

No. 865,848.

PATENTED SEPT. 10, 1907.

J. S. ANDERSON.
AUTOMATIC SIGNALING APPARATUS.
APPLICATION FILED MAY 20, 1907.

6 SHEETS—SHEET 1.

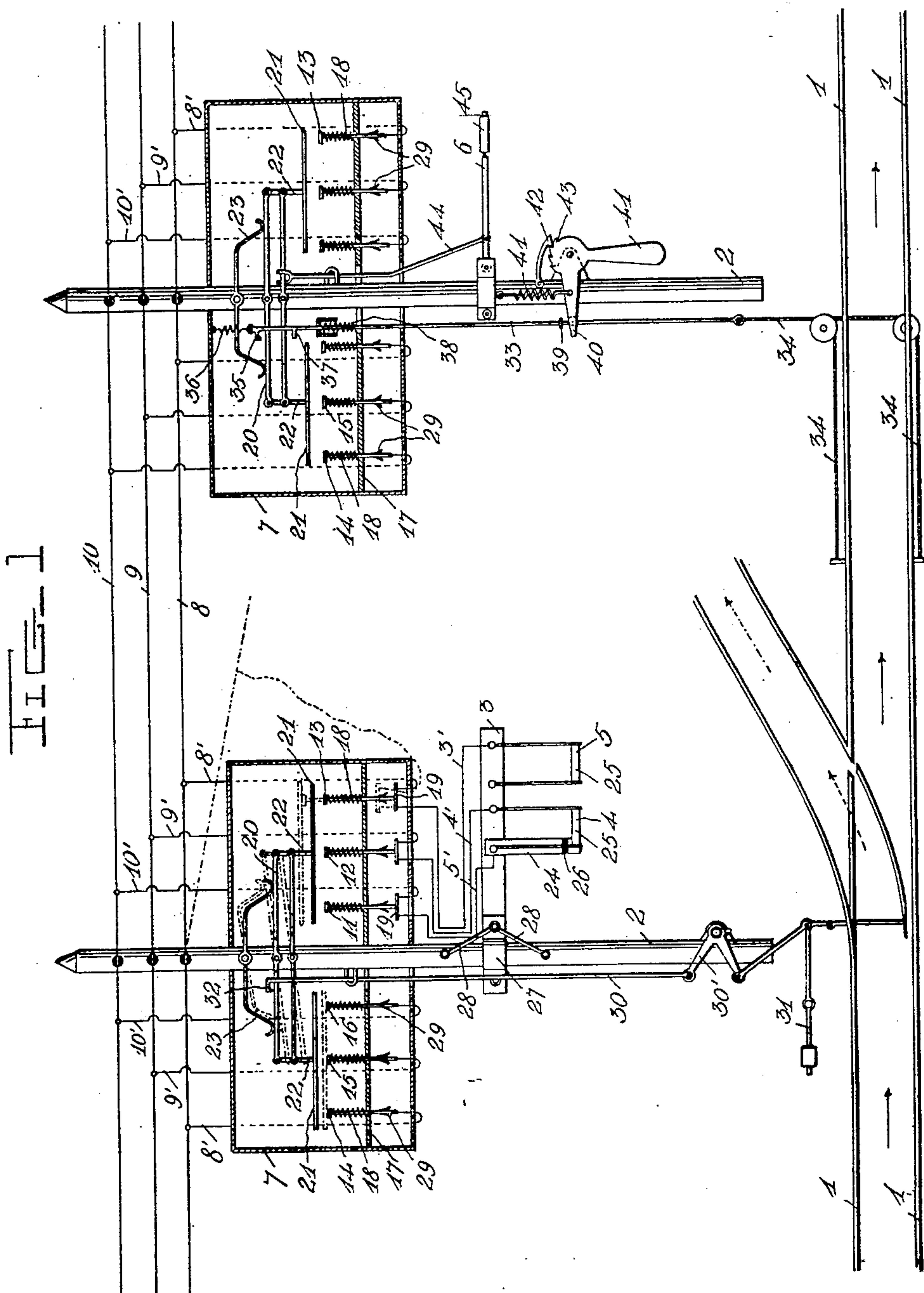


FIG. 1

Inventor

Witnesses
C. H. Griesbauer
C. H. Griesbauer.

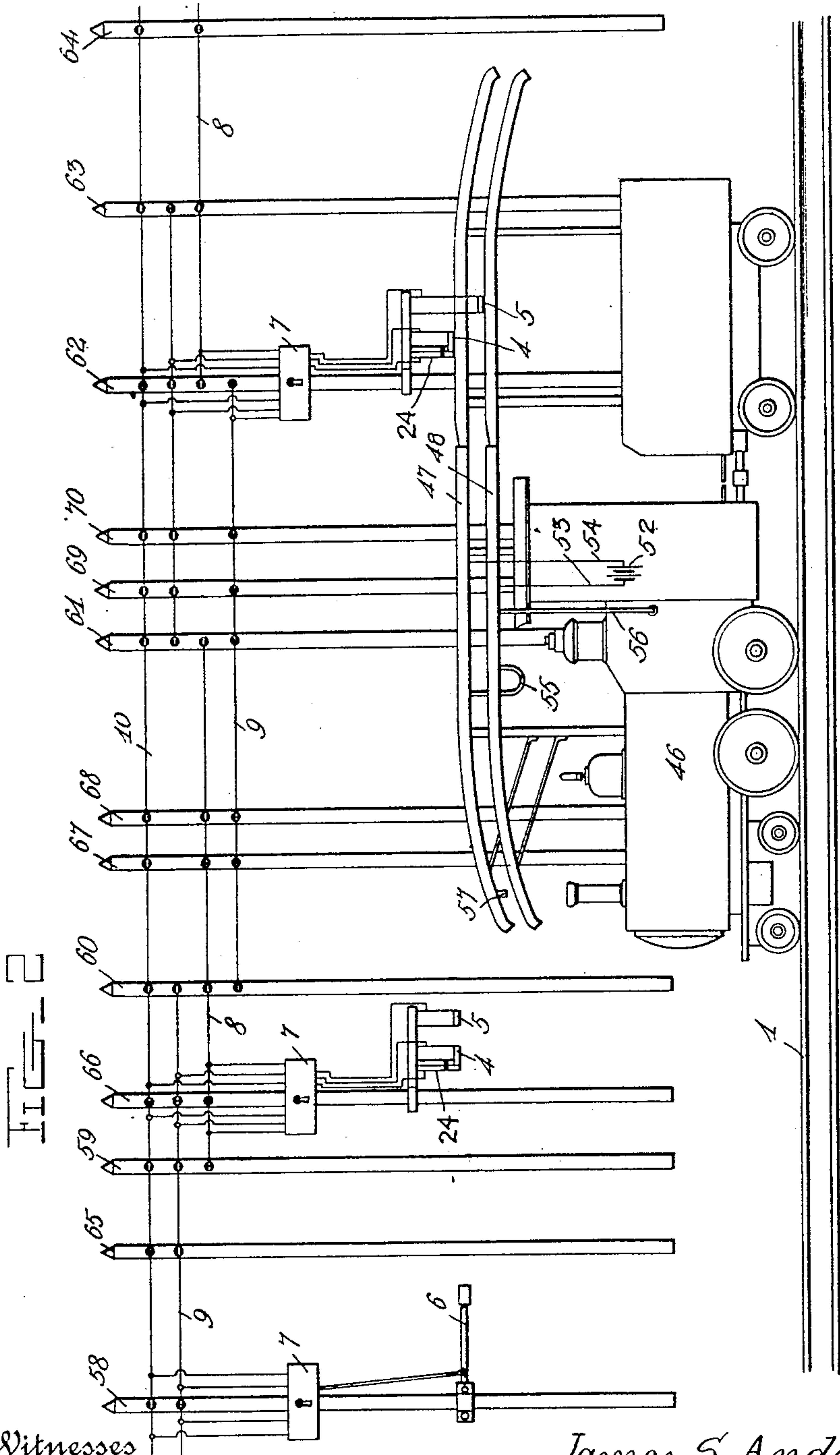
James S. Anderson
by *A. B. Wilson & Co.*
Attorneys

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C. H. Giesbauer
C. H. Giesbauer

Inventor
James S. Anderson
By *A. B. Wilson & Co.*
Attorneys

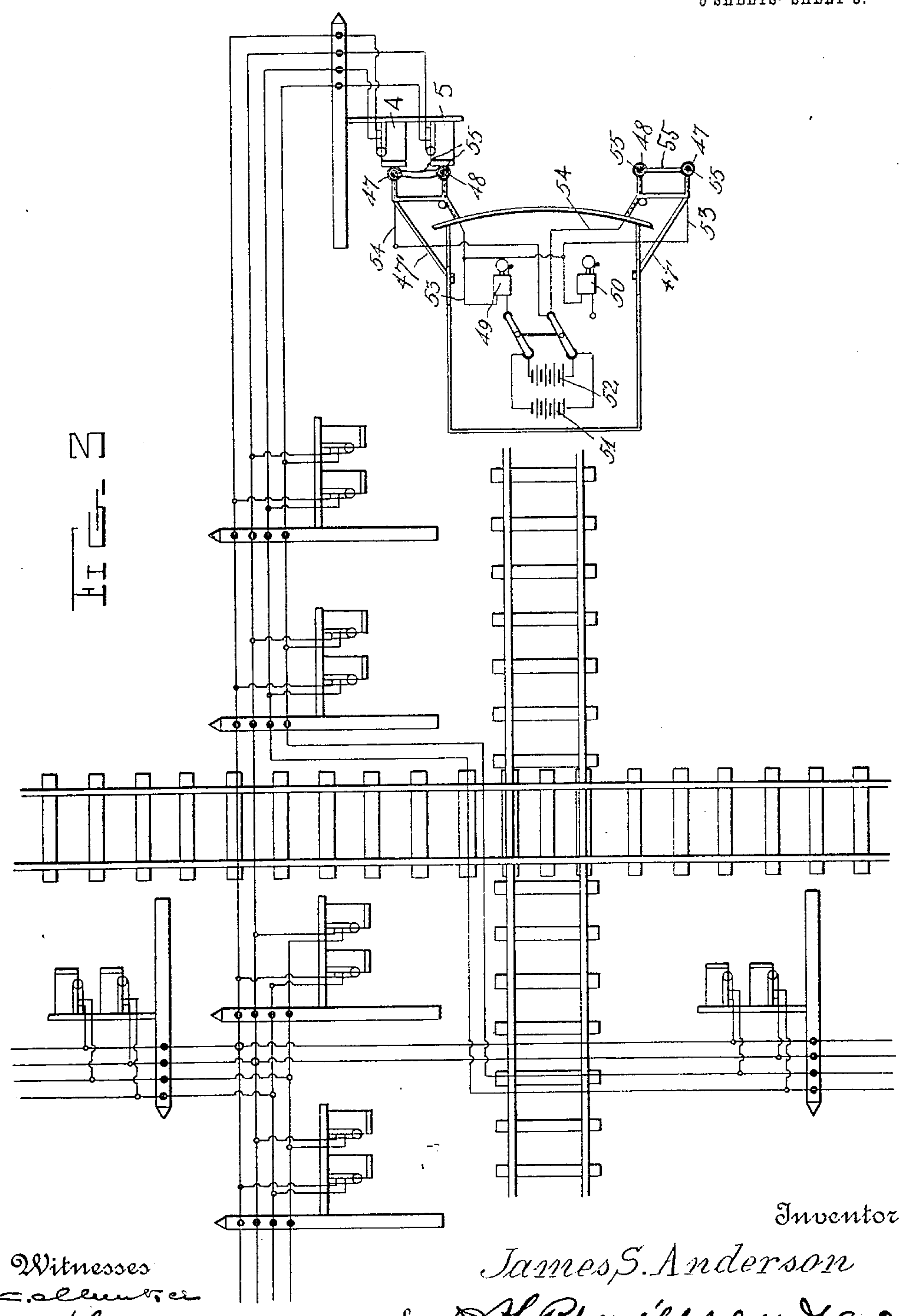
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5 SHEETS—SHEET 3.



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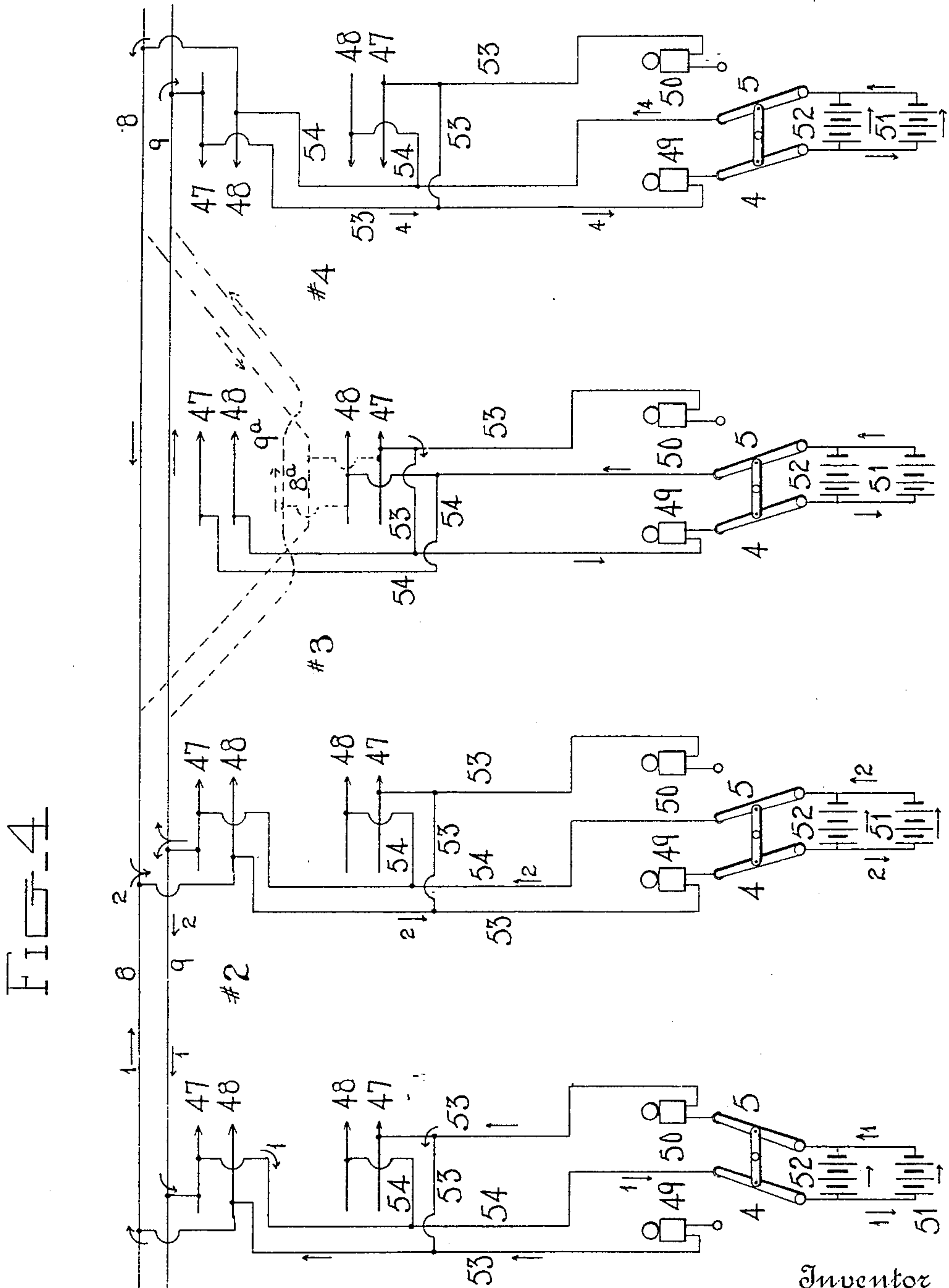


FIG. 4

Witnesses
L. B. James
C. H. Griesbauer

Inventor
James S. Anderson
by *A. B. Wilson & Co.*
Attorneys

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5 SHEETS—SHEET 5.

FIG-7

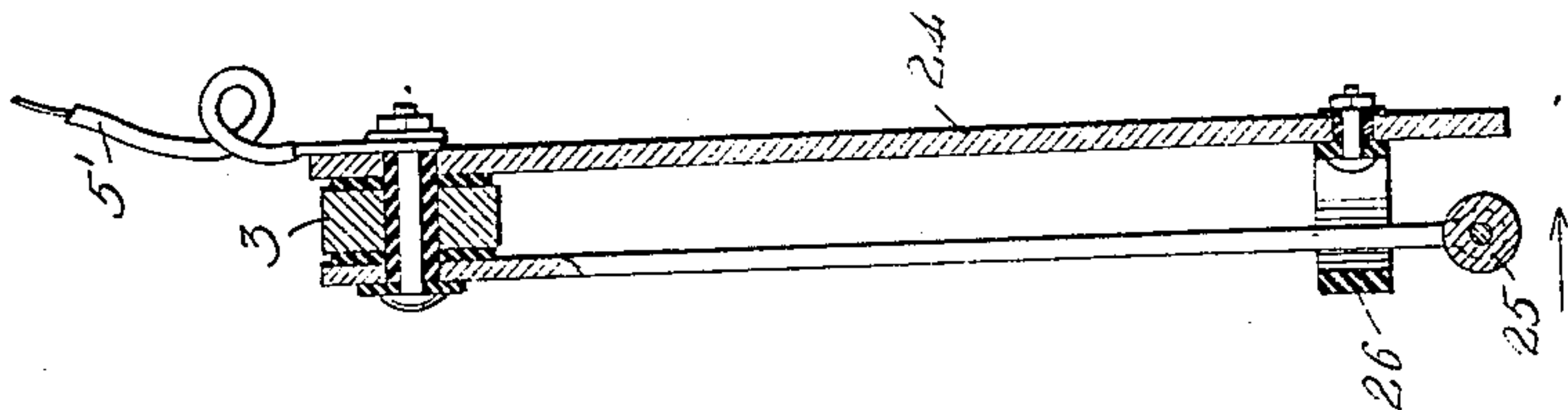


FIG-5

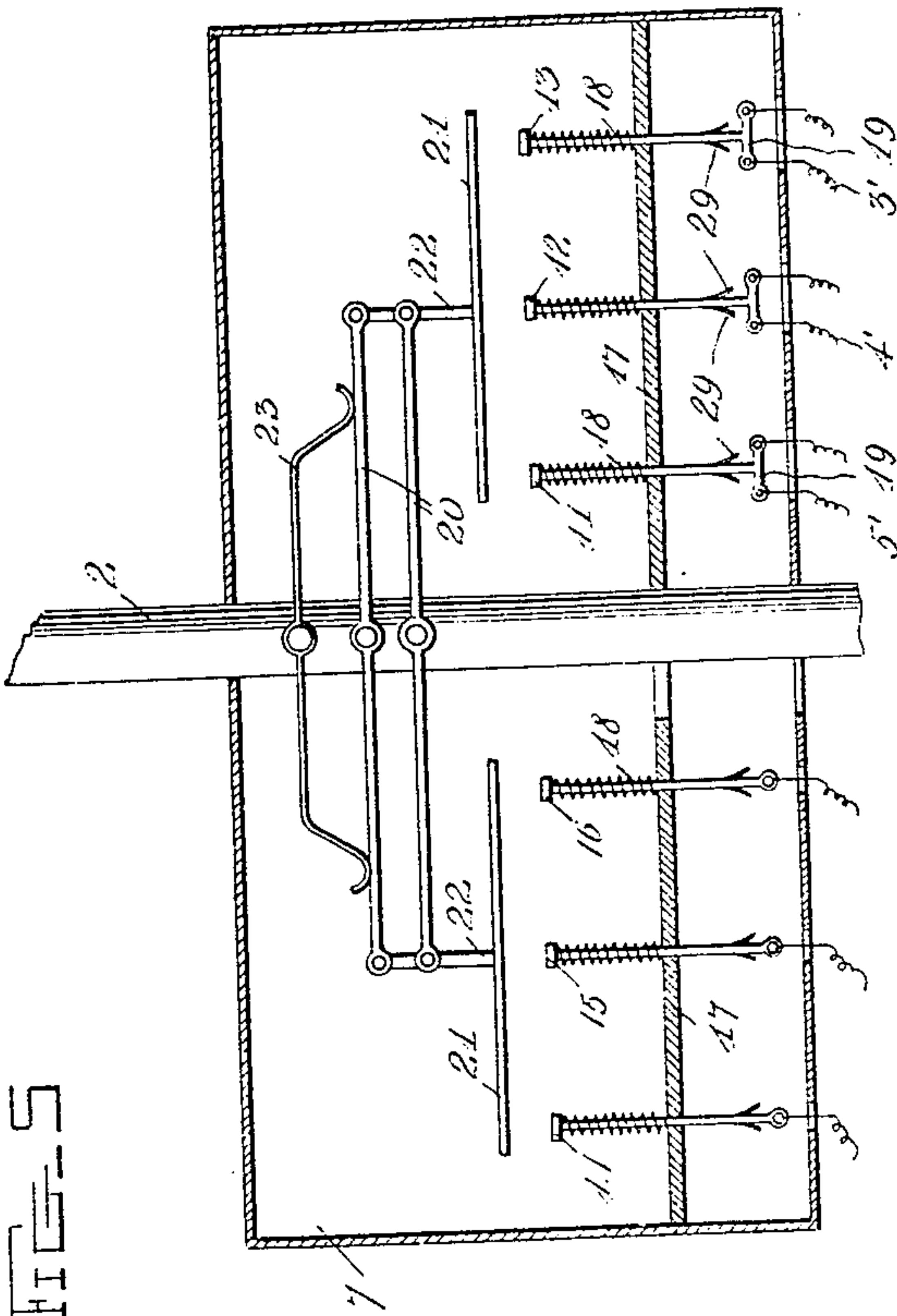
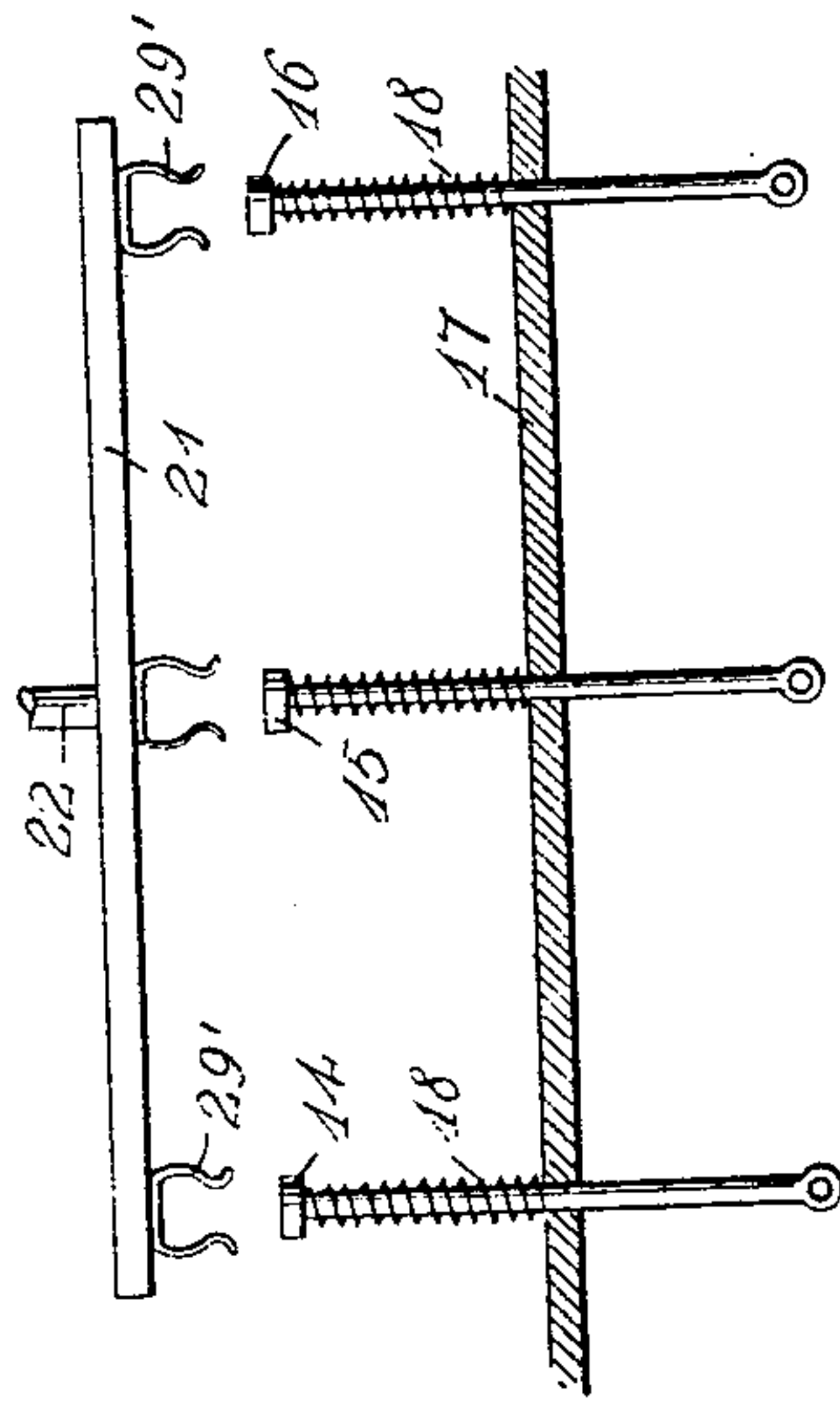


FIG-6



Witnesses
C. H. Griesbauer

Inventor
James S. Anderson
by A. B. Wilson & Co
Attorneys

UNITED STATES PATENT OFFICE.

JAMES S. ANDERSON, OF AMES, NEBRASKA.

AUTOMATIC SIGNALING APPARATUS.

No. 865,848.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed May 20, 1907. Serial No. 374,618.

To all whom it may concern:

Be it known that I, JAMES S. ANDERSON, a citizen of the United States, residing at Ames, in the county of Dodge and State of Nebraska, have invented certain new and useful Improvements in Automatic Signaling Apparatuses; and I do 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.

10 This invention relates to signaling apparatus for rail roads, and more particularly to that class of such devices which are electrically controlled and are adapted to be automatically operated.

15 The objects of the invention are to prevent substantially all kinds of wrecks by giving signals or warnings to those persons whose lives are placed in jeopardy from damage or misplacement of any portion of the track, or from collision between trains going in the same or opposite directions upon the same track, or at the crossings

20 of two tracks. In the accompanying drawings which illustrate the invention,—Figure 1 is a diagrammatic side elevation of a portion of a track provided with part of the apparatus; Fig. 2 is a similar view showing the locomotive and 25 arrangement of the posts, some of which are provided with the signal boxes; Fig. 3 is a diagrammatic plan view of a crossing and the wiring in the cab of a locomotive. Fig. 4, is a diagrammatic view of a portion of a track showing the wires crossing the same and engines 30 on the track at different points and running in opposite directions; Figs. 5, 6 and 7 are enlarged detail views.

Referring more particularly to the drawings, 1, 1 indicate the rails of a track along which are placed poles or posts 2, for supporting my improved signaling apparatus. This apparatus preferably consists of two forms, 35 one of which is provided with a stationary arm 3, upon which are mounted contact points 4 and 5, for closing one or more circuits through the signaling apparatus in the cabs of one or more locomotives, as when the track 40 is out of order, or two locomotives are approaching each other on the same track, and the other form is provided with a movable arm 6, which is adapted to close a circuit, as when a locomotive is standing at a depot, or other place provided with such apparatus.

45 In connection with either form of apparatus, a box 7 is secured to the pole within which is placed the mechanism for forming connections with the line wires on the poles, three such wires 8, 9, and 10, being shown in some of the figures and four in the others. This 50 mechanism preferably consists of two sets of buttons or contact points, 11, 12 and 13, and 14, 15 and 16, respectively. Each point or button is provided with a stem which is reciprocally mounted in a bar 17 or other support, and when released, it is forced upward by a spring 55 18 around the stem. The stems of each set are connected with the respective wires by connectors 8', 9' and

10', respectively, so as to close the circuits through either set, and the stems of one set in one of the signaling boxes are connected with the contact points 4 and 5 on the stationary arm 3, preferably by means of cross 60 bars 19, one end of each bar being connected with one of the line wires and the other end with the wires 3', 4' and 5', leading to the contacts on the arm 3. A lever 20 is pivotally mounted in each box and provided at each end with a contact bar or plate 21, which is long 65 enough to simultaneously engage with all of the buttons in one set, and is adapted to be moved toward or from said buttons whenever the lever is rocked on its pivot. The lever is preferably formed double with two pivot points at the middle and connected at two points at 70 each end to the stem 22 of the bar 21 so as to prevent the latter from tilting as it is actuated. The return of the lever to its normal or level position, that is, with the plates 21 out of engagement with the contact buttons of each set, is effected by a spring arm or bar 23. 75

The wires to the arm 3 and contacts 4 and 5 are covered with suitable insulating material and one of them is electrically connected with one of the points, as 5, another with the point 4, and the other one, when there are three or more wires, is connected with a contact 80 plate 24. The two contacts 4 and 5 are preferably formed as frames, each comprising two depending wires, with a bar or roller 25 at their lower ends, and the plate 24 also depends from the arm 3, and is insulated therefrom and has an insulated ring 26 at its lower end through 85 which one of the depending wires of the frame 4 extends. The arm 3 is secured to the pole or post 2 in any desired manner, as by clamps 27, and is held against vertical or lateral movement by suitable braces 28.

The buttons of the different sets are movably held 90 depressed against the tension of the springs 18 by the strain or pull of the line wires which is exerted through the wires 8', 9' and 10', leading into the box, so that as soon as either one of the line wires is broken from any cause, as the wire 8, shown in dotted lines in Fig. 1, 95 the button connected therewith will be released and the spring 18 will force it up against the plate 21 for that set with sufficient force to tilt the lever 20 and cause the bar at the other end to be moved down into contact with the buttons of that set, as shown in dotted 100 lines in Fig. 1, and thereby close a circuit through them and actuate a signal at any desired point. The stem of each button is preferably provided with a spring catch 29 that is adapted to engage with the top of the support 17 and prevent the return of the stem 105 until the box has been opened and the catch released, or the bar 21 may be provided with a catch 29' for each button so as to engage therewith and prevent the release of the button until the box has been opened.

One use for which the apparatus can be used is to indicate an open switch, as shown in Fig. 1. In this 110 case, a reciprocatory bar 30 is connected with the

switch mechanism 31 by any suitable means, as a bell-crank lever 30', and has its upper end provided with a hook 32, which is adapted to engage with one end of the lever 20 when the switch is open and pull the plate 21 on that end down into contact with one set of buttons, as 14, 15 and 16, and close the circuit there-through to give the proper signal. Another use is to indicate that the track is out of order, as being partly or entirely broken, as from a land-slide, etc., in which case the mechanism, preferably that which is connected with the circuit closer, or movable arm 6, is adapted to be actuated, as by means of a rod 33, which is connected with the track by a cable 34. The rod is provided with a hook 35 at the upper end which is adapted to engage with one end of the lever 20 and close a circuit as in the manner described for the switch, whenever strain is placed upon the cable by a slight injury to the track. But when a portion of the track is destroyed, or removed, the strain is taken off the cable and a spring 36 connected with the rod 33 draws the rod upward until a shoulder 37 thereon engages with the lever 20 on its under side and causes the plate 21 at the other end to contact with the set of buttons 11, 12 and 13, and thereby close a circuit and cause a signal to be given in the cab of an approaching locomotive, or elsewhere, of the danger.

In actuating the apparatus to give notice of only a slight injury to the track, as by sinking, the strain on the cable will cause it to be drawn down against the tension of a spring 38 until a stop 39 will engage with an extension 40 on the rear end of a semaphore arm 41 and raise the latter to give notice to the engineer of the danger, or to the section men. The amount of the damage or sinking of the track will be indicated by the position of the arm, that is, the greater the movement of the track the greater the strain on the cable and the more nearly horizontal will be the arm. The arm is held in its elevated position by means of a catch or detent 42 which engages with teeth or shoulders 43, on the hub or pivotal portion of the arm. After the track has been repaired the catch is released and the arm swings down into its normal position, where it is held against accidental movement by a spring 41'. The lever 20 at this point, or elsewhere, if desired, may be actuated by means of a forked push rod 44, which engages with the underside thereof at one end and has its other end connected with the swinging arm 6, so that when the arm is raised, as by being engaged by a catenary rail on the locomotive, the lever will be actuated and a circuit will be closed through the contact points on the box. The outer end of the arm is preferably provided with an anti-friction roller 45 against which the rail engages, and lifts the arm upward to close the contacts in the box and thus complete a circuit and cause a signal to be given in the cab of another locomotive or elsewhere.

One means for giving a signal is shown in Fig. 3, in which 46 indicates a locomotive on which are arranged the catenary rails 47 and 48, preferably in two sets, one set upon each side so that contact will be automatically made with the circuit closer 6, or the contact points 4, 5, and 24 on the arm 3, in whichever direction the locomotive is moving, or on whichever side of the track the signaling apparatus may happen to be located. Where the wires cross to the opposite side of the track

their relative position to or connection with the contact points 4 and 5 must be reversed or changed as shown at 8^a and 9^a in Fig. 4. Two bells 49 and 50 are connected with the rails 47 and 48, respectively, and with batteries 51 and 52 by wires 53 and 54, which may be doubled if desired, as shown by dotted lines. The catenary rails are preferably made hollow and a hose or pipe 55 is located therein for the admission of steam from the boiler through a pipe 56 to melt any ice that may form thereon, the hose extending lengthwise of the rails and from one rail to the other at any desired point, and the steam escaping from an outlet 57 in the second rail. The outer rail may be so arranged as to be lowered as by an arm 47', as shown in Fig. 3, to prevent its engaging with the arm 6, when desired. As for instance, when one train is following another one so closely that signals may be given by the whistle in the ordinary manner, and it is not desired to use the electrical apparatus on more than the front train.

In the drawings, two systems of wiring are shown, one with three wires on the poles 2 and the other with four, but the signaling apparatus is substantially the same and the circuits will be closed and the signals given in the same manner with either system. That is, the circuit is always open in the signal boxes whenever everything is all right, or the parts are in their normal position, but as soon as there is a change in any of the parts, a circuit will be closed through one or the other of the signals in the cab, or elsewhere, whenever the catenary rails come in contact with any of the signaling apparatus along the track. When three wires are used, one of them, as 10, preferably extends the entire length of the track, or for any desired portion thereof, while the other two wires 8 and 9 are used in sections of only a few miles with their adjacent ends overlapping, or terminating at the same pole. The posts for this system of wiring are preferably arranged as shown in the drawings with the first one 58, set close to the station and provided with the circuit closing arm 6, preferably in such a position that the arm will be engaged and raised by the catenary rail of the locomotive when the latter occupies its usual stopping place. The other arms 59 to 70, inclusive, are set at suitable distances along the track, preferably about two miles apart, and each provided with the contact points 4, 5 and 24 and the box 7. The wire 9 commences at pole 58 and runs to pole 60, then from 60 to 62, and from 62 to 64, and 8 runs from 59 to 61, and then from 61 to 63, and so on along the track. When four wires are used they extend the same length and virtually form two circuits, each of which passes through the signaling apparatus in the cab, as shown in Fig. 3. If either one or all of the wires should break, the circuit would be closed through the wires which are not out of order, and the signal would be given through one or the other of the bells. When used at a crossing, as shown in Fig. 3, part of the wires make connections so as to give signals in both directions upon both tracks, thereby preventing accidents from cross trains running into each other.

As above described, it will be seen that signals will be given in time to prevent substantially all kinds of wrecks or accidents that are liable to occur upon rail roads on which trains are moving, and in some instances, where one of two trains is standing still. But

in all cases there is no current flowing except when the circuit is closed, or completed by the engagement of the catenary rails with the contact members at the different poles, and then only in case of danger, thus requiring but little cost for electrical generation, and the wear upon the contacting surfaces will be but slight, thus decreasing the cost of material to the minimum. In addition to this, the apparatus operates automatically and never makes a mistake and the engineer can test his batteries at any time, thereby insuring that they are in proper condition.

In some instances the poles, as 67 and 68, may be placed so close together that, by providing each of them with a contact closing arm 6, when the catenary rails leave one arm, they will immediately engage with the other, thereby enabling a slower going train to receive notice of the approach from the rear of a faster train. In such instances, if the bell on the slower train gives a short ring the engineer should reverse the signal switch in his cab and if the bell keeps on ringing, he will know that the other train is gaining on him, and the bell in the other train will also keep on ringing.

When the train is standing still, as at the depot with its catenary rail under the arm 6, and another train is coming in, the signal bell on the approaching train will begin ringing as soon as it passes pole #60 and thereby give sufficient warning to prevent any danger from a collision between the two trains.

In Fig. 5 a portion of track is shown with four engines, #1, #2, #3, and #4, thereon, three of which are following each other and the other one #4 is moving in the opposite direction. A portion of the line wires is shown in dotted lines 8" and 9", as being crossed to the opposite side of the track and back again. The catenary rails of the different engines are shown by two sets of parallel arrows, and the course of the circuits is shown by small arrows, and the switch 4—5 on #1 is shown as reversed so as to give and receive signals from trains moving in the same direction.

Having described my invention, I claim:—

1. In a signaling apparatus, a series of poles adjacent to a railroad track, each provided with signal closing mechanism, said mechanism comprising two sets of buttons, a lever, each end of which is provided with a plate adapted to be moved into engagement with one of said

sets, wires on the supports electrically connected with said buttons, contact members electrically connected with one of said sets, and means for closing a circuit through said wires when a locomotive provided with a signaling apparatus is in engagement with said contact members.

2. In a signaling apparatus, a series of poles adjacent to a railroad track, each provided with a box, two sets of spring-pressed buttons in said box, a spring-pressed lever, each end of which is provided with a plate adapted to be moved into simultaneous contact with the buttons of one set, wires on said poles, in electrical connection with said buttons an arm on each pole provided with means for causing said lever to be actuated and a circuit completed through said wires when a locomotive provided with a signaling apparatus is in engagement therewith.

3. In a signaling apparatus, a series of poles adjacent to a railroad track, a box and an arm on each pole, the arms on part of said poles being pivotally mounted, and the arms on the other poles being provided with contact members, sets of buttons in each box, a lever in each box provided with means for engaging with said buttons, wires on the poles electrically connected with said buttons, and means on said arms for closing a circuit through said buttons and wire when a locomotive provided with a signaling apparatus is in engagement with either of said arms.

4. In a signaling apparatus, a series of poles adjacent to a railroad track, a box and an arm on each pole, the arms on part of said poles being pivotally mounted, contact points in each box, wires on the poles electrically connected with said buttons, means on said arms for establishing electrical circuits between said wires and buttons, reciprocatory members on said poles connected with said track for establishing said circuits when the track is not in its normal condition.

5. In a signaling apparatus, a series of poles along a railroad track, a box and an arm on each pole, the arms on part of said poles being pivotally mounted, a semaphore arm on one of said poles, sets of contact buttons in each box, wires on said poles in electrical connection with said buttons, a lever in each box provided with means for closing circuits through said buttons, a reciprocatory member on each of said poles, each of which is provided with means for actuating said lever when moved in one direction, and one of them provided with means for actuating the semaphore arm, said last-mentioned member being provided with means for moving the lever in the opposite direction, and means for establishing electrical circuits when a locomotive provided with a signaling apparatus is in engagement with said means.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES S. ANDERSON.

Witnesses:

VICTOR SEITZ,
HERBERT SMAILES.