J. HOFFER.

RAILWAY SIGNAL.

APPLICATION FILED JAN. 14, 1908.

898,473.

Patented Sept. 15, 1908.

4 SHEETS—SHEET 1.

Fig. 1.

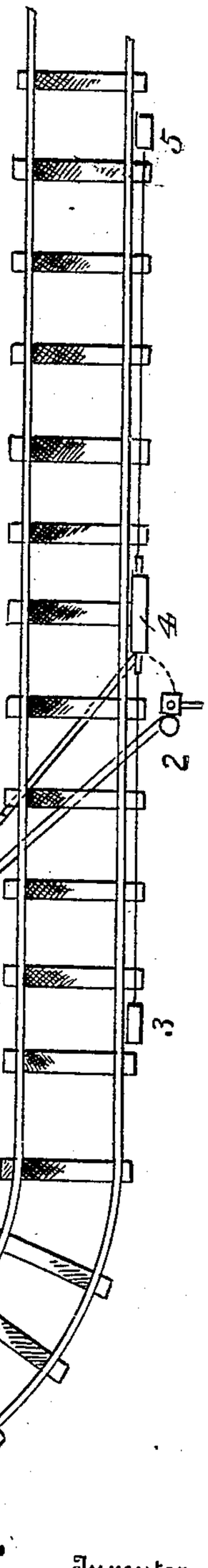
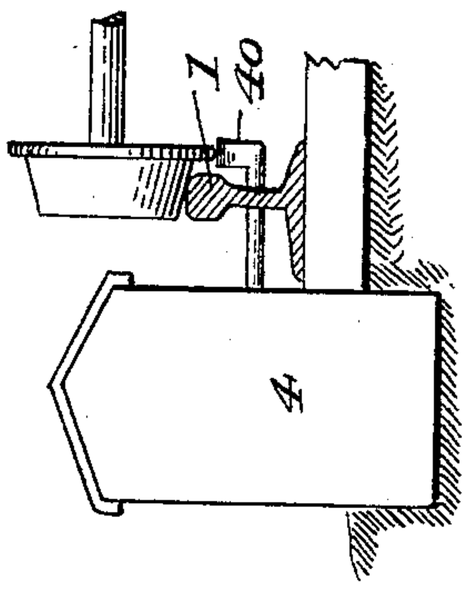


Fig. 4.



Witnesses

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4 SHEETS—SHEET 2.

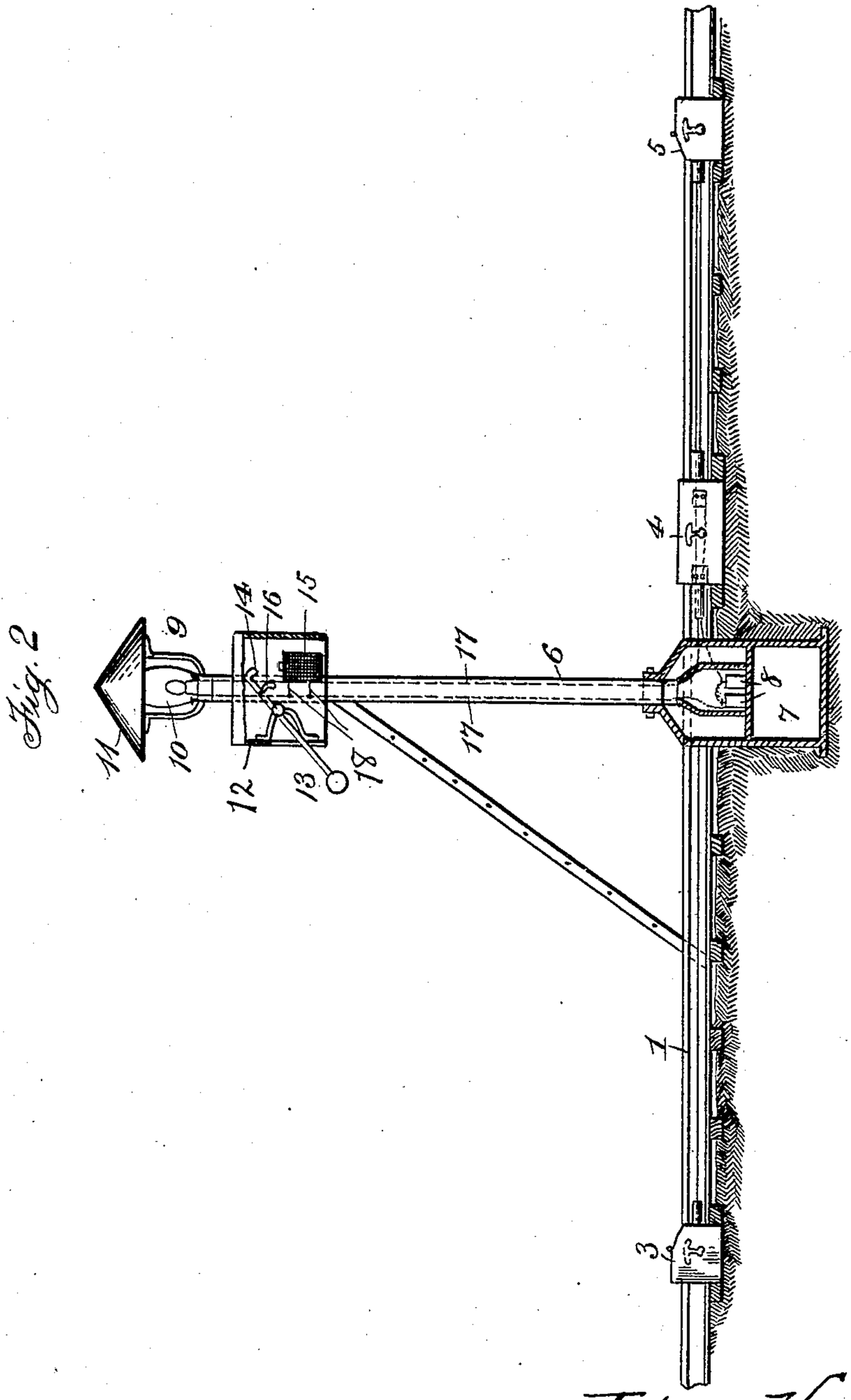

Fig. 2

Witnesses

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4 SHEETS—SHEET 3.

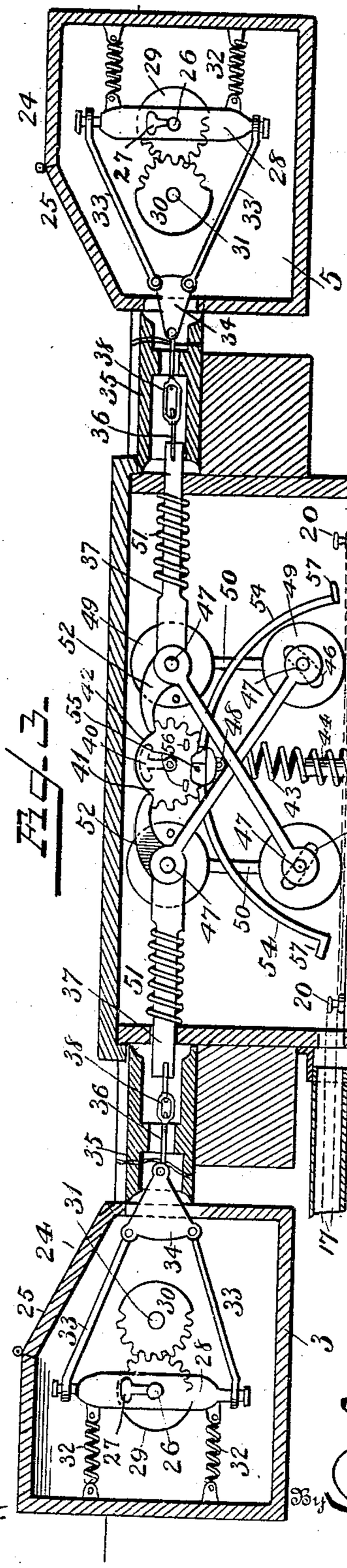

Fig. 3.

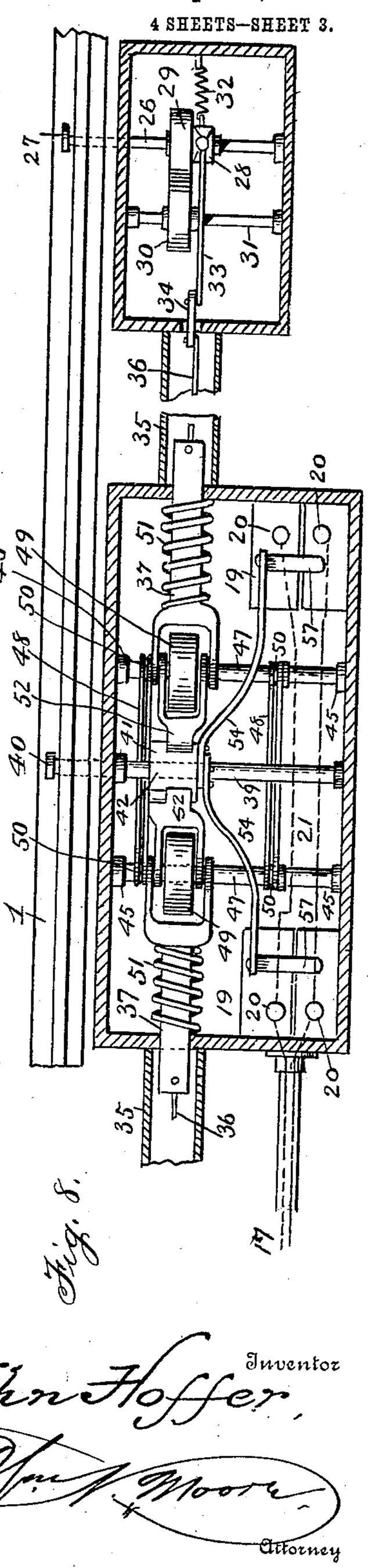

Fig. 4.

Witnesses

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4 SHEETS—SHEET 4.

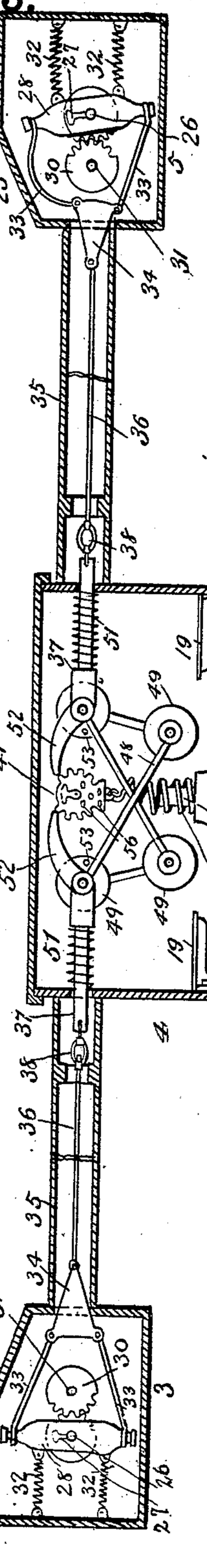

Fig. 5.

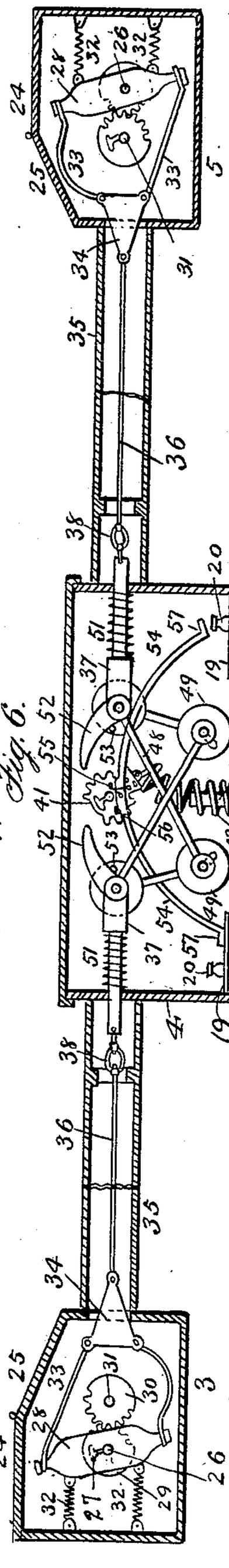

Fig. 6.

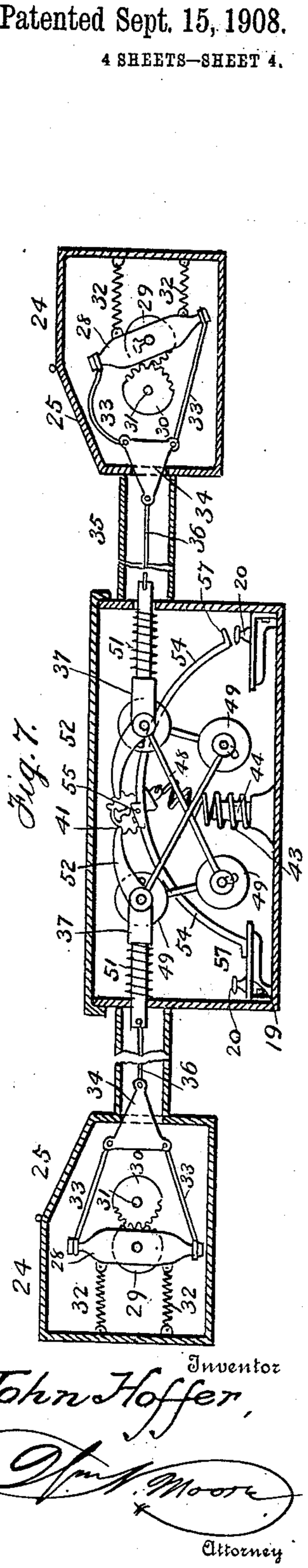

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN HOFFER, OF LOUISVILLE, KENTUCKY.

RAILWAY-SIGNAL.

No. 898,473. Specification of Letters Patent. Patented Sept. 15, 1908.

Application filed January 14, 1908. Serial No. 410,725.

To all whom it may concern:

Be it known that I, JOHN HOFFER, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention relates to improvements in railway-signals, and has for its primary object the provision of practical and efficient signaling mechanism particularly adapted for use upon curves and in like places where it would be difficult or impossible for trains approaching each other on the same track to be aware of each others presence in time to stop and avoid collision, which will automatically by the action of the approaching trains cause appropriate signals to be set and thereby give warning that a train is in the block or section of track ahead. Many serious accidents occur upon the curved stretches of single track due to this fact that those in control of the train cannot ascertain whether the track is clear beyond the curve, but with my invention as soon as the train approaches the curve, it automatically causes a signal to be set at the opposite end of the curve, which gives warning to any other train which might be approaching from the opposite direction that there is a train entering the curve, and the trains are thereby warned in time to stop and the otherwise inevitable collision is avoided.

Another object of my invention is the provision of a signal system which will automatically cause a signal to be displayed as it enters the danger zone and which will also cause such signal to be returned to its normal or non-indicating position when it leaves such danger zone.

A further object of my invention is to provide a signaling system of the character set forth which will be entirely automatic in action, which will be comparatively simple in construction, and which will be thoroughly practical and desirable in every particular.

With these and other objects in view, my invention consists in the combination with a trackway, a signal post and signal mechanism carried thereby, and mechanism located at a distant part of the trackway and actuated by passing trains to cause the signal mechanism to be displayed.

The invention further consists of a railway signal system embodying certain other novel features of construction, combination and arrangement of parts substantially as disclosed herein and as illustrated in the accompanying drawings, in which;

Figure 1, is a plan view showing the manner in which my warning system is applied to a curve in a railway track. Fig. 2, is a view in elevation of a portion of the track with the switches applied thereto and the signal post, the base of the post being in section. Fig. 3, is a sectional view through the switch casings showing the switch mechanism in elevation. Fig. 4, is a broken detail view showing the manner in which the wheel flanges actuate the switch mechanism. Figs. 5, 6 and 7, are sectional views showing the successive operation of the different switches. Fig. 8, is a top plan view of the switches with the switch casings shown in section.

As before explained, my improved signaling system is particularly adapted for displaying warnings at points of curvature in the trackway to inform of the presence of a train and it is shown in such connection in the drawings, in which; the numeral 1, designates the trackway and 2, the signal posts. These posts are located at each end of the curve, bridge, or other likely point of danger, and sufficiently in advance of the curve so as to give warning in time for the train to be brought to a stop before entering the curve. Considerably in advance of each post is located a switch box 3, at a point slightly in advance of the post is located the main switch box 4, in which is arranged the mechanism for setting the signals, and a third switch box 5, is located in rear of each post which is the counterpart of the first switch and which contains the mechanism for restoring the signals to the original or "clear track" position. The posts each comprise a hollow tubular standard 6, mounted upon the hollow base 7, which forms a casing for the reception of the battery 8. An electric lamp 9, is carried by the post which is preferably surrounded by a red globe 10, to indicate danger, and the hood 11, is preferably lined with mirrors or other suitable reflector to concentrate the light. A box 12, is also supported by the post in which is pivoted the semaphore arm 13, the inner end of the semaphore being in the shape of an armature 14, to be attracted by the electro magnet 15. The armature is provided with a downward extension 16, which lies close to the pole of the magnet so that when the magnet is energized the armature is the more readily at-

tracted thereby. The two wires 17, lead to the lamp, one of these wires coming from one terminal of the battery and the other wire leading to the main switch box. The electro magnet is preferably connected in parallel with the lamp by means of the branch wires 18, or it may be connected in series with the lamp.

Contact plates 19, are located in opposite ends of the main switch box, these plates being four in number, a pair at each end of the box and insulated from each other. Terminal screws 20, are mounted in each of the plates and the opposite plates are connected by the bridge wires 21. One of the wires 17, is connected to one of the contact plates and the wire 22, leads from the adjoining contact plate to the remaining terminal of the battery. Conduits 23, lead from one main switch box to the signal post at the opposite point, and these conduits are preferably in the shape of piping, the joints of which are connected by unions 24.

The setting and releasing switches 3 and 5, are alike so that the main switch may be operated by a train coming from either direction. The switch casings of these two switches preferably have inclined tops 24, provided with doors 25, and the casings are made water tight. Transverse shafts 26, are journaled in the casings which pass inward through the rails and a rocker arm 27, is affixed on the inner end of each shaft, which is adapted to be contacted by the wheel flange of a passing car to rock the shaft. A double headed "king bolt" 28, is mounted on each of these shafts and a sector or half cog 29, is affixed on each of the shafts, which mesh with the like cogs 30, on the additional transverse shafts 31. Light springs 32, are connected between the casings and the ends of the king bolts and tend to hold the bolts upright. Flexible cords, cables or like connectors 33, are connected to the opposite ends of each king bolt and the opposite ends of the cords are joined to the triangular plates 34. The switch boxes are connected by piping 35, to receive the draw rods 36, one end of each of the draw rods being connected to each of the triangular plates. Draw bars 37, are connected to the inner end of each of the draw rods and turn buckles 38, are interposed to take up any slack in the connections.

A transverse shaft 39, is journaled in the main switch box which carries on its inner end the rocker arm 40, to be contacted by a wheel flange, and the cog 41, is affixed on this shaft, which has a plain curved upper portion 42, free of any cogs. A spring 43, has its upper end connected to the lower portion of the cog wheel 41, the spring being mounted on and secured to the upstanding stud 44, the spring tending to hold the cog wheel with its plain portion uppermost. Bearing blocks 45, are carried on the inner walls of the main switch box which are each formed with a downwardly inclined curved slot or bearing 46, which receive the ends of the four transverse shafts 47, and form journal bearings for these shafts, or these journal slots may be formed direct in the walls of the casing. Shearing bars 48, are connected between the four shafts and weights 49, are mounted on each of the shafts. Each pair of these weights on the opposite sides of the irregular cog wheel are connected together by a bar 50, so that the weights are of dumb-bell formation.

The draw bars are forked on their inner ends and engage the upper pair of shafts, and the springs 51, tend to force the draw bars inward toward the cog wheel. Pawls 52, are loosely mounted on each of the upper shafts and these pawls are adapted to interlock with the cogs when the cog wheel is rocked. Lugs 53, on the sides of the upper weights support the pawls when they are in engagement with the cogs of the cog wheel. A pair of forks or curved arms 54, are pivoted at 55, to the face of the cog wheel, and the spaced guiding lugs 56 on the face of the irregular cog limit the movement of the forks. Each of the forks carries a bridging piece 57, at its lower end which when the fork is depressed bridges the gap between the contact plates and completes the circuit.

The operation of the parts is as follows: Suppose a train going toward the right in the direction of the arrow. The rocker arm of the first switch box is contacted by the wheel flange of the engine and the king bolt rocked forwardly and remains in this position by reason of its own weight and the friction with the half cog. This movement puts tension on the draw rod which pull causes the upper sets of shafts in the main switch box to spread as in Fig. 5, and by reason of the shearing bars the lower set of shafts are drawn together, the upper shafts riding upward in the curved bearing slots. This first switch serves simply to set the parts of the main switch ready to be acted upon when the train reaches the main switch. When the train reaches the main switch, the rocker arm is depressed and the irregular cog rocked forwardly allowing the rearward pawl to interlock with the cogs and hold said irregular cog wheel in this position, as illustrated in Fig. 7. The upper forwardly disposed lug on the irregular cog is then in engagement with the forward depending fork, depressing the same and causing the bridge piece carried thereby to contact the forward pair of contact plates and complete the circuit and set the signals. Now when the rocker arm of the third switch is contacted, the corresponding draw bar is pulled outward which causes a further spreading of the parts and the pawl is forced out of engagement with the irregular cogs, as shown in Fig. 6, all three of the switches having then

been acted upon. The upstanding spring in the main switch box then rocks the irregular cog back to normal upright position, the transverse shafts slide back to the lower ends of the bearing slots of their own weight, which movement is assisted by the coiled springs on the draw bars. This movement also resets the other two switches. Should the train approach from the opposite direction of course the operation of the parts will be reversed, the results being the same in each case.

From the foregoing description taken in connection with the drawings it will be evident that I have provided a signal system which is practical and which accomplishes all the results herein aimed at.

I claim:

1. A railway signal adapted to be actuated by passing trains comprising a main switch, auxiliary switches located on each side of the main switch, a signal, connections leading from the main switch to the signal, the first auxiliary switch when actuated by a passing train affecting the main switch so that as the main switch is actuated by the train the signal is set, and the last auxiliary switch when actuated by the train serving to release all switches from the set position to restore the signal to normal condition.

2. A railway signal comprising a main switch and auxiliary switches, an electric signal, connections leading from the main switch to the signal, the circuit being normally open in the main switch, the first auxiliary switch being actuated by passing trains to affect the main switch so that when the train reaches the main switch the circuit is completed in the main switch and signal is set, and the last auxiliary switch when actuated by the train allowing all switches to return to normal position.

3. A railway switch comprising a main switch and auxiliary switches located on each side of the main switch, the said switches each having elements to be affected by passing trains, and a signal controlled by the main switch, the first auxiliary switch affecting the main switch so that the main switch is actuated by the train to set the signal, and the last auxiliary switch serving to release all switches from set position.

4. A signal for railway curves and the like places comprising two sets of switches located at opposite ends of the curve or like place, each set comprising a main switch and auxiliary switches located on each side of the main switch, signals at opposite ends of the curve, each switch having an element to be acted upon by a passing train, and connections between the main switches and the signals at the opposite end of the curve.

5. In railway signals for displaying signals at a distant point, a main switch, auxiliary switches spaced on each side of the main switch, mechanical connections between the switches, the switches having elements to be affected by passing trains, an electrically actuated signal located at a distant point, electrical connections leading from the main switch to the signal, there being a gap in the signal circuit provided in the main switch, a member to bridge said gap and complete the electrical circuit, said bridging member being actuated to close the gap and cause the signal to be set after the first auxiliary switch and main switch have been affected by a passing train, and the last switch when affected by the train serving to restore all switches to first position.

6. Signaling mechanism comprising main and auxiliary switches and a signal or signals, the first auxiliary switch being affected by passing trains to set the main switch the main switch affected by the train to operate the signal, and the last auxiliary switch affected by the train to cause all switches to resume normal position.

7. Signaling apparatus consisting of main and auxiliary switches, a signal or signals, connections leading from the main switch to the signal or signals, the first auxiliary switch affecting the main switch so that when said main switch is operated the signal or signals will be displayed, and the last auxiliary switch allowing the parts to return to normal non-display position.

8. A railway signal comprising a series of switches each having elements to be affected by passing trains, mechanical connections between the switches, signals, connections between the signals and certain of the switches, certain of the switches affecting the signal switches so that the signals will be displayed when the signal switches are affected by the passing train, and certain of the switches causing all parts to return to normal position.

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

JOHN HOFFER.

Witnesses:

BEN HUMPICH.

JOHN KEATING.