has passed through the gate he pulls upon the pendant *r*', which immedi-

ately tilts the upright K, turns the rock-shaft T and levers R S, and releases the catch P, and then swings the beam N and closes the gate A. The latch F, pressing back one part of the catch G, and striking fair the other part, prevents the gate from swinging open on the other side. The spring of catch P, after it is once released, drops back to its normal place, its strength, as already stated, being sufficient for it ordinarily to serve as the point of resistance.

It is obvious that the sagging of the gate would be liable materially to interfere with the operation of the gate by the aforesaid mechanism. The counterpoise prevents difficulty in this regard. In like manner the special construction of hinge described assists the operation of the gate-operating mechanism by supplying those conditions under which efficient working may be accomplished.

Modifications may be made in the construction without departing from the spirit of the invention, and portions of the invention may be used separately.

Instead of employing the pendants r and their connections, these, including the levers L and I, may be dispensed with, and the short arm of lever H may be connected with the lever R at the same point as the cords or chains z. In Fig. 5 this modification is shown, the lever H being connected with the lever R by the cord or chain z. The lever H should be properly shaped and placed to operate in its new connection. In the modification indicated the advantages of the operation of the latch by separate pendants would, of course, be lost; but at the same time the efficiency of the apparatus is by no means destroyed. Owing to the strength or tension of the spring of catch P, the latch F is substantially independent of the gate-operating mechanism in closing. Moreover, if the strain should be sufficient to lift the spring-catch P, it would rarely, if ever, be sufficient to overcome the spring k in addition, and this must be done in order to withdraw the latch, so as not to engage the catch G. Another modification (shown in Fig. 6) would be to dispense with the rock-shaft T and lever S, and to connect the lever R by cords or chains q directly to the lever I, the said lever R being also connected with the lever H. This construction would have substantially the advantages and disadvantages of that just described. The upright would be connected by the rod to a fixed arm on the swinging beam.

Instead of the double spring-catch shown in Figs. 1 and 2, or other movable catch—such as the modified form represented in Fig. 4—a fixed catch—such as shown in my patent referred to above—could be used; but the fixed catch is not so certain to retain the gate because it forces the latch back, and the spring may not always return it before the gate has swung past the post C. The bent lever H could be dispensed with, the cord from the lever I or from the lever R being led directly to the latch; but the use of the lever is pre-

ferred, and is specially claimed. The tangs on the hinge could be omitted, bolts or screws being relied upon to secure the hinge to the gate-post. The chain connected with the counterpoise, instead of passing between rollers, could be run through an eye, although not so well. Other alterations could be made; but it is not deemed necessary to rehearse them here.

I claim the new improvements herein described, all and several, to wit:

1. The combination of the gate-post, the gate hinged thereto, the separate post or support in the rear of said gate-post, and the horizontal swinging beam pivoted to said separate post or support and connected with the gate, substantially as described.

2. The combination of the gate-post, gate hinged thereto, separate post or support in the rear of the gate-post, and the horizontal swinging beam pivoted to said separate post or support and connected with the gate, the said parts being disposed, as explained, so that when the gate is opened the beam makes an angle therewith of about forty-five degrees, and when closed the middle of the front arm of the beam is about over the gate-post, substantially as described.

3. The combination, with a gate and a horizontal swinging beam for shifting said gate, of a stop on the gate for arresting the motion thereof by contact with said beam, substantially as described.

4. The combination of the gate-post, the gate hinged thereto, the swinging beam pivoted to a support in the rear of said post, and the arresting-stop on the gate, substantially as described.

5. The combination, with the gate and the mechanism for opening and closing the same, of the positive catch attached to and carried by the gate-shifting mechanism, for locking said mechanism in position to hold the gate open, and connections whereby the catch may be released through said mechanism, substantially as described.

6. The combination, with the gate and gate-shifting beam, of a catch for engaging and locking together the said gate and beam, so as to hold the gate open, substantially as described.

7. The combination of the gate, gate-shifting beam, catch for locking said beam to the open gate, mechanism for swinging the beam to open and close the gate, and connections whereby the catch may be released through said mechanism, substantially as described.

8. The swinging beam having between its front end and the gate a connection, such as the eye and rod or its equivalent, for permitting the said end to slide lengthwise of the gate, in combination with a catch for locking the open gate to said beam, substantially as described.

9. The combination of the gate, the swinging beam, the devices for making a sliding connection between the beam and gate, and the stop for arresting the motion of the gate by

contact with said beam, substantially as described.

10. The combination of the gate, the beam, the rod fixed to the gate, and the eye on the beam embracing said rod, substantially as described.

11. The combination, with the latch-releasing and gate-shifting mechanism, of a spring, such as P, separate from the latch-spring and connected with said mechanism, substantially as described.

12. The combination, with the three-armed lever S, of the rock-shaft T, for turning said lever, a latch or catch, such as P, and connecting devices for withdrawing said latch or catch on turning said lever, substantially as described.

13. The combination, with the hinged gate, its latch, the horizontal swinging beam, the pivoted upright, and the devices for releasing the latch and for operating said upright and beam to open the gate, of the means for operating said upright and beam to close the gate without danger of withdrawing the latch, said means including a device separate from the latch and latch-spring as the point of resistance to the pull of the passer-by in closing the gate, substantially as described.

14. In a gate, the combination, with the pivoted upright and the operating arm or arms fixed thereto, of the latch and the latch-releasing devices connected with and carried by said upright and its arms, and capable of a slight independent movement, so that the latch may be withdrawn before the upright is turned to swing the gate, substantially as described.

15. The combination, with a gate, a latch for holding it closed, and a catch for holding it open, of the devices for releasing the latch, the devices for releasing the catch independently of the latch, and the mechanism for shifting the gate, substantially as described.

16. In combination with the gate-post, gate, and gate-operating mechanism, the hinges for connecting the gate with the gate-post, the said hinges, one or both, having an attaching-plate split and spread apart, and being secured to said post by said plate, substantially as described.

17. In combination with the gate-post, gate, and gate-operating mechanism, the hinges for connecting the gate with the gate-post, the said hinges, one or both, being provided with

a flexible steady-plate attached to the gate, substantially as described.

18. The combination, with a swinging gate and a stationary support above the axis on which the gate swings, of a counterpoise and a flexible cord or connection connecting the gate and counterpoise, and running through an opening in a device or between devices on the aforesaid stationary support, substantially as described.

19. The combination of the swinging gate, the counterpoise, the lever, the flexible cord or chain, the rollers or their equivalent over the gate-hinges, and the stationary support for the said rollers, substantially as described.

20. The combination of a gate, its counterpoise, a lever, a stationary support above the gate-hinges, and a flexible connecting cord or chain running through an opening in said support, said counterpoise being adjustable on an arm of said lever, substantially as described.

21. The pivoted upright having a long pivot-piece with its opposite ends journaled in bearings, and braces connecting the body of the upright to said pivot-piece, substantially as described.

22. In a gate, the combination, with the gate-shifting lever turning upon a fulcrum exterior to the gate and its hinges, such as the pivoted upright shown, of the latch, the latch-releasing devices carried by said lever, and capable of a limited movement independent thereof, but adapted when said movement is completed to engage and operate said lever, and the means for operating the lever independently of said devices, substantially as described.

23. The herein-described automatic gate, comprising in combination the gate, gate-posts, hinges, latch, catch on the front gate-post, counterpoise, horizontal swinging beam, spring-catch thereon, arresting-stop on the gate, and device for engaging the spring-catch also on the gate, together with the various levers and connecting and operating means, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ADDISON F. PUREFOY.

Witnesses:

AUSTIN B. FULLER,
GEORGE A. ISBELL.