

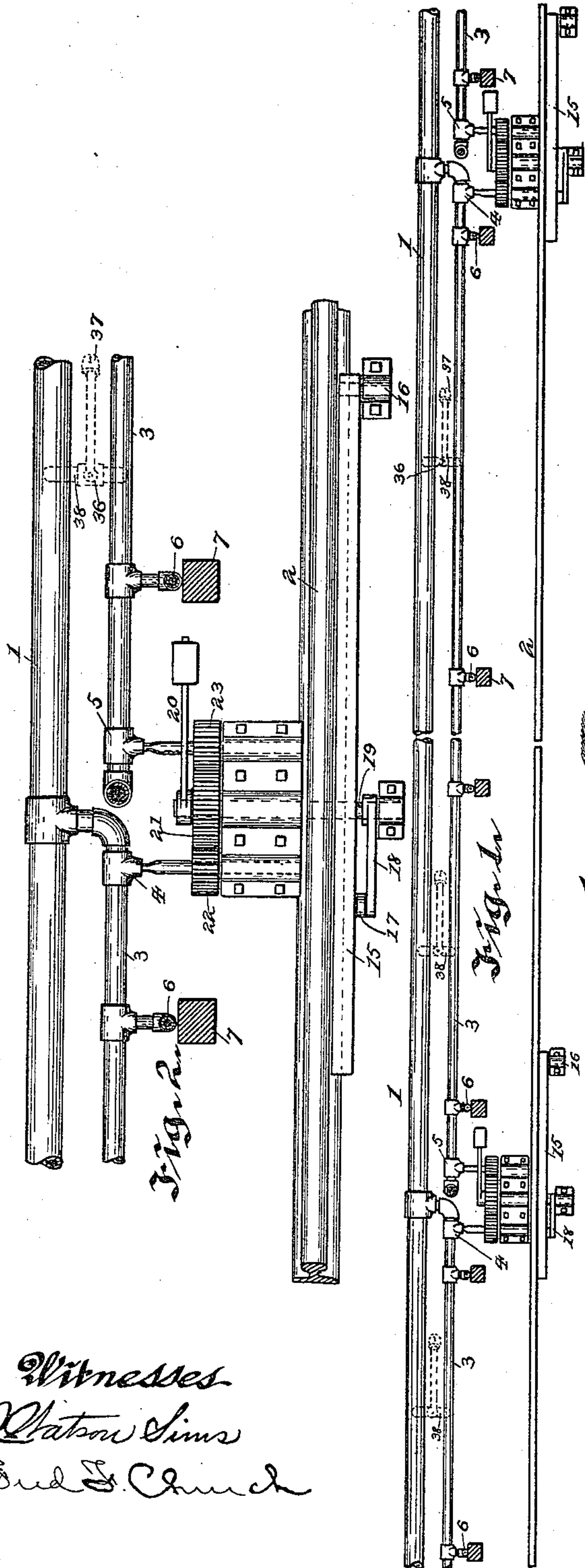
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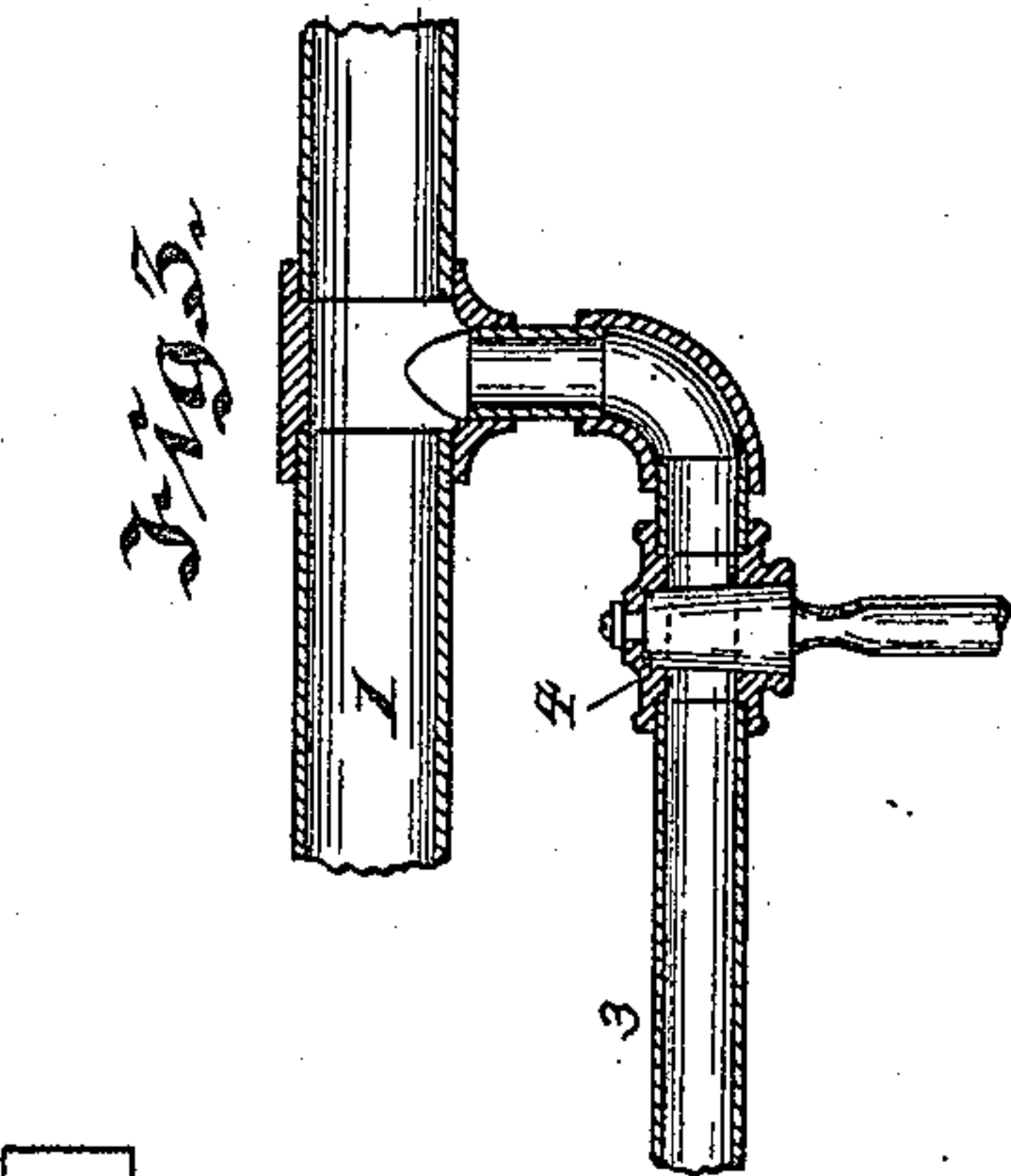
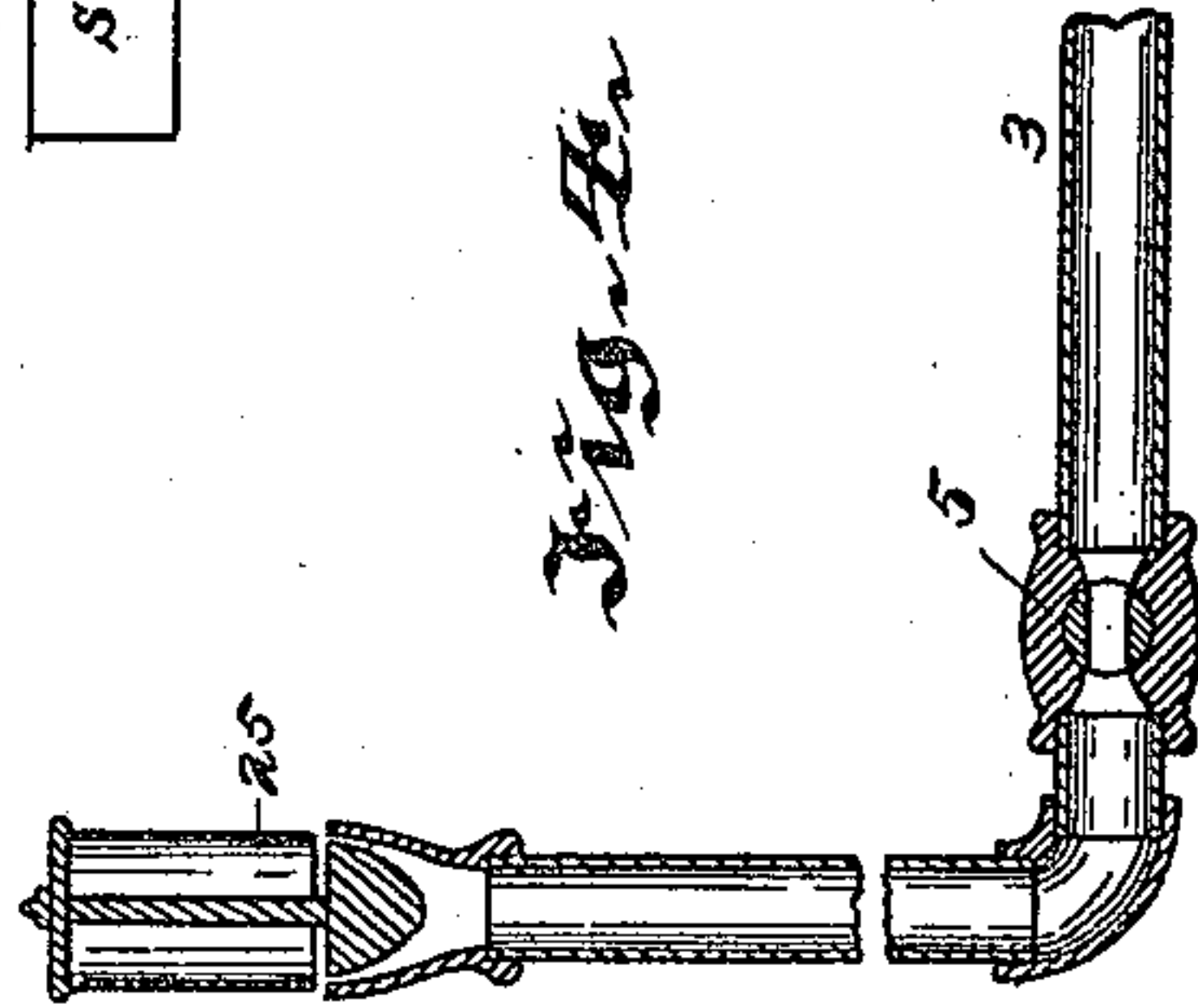
J. H. McCARTNEY.  
RAILWAY SIGNAL.

No. 441,324.

Patented Nov. 25, 1890.



Station



Station

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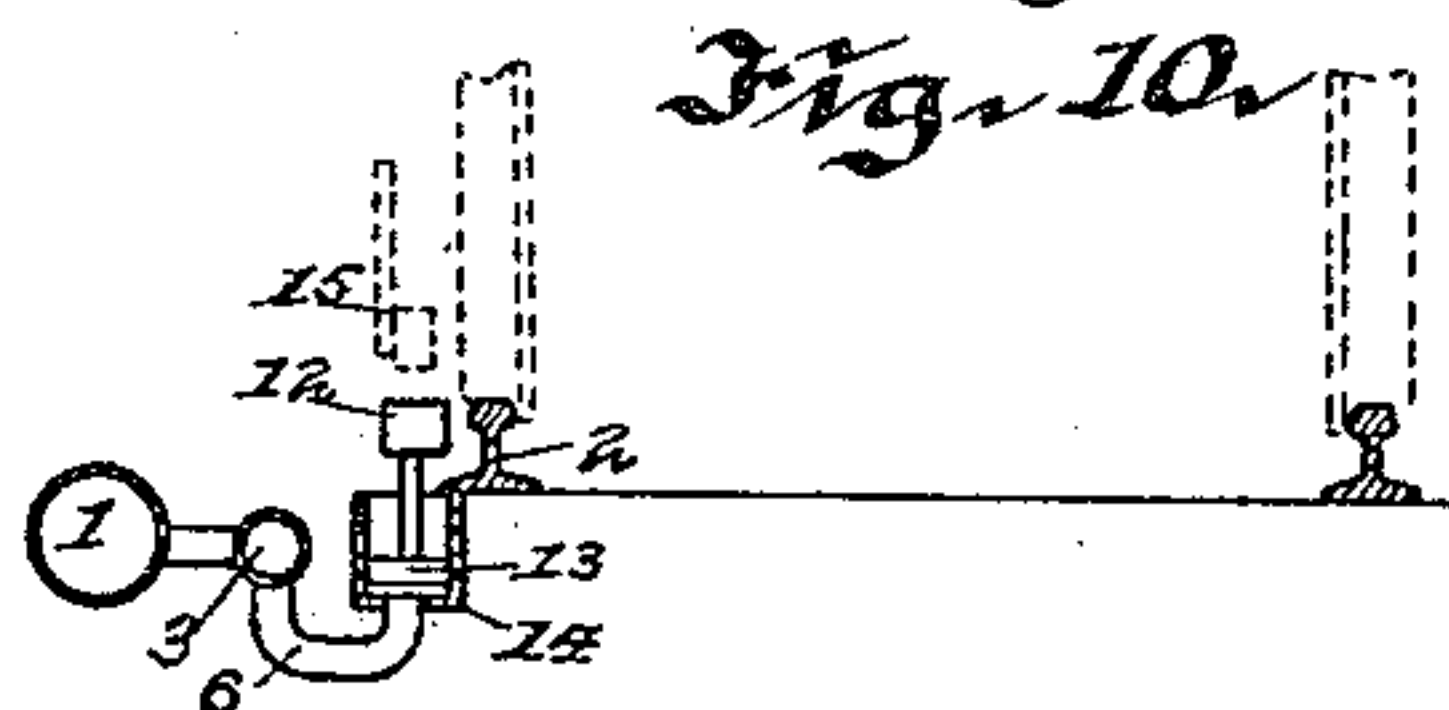
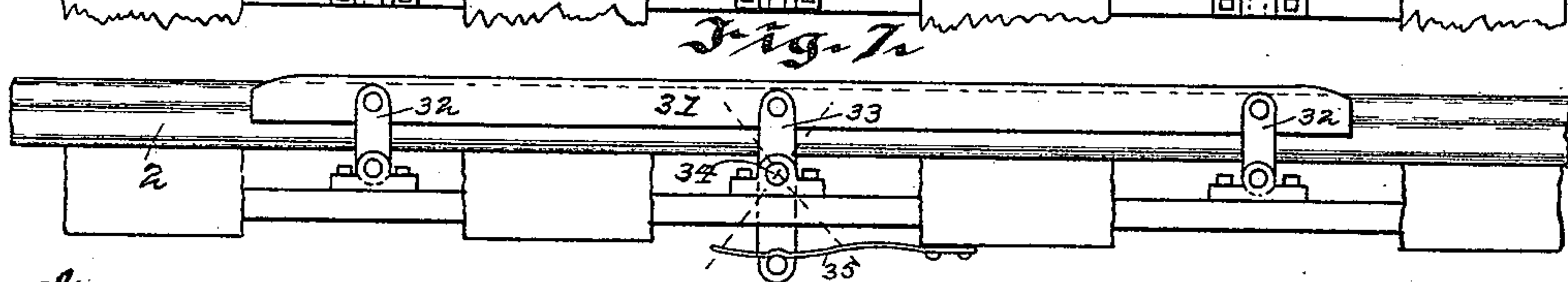
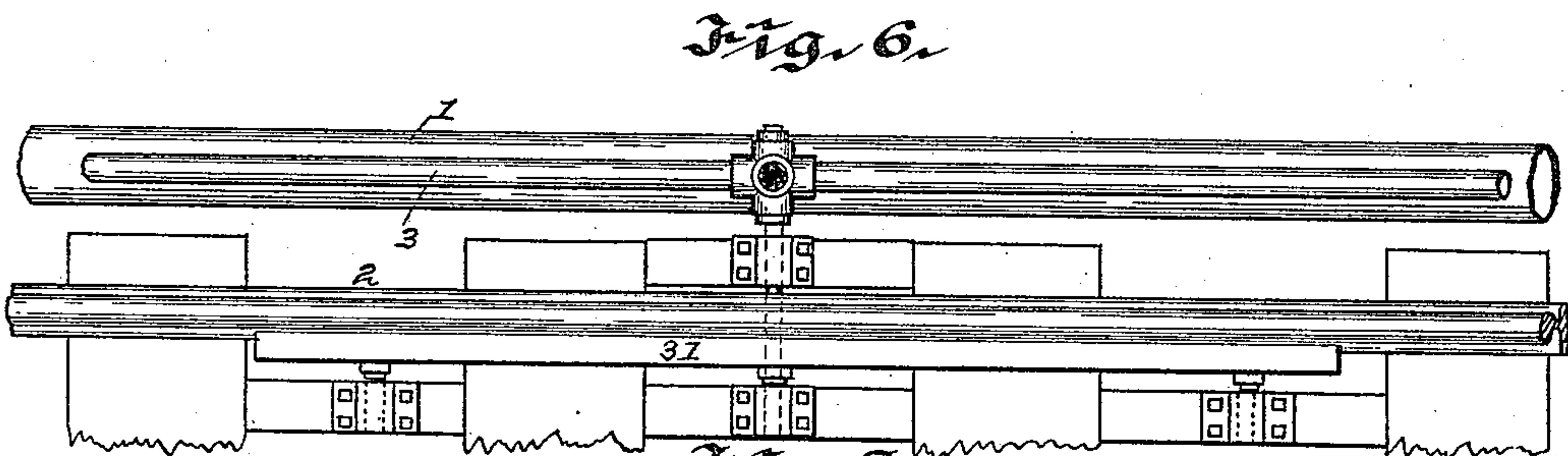
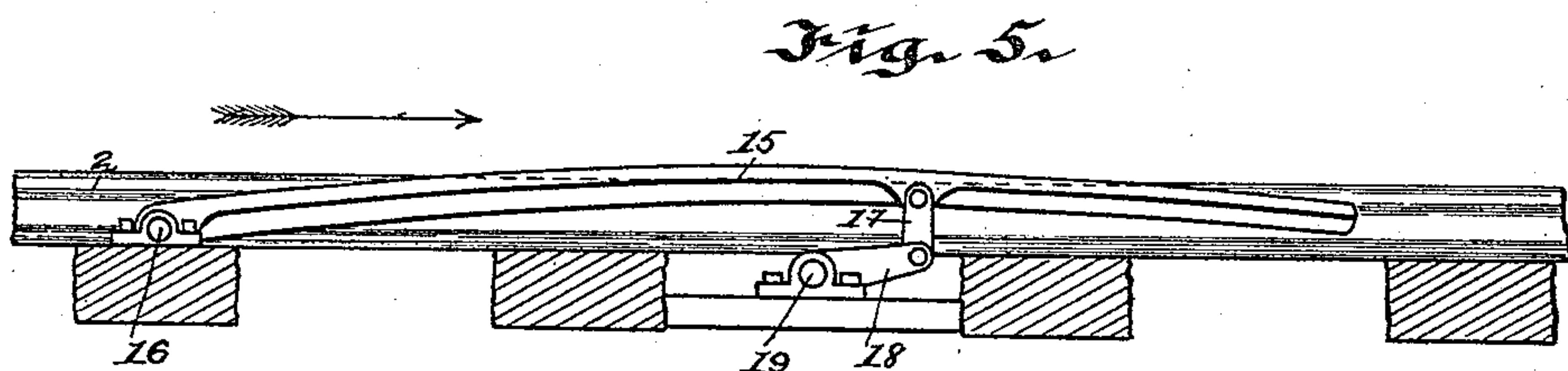
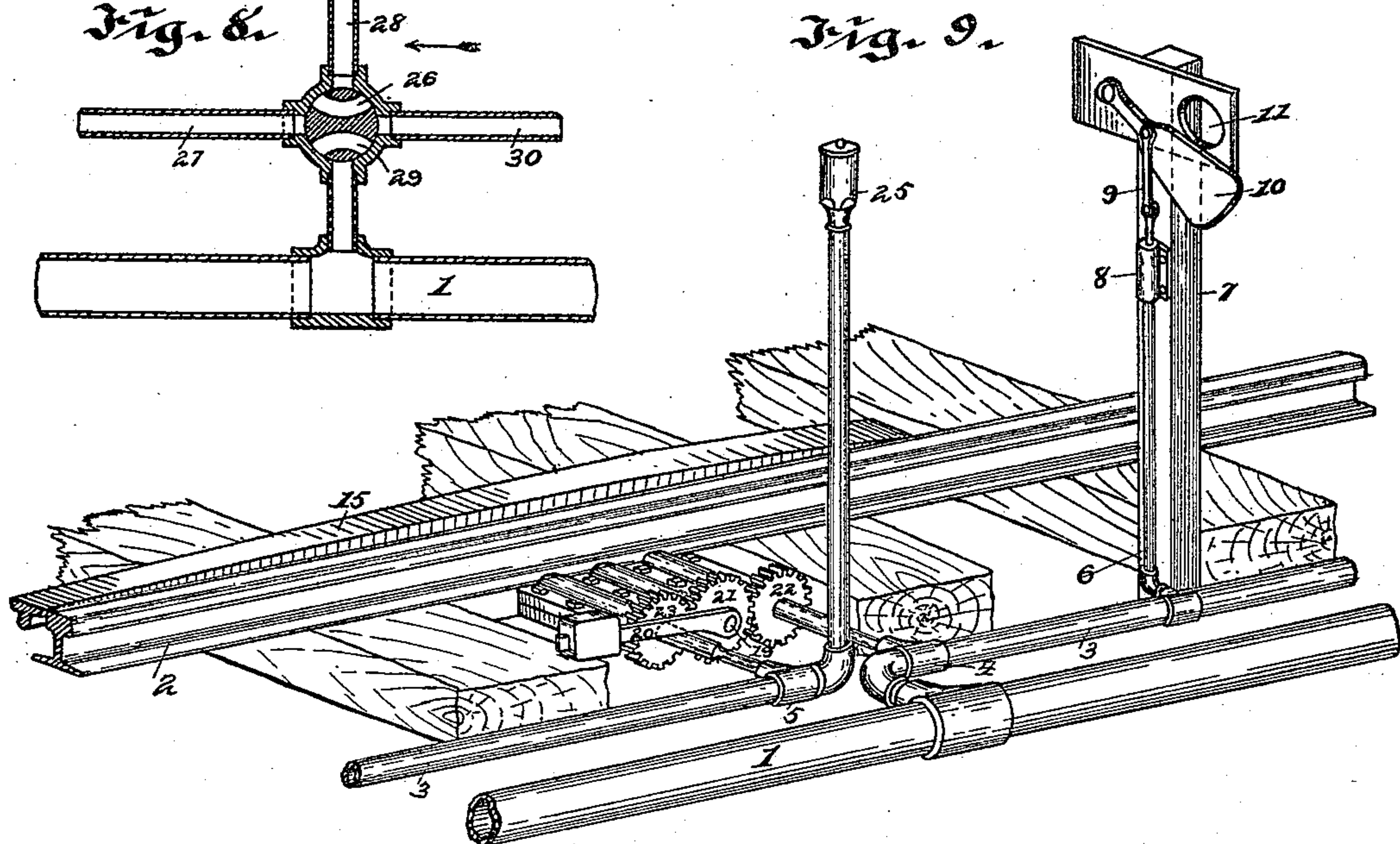
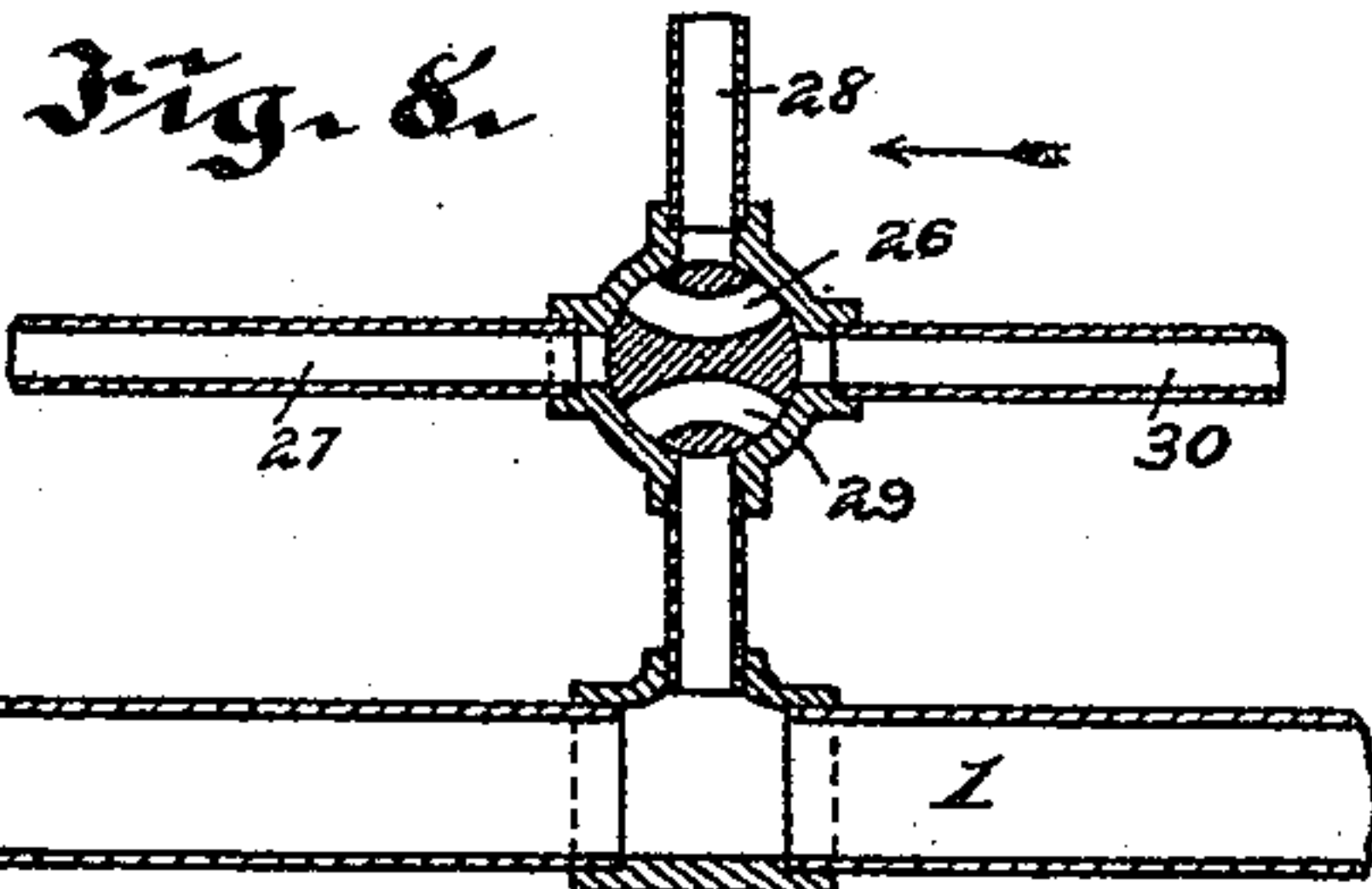
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2 Sheets—Sheet 2.

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RAILWAY SIGNAL.

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# UNITED STATES PATENT OFFICE.

JAMES H. MCCARTNEY, OF ROCHESTER, NEW YORK.

## RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 441,324, dated November 25, 1890.

Application filed June 30, 1890. Serial No. 357,254. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. MCCARTNEY, of the city of Rochester, county of Monroe, and State of New York, have invented certain new and useful Improvements in Railway-Signals; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

My present invention relates to that class of signals operating on the block system and adapted for use on railways wherever the track or way is divided into sections or blocks, each being provided with certain signaling devices indicating its condition and arranged to be actuated either automatically by the passage of trains or by hand; and it consists in certain novel constructions and combinations of parts, whereby the signals are more easily and positively operated than in prior arrangements, all as will be hereinafter fully described, and the novel features pointed out particularly in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a plan view of a section of track provided with my invention; Fig. 2, a detail plan view of adjoining ends of two sections or blocks; Figs. 3 and 4, detail sections of the inlet and outlet valves of a section; Fig. 5, a side elevation of the shoe or treadle for actuating the valves; Figs. 6, 7, and 8, plan, side elevation, and sectional views, respectively, illustrating a modification; Fig. 9, a perspective view of the ends of adjoining sections or blocks, and Fig. 10 a view of a detail.

Similar numerals of reference in the several figures denote similar parts.

In the carrying out of my present invention I provide a main or trunk pipe 1, extending the entire length of the section of track 2, to which the signals are to be applied, which pipe is supplied with air or fluid under pressure by suitable pumps, the pressure being maintained constant, or nearly so, at all times by automatic means such as are in use on trains supplied with air-brakes, or the pumps used to raise water into the tanks in use along railways may by suitable and obvious con-

nections be utilized to keep the pressure constant in the air-mains.

As is usual in block systems, the way is divided into sections, preferably, between stations, the signals for a block toward which the train is running being set to "danger" at this point and the one just left being set at "safety." In my system each block is provided with a section-pipe 3, extending along the way, and in the arrangement shown in Figs. 1 to 5 adapted to be connected at the entering end of the block with the main or trunk pipe 1 by suitable valves 4, while at the exit end of the adjoining section is arranged a valve 5, adapted to be actuated at the same time as valve 4 to permit the air to escape from the section-pipe. Connected with the section-pipe are suitable branch pipes 6, leading to signaling devices, which may consist of targets, lanterns, or any suitable apparatus desired, adapted to be actuated or set at "danger" by an increase of pressure in the branches and released or set at "safety" by a diminution in pressure.

In Fig. 9 is shown one of these signals consisting of a post 7, to which is affixed a cylinder 8, having a piston operating therein connected by a rod 9 with a target 10, adapted to be raised when the pressure in pipe 6 increases, so as to be exposed through an aperture in a covering-board 11, thus indicating danger; but adapted to fall when the pressure is relieved, removing the target and indicating "safety" or "line clear."

In Fig. 10 is shown another form of signaling device, wherein an arm or plate 12, located close to the rail, is raised by a piston 13 in cylinder 14, connected to a branch pipe 6, so as to strike an arm or shoe 15 on a train passing over it and operate the air-brakes, stopping a train automatically that might run on a section where signals are set at "danger" or actuating any suitable signal on the train.

As stated, it is desirable that pressure should be increased in the section entered by the train, so as to set all the signals therein at "danger," and diminished in the section just left, to set its signals at "safety," and as one means for accomplishing this result automatically I provide a shoe or bar 15 on the inside of the rail at the junction of the two adjacent



sections, pivoted at 16 and connected by a link 17 with an arm 18 on a rock-shaft 19, extending to the side of the track. On the end of the rock-shaft is a weighted arm 20 and a gear 21, meshing with gears 22 and 23 on the stems of valves 4 and 5, respectively, the arrangement of parts being such that as the train passes the shoe the flanges of the wheels will depress it, turn the rock-shaft, and open both valves 4 and 5, allowing the air in the section-pipe of the section the train leaves to escape, restoring its signals to normal—that is, safety—position, and connecting the pipe of the section it enters with the main, thereby setting all the signals therein at “danger.” The flanges of all the wheels of the train will operate on this shoe, and it will therefore be held down a sufficient length of time to cause the diminution of pressure and filling of the respective pipe-sections; but as soon as the train passes the shoe the weighted arm 20, which is raised by the movement of the rock-shaft, will in returning to normal horizontal position rotate the shafts and gears in the opposite directions and close both valves 4 and 5, the one containing air at normal atmospheric pressure and the other at augmented pressure, holding the signals. In order to prevent the too rapid return of the rock-shaft and valves to normal position, a dash-pot of ordinary construction or other suitable retarding device might be employed, if desired.

Instead of permitting the free escape of the air from the section in which the pressure is released, I prefer to pass it through a whistle 25 or other suitable signaling device, as shown, which when sounded will serve to notify the engineer that the system is in proper working order when his train passes from one section to another.

In Fig. 8 is shown a modified arrangement, in which the two valves 4 and 5 are united in one casing, the passage 26 serving to connect the section-pipe 27 with the exhaust-pipe 28, and passage 29 connecting section-pipe 30 with the main 1 when oscillated in the direction indicated by the arrow, Fig. 8, and when returned to normal position restoring the valve to the position shown. This same valve when operated upon by the means shown in Figs. 6 and 7 may be used on single-track roads to set the signals for trains moving from opposite directions. In said figures the shoe 31 is supported at opposite ends on links 32 and connected to an arm 33 on the rock-shaft 34, which latter forms or is connected to the stem of the valve, said arm 33 being maintained in upright position by a spring 35, operating on arm 33 on the rock-shaft or other suitable means, the construction being such that the rock-shaft can be turned in either direction by passing trains, and whichever way it is operated it will connect the pipe of the section from which the train passes with the exhaust and the pipe of the section to which it passes with the main, thereby always setting the signals at “danger”

in the section in which the train is. For ordinary use on double-track roads, the construction first described is better adapted, two sets of section-pipes being employed, as will be understood.

The signaling devices may be of any desired description, and may be either actuated directly by the air-pressure or released by the pressure and operated by other means—as, for instance, weights. If desired, the signals could be arranged to be set to “safety” by the admission of the air under pressure to the section-pipes and to “danger” by allowing said air to escape, and this might be advantageous in some instances, as any leak in the section-pipes would cause the signals to be set for “danger” if no train were in the section.

In case it is desired to arrange the signals so that any employé can set the signals to “danger,” I provide suitable connecting-pipes 38 between the main and branch pipes, and arrange a valve 36 therein, secured by a lock 37, of which the employé carries a key, so that at any time desired he can admit pressure to the branch, as in dotted lines, Figs. 1 and 2. It will further be understood that the main pipe extending along the track is to be considered merely a reservoir for air or fluid under pressure, and that if the section-pipes were supplied from separate reservoirs the result would be the same; but I prefer to employ a main pipe, as it affords a convenient means of supplying all the “blocks” without special local pumping plants.

I claim as my invention—

1. The combination, with the main pipe or conduit, of a series of branch pipes containing signals operated by pressure and valves in adjacent branch pipes directly connected for simultaneous operation, one to connect one branch with the main and the other with the open air, substantially as described.

2. The combination, with the way or track, of a main pipe extending along the way, a series of branch pipes containing signals operated by pressure, and valves in adjacent branch pipes positively connected for simultaneous operation, one operating to open one branch to the main and the other to the air, substantially as described.

3. The combination, with the main pipe, of two branch pipes having signaling devices operated by pressure, valves for connecting the branches with the main pipe and the open air, positively connected for simultaneous operation, and a device for automatically closing said valves after being operated, substantially as described.

4. The combination, with the way or track and a main pipe extending beside it, of two branch pipes having signaling devices operated by pressure, valves for connecting one branch pipe with the main pipe and the other with the open air, said valves being positively connected for simultaneous operation, and a device for automatically closing said valves



after being operated, substantially as described.

5. The combination, with the track or way and a series of pipe-sections beside it, each containing signaling devices operated by pressure, of a reservoir for air under pressure and valves for connecting said reservoir with the sections, valves for relieving the pressure in said sections, and direct connections between the supply and relief valves of adjacent sections for causing their positive and simultaneous operation, substantially as described.

6. The combination, with the track or way and a series of pipe-sections beside it, each containing signals operated by pressure, of a reservoir for air under pressure and valves for connecting said reservoir with the sections, valves for relieving the pressure in the sections, direct connections between the supply and relief valves of adjacent sections for causing their positive and simultaneous operation, and a signal (as a whistle) operated by the air escaping through the relief-valve, substantially as described.

7. The combination, with the track or way and a series of pipe-sections beside it, each containing signals operated by pressure, of a reservoir for air under pressure and valves for connecting said reservoir with the sections, valves for relieving the pressure in the sections, direct connections between the supply and relief valve of adjacent sections for causing their simultaneous and positive operation, and a treadle arranged in proximity to the track and adapted to be moved by passing trains to positively operate both said valves, substantially as described.

8. The combination, with the track or way,

of the main pipe, the section-pipes containing signals, the valves at each end, the rock-shaft positively connected to valves of adjacent sections, and the treadle connected to said rock-shaft arranged in proximity to the track, substantially as described.

9. The combination, with the track or way, the main pipe, and the section-pipes containing signals operated by pressure, of the inlet and outlet valves, those in adjacent sections being positively connected for simultaneous operation, the additional valves between the main and section pipes, and locking devices for securing them closed, substantially as described.

10. The combination, with the track or way, of the main pipe, the section-pipes containing signals, the valves at each end, the rock-shaft connected to valves of adjacent sections, the treadle connected to said rock-shaft arranged in proximity to the track, and the counterweight for returning the rock-shaft to normal position after being actuated, substantially as described.

11. In a pneumatic railway-signal, the combination, with an air-pipe, a cylinder connected therewith, and a piston in the cylinder actuated by pressure in the air-pipe, of a shoe or arm moved by said piston located in proximity to the track and a signal located on a railway-train on the track, adapted to be actuated by said shoe when projected by its piston, substantially as described.

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Witnesses:

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