

(No Model.)

J. K. E. DIFFENDERFFER.

AUTOMATIC RAILWAY SIGNAL.

No. 430,567.

Patented June 17, 1890.

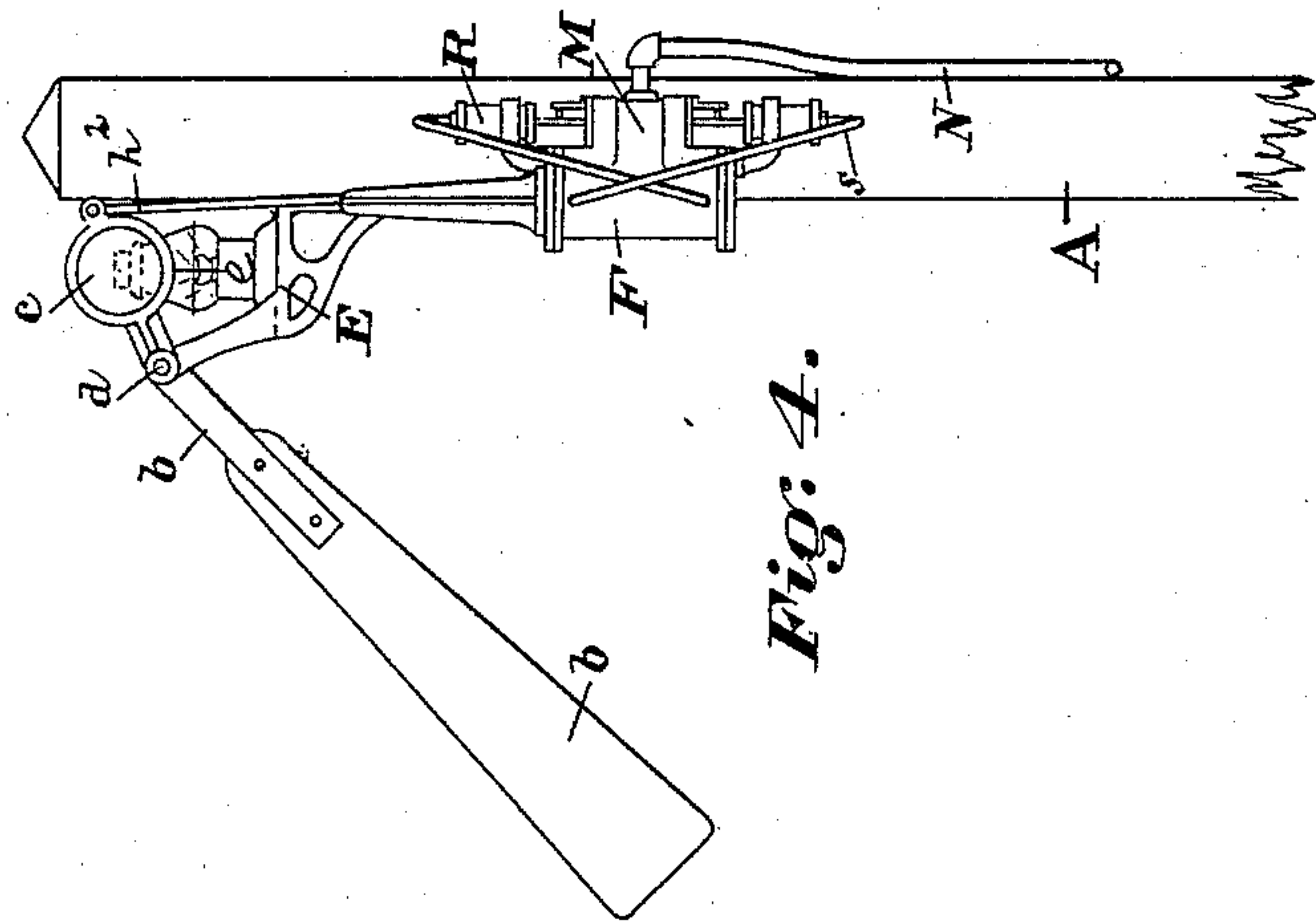


Fig. 4.

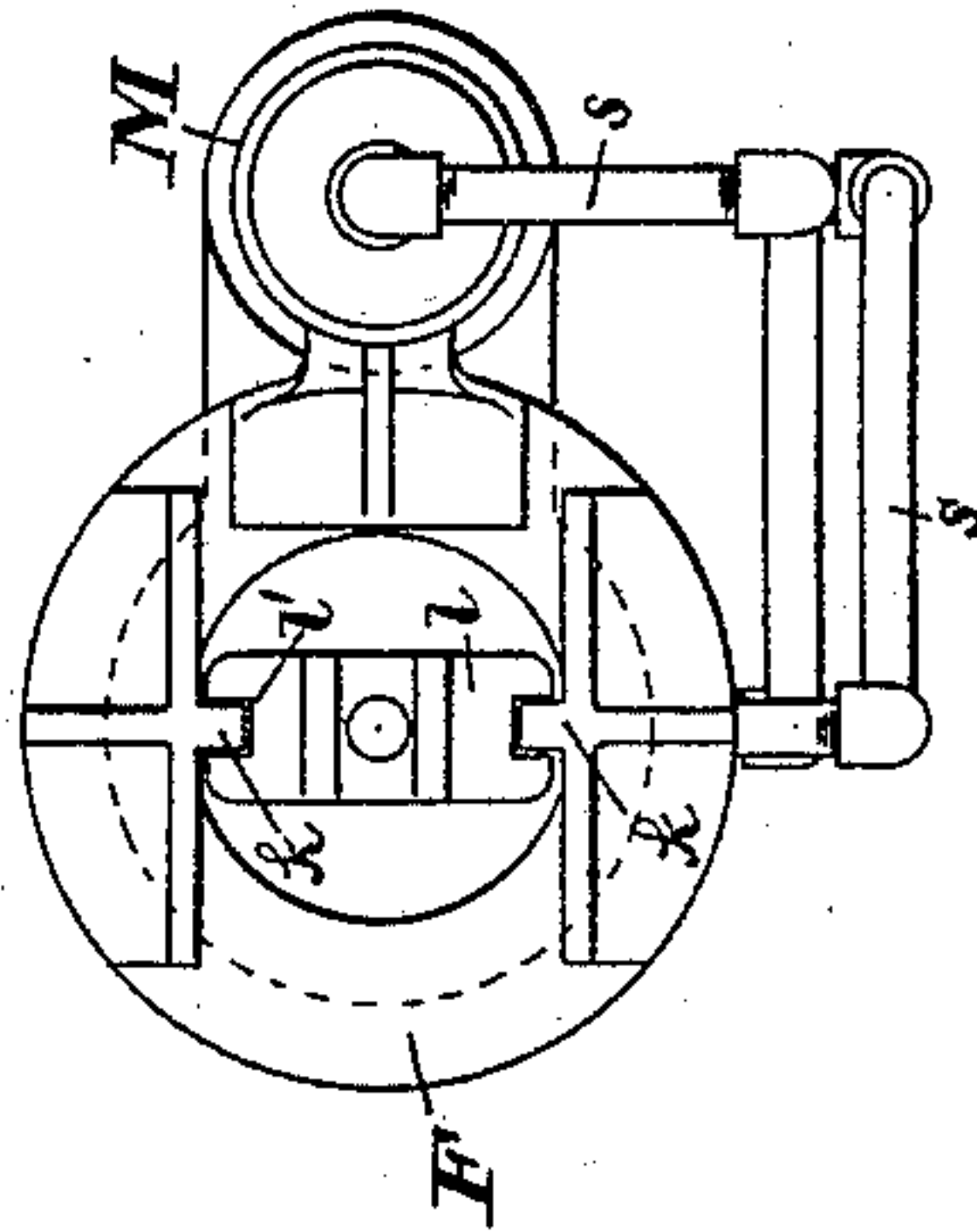


Fig. 5.

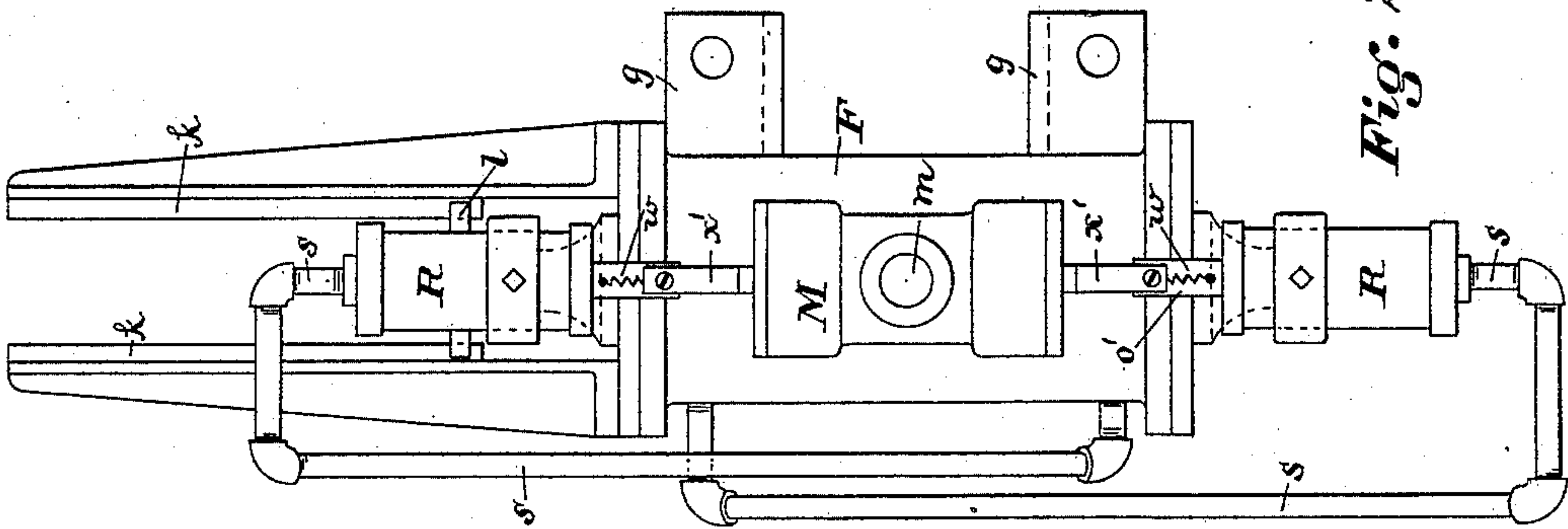


Fig. 2.

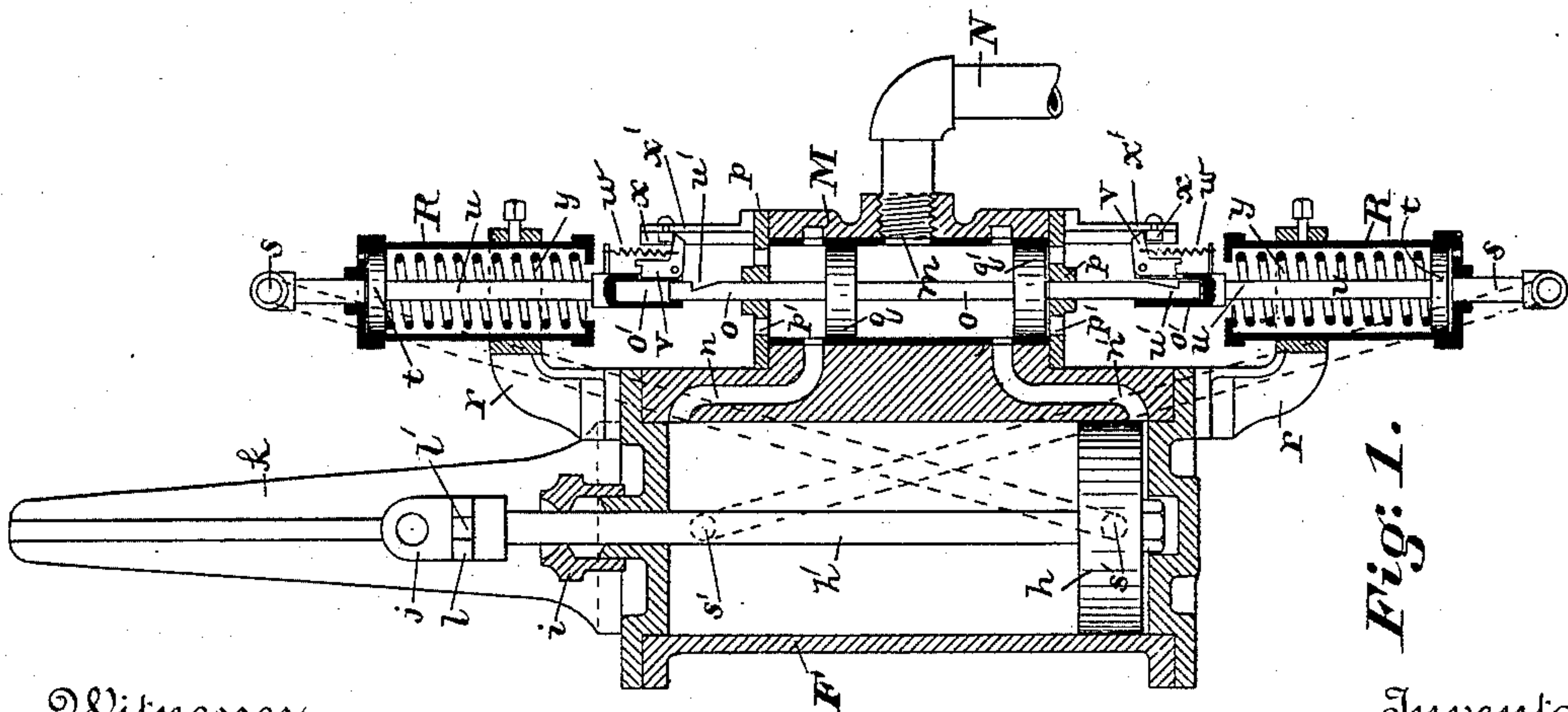


Fig. 1.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN K. ELGEE DIFFENDERFFER, OF BALTIMORE, MARYLAND, ASSIGNOR
TO GEORGE D. GREENWOOD AND JOHN G. JORY, BOTH OF SAME
PLACE.

AUTOMATIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 430,567, dated June 17, 1890.

Application filed December 13, 1889. Serial No. 333,590. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. ELGEE DIFFENDERFFER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Automatic Railway-Signals, of which the following is a specification.

This invention has reference to a block-signal system for railways; and it consists in the combination, with semaphores or signal devices of certain instrumentalities hereinafter described, whereby the signals are changed or adjusted by the action of compressed air.

The invention is illustrated in the drawings, in which—

Figure 1 is a vertical section of the operating-cylinder, valves, and other parts connected therewith. Fig. 2 is a side view of the same. Fig. 3 is a top end view of same. Fig. 4 is a side view of a signal post or semaphore with the operating-cylinder mounted thereon according to my invention.

The letter A designates a signal-post having at the top a signal-arm *b*, and glass lens *c*, pivoted at *d*, and a lamp *e*. These parts may be of any preferred form. In the present instance a bracket E, attached to the post, supports the lamp and also affords bearing for the pivot *d*.

My invention consists of the means here shown for moving or changing the position of the signal-arm and glass lens by the agency of compressed air.

The operating-cylinder F is secured to the post A by suitable flanges *g*, or other means. A piston *h* reciprocates in the cylinder and has a rod *h'*, which passes through a stuffing-box *i*. A rod *h²* is jointed at *j* to the piston-rod and connects with the pivoted signal-arm *b*. At the end of the cylinder where the stuffing-box is located are two guide-bars *k*, and the joint-head of the piston-rod *h'* has a cross-head *l*, with a notch *l'* at each end, which takes on the said guide-bars *k* and travels thereon. The side of the operating-cylinder F has an air-chest M, and a part or passage *n n'* leads from near each end thereof to each end of the cylinder. These passages

serve alternately for induction and eduction of air. At the center of the chest is an inlet *m*, to which a supply-pipe N is attached. A rod *o* extends longitudinally through the valve-chest and projects through both ends *p*, and within the valve-chest this rod has two piston-valves *q q'*, which are fast on the rod and with the rod reciprocate. Each end *p* of the chest M has one or more exhaust-ports *p'*. The position of the two valves *q* is such that when one of them, *q'*, is in contact with one end *p* of the chest M the air-passage *n'* near that end will open between the two piston-valves *q q'*, and serves for the induction of compressed air to the operating-cylinder F. This will be seen by reference to Fig. 1, it being understood that the air-supply inlet *m* is always open between the two piston-valves *q q'*. While the lower passage *n'* is allowing air to enter the cylinder F under the piston *h*, the upper air-passage *n* will be open between one of the valves *q* and the top end of the chest, at which time it will serve for the eduction of air from the cylinder, the air passing first into the chest and then out of the exhaust-port *p'*.

Two valve-shifters R are employed to move the piston-valves *q q'*. Each shifter is at an opposite end of the valve-chest M, and each is supported by an arm or bracket *r* attached to the cylinder. These shifters comprise a cylinder (shown in section in Fig. 1 by heavy black lines) whose outermost end is fitted with an air-pipe *s*, and inside has a piston *t*, attached to which is a rod *u*, which projects toward and is in line with the valve-rod *o*. This rod has at its end a socket *o'*, which takes over the notched end *u'* of the valve-rod *o*. The socket end of the shifter-rod *u* carries a pivoted catch *v*, one end of which is adapted to engage with the notch *u'* on the valve-rod. A spring *w* on the shifter-rod acts on the said pivoted catch *v* and forces it to engage with the notch *u'*, except when restrained by a stationary stop *x* on a stud *x'* attached to the valve-chest. As shown in Fig. 1, both pivoted catches *v* are in the position where the stops *x* hold them disengaged from the notches *u'*. Each shifter-cylinder R contains a spiral

spring y , which serves to press and move the piston t toward the outermost end of the cylinder. In Fig. 1 both pistons t are in this position. While the spring y moves the shifter-piston t one way, the compressed air entering the cylinder by the pipe s will move it the opposite way. When the pivoted catch v of either shifter is in engagement with one of the notches u' of the valve-rod, and the air back of the shifter-piston t is exhausted, then the spiral spring y of that shifter, acting on the piston t , will draw the valve-rod and move the two piston-valves q q' . The air-pipe s of each shifter-cylinder takes into the side of the operating-cylinder F , near that end which is most remote—in other words, the shifter at one end of the valve-chest has an air-pipe connection with the opposite or remote end of the cylinder. In the present instance these two air-pipes s cross each other. The piston h in the operating-cylinder, when at either end, closes one of the air-pipe ports. (Shown by broken lines s' in Fig. 1.) When this piston begins to move, it uncovers a port s' , allowing the air in the shifter-cylinder R , which is connected with said port, to exhaust into the operating-cylinder F . The spiral spring y thereupon causes the two valves q q' to shift, and carries the pivoted catch v where one of its ends will impinge against the stationary stop α , which latter will turn the catch and disengage its other end from the notch u' on the valve-rod, thus leaving the latter in a free position where its other end may be acted on by the socket o' and catch v of the other shifter device.

The pipe N on the signal-post leads down to and connects with a pipe extending along the road-bed. (Not shown.) The compressed air to supply the operating-cylinder F comes from a power-cylinder which is fitted with a piston, said piston being connected with a wheel-treadle which is depressed when a car passes over it.

The parts here referred to form no part of the present invention, but are fully shown and described in Letters Patent of the United States, dated December 10, 1889, No. 417,022, granted to Greenwood and Jory. It is unnecessary, therefore, to describe the same parts here. In the said patent the power-cylinders are designated by the letters D D' and the wheel-treadles by C . The device here claimed is a substitute for the operating-cylinder E in the patent referred to.

By mounting the operating-cylinder on the signal-post, as here shown, the moving parts

are placed in an accessible position, and the signal connection-rod h^2 can be very short.

It is obvious that some of the details here shown and described may be varied without materially affecting my invention.

Having described my invention, I claim—

1. In a signal apparatus, the combination of a movable signal, an operating-cylinder provided with a piston, connections between the movable signal and said piston, an air-chest at the side of the operating-cylinder and connected therewith by ports, valves in the air-chest to govern the passage of air to and from said ports, a rod to actuate the valves and extending through the air-chest with both ends projecting outside, two valve-shifter cylinders, each at an opposite end of the air-chest, and a piston in each shifter-cylinder having a rod provided with a catch device to engage the said valve-rod.

2. In a signal apparatus, the combination of a movable signal, an operating-cylinder provided with a piston, connections between the movable signal and said piston, an air-chest at the side of the operating-cylinder and connected therewith by ports, valves in the air-chest to govern the passage of air to and from said ports, a rod to actuate the valves, and extending through the air-chest with both ends projecting outside, two valve-shifter cylinders, each at an opposite end of the air-chest, an air-pipe connecting the shifter-cylinder at one end of the air-chest with that end of the operating-cylinder which is most remote, a piston in each shifter-cylinder having a rod provided with a catch device to engage the valve-rod, and a spring to move the shifter-piston one way.

3. In a signal, the combination of a movable signal, an operating-cylinder provided with a piston, connections between the movable signal and said piston, and air-chest at the side of the operating-cylinder and connected therewith by ports, valves in the air-chest to govern the passage of air to and from said ports, a rod to actuate the valves, and extending through the air-chest with both ends projecting outside, two valve-shifter devices, each at an opposite end of the air-chest, and air-pipe connections between the operating-cylinder and said valve-shifter devices.

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

JOHN K. ELGEE DIFFENDERFFER.

Witnesses:

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