(No Model.)

E. W. JACKSON.

AUTOMATIC SAFETY GATE.

No. 463,194. Patented Nov. 17, 1891.

FIG. 1.

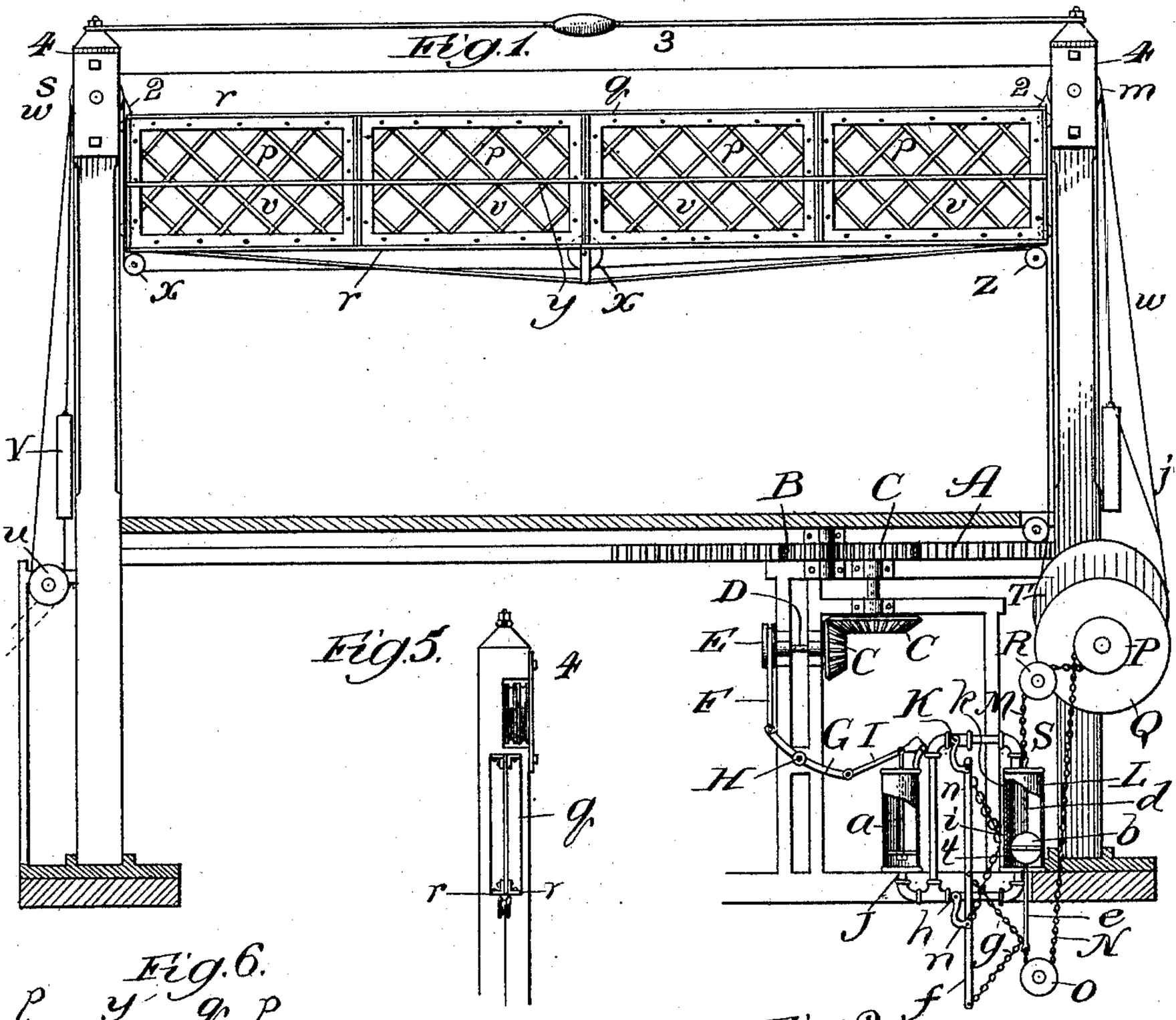


FIG. 5.

FIG. 6.

FIG. 2.

FIG. 4.

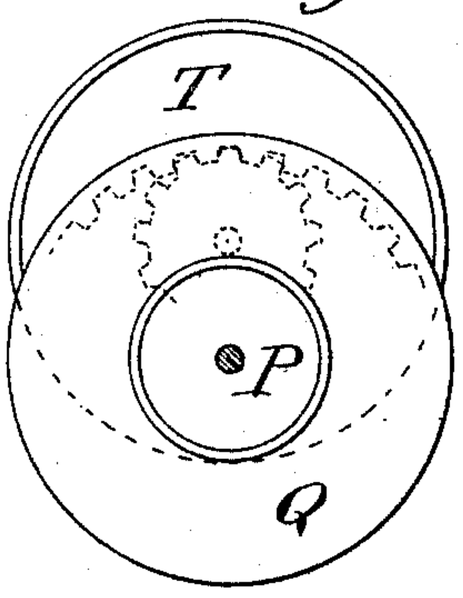
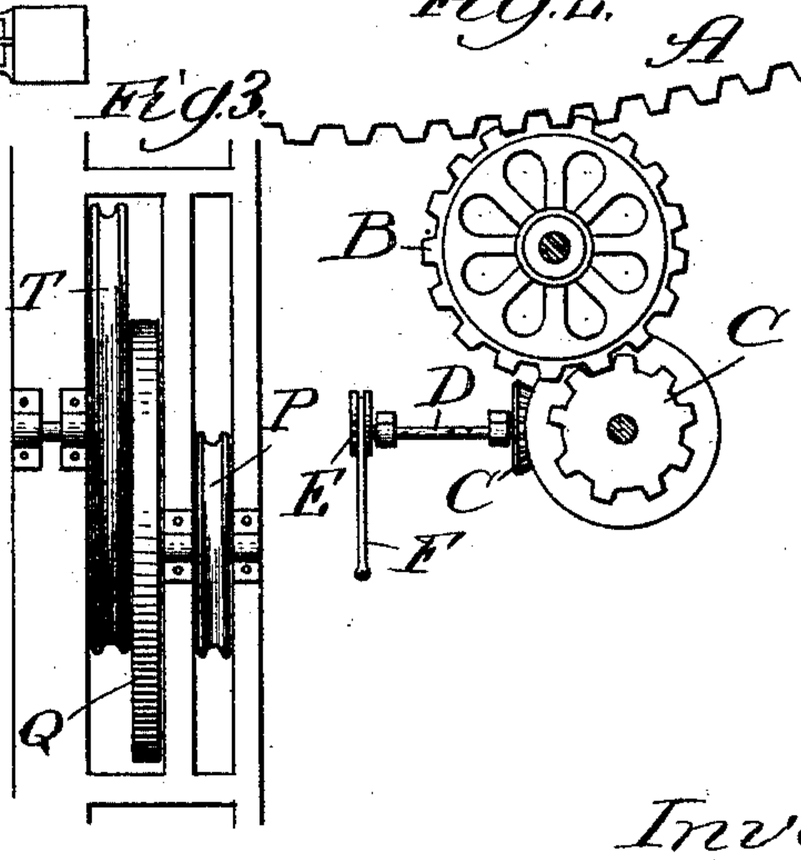


FIG. 3.



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UNITED STATES PATENT OFFICE.

EZRA W. JACKSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF SEVEN-TWENTIETHS TO MARY LOUISA MILLS AND HENRY JACKSON, OF SAME PLACE.

AUTOMATIC SAFETY-GATE.

SPECIFICATION forming part of Letters Patent No. 463,194, dated November 17, 1891.

Application filed March 2, 1891. Serial No. 383,529. (No model.)

To all whom it may concern:

Be it known that I, EZRA W. JACKSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, pray that Letters Patent be granted to me for Improvements in Automatic Safety-Gates, as set forth in the annexed specification.

My invention relates to improvements in the method of raising and lowering vertical safety-gates for draw-bridges or road-crossings and may be operated automatically or otherwise.

The objects of my improvements are as follows: first, to provide automatic motion by placing at either end of the draw-bridge segmental cog-gearing which is connected with pinion-gearing to operate an air-pump which forces the air to a vertical cylinder through pipes having automatic rotary valves, thus producing vertical motion; second, to convert the vertical motion of the piston into a rotary motion by employing an epicycloidal wheel; third, to provide accelerated motion equal to the distance the gate will rise by connecting the epicycloidal wheel with a sheave; fourth, to provide a vertical motion of the gate (the power being derived from one side only) by the application to it and to the sheave of a chain or wire rope in such manner as to raise or lower the gate at each stroke of the piston-rod, and, fifth, to construct a gate that will not sag, although being fifty feet in length and suspended at each end. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the entire gate, showing the floor and end timbers of the draw-bridge and the connections of the air-pump and other machinery thereto. Fig. 2 is a top view of the segmental cog-gearing on the end of the bridge and its connections with the pinion and the gear-wheel. Fig. 3 is a vertical and side view of the epicycloidal wheel and sheaves and their connection with the gate-post. Fig. 4 is a side view of the epicycloidal wheel and its connection with the sheave, indicated by dotted lines. Fig. 5 is a vertical section of a part of the gate-post, showing the sheaves at the top, also a section of the gate showing sections of the iron or steel angles. Fig. 6 is a view of a cross-section of the post and a longitudinal view of the gate, showing tension-rods and the connection of the gate with the post.

Similar letters and figures refer to similar parts throughout the several views.

The segmental cog-gearing A being secured to the timbers at either end of the draw-bridge, the motion of the draw-bridge turns pinion B and its attached gearing C C C. The shaft D is connected at one end with gearing C C C and at the other with cam E, and to the latter is secured the connecting-rod F, which is connected at its lower end with lever G, Fig. 1. Lever G is secured at fulcrum H and connected at the opposite end with the lever of the air-pump I. Thus the air-pump is operated, and compressed air is forced from the bottom of the pump *a* through pipe J and rotary valve K into the cylinder L at M and forces piston *b* (having two piston-rods *d* and *e*, which will be referred to hereinafter) to the bottom of the cylinder L.

The piston-rod *e* has two connections, viz:

First. By chain *g* to rod *f*, which is secured to rotary valves K and *h*, and also to slide-valve *i*, by the chain *n n*. This combination closes rotary valve K, opens rotary valve *h*, moves the slide-valve *i* from port *k* over port *t*, and allows the air to escape from port *k*. The rotary valve *h* is now open for the admission of compressed air, which forces piston *b* upward and restores the rotary and the slide valves to their original positions.

Second. The chain N, being connected at the lower end of the piston-rod *e*, passes around sheave O, thence around sheave P, which is secured to the epicycloidal wheel Q, (see Fig. 3,) and over sheave R to piston-rod *d* at S. The connection of the two piston-rods *d* and *e* by the chain N to the fixed sheave P and the connection of the large sheave T with the epicycloidal wheel produce at each stroke of the piston-rods *d* and *e* rotary motion equal to the vertical motion of the gate. The chain or wire rope J (see Fig. 1) passes from sheave T to sheave *m*, to sheave *s*, to sheave *u*, to lower end of weight *v*, while the other end of said chain or wire rope is attached to the upper end of weight V and passes over sheave W to sheave X and X, to sheave Z, to sheave

T, thus making a complete circuit. By the attachment of weight *w* by chain or wire rope to J, the attachment of the weights *v* and *w* to the gate *q* at 2 2, (the weights together being equal to the weight of the gate,) and the connection of the gate *q* by the chain or wire rope to sheave T, as described, the vertical motion of the gate is assured. The gate *q*, (see side view, Fig. 1,) is divided into panels U U U U, made of wire-screen or spread metal, with margins on either side of iron or steel angles *r r*, riveted together. (See section, Fig. 5.) Fig. 6 shows the tension-rods *y y y*, secured at either end of the gate and resting on the bearings at P P P, while the chain or wire rope passing under the gate and under large pulley X acts as a tension-rod on account of its connection with the weight V. The truss-rod 3, (see Fig. 1,) being secured at the top of each post and joined midway between them by a sleeve-nut, prevents the post 4 4 from spreading.

I am aware that prior to my invention vertical gates have been used, so I do not broadly claim such a combination; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a bridge-gate, the combination, with an air-pump and a piston actuated thereby, of the segmental cog-gearing A, the pinion B, gearing C C C, the cam E, rod F, levers G and I, and valve-operating mechanism actuated by said piston, all substantially as set forth.

2. The combination of the air-pump *a*, the cylinder L, the rotary valves K and *h*, the slide-valve *i*, and connections for operating said valves, with the wheel Q, piston-rod *d e*, and chain N, all substantially as and for the purpose set forth.

3. In a bridge-gate, the combination, with the sheave T and operating mechanism actuated by the segmental cog-gearing A, of the gate *q*, the endless chain or cable *j*, attached counterbalance-weights *v* and *w*, sheaves *m*, *s*, *u*, W, *x*, *x*, and *z*, all operated by the said sheave T, substantially as and for the purpose set forth.

4. The combination, with a gate *q*, provided with metallic panels *v v v v*, having angle-iron margins *r r*, of the tension-rods *y y y*, fixed to the sides and bottom of said gate *q*, in the manner and for the purpose set forth.

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