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PATENTED SEPT. 10, 1907.

T. WOLFE.

RAILWAY SWITCH AND AUTOMATIC SIGNAL APPARATUS.

APPLICATION FILED FEB. 10, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

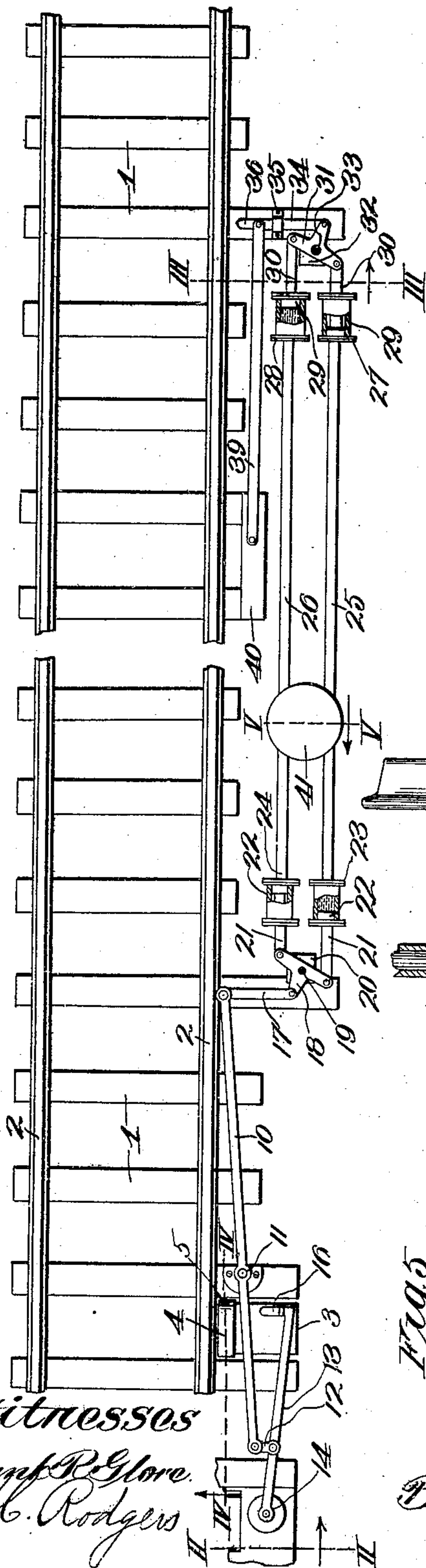


Fig. 2.

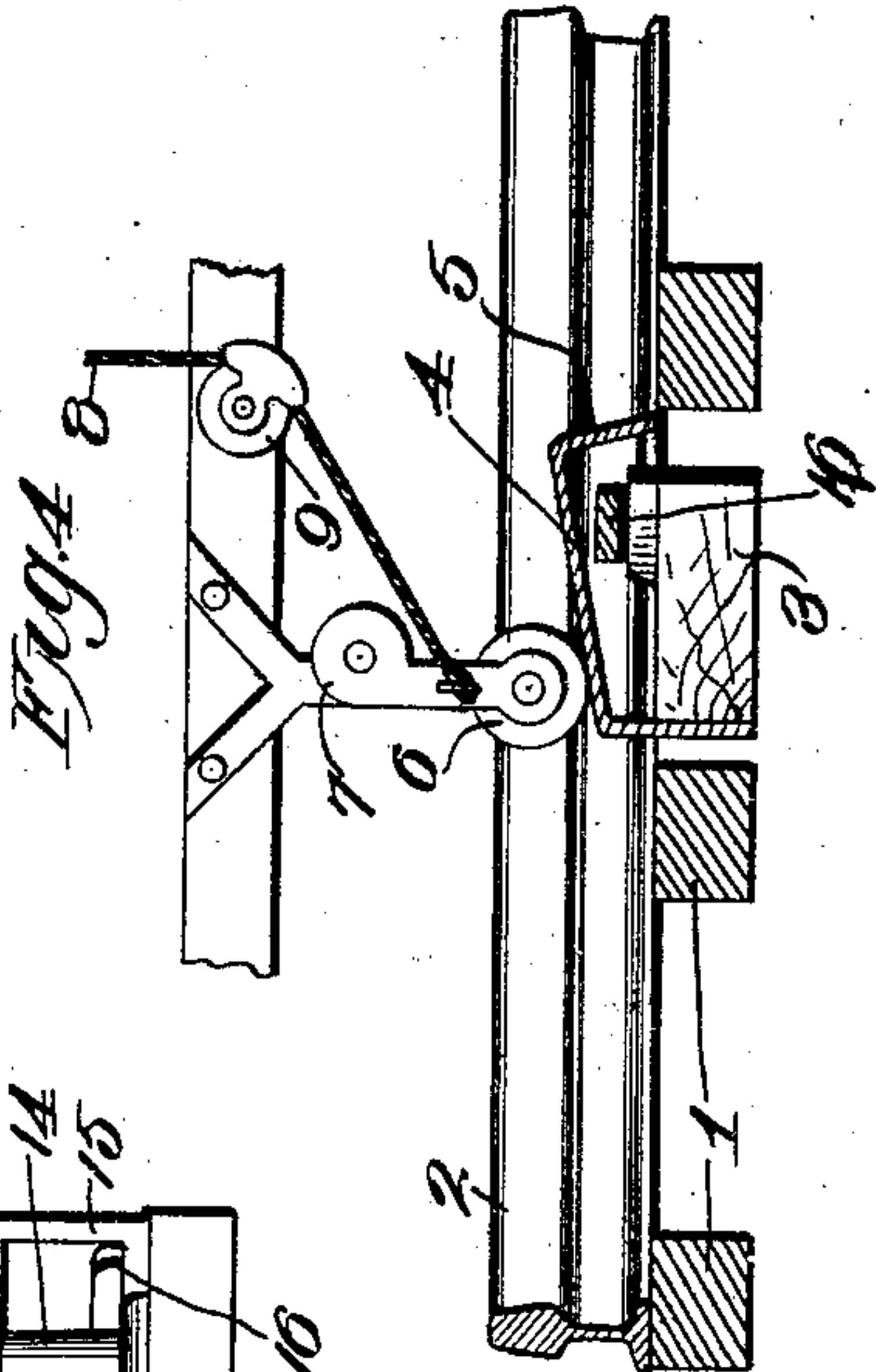
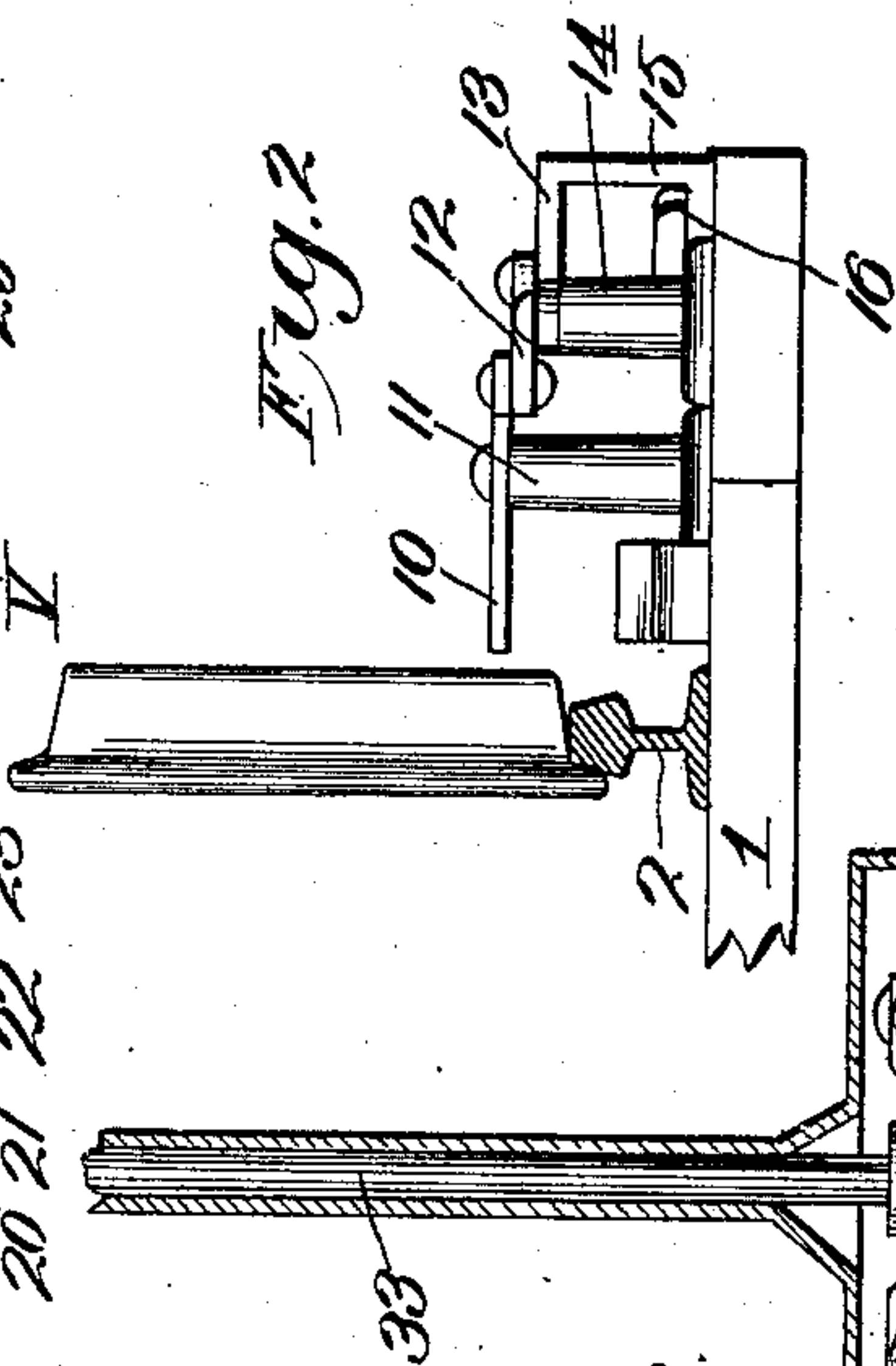


Fig. 4.

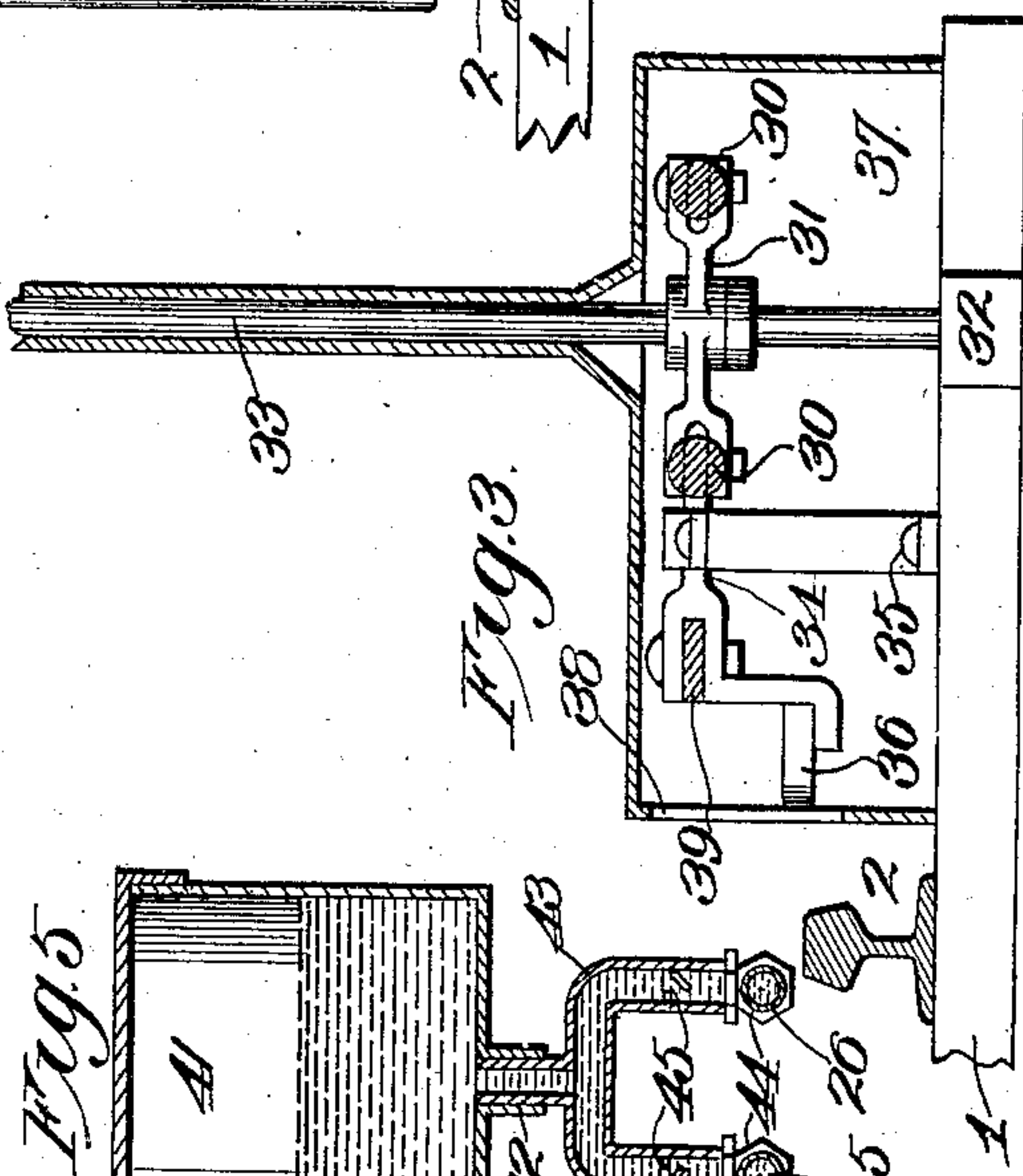
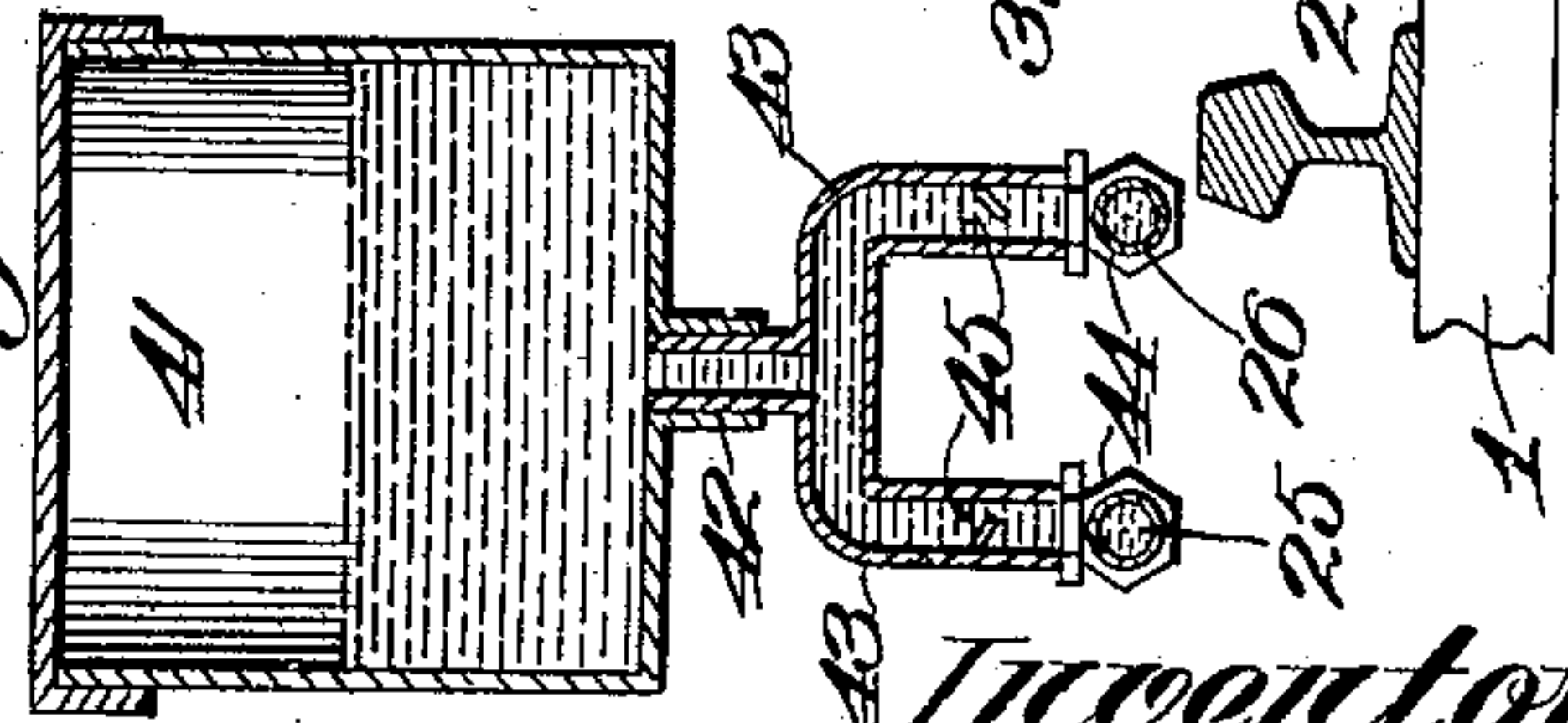


Fig. 5.



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RAILWAY SWITCH AND AUTOMATIC SIGNAL APPARATUS.

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2 SHEETS—SHEET 2.

Fig. 6.

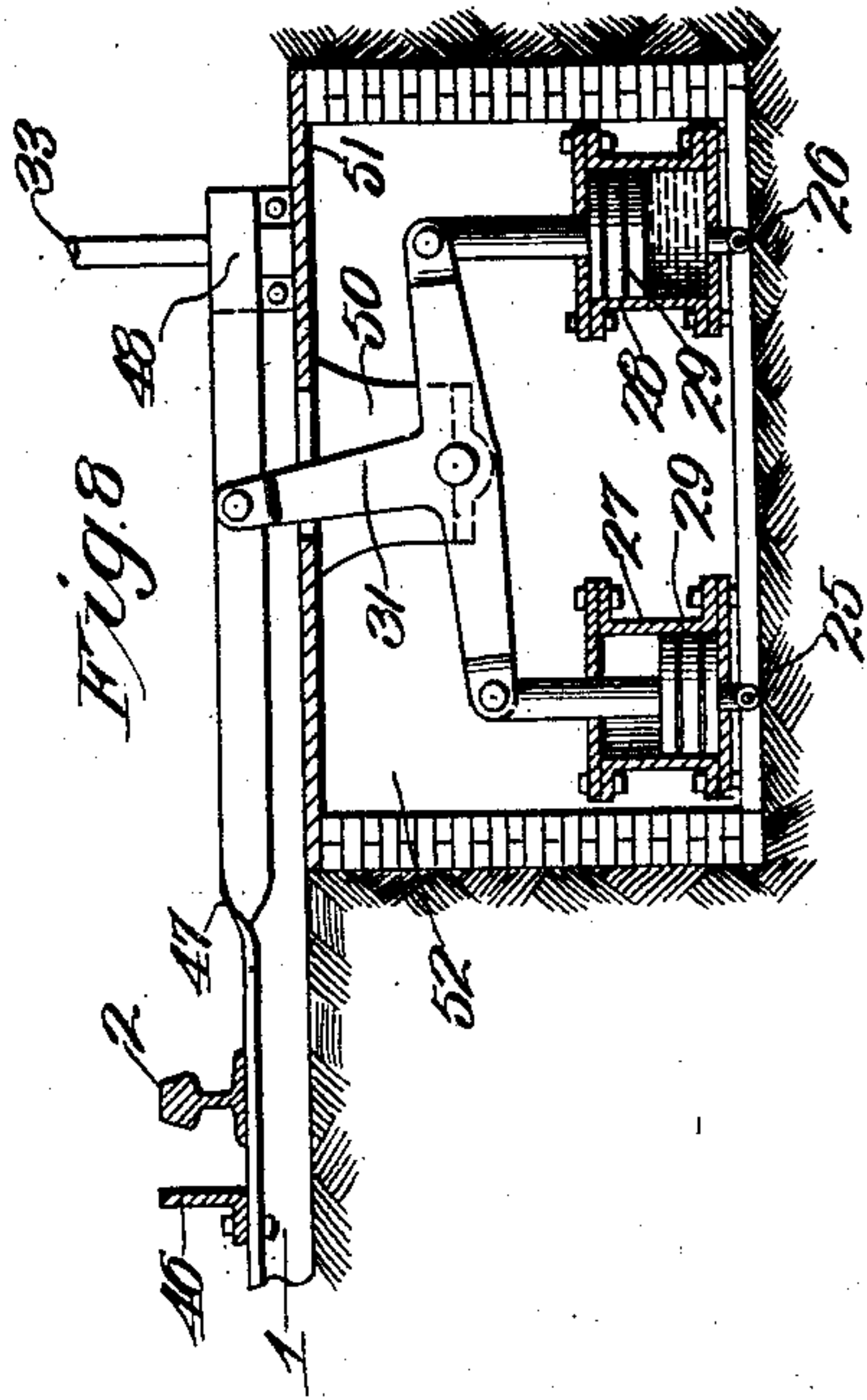
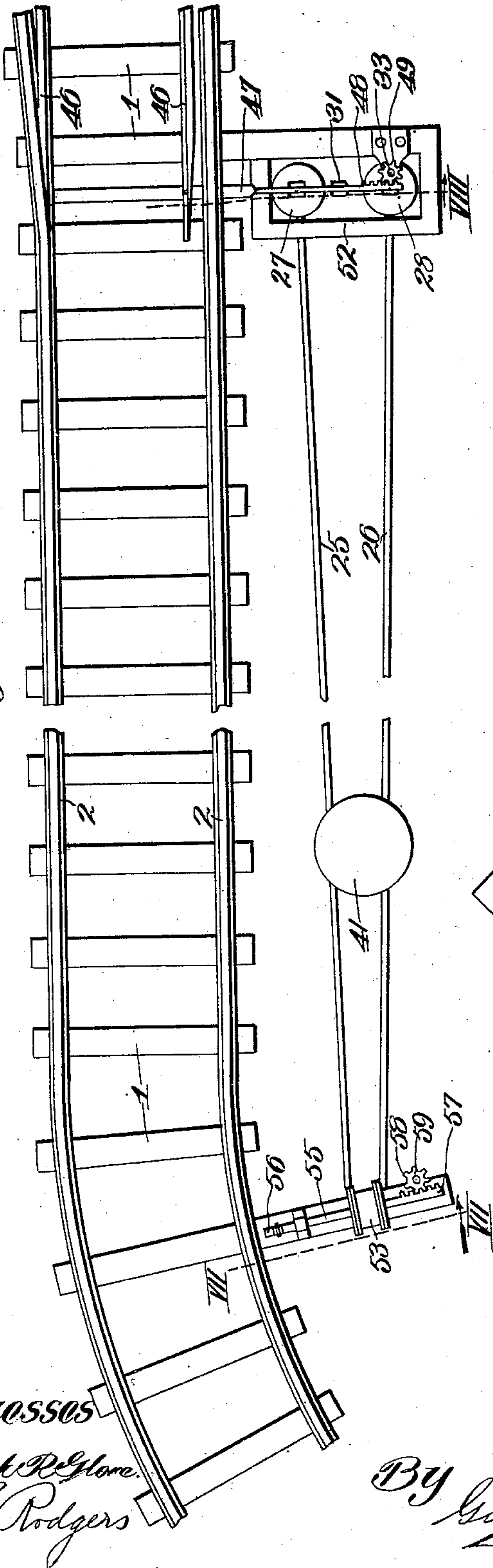
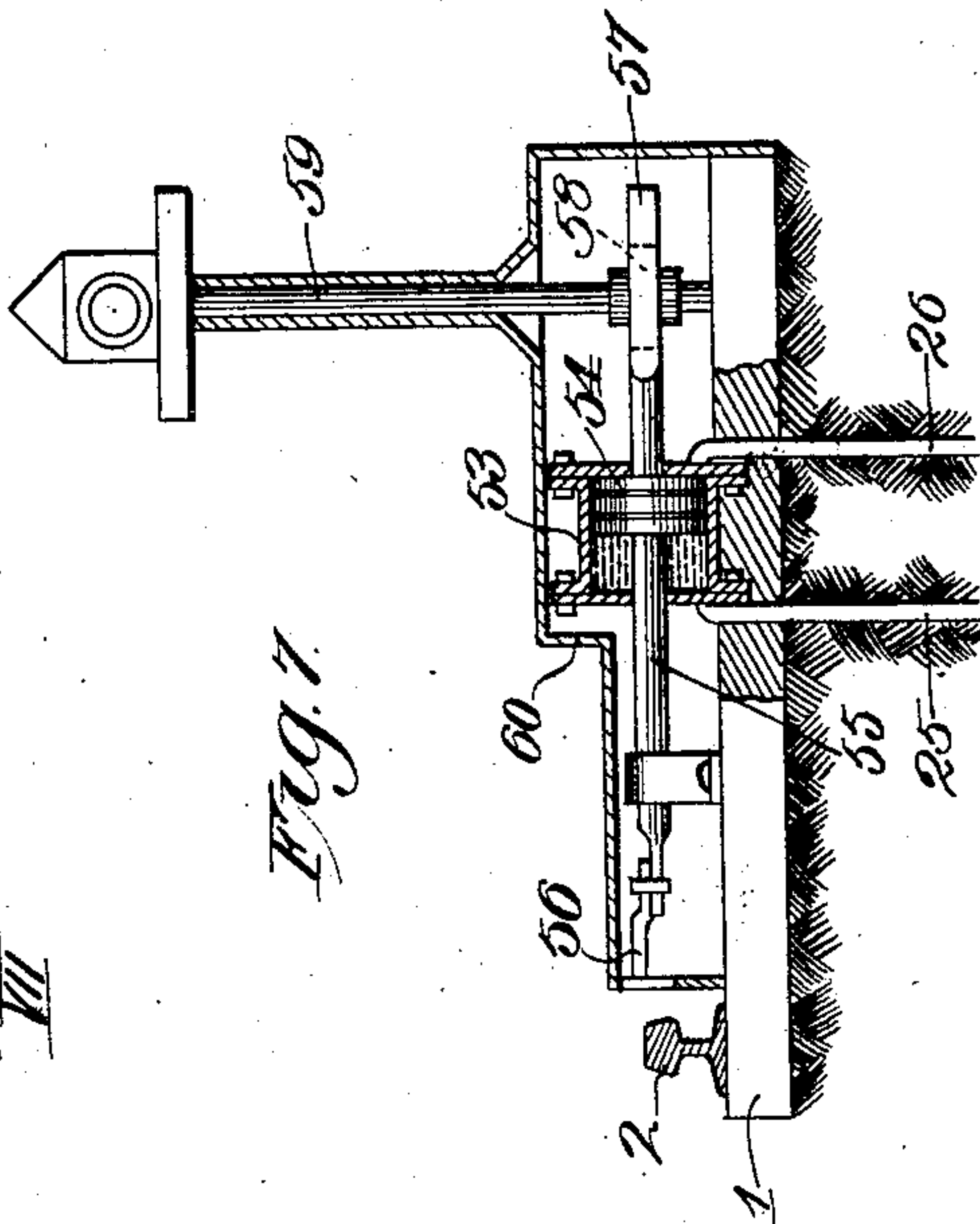


Fig. 7.



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# UNITED STATES PATENT OFFICE.

THOMAS WOLFE, OF KANSAS CITY, MISSOURI.

## RAILWAY-SWITCH AND AUTOMATIC SIGNAL APPARATUS.

No. 865,742.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed February 19, 1907. Serial No. 358,235.

*To all whom it may concern:*

Be it known that I, THOMAS WOLFE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain  
5 new and useful Improvements in Railway-Switches and Automatic Signal Apparatus, of which the following is a specification.

My invention relates to railway switch and automatic signal apparatus, and has for its object to produce  
10 an efficient and reliable apparatus of this character which can be installed at a comparatively small expenditure of time and which with but little attention and expense can be kept in perfect repair.

With this object in view the invention consists in  
15 certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1, is a broken plan view of a railway track  
20 equipped with automatic signal apparatus embodying my invention, the housings being omitted and the signal post shown in section. Fig. 2, is an enlarged cross section on the line II—II of Fig. 1, and disclosing a car wheel to show that it passes without affecting the mechanism. Fig. 3, is a cross section on the line III—III of  
25 Fig. 1, and showing a housing in section. Fig. 4, is a longitudinal section on the line IV—IV of Fig. 1. Fig. 5, is a section on the line V—V of Fig. 1. Fig. 6, is a broken plan view of a railway track and switch  
30 equipped with the automatic signal mechanism, certain housings and the top plate of another being omitted and the signal post shown in section. Fig. 7, is a section on the line VII—VII of Fig. 6, and showing a housing in section. Fig. 8, is a section on the line  
35 VIII of Fig. 6, but with the top plate of the housing in position.

Referring to the drawings in detail, 1 indicates the cross ties and 2 the rails of a railway track.

3 is a block contiguous to the right hand side of the  
40 track with respect to the direction of travel, and 4 a spring plate carried by and overhanging said block and having a depending flange 5, at its free end, said plate being adapted to be depressed by the roller of a rule-joint frame 7 depending from one of the cars of a passing train, said frame being of the type mentioned in  
45 order that it shall reliably depress the plate and yet be capable of being elevated to inoperative position by a pull on the cable 8, attached to the lower portion of the frame and guided around the pulley 9 mounted on the  
50 car, the cable leading to within convenient reach of the engineer or fireman who permits said lower portion to swing downward to operative position at the proper time. It is to be understood that this plate is located at one end of a block of track.

55 10 is a long lever contiguous to plate 4, and converging forwardly with respect to the track, its position and

inclination being such that the roller 6 shall strike it rearward of its front end and comparatively speaking, swing it gradually outward so as to avoid seriously jarring the connected mechanism. Said lever is pivoted  
60 on stand 11, secured to a tie and projects forward of the plate 4, and also rearward thereof by preference, and at its rear end is connected pivotally by link 12, to a swing arm 13, pivoted on stand 14, or otherwise, the front end of the swing arm having a depending portion  
65 15, to which a torpedo 16 is attached, said torpedo projecting toward the track so that the operation of the lever 10, by the passing train shall swing arm 13 inward and dispose the torpedo between the block 3 and plate  
70 4, where it is exploded by the depression of said plate by the roller 6 of a following train to notify the engineer thereof that a train is on the block.

17 is a link pivotally connecting the front end of lever 10 with the stem of a T-lever 18, pivoted as at 19,  
75 on block 20, the arms of said T-lever being pivotally connected to the stems 21 of pistons 22, of cylinders 23 and 24, which cylinders may be located above ground and in a suitable housing (not shown) but preferably will be housed below the surface of the ground.  
25 and 26 are pipes leading from the opposite ends of  
80 said cylinders to a second pair of similar cylinders 27 and 28 respectively, located at the opposite end of the "block", said cylinders and the pipes being also buried in the ground by preference. The pipes are  
85 charged with a non-compressible fluid, preferably oil, because it will move with the least friction in the pipes. This oil also enters the cylinders and bears against the faces of the pistons which are nearest the pipes, so that movement imparted to one set of pistons is transmitted  
90 to the others.

The pistons 29 of cylinders 27 and 28 respectively have their stems 30, pivotally connected to the arms of the T-shaped lever 13, pivoted on block 32, the pivot being rod 33 adapted to support the usual or any preferred type of visual signal, for day and night service.  
95 The stem of the lever is pivotally connected to a reciprocatory bar 34, suitably guided in bracket 35 mounted on a tie and having secured to its end adjacent to the track a torpedo 36, which is disposed upon the proximate track rail as hereinafter explained.  
100 The lever and torpedo-carrying bar are preferably covered by a housing 37 (Fig. 3) provided with an opening 38, through which the bar projects the torpedo. Pivoted to said bar is along lever 39 mounted on block  
40, and normally occupying the position shown, but  
105 which through certain instrumentalities described is caused by the outward movement of lever 10, to swing toward the track and occupy a position in the path of the train which operated said lever 10, the same action resulting in disposing the torpedo 36 upon the track.  
110

41 indicates an oil tank preferably buried in the ground in practice but occupying a higher plane than



the cylinders, and provided with a depending discharge pipe 42, having branch pipes 43, coupled as at 44, to pipes 25 and 26 flap valves 45 in pipes 43 permitting additional oil from the tank to enter pipes 25 and 26 whenever loss of oil therefrom occurs by leakage or otherwise. As long as the tank contains oil the pipes are fully charged and the full and proper operation of the signal mechanism is assured.

From the foregoing it will be seen that a train moving in the direction indicated by the arrow Fig. 1, forces lever 10, outward and disposes torpedo 16 beneath the plate 4, and at the same time through the medium of link 17 and rock lever 18, it moves the pistons of cylinders 23, 24, in opposite directions so as to eject oil from cylinder 23 into connecting pipe 25, and permit oil to enter cylinder 24, from pipe 26. The result is, the oil forced into the pipe displaces an equal quantity at the opposite end, the displaced oil entering cylinder 27, and moving its pistons, which movement through the instrumentality of lever 31 operates the piston of cylinder 28 and forces oil into cylinder 24 so as to maintain the pressure on its piston. Said lever also turns the pivot rod to disclose the proper color as a signal to the engineer of the train in the block or a train backing toward the block from the opposite direction, and furthermore causes bar 34 to dispose the torpedo 36 upon the track rail where it will be exploded by the last-named train, should the engineer fail to observe the usual signal and thus warn him that a train is in the block, as the explosion of the torpedo 16 warns the engineer of a following train that the preceding one is in the block. The roller 6, of the last-named train, just before it passes out of the block engages lever 39 converging toward the rail and forces it outward of its original position, which action reverses the operation described and restores the apparatus to its original position and thus informs the engineer of a train approaching the block from either direction that the block is "open", that is, that no train is in the block. It is understood, however, that with the apparatus shown, trains are intended to pass only one way, as the other track (not shown) for trains traveling in the opposite direction will be equipped with similar apparatus.

Referring now to the combined switch and signaling mechanism where parts in common with those already described are correspondingly numbered, 46 is the usual switch and 27 the bar connecting the switch rails and taking the place of torpedo-carrying bar 34, and equipped with a rack-bar extension 48, meshing with a cog wheel 49, mounted rigidly on rod 33, suitably journaled. The lever 31 in this instance is disposed for operation in a vertical plane and is journaled on an arm 50, depending from the top or cover 51 of the pit or housing 52. In this case the cylinders 27 and 28 are vertically disposed, and the pipes 25, 26 leading to the opposite end of the block communicate with opposite ends of a cylinder 53, disposed horizontally and at right angles to the tracks. The piston 54 of cylinder 53, has its stem 55, projecting through both ends of the cylinder and equipped at the end near the track with a torpedo 56, and at the opposite end with a rack bar 57 engaging a gear wheel 58, of signal stand rod 59, the upper end of the rod carrying the usual board and lantern for day and night signaling, said signals warn-

ing the engineers of the trains approaching the switch from either end of the block that the switch is "open" or closed as the case might be.

When the switch is closed, as shown the torpedo is withdrawn and the signals show the "safety" or "clear" color. When the switch is open, the "danger" color is exposed and the torpedo is upon the track to give audible warning by explosion as the first wheel of the train passes over it, of the condition of the switch, it being understood that the switch and signal mechanism are manipulated by an operator in the usual or any preferred manner. The mechanism at the torpedo end of the block is housed as at 60, or otherwise. The housings in all cases are for the purpose of protecting the mechanism from snow, rain, or accidental injury, or injury by mischievous or malicious persons.

From the above description it will be apparent, that I have produced a railway switch and automatic signal apparatus which possesses the advantages enumerated in the statement of invention, and which can be operated with a minimum of power not only because of the use of a lubricant as a power transmitting agent but also because the employment of duplicate sets of cylinders and pipeways through which the oil passing in opposite directions simultaneously tends to create a vacuum in a cylinder at each end of the line, which vacuum coöperates in effecting the movement of the oil in both pipeways. This construction furthermore equalizes on all grades the resistance offered by the operated levers of the automatic switch mechanism, because the oil of one pipeway flows downward to counterbalance that forced to flow upward.

The invention is obviously susceptible of modification without departing from the spirit and scope or sacrificing any of its advantages.

Having thus described the invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a mechanism of the character described, the combination of a pair of cylinders equipped with pistons, a second pair of cylinders, equipped with pistons, pipeways connecting one pair of the cylinders with the other, connections between the pistons of each pair of cylinders, and a non-compressive fluid in each pipeway adapted for transmitting movement from one piston of each pair to the companion piston of the other pair of cylinders.

2. In a mechanism of the character described, the combination of a pair of cylinders equipped with pistons, a second pair of cylinders equipped with pistons, pipeways connecting one pair of cylinders with the other, connections between the pistons of each pair of cylinders, a non-compressive fluid in each pipeway adapted for transmitting movement from one piston of each pair to the companion piston of the other pair of cylinders, and a signal mechanism connected to and operated by the movement of one pair of said pistons.

3. In a mechanism of the character described, the combination of a pair of cylinders equipped with pistons, a second pair of cylinders equipped with pistons, pipeways connecting one pair of cylinders with the other, connections between the pistons of each pair of cylinders, a non-compressive fluid in each pipeway adapted for transmitting movement from one piston of each pair to the companion piston of the other pair of cylinders, a signal mechanism connected to and operated by the movement of one pair of said pistons and a switch operating mechanism connected to and operated from the other pair of pistons.

4. In a mechanism of the character described, the combination of a pair of cylinders, pistons therein, a rock lever pivotally connected to said pistons, a second pair



of cylinders provided with pistons, a rock lever connecting said pistons, pipeways connecting one pair of cylinders with the other, a non-compressive fluid in said pipeways and between the pistons, means to operate one of said rock-levers, and signal mechanism operatively connected to the other rock lever and embodying a torpedo-carrying arm to dispose a torpedo contiguous to or remote from the trackway.

5 5. The combination of a pair of cylinders equipped with pistons, a second pair of cylinders equipped with pistons, pipeways connecting one pair of the cylinders with the other, connections between the pistons of each pair of cylinders, a non-compressive fluid in each pipeway adapted for transmitting movement from one of the pistons to the companion piston of the other pair of cylinders, a lever connected to simultaneously operate one pair of said pistons, a second lever connected to the other pair of pistons, and car-carried means for successively operating the said levers.

20 6. In a mechanism of the character described, the combination of a pair of cylinders, a pipeway connecting the cylinders, a piston in each cylinder, means for operating one of said pistons, a non-compressive fluid in the pipeway and adapted to transmit the power applied on one piston to the other, and means for automatically supplying additional non-compressive fluid to the pipeway to compensate for loss therefrom.

25 7. In a mechanism of the character described, the combination of a pair of cylinders equipped with pistons, a second pair of cylinders equipped with pistons, pipeways connecting one pair of the cylinders with the other, connections between the pistons of each pair of cylinders, a non-compressive fluid in each pipeway adapted for transmitting movement from one piston of each pair to the companion piston of the other pair of cylinders, and means for automatically supplying additional non-compressive fluid to the pipeway to compensate for loss therefrom.

30 8. In a mechanism of the character described, the combination of a pair of cylinders equipped with pistons, a second pair of cylinders equipped with pistons, pipeways connecting one pair of the cylinders with the other, connections between the pistons of each pair of cylinders, a non-compressive fluid in each pipeway adapted for transmitting movement from one piston of each pair to the companion piston of the other pair of cylinders, and means for automatically supplying additional non-compressive fluid to the pipeway to compensate for loss therefrom.

40 8. In a mechanism of the character described, the combination of a pair of cylinders equipped with pistons, a second pair of cylinders equipped with pistons, pipeways connecting one pair of the cylinders with the other, connections between the pistons of each pair of cylinders, a non-compressive fluid in each pipeway, adapted for transmitting movement from one piston of each pair to the companion piston of the other pair of cylinders, and means for disposing a torpedo in position to be exploded by a passing train and for simultaneously withdrawing another torpedo from such path.

45 In testimony whereof I affix my signature, in the presence of two witnesses. 50

THOMAS WOLFE.

Witnesses:

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G. Y. THORPE.