

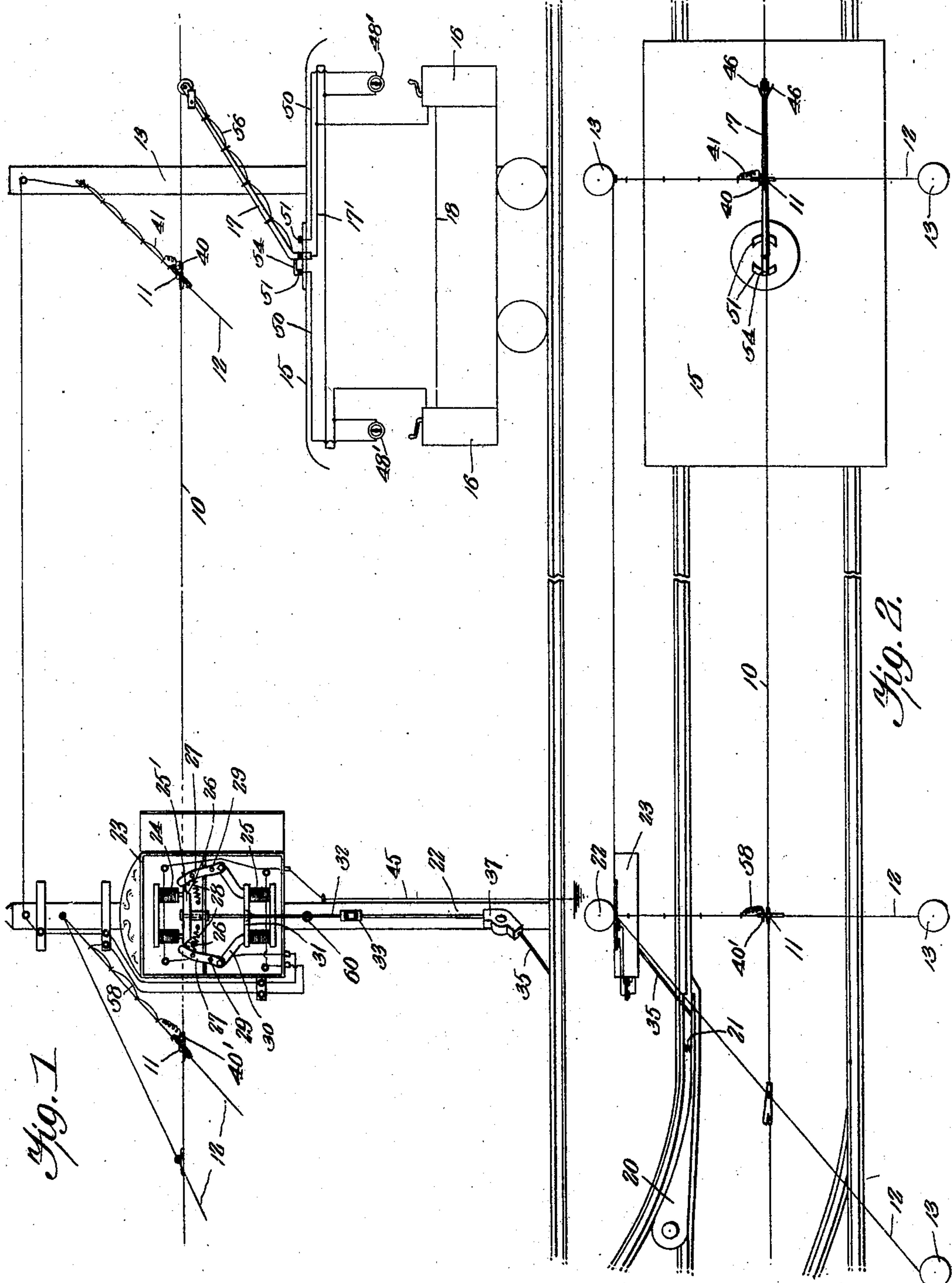
No. 806,442.

PATENTED DEC. 5, 1905.

I. J. STOFFER.  
ELECTRIC SWITCH OPERATING DEVICE.

APPLICATION FILED JULY 10, 1905.

2 SHEETS—SHEET 1.



Witnesses

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*Jno. C. Parker*

*Ira J. Stoffer,* Inventor,  
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Attorneys

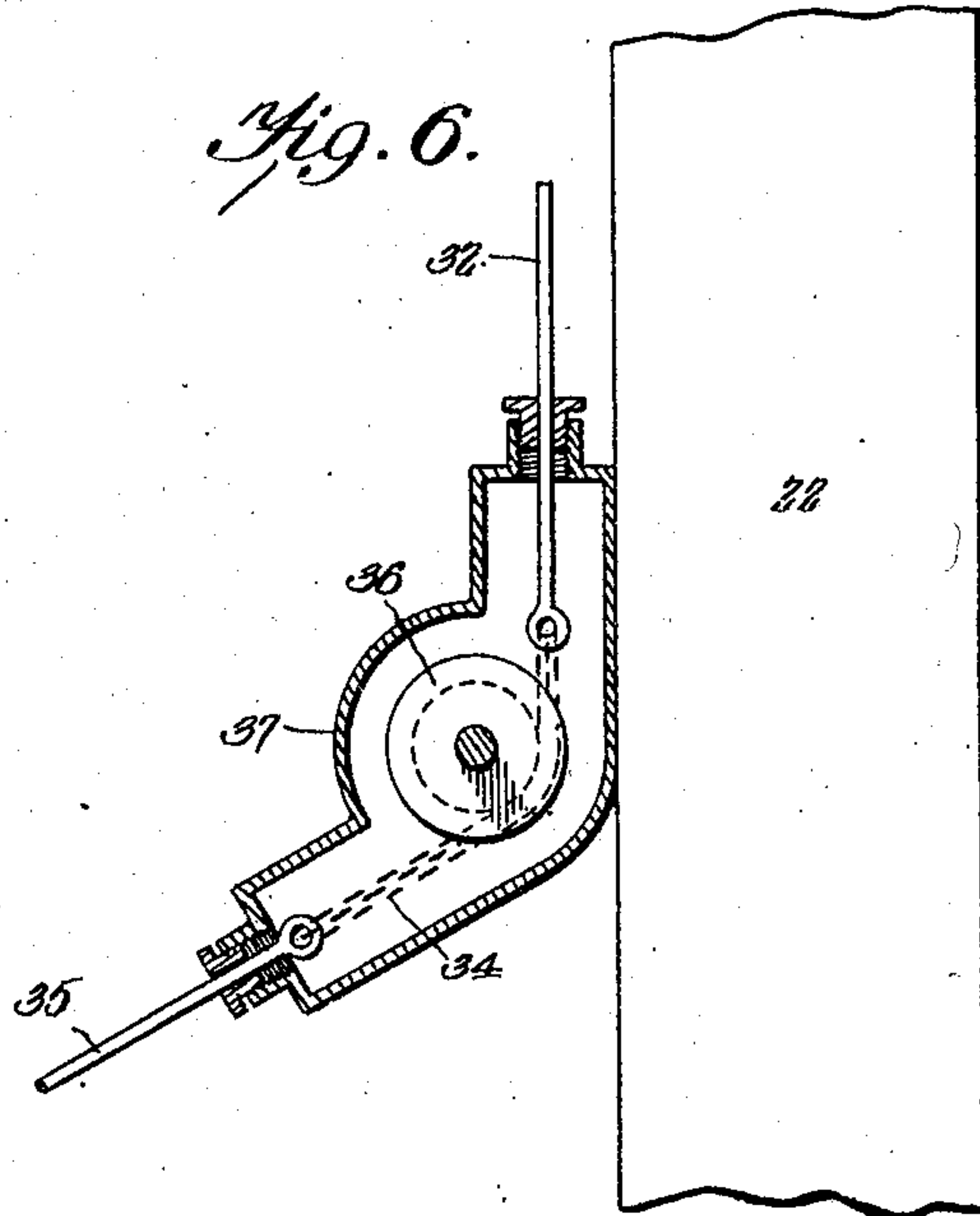
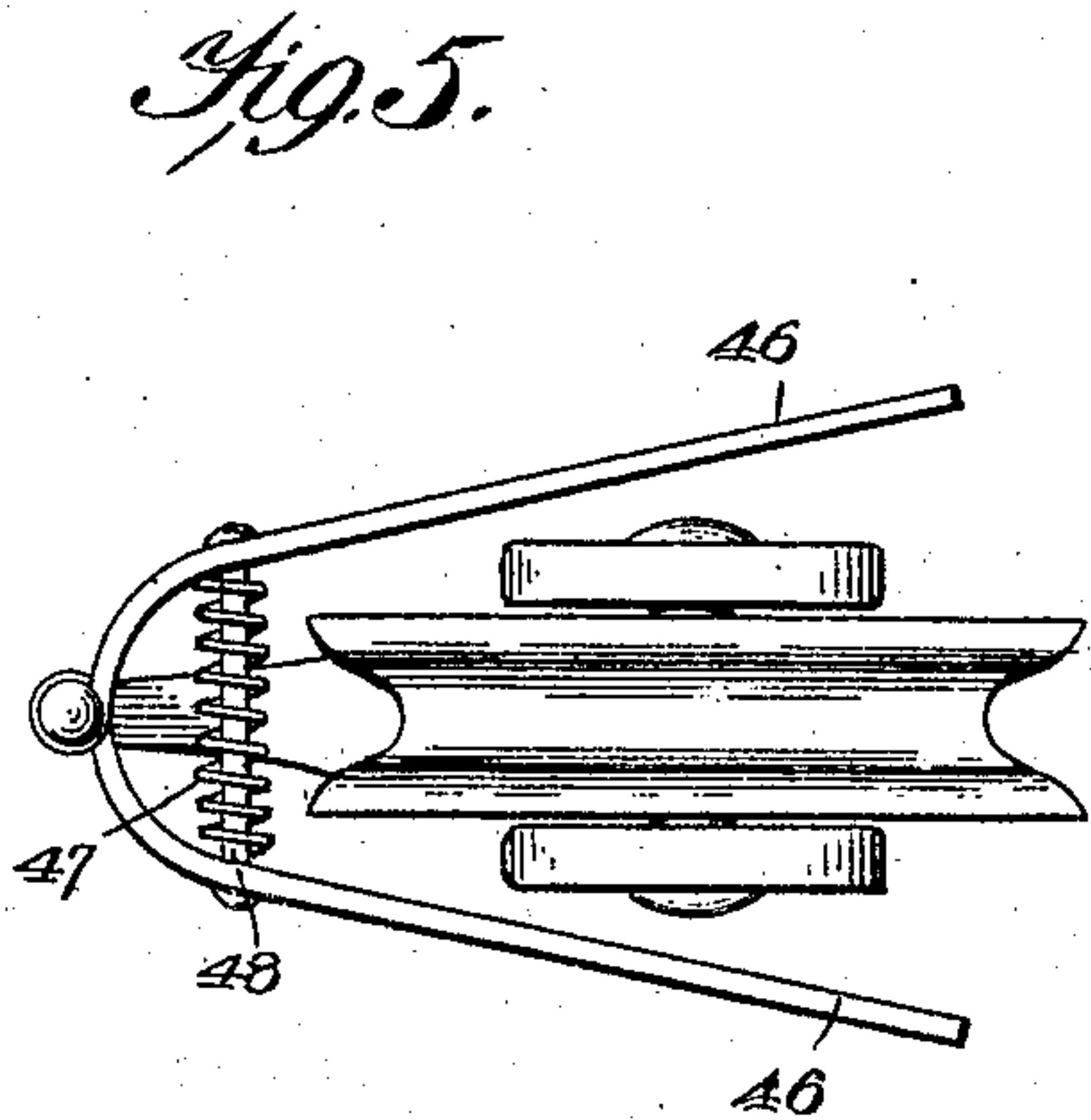
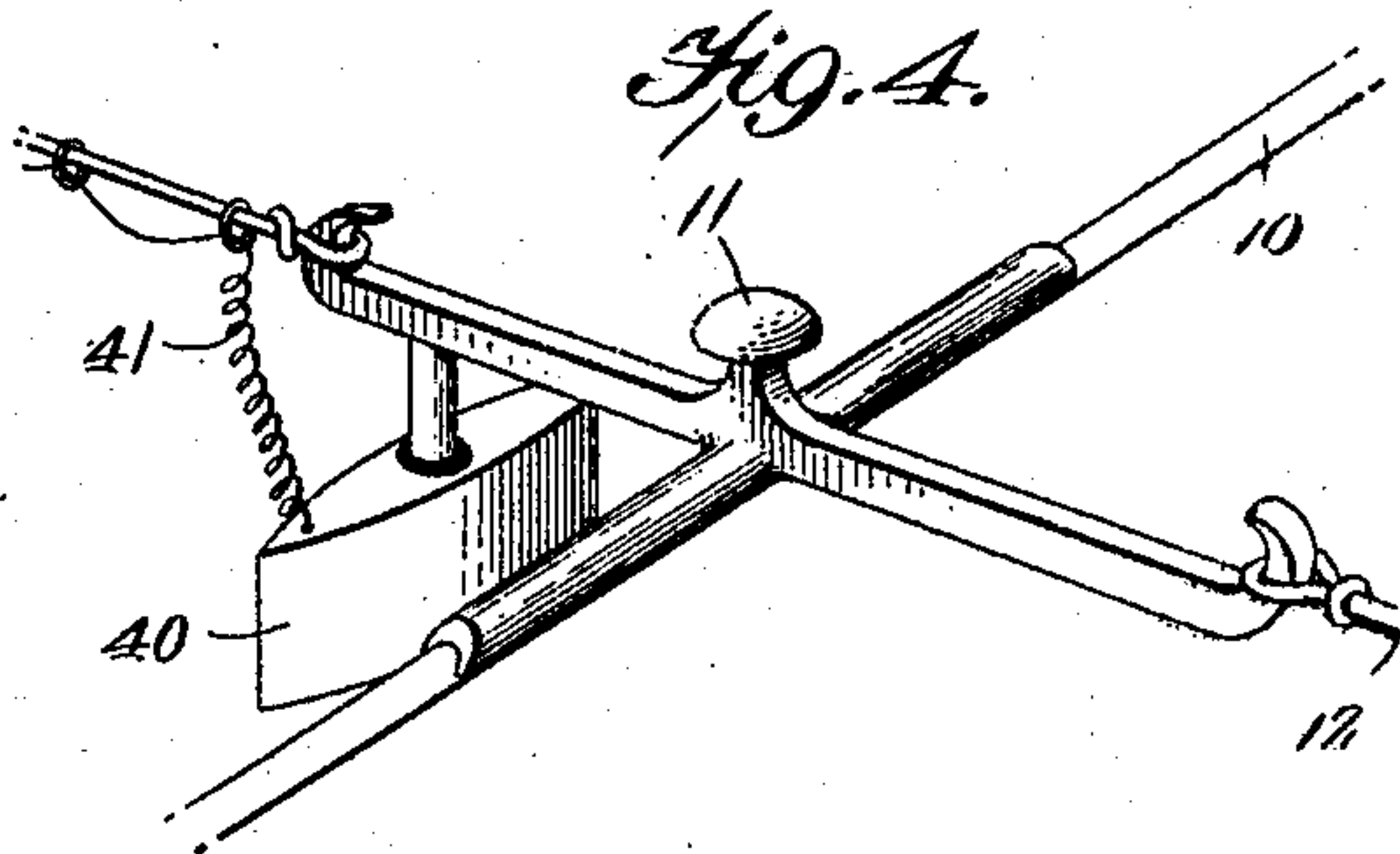
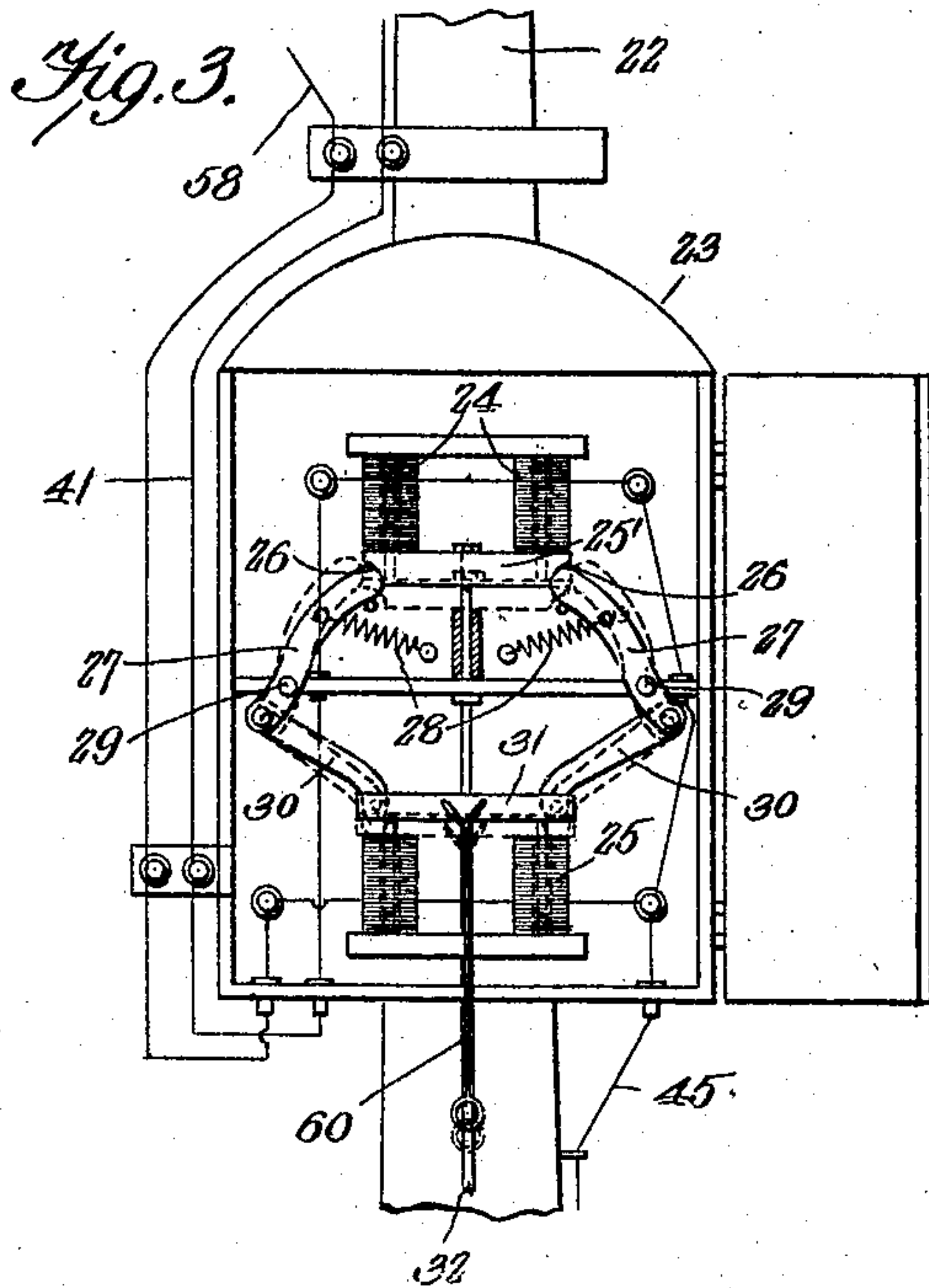
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2 SHEETS—SHEET 2.



## Witnesses

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Jno E Parker

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# UNITED STATES PATENT OFFICE.

IRA J. STOUFFER, OF ALTOONA, PENNSYLVANIA.

## ELECTRIC SWITCH-OPERATING DEVICE.

No. 806,442.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed July 10, 1905. Serial No. 269,024.

*To all whom it may concern:*

Be it known that I, IRA J. STOUFFER, a citizen of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented a new and useful Electric Switch-Operating Device, of which the following is a specification.

This invention relates to switch-operating mechanism, and has for its principal object to provide a novel means whereby a switch may be adjusted in advance of an approaching car and placed wholly under the control of the motorman or other operator on the car.

A further object of the invention is to provide a switch-operating mechanism in which the turning of a switch or similar member on an approaching car will result in the movement of the switch in advance of the car and after the passage of a car beyond the switch the latter will be automatically restored to its initial position.

A still further object of the invention is to provide a controlling mechanism that may be adjusted from either end of the car and to so arrange the electrical circuits and contacts that the mechanism may operate while the car is moving in either direction.

A still further object of the invention is to provide a switch-operating mechanism in the form of an electromagnet of which the armature is connected to the switch and to provide means for automatically locking the armature in adjusted position, so that it is not necessary to hold the electromagnet-circuit closed for any considerable length of time, a mere momentary closing to effect the first movement of the armature being sufficient, and the latter being thereafter held in adjusted position by the locking means.

A still further object of the invention is to provide means for automatically unlocking the switch-actuating armature after the car has passed the switch.

A still further object of the invention is to provide for the manual release of the armature in case of accidental derangement of the parts.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that

various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is an elevation, partly in the nature of a diagram, of a switch-operating mechanism constructed in accordance with the invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail elevation of the switch-operating electromagnets drawn to an enlarged scale. Fig. 4 is a detail perspective view of the contact member arranged adjacent to the trolley-wire. Fig. 5 is a plan view of the upper portion of the trolley harp and wheel, showing the contact carried thereby. Fig. 6 is a detail sectional view of the flexible connecting means forming a part of the switch-actuating device.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The apparatus is shown as employed in connection with an overhead-trolley wire 10, which is supported in the usual manner from hangers 11 and cross-wires 12, the latter being supported by posts 13, or any other suitable supporting mechanism may be utilized.

The trolley-car 15 is provided at each end with a controller 16 and carries a trolley-arm 17 and a current-conductor of any ordinary type, the current being led through wire 17' to the controller 16 and thence through wire 18 to the ground, usually through the wheels of the car.

In Fig. 2 is shown a switch-tongue 20 of any ordinary type, the switch-tongue being normally held in the position shown by means of a spring 21.

At a point adjacent to the switch is a post 22, at the upper end of which is arranged a casing 23, carrying supports for the reception of two electromagnets 24 and 25. Arranged below and within the field of force of the electromagnet 24 is an armature 25', the opposite ends of which are provided with recesses 26, arranged for the reception of locking-arms 27, that are forced toward each other by tension-springs 28. These arms are pivoted on studs 29 and at their lower ends are connected by links 30 to an armature 31, that is disposed within the field of force of the electromagnet 25.

The armature 25' is connected to the upper end of a rod 32, which preferably is formed



of two sections coupled by a turnbuckle 33 to permit adjustment. The lower end of the rod 32 is connected by a chain or cable 34 to a rod 35, the outer end of the rod 35 being  
 5 connected to the switch-tongue 21 in any suitable manner, and usually the rod 35 will be arranged horizontally and may be passed through a suitable shield in the form of a tube or the like. The chain or cable 34 is guided  
 10 by a suitable sheave 36, arranged within a casing 37, that preferably has small stuffing-boxes at its upper and lower ends for the reception of the rods 32 and 35 in order to prevent the entrance of dust and dirt.

15 The arrangement of the parts is such that if the electromagnet 24 is energized it will attract the armature 25' and movement will be transmitted, through the rods 32 and 35, to the switch-tongue 21, moving the latter to the  
 20 position opposite that shown in Fig. 2. As soon as the armature 25' moves up, the arms 27 move inward and engage the recesses 26, thus locking the armature in the highest position and holding the switch-tongue in the  
 25 position to which it has been adjusted. The parts remain in this position until the electromagnet 25 is energized, and when this occurs the armature 31 is drawn down and the locking-arms 27 are moved from engagement with  
 30 the armature 25', leaving the rods 32 and 35 free to move. The spring 21 then acts to throw the switch-tongue to the position shown in Fig. 2, and this movement is imparted to the rods 35 and 32, pulling the armature 25'  
 35 down to the normal position.

To one of the hangers 11 of the trolley-wire is hung a contact-block 40, that is insulated from the hanger and is disposed in a horizontal plane slightly below that of the  
 40 trolley-wire. This contact is connected by a wire 41 to the upper electromagnet 24, the circuit being thence completed to ground through a wire 45.

At the upper end of the trolley-harp is arranged a pair of pivotally-connected contacts 46, that normally are separated by a helical compression-spring 47, the carrying-bolt 48 of the spring being headed and serving to limit the spreading movement of the contacts.  
 50 A car traveling in a direction of the switch will move one or other of its contacts 46 into engagement with the contact 40 and close the circuit of the electromagnet 24, the circuit being under the control of the motorman.

55 Arranged in each car are two switches 48', one terminal of each switch being connected to the main wire 17, while the opposite switch-terminal is connected by a wire 50 to a contact-plate 51 on the top of the car. Two contact-plates 51 are shown in Fig. 2, these being  
 60 spaced from each other and arranged on arcuate lines struck from the center of rotative movement of the lower end of the trolley-pole. Secured to, but insulated from, the trolley-pole is an arm 54, that is arranged to engage

one or other of the plates 51, one of said plates being engaged when the car is traveling in one direction and the other while the car is traveling in the opposite direction, so that  
 70 only one of the switches 48' is operative, the switch at the forward end of the car being under the control of the motorman, while the switch at the rear end of the car is cut out, and no harm can result from turning of the same by the conductor or a passenger. 75

Should the motorman of the approaching car desire to change the position of the switch-tongue 20, he turns the switch 48' at the forward end of the car and a portion of the current from the wire 17' is shunted through the  
 80 switch 48', wire 50, one of the plates 51, arm 54, wire 56, contact 46, contact 40, wire 41, electromagnet 24 and operating the switch in the manner previously described. If the switch is to remain in adjusted position, the  
 85 switch 48' of the car is not operated, and the contacts may then engage each other without closing the circuit of the electromagnet 24. After the car has passed beyond the switch-tongue the contact 46 will engage a second  
 90 contact 40', also hung adjacent to the trolley-wire, and a circuit will be closed from the car through contact 46, contact 40', wire 58, electromagnet 25, wire 45 to ground, thus energizing the lock-controlling magnet and releasing the upper armature 25' and permit-  
 95 ting the switch-tongue to reassume its initial position, or by turning the switch 48' to open position before the car passes under the contact 40' the switch-tongue may be retained in  
 100 the position to which it was previously adjusted. Should this occur or any of the parts become accidentally broken or impaired, the armature 31 may be pulled down by means of a handled rod 60, that is hung from the  
 105 armature, the handle being arranged within convenient reach of a person standing on the ground.

With an apparatus of the class described the position of the switch may be adjusted  
 110 without the necessity of leaving the car and without the employment of a switch-tender.

Having thus described the invention, what is claimed is—

1. In apparatus of the class described, the  
 115 combination with an electromagnet having an armature, the opposite ends of which are recessed, means for connecting said armature to the switch-point, a pair of pivotally-mounted locking-arms arranged to enter said recesses  
 120 after the armature has been moved, and thus lock the switch-tongue in position, a second electromagnet, an armature therefor, and links connecting said armature to the pivoted locking-arms. 125

2. In apparatus of the class described, the combination with a switch-operating electromagnet, of a trolley-wire, a contact arranged adjacent to the trolley-wire, an electrically-propelled car, a trolley-arm carried thereby, 130



a bracket member extending forward of the trolley-wheel, a pair of contact-arms pivoted to the bracket and projecting beyond the sides of the trolley-wheel, a guide bolt or bar extending through the contacts, and a spring encircling said bar and tending to separate said contacts.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

IRA J. STOUFFER.

Witnesses:

CHARLES H. CHERRY,  
ROBERT E. CASKY.