(No Model.) 2 Sheets—Sheet 1.

G. H. WRIGHT.

AUTOMATIC SIGNAL FOR CROSSINGS OF CABLE RAILWAYS.

No. 407,389. Patented July 23, 1889.

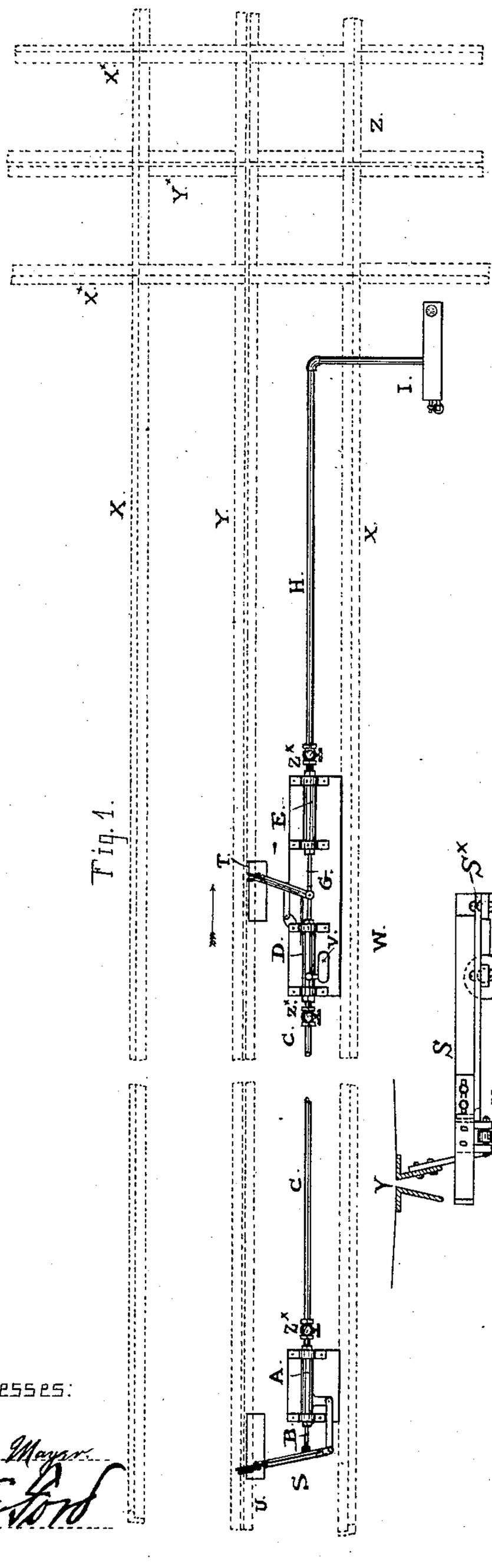

Fig. 1.

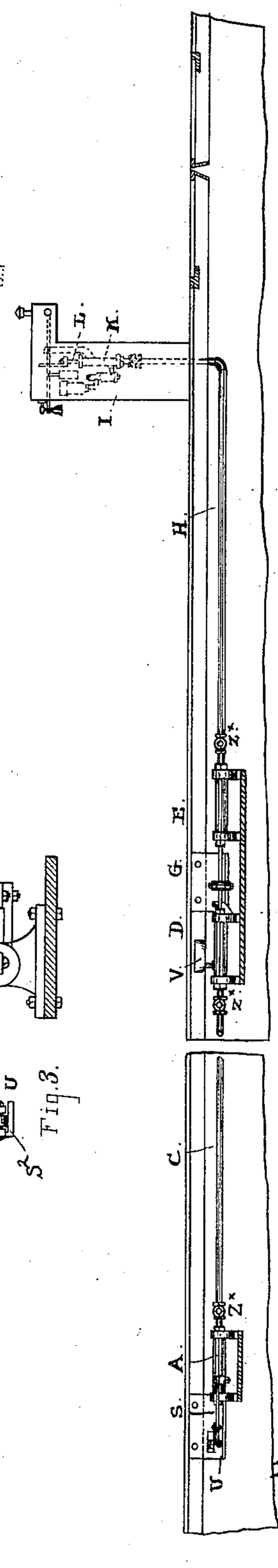

Fig. 2.

Fig. 3.

Witnesses:

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Atty's.

(No Model.) 2 Sheets—Sheet 2.

G. H. WRIGHT.

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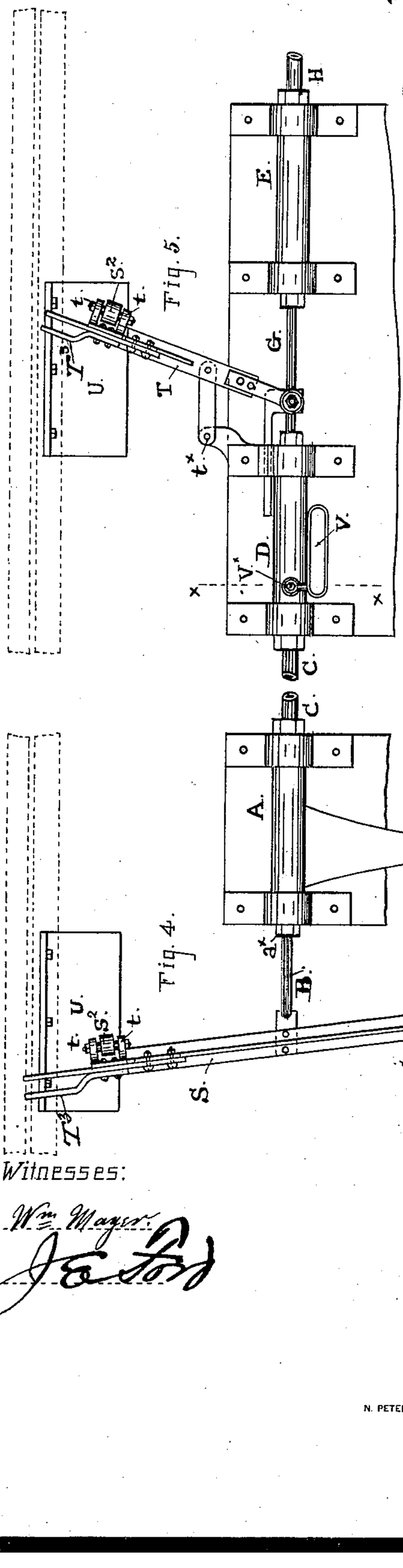

Fig. 5.

Fig. 4.

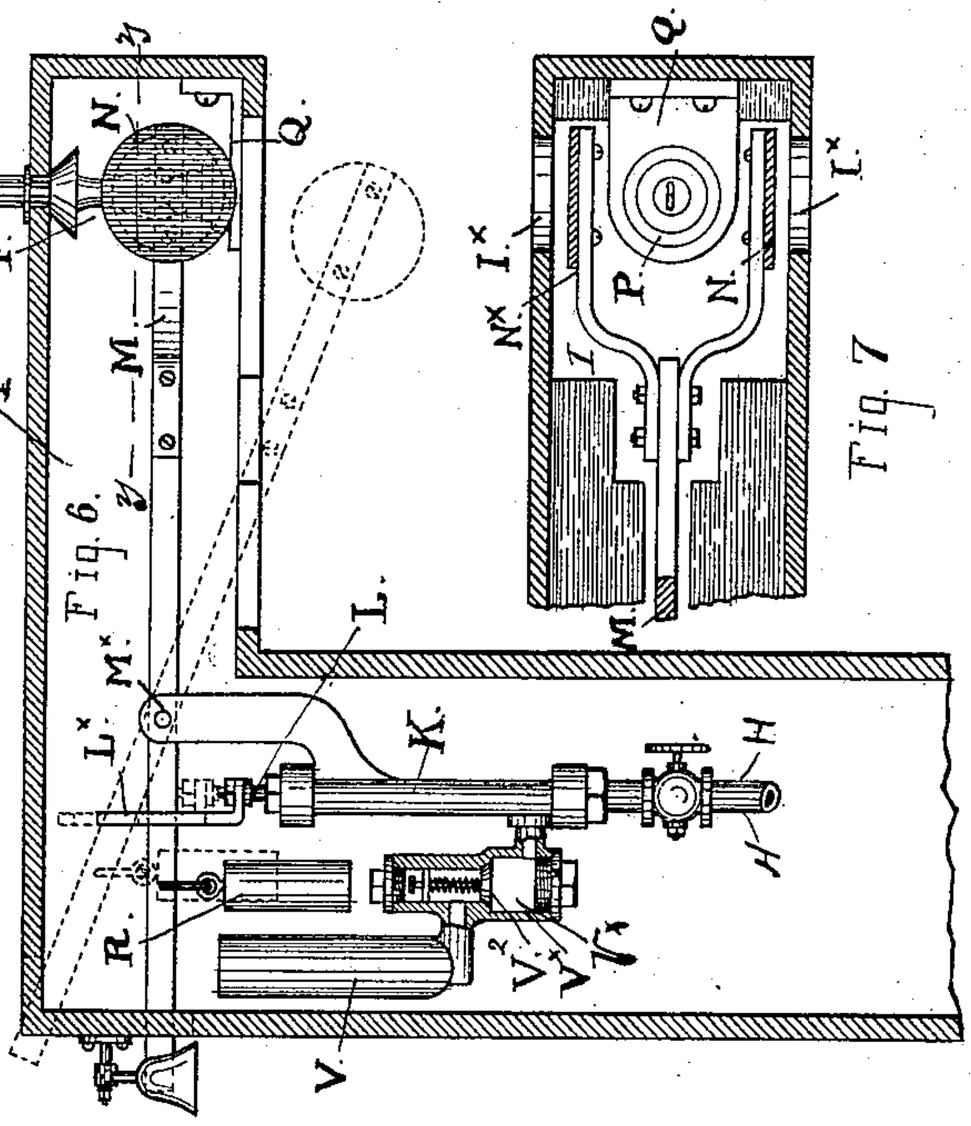

Fig. 6.

Fig. 7

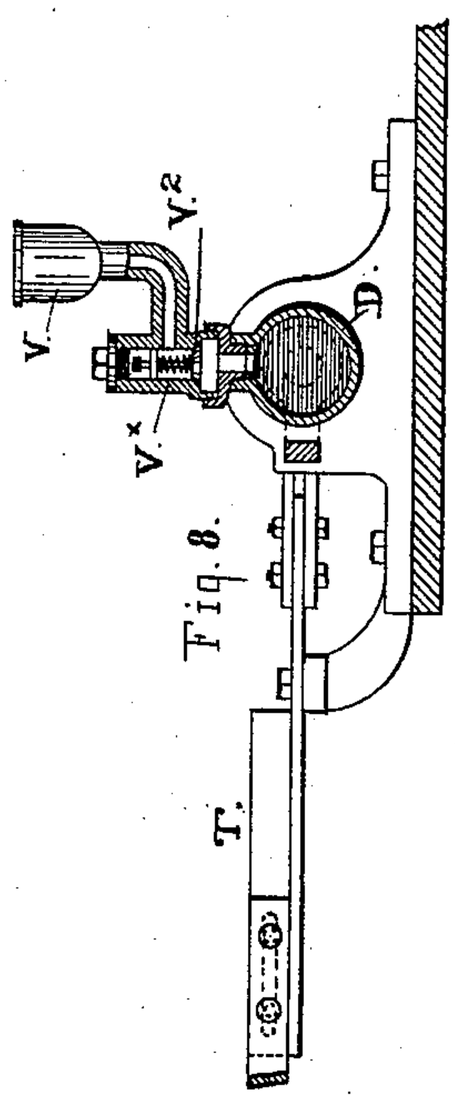

Fig. 8.

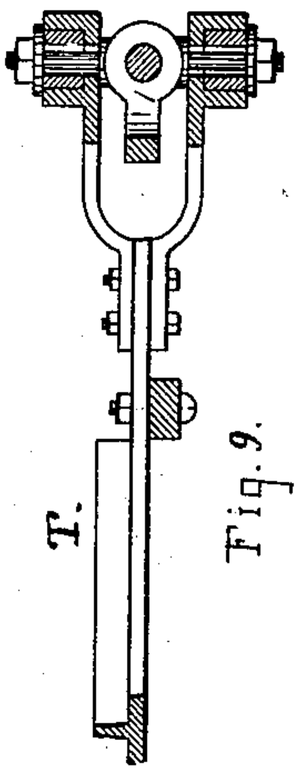

Fig. 9.

Witnesses:

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J. E. Lord

Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE H. WRIGHT, OF SAN FRANCISCO, CALIFORNIA.

AUTOMATIC SIGNAL FOR CROSSINGS OF CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 407,389, dated July 23, 1889.

Application filed February 5, 1889. Serial No. 298,785. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. WRIGHT, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented certain new and useful Improvements in Automatic Signals for Crossings of Cable Railways, of which the following is a specification.

My invention has for its object to produce a signal mechanism for the crossings of intersecting lines of road to be operated automatically by the moving car or train before it reaches the crossing-point, whereby suitable notice or signal is given to the trains of the cross-line of road without the attendance and services of a signal-man. I secure the desired end and object and produce an automatic signal mechanism particularly adapted for cable railroads and other roads that run under moderate speed by means of the construction and combination of parts and mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents the crossing of two single-track roads with my signal mechanism arranged in position for operation by the trains of one road, the parts being shown in plan. This is the simplest form and arrangement of the mechanism, and it is designed to be operated only by the trains on one line, as the other road has the right of way. The same arrangement of signal-box and mechanism, however, can be provided for the cross-road, and likewise for roads having double tracks each line may have its separate signal mechanism. Fig. 2 is an elevation of the parts principally in longitudinal section. Fig. 3 is a cross-section taken across the track-slot at the left-hand end of Figs. 1 and 2, but on a larger scale. Figs. 4 and 5 are top views of the principal parts of the mechanism, also on a larger scale than the foregoing views. Fig. 6 represents the signal-box in elevation and the parts of the mechanism that are located in the box. Fig. 7 is a section taken horizontally through the signal-box at the line $y\ y$, Fig. 6. Fig. 8 is a vertical cross-section taken through the liquid-supply reservoir and adjacent parts at about the line $x\ x$, Fig. 5, but on a larger scale. Fig. 9 is a detail view of the lever and connections by which the signal is set for operation after each time of display.

The principal parts of this signal mechanism consist of a suitable signal device—such as a target or disk for a day-signal or a light for use at night—an arrangement of cylinders and pistons or plungers filled with a liquid that will not congeal in cold weather, and which serves as the medium of transmitting a force of pressure applied at one end of the line of pipe to a signal-actuating mechanism at the other end, and an arrangement of pistons or plungers and of levers adapted to be acted on by the grip-bar or a projecting bar carried by the grip-car or motor-car of the train in suitable position with regard to the surface of the roadway for that purpose. In connection with these parts there is also provided a liquid-supplying reservoir for the purpose of keeping the lines of pipe always filled and for replacing from time to time, as required, whatever loss of liquid may take place through leakage and other causes.

In the arrangement shown in Figs. 1 and 2 the signal mechanism is placed on one line of road, as before mentioned.

X $X^{\times}$ are the track-rails, and Y $Y^{\times}$ the slots in which the grip-bar travels.

A is a stationary cylinder fixed on a suitable bed-plate, that may be bolted to the frame-work of the roadway within the cable-tube, and B is a plunger working in one head of the cylinder through a stuffing-box $a^{\times}$. From the opposite head a pipe C is laid along the cable-way forward or toward the crossing to a point W nearer to the crossing-point Z, where the pipe is joined to a cylinder D, similar in size and position to the cylinder A. In the same manner a second section of pipe H, with cylinders E and K at opposite ends, is laid from the point W, where the cylinder D is set, to the point where the signal-box is placed. The cylinder E of this second section is fixed on the same plate or support with the cylinder D and in line with it, so that a double piston or plunger G, fitted to slide in the adjacent heads of the two cylinders, will work smoothly through stuffing-boxes in the cylinder-heads. The pipe leading out of this cylinder E terminates in the cylinder K, that is set inside the signal-box

and is fitted with a plunger L. These cylinders and connecting-pipes being filled with a suitable liquid—such as kerosene-oil—that will not be affected by low degrees of temperature and all joints and connections being liquid-tight, it will be seen that a sufficient force applied against the end of the plunger B in the direction of its length will move the plunger G, and through that part will act upon the confined liquid in the second set of pipes and cylinders and force out the plunger L. Connection of the part L is made with a pivoted arm or lever M, carrying the signal on its outer end, and thus the arm is moved and caused to display the signal as often as the plunger L is forced out of its cylinder.

The plunger B at the head of the line is connected with a horizontally-moving lever S, having one end pivoted to a fixed point $S^{\times}$ and the opposite end set across the grip-slot in suitable position to stand in the path of the grip-bar, so that it will be struck and pressed forward when the grip-bar passes that point.

The outer end of the lever is supported by a stationary plate U, bolted to the framework in position under the lever to present a track or surface for a traction-roller S^2, that is fixed to the leading side of the lever in brackets *t t*. These parts, as clearly shown in Fig. 4, serve to support the outer end of the lever and prevent irregular movements out of line. A similar lever T is connected with the double plunger G between the two cylinders D E; but it is also so arranged that when struck by the advancing grip-bar it applies its power in a direction contrary to that of the first lever, in consequence of which the plunger G is moved backward by this lever T. Such movement, as often as it takes place, sets the lever S back into position, and also relieves the liquid confined between the two plungers G and L, by virtue of which the signal-arm is brought back into place again and the mechanism is set ready for operation as soon as the following train comes to the first lever. The lever T and its plunger thus perform the double service of bringing the lever S to place and of throwing the signal out of action.

The signal-arm M is inclosed in the box I, Figs. 6 and 7, and works on a pivot $M^{\times}$ through the slotted opening in the bottom of the box. The end of the arm is forked and carries two disks N $N^{\times}$, that are set at suitable distance apart to take in a lantern P.

Support for the lantern is provided on a bracket Q in the end of the box, on the two sides of which the disks play up and down to cover or to uncover the light. Sight-openings in the sides of the box, through which the light shows, are covered by the disks when the signal-arm is drawn up or are uncovered to expose the light when the arm is dropped. These movements are produced by a weight R on the shorter arm of the lever and the plunger L, before mentioned, the plunger being connected with the lever M by the forked or slotted plate $L^{\times}$, fixed on the top of the plunger and setting under the lever to raise the shorter member by the upward thrust of the plunger, and the weight being of sufficient size to overcome the weight of the longer member and its disks, and also whatever resistance may be due to the friction of the plunger in its cylinder. As thus set up and arranged it will be seen that the signal-lever is projected through the opening of the signal-box as often as the plunger B is forced into its cylinder, and also that the plunger L is relieved of the pressure of the confined liquid beneath it and the weight R is allowed to act when the plunger G is moved back. The lever S therefore operates to set the signal and the lever T to throw it off. The dotted lines in Fig. 6 of the drawings indicate one position and the full lines show the other position of these parts of the mechanism at the box. In addition to these signals a bell or gong can be operated by the same means, the lever being arranged to act directly on the bell, as shown in Fig. 6, or to work a striker.

In Figs. 5, 6, and 8 is shown an attachment to keep the pipes and cylinders always properly filled with liquid, and thus to insure constant and reliable action of the apparatus, this attachment consisting of a cup or small receptacle V, to form a reservoir holding a suitable quantity of liquid, and a connecting pipe or passage in which is a valve-chamber $V^{\times}$, fitted with an outwardly-acting valve V^2. As this valve is set to close and be held to its seat by the pressure of the liquid in the pipes and cylinders, but to open when the pressure is taken off, the communication between the reservoir and pipes is interrupted while the signal is being worked; but at all other times the liquid in the reservoir may pass into the pipes to supply whatever loss may take place from time to time through leakage and other causes. A reservoir and valved connection of this kind is applied to one of the cylinders in the line of pipe C and in like manner to one of the cylinders of the pipe H. In the last-mentioned line of pipe I have placed the reservoir in the signal-box, where access may readily be had for filling and cleaning the reservoir. Shut-off cocks Z Z should be provided at points in the lines of pipe to enable the cylinders and plungers to be removed for cleaning or repairs.

The pieces T^3 on the back sides of the levers S T are spring-tongues that set off from the lever to take the blow or first contact of the grip-bar or part that is carried by the car, and thereby relieve the lever from too-sudden force where a train is moving under full headway.

From the foregoing description and illustrations any person familiar with the construction and operation of signal apparatus and other devices worked automatically by or from a projecting bar or part on the moving

train can understand how to apply and adapt my improved mechanism to roads of different kinds as well as to those propelled by underground cables.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described automatic signal mechanism for railway-crossings, adapted to be operated by a moving car or train, consisting, essentially, of the line of pipe C, terminating in cylinders A D and filled with liquid, the line of pipe H, also containing liquid and having at one end a cylinder E in close relation to the cylinder at the end of the line of pipe C, the double plunger G, working in both of said cylinders, a plunger B, fitted to the leading cylinder A, the levers S T, connected with the plungers B and G, respectively, and projecting in the path of a bar or projecting part carried by the car to move said plungers when struck by said part, and the cylinder K at the end of the line having a plunger connected to a suitable signal, substantially as set forth.

2. In a signal mechanism, the combination of a line of pipe having cylinders at the opposite ends fitted with plungers, means for applying pressure to the end of the leading plunger to act on a body of liquid confined in said pipe and cylinders and through the medium thereof to move the plunger of the cylinder at the opposite end of the line, and the intermediate cylinders D E, having a plunger G common to both, and means by which said plunger can be moved back or in a direction contrary to the movement given to the leading plunger, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

GEORGE H. WRIGHT. [L. S.]

Witnesses:
C. W. M. SMITH,
CHAS. E. KELLY.