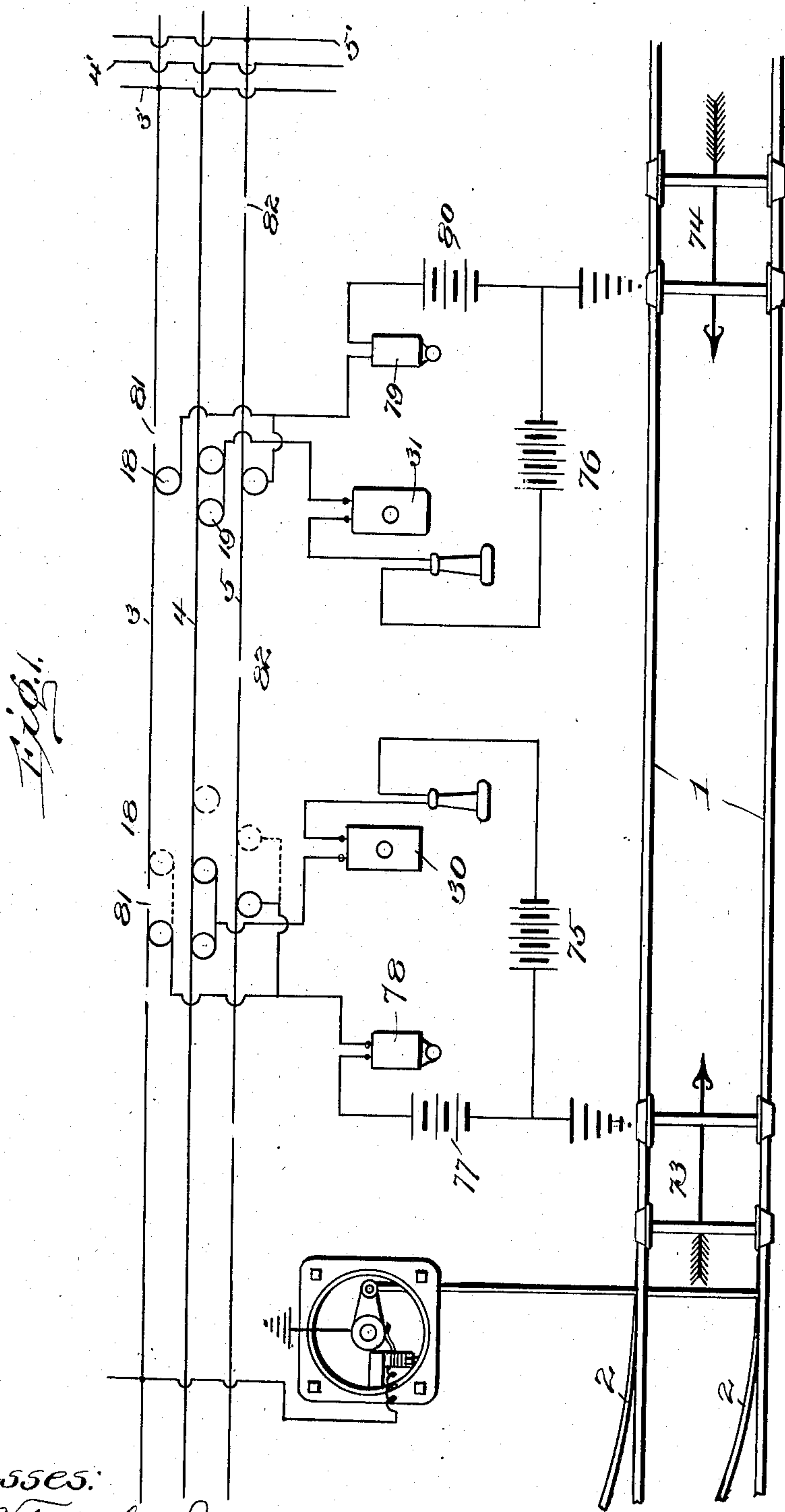


W. & A. H. FECHNER.  
BLOCK SIGNALING DEVICE.  
APPLICATION FILED JULY 23, 1907.

900,360.

Patented Oct. 6, 1908.

4 SHEETS—SHEET 1.



Witnesses:

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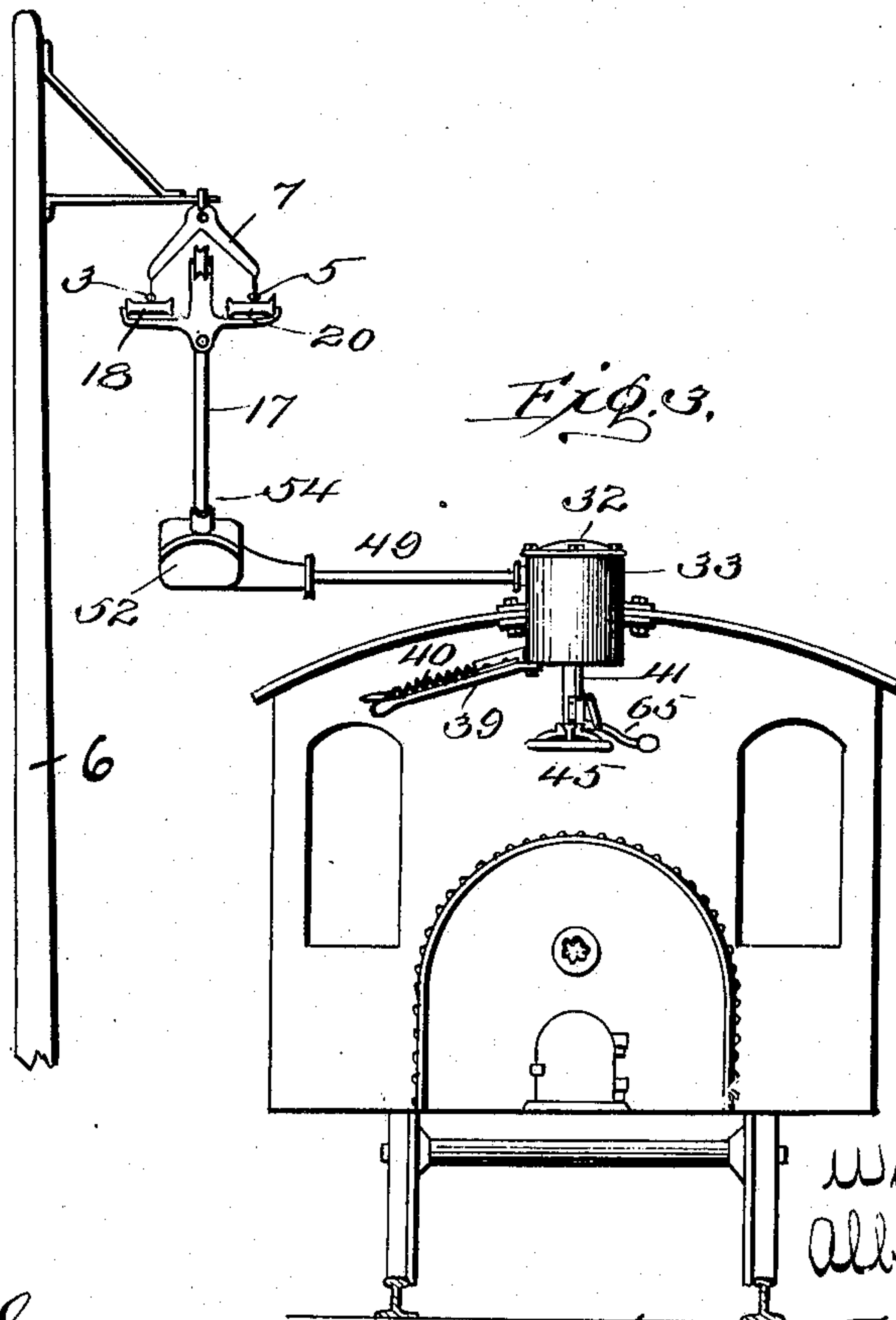
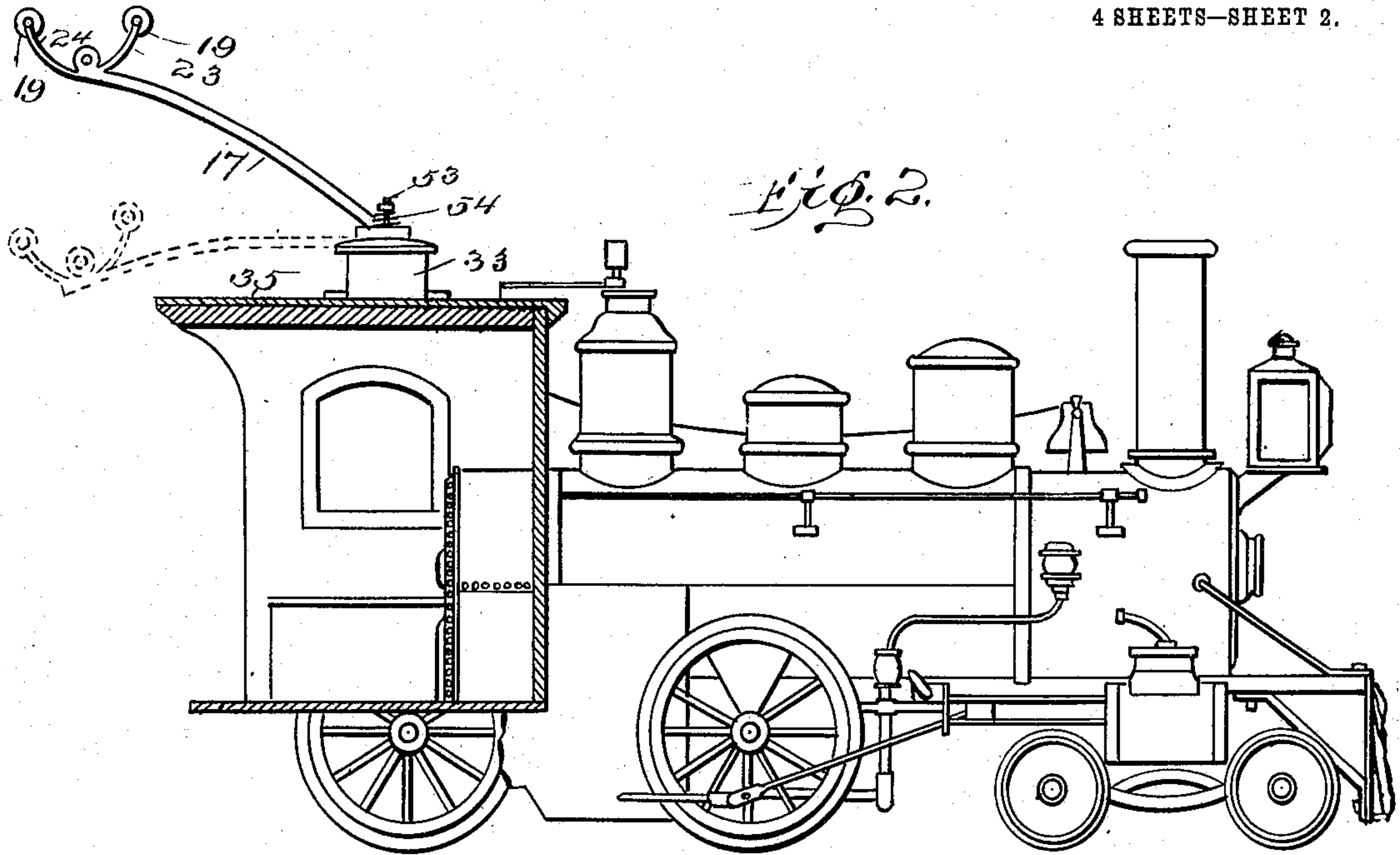
and  
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4 SHEETS—SHEET 2.



Witnesses

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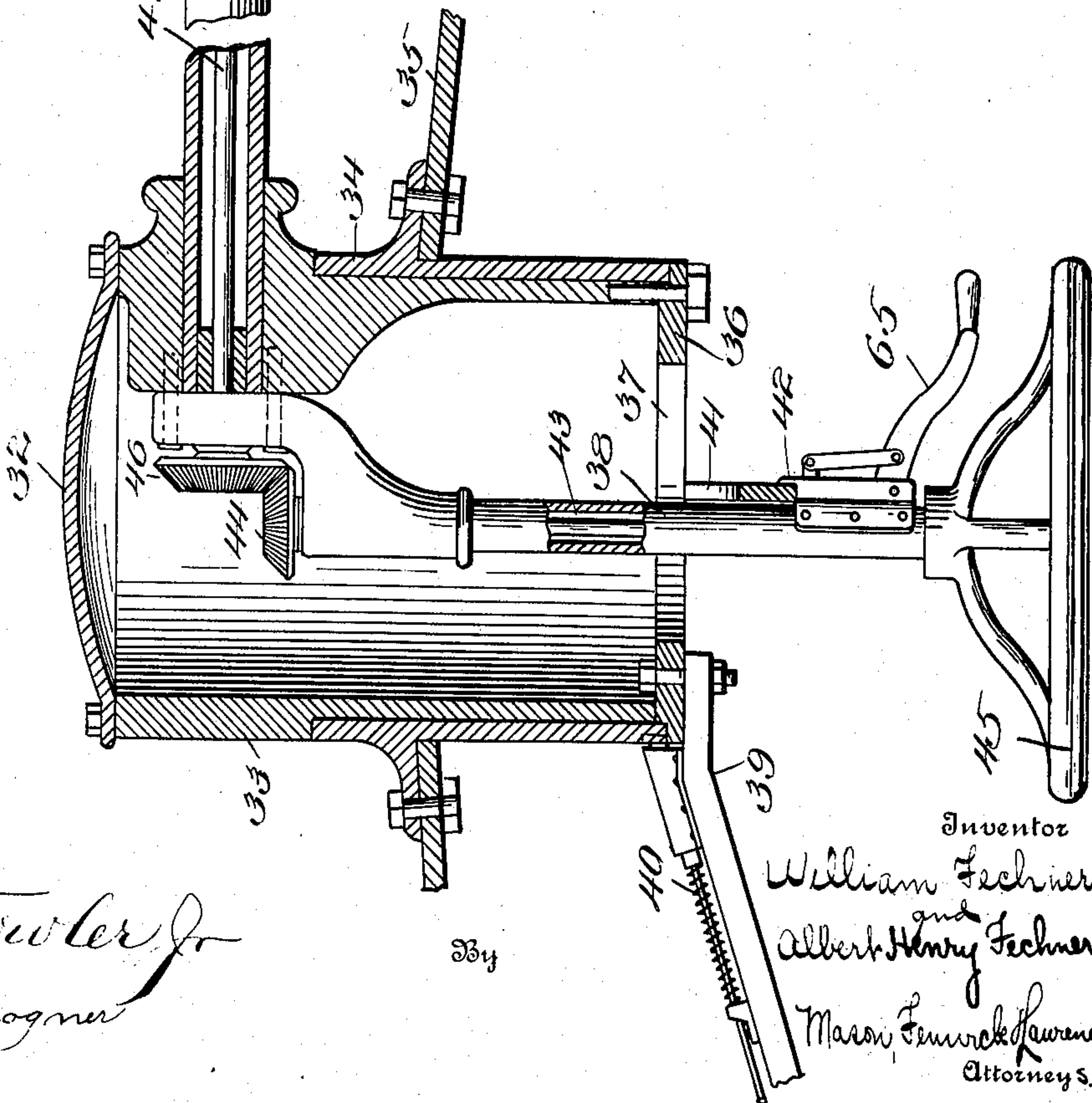
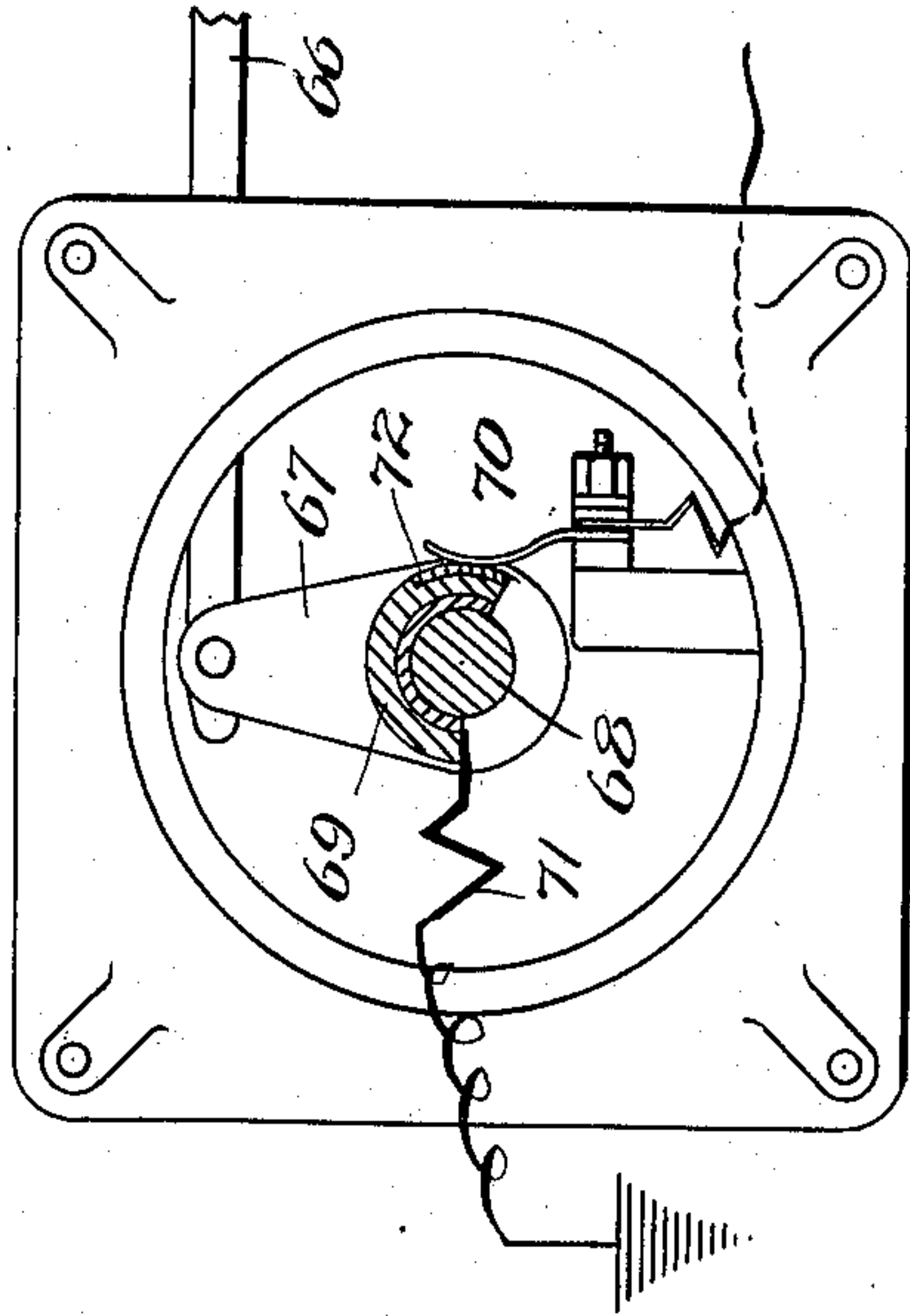
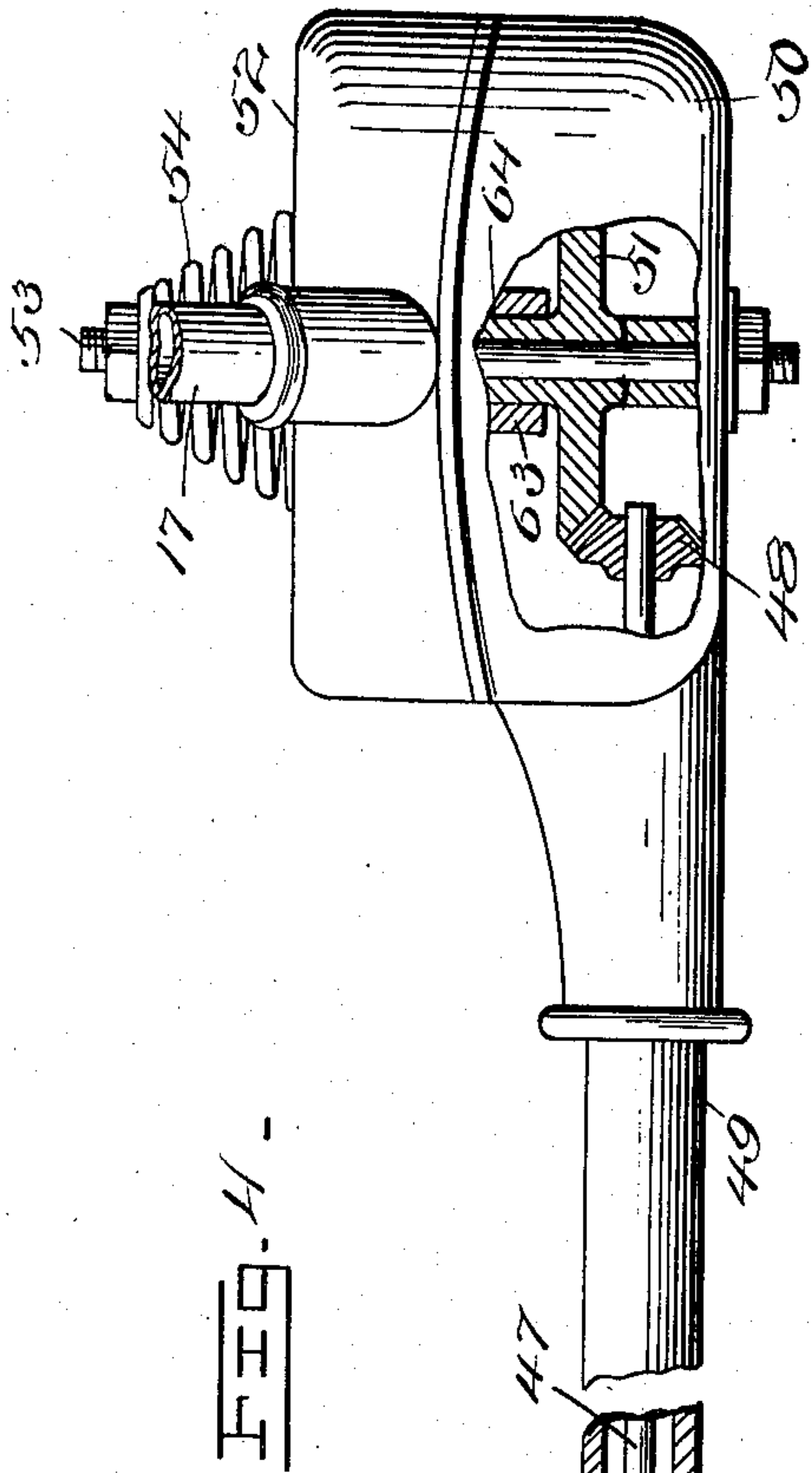
Attorneys

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4 SHEETS—SHEET 3.



Witnesses

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4 SHEETS—SHEET 4.

FIG. 6.

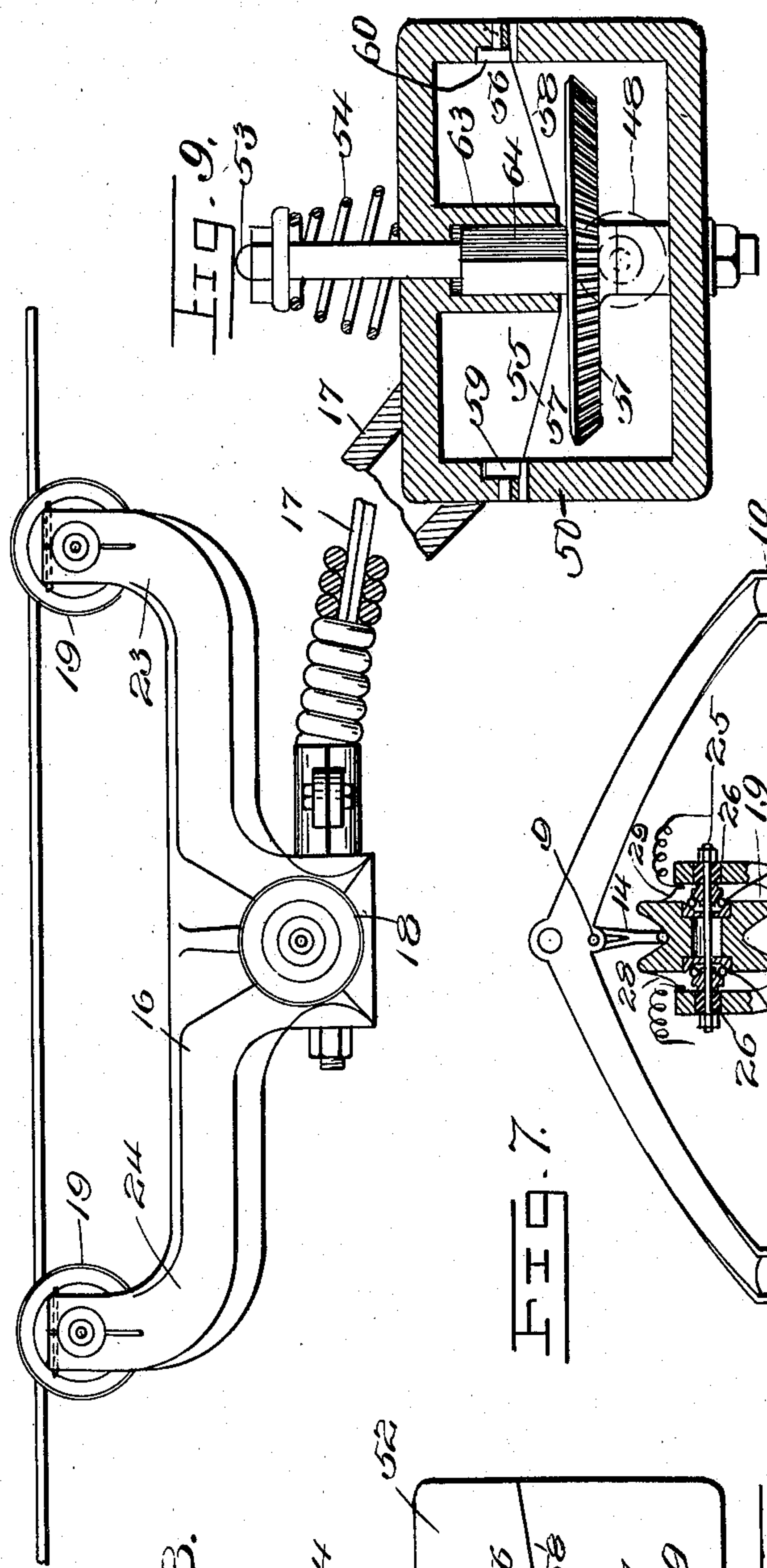


FIG. 7.

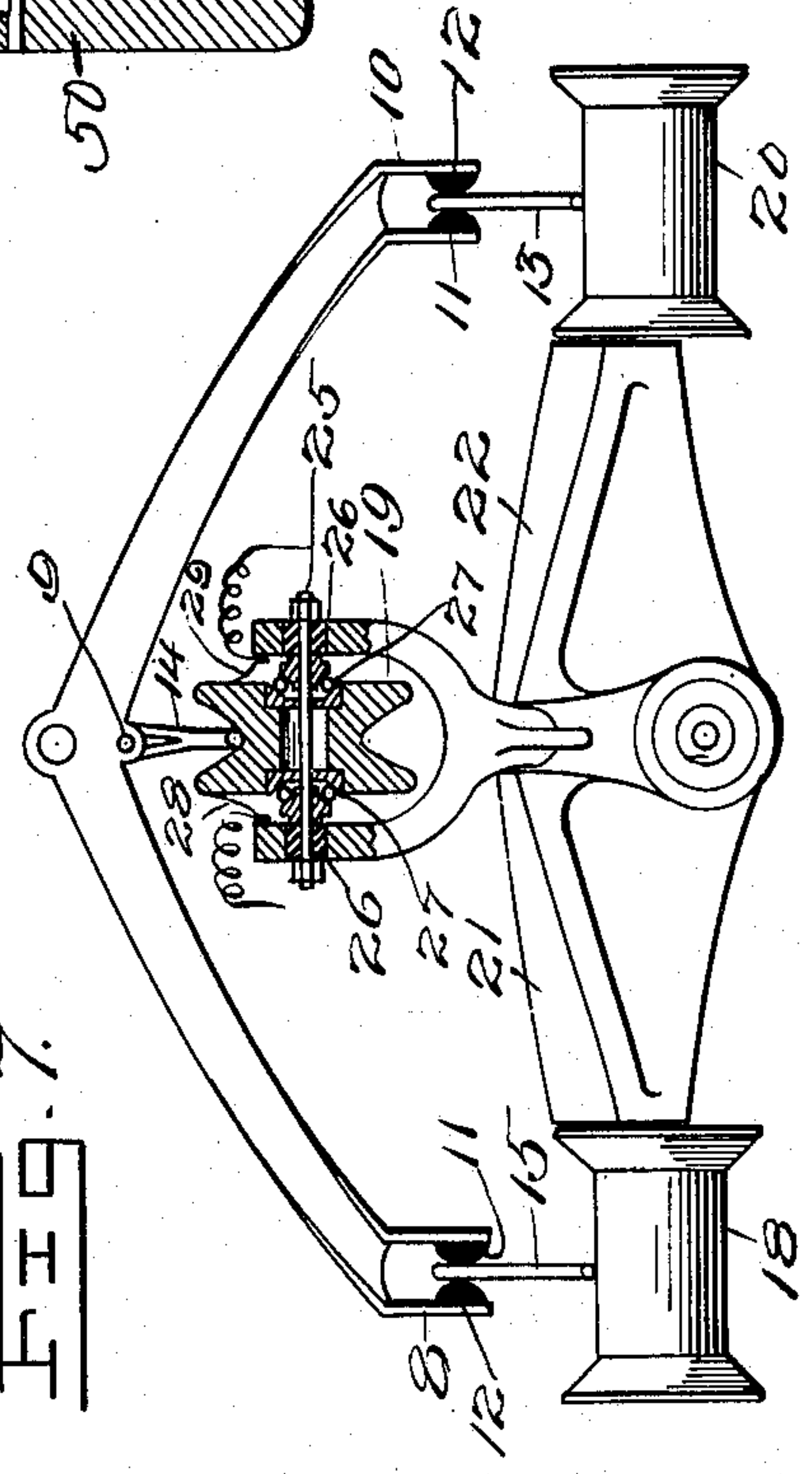


FIG. 8.

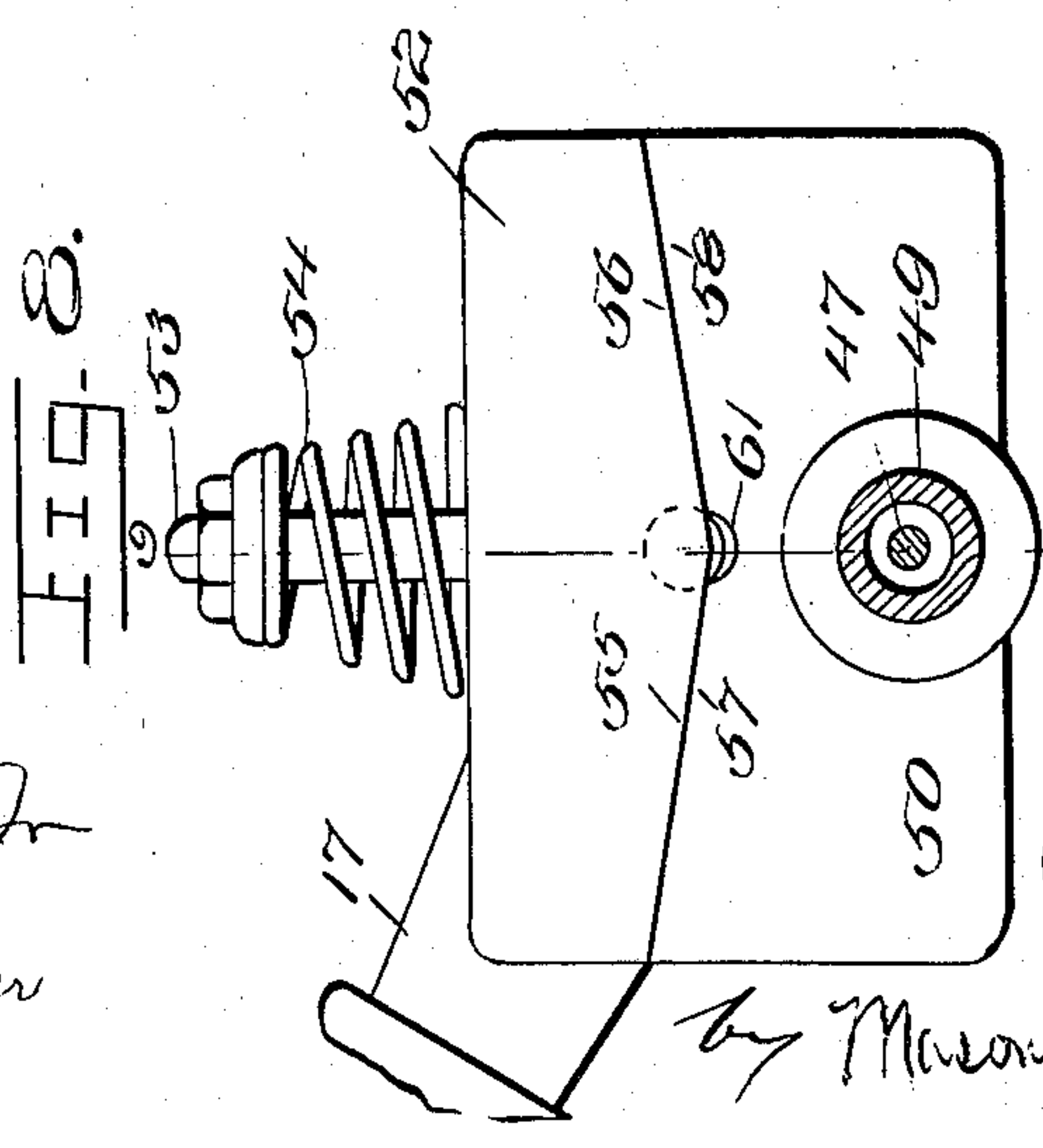
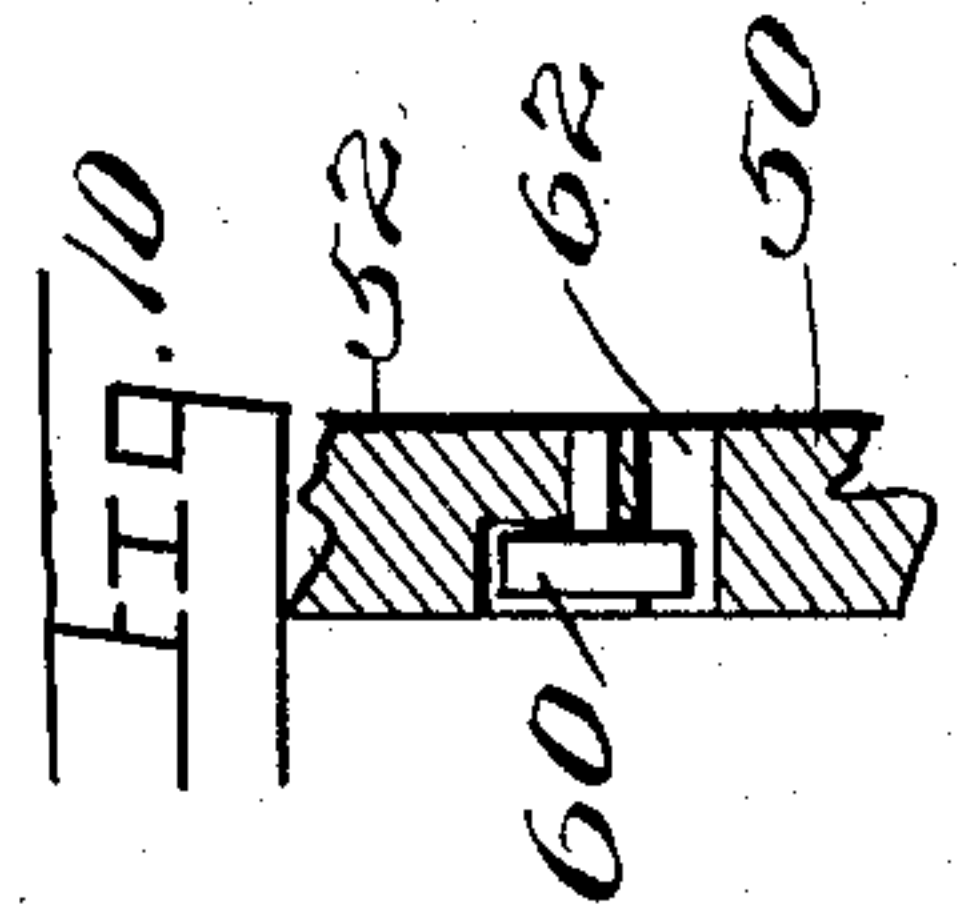


FIG. 10.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM FECHNER AND ALBERT HENRY FECHNER, OF GOLIAD, TEXAS.

## BLOCK-SIGNALING DEVICE.

No. 900,360.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed July 23, 1907. Serial No. 385,107.

*To all whom it may concern:*

Be it known that we, WILLIAM FECHNER and ALBERT HENRY FECHNER, citizens of the United States, residing at Goliad, in the county of Goliad and State of Texas, have invented certain new and useful Improvements in Block-Signaling Devices; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in block signaling devices, and particularly to signaling devices which will operate audible signals and electric bells and connect up a telephone at the same time.

The invention comprises the production of a plurality of wires divided into blocks for conveying electrical energy, and means mounted upon trains in proximity to said wires for sending signals over the wires whenever two trains enter the same block or whenever a train approaches an open switch.

Another feature of the invention is the provision of a trolley mounted upon a locomotive and designed to be raised and lowered from the interior of the cab thereof and to be set in various positions as may be desired for permitting signals to be transmitted from the engine to the wires against which the trolley rests.

The invention further comprises the production of a block signaling system in which a plurality of wires are provided, one of which is designed to be used for a telephone and the others for transmitting signals, together with means secured to a locomotive for connecting the telephone wires and signal wires to proper instruments in the cab of the engine for providing means for transmitting messages from one engine to another in the same block and for signaling each engine and for providing a signal for the engine upon the approach of the same to an open switch.

A further object in view is the production of a block system in which signaling wires are provided at one side of a track which are designed to contact with a trolley upon locomotives passing over the track for providing means for transmitting messages from one locomotive to the other within the signal block or for signaling any locomotive upon approaching an open switch of the condition of the switch.

A further object of the invention is the provision of a trolley mounted upon a locomotive that is designed to be swung from one side to the other of the locomotive by mechanism mounted within the cab of a locomotive so that the trolley may at all times be in proper position for engaging signal carrying wires positioned at one side of the track.

With these and other objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts, as will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a diagrammatic view of a block signaling system constructed according to the present invention. Fig. 2 is a view in side elevation of a locomotive, parts being broken away, in connection with my improved trolley and surrounding parts. Fig. 3 is an end view of Fig. 2. Fig. 4 is a view of the turn table formed according to the present invention; the same being shown in section to better disclose the mechanism thereof, and showing a trolley connected thereto, parts being broken away. Fig. 5 is a top plan view partly in section of an electrical switch device connected to a switch of a railroad track. Fig. 6 is a side elevation of the harp of a trolley formed according to the present invention. Fig. 7 is an end view of the harp shown in Fig. 6 taken in connection with a hanger and trolley wire. Fig. 8 is a detail fragmentary view of one end of the trolley and surrounding mechanism. Fig. 9 is a section through Fig. 8 on line 9, the section being taken looking in the direction of the arrow. Fig. 10 is a detail fragmentary sectional view of anti-friction means and surrounding parts forming part of the present invention.

In providing a signaling system it has been found desirable in many instances to not only signal a train when the same approaches an open switch or other train, and notify the same that there is danger ahead, but it has also been found desirable to provide means for telephoning between the approaching train in addition to simply signaling the same that there is danger ahead. Various devices have been constructed with varying results for accomplishing these desirable results, and it is to this class of devices that the present invention relates.

In the accompanying drawings, which show one form of the invention, 1 indicates a railroad track of any ordinary construction,



and 2 a track switch. Positioned at one side of the track 1 are wires 3, 4 and 5 that may be supported in any manner as by poles 6 so as to hold the wires a certain distance from the track and parallel therewith. The wire 4 is preferably positioned centrally or between wires 3 and 5, and is made continuous so as to provide a circuit for the telephone as hereinafter more fully described. The wires 3, 4 and 5 are supported by a hanger 7 which is preferably provided with a covering 8 of any desired kind so as to prevent any short circuiting of the current carried by the various wires by rain, snow or the like. The hanger 7 is made with depending supporting portions 8, 9 and 10 for supporting the various wires, the portions 8 and 10 being on substantially the same plane while the portion 9 is positioned on a different plane. All the depending portions 8, 9 and 10 are provided with insulation blocks 11 and 12 for insulating the wire supporting members 13, 14 and 15 from the hanger 7. By this construction, the wires 3, 4 and 5 are firmly held in position in different horizontal planes and insulated from each other and at the same time protected from the weather, but also positioned so as to be easily brought into contact with contact members of a harp 16 mounted on the end of the trolley pole 17. The harp 16 is provided with contact members or rollers 18, 19 and 20 for contacting with the respective wires 3, 4 and 5. The contact members 18 and 20 are preferably formed spool-shaped so as to provide a comparatively large surface against which wires 3 and 5 may contact. The harp 16 is made with fins or bracing members 21 and 22 that project over wheels 18 and 20 at 18' and 20' so that when placing the harp in position either of the wires 3 or 4 will be brought over into their correct position upon the contact wheels as fins 21 and 22, will guide the same into position. Forming a part of the harp 16 are members 23 and 24 that project upward from the main part of the harp and carry rollers or contact members 19. As clearly seen in Figs. 2 and 6 contact members 19 are positioned an equal distance on each side of members 18 and 20. By this construction the harp 16 is balanced nicely against the central upper wire 4 by wheels 19 being spaced apart and also against the lower wires 3 and 5 by wheels 18 and 20.

Referring more particularly to Fig. 7 it will be seen that wheels or contact members 19 are insulated from the harp by having its axle 25 mounted in insulated blocks 26. Suitable anti-friction means as ball bearings 27 is provided for members 19 so that the same will operate easily and smoothly against wire 4. This is very desirable as wire 4 is the telephone wire, and a continuous even contact is desirable. Mounted upon extensions or members 23 and 24 are springs 28 and 29, which are insulated from members

23 and 24 and form frictional contact with wheels 19 for receiving current therefrom. Suitable connecting wires are provided for connecting springs 28 and 29 to the telephone instrument 30, mounted in the cab of the locomotive. The other end of the telephone instrument 30 is connected to the earth so that the circuit may be completed to either telephone set 31 of an approaching train, and all connected with stations as may be desired.

In operation it is preferable to place the wires 3, 4 and 5 only upon one side of the track rather than above the track. In order to provide a trolley that may be turned from one side of the track to the other and to be held in any position desired, we provide a mechanism that will easily and quickly convey the trolley from one side of the track to the other and hold the same in the correct position. Referring more particularly to Fig. 4, 32 may be termed a turn table and is composed of a rotating part or member 33 and a stationary part or member 34 that is rigidly secured to the cab 35 of an engine. The top of the turn table 32 may be provided with a cap of any desired construction for protecting the mechanism of the turn table from the weather. Positioned on the face of the revolving member 33 is a washer 36 formed with an elongated opening 37 through which an oscillating member 38 projects. The member 36 is rigidly secured to the rotating member 33 and in turn has secured thereto a lever 39 which is provided with a catch 40 that engages a rack upon stationary member 34. Whenever it is desired to change the position of the rotating member 33 the latch or catch 40 is disengaged and lever 39 is moved to any desired extent and then catch 40 is permitted to engage its rack which will lock rotating member 33 firmly in position. Spanning or passing beneath opening 37 is a sector 41 formed with a rack upon one edge that is designed to be engaged by a catch 42 mounted upon lever or member 38. Lever 38 is securely fastened to extension arm 49 which rotates in member 33 to raise and lower the trolley. Lever 38 is made hollow and is provided centrally thereof with a shaft 43 which in turn is provided with a gear 44 on one end and a hand wheel 45 upon the opposite end. Gear 44 meshes with gear 46 which in turn is rigidly secured to a shaft 47 that is provided at the end opposite to gear 46 with a gear 48. The shaft 47 is designed to pass through an arm 49 positioned substantially horizontally for providing a support for trolley 17. Arm 49 is provided with an enlarged portion or head 50 in which is mounted gear 48 and gear 51.

Formed upon the end of trolley pole 17 is an enlarged portion or head 52 that is designed to contact with head 50 and is held in position against the same by tension bolts 53 and tension spring 54. The head 52 is



formed with beveled ways 55 and 56 and the head 50 is formed with beveled ways 57 and 58, as clearly seen in Figs. 8 and 9. The bevels 55, 56, 57 and 58 are so formed that when the trolley is at right angles to the arm 49, and parallel with the track that the face or converging part of the beveled portions are parallel with arm 49. Anti-friction members 59 and 60 are mounted in the head 52 and designed to bear against the beveled portions 57 and 58 of head 50 whenever head 52 is moved out of its normal position. When head 52 is in its normal position with trolley 17 pointing at right angles to arm 49, anti-friction members 59 and 60 rest in depressions or notches 61 and 62 and permit the beveled portions 55, 56, 57 and 58 to contact with each other, the spring 54 continually giving the heads 50 and 52 a tendency to take their normal position. Head 52 is formed with a lug or extension 63 that is formed with a hollow, preferably square, for engaging the squared portion 64 formed integral with gear 51, so that whenever gear 51 is rotated head 52 will be rotated, the lug 63 permitting head 52 to rotate and yet to be actuated by extension 64.

When operating the trolley the same may be easily manipulated from the cab of the engine by means of levers 38 and 39, and gripping wheel 45. When it is desired to move the trolley from one side of the track to the other, lever 38 is disengaged at 42 whereby the trolley is disengaged from lines or dropped as shown at Fig. 2, then lever 39 is moved half a revolution which will rotate member 33, 180° to which arm 49 is rigidly secured. This will rotate arm 49 together with trolley 17. When trolley 17 has thus been moved from one side to the other, it is pointing in the wrong direction, and in order to reverse the direction at which trolley 17 points wheel 45 is rotated which acting through shaft 43, gears 44 and 46, rod 47, gears 48 and 51, and lugs or extensions 63 and 64 will rotate head 52 which carries trolley 17. Wheel 45 is rotated until trolley 17 is in its proper position and the trolley is raised up against wires, then left free to oscillate back and forth as may be desired by the incidental swaying of trolley 17, as the same passes switches or round curves. Whenever it is desired to lower trolley 17 lever 65 is moved and catch 42 is disengaged from the rack or member 41 and lever 38 is swung to any desired degree and catch 42 is permitted to again engage the latch or member 41, lever 38 being rigidly secured to arm 49 will partially rotate the same which, in turn, will partially rotate or lower trolley pole 170 clearly seen in dotted lines in Fig. 2.

Referring more particularly to Figs. 1 and 5, there will be observed a device that is designed to connect up or close the circuit of wire 3 when switch 2 is opened. When the

track 2 is opened connecting rod or bar 66 will move arm 67 and shaft 68 a short distance so that the contact member 69 that is secured to shaft 68 will be in such a position as to contact with spring 70. When spring 70 is brought into contact with contact member 69, a circuit from line 3 is closed through wire 71 so that any train approaching switch 2 will be notified of the condition of the switch. When the switch is again closed contact member 69 is rotated to the position shown in Fig. 5 and an insulating block 72 is forced beneath contact springs 70 and interrupts the circuit of line 3. Shaft 68 is preferably connected to the ordinary visual signaling device, as, for instance, the ordinary safety and danger lamp so that when switch 2 is operated the visual sign is operated and also the signaling system is brought into operation.

In operation when a train is approaching a switch which is not open, that is a clear track, there will be no signal, but if the switch is open (which will close electric contact) then as soon as the cab enters the block in which the switch is located, line wire 3 at 81 will complete the circuit of bell 28. If, however, a train going in the direction of arrow 73 will move so that its contact members 18, 19 and 20 will be in the position shown in dotted lines, the signal will be given each train. When the train is moved to the position just indicated, a current will be completed from battery 77 through bell 28, contact members 18 of both trains, wire 3, bell 79, battery 80, and through the ground back to battery 77. This is arranged by means of having wires 3 and 5 formed in blocks or sections, each section being insulated from the other sections. The lines are strung parallel on a different plane, the telephone line wire being strung in the center and about 12 inches above the two outside bell wires. Wire 3 is opened or insulated at 81, while wire 5 is opened or insulated at 82. When two trains enter the same block not only are the telephones of both trains connected up, but also the alarms are sounded for indicating to each train that there is another train within the block. By the use of the connecting rod 66 whenever switch 2 is opened, wire 3 is connected to the earth so that whenever a train approaches switch 2 or enters the block in which switch 2 is located a circuit is completed through the arm 78 or 79 as the case may be.

It will be observed that the wires 3 and 5 are disconnected at predetermined distances, as, for instance, six miles, the point of disconnection of one wire being midway of disconnection of the other wire, so that between each disconnection there is a distance of three miles. It is so arranged that though the blocks formed by each wire is six miles, the blocks formed by the combination of both wires is three miles so that trains approach-



ing each other may come to a distance of three miles of each other before the signals in the respective cabs are sounded. When two trains have approached each other to within a distance of three miles, the signals will be sounded and then the telephone may be used by simply removing the receivers from the respective hooks and oral communication established between the two trains. It will also be observed that not only two trains approaching each other will cause the signals to operate, but when, one train overtakes the other and comes within three miles of the train the signals will be operated. The telephones of course may be used by ringing up in the usual manner before two trains come within a distance of three miles of each other, but the signals will not operate until the trains come within such distance. The system of signaling will act upon the block of crossing trains in the similar manner to a straight line. As seen in Fig. 1 line 3 is connected to line 3' of a cross track and line 5 is connected to 5' of the same cross track. Usually the telephone line 4 is not connected to the telephone line 4' of the cross track, but if desirable, the same may be connected for providing telephone communication between trains approaching the crossing on various tracks. By this construction the block on each side of the crossing of each track is connected so that signals will be sounded upon the cross track as well as block straight ahead whenever a train approaches the crossing on either track.

What we claim is:—

1. The combination with a block signaling system, of a trolley mounted upon a train the same comprising a stationary casing, a rotating casing, an arm mounted on said rotating casing and adapted to be rotated thereby, a trolley mounted on one end of said arm, said arm having at its outer end a V shaped portion and said trolley having at its lower end an inverted V shaped portion for fitting into the V shaped portion of said arm, a bolt for holding said trolley and said arm together, and a spring for permitting said trolley to be rotated upon said arm.

2. The combination with a signaling system of a trolley mechanism mounted upon an engine for permitting signals to be conveyed from said signaling system to said train, said mechanism comprising a stationary member, a rotating member, an arm rigidly secured to said rotating member, a trolley mounted on said arm, a plurality of gear for rotating said arm, means for rotating said gear from said stationary member, a lever for raising and lowering said trolley, a rack, and a catch secured to said lever for engaging said rack for holding said trolley in any desired position.

3. The combination with a signaling system of a trolley mounted on a locomotive

comprising a rotating arm, a lever for rotating said arm, a catch on said lever for holding said lever in any adjusted position, a trolley mounted on one end of said arm, and means engaging said trolley for rotating the same.

4. The combination with a signaling system of a trolley mounted upon a locomotive comprising a rotating arm, a lever for rotating the same, a trolley mounted on one end of said arm formed with a depending lug, a gear mounted in one end of said rotating arm formed with an engaging member, said engaging member being adapted to engage said depending lug whereby when said gear is rotated said trolley will be rotated, a shaft for rotating said gear, a hand wheel for rotating said shaft, and means connecting said hand wheel and said shaft for permitting power from said hand wheel to be communicated to said shaft.

5. The combination with a signaling system of a trolley mounted upon a locomotive, a rotating arm for supporting said trolley formed with a plurality of beveled surfaces, said surfaces forming a V shaped member, a trolley formed with a plurality of beveled surfaces adapted to engage said first mentioned beveled surfaces, a spring for normally holding all of said beveled surfaces in contact, thereby holding said trolley at right angles to said supporting arm, and means for rotating said trolley.

6. The combination with a block signal system, of a trolley mechanism mounted upon a train, the same comprising a stationary casing, a rotating casing, an arm mounted on said rotating casing, and adapted to be rotated thereby, a trolley mounted on one end of said arm, said arm and said trolley at their meeting points being formed with beveled portions, and means for normally holding said beveled portions in contact.

7. The combination with a signaling system, of a trolley mechanism mounted upon an engine for permitting signals to be conveyed from said signaling system to said trains, said mechanism comprising a stationary member, a rotating member, an arm rigidly secured to said rotating member, a trolley mounted on said arm, means for rotating said trolley means for raising and lowering said trolley, and means for locking said trolley in any desired position.

8. The combination with a signaling system, of a trolley mounted on a locomotive, comprising a rotating arm, means for rotating the same, a trolley mounted on one end of said arm, and formed with a hollow depending lug, a gear mounted in one end of said rotating arm and formed with a projecting arm, said projecting arm of said gear being adapted to fit into said hollow depending lug on said trolley whereby when said gear is rotated, said trolley will be rotated, and means for rotating said gear.



9. The combination with a block signaling system, of a trolley mounted upon a locomotive, a rotating arm for supporting said trolley formed with a beveled surface, a trolley  
5 formed with a beveled surface on one end for contact with the beveled surface of said supporting arm, anti-friction means interposed between said trolley arm and said supporting arm, a spring for normally holding said trolley arm at right angles to said supporting  
10 arm, and means for rotating said trolley arm.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM FECHNER.

ALBERT HENRY FECHNER.

Witnesses:

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WM. L. FROMME.