(No Model.) 3 Sheets—Sheet 1.

J. FORSTER.

AUTOMATIC RAILWAY SIGNALING APPARATUS.

No. 569,008. Patented Oct. 6, 1896.

Fig. 1.

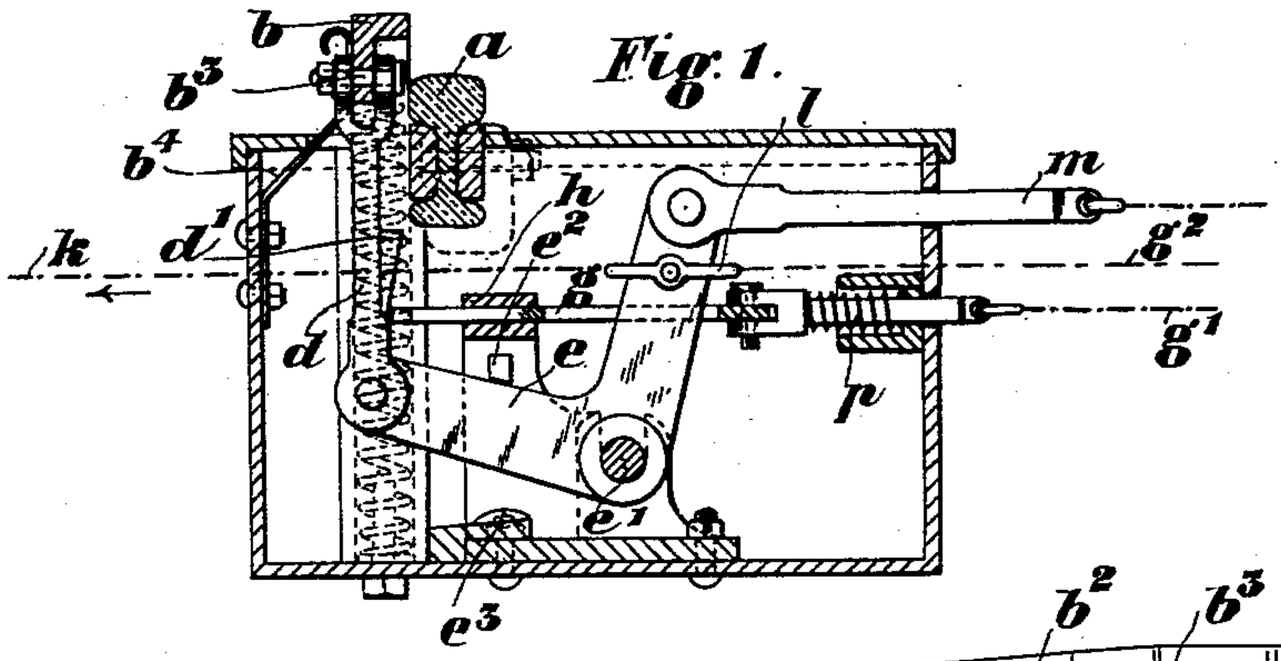


Fig. 2.

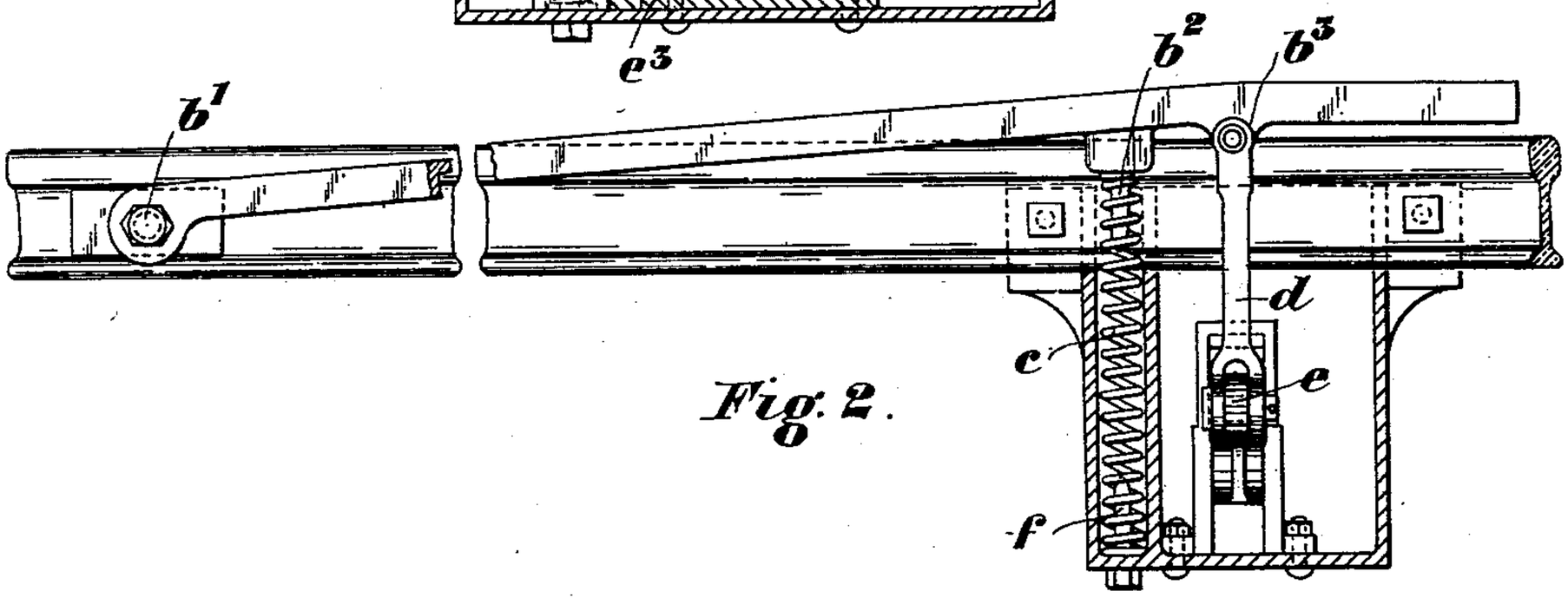
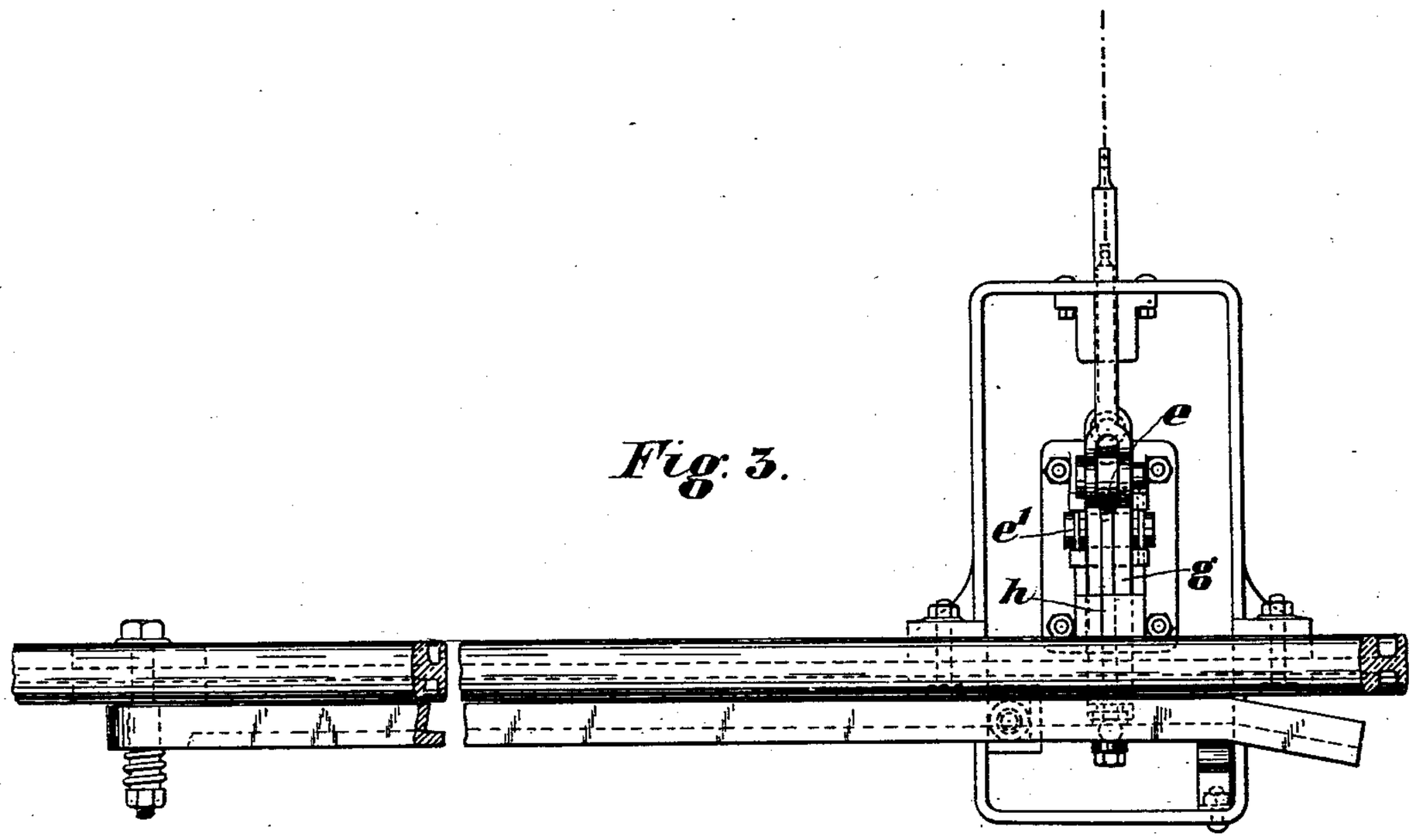


Fig. 3.



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AUTOMATIC RAILWAY SIGNALING APPARATUS.

No. 569,008. Patented Oct. 6, 1896.

Fig. 4.

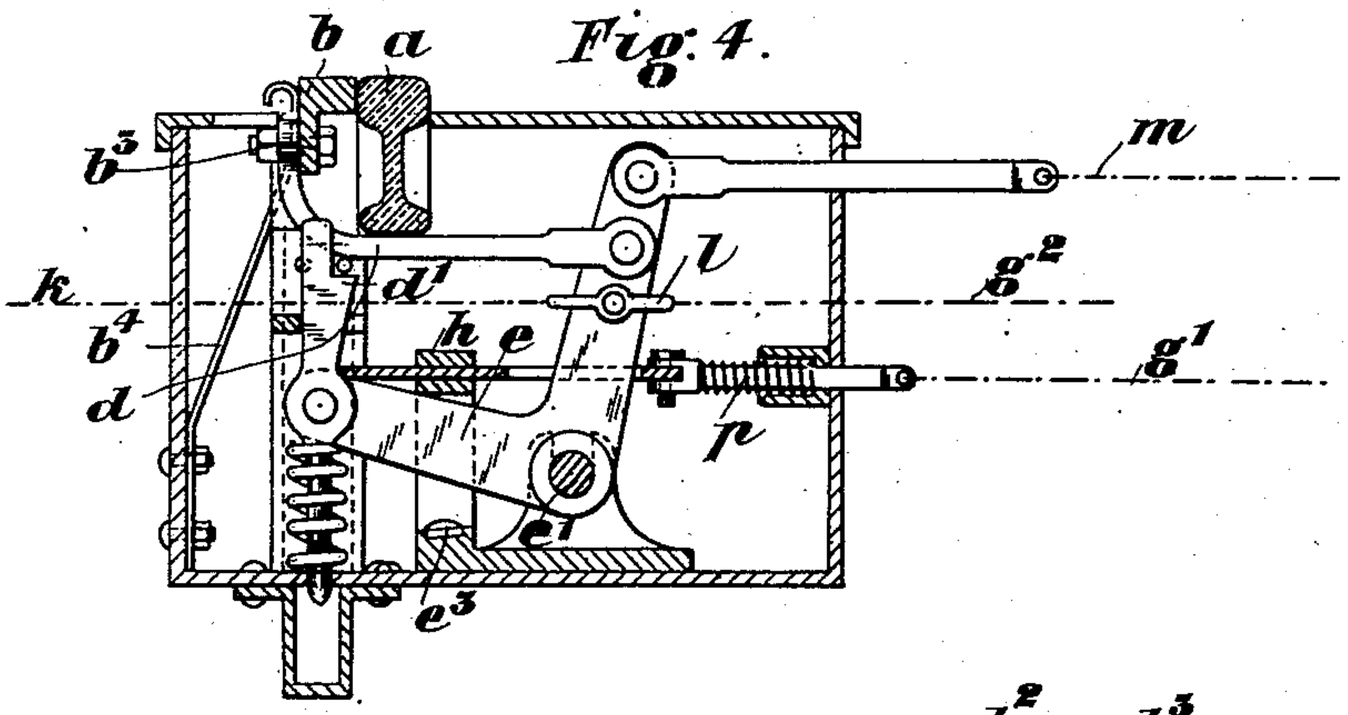


Fig. 5.

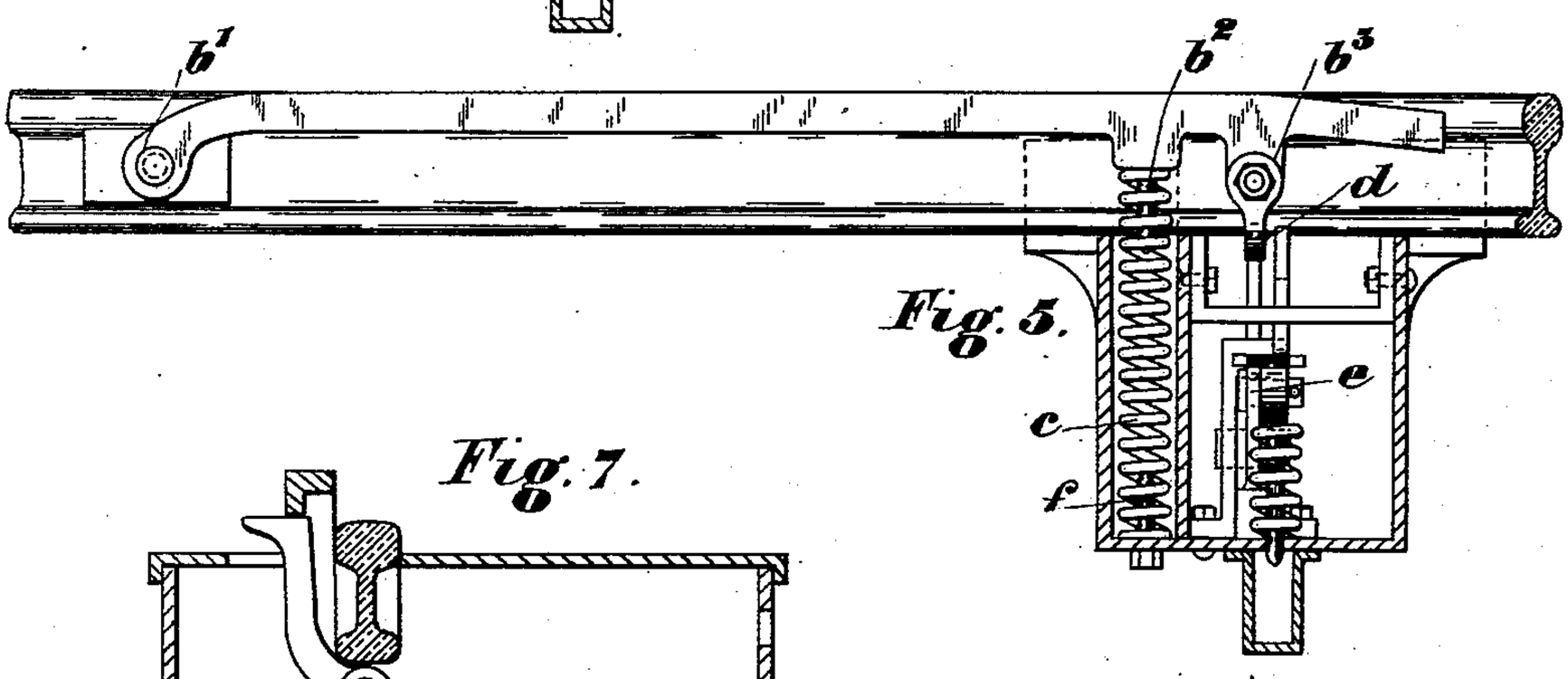


Fig. 7.

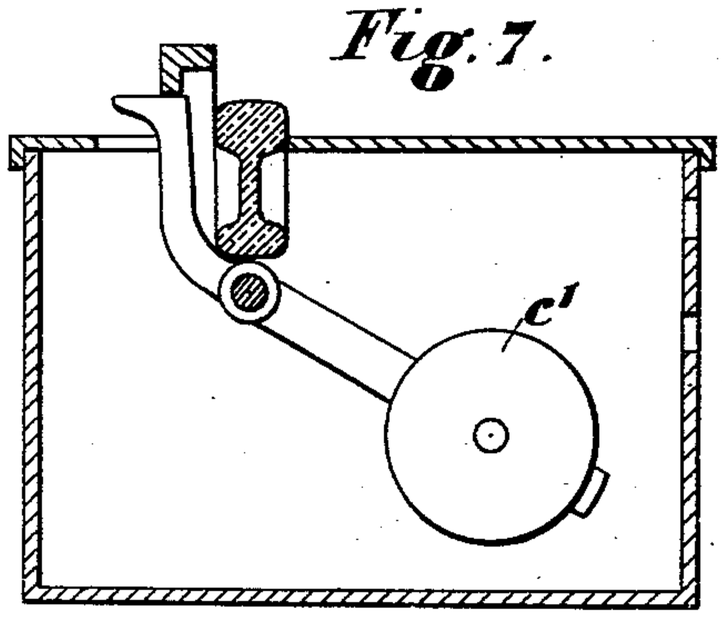
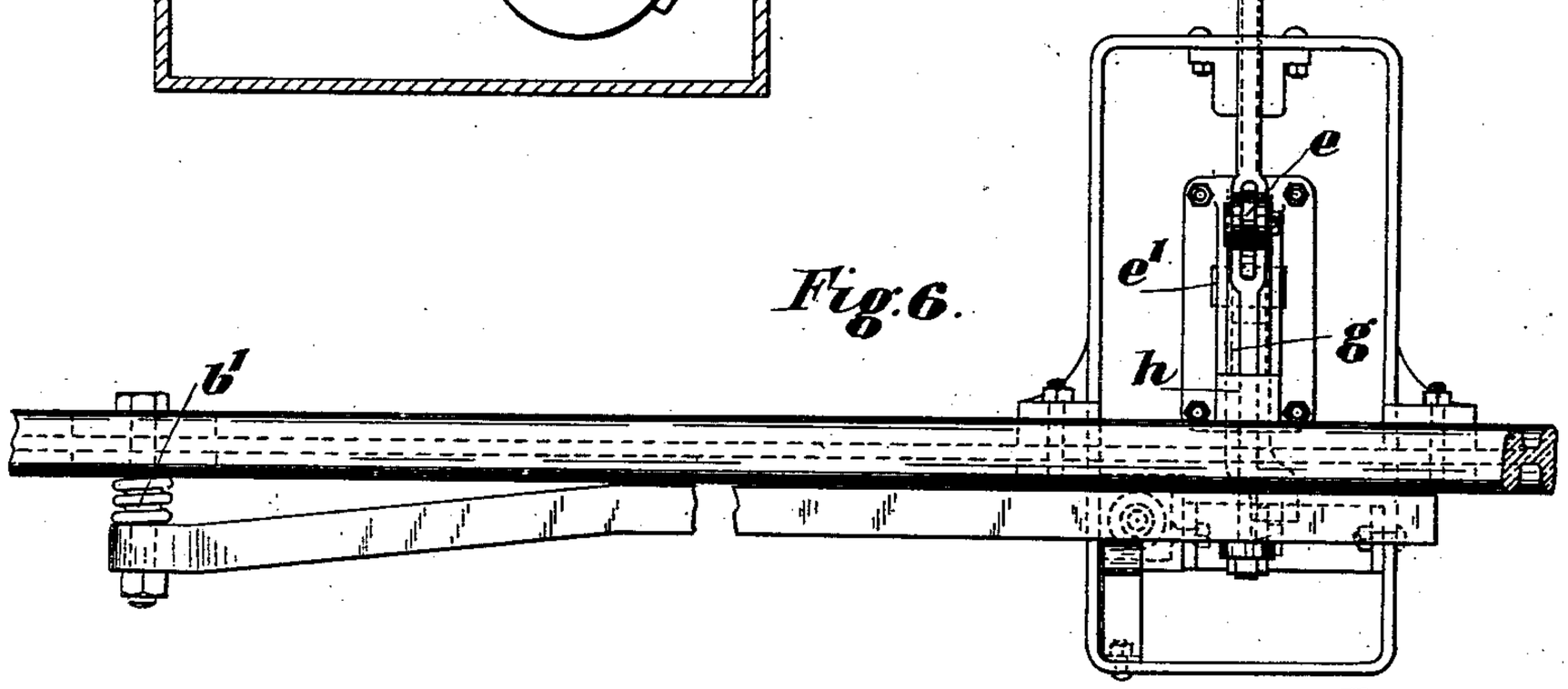


Fig. 6.



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(No Model.) 3 Sheets—Sheet 3.

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AUTOMATIC RAILWAY SIGNALING APPARATUS.

No. 569,008. Patented Oct. 6, 1896.

Fig. 8.

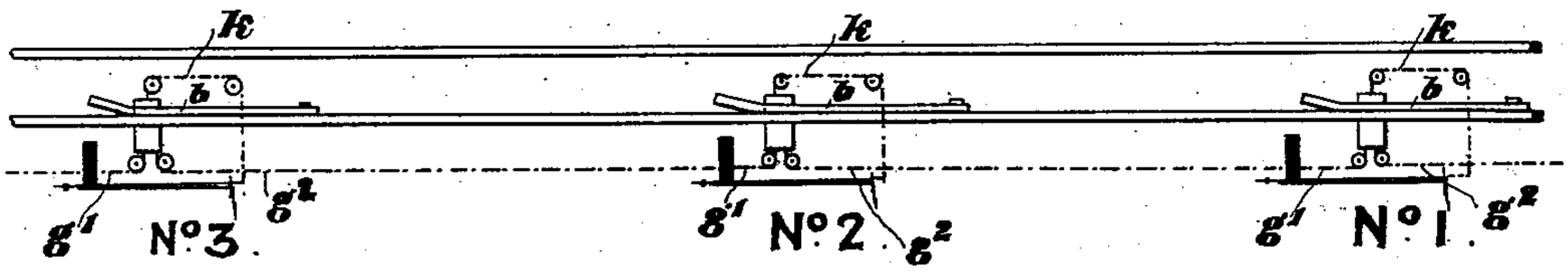
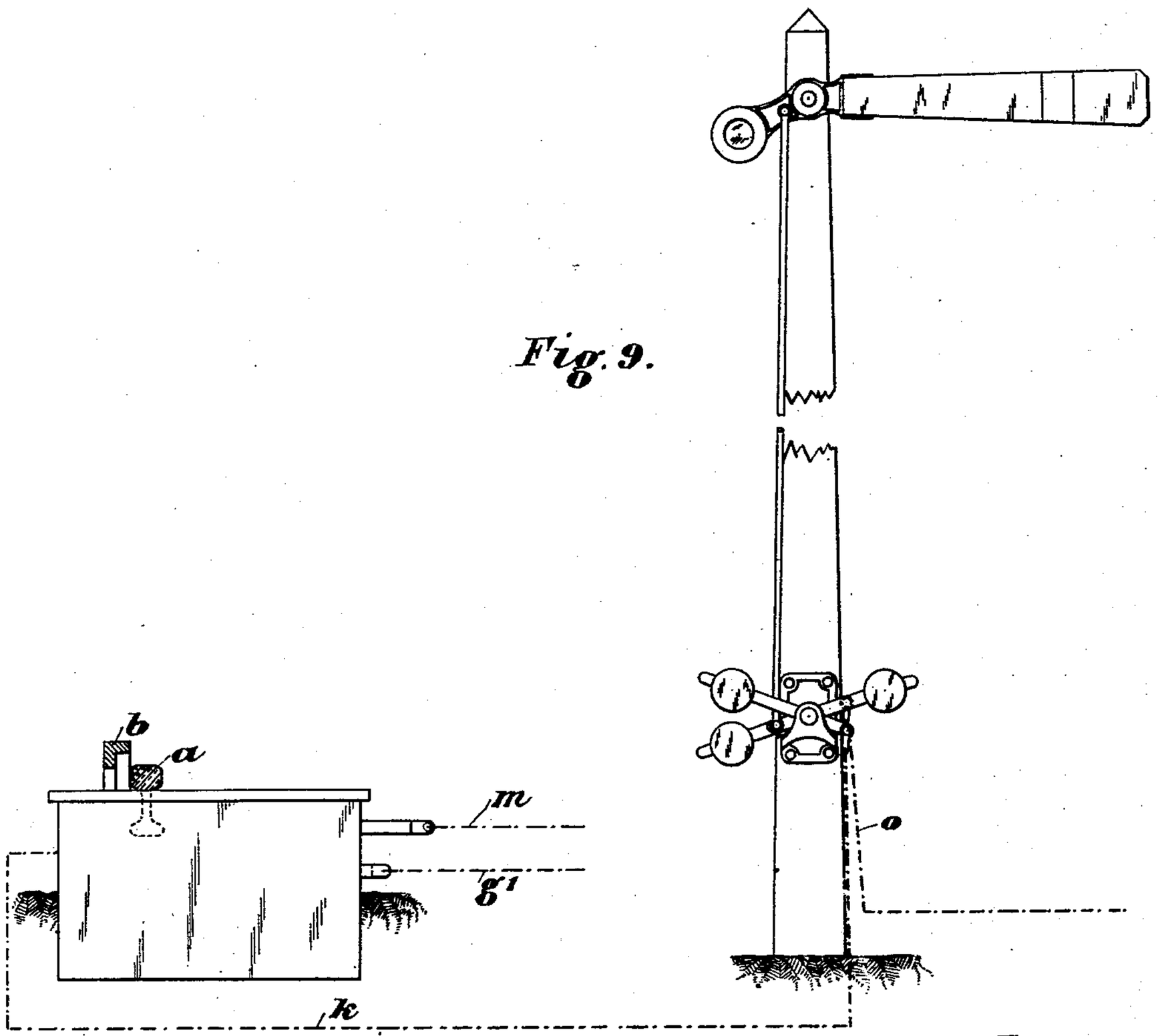


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN FORSTER, OF ST. HELENS, ENGLAND.

AUTOMATIC RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 569,008, dated October 6, 1896.

Application filed October 3, 1895. Serial No. 564,549. (No model.)

To all whom it may concern:

Be it known that I, JOHN FORSTER, a subject of the Queen of Great Britain and Ireland, residing at the Navigation Boiler Works, Atlas Street, St. Helens, in the county of Lancaster, England, have invented certain new and useful Improvements in Automatic Railway Signaling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention has reference to improvements in railway signaling; and it consists in apparatus which may be either used as an automatic railway signaling system, that is to say, without signal-boxes, operating-levers and accessories of that nature, or it may be used as an auxiliary to the present manual system of signaling.

The chief characteristic of my invention, whether it is applied purely as an automatic system, or whether it be used as an auxiliary to the present system of manually-operated signals, is that the train itself on passing a sectional signal (in the automatic system it may be any or all signals) replaces that signal to the "danger" attitude, and that such signal cannot be again lowered to the "safety" attitude until the train itself has proceeded into the next section, (or a given distance ahead,) when it performs another operation, (operating a treadle,) thereby lowering to the "safety" attitude the signal in the rear, that is, the one it had previously passed and placed to the "danger" attitude. It may thus be briefly stated that the train on passing the given spots performs two operations—places the signal adjacent to it to "danger" and lowers the signal in the rear to the "safety" attitude. As additional facilities for indicating the positions of the trains as having passed given spots, I arrange, if desirable, gongs or bells in the signal-boxes in the rear or in the front, or in both front and rear, which may be rung or sounded by the train as it passes over my apparatus, giving information to the signalmen that the train has either left the section in the one case or is approaching it in the other.

I am aware that many means have been devised for performing similar results, and I therefore lay no claim, broadly, to the results themselves as effected. The majority of inventions previously devised for obtaining these results have been electrical or pneumatic, or both combined, but my invention is purely mechanical.

The way in which I carry out my invention is as follows, reference being made to the accompanying drawings, in which similar letters and figures refer to similar parts or substitutes therefor in the several figures.

Figure 1 is a cross-section of that form of my apparatus in which the treadle is operated vertically, showing it in position above the rail. Fig. 2 is a side view of the vertical form of treadle of my apparatus. Fig. 3 is a plan of the vertical form of treadle. Figs. 4, 5, and 6 are cross-section, side elevation, (partly in section,) and plan of my apparatus where the treadle is operated horizontally. Fig. 7 shows a cross-section of a vertically-operated treadle with a counterbalance-weight to assist its return to the normal position above the rail. This balance-weight may be either used in substitution of the spring shown in Figs. 1 to 6 or it may be used in conjunction with them. Fig. 8 is a diagram showing three sections when my apparatus is fixed as an automatic system of signaling. The sections are numbered 1, 2, and 3. Fig. 9 illustrates an ordinary signal having a joint control, that is to say, where my apparatus is fixed as an auxiliary to the present interlocking systems with signal-cabins and interlocking levers. Any form of controlling or slotting apparatus may be fixed on the signal-post, but before the signal can be deflected to the "safety" attitude the operating-lever in the signal-cabin, say No. 1, must be worked, and also the treadle of my apparatus fixed in section No. 2 (that is to say, beyond signal-cabin No. 2) must be depressed, which, by operating through the treadle at my apparatus fixed at cabin No. 1, would deflect the signal at No. 1 to the "safety" attitude. This application of my apparatus is really a mechanical "lock-and-block system."

a is the rail; *b*, the treadle-bar, fulcrumed at *b'* to the web of the rail and provided with a projecting pin b^2, about which a spring *c* is fixed.

d is a connecting-rod connecting b^3 of the

treadle *b* to a crank *e*, fulcrumed at *e'*. A tooth or projection *d'* is formed in the connecting-rod *d*.

e^2 is a stop to prevent the crank *e* from thrusting the bar beyond its normal position.

e^3 is a stop of rubber or similar material underneath the crank to prevent the bar from being depressed beyond its required position.

b^4 is a spring connected to the side of the box containing the apparatus, and which presses against the treadle-bar *b* to assist the return of the treadle-bar *b* to its normal position against and above the rail.

f is a pin projecting into the lower side of the spring.

g is the locking and releasing blade, working through a bracket *h*. The said blade *g* is connected at its end to the end *l* of a similar double shackle, in my apparatus fixed adjacent to the signal in the section in advance, and upon the depression of the treadle at the section in advance the said blade *g* is moved to free the upward movement of the treadle-bar *b* to its normal position, which action lowers the signal through the wire *k* and crank *e* to the "safety" attitude.

m is a connecting-rod which may be used for controlling the lever in the signal-cabin, which operates the signal adjacent to the apparatus, and it may also ring a gong or bell or otherwise indicate in either the forward or rear signal-cabins.

o is the wire in Fig. 9 from the operating-lever in the signal-cabin at No. 1 to one of the balance-levers on the signal at No. 1 box.

The treadle-bar projects outward from the rail at the end farthest from the fulcrum and a spring is fixed around the spindle by which the bar is fulcrumed to the rail, allowing that should a train shunt back over the treadle the treadle-bar may be moved away from the rail by the flange the whole length of the bar without operating my apparatus in Figs. 1, 2, and 3. The spring *p* forces the blade *g* above the tooth *d'* when the treadle-bar *b* is depressed.

Adverting to Fig. 8 for diagram and Figs. 1 to 3 for details, a train on passing out of section 1 depresses the treadle *b*, so that the tooth *d'* is moved below the level of the blade *g*. *g* being free moves above the tooth and prevents the treadle-bar *b* returning to its normal or raised position. The wire *k* becomes slack, the crank *e* turning on its fulcrum toward the treadle, so that the signal No. 1 assumes the "danger" attitude. The spring *c* is compressed or the weight *c'*, Fig. 7, is raised. The train on proceeding to section 2 and passing over the apparatus fixed there depresses treadle *b*, the treadle again becomes locked by the blade *g*, the wire *k* is payed out or becomes slack, signal No. 2 is put to the "danger" attitude, and the wire g^2, Fig. 1, is pulled to release through the same wire (*g'* for distinction in the rear apparatus) the blade *g* free of the tooth *d'* and the treadle-bar of the apparatus adjacent to No. 1 signal to assume its raised or normal position. On this treadle-bar moving to its normal position the wire *k*, attached to the crank *e*, is pulled and the signal-arm No. 1 lowered to the "safety" attitude. The action of my apparatus is substantially the same when used as a mechanical lock-and-block system in conjunction with the operating-levers in a signal-cabin.

Although my invention is herein described and illustrated as having reference to a double line of railway, yet same is equally applicable where trains run in opposite directions over the one pair of rails.

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

1. The combination, with a railway-rail, and a depressible treadle; of a pivoted bell-crank lever, a link provided with a projecting tooth and pivotally connected to one arm of the bell-crank lever and to the treadle, means—such as a rod—for operating a signal-gong, connected to the other arm of the bell-crank lever; and locking mechanism provided with means for retracting it and operating to engage with the said tooth when the said treadle is depressed and thereby preventing it from rising, substantially as set forth.

2. The combination, with a railway-rail, and a depressible treadle; of a pivoted bell-crank lever operatively connected to the said treadle, a tooth *d'* supported by the said bell-crank lever, a rod *m* pivoted to the said bell-crank lever and operating a signal-gong, wires *k* and g^2 connected to the bell-crank lever and extending in opposite directions to operate signals, a slidable spring-pressed locking-blade for engaging with the said tooth when depressed, thereby preventing the treadle from rising, and a wire *g'* for retracting the said locking-blade, substantially as set forth.

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