

J. P. BLACKWOOD.  
RAILWAY SWITCH OPERATING MECHANISM.  
APPLICATION FILED JUNE 16, 1908.

923,804.

Patented June 8, 1909.

2 SHEETS—SHEET 1.

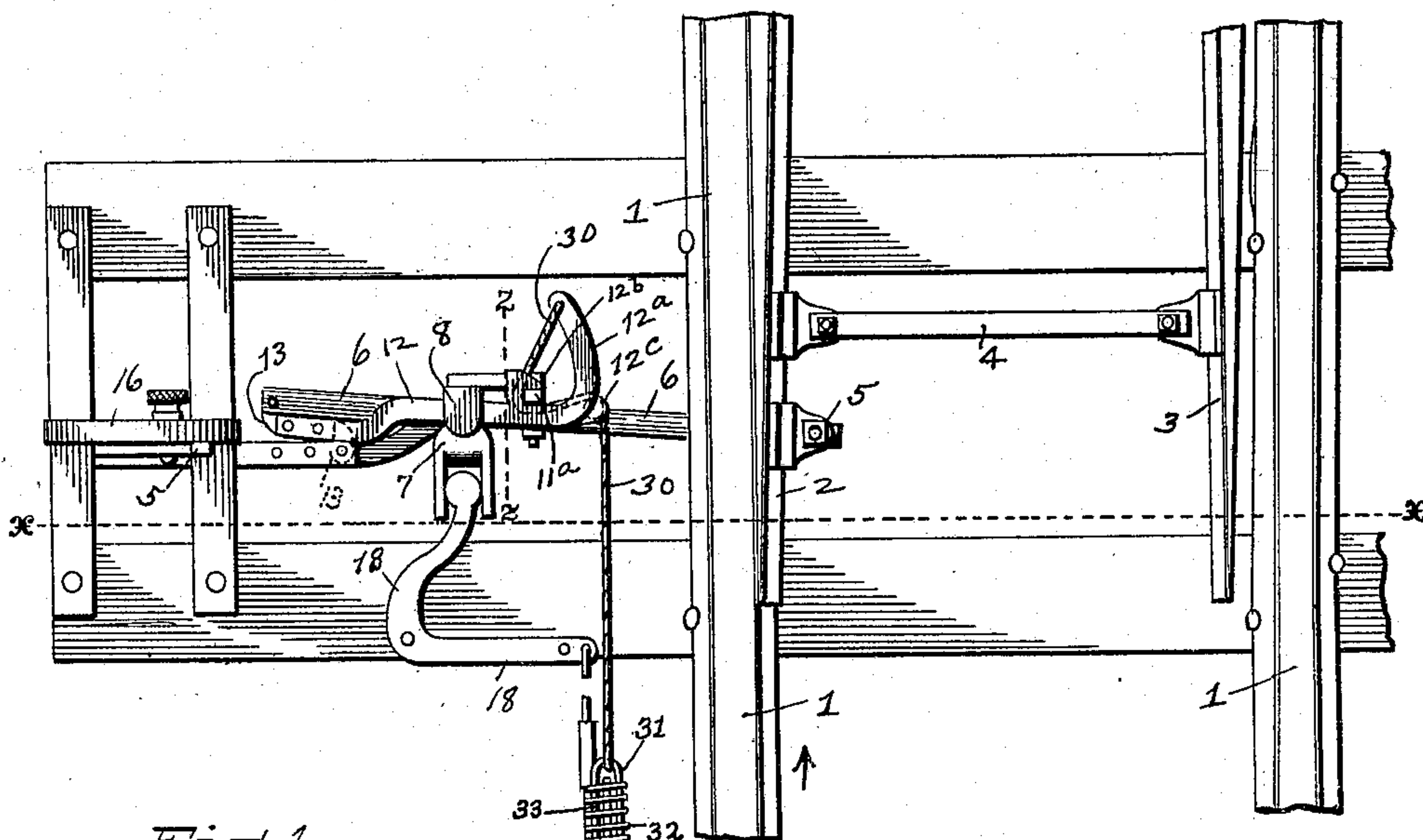


Fig. 1.

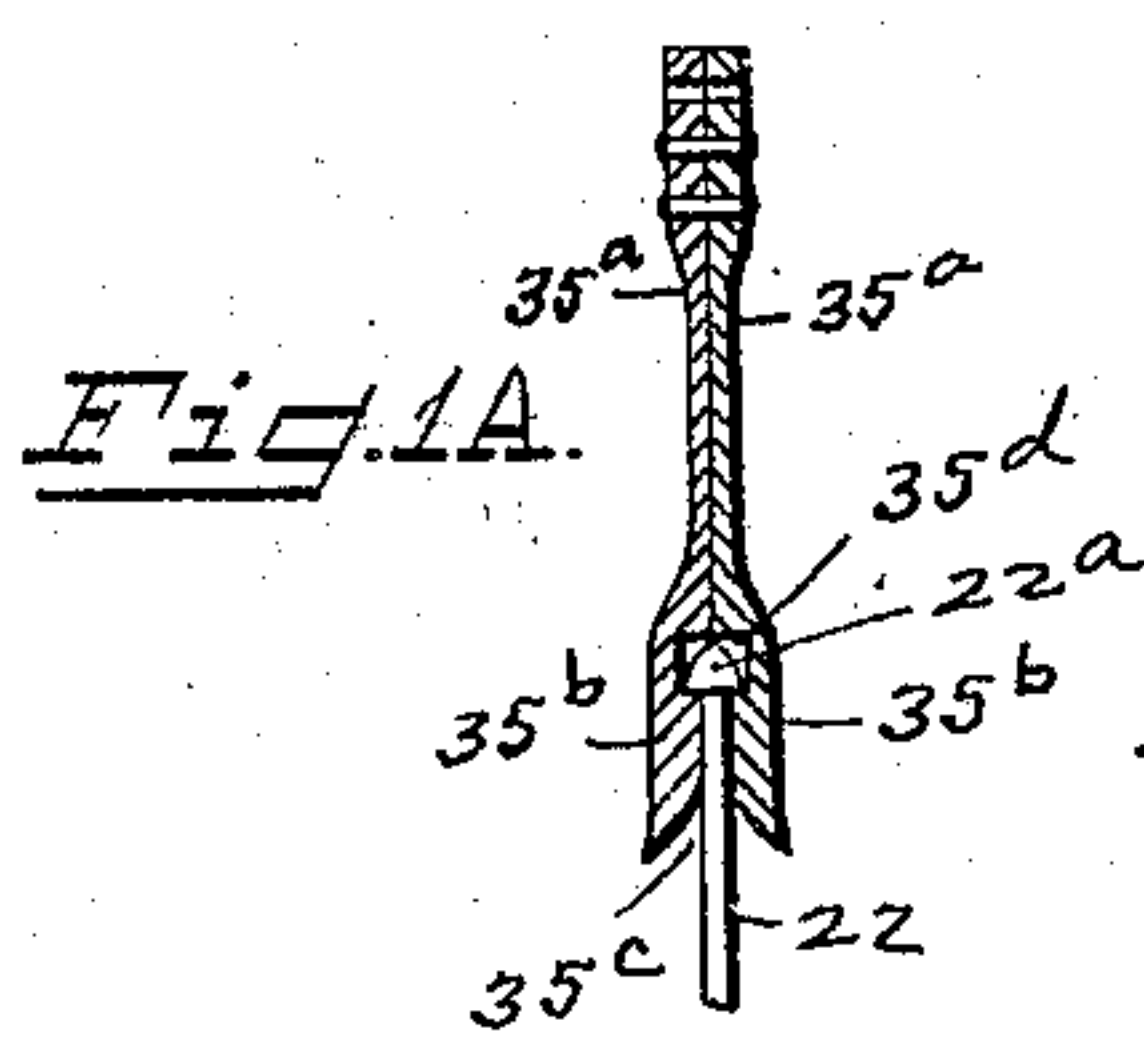


Fig. 1A.

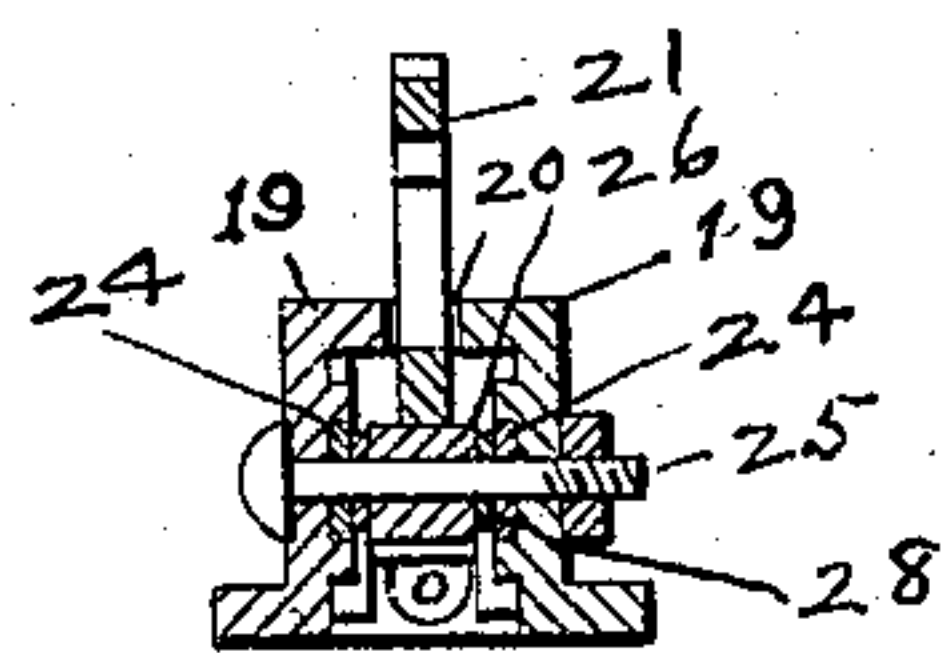


Fig. 10.

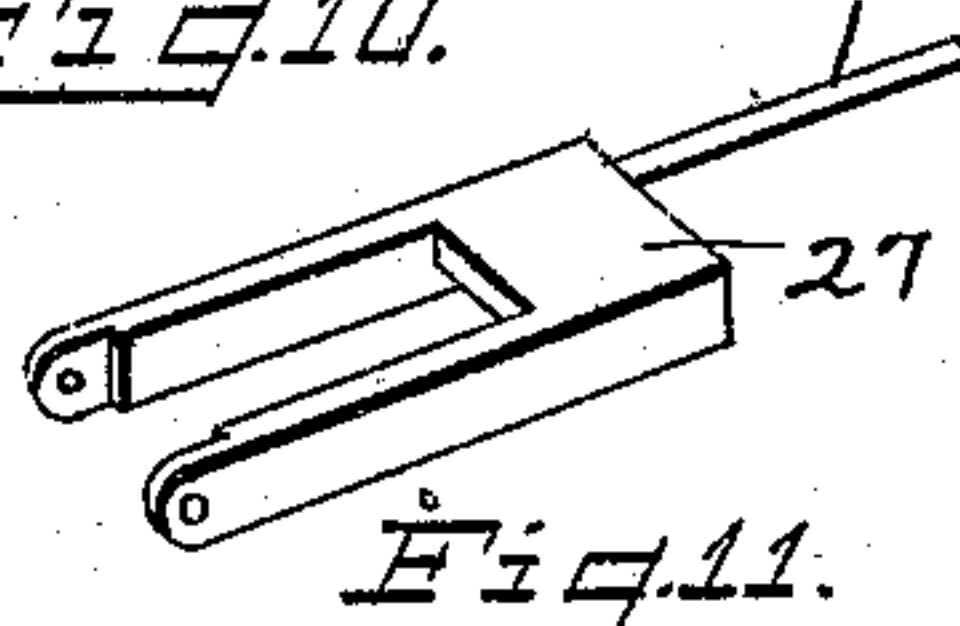


Fig. 11.

Witnesses

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2 SHEETS—SHEET 2.

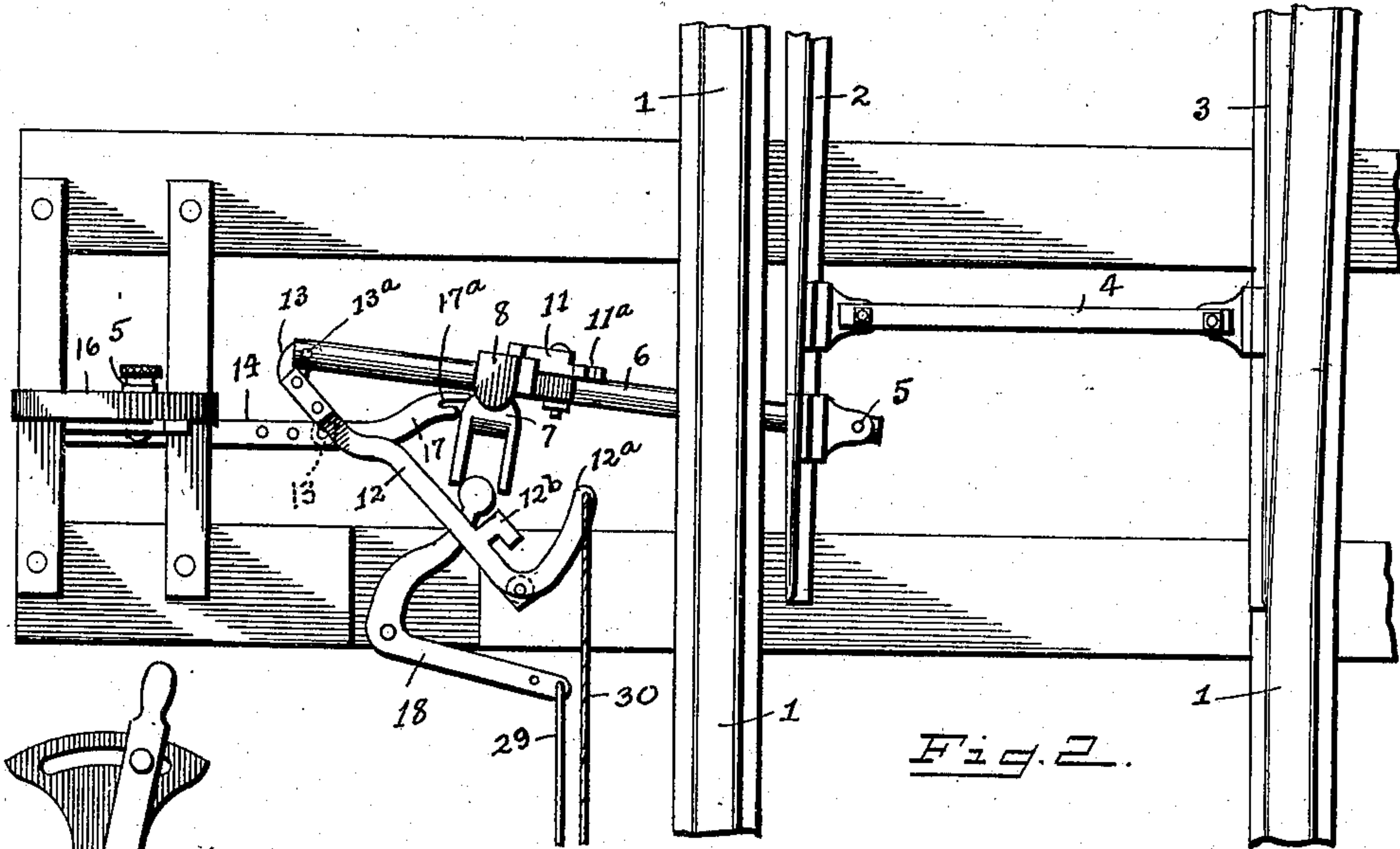


Fig. 2.

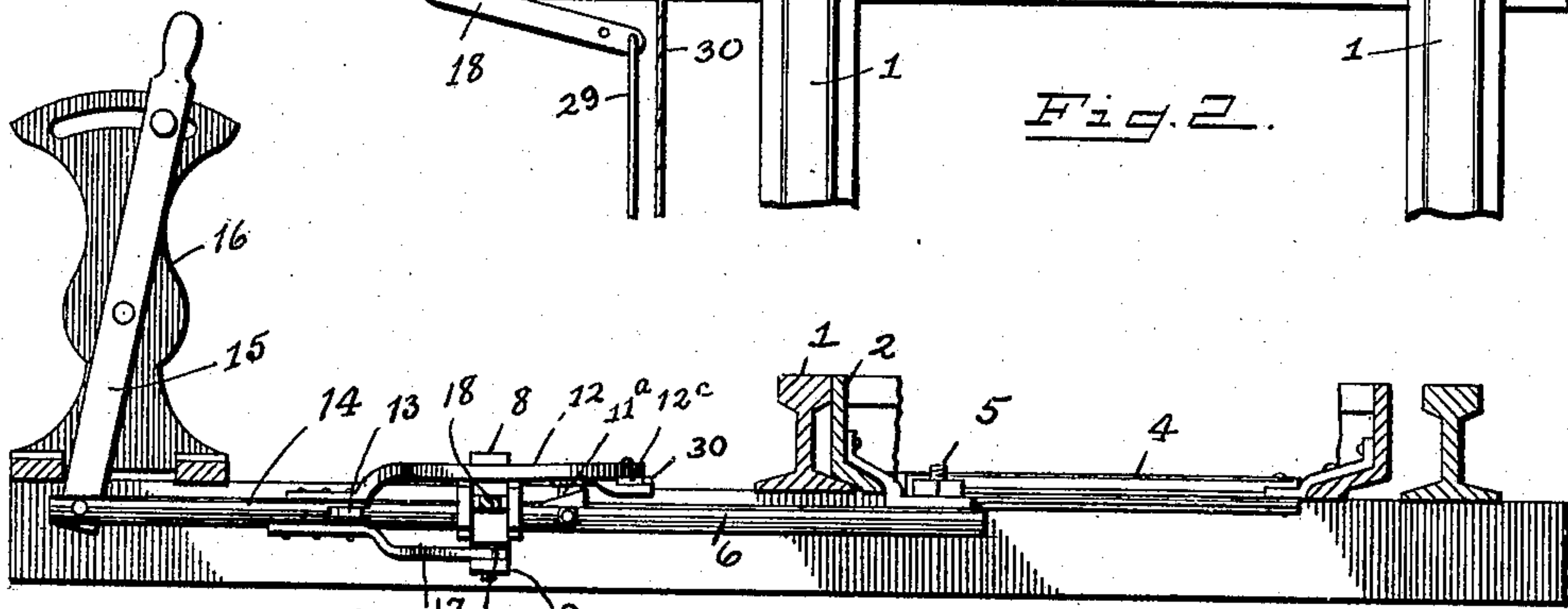


Fig. 3.

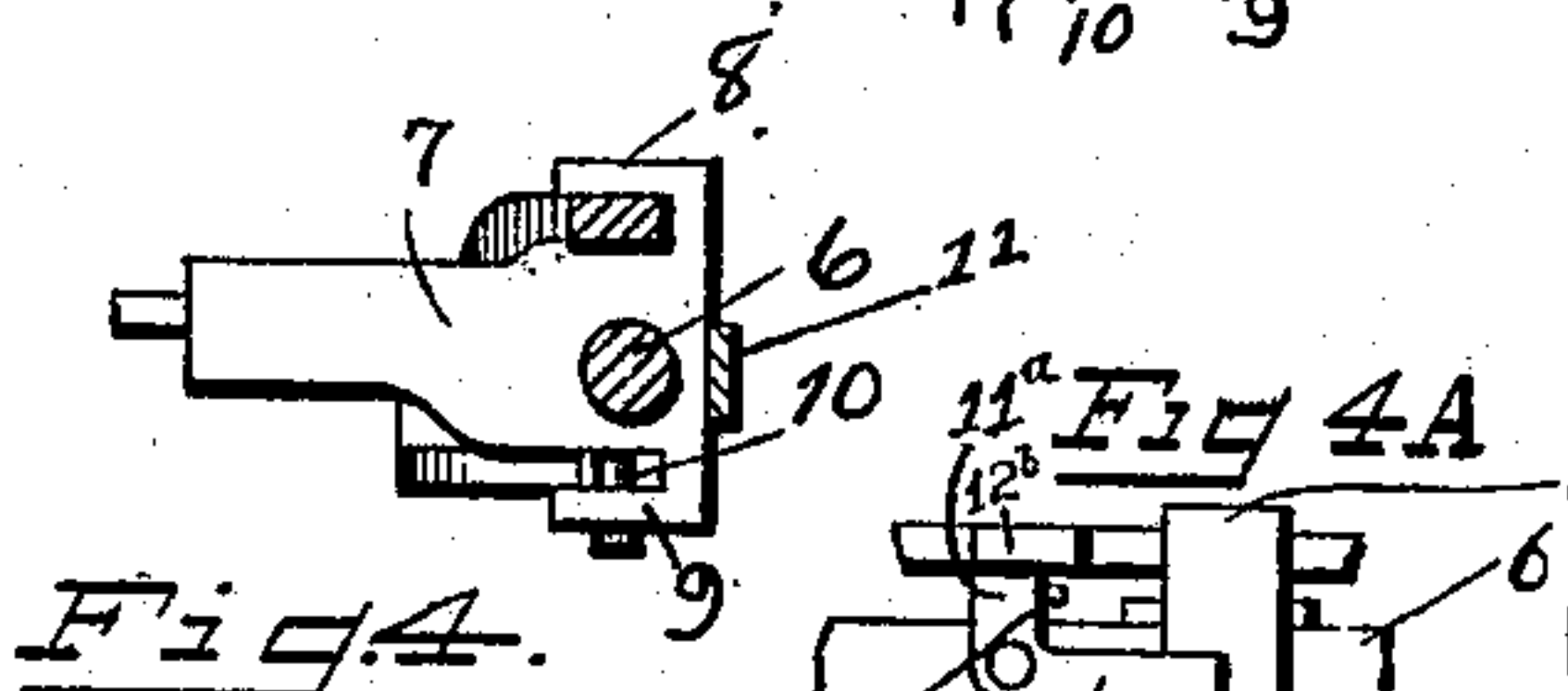


Fig. 4.

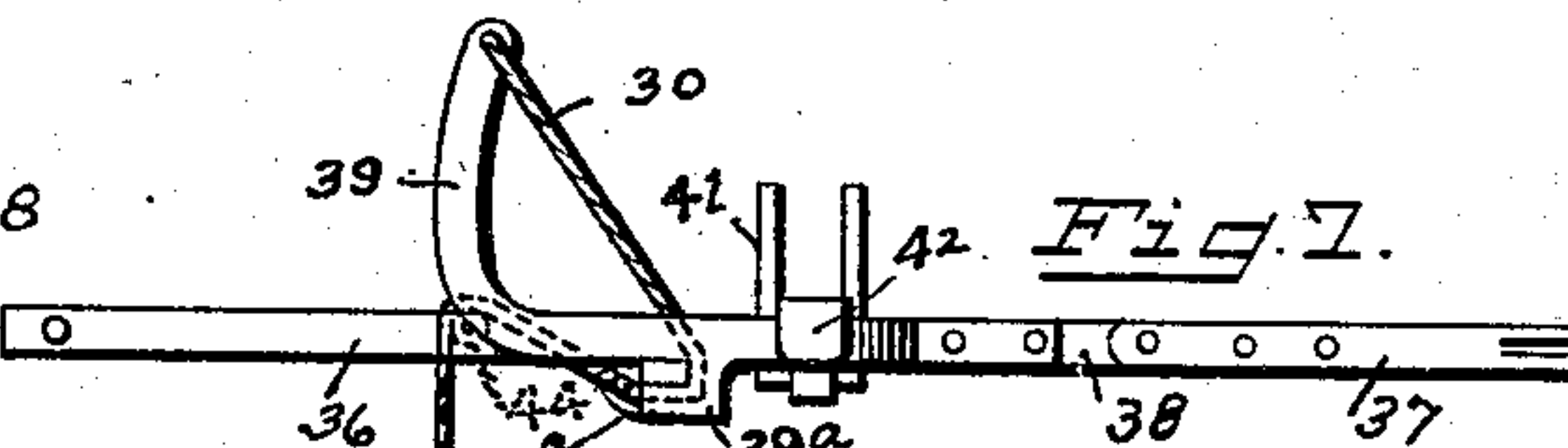


Fig. 5.

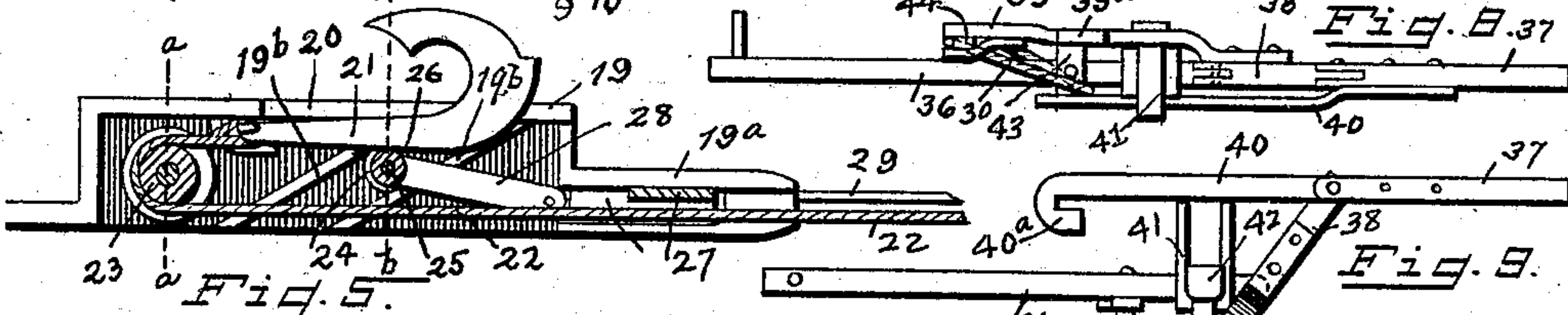


Fig. 6.

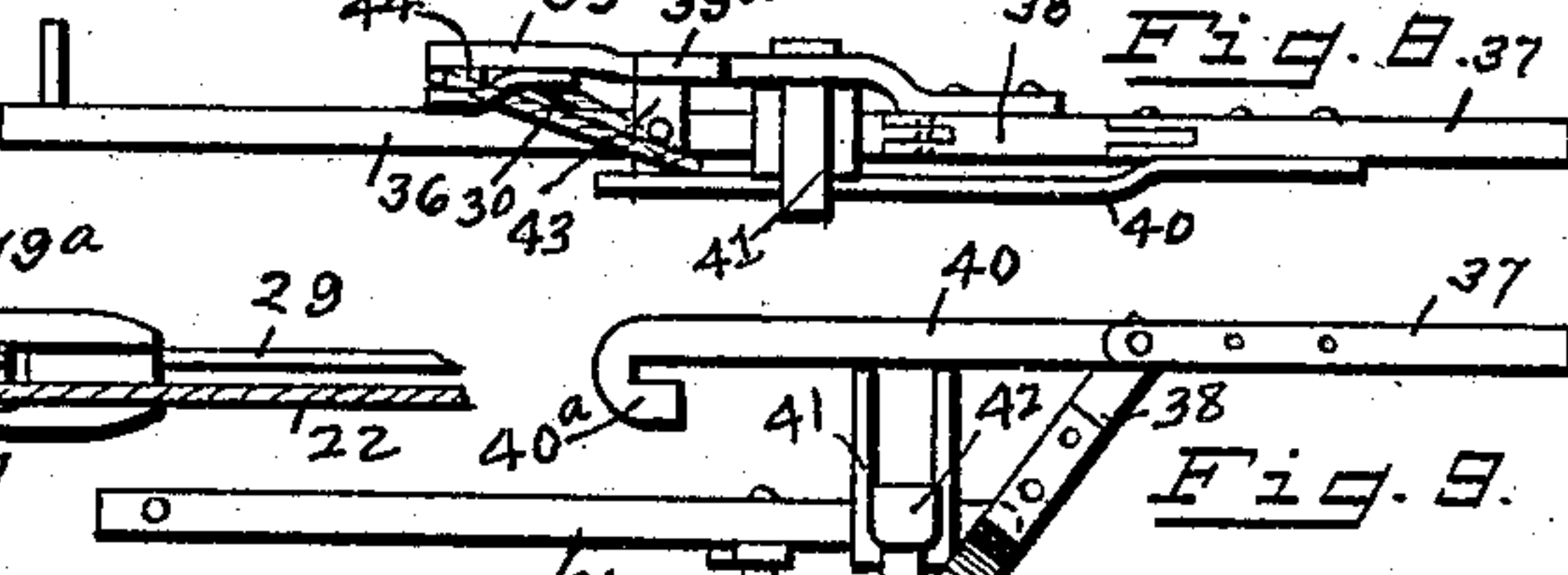


Fig. 7.

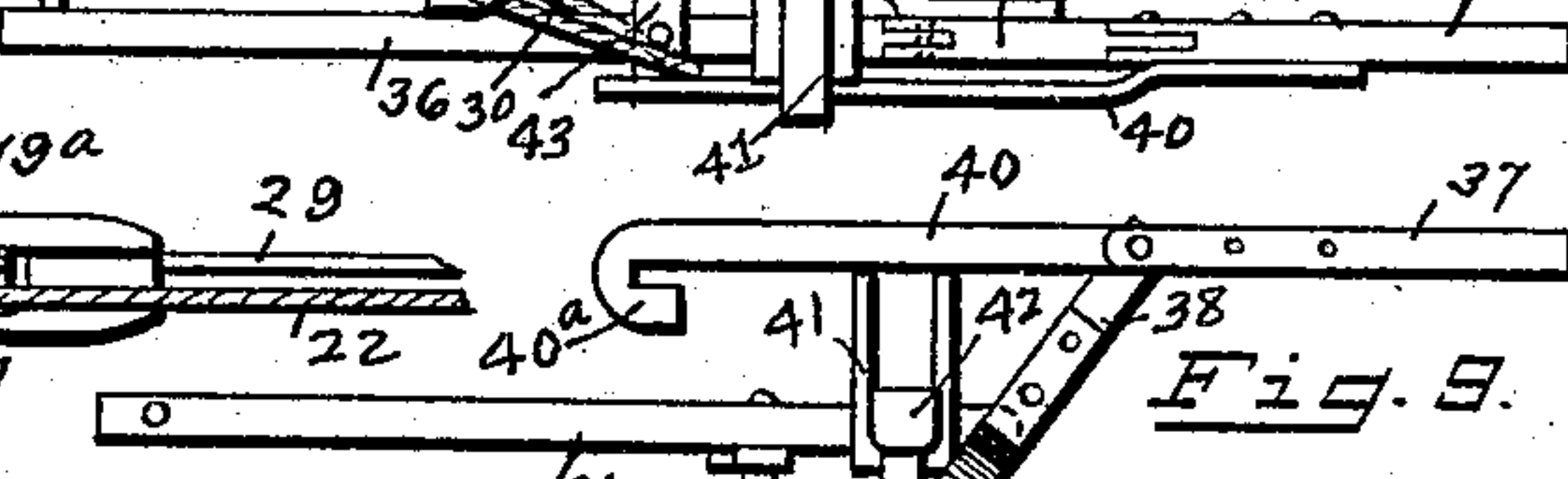


Fig. 8.

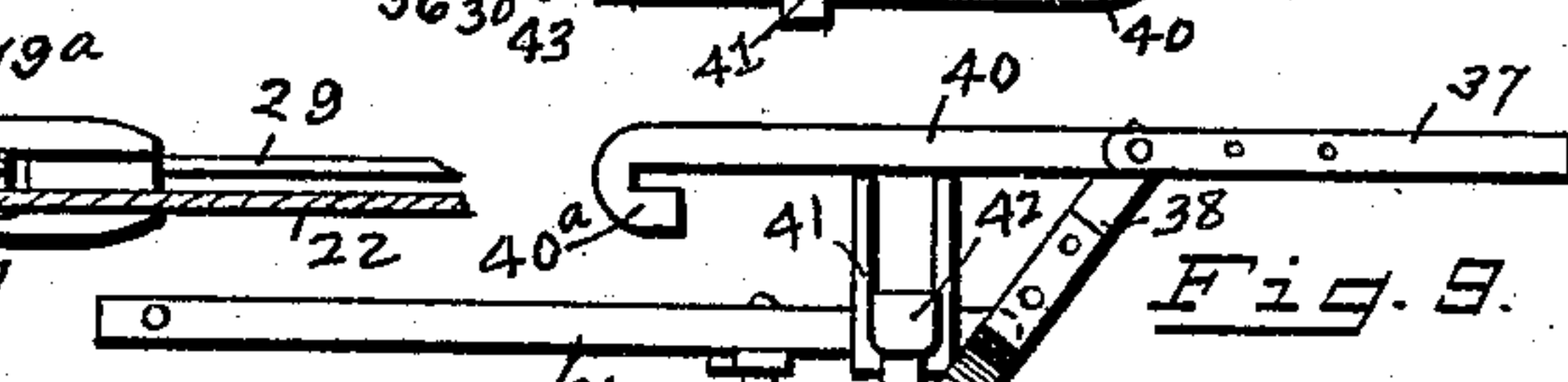


Fig. 9.

Witnesses  
Carl Stoughton  
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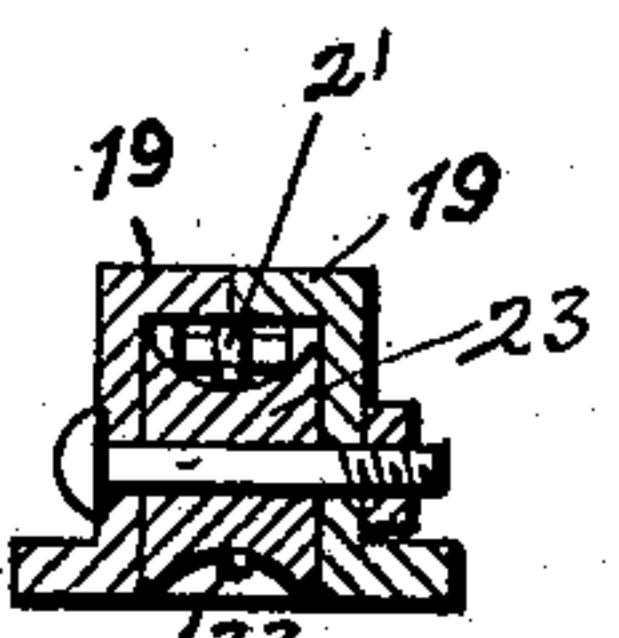


Fig. 10.

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# UNITED STATES PATENT OFFICE.

JOHN P. BLACKWOOD, OF ATHENS, OHIO, ASSIGNOR OF ONE-HALF TO FRANK S. HOOKER,  
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## RAILWAY-SWITCH-OPERATING MECHANISM.

No. 923,804.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed June 16, 1908. Serial No. 438,707.

*To all whom it may concern:*

Be it known that I, JOHN P. BLACKWOOD, a citizen of the United States, residing at Athens, in the county of Athens and State of Ohio, have invented certain new and useful Improvements in Railway-Switch-Operating Mechanism, of which the following is a specification.

My invention relates to railway switch operating mechanism, and the objects of my invention are to provide improved means for automatically closing an open switch on the approach of a train; to provide an improved switch rod construction and to produce other improvements the details of which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a portion of a railway track and switch showing my improved mechanism in connection therewith and showing the switch open or in position for running a train on a side track, Fig. 1<sup>A</sup> is a central horizontal section of a cable clamp which I employ in the manner hereinafter described, Fig. 2 is a plan view of portions of a railway track and switch rails showing the positions of the operating parts when the switch is closed, Fig. 3 is a sectional view on line *x—x* of Fig. 1, Fig. 4 is a sectional view on line *z—z* of Fig. 1, Fig. 4<sup>A</sup> is a detail view in elevation of the rear side of the switch tongue latch, Fig. 5 is a central longitudinal section of a trip or trigger mechanism which I employ in the manner hereinafter described, Fig. 6 is a sectional view on line *a—a* of Fig. 5, Fig. 7 is a plan view of a modification in the construction of the switch rod and its operating attachments as adapted for use on the opposite side of the railway track from that illustrated in Figs. 1 and 2, Fig. 8 is a side elevation of the mechanism shown in Fig. 7, Fig. 9 is a plan view of said mechanism illustrating the positions of the parts when the same have been opened by the operation of the trip or trigger, Fig. 10 is a transverse section on line *b—b* of Fig. 5, and, Fig. 11 is a detail view in perspective of a yoke body which I employ in connection with the trip mechanism in the manner hereinafter described.

Similar numerals refer to similar parts throughout the several views.

1 represents the main track rails of a

railway and 2 and 3 portions of the switch rails, said switch rails being connected by a transverse connecting rod 4. Pivotally connected at 5 to the switch rail 2 is one end of a switch rod 6 which extends under and to one side of the adjacent rail 1. On the outer side of the track rail 1 the switch rod 6 has connected therewith a laterally projecting yoke-shaped bracket 7 from the upper side of the rear portion of which projects an angular catch lip or keeper 8, while a similar keeper or lip 9 projects from the lower side thereof. This lower lip 9 has projecting upwardly therefrom a pin 10. Pivoted to what we will term the rear side of the rod 6 at a point on the inner side of the bracket 7 is an angular or crank-shaped catch piece 11 (see Figs. 1, 2 and 4<sup>A</sup>).

12 represents a hook lever or bar, the outer end portion of which is rigidly connected with an S-shaped connecting link 13 one end of which is pivotally connected as indicated at 13<sup>a</sup> with the outer end of the switch rod 6. The hook lever or bar 12 has its unsecured remaining end bent rearwardly to form a hook termination 12<sup>a</sup> and on the rear side of said hook lever near its hook termination is provided an angular catch projection 12<sup>b</sup>. The lever 12 is adapted as shown in Fig. 1 of the drawing, to be swung until its body portion is over and in line with the rod 6, in which position said lever body engages the underside of the lip 8 of the bracket 7 and the angular catch projection 12<sup>b</sup> extends over the rod 6 in position for engagement with the upper end portion 11<sup>a</sup> of the crank shaped latch 11 which engagement results in holding the hook lever in the position indicated in Fig. 1 of the drawing. On the underside of the hook lever at the point where its hook bend 12<sup>a</sup> begins, I pivot a small pulley wheel 12<sup>c</sup>.

The connecting link 13 has its outer end pivotally connected with the inner end of an outer switch rod section 14 the outer terminal portion of which is connected with the lower end of a switch lever 15 which in turn is pivotally connected with a suitable form of switch stand 16. To the underside of the forward portion of the switch rod section 14 is secured the outer end portion of an inwardly extending and rearwardly inclined arm 17, the latter having a bifurcation or recess in its end as indicated at 17<sup>a</sup>. This arm 17 is adapted to have its bifurcated



portion engage the pin 10 of the lip 9 when the parts are in the position shown in Fig. 1. 18 represents a bell crank lever which is pivoted at its angle to one of the railway ties and which is adapted when the switch rail 2 is closed against the adjacent rail 1, to have its head portion inserted within the yoke termination of the bracket 7.

Adjacent to the railway track at a suitable distance from the switch, I provide an elongated trip housing which preferably consists of two oblong housing sections 19, the forward portion of said housing being as indicated at 19<sup>a</sup>, formed with a reduced extension. Projecting through a slotted opening 20 in the upper side of the housing is the rearwardly turned forward end of a trip hook or trigger 21. Within the housing the longer arm of the trip hook is connected at its rear end with the rear end of a cable 22, which passes about a pulley or grooved wheel 23 journaled between the sides of the sections 19 and thence extends forwardly through the reduced portion of the housing and terminates in an end enlargement 22<sup>a</sup>. On the inner surfaces of the side wall of the housing sections 19 are formed parallel ribs 19<sup>b</sup> which incline rearwardly and downwardly forming a channel or run-way for guide wheels 24 on the ends of a transverse shaft 25 which shaft carries a central roller 26 upon which the underside of the trip body 21 bears.

In the reduced portion 19<sup>a</sup> of the housing, I provide a yoke-shaped member 27 which is slidably mounted in said housing extension and which has its rearwardly extending arms pivotally connected with the parallel bars of a link 28 the rear ends of which are pivoted on the shaft 25. With the yoke 27 is connected one end of a rod 29 which extends outward through an opening in the housing extension 19<sup>a</sup> and is connected with the outer arm of the bell crank lever 18. With the hook end 12<sup>a</sup> of the lever bar 12 is connected one end of a cable 30, the remaining end of which is connected with one end of a wire yoke 31 which is surrounded by a coiled spring 32, the outer of said spring being engaged by the outturned ends of the yoke arms and the opposite end thereof being engaged by the outturned ends of a yoke 33 which extends within the yoke 31. The outer end of the internal yoke 33 engages the hook or coupling link 34 which in turn engages one end of a cable coupling or clamping member 35. This cable clamp comprises two elongated sections such as are indicated at 35<sup>a</sup>, the rear portions of which are, as shown more clearly in Fig. 1<sup>A</sup> of the drawing, riveted together. Each of the sections 35<sup>a</sup> has its outer end portion enlarged to form two clamping jaws 35<sup>b</sup> and the terminal portion of each of said jaws is so inclined on its inner face as to produce a flar-

ing mouth 35<sup>c</sup>. The inner surfaces of the enlarged portions of the sections 35<sup>a</sup> are recessed as indicated at 35<sup>d</sup> this recess being adapted to receive and engage the enlargement 22<sup>a</sup> on the end of the cable section 22, which is embraced between the jaws 35<sup>b</sup>.

When the switch rail 2 is in contact with the adjacent main track rail 1, it will be understood that the catch projection 12<sup>b</sup> of the hook bar 12 is engaged by the latch 11<sup>a</sup>, that said bar 12 will occupy a position beneath the keeper lip 8 and that the arm 17 will have its bifurcated end portion in engagement with the pin 10. When in this position the cable 30 runs from the end of the hook lever 12<sup>a</sup> in front or on the outer side of the upwardly projecting member 11<sup>a</sup> of the angular latch 11, from which the cable extends toward the track, thence about the small grooved wheel or pulley 12<sup>c</sup>.

With the parts in the position described, it will be understood that when a train approaches the switch on the main track rails in the direction of the arrow, a suitable projection on the locomotive or its pilot coming into contact with the projecting trigger or trip 21, will result in a pull on the cable 30, which pull will be sufficient to swing the hook lever 12 in the direction of the train, said lever being released from engagement with the upturned end of the swinging latch 11 by the pull exerted on said latch by the cable 30. This being accomplished the flaring jaws 35<sup>b</sup> of the cable clamp will by contact with the outer end of the reduced extension 19<sup>a</sup> of the trip housing, be spread apart sufficiently to cause a disengagement of the enlargement 22<sup>a</sup> of the cable 22 from said jaws, thereby permitting the trip or trigger to drop downward.

In the swinging movement imparted as described to the hook lever 12, it is obvious that through its jointed connection with the outer end of the switch rod 6, said switch rod will be forced toward the track, with the result that the switch rail 3 will be brought into contact with the adjacent rail 1 and the switch rail 2 will be separated from its adjacent rail 1, thus providing a clear main track for the approaching train.

In order to return the switch rails by hand to the positions shown in Fig. 1 and to reset the trigger, the following operation is necessary: By releasing the switch lever 15 and moving the same to force the rod section 14 inward, it is obvious that not only will the hook lever 12 be again swung to the position shown in Fig. 1 of the drawing, but that the arm 17 will again engage the pin 10. When the parts have thus been returned, the cable 30 may be again looped into connection with the pivoted latch 11 and pulley wheel 12<sup>c</sup>. The switch lever 15 being now swung so as to impart an outward pull on the switch rod section 14, it will be seen that through the



jointed connection of said rods 14 and 6, the latter will move toward the track and operate to force the switch rail 2 to the position shown in Fig. 2 of the drawing.

5 In the operation of closing the switch rail 3 against the main track rail 1, the movement imparted to the bell crank lever 18 has the effect of releasing the tension on the rod 29, thereby permitting a rearward movement  
10 of the yoke 27 and rearward and downward movement of the link 28, the wheels 24 running in the guideway formed by the ribs 19<sup>b</sup> of the housing.

The switch rails having been thrown to  
15 the positions shown in Fig. 2 of the drawing as described, the operation of resetting the trip to the operative position is as follows: In the last outward movement of the rod section 14 heretofore described, the engage-  
20 ment of the lever 18 with the bracket yoke 7, will result in a pull on the rod 29 toward the switch operating mechanism and a consequent outward sliding movement of the yoke member 27 and link 8 and an upward move-  
25 ment of the roller 26 which will operate to again raise the trigger 21 to the position shown in Fig. 5. This being accomplished, the enlarged end 22<sup>a</sup> of the cable 22 may be again forced into connection with the clamp-  
30 ing jaws 35<sup>b</sup>.

It will be observed that the mechanism which has been described, is particularly applicable to the operation of a switch from what may be termed the left side of the track.  
35 For the purpose of operating the switch rails from the opposite or right side of the track, I have shown in Figs. 7, 8 and 9 a slightly modified construction of operating mechanism, which results in the clearing of  
40 the main track rails by pulling upon the rail 3 instead of pushing against the rail 2. In said modified construction, 36 represents the switch rod section which corresponds with the section 6 heretofore described and  
45 one end of which is adapted to be suitably connected with the switch rail 3. This switch rod section 36 is jointedly connected with a second or outer section 37 through the medium of a pivoted connecting bar 38  
50 which performs substantially the office of the connecting bar 13 heretofore described. The section 37 has its outer end adapted to be connected with an ordinary form of switch lever not shown. To the upper side  
55 of the connecting bar 38 is secured one end of a hook lever 39, with one side of which is formed an angular catch projection 39<sup>a</sup>. To the underside of the switch rod section 37 is secured one end of a bar 40, which forms  
60 a longitudinal extension of said rod section 37 and which has a terminal hook 40<sup>a</sup>. The rod section 36 is provided with a laterally projecting yoke bracket 41 which corresponds substantially with the yoke bracket 7  
65 of the mechanism heretofore described and

at the inner end of said bracket is provided above the bar section 36 a projecting catch lip 42.

When the switch rail 3 is in the position shown in Fig. 1, the elements of said modi- 70 fied construction are arranged as shown in Figs. 7 and 8 of the drawing, in which the members 37, 38 and 36 are in alinement and in which the straight portion of the plate lever 39 is over and in the direction of the 75 length of the rod member 36. When in this position the cable 30 which is connected with the hook extension of the lever 39, runs from said hook about one end of a vertical latch member 43 which is pivoted on the member 80 36 and one end of which engages the hook termination 40<sup>a</sup> of the bar 40 and the remaining end of which engages the hook projection 39<sup>a</sup> of the bar 39. Passing about this  
85 latch, the cable 30 runs over a small wheel 44 which is pivotally mounted on the underside of the hook lever 39. When the pull on the cable is exerted by contact of the train with the trip as heretofore described, it is obvious that the latch 43 will be thrown to 90 an open position, thereby releasing the cable therefrom and at the same time the hook arm 39 will be thrown outward to the position indicated in Fig. 9 of the drawing, by which operation an outward movement of 95 the switch rod sections would be effected, which would result in pulling the switch rail 3 into contact with the adjacent main track rail. It is obvious that the operation of resetting the parts will be substantially the 100 same as that heretofore described for the mechanism on the left side of the track.

From the construction and operation described, it will readily be understood that in case a switch is left open or in position for 105 carrying an approaching train on to a side track, the switch will be automatically closed and clear main track-way provided for the train.

What I claim, is: 110

1. In a switch operating mechanism, the combination with main track and switch rails, a switch stand and lever, jointedly connected switch rod sections one of which is connected with one of the switch rails, and a 115 locking mechanism for locking said switch rods in position to hold the switch open, of a trip adjacent to the main track rails adapted to be operated by a passing train, and connections between said trip and said switch 120 rod locking mechanism whereby an operation of the trip will result in releasing said locking mechanism and moving the switch rails to the closed position.

2. In a device of the character described, 125 the combination with a railway track and its movable switch rails, of a switch rod connected to one of said rails, a manually operable switch rod, a lever pivoted at one end to the first named switch rod and pivoted in- 130



intermediate its ends to the manually operable switch rod, the other end of the manually operable switch rod being adapted to loosely connect a member carried by the first named switch rod, a latch carried by the first named switch rod and adapted to engage a member carried by the lever, a trip, and a connection between said lever and said trip.

3. In a device of the character described, the combination with a railway track and its movable switch rails, of a switch rod connected to one of said rails, a manually operable switch rod, a lever pivoted at one end to the first named switch rod and pivoted intermediate its ends to the manually operable switch rod, the other end of the manually operable switch rod being adapted to loosely connect a member carried by the first named switch rod, a latch carried by the first named switch rod and adapted to engage a member carried by the lever, a trip, a connection between said lever and said trip, said lever having an inwardly curved end to which said connection is secured and a pulley also carried by said lever over which said connection passes.

4. In a device of the character described, the combination with a railway track and its movable switch rails, of a switch rod connected to one of said rails, a manually operable switch rod, a lever pivoted at one end to the first named switch rod and pivoted intermediate its ends to the manually operable switch rod, the other end of the manually operable switch rod being adapted to loosely

connect a member carried by the first named switch rod, a latch carried by the first named switch rod and adapted to engage a member carried by the lever, a trip, a connection between said lever and said trip, said lever having an inwardly curved end to which said connection is secured, a pulley also carried by said lever over which said connection passes, a bell crank lever pivoted adjacent the track, means for causing the movement of the first named switch rod to impart movement to said bell crank lever, and a connection between said bell crank lever and the trip, and adapted to impart bodily movement to said trip.

5. In a device of the character described, the combination with a railway track and its switch rails, of a switch rod connected to one of the switch rails, a manually operable switch rod, a lever pivotally connected to the first named switch rod at one of its ends, and pivoted to the manually operable switch rod intermediate its ends, a locking projection carried by said lever, a latch carried by the first named switch rod, and adapted to engage said projection, a cable connected to said lever and adapted to be looped about said latch, and a trip to which said cable is connected.

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

JOHN P. BLACKWOOD.

Witnesses:

E. B. CLARKE,  
R. L. WOODWORTH.