

(No Model.)

5 Sheets—Sheet 1.

G. F. RYAN.  
BRIDGE GATE.

No. 516,121.

Patented Mar. 6, 1894.

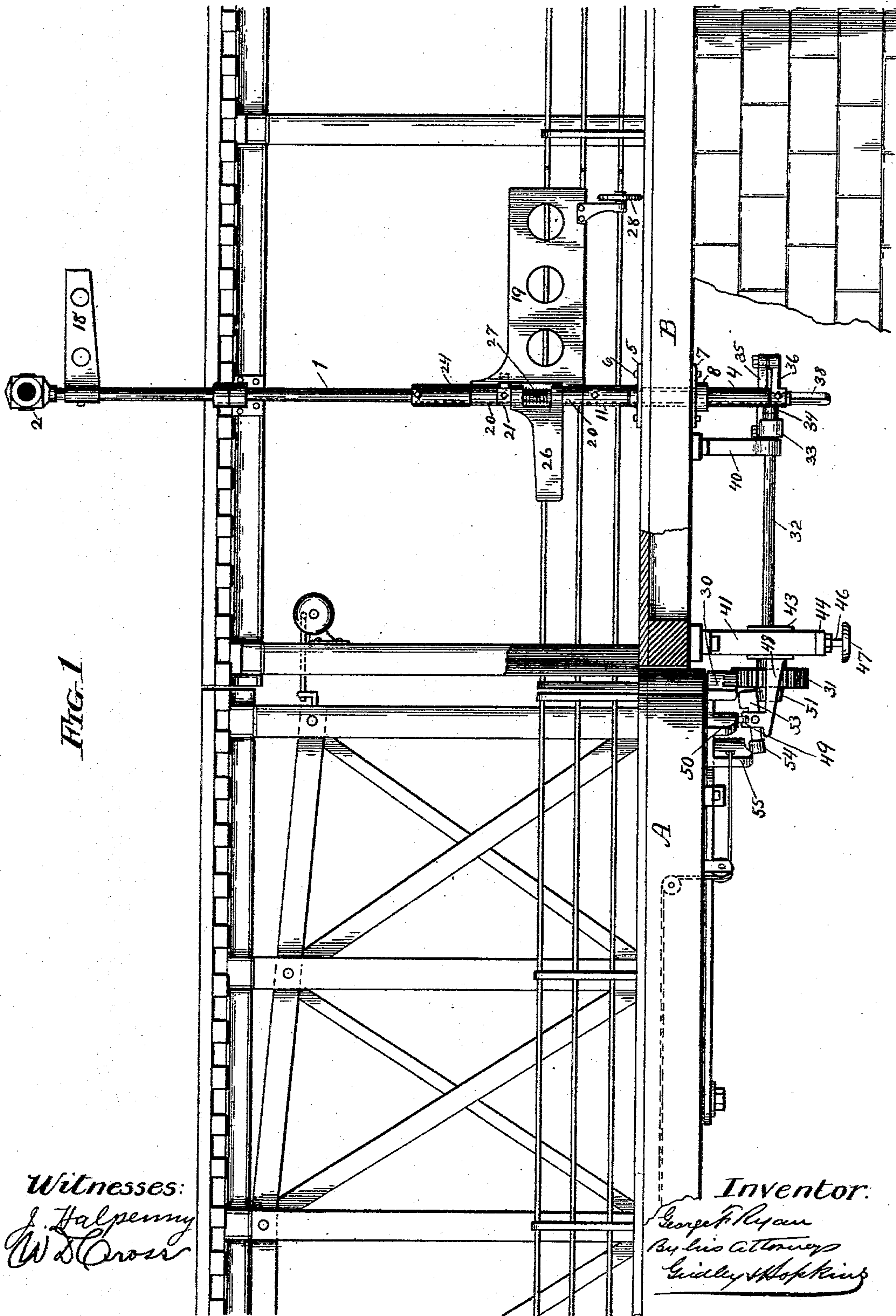


FIG. 1

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Inventor:

George F. Ryan  
By his Attorneys  
Ludley & Hopkins

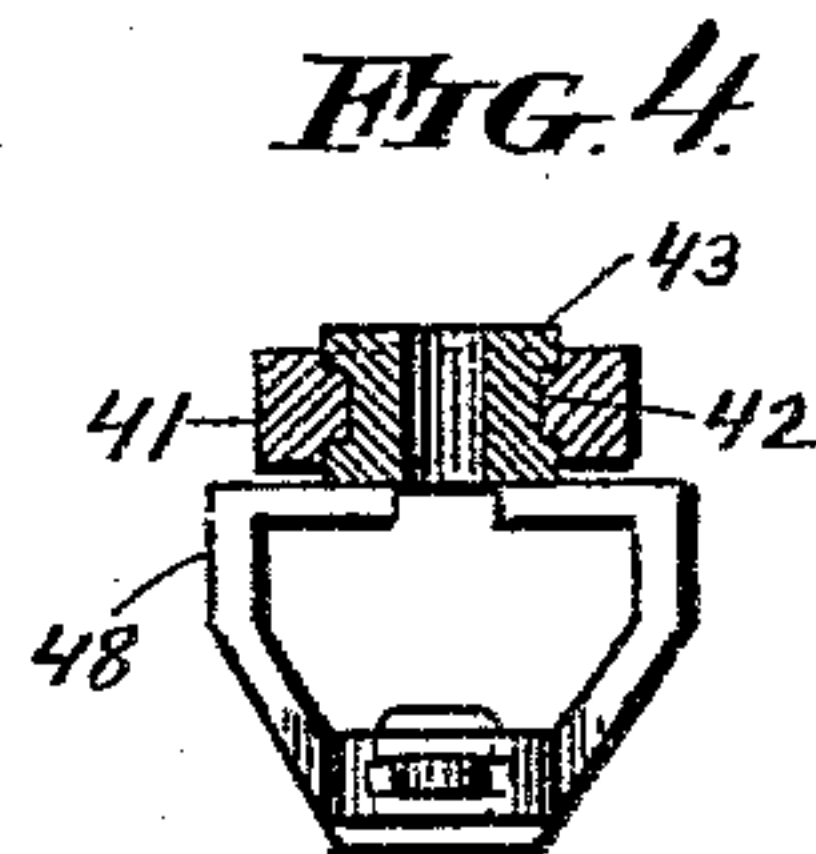
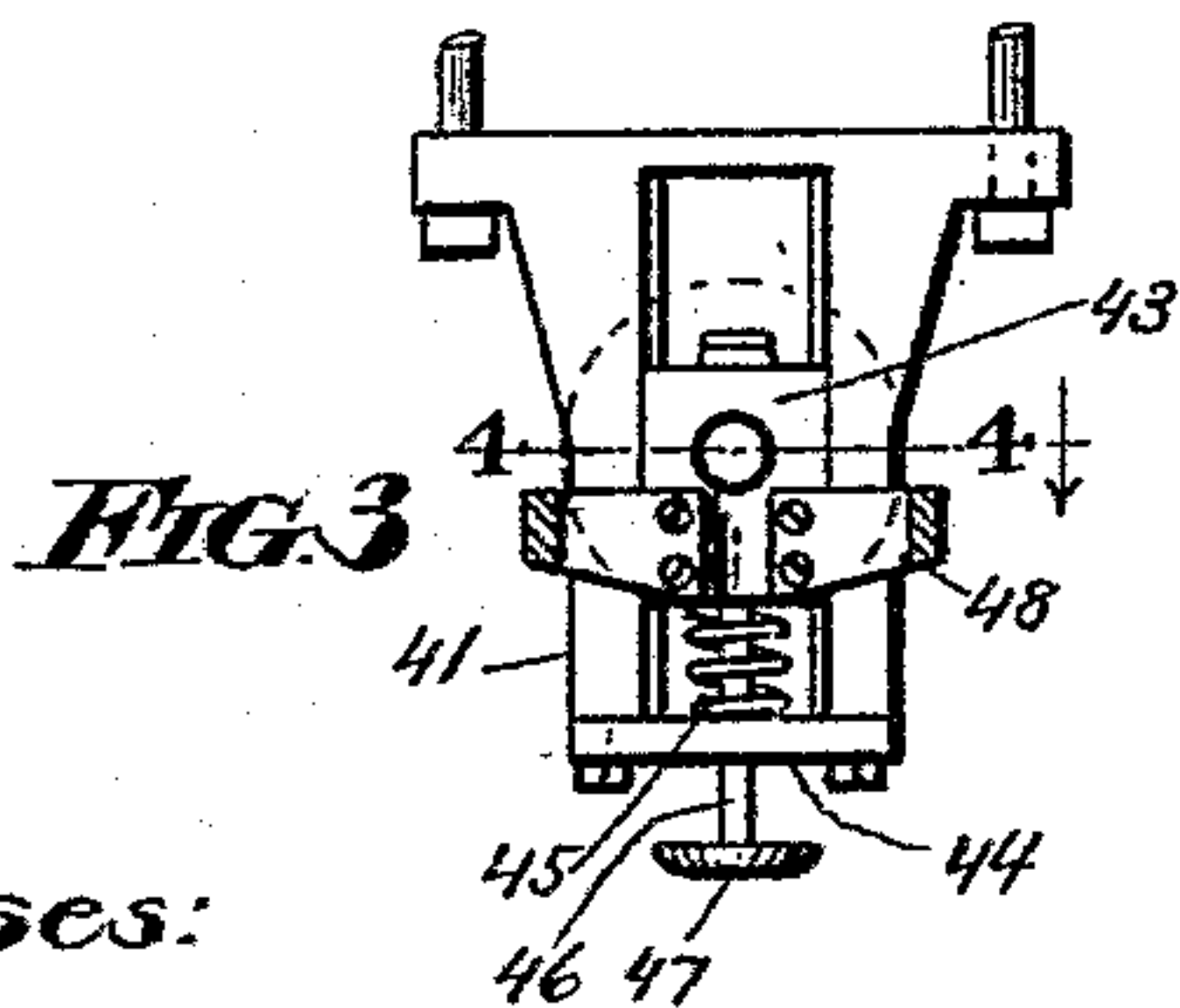
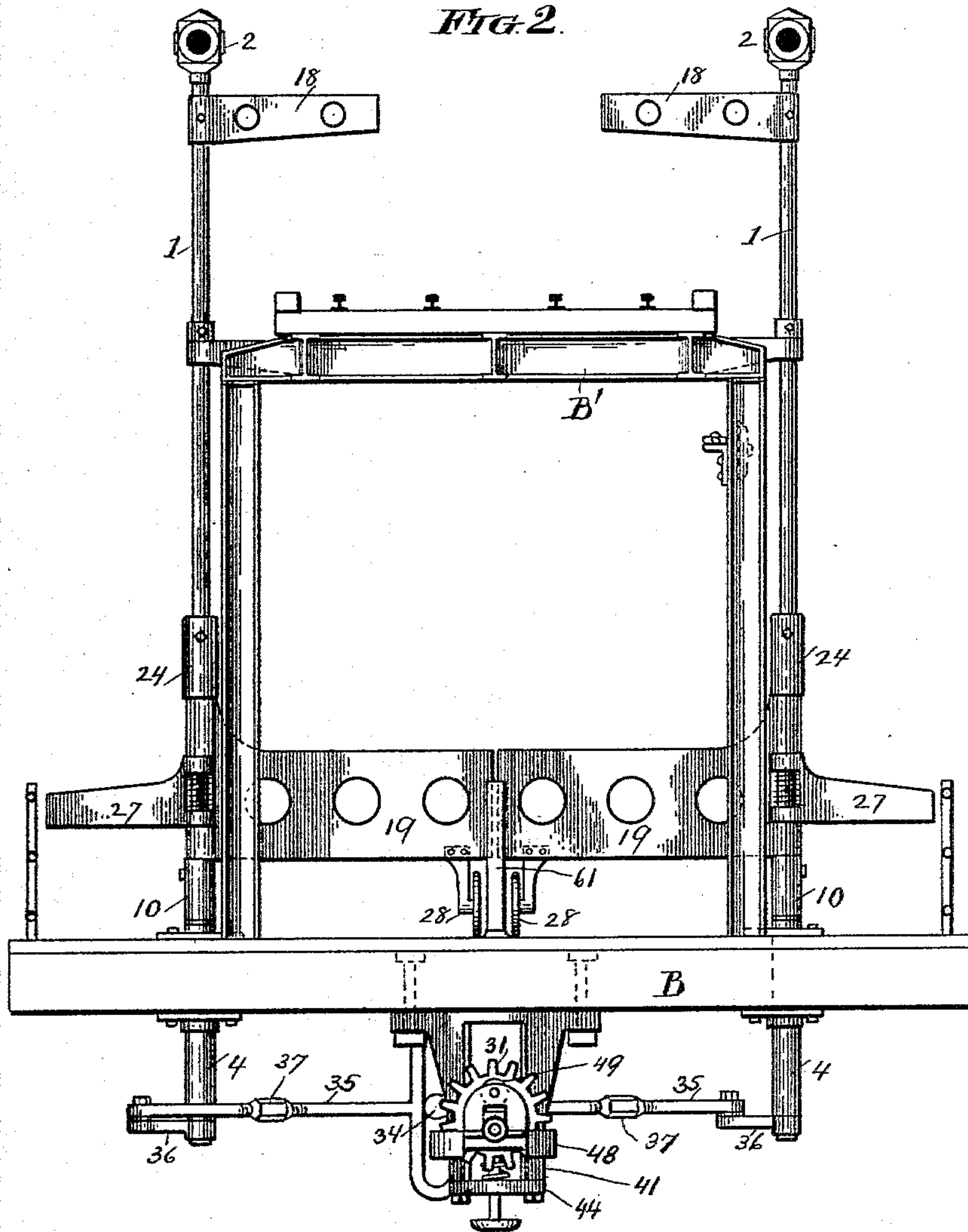
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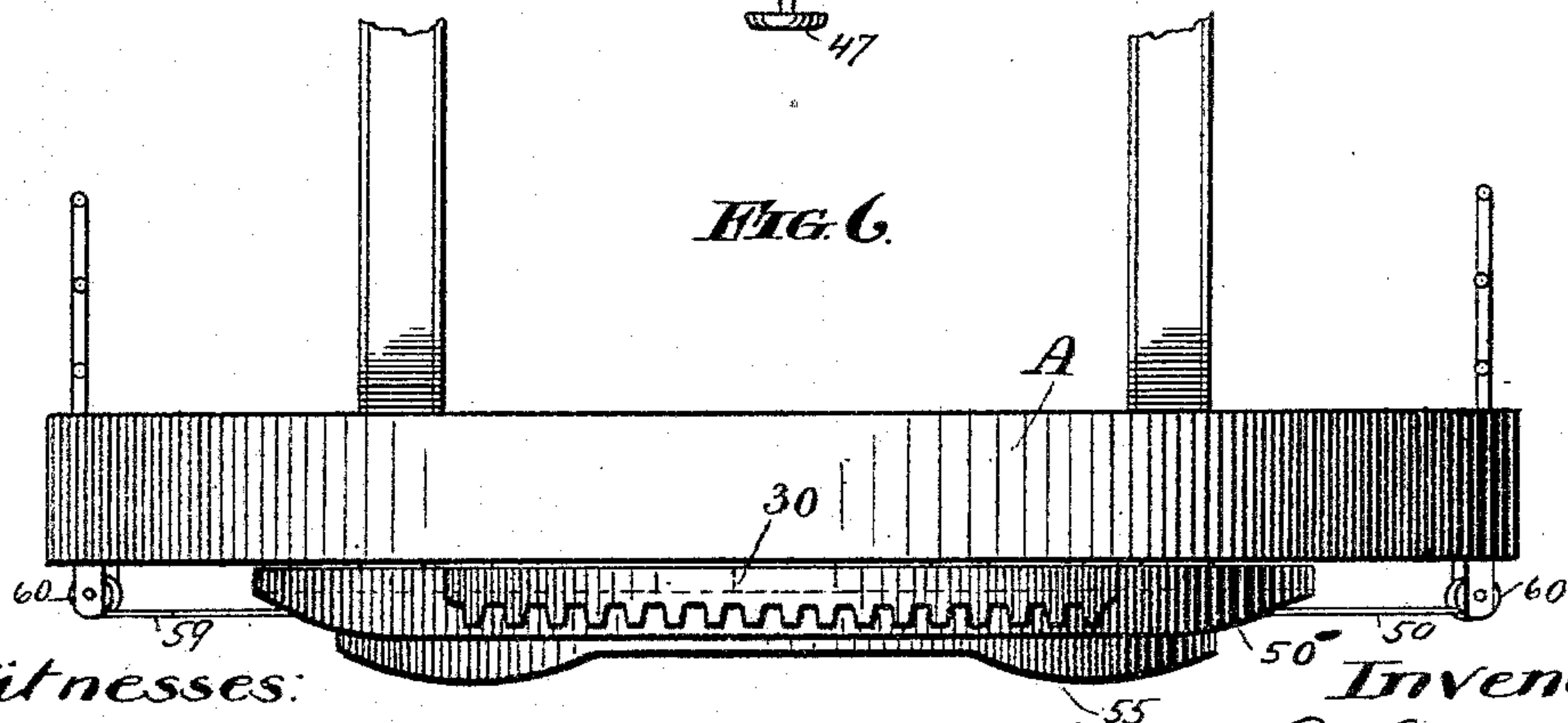
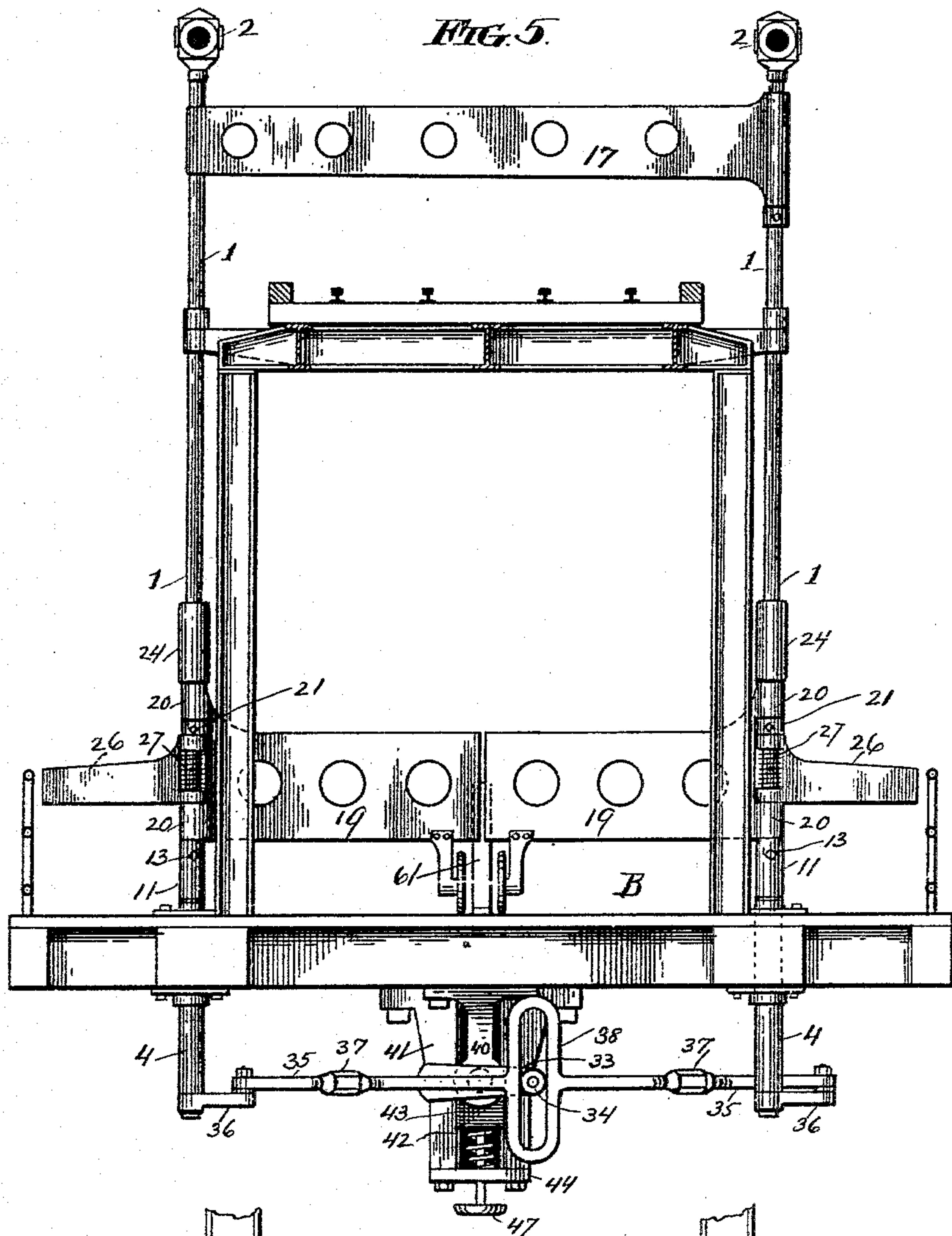
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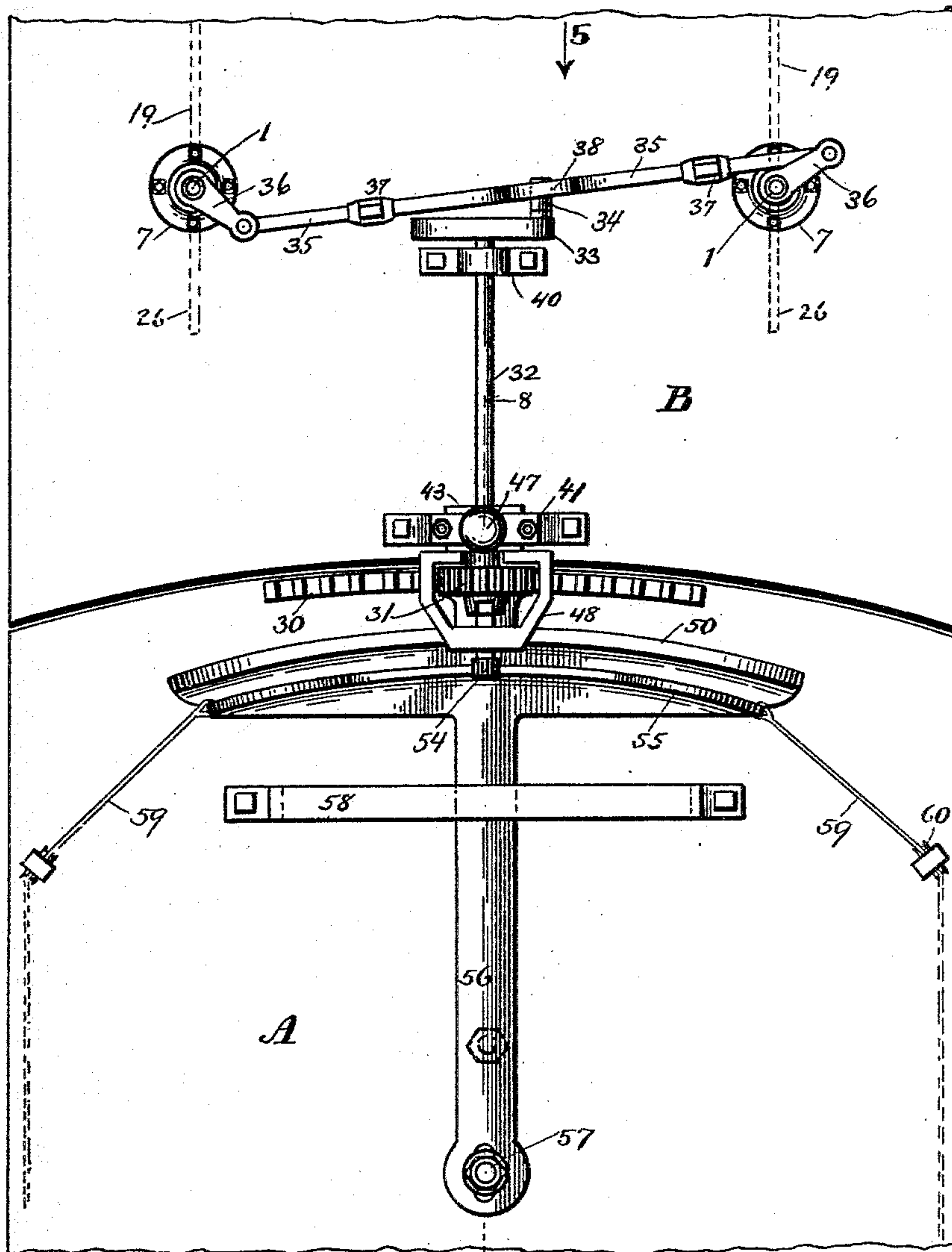
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G. F. RYAN.  
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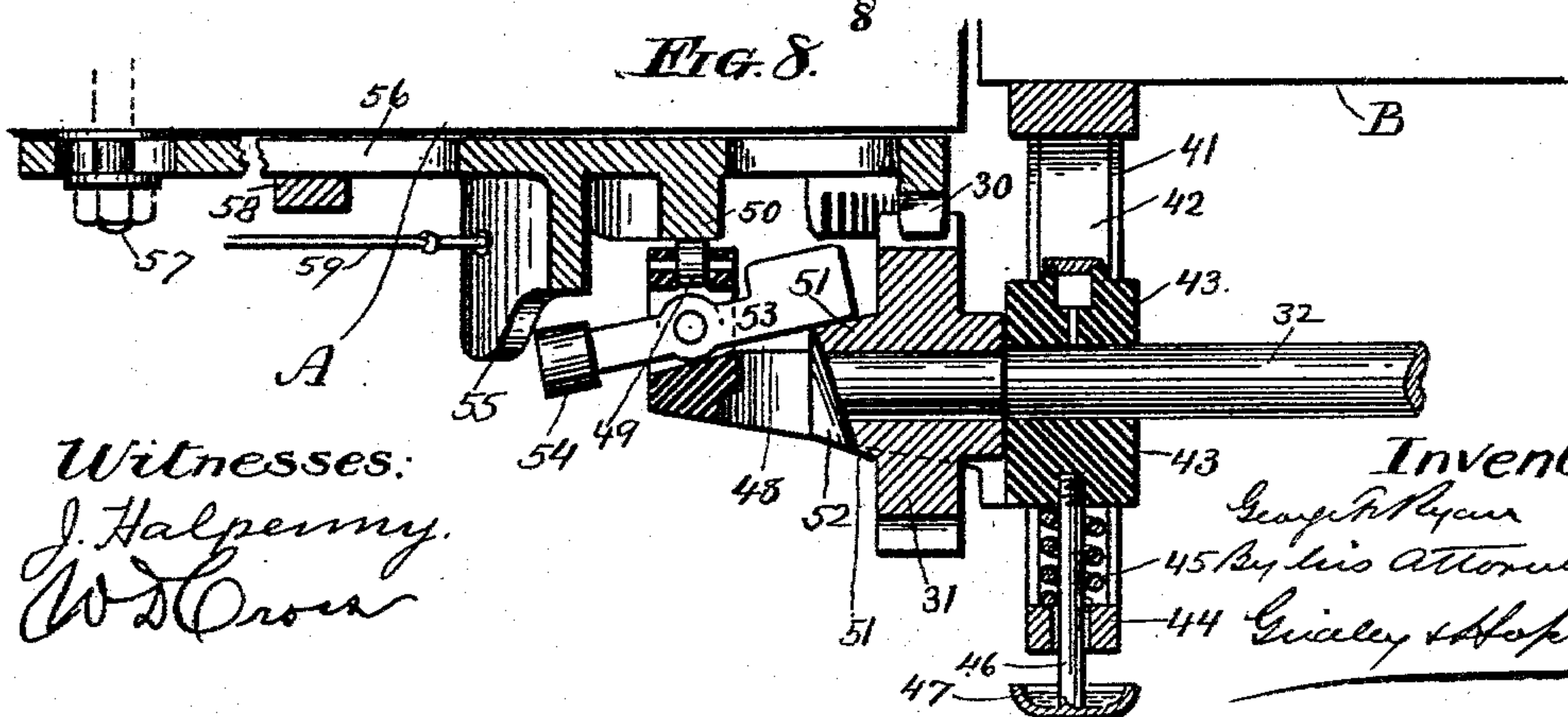
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**FIG. 7.**



*Fig. 8.*



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(No Model.)

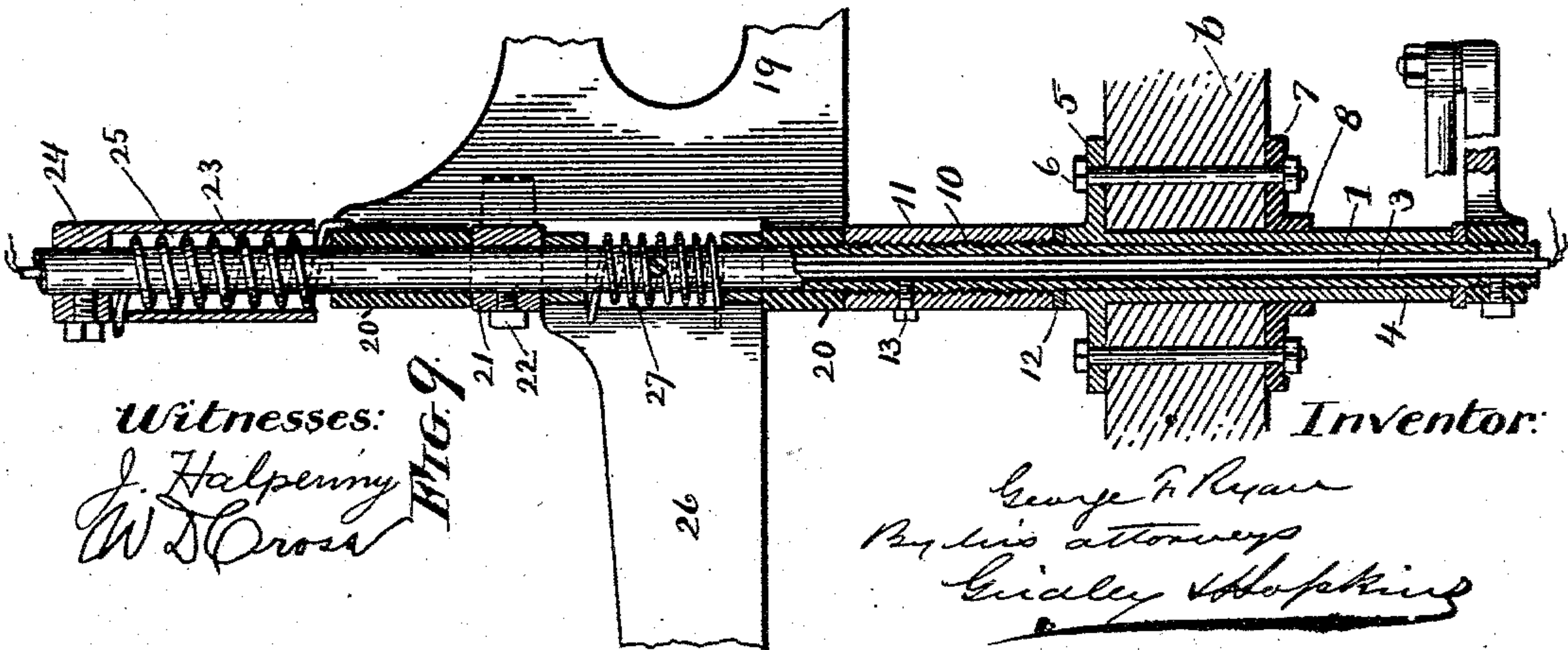
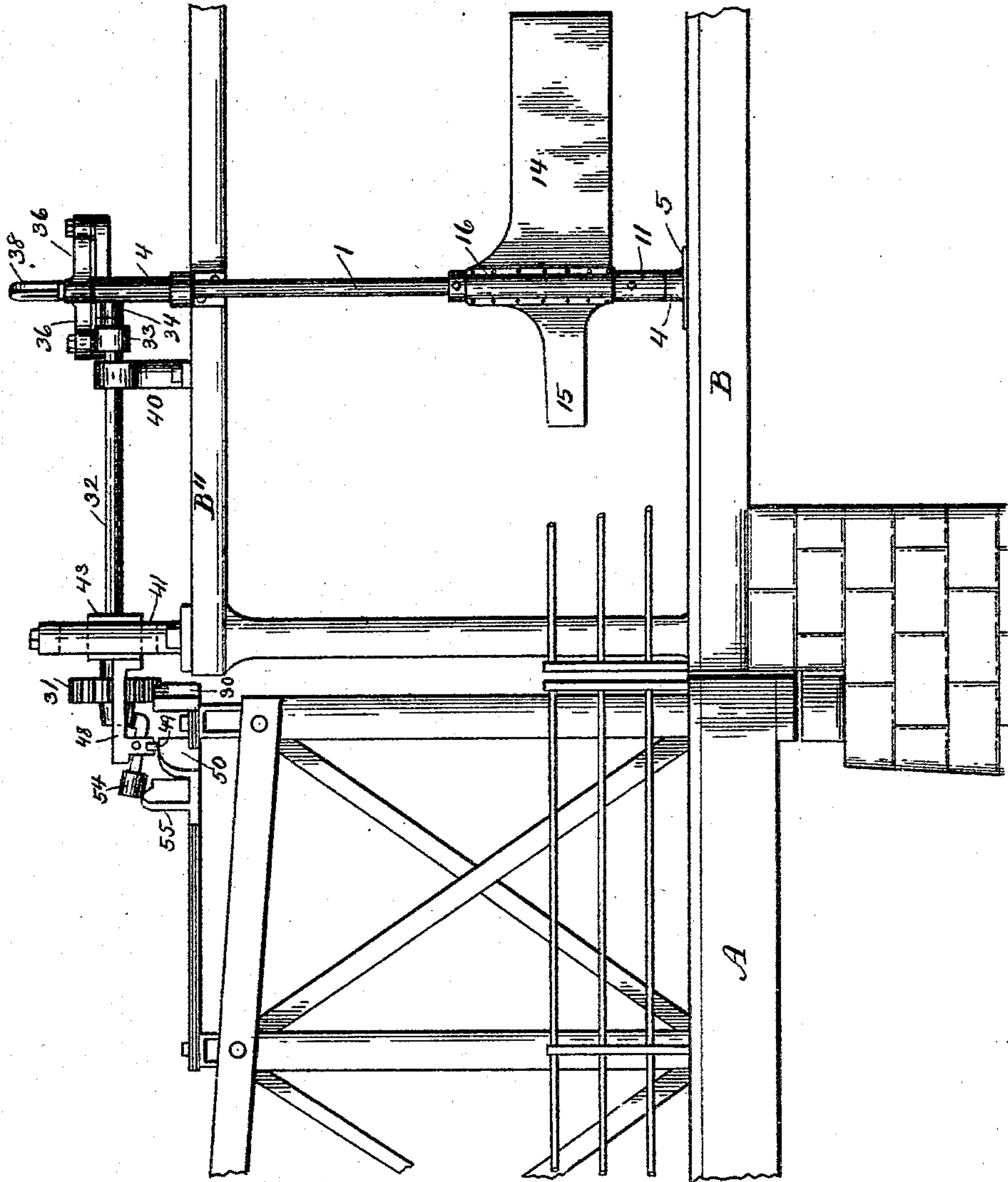
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FIG. 10.



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FIG. 9.

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# UNITED STATES PATENT OFFICE.

GEORGE F. RYAN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JOSEPH L. DUPLISSIS, OF SAME PLACE.

## BRIDGE-GATE.

SPECIFICATION forming part of Letters Patent No. 516,121, dated March 6, 1894.

Application filed September 11, 1893. Serial No. 485,270. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE F. RYAN, 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 Bridge-Gates, of which the following is a specification.

The present invention relates to that class of bridge-gates that are opened and closed by mechanism which derives its motion from the bridge as the latter is moved, and the objects of said invention, generally stated, are, to improve, simplify and cheapen the mechanism for operating and controlling the gates.

The invention consists in certain novel features that are pointed out in the claims, and the particular objects of said novel features are specifically set forth in the descriptive portion of the specification.

In the accompanying drawings, which are made a part of this specification,—Figure 1 is a side elevation of one end of a bridge, the adjacent abutment, the gates, and the mechanism for operating and controlling them; a portion of the abutment being broken away in order to expose the parts that are located beneath the road-way. Fig. 2 is an elevation of the gates, the abutment on which they are arranged, and so much of the operating mechanism as is also arranged on said abutment, the parts being viewed from the river. Figs. 3 and 4 are views showing in detail parts hereinafter fully described. Fig. 5 is an elevation of the gates and part of their operating mechanism, viewed in the direction of the arrow in Fig. 7, portions of the abutment and superstructure being shown in elevation. Fig. 6 is an end elevation of the bridge and so much of the mechanism as is carried thereby. Fig. 7 is a plan (viewed from the under side) of the end of the bridge, the abutment, and the gate-operating mechanism. Fig. 8 is a vertical section on the line 8—8, Fig. 7, the parts being shown on a larger scale. Fig. 9 is a sectional elevation of a portion of one of the gate posts, and its accessories, also on a larger scale. Fig. 10 is a side elevation of one end of the bridge, the adjacent abutment, the gate, and the mechanism for operating it, said mechanism being lo-

cated overhead, instead of beneath the roadway as in the other figures of the drawings.

A represents a portion of a draw-bridge of the type which revolves about an axis located at its center and has ends that are formed on curves that are concentric with said axis and B represents the abutment which is formed with a curved portion which, also, is concentric with said axis. The construction of the abutments of this well known type of bridge depends upon the exigencies of the situation. Sometimes they are of masonry, sometimes of open trestle work, sometimes of other construction. The present invention is not concerned with their construction further than to require that they properly support the parts shown in the drawings and hereinafter described as being supported by them. Even the abutting end of an elevated railway, or any other structure that is located in proximity to the end of the bridge, is within the scope of the term abutment as used in this specification. Such an elevated railway is shown at B' and such a structure rising above the roadway and not an elevated railway is shown at B'' in Fig. 10.

Upon each side of the roadway is a gate-post 1 which is preferably surmounted by a lamp 2 provided with lenses of colored glass and used for signaling purposes. The post is preferably hollow, and through it may be passed either gas or wires, 3, accordingly as gas or electricity is used for the lamp. The post is suitably stepped to sustain it against vertical depression, and while there are a number of ways in which this can be done, still I prefer the way shown in the drawings and now to be described. Passing through a suitable part *b* of the abutment is a tube or sleeve 4 provided at or near its upper end with a broad plate or flange 5 that rests upon said part *b* and is perforated for the passage of heavy bolts 6. These bolts also are passed through the part *b* and through a second plate or collar 7 which fits against the under side of said part. This latter plate has a central opening and around the margin of this opening is a short flange 8 which fits snugly upon the outside of the sleeve 4. By tightening the bolts 6 the plates 5 and 7 are firmly



bound to the top and bottom sides, respectively, of the part *b* and the sleeve 4 is thereby held absolutely against movement in any direction. Above the upper end of the sleeve 4 the post is provided with screw threads 10 (being enlarged for the purpose) and upon this threaded portion is screwed a sleeve 11 the lower end of which bears against the upper end of sleeve 4 through the medium of a washer 12. Preferably a bolt 13 is provided for preventing the sleeve from turning upon the post when once it is brought to its proper place.

So far as the mechanism for transmitting motion from the bridge to the post is concerned, the invention is not limited to a gate of any particular construction, nor to the manner of attaching the gate to its post. I prefer, however, to construct the gates and attach them as shown in Figs. 1, 2 and 9 and also in Fig. 5, so far as this figure relates to the gates for the driveway and sidewalk. Before describing these gates of preferred form I will describe the others.

In Fig. 10 there is no elevated railway, so that the only gates there shown are those for the driveway and sidewalk. These are shown at 14 and 15, respectively, and consist of plates rigidly secured to the post by means of a tubular portion 16 which surrounds it and bears at its lower end upon the upper end of the sleeve 11, so that the weight of the gate is, for the most part, taken off of the post and transmitted to the abutment through the sleeves 11 and 4. Owing to the point of view Fig. 10 shows only one gate-post, &c., but the structure represented by this figure has, in fact, two such posts, one located on each side of the driveway and both having similar accessories. I desire to have it understood, however, that instead of having the drive-way crossed by two gates meeting in the center, it may be crossed by a single gate. Such a gate is shown at 17, Fig. 5, crossing the tracks of the elevated railway. This form of gate is not preferred, even for the elevated railway, because its sweep is too great and it produces too much lateral strain upon the post. The preferred form of gate for the elevated is shown at 18, in Figs 1 and 2, and consists of a short arm or plate rigidly attached to the post and projecting over or across the track, when "closed." Its office is more that of a signal than a gate.

For the drive-way and sidewalks I prefer to so mount the gates that they yield when they come against obstructions, for the reason that appears hereinafter.

The drive-way gate 19 is provided with or attached to sleeves 20, which fit loosely upon the post so as to permit them to turn freely upon it. The movement of the gate relatively to the post is limited, in one direction, by an adjustable stop, consisting of a collar 21 secured adjustably to the post by means of a set-screw 22 and having a finger that projects into the path of the gate, as indi-

cated by dotted lines in Fig. 9. This stop engages the side of the gate that is in advance as the gate is being closed, and the gate is held in contact with it by means of a coiled spring 23 which surrounds the post and bears at one end against the side of the gate opposite to that which is engaged by the stop. The other end of this spring is secured to the post, preferably through the medium of an adjustable collar 24, having a counterbore 25 in which the spring fits. With this arrangement the spring is completely inclosed and provision is had for regulating its tension. When thus mounted, if anybody should be caught between the gates as they are closing, the spring 23 will yield and permit the further movement of the gates to cease while permitting the posts to complete their movement. In this way it becomes impossible to crush a person or other yielding body between the gates and also impossible for the gates to be injured by any unyielding body that may be caught between them.

I have shown applied to the gate 26 that crosses the side-walk still another way of mounting a gate so that it will yield. Here the gate will yield in either direction, instead of only one direction as above described. To accomplish this I use a coiled spring 27, the ends of which engage the opposite sides of the gate and the middle of which is rigidly attached to the post by some suitable means. To the outer ends of the gates 19 are attached caster wheels 28, which assist in supporting the gates and relieve the posts of much lateral strain that would otherwise come upon them.

It will be understood that in opening or closing the gates the posts turn in opposite directions and that each makes one-quarter of a revolution. This movement is derived from the bridge through the medium of a toothed rack 30 carried by the bridge, a pinion 31 with which said rack engages, a shaft 32, to one end of which said pinion is secured, a crank-arm 33 carried by the other end of said shaft, a wrist-pin 34 carried by said crank-arm, a rod 35 engaged by the wrist-pin, and a pair of crank-arms 36 each having one of its ends pivotally connected to one end of the rod 35 and the other rigidly attached to one of the posts. For convenience in manufacturing and handling it, and also for enabling it to be properly adjusted, the rod 35 is made of a number of parts secured together and adjustable endwise with relation to each other. Turnbuckles 37 or other suitable devices may be used for uniting the meeting ends of the several parts. The cranks 36 are so related to the gates and to each other that when the gates are half-way between their extreme positions the cranks are parallel with each other, but projecting in opposite directions, and the rod 35 should be of such length as will make it possible for the cranks to come to these positions. The strength and rigidity of the rod are such that when moved



endwise by a force applied to it at the middle, it moves both of the cranks 36, one by a thrust and the other by a pull. In order that this endwise movement may be produced by a half revolution of the shaft 32, the rod is provided at its middle or thereabout, with a loop or eye 38 into which projects the wrist-pin 34, the object of the loop or eye being to permit the wrist-pin to travel in a circular path as the shaft revolves, without causing any lateral movement of the rod.

The shaft 32 is supported by a pair of hangers 40 and 41, the former of which is of ordinary construction, while the latter has some peculiar features which permit the end of the shaft carrying the wheel 31 to move laterally in a vertical direction. The vertical arms of this hanger 41 are provided with guides 42 and between them is located a two-part journal box 43 having in its opposite sides grooves in which the guides 42 fit.

The lower cross-head 44 is removable and between it and the under side of the box is interposed a coiled spring 45, the object of which is to hold the box normally at a given height while permitting it to be forced to a lower position. This spring is held in place by a rod 46 which it surrounds and which passes through an opening in the cross-head 44 and is tapped into the under side of the journal box. To the lower end of the rod is fixed a cup 47 for catching the oil that drips from the box. Of course, the pinion 31 partakes of the vertical movement of the journal box. The necessity for this vertical movement arises from the fact that the rack 30 does not always move in exactly the same horizontal plane. There is usually more or less vertical movement to the end of the bridge, and this movement is sometimes as much as three to five or even six inches, so that without some means for compelling the pinion to follow the vertical movement of the rack, the two would sometimes become disengaged when they should be engaged. It is intended to have the pinion held high enough to engage the rack when the latter is at the highest position to which it can possibly go, and by means of mechanism presently described to depress the pinion as the end of the rack approaches it and hold it in such position that they will mesh properly. To this end I secure to the journal box a bracket 48 which embraces the wheel and has journaled to its top side an anti-friction roller 49, and I secure to the under side of the bridge a cam 50 that is located in the path of and adapted to engage this roller. The location and construction of this cam are such that before the first tooth of the rack reaches the pinion the cam will have engaged the roller and depressed it and its associated parts to such a level that the top side of the pinion is at proper level to be engaged by the first tooth of the rack. As soon as the rack and pinion are fairly in engagement there is no further need for the cam, and hence it may terminate, leaving the rack and pinion held firmly in en-

gagement by the upward pressure of the spring 45. In order that the operation of the gates may be the same whether the bridge moves in one direction or the other, the rack is provided with the same number of teeth as is the pinion and the parts are so located and arranged that when the bridge is closed the pinion is in engagement with the middle of the rack and the crank 33 occupies a horizontal position, so that whichever way the bridge moves in opening, it will cause the pinion and consequently the shaft 32 to make a half revolution and stop with the crank 33 still in horizontal position, but projecting in a direction opposite that in which it projected at the commencement of the movement. The movement of the crank from a horizontal to a horizontal position is what produces the endwise reciprocation of the rod 35 already described. It is, of course, essential that the pinion 31 be not allowed to turn at random while the bridge is open and the rack out of engagement with it. Hence, it is provided with a hub 51 having a notch 52, and a latch or pawl 53 is pivoted to the bracket 48. These parts are so arranged that as soon as the last tooth of the rack leaves the pinion the pawl will drop into the notch 52 and check all further movement of the pinion. The heel of the pawl is provided with an anti-friction roller 54 and to the under side of the bridge is secured a cam 55 so located and of such construction that it engages the roller and lifts the pawl out of the notch just at the instant the first tooth of the rack engages the pinion. Conversely, as the last tooth of the rack is leaving the pinion this cam permits the weighted pawl to enter the notch as aforesaid.

In order that dirt may not accumulate in the notch, it is formed with a sloping bottom.

Of course, it will be understood that since the bridge may move in either direction in closing two of these cams 55 or else a double-end cam must be used.

It sometimes becomes desirable to close the gates while the bridge is closed, and at rest, and to this end the rack 30 and cams 50 and 55 are attached so as to be capable of sliding endwise. They are all attached to a heavy arm 56 which extends toward the center of the bridge and has its inner end pivotally secured to the underside of the bridge by means of a heavy bolt 57. The outer end of this arm is sustained by a heavy plate 58 which has its ends offset and bolted to the under side of the bridge. To the cams 55 are attached cords 59 which are carried toward the sides of the bridge and then trained over suitably arranged pulleys 60 and led to the engine-room or other convenient place whence they may be operated. By pulling upon one or the other of these cords the rack and the cams are moved in one direction or the other and the gates are operated just as if the rack and cams were being moved along with the bridge. If desired the arm 56 may be rendered immovable by an additional bolt or



bolts passed through it, and into the bridge, as indicated by dotted lines in Fig. 7, or it may be permanently attached and without any provision for movement as shown in Fig.

10. The operating mechanism shown in this figure is precisely the same as has already been described except that the positions of the rack and cams are inverted, and gravity does the work of the spring 45.

61 represents a post located in the middle of the road-way, against which the outer ends of the gates strike, for the purpose of limiting their movement toward the bridge.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination with a gate and a draw-bridge, of mechanism for transmitting motion from the bridge to the gate, said mechanism including a vertically movable gear wheel which receives motion from the bridge, and means for moving said wheel vertically, substantially as set forth.

2. The combination with a gate and a draw-bridge of mechanism for transmitting motion from the bridge to the gate, said mechanism including a rack carried by the bridge and a vertically movable pinion gearing therewith, and means for moving said pinion vertically, whereby it is made to follow the vertical movements of the bridge and keep its engagement with the rack, substantially as set forth.

3. The combination with a gate and a draw-bridge, of a rack carried by the bridge, a vertically movable pinion adapted to engage said rack, means for moving the pinion toward the rack and past the proper position for engaging therewith, a cam carried by the bridge and adapted to move said pinion back to proper position for engaging the rack, and means for transmitting movement from the pinion to the gate, substantially as set forth.

4. The combination with a draw-bridge and a gate, of a rack carried by the bridge, a pinion adapted to engage said rack, a shaft to which said pinion is secured, a vertically movable box in which said shaft is journaled, means for forcing said box in the direction of the rack, a bracket movable with the box, a cam carried by the bridge and adapted to engage said bracket, and means for transmitting motion from the shaft to the gate, substantially as set forth.

5. The combination with a bridge and a gate, of the rack 30 carried by the bridge, the pinion 31 with which said rack engages, the shaft 32 to which said pinion is secured, means for transmitting motion from said shaft to the gate, the vertically movable box 43 in which said shaft is journaled, the hanger 41 having guides upon which said box is adapted to slide, the spring 45 for elevating said box, the bracket 48 movable with said box, the roller 49 journaled to said bracket, and the cam 50 carried by the bridge and

adapted to engage said roller, substantially as set forth.

6. The combination with a bridge, a gate, and means for transmitting motion from the bridge to the gate, said means including a gear-wheel, of a pivoted pawl 53 adapted to engage said wheel, and a cam carried by the bridge and adapted to disengage said pawl from said wheel at the proper instant, substantially as set forth.

7. The combination of a bridge, a gate, the rack 30 carried by the bridge, the pinion 31 gearing therewith, means for transmitting motion from said pinion to the gate, the pawl 53 adapted to engage the pinion when the rack and pinion are disengaged, and the cam 55 carried by the bridge and adapted to disengage the pawl from the pinion an instant before the rack and pinion become engaged, substantially as set forth.

8. The combination with a bridge and a gate, of gearing for transmitting motion from the bridge to the gate, said gearing including a pinion supported by the abutment, a rack 30, an arm 56 pivotally connected to the bridge and carrying said rack, and means for moving the rack endwise and thereby operating the gates while the bridge is closed, and at rest, substantially as set forth.

9. The combination with a bridge and a gate, of gearing for transmitting motion from the bridge to the gate, said gearing including a pinion supported by the abutment, a rack, an arm 56 pivoted to the bridge and carrying said rack, the plate 58 secured to the bridge and engaging the under side of the arm for supporting it, and means for moving said rack endwise and thereby operating the gates while the bridge is closed and at rest, substantially as set forth.

10. The combination of a pair of gates, a pair of vertical posts carrying said gates and mounted so as to be capable of partial rotation, cranks secured to said posts and located upon opposite sides of a vertical plane passing through the axes of the posts, a rod extending from one of said cranks to the other and having a transversely elongated eye or loop 38, a wrist-pin occupying said eye or loop, and means for moving said wrist-pin in a circular path, substantially as set forth.

11. The combination of a pair of gates, a pair of vertical posts carrying said gates and mounted so as to be capable of partial rotation, cranks secured to said posts and located upon opposite sides of a vertical plane passing through the axes of the posts, a rod extending from one of said cranks to the other and having the transversely elongated loop 38, the shaft 32 having an arm 33 provided with wrist-pin 34 occupying said loop, and means for rotating said shaft, substantially as set forth.

12. The combination with a vertical post mounted so as to be capable of rotation, and a gate mounted thereon so as to be movable



relatively thereto, of a spring secured at an intermediate point to the post and bearing at its ends against the gate, in opposite directions, substantially as set forth.

5 13. The combination with a gate and a rotary post to which it is attached, of the sleeve 11 secured fixedly to said post, the sleeve 4 through which said post passes loosely and upon the upper end of which the sleeve 11  
10 bears, said sleeve 4 having flange 5, the part

b through which the sleeve 4 passes and upon which the flange 5 rests, the loose collar 7 fitting on the sleeve 4 and bearing against the under side of the part b, and the bolts 6 passing through the flange 5, part b and collar 7, 15 substantially as set forth.

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Witnesses:

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