No. 891,200. PATENTED JUNE 16, 1908.

A. WILHELM.

RAILWAY SIGNAL SYSTEM.

APPLICATION FILED JULY 10, 1907.

4 SHEETS—SHEET 1.

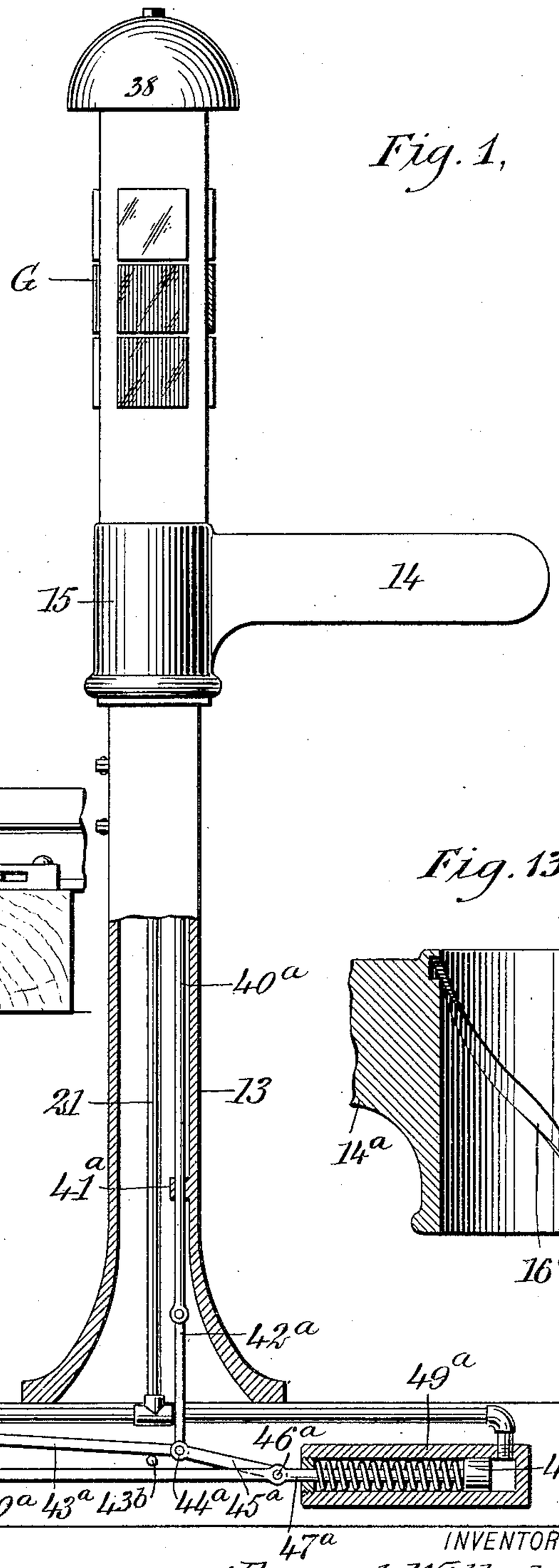


Fig. 1.

Fig. 2.

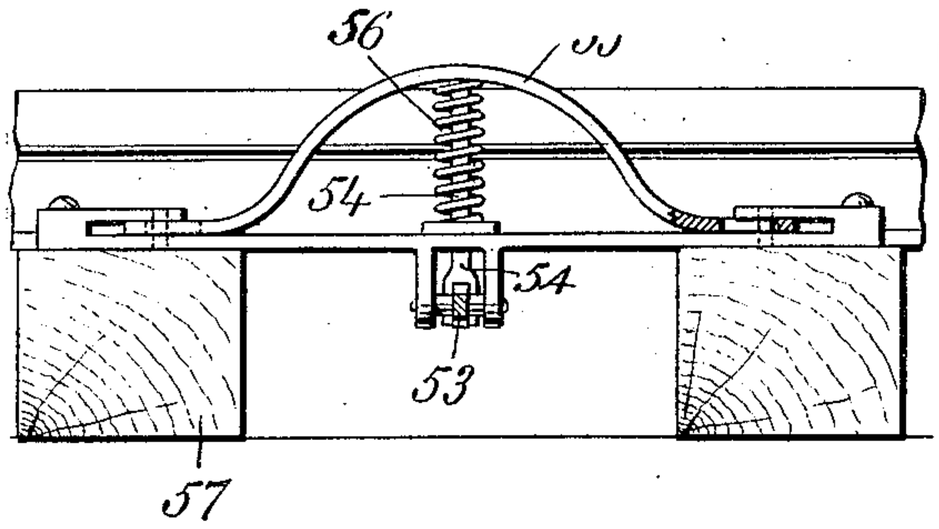
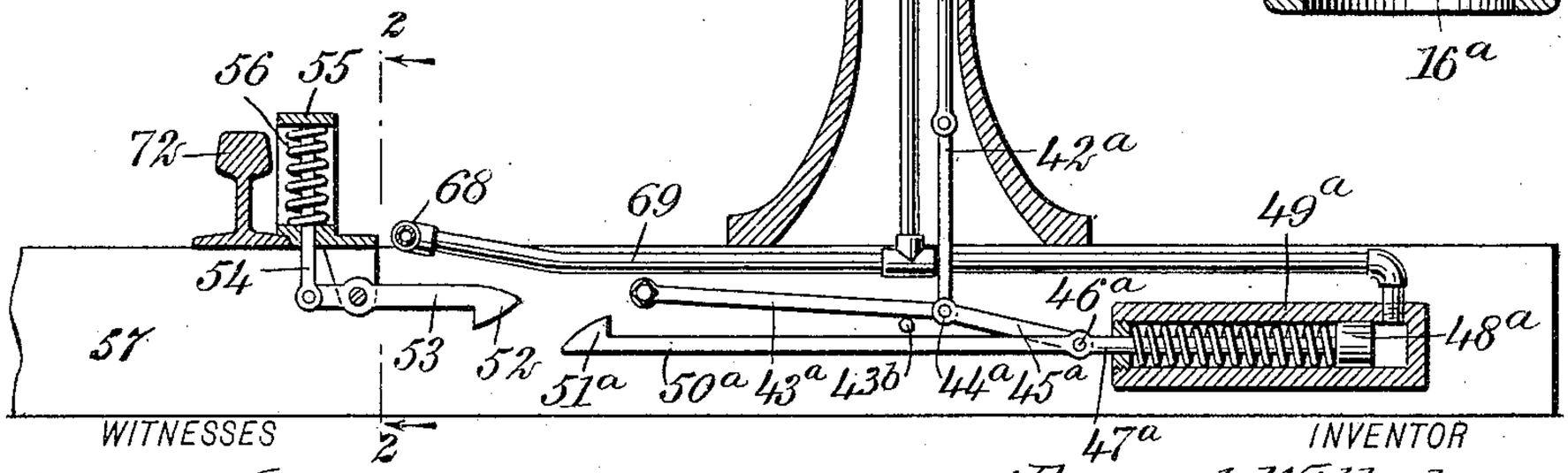


Fig. 13.



WITNESSES

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Fig. 3,

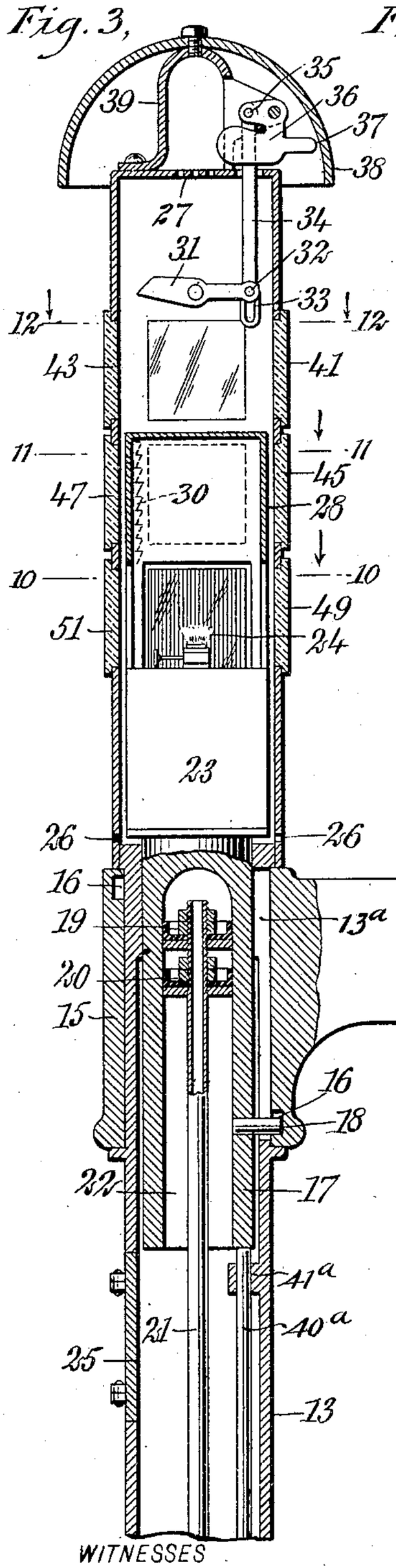

Fig. 5,

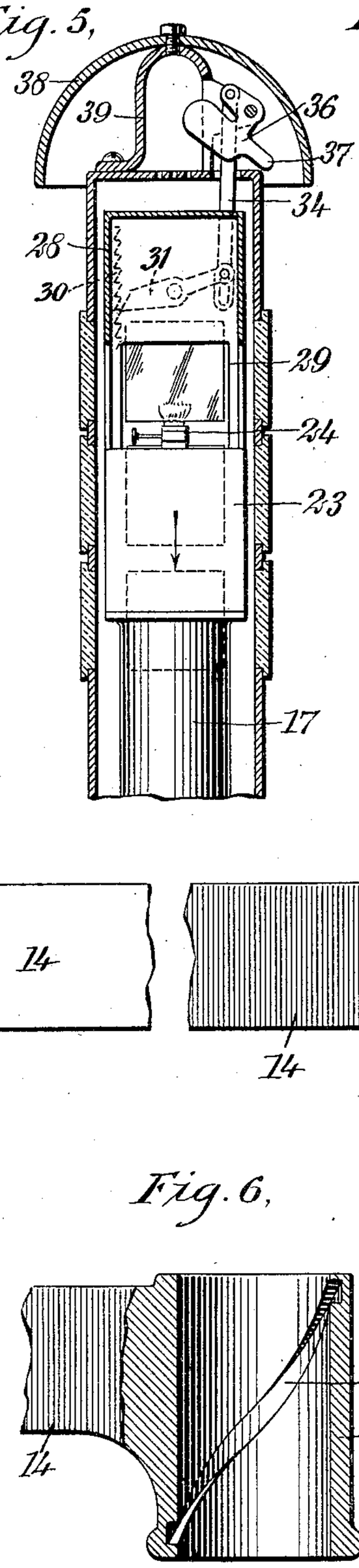

Fig. 4,

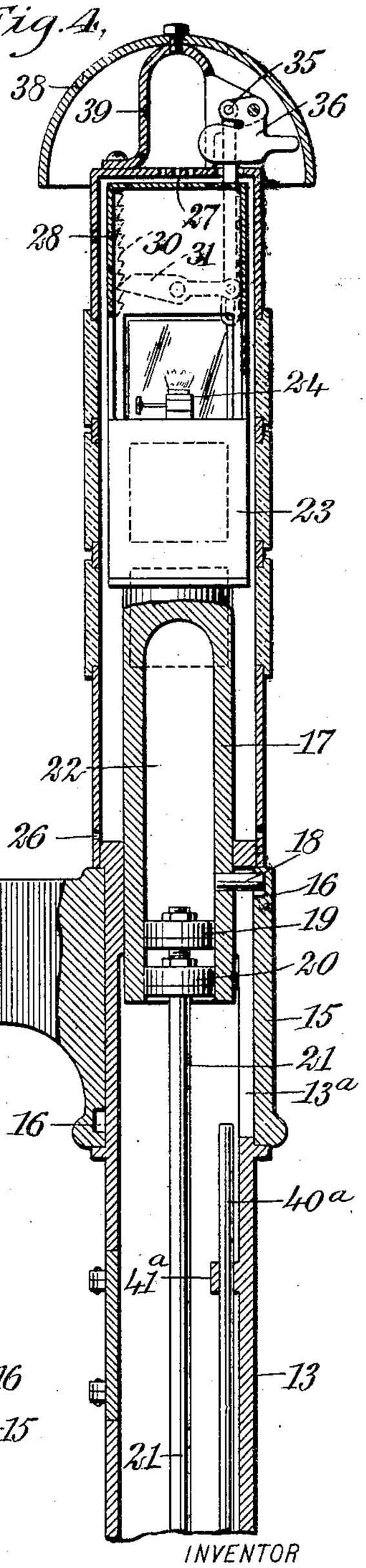

Fig. 6,

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4 SHEETS—SHEET 3.

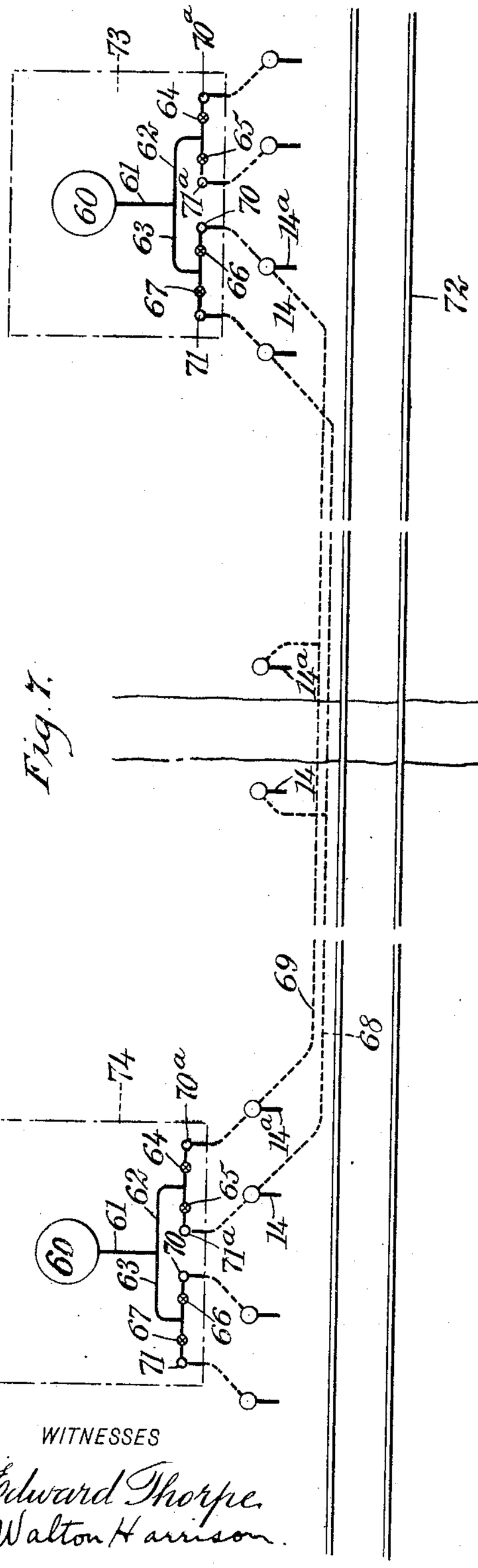

Fig. 7.

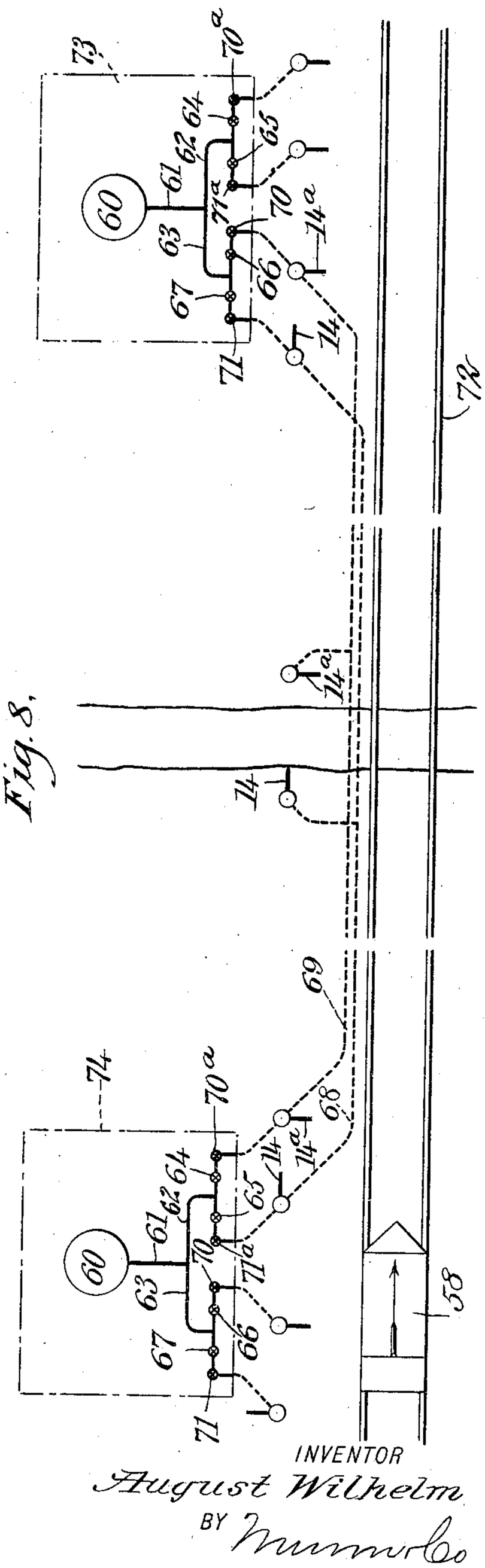

Fig. 8.

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4 SHEETS—SHEET 4.

Fig. 9.

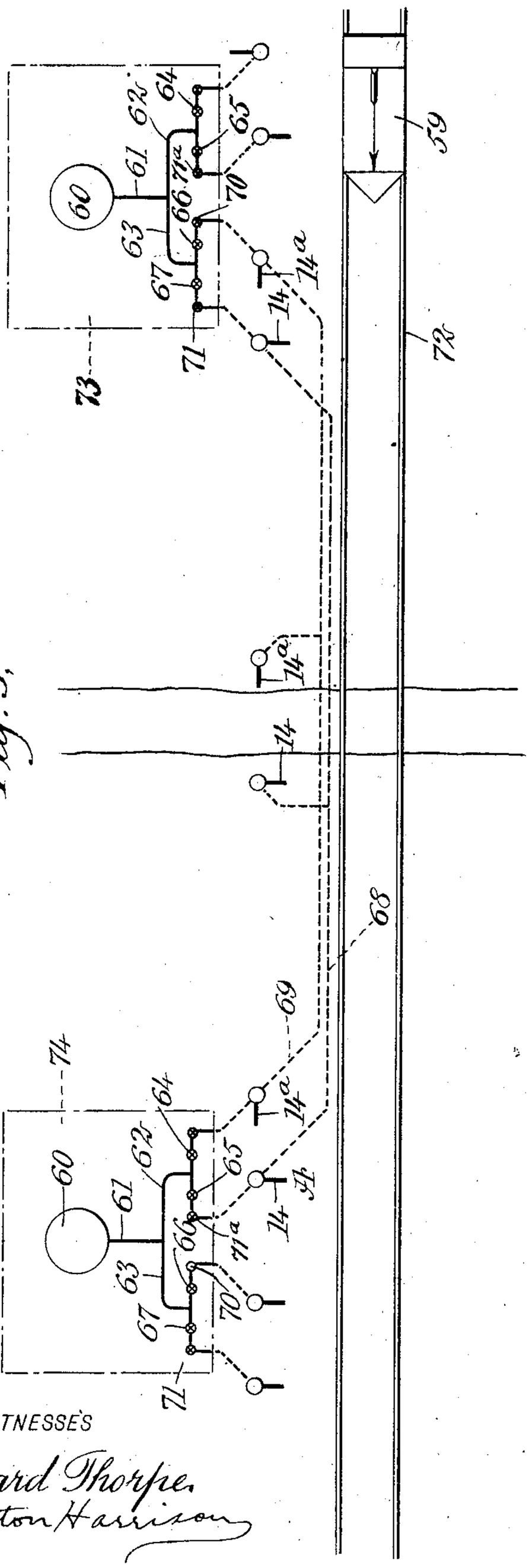

Fig. 12.

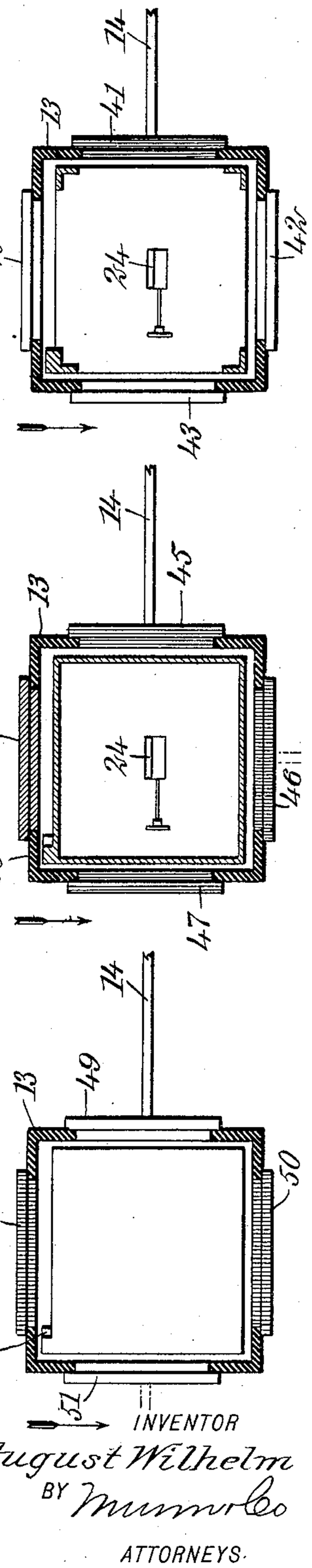

Fig. 11.

Fig. 10.

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UNITED STATES PATENT OFFICE.

AUGUST WILHELM, OF ST. JOHNS, OREGON.

RAILWAY SIGNAL SYSTEM.

No. 891,200. Specification of Letters Patent. Patented June 16, 1908.

Application filed July 10, 1907. Serial No. 383,077.

To all whom it may concern:

Be it known that I, AUGUST WILHELM, a citizen of the United States, and a resident of St. Johns, in the county of Multnomah and State of Oregon, have invented a new and Improved Railway Signal System, of which the following is a full, clear, and exact description.

My invention relates to railway signal systems, my more particular object being to provide for effectively signaling trains in a predetermined relation according to the condition of the track, the signal being controllable partially by movements of the train and partially by will of an operator.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a section taken in a plane crossing the railway track and showing one of the improved semaphores forming a part of my system, the semaphore being provided with a movable arm which in said figure occupies its normal position, indicating a clear track; Fig. 2 is a fragmentary section upon the line 2—2 of Fig. 1, looking in the direction of the arrow, and showing the spring mechanism actuated by movements of a train for the purpose of controlling the semaphore; Fig. 3 is a central vertical section through the semaphore post shown in Fig. 1, the view disclosing the arrangement of the pneumatic piston, the lamp raised by movements thereof, and the various panes of colored glass used for signaling in different directions, and showing further the lamp in its lowermost position; Fig. 4 is a section similar to Fig. 3 but showing the pneumatic plunger as occupying its highest position, the relations of other movable parts being changed accordingly; Fig. 5 is a fragmentary section similar to Figs. 3 and 4, but showing the pneumatic piston carrying the lamp as moving downward and as controlling the ringing of the bell; Fig. 6 is a fragmentary section through the cylindrical sleeve supporting the movable semaphore arm, this view showing the arrangement of a spiral groove for turning the arm in a contra-clockwise direction whenever it is moved from its normal position; Fig. 7 is a diagram of a section of railway track crossed by a highway, this view showing diagrammatically the arrangement of two stations and their pneumatic connections to a number of semaphores, the latter being in such position as to indicate that the track is clear; Fig. 8 is a view similar to Fig. 7 but showing a train as passing one of the stations and as moving toward the right; Fig. 9 is a view similar to Figs. 7 and 8, but showing the condition of the semaphore at the moment when a train is passing along the track from right to left; Fig. 10 is a horizontal section upon the line 10—10 of Fig. 3, looking in the direction of the arrow, and showing the arrangement of four glass panes, two red and two white, which are illuminated by the lamp when it occupies its lowermost position; Fig. 11 is a horizontal section upon the line 11—11 of Fig. 3, looking in the direction of the arrow and showing the relative arrangement of three red panes and one green pane of glass situated immediately above the four panes shown in Fig. 10; Fig. 12 is a section upon the line 12—12 of Fig. 3, looking in the direction of the arrow and showing the arrangement of three panes of white glass and one of red glass, all occupying a position just above the panes shown in Fig. 11; and Fig. 13 is a fragmentary section somewhat similar to Fig. 6 but showing the cam groove as reversed relatively to the position of the cam groove shown in Fig. 6, for the purpose of turning the semaphore arm in a different direction from its normal position.

The semaphore post 13 is hollow, and journaled upon it is a semaphore arm 14, painted red upon one side and white upon the other. This arm is integral with a sleeve 15, constituting a bearing for the arm. This sleeve is provided internally with a groove 16, disposed spirally thereof and occupying in its curvature substantially one-half of the sleeve (see Fig. 6). A plunger 17, is fitted airtight within the post 13 and is adapted to move up and down therein. Mounted rigidly upon this plunger is a pin 18, which projects radially outward and enters the groove 16. The post 13 is provided with a straight vertical slot 13^a, in which the pin 18 works. Whenever the plunger 17 is raised or lowered, the pin 18 being guided vertically by the slot 13^a causes the sleeve 15, and consequently the semaphore arm integral therewith, to turn a distance which can never exceed one-half of a revolution.

All of the semaphores used are exactly alike with the exception of the part indicated in Figs. 6 and 13. In Fig. 13 the arm 14^a is integral with a sleeve 15^a (corresponding to

the arm 14 and sleeve 15 in Fig. 6) but in Fig. 13 the sleeve 15[a] has its cam groove 16[a] reversed relatively to that of the groove 16 in Fig. 6. The idea is that when an arm 14 or 14[a] is moved from its normal position, it travels in a clockwise direction or in a contra-clockwise direction, according to whether the cam groove has the form shown at 16, Fig. 6, or 16[a], Fig. 13.

Pistons 19, 20 are mounted upon the upper end of an air pipe 21 through which air may be admitted to the core 22 of the plunger 17 in order to raise the plunger. A lamp 23 rests at all times upon the plunger and is movable therewith. This lamp is provided with a burner 24 which is adapted to be brought into registry with the various panes of glass shown in Figs. 10, 11, 12, according to the relative altitude of the lamp 23.

A door 25 is provided for the purpose of promoting accessibility to the interior of the post. The post is provided with air-ducts, 26, 27 for the purpose of affording ventilation for the lamp 23. A hood 28 rests upon four corner posts 29 integral therewith and is thereby supported above the lamp burner 24. The upper part of this hood being of opaque material, preferably metal, effectively prevents light from the lamp from illuminating any of the glass panes except those immediately adjacent to the lamp burner.

The hood 28 is provided with a rack 30 which periodically trips a lever 31 as the hood is raised or lowered. The lever 31 is adapted to rock and is provided with a pin 32 which projects through a slot 33 in the lower end of a link 34. The upper end of this link is connected by a pivot pin 35 with a clapper 36. This clapper has a portion 37 disposed immediately adjacent to a bell 38 and adapted to strike the same whenever the link 34 is actuated by the lever 31. The descent of the hood 28 causes the rack 30 to drag across the end of the lever 31, thus causing the link 34 to move vertically and to swing the clapper against the bell, causing the latter to ring.

The bell is supported upon a pedestal 39 resting upon the top of the post 13. Mounted within the top of the post 13 are three panes of white glass 40, 42, 43, and one pane of red glass 41 (see Fig. 12) all occupying the same level or horizontal zone. Immediately below these four panes are a pane 44 of green glass and three panes 45, 46, 47 of red glass, all occupying a middle zone, as indicated in Fig. 11. Below the four panes just mentioned are four other panes 48, 49, 50, 51, all occupying the same zone, the panes 48, 50 being of red glass and the panes 49, 51 being of white glass. By this arrangement of panes, as indicated in Figs. 10, 11, 12, the raising and lowering of the lamp will cause various colored lights to be seen by persons viewing the semaphore arm from different directions.

A slide rod 40[a] is disposed within the post 13 and mounted within bearings 41[a], and a link 42[a] is connected with the lower end of this slide rod and joins a rod 43[a], which rests upon a stop pin 43[b]. The rods 42[a] and 43[a] are connected by a pivot 44[a] with a link 45[a], and the latter is connected by a pivot 46[a] with a piston rod 47[a], mounted upon a piston 48[a] sliding within a cylinder 49[a]. The piston rod 47[a] is provided with an extended portion 50[a] having thereupon a hook 51[a], adapted to engage a hook 52 carried by a rocking lever 53. A link 54 connects this lever with a leaf spring 55 having substantially a bow shape, as shown in Fig. 2. A spiral spring 56 encircles the link 54 and assists in returning the leaf spring 55 to its normal position. The leaf spring 55 and its accompanying parts are supported upon cross ties 57, as indicated in Fig. 2.

Trains are indicated diagrammatically at 58 (Fig. 8) and 59 (Fig. 9). At 60 are shown compressed air tanks which may be of known construction. Connected with each air tank is an air main 61 connected with branch pipes 62, 63 into which air is admitted by hand valves 64, 65, 66, 67 so that the passage of the air into pipes 68, 69 is controlled at will. By aid of hand valves 70, 71, 70[a], 71[a], the air is allowed to escape. Service rails are shown at 72. Both pipe lines 68, 69 are independently controllable at will from either of the stations 73, 74, so that all of the semaphores upon any one of the pipe lines are actuated alike. The semaphore arms controllable by the pipe line 68 are adapted to turn clockwise when the plunger 17 descends, those upon the line 69 being adapted to turn contra-clockwise under a like condition.

The operator at each station 73, 74, by manipulating the hand halves 64, 65, 66, 67, is able to send compressed air to the several semaphore posts, the action at all posts on the same line being the same. Entering the cylinder 49[a] the air pushes the piston 48[a] to the left according to Fig. 1. This causes the links 45[a], 43[a] to raise the link 42[a] and push the slide rod 40[a] upward. At the instant when this occurs, the compressed air is admitted through the air pipe 21 into the core 22 of the plunger 17. The plunger is thus raised by the joint action of air pressure within it and of pressure against its under edge exerted by the slide rod 40[a]. The lamp 23 is thus lifted to its uppermost position. It now illuminates the four panes 40, 41, 42, 43 of glass. The movement of the piston 48[a] to the left, according to Fig. 1, causes the hook 51[a] to engage the hook 52 thus preventing the piston 48[a] from returning to its normal position. The upward movement of the plunger 17 causes the pin 18 to turn the sleeve 15 so that the semaphore arm 14 rotates to the extent of half a turn,

as above described. This brings the semaphore arm 14 into such position that it extends across the track and exposes its red side toward the approaching train, thereby signaling the latter to stop.

When the train is ready to proceed the operator, by manipulating the proper air valve 64, releases the air pressure. This causes the lamp 23 to descend into such position that the glass panes 44, 45, 46, 47 are now illuminated. The result is that the green pane of glass in this zone and occupying such position as to be visible from the train, is now illuminated so as to be seen by the trainmen, the red glass of the same zone being also illuminated and throwing red light in three other directions.

The lamp does not descend completely, owing to the fact that the plunger 17 lodges upon the upper end of the slide rod 40^a and this rod is unable to descend owing to the engagement of the hooks 51^a, 52 (see Fig. 1). The lamp and plunger are therefore sustained for the moment, notwithstanding the total relaxation of air pressure within the plunger 17 and cylinder 49^a. The plunger 17 is now in a position intermediate of its two limits of movement. The semaphore arm is neither in its normal position nor in its extreme abnormal position, but is turned a quarter of a revolution and lies parallel with the track, extending in a direction away from the train. This state of affairs continues so long as the train rests at the station. As soon, however, as the train proceeds, the wheels depress the spring 55 causing the hook 52 to release the hook 51^a. This enables the piston 48^a to return to its normal position so that the slide rod 40^a drops into its lowest position, the sleeve 15 turns another quarter of a revolution, and the arm 14 is brought into the position indicated in Fig. 3.

The change in the position of the lamp now causes the illumination of the glass panes shown in Fig. 10, or in other words, in the bottom zone. The result is that red lights are visible from the track at a point ahead of the train and also from a point behind the train, whereas white lights are thrown across the tracks and directly away from the track.

The normal position of the railway track and of both pipe lines 68, 69, being as indicated in Fig. 7, all of the semaphores, whether equipped with arms 14 or 14^a, have their arms pointing toward the track and are otherwise in their respective normal positions. If, now, a train 58 (see Fig. 8) comes along in the direction indicated by the arrow, the operator at the station 74, by manipulating the hand valve 65, turns on the air and this turns the several semaphore arms 14 each in a contra-clockwise direction, leaving the arms 14^a in their respective normal positions. Suppose again that a train 59 (see Fig. 9) approaches in the direction indicated by the arrow. The operator at station 73, by turning on the air through valve 70, causes the other semaphore arms 14^a to turn in a clockwise direction. After the movement of the semaphore is completed, the operator may at will, by actuating the valve 71, cause the pneumatic pipe to be vented, as above described. It thus appears that by the system above described, an operator can actuate quite a number of semaphore arms by merely turning on or off the air by means of hand valves.

From the above description it will be seen that a train, when advancing in one direction, has the signals so arranged by the operator that the track is closed to a train advancing from the opposite direction; also that any train automatically signals to another train following in the same direction in such manner as to indicate that the track is closed to such other train, this condition continuing until such time as the operator at the station toward which the first-mentioned train is advancing opens the track behind said train. It is also apparent that by locating signals at highways or cross roads, or at other desirable points between stations, the operator at a station either ahead of a train or behind the train can signal that train or call it back, if desired. It will be further observed that persons using the public highways crossing the track, may be warned both by visual signal and by the ringing of the bell, of an approaching train. A train can not pass a station until the operator has had an opportunity to give a signal of a clear track ahead, and when the track is thus clear the operator at the next station ahead can readily exhibit such a signal as will not permit the train to approach from the opposite direction.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a system of the character described, the combination of an air receptacle, a plurality of pneumatic lines extending therefrom, means controllable at will for turning air pressure into said lines and releasing the same therefrom, a number of semaphore posts connected with one of said lines, a number of other semaphore posts connected with another of said lines, all of said posts being provided with semaphore arms, all the posts connected with one line having their arms adapted to turn in one direction from the normal, and the arms of the posts upon the other line being adapted to turn in the opposite direction from their normal, and means controllable by air pressure and connected with said arms for actuating the same.

2. A semaphore post comprising a movable semaphore arm, a sleeve connected therewith

and provided with a groove, a movable member having a portion inserted within said groove, and means controllable by air pressure by actuating said movable member.

3. The combination of a post provided with panes of different color arranged in different zones for the purpose of indicating differences in the condition of a railway track, a lamp movable relatively to said zones, a plunger for shifting the position of said lamp in one direction, said plunger being movable by gravity in the opposite direction, pneumatic mechanism controllable at will from a distance for raising said plunger, and means controllable by movements of rolling stock independently of said pneumatic mechanism for releasing said plunger.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST WILHELM.

Witnesses:
TRUMAN J. GLOVER,
LESTER L. CURL.