

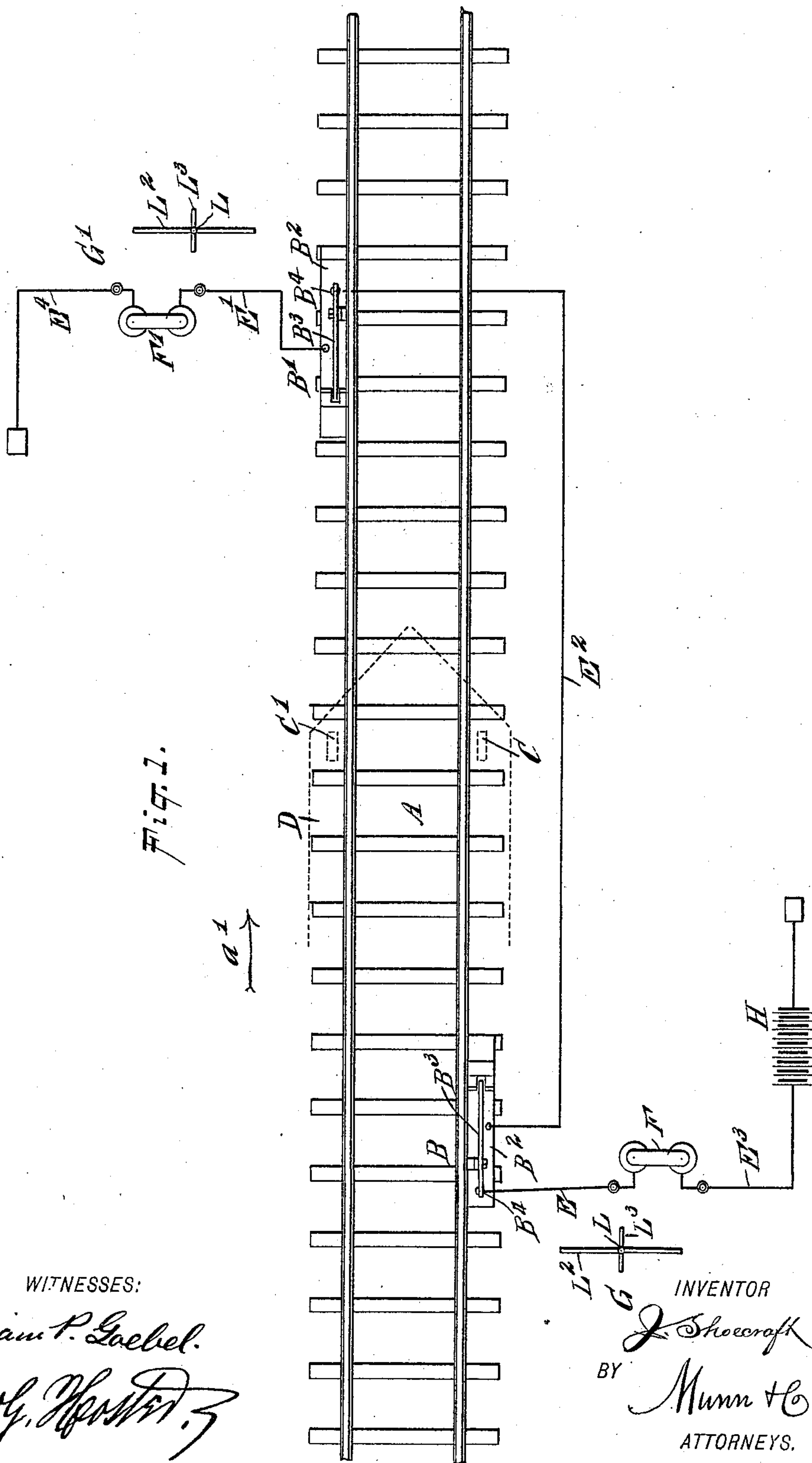
(No Model.)

3 Sheets—Sheet 1.

J. SHOECRAFT.
AUTOMATIC BLOCK SYSTEM.

No. 562,253.

Patented June 16, 1896.



(No Model.)

3 Sheets—Sheet 2.

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Patented June 16, 1896.

Fig. 2.

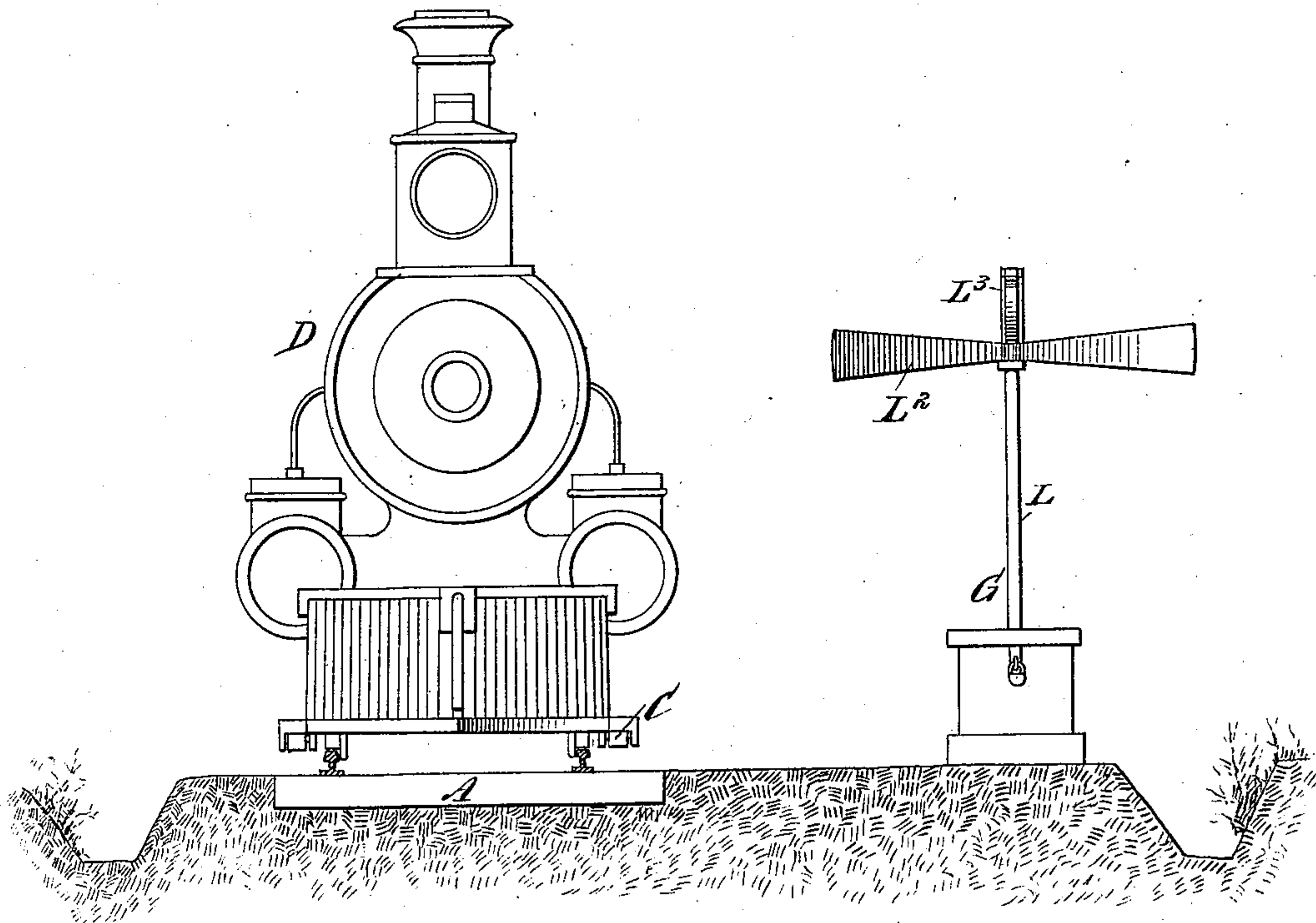
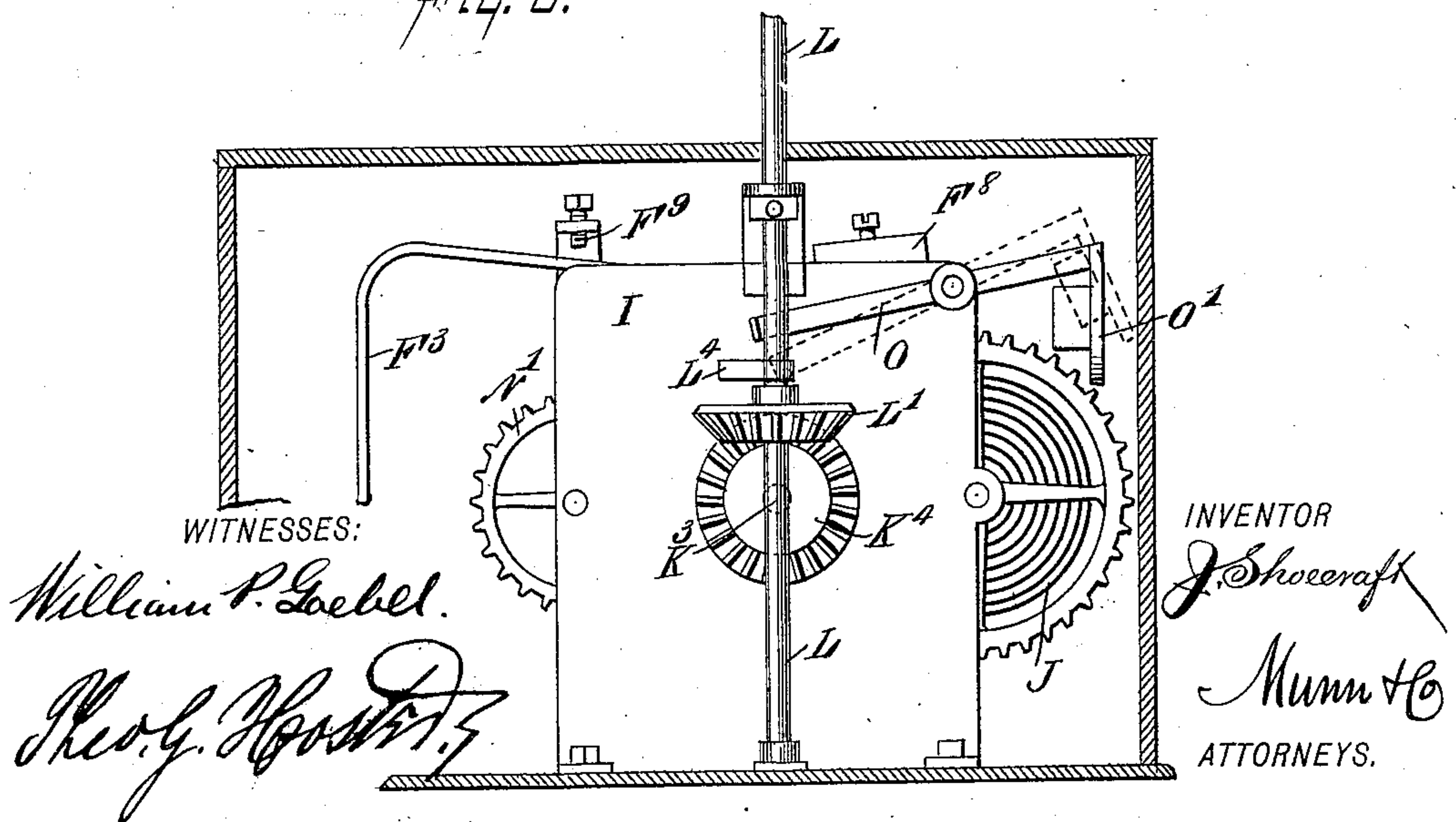


Fig. 3.



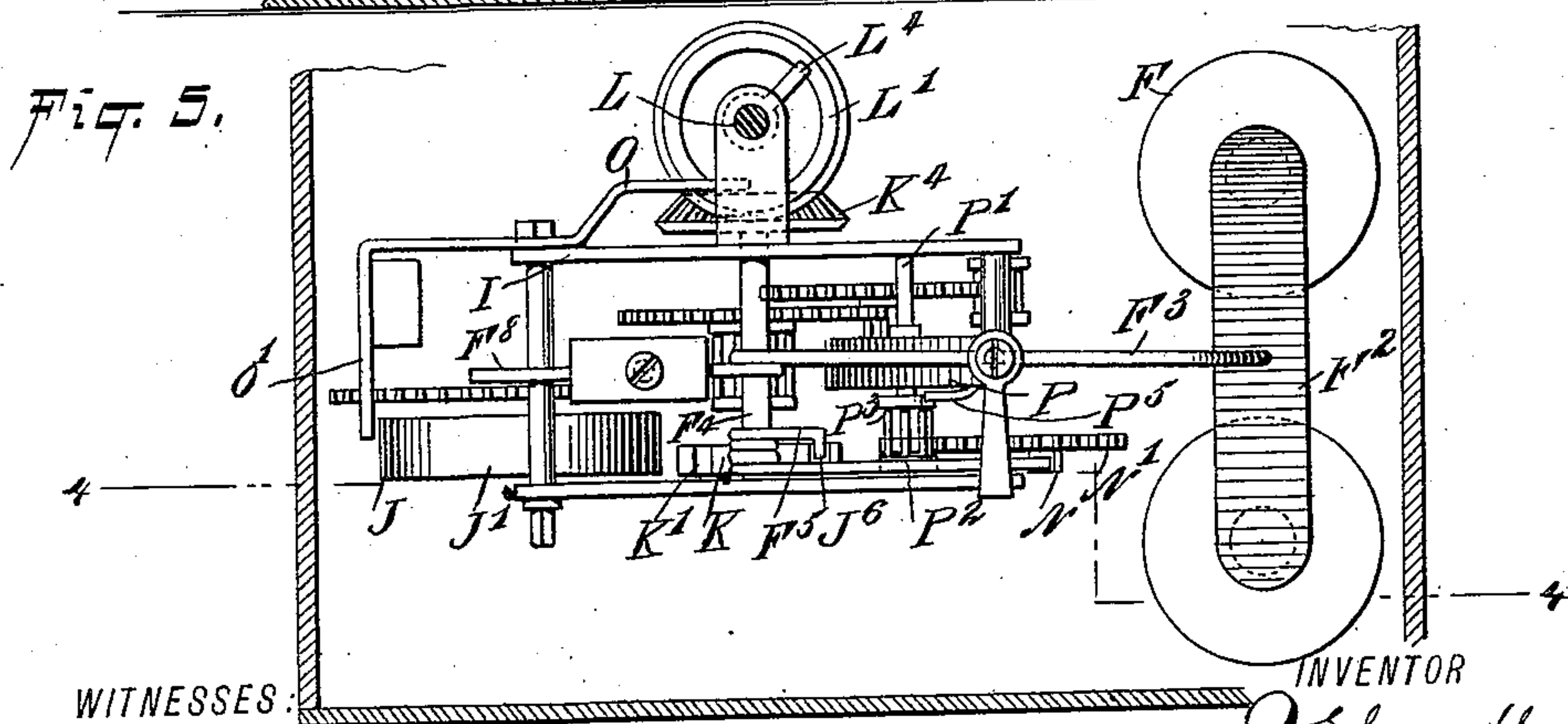
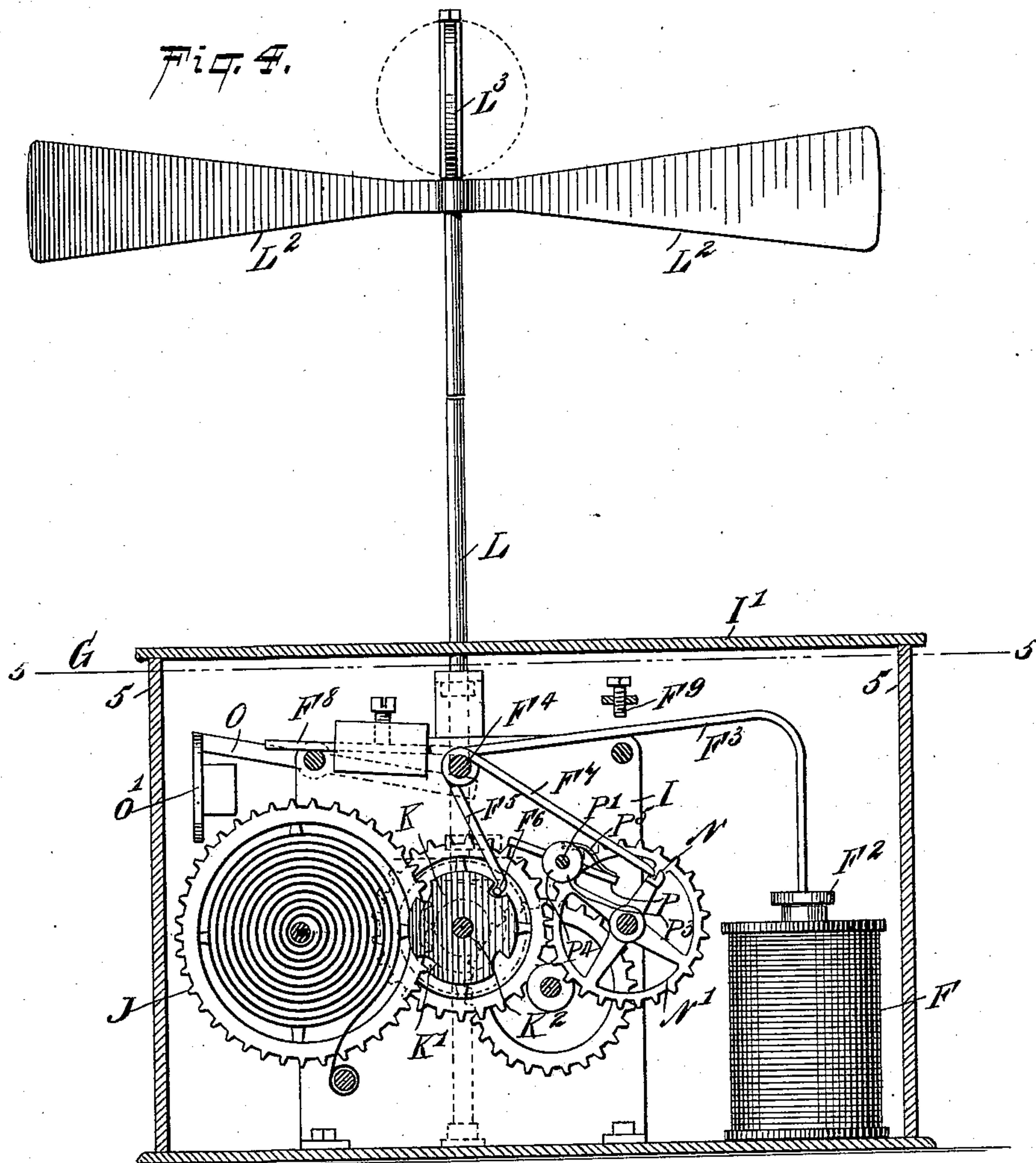
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3 Sheets—Sheet 3.

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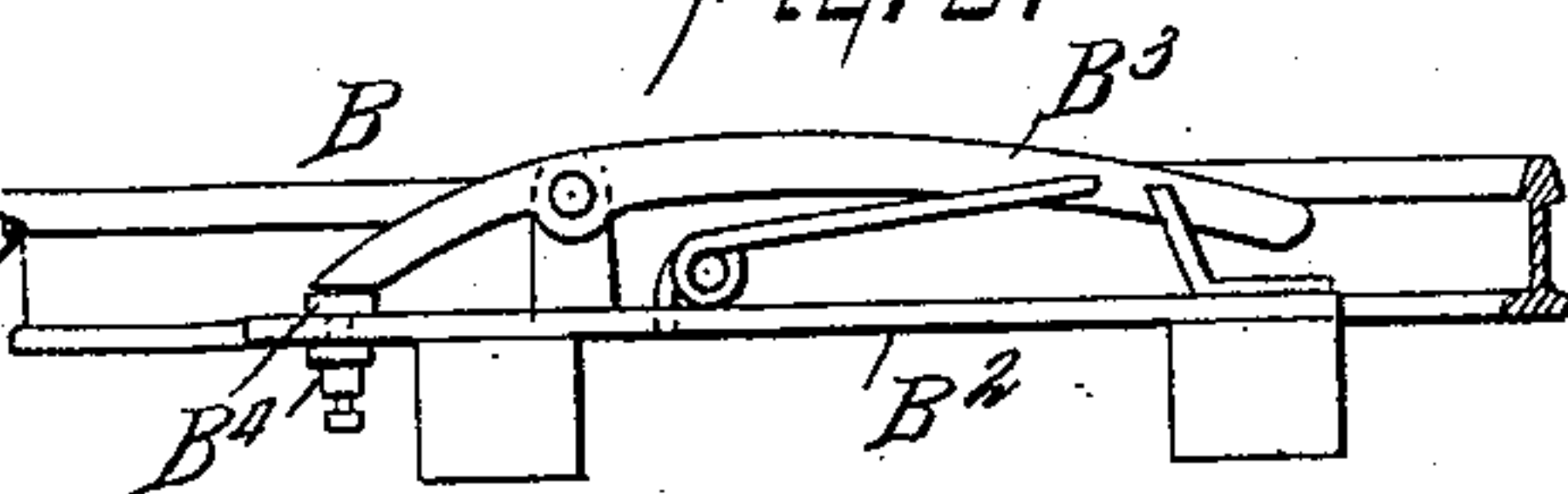


WITNESSES.

INVENTOR

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Fig. 6.



BY

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Munn & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JUDSON SHOECRAFT, OF HARVEYVILLE, KANSAS, ASSIGNOR TO THE
WESTERN RAILWAY SIGNAL COMPANY, OF TOPEKA, KANSAS.

AUTOMATIC BLOCK SYSTEM.

SPECIFICATION forming part of Letters Patent No. 562,253, dated June 16, 1896.

Application filed August 8, 1895. Serial No. 558,668. (No model.)

To all whom it may concern:

Be it known that I, JUDSON SHOECRAFT, of Harveyville, in the county of Wabaunsee and State of Kansas, have invented a new and
5 Improved Automatic Block System, of which the following is a full, clear, and exact description.

The invention relates to automatic block systems, such as are shown and described in
10 the application for Letters Patent of the United States, Serial No. 543,389, filed by me on March 27, 1895, and allowed on May 4, 1895.

The object of the present invention is to
15 provide a new and improved automatic block system, arranged to prevent both front and rear collisions on railroads, and constructed to set the signal at "danger" should the mechanism accidentally get out of order.

20 The invention consists principally of a signal-station at each end of the block-section, a closed electric circuit adapted to be opened by a device carried on the train entering the section, and a battery and signal-magnets in
25 the circuit at each end station.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

30 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 plan view of the improvement. Fig. 2 is an enlarged end elevation of the same. Fig. 3 is an enlarged rear elevation of the motor with the casing in section. Fig. 4 is a sectional side elevation of the same on the line 4 4 of Fig. 5. Fig. 5 is a sectional
40 plan view of the same on the line 5 5 of Fig. 4, and Fig. 6 is an enlarged side elevation of the circuit-closing device.

The device as illustrated in Fig. 1 is arranged on a section A of the railroad, and
45 near one of the rails on one end of the section is arranged a circuit-closing device B, and a similar device B' is arranged at the other end of the section, but on the opposite side of the track from that on which the device B is located. The circuit-closing devices B and B'
50 are adapted to be opened by wheels C and C'

or other mechanism arranged on the locomotive D, so that when the latter passes upon the section and travels in the direction of the arrow α' , then the wheel C in passing over
55 the circuit-closing device B actuates the latter and opens the circuit, as hereinafter more fully described. In a like manner when the locomotive D leaves the section the other wheel C' actuates the circuit-closing device
60 B' to open the circuit. If the locomotive comes in the inverse direction of the arrow α' to the section A, the wheel C actuates the circuit-closing mechanism B' to open the latter, and when leaving the section the wheel
65 C actuates the other device B to again open the circuit.

The circuit-closing devices B and B' are alike in construction, and each is provided with a plate B², on which is fulcrumed a
70 spring-pressed lever B³, curved as shown in Fig. 6, and adapted to be engaged by the tread of an extra or friction wheel passing over, to press the lever downward, and to disengage the free end from the contact-point
75 B⁴, so that the circuit is opened. The contact-point B⁴ of the circuit-closing device B is connected by a wire E with an electromagnet F at the station G, and a similar wire E' connects with the plate B² of the circuit-clos-
80 ing device B', to connect with an electromagnet F' at the other station G'. The plate B² of the device B is connected by a wire E² with the contact-point B⁴ of the other device B', as is plainly shown in Fig. 1. An electro-
85 magnet F is connected by a wire E³ with one pole of a battery H, connected at its other pole with the ground. The electromagnet F' is connected by a wire E⁴ with the ground, or, if necessary, with a battery likewise connect-
90 ed with the ground.

The devices at each signal-station G and G' for operating the signals proper are alike in construction, and hence it suffices to describe
95 but one of them. Each electromagnet F and F' is provided with an armature F², held on a lever F³, (see Figs. 4 and 5,) having its pivot F⁴ journaled in suitable bearings in a frame I, carrying a spring-motor J of any approved construction. The arm F⁵ of the lever F³ is
100 provided at its free end with a lug F⁶, adapted to engage one of four recesses A' formed

in the periphery of a wheel K and placed equidistant apart, as is plainly shown in Fig. 4. This wheel K is secured on a shaft K², journaled in suitable bearings in the casing I, and driven by suitable gear-wheels on the spring-motor J.

On the rear end of the shaft K² is secured a beveled gear-wheel K⁴, in mesh with a beveled gear-wheel L', secured on a vertically-disposed semaphore-shaft L, journaled in suitable bearings on the frame I and extending a suitable distance above the casing I', inclosing the device above mentioned. On the upper end of the semaphore-shaft L is arranged a diametrically-extending leaf L², which, when standing in alinement with the track-rails, indicates "safety," and when standing at right angles to the track indicates "danger." On the extreme upper end of the semaphore-shaft L is secured a night-signal L³, showing on one face a red light and on the other face a green light, to indicate the "safety" and "danger" positions of the signal.

From the pivot F⁴ of the lever F³ extends forwardly a second arm F⁷, adapted to engage with its free end a lug N, formed or secured on the face of a gear-wheel N', driven from the motor J, and making sixteen revolutions to one-quarter of a revolution of the wheel K. This arm F⁷ is in engagement with the lug N as long as the circuit is closed and the armature-lever F² is attracted by its magnet F or F'; but when the circuit is broken and the lever F³ swings upward by the action of the weighted arm F⁸ of the said lever, then the arm F⁷ swings out of engagement with the lug N, and the gear-wheel N' is free to rotate and is now driven from the spring-motor J. The wind wheel or fan P of the spring-motor J is mounted to rotate loosely in one direction on a shaft P', provided with a pinion P² in mesh with the gear-wheel N'; and on the rim P³ of this pinion P² is formed a tooth or shoulder P⁴, adapted to be engaged by a spring-pawl P⁵, held on the fan-wheel P.

Now it will be seen that when the wheel N' is released and rotates as above described, it drives the pinion P² and the shaft P', and by the shoulder on the rim P³ engaging the pawl P⁵, it carries around the fan-wheel P; but when the circuit is again closed and the armature-lever F² is attracted by its magnet F or F', then the arm F⁷ swings downward in the path of the lug N, to be finally engaged by the latter and stopped, while the fan-wheel P is still free to rotate in the direction of the arrow a', owing to the spring-pawl P⁵ passing over the shoulder, and the fan-wheel rotates freely on the shaft P' until its momentum is spent. By this arrangement all jars or jerks of the working parts in the motor are prevented.

It will be understood that the jarring is not caused by the sudden stopping of the motor-gearing, as the gearing moves at a comparatively slow rate of speed, but such jar is

usually caused by the sudden stoppage of the fan-wheel which revolves at a very high rate of speed.

On the semaphore-shaft L is arranged a lug L⁴, adapted to be engaged by a lever O, fulcrumed on the frame I, (see Figs. 3 and 5,) and provided at its rear end with an extension O', reaching over the spring J' of the motor, so that when the latter is nearly run down, the extension O' is lifted by the outermost coil of the spring, and the swinging motion thus given to the lever O brings the free end thereof in the path of the lug L⁴, so that the latter finally abuts against this lever O and a further rotation of the semaphore-shaft L is prevented. Thus if any of the parts of the motor should break or the circuit should be accidentally opened by the wires breaking or by other causes, then the spring J' of the motor J will run down and the semaphore-shaft L will turn continually until finally the lever O is actuated by the spring to engage the lug L⁴ and stop the rotation of the semaphore-shaft L at the time the leaf L² is in a "danger" position.

It is understood that normally the circuits in both devices B and B' are closed by the spring-pressed levers B³; but when a locomotive passes upon the section, the circuit is opened by the friction-wheel on locomotive actuating the levers B³. In opening the circuit for both stations G and G', the respective armature-levers F² for the magnets F and F' is released, and the lever F³ swings upward to release the wheels N' and K, and to permit the latter to make a quarter-revolution—that is, to turn the semaphore-leaves L² into a "danger" position. When the train leaves the section, then the device B or B' of the station G or G' is actuated, so as to again open the circuits, to cause a further quarter-revolution of the wheel K, and again move the semaphore-leaves L² out of the "danger" position into the "safety" position.

It will be seen that by the arrangement described, the section A is closed or blocked at both ends, so that an approaching train from either direction will be warned that the section is already occupied by a train; but when the section is clear of trains, both semaphore-leaves L² stand in a "safety" position and a second train can enter from either end of the section; but as soon as this train does so, it sets both signals, automatically, to the "danger" position.

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

1. An automatic block-signal system for railroads, comprising a signal-station at each end of the block-section, a normally-closed electric circuit consisting of a single line and ground circuit, a battery in the circuit, electromagnets in said circuit and located at each signal-station, circuit-opening devices at each station and adapted to be operated to open the circuit by a device carried by a locomotive.

tive, a motor at each station, a releasing and locking device for the motor comprising two arms adapted to engage with separate wheels of the motor and controlled by the armature
5 of the electromagnets, means for stopping the signal-shaft at "danger," when the motor is nearly run down, and signals at each station operated by the motors, substantially as specified.

10 2. An automatic block system for railroads, provided with a motor, a stopping-wheel driven from the said motor and provided with a lug adapted to engage the armature-lever, a wind-wheel shaft driven from
15 the said stop-wheel and carrying a wind-wheel

connected by a pawl and ratchet with the wind-wheel shaft, substantially as shown and described.

3. An automatic block system for railroads, provided with a signal-shaft adapted
20 to be revolved, a stopping-lever for the said shaft, and a spring-motor adapted to engage when expanded the said lever when the motor is nearly run down, to stop the signal-shaft at the "danger" position, substantially as
25 shown and described.

JUDSON SHOECRAFT.

Witnesses:

E. E. MITCHELL,
JOHN H. SMALE.