No. 767,014. PATENTED AUG. 9, 1904.

S. T. SHOW.

RAILWAY SIGNAL APPARATUS.

APPLICATION FILED DEC. 8, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

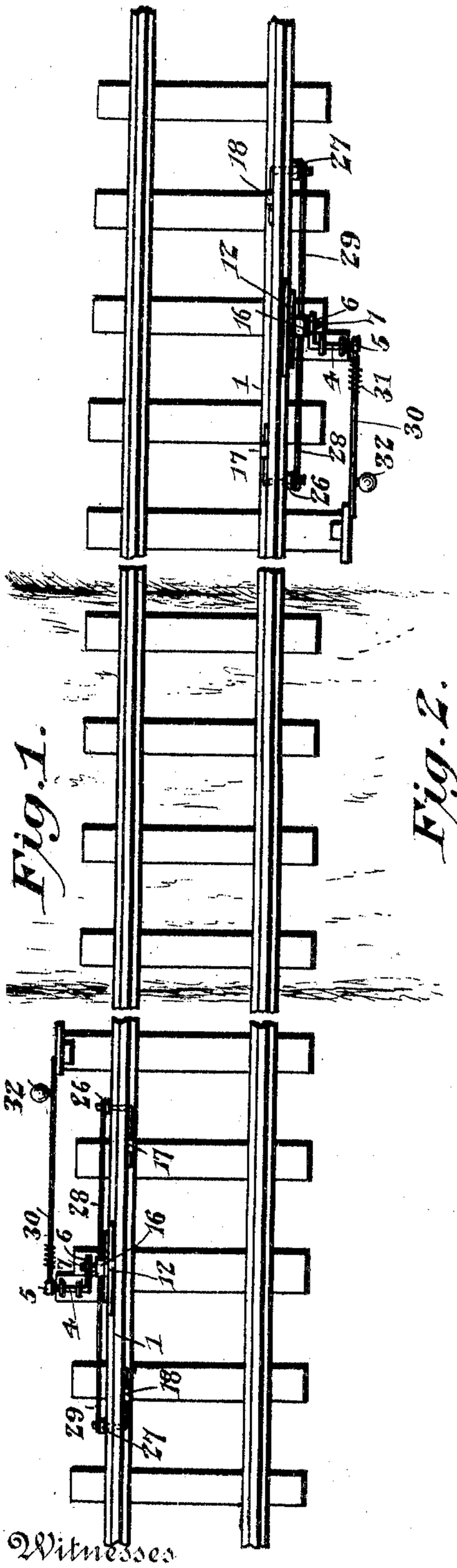

Fig. 1.

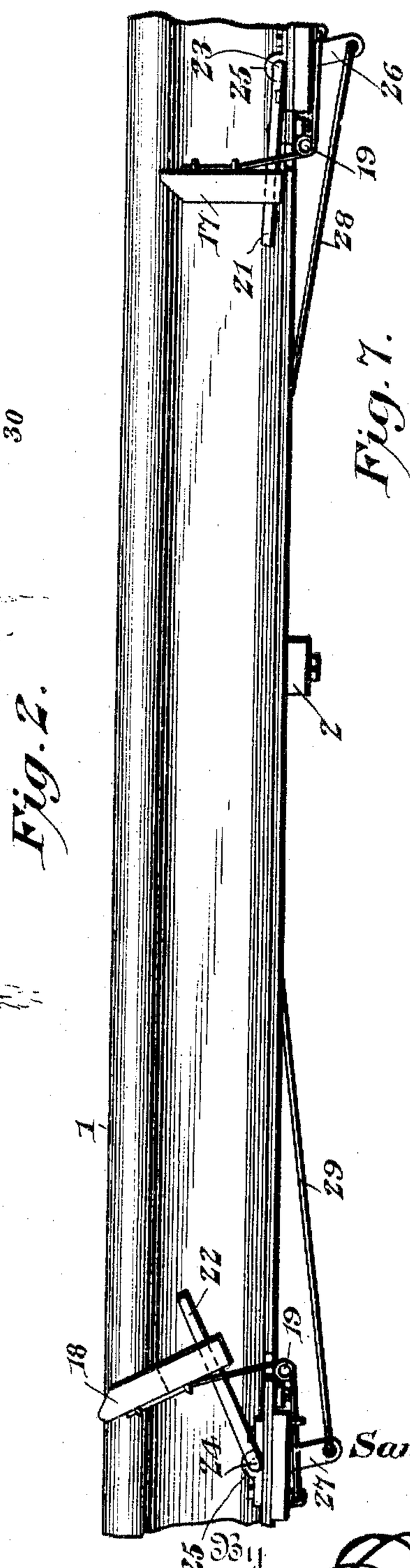

Fig. 2.

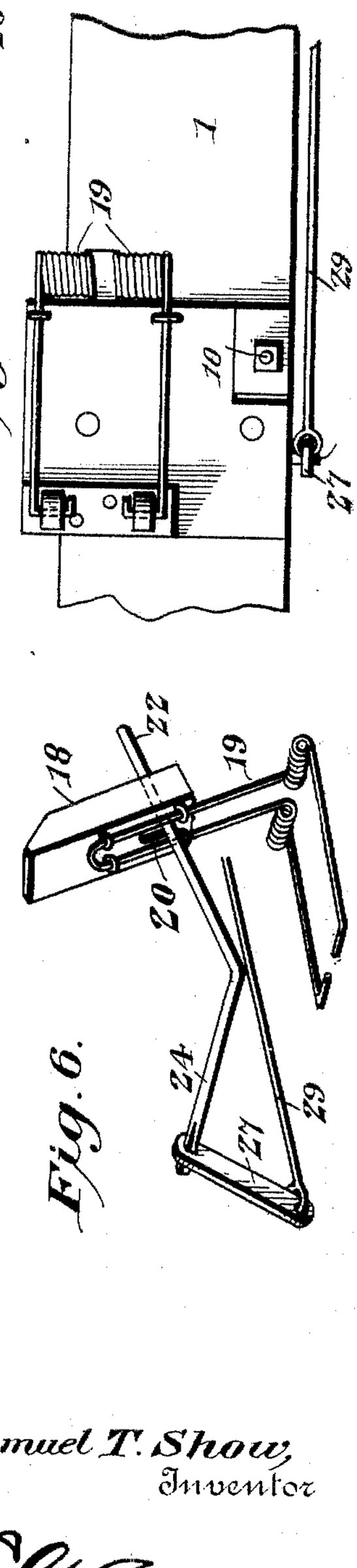

Fig. 7.

Fig. 6.

Witnesses

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NO MODEL. 2 SHEETS—SHEET 2

Fig. 3.

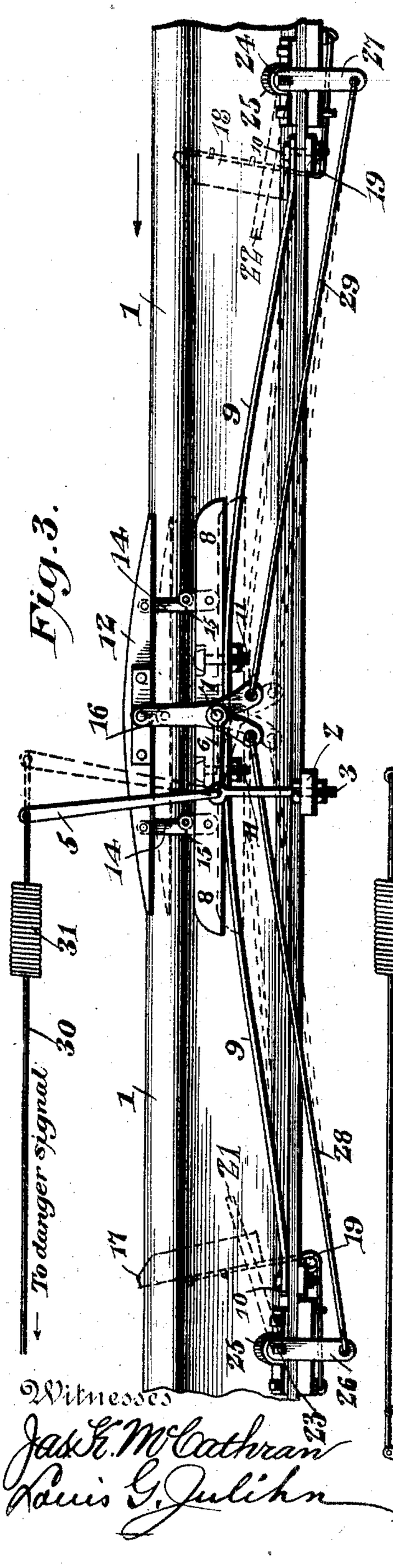


Fig. 4.

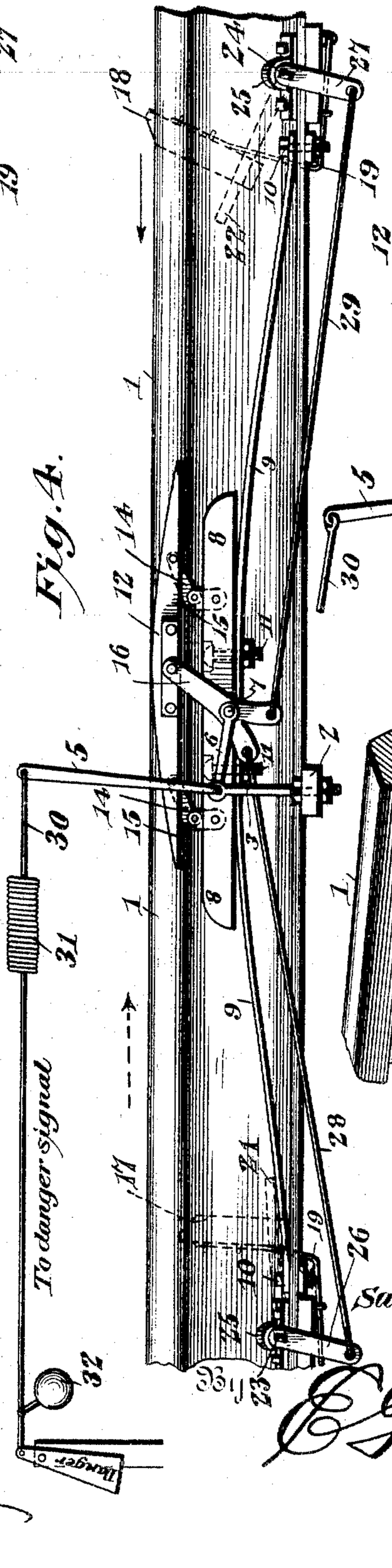
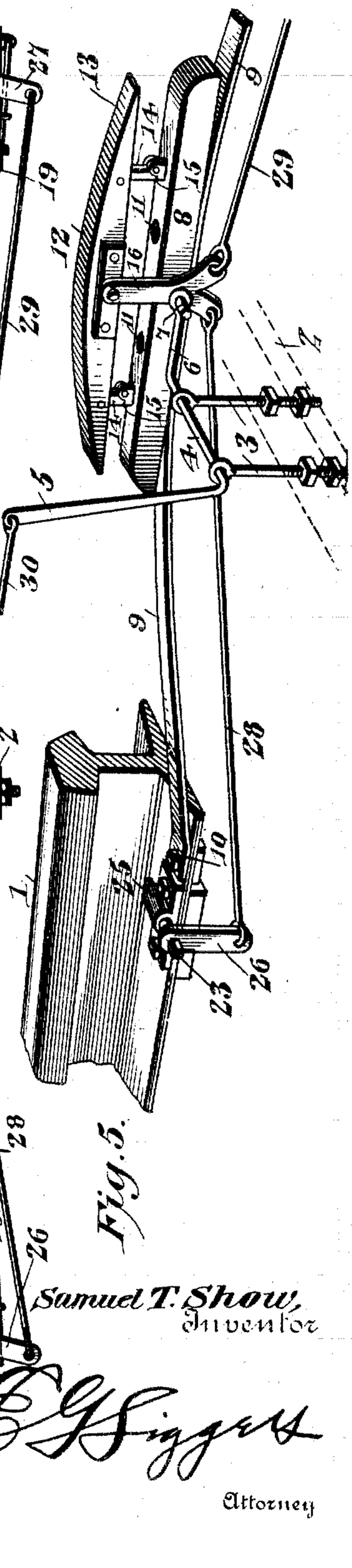


Fig. 5.



No. 767,014. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

SAMUEL T. SHOW, OF EXCELSIOR, MINNESOTA.

RAILWAY SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 767,014, dated August 9, 1904.

Application filed December 8, 1903. Serial No. 184,350. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL T. SHOW, a citizen of the United States, residing at Excelsior, in the county of Hennepin and State of Minnesota, have invented a new and useful Railway Signal Apparatus, of which the following is a specification.

This invention relates to a novel railway signal apparatus, the object being to provide simple and efficient signal-operating means arranged to be operated by an approaching train to sound or display a warning signal at a crossing or other desired point.

A further object of the invention, subordinate to that just stated, is to provide a signal apparatus capable of being employed in connection with single-track roads and including means for automatically setting the apparatus in position to be actuated by a train approaching the crossing or other point at which the signal is located and for atuomatically throwing the apparatus out of operative condition to prevent the sounding of the signal by a train which has passed the danger-point.

Subordinate to these general objects are others, which will appear during the course of the succeeding description of the illustrated embodiment of the invention.

In the accompanying drawings, Figure 1 is a diagrammatic plan view of a portion of a single-track railroad equipped at opposite sides of a crossing with my signal-operating devices. Fig. 2 is a side elevation of a rail, showing a pair of shifters for throwing the signal-operating tread into and out of position. Fig. 3 is a view similar to Fig. 2 looking toward the opposite side of the rail and showing the tread in its elevated or operative position. Fig. 4 is a similar view showing the positions assumed by the parts when the tread is swung down to its inoperative position to prevent the operation of the signal by a train receding from the crossing. Fig. 5 is a detail perspective view designed to more clearly show the relation of certain of the parts. Fig. 6 is a detail perspective view of one of the shifters and its mounting; and Fig. 7 is a bottom plan view of a portion of a rail, showing certain details of the apparatus.

Like numerals of reference are employed to designate corresponding parts throughout the several views.

When my apparatus is employed in connection with a single-track road, complete signal-operating devices are located at each side of the signaling-point—as, for instance, a cross-road—and each device is arranged to be operated by a train approaching the crossing to sound or display a signal, but is incapable of effective operation by a train receding from the crossing. These signal-operating mechanisms are of similar construction and only one need be specifically described.

At the outer side of one of the rails 1 is mounted in any suitable manner a support 2, provided with suitable bearings 3 for the rock-shaft 4, provided at one end with a signal-lever 5 and at its opposite end with a crank-arm 6, as is clearly shown in Fig. 5. The crank-arm 6 is disposed in a substantially horizontal position and is connected at its free end with a stud 7, projecting from one side of what may be termed a "tread-block" 8, preferably of cast metal and yieldingly supported by a heavy spring 9. The spring 9 may be of any desired type, but, by preference, is a long bow of strapped steel having its opposite extremities bolted, as indicated at 10, to the foot-flange of the rail 1, at the outer side thereof. The tread-block 8 is secured to the middle portion of the spring 9, as by bolts 11, and constitutes a support for the tread 12, having a curved upper face 13 to facilitate the passage of the train-wheels thereover. The tread 12 is connected to the tread-block 8, through the medium of links 14, hinged at their opposite ends to said elements and designed to permit the depression of the tread to a position below the upper surface of the track, but maintaining at all times a parallel relation between the tread and block. The links 14 are intended to swing in one direction only and for that reason are provided with stop-shoulders 15, which arrest the links and normally retain the same in vertical position.

Fulcrumed upon the stud 7, projecting from the block 8, is what may be termed a "tread-lever" 16, having pivotal connection at its upper end with the tread 12 and designed to be swung by mechanism to be described for the purpose of shifting the tread 12 into or out of its operative position. The tread-shifting mechanism comprises a pair of shifters 17 and 18, located at the opposite ends of the tread and at the opposite or inner side of the rail. These shifters are in the form of blocks supported by springs 19, preferably secured to the under side or bottom of the rail and extended upwardly through the foot-flange thereof for attachment to the block, as indicated in Fig. 2. The specific construction of these springs is not material; but they are preferably formed as shown in Fig. 6 of the drawings. The shifters 17 and 18 are provided with longitudinal slots 20 for the reception of shifter-arms 21 and 22, extending from the ends of rock-shafts 23 and 24, passed through the rail and preferably journaled in suitable boxes 25, secured to the foot-flange. The ends of the shafts 23 and 24 opposite the shifter-arms are provided with crank-arms 26 and 27, connected to the lower end of the tread-lever 16 by connecting-rods 28 and 29, the tread-lever being preferably branched or bifurcated, as shown, to facilitate the attachment of the rods.

The signal-lever 5 is designed when swung to operate a visual or audible signal located at a cross-road or the like, or, in fact, it may simultaneously operate both of said signals—as, for instance, a gong and a semaphore, as indicated in Fig. 4 of the drawings. The connection between the lever and the signal devices is preferably effected by means of a wire 30, having a spring 31, designed to take up the slack and connected to the gong 32 and the semaphore in any approved manner. For the sake of economy the signal-operating wire may be strung along telegraph-poles or other convenient supports, and those portions of the wire accessible to mischievous or maliciously-inclined persons may be incased—as, for instance, in pipe.

Briefly, the operation of the device is as follows: Assuming the parts to be in the positions indicated in Fig. 3 of the drawings, a train moving in the direction of the full-line arrow in said figure and approaching the crossing will present its wheels to the tread 12, depressing the latter, together with the tread-block 8, against the resistance of the spring 9. As the stud 7 is connected to the block 8 and to the end of the crank-arm 6, this depression of the block will cause the arm to be swung down, thus locking the shaft 4 and swinging the signal-lever 5 to operate the signal device or devices located at the crossing. The wheels, having passed the tread, their flanges will strike the shifter 17; but the latter will simply move back against the resistance of its spring 19 without effecting the operation of the shifter-arm 21. When the train has passed beyond the tread, the spring 9 will restore the parts to their normal positions to effect a rear operation of the signals when another train moving in the same direction approaches the crossing. Suppose, however, that the parts are positioned as shown in Fig. 3 and that a train receding from the crossing approaches the apparatus. The flange of the first wheel will strike the shifter 17, moving it out toward the end of the arm 21 and at the same time depressing it to cause the arm to be swung down to the position indicated in Fig. 4. This movement of the shifter-arm will rock the shaft 23, and by reason of the connection between the crank 26, carried by said shaft and the lower end of the shaft-lever, the latter will be swung from the stud 7 as a fulcrum, shifting the tread longitudinally and causing the latter to be dropped below the top of the rail to the inoperative position shown in Fig. 4. With the tread in this inoperative position the train will obviously pass thereover without effecting the operation of the signal from which it is receding. Having passed beyond the tread, the wheels will strike the shifter 18, which will now be in its raised position, to which it will have been moved by the shifting of the lever 16. When thus struck, the block 18 will merely move back under the arm 22 in opposition to the spring 19 and will return to its elevated position as soon as the train has passed. Any train passing over the apparatus and moving in the direction of the dotted arrow in Fig. 4 may now pass over the apparatus without operating the signal and without having any effect whatever other than the mere movement of the shifter 18 along its arm. Suppose, however, that with the parts positioned as indicated in Fig. 4 a train should approach the crossing in the direction of the full-line arrow in Fig. 4. The first wheel would contact with the shifter 18, depressing the latter and swinging down the shifter-arm 22. This will cause the shaft 24 to be rocked and through the intermediate connections would swing back the shifter-lever 16 to its normal position. Continued movement of the train would then bring it into engagement with the tread to depress the latter and operate the signal. It will be observed, however, that the depression of the shifter 18 has not only elevated the tread to its operative position, but has also elevated the shifter 17. Therefore the train having passed over the tread and operated the signal will strike the block 17, sliding it back along its arm, from which position its spring will restore it after the passage of the train, so that it will be in place to shift the tread to its inoperative position upon the approach of a train receding from the crossing.

Attention is directed to the fact that the mechanism described embodies a tread movable into and out of its operative position by shifters located beyond the opposite ends of the tread and that the operation of a shifter by a train moving in one direction automatically sets the other shifter for actuation by a train moving in the opposite direction, this arrangement making it absolutely impossible for trains moving in one direction to operate the signal and absolutely insuring the operation of the signal by trains moving in the opposite direction or toward the crossing.

I have not considered it necessary to illustrate my signal-operating apparatus in connection with a double-track road; but it is obvious that it is equally applicable thereto. In that event, however, as the trains do not move in opposite directions along the same track it would be unnecessary to provide the shifters or those connections whereby the tread may be thrown into and out of operative position.

It is thought that from the foregoing the construction, operation, and many advantages of my improved railway signal apparatus will be clearly apparent without further description; but, while the present embodiment of the invention appears at this time to be preferable, I desire to reserve the right to effect such changes, modifications, and variations of the illustrated structure as may fall fairly within the scope of the protection prayed.

What I claim is—

1. In an apparatus of the character described, the combination with a rail; of a supporting-spring secured thereto, a tread yieldingly supported by the spring and projecting above the upper suface of the rail, and a rock-shaft provided with a crank operatively connected with the tread and with a signal-lever connected with a signal device.

2. In an apparatus of the character described, the combination with a rail; of a spring secured at its opposite ends to the foot-flange thereof, a tread supported by the middle portion of the spring and extended above the rail, a rock-shaft having a crank-arm disposed to be swung by the depression of the tread, a signal-lever extended from the shaft, and a signal device operatively related to the lever.

3. In an apparatus of the character described, the combination with a signal device; of a tread operatively related thereto and movable into and out of operative position, and a shifter located at a point removed from the tread and arranged to move the tread in one direction.

4. In an apparatus of the character described, the combination with a signal device; of a rail, a tread associated therewith, said tread being movable in one direction to operate the signal device and also movable into and out of operative position, and a plurality of interdependent shifters associated with the rail and operatively connected to the tread to shift the same.

5. In an apparatus of the character described, the combination with a signal device and a rail; of a vertically-movable tread associated with the rail at one side thereof and operatively related to the signal device, shifters associated with the rail at opposite sides thereof and beyond the opposite ends of the tread, and means operated by the shifters for throwing the tread into and out of operative position.

6. In an apparatus of the character described, the combination with a signal device and a rail; of a tread arranged to operate the signal device and movable into and out of operative position, shifters associated with the rail beyond the opposite sides of the tread and alternately movable into position to be operated by a train, and means operatively connecting the shifters with each other and with the tread to throw the latter into and out of operative position.

7. In an apparatus of the character described, the combination with a signal device and a rail; of a spring-supported tread associated with the rail, a tread-lever arranged to throw the tread into and out of operative position, rock-shafts located beyond the opposite ends of the tread and operatively connected to the tread-lever, shifters connected to the rock-shafts and arranged to be operated by a train passing over the rail, and means for operatively connecting the rail with the signal.

8. In an apparatus of the character described, the combination with a signal device and a rail; of a spring-supported tread-block, a tread movable with the block to operate the signal and movable independently of said block to assume operative or inoperative positions, a tread-lever arranged to impart such independent movement of the tread, and shifters associated with the rail for actuation by trains passing thereover and having operative connection with the tread-lever.

9. In an apparatus of the character described, the combination with a spring-supported tread-block; of a tread, links connecting the block and tread, a tread-lever arranged to shift the tread longitudinally, and a pair of shifters connected to the lever to operate the same.

10. In an apparatus of the character described, the combination with a rail, and a signal device; of a spring-supported tread-block connected to the signal device, a tread located above the block, links connecting the block and tread and provided with stop-shoulders for limiting the movement of the links in one direction, a tread-lever fulcrumed on the tread-block and connected at one end to the tread, rock-shafts located beyond the opposite ends of the tread and operatively con-

nected to the lower end of the tread-lever, shifter-arms extended from said rock-shafts, and shifters carried by said arms and disposed to be operated by trains passing over the rail.

11. In an apparatus of the character described, the combination with a rail, and a signal device; of a spring-supported tread-block connected to the signal device, a tread located above the block, links connecting the block and tread and provided with stop-shoulders for limiting the movement of the links in one direction, a tread-lever fulcrumed on the tread-block and connected at one end to the tread, rock-shafts located beyond the opposite ends of the tread and operatively connected to the lower end of the tread-lever, shifter-arms extended from said rock-shafts, and shifters carried by said arms and disposed to be operated by trains passing over the rail, each of said shifters being movable in one direction independently of its shifter-arm.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL T. SHOW.

Witnesses:

WALTER PHILLIPS,

CHAS. J. SMITH.