

No. 780,639.

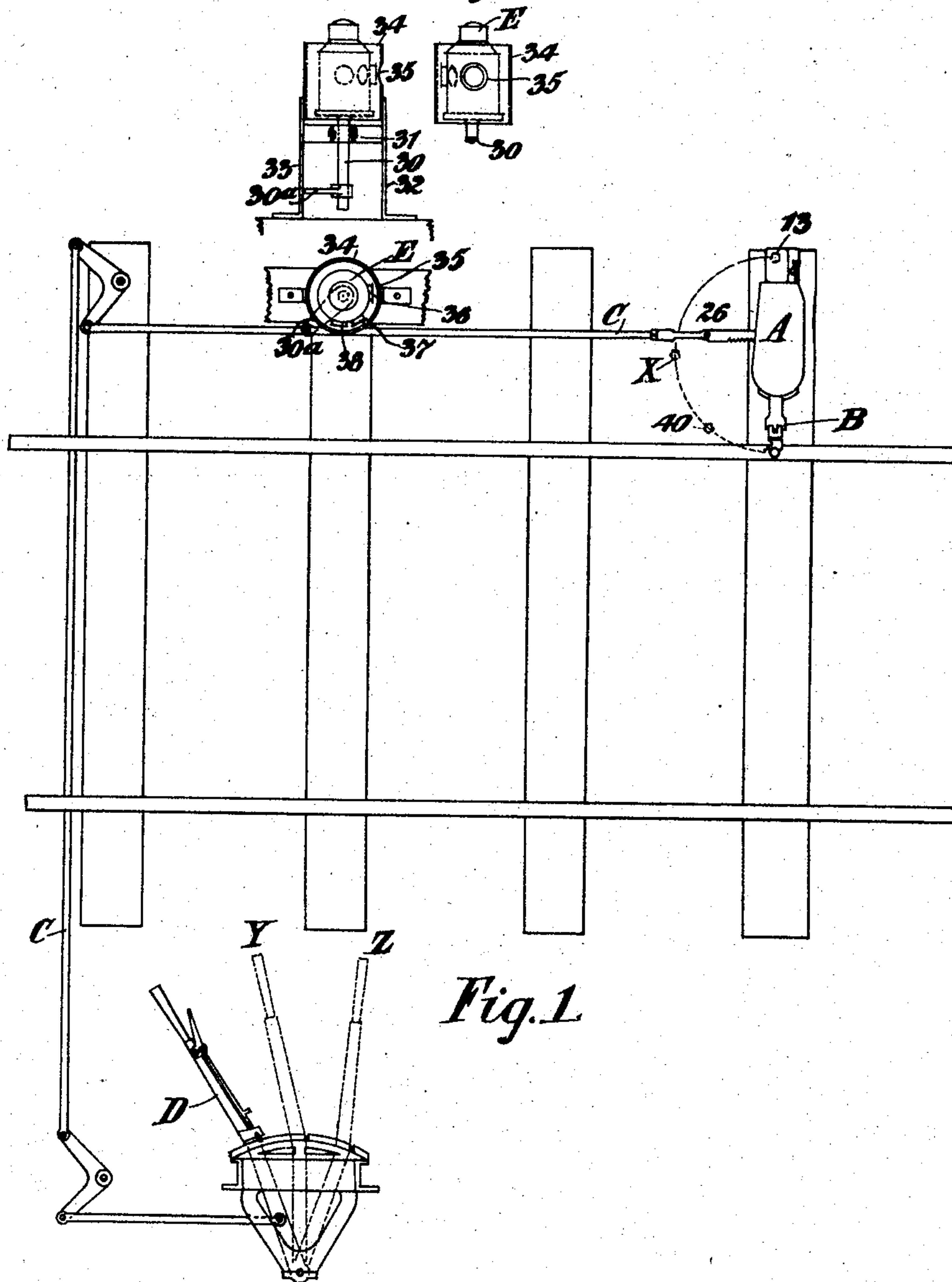
PATENTED JAN. 24, 1905.

H. F. CLAYTON.  
FOG SIGNALING APPARATUS FOR RAILWAYS.

APPLICATION FILED JULY 28, 1904.

2 SHEETS—SHEET 1.

*Fig. 2. Fig. 3.*



*Fig. 1*

Witnesses.

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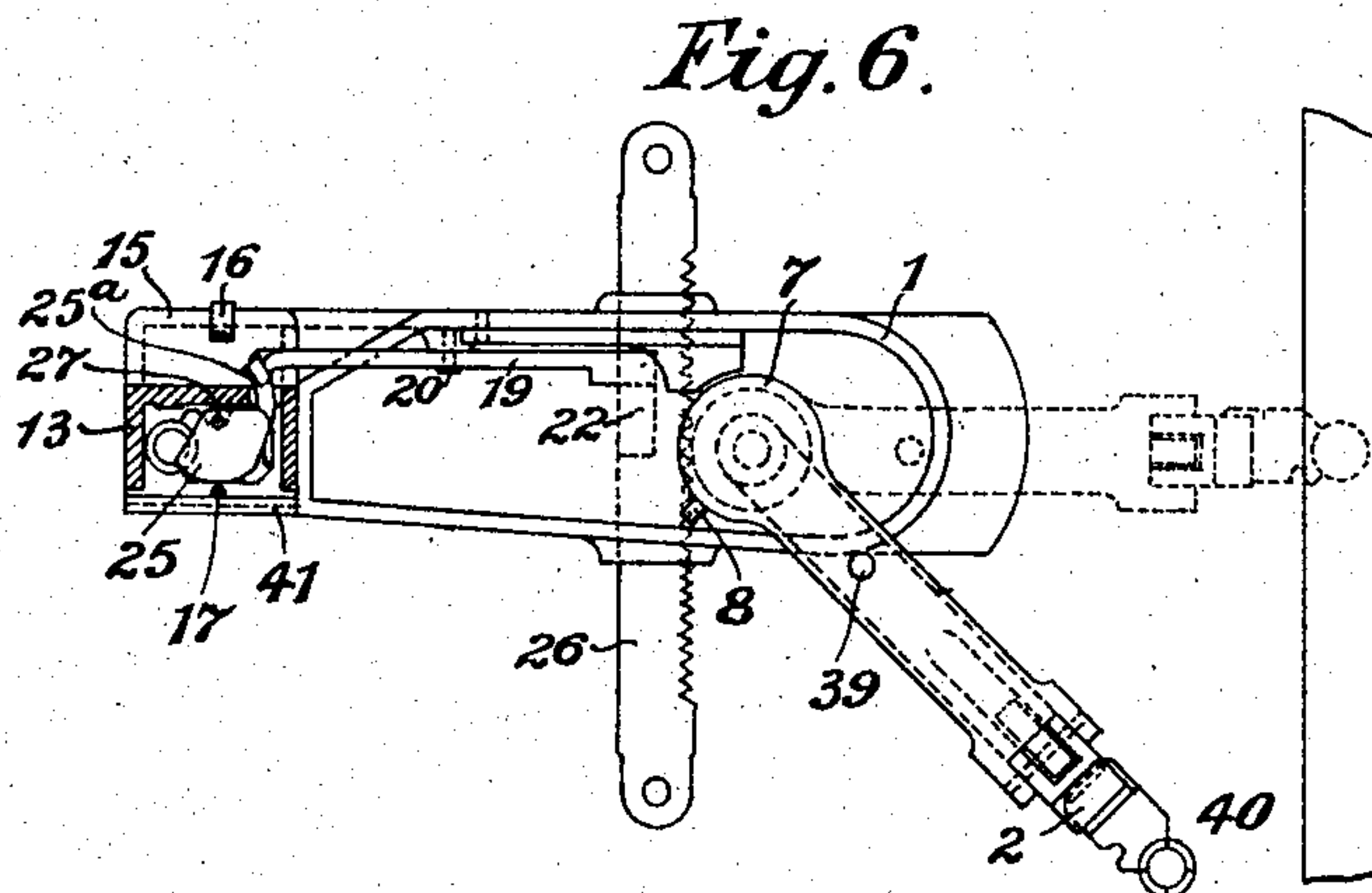
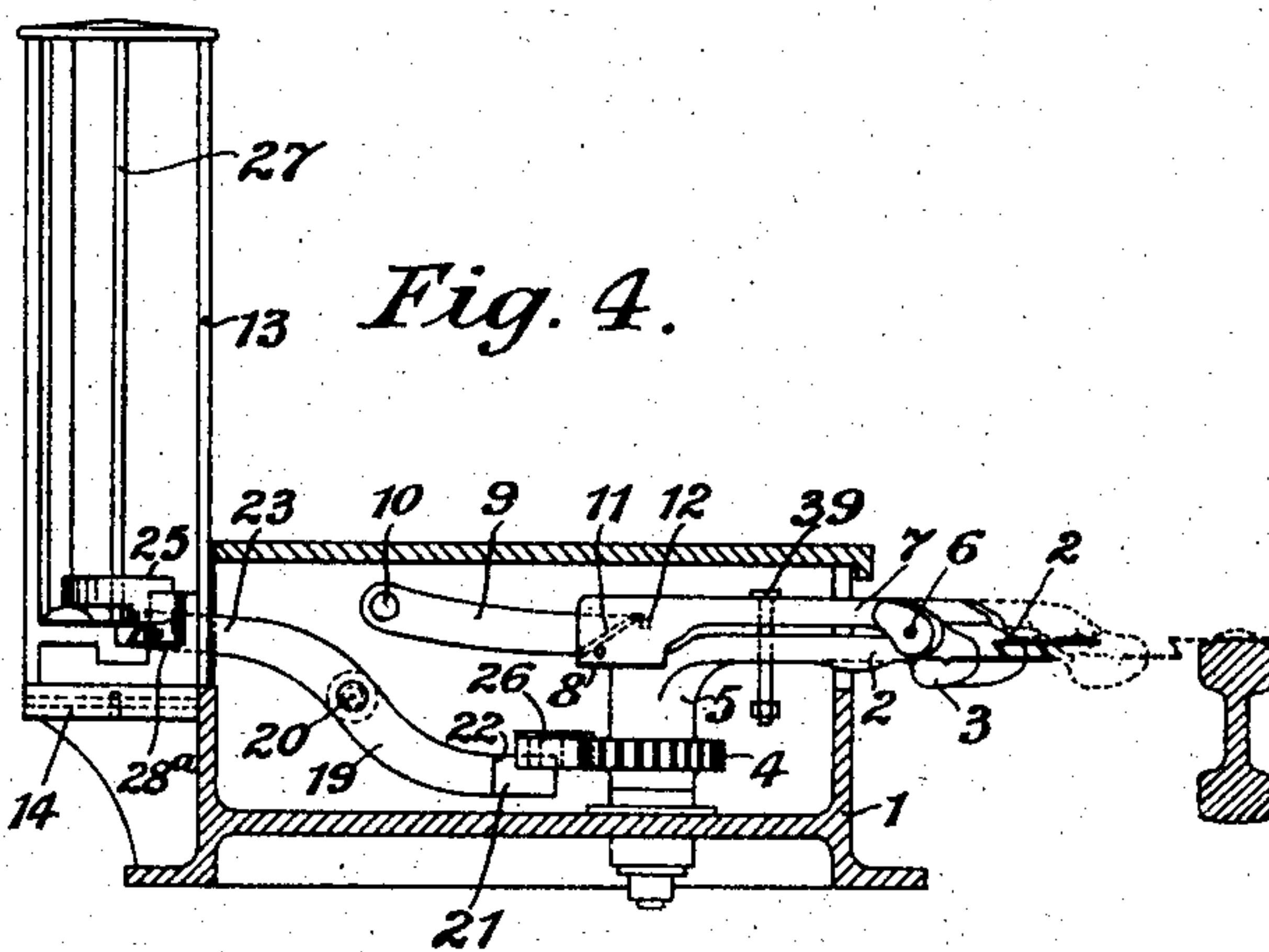
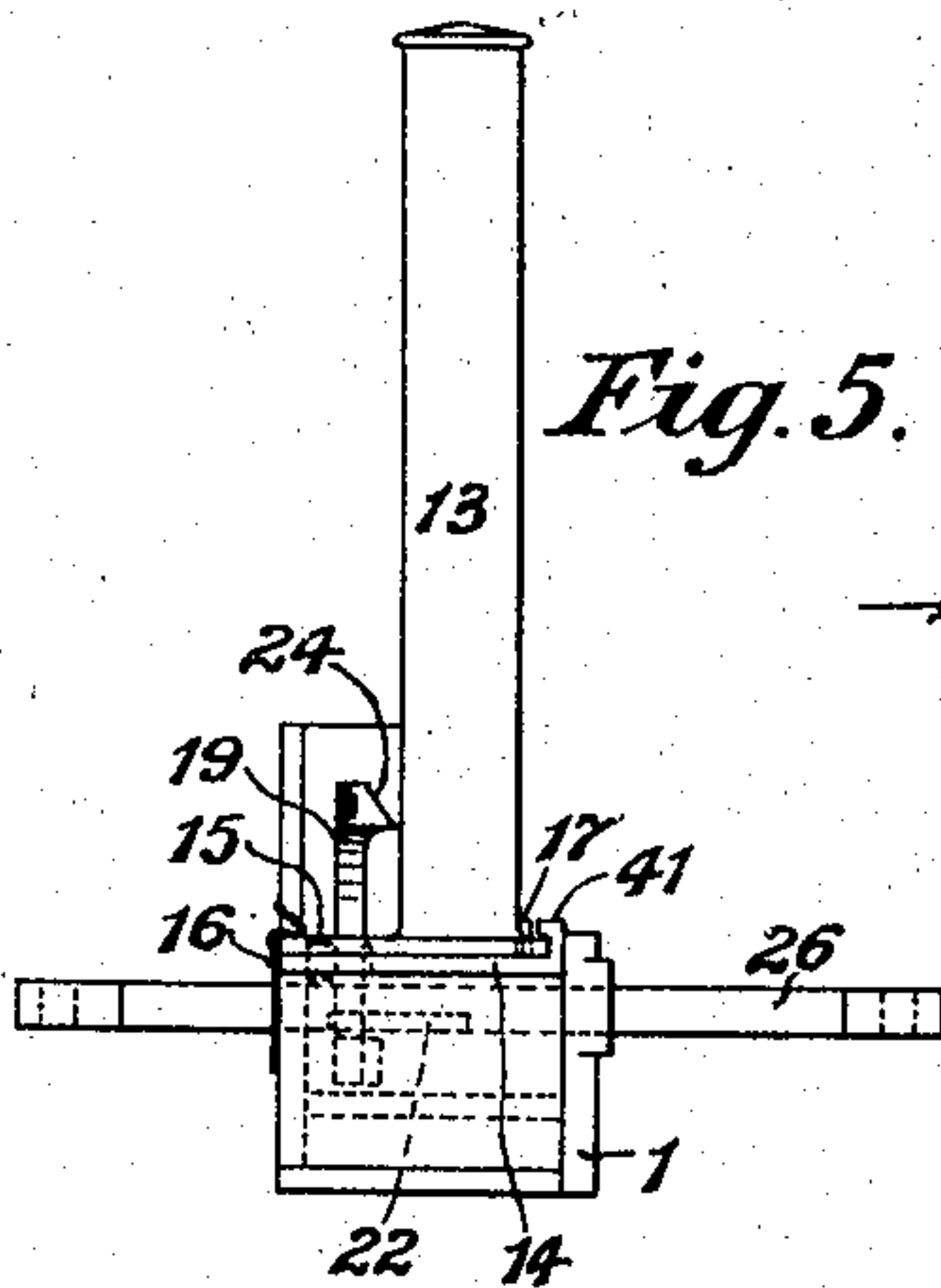
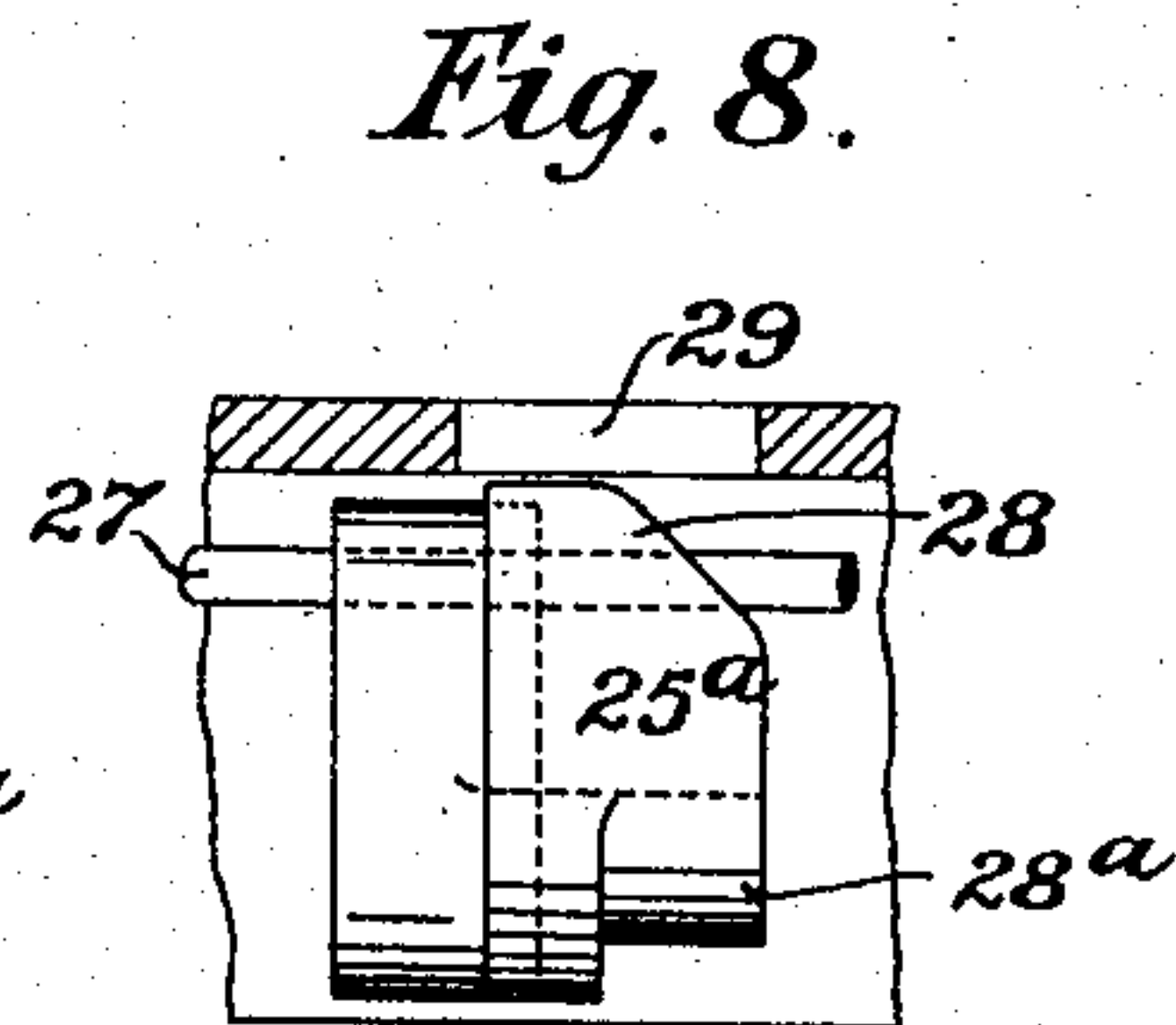
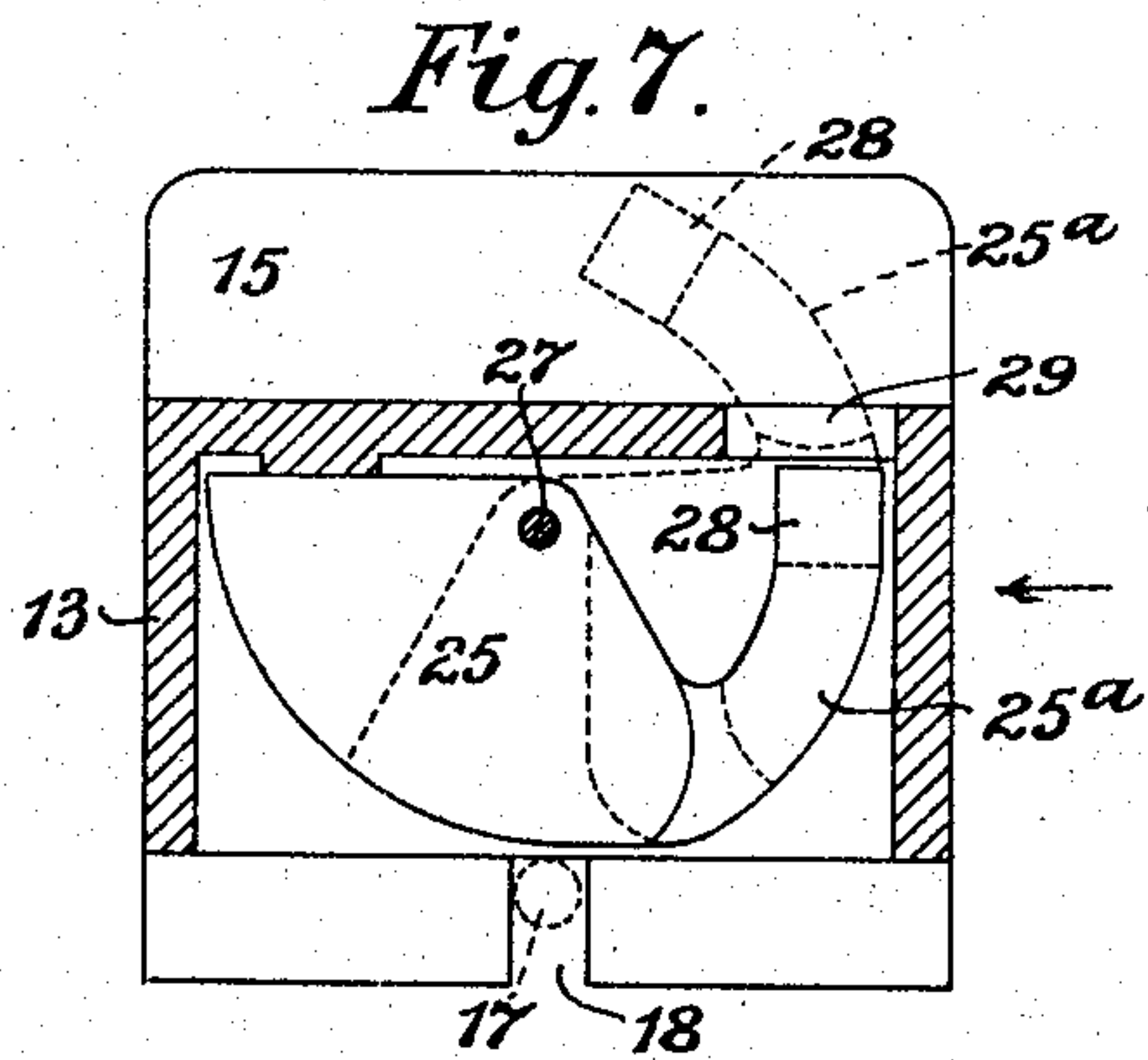
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2 SHEETS—SHEET 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

HERBERT FITZROY CLAYTON, OF HUDDERSFIELD, ENGLAND.

## FOG SIGNALING APPARATUS FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 780,639, dated January 24, 1905.

Application filed July 28, 1904. Serial No. 218,583.

*To all whom it may concern:*

Be it known that I, HERBERT FITZROY CLAYTON, a subject of the King of Great Britain and Ireland, residing at Craigmhor, Huddersfield, in the county of York, England, (whose post-office address is Craigmhor, Huddersfield, in the county of York, England,) have invented certain new and useful Improvements in Fog Signaling Apparatus for Railways; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists in improvements in fog signaling apparatus for railways, and relates principally to improvements in the apparatus described in the prior specification of Letters Patent No. 726,867, dated May 5, 1903, granted to me. In the apparatus according to said prior specification the detonator gripping-jaws are rotatably mounted in a casing and are operatively connected to a lever by means of a rack and pinion, the arrangement being such that the jaws can be moved from the magazine to the rail with the detonator, and when the detonator has been exploded a reverse movement of the lever will move the jaws back into the magazine, during which action the spent detonator is knocked out of the jaws, the jaws are automatically opened and are automatically closed again, so as to grip a new detonator in the magazine. If the semaphore-signal is moved to the safety position, the lever is moved to a position whereby if the detonator-jaws are in position with the detonator on the rail they will be moved away from the rail to a position between the magazine and the rail.

The jaw mechanism and method of operation in the present invention are, generally speaking, the same as in the prior specification above referred to. In the present invention, however, means are provided for locking the detonator gripping-jaws either when the last detonator has been removed from the magazine or when the last but one (or more, as may be desired) has been removed. Again, in the present invention a detachable magazine is employed, which can be readily de-

tached from the main casing of the machine when empty, so that it can be replaced by a full magazine, means being provided for automatically engaging and locking or holding the magazine on the machine-casing, and the withdrawal of said magazine acts to take the lock off the detonator gripping-jaws, as hereinafter explained.

The present invention also comprises a lamp-signal adapted to give two clear or "safety" indications and one or more "danger" indications, said lamp being operatively connected to the rod connection through which the detonator-jaws are moved to and from the rail, or said lamp might be connected to any other convenient part of the apparatus adapted to give the necessary movement to the lamp.

The present invention further comprises constructions and arrangements of parts, as hereinafter more fully set forth.

The accompanying drawings illustrate the invention.

Figure 1 is a plan view of part of the railway, showing the arrangement of the fog apparatus, as hereinafter described. Fig. 2 is a side elevation of the lamp-signal. Fig. 3 is a front view of the lamp. Fig. 4 is a side elevation, partly in section, of a fog signaling-machine with the door of the detonator-magazine removed. Fig. 5 is an end elevation of Fig. 4 looking in the direction of the arrow. Fig. 6 is a plan view of the machine with the cover removed and the detonator-magazine shown in section. Fig. 7 is an enlarged sectional plan of the detonator-magazine, showing the pivoted piece or cam hereinafter referred to. Fig. 8 is a part side view of Fig. 7 looking in the direction of the arrow.

In Fig. 1, A indicates the fog signaling-machine, B being the jaw mechanism and C C the rod-and-crank connections to the lever D for operating the jaw mechanism. E is the lamp-signal, operatively connected to the rod C. In this figure the jaw mechanism B is in the danger position, holding a detonator on the rail.

Referring to Figs. 4 to 8, inclusive, 1 is the casing of the machine, 2 and 3 being respectively the upper and lower detonator grip-



ping-jaws. 4 is the pinion on the rear end or vertical portion 5 of the upper jaw 2, which is pivotally mounted in the casing 1. 7 is the weighted lever, fulcrumed at 6 on the upper jaw; 8, a pin projecting from the rear end of lever 7; 9, a cam pivoted at 10 in the casing 1 and provided with a sloping surface 11 at its free end, which normally rests on the stop or pin 12 in casing 1. 26 is the rack-engaging pinion 4, which rack is connected to the rod-and-crank connections C C, as shown in Fig. 1.

The parts thus far described are identical with the corresponding parts in the prior specification of Letters Patent No. 726,867 granted to me.

13 is the detachable detonator-magazine, mounted on the shelf or bracket 14, provided on the casing 1. The bottom of the magazine is provided with a rearward flange 15, Figs. 5, 6, and 7, with which a spring-catch 16, Figs. 5 and 6, is adapted to engage when the magazine is placed on the shelf 14, the spring 16 holding the magazine on the shelf.

17 (see Figs. 6 and 7) is a pin or projection on shelf 14, with which a slot or recess 18 in the bottom plate of the magazine engages, thus insuring that the magazine is properly placed on the supporting-shelf 14 and preventing lateral displacement of the magazine.

19 is a lever pivoted at 20 in the magazine-casing, the end 21 of said lever being adapted to engage in a recess or slot 22 in the under side of the rack 26 for the purpose of locking the jaws against movement, as hereinafter described. The end 23 of lever 19 projects through the casing 1 to behind the magazine 13, and this end of the lever is provided with a sloping surface 24, Figs. 5 and 6.

25 is a weight or cam which is pivotally and slidably mounted on the rod 27 (or equivalent device) in magazine 13, said cam 25 being suitably formed to accommodate itself to the shape and position of the detonators in the magazine. The lower part 25<sup>a</sup> of the cam 25 is formed as a projection or finger and is provided with a sloping or cam surface 28. (See Figs. 7 and 8.)

29 is an opening in the back of the magazine, through which the projection or finger 25<sup>a</sup> is adapted to be moved, as hereinafter described.

The magazine 13 is provided with a preferably sliding door capable of vertical movement in grooves in the inside walls of the magazine, and said door is provided with a pivoted flap projecting over the opening through which the detonators enter and leave the magazine, as in the case of the apparatus described in the prior specification above mentioned.

Referring again to Figs. 1 to 3, the lamp E, as shown, is provided with a shaft or spindle 30, Fig. 2, which is rotatable in the bearing 31, attached to the supporting-standards

32 33. 30<sup>a</sup> is a half crank or lever fixed on shaft 30 and connected at its outer end to the rod C, as shown in Fig. 1. 34 is a casing in which the lamp works, said casing being provided with an aperture or window 35. 36, 37, and 38, Fig. 1, are the lenses of bull's-eyes of the lamp E, 36 in the arrangement shown being provided with a red glass for giving the danger-signal and 37 38 provided with green glasses for giving safety or clear signals. With the apparatus in the position shown in Fig. 1 the lens 36 is opposite the opening or window 35 in casing 34, thus showing that the detonator is on the line and the signal at the danger position. X, Fig. 1, indicates the intermediate position to which the detonator-jaw mechanism B is moved by the operation of lever D when the main-track signal is moved to the safety position, the lever D being moved to the dotted-line position Y. Z indicates the position of lever D when the jaw mechanism is moved into the magazine 13.

39, Figs. 4 and 6, is a pin or bolt working in holes through the lever 7 and the upper jaw 2, said pin 39 being provided for the purpose of preventing the lever 7 being thrown too far up, whereby the mechanism might be strained.

The operation of moving the detonator gripping-jaws to and from the magazine and rail and to the intermediate position X, Fig. 1, is identically the same as described in the prior specification of Letters Patent No. 736,867, the lever D being moved to the full-line position, Fig. 1, for placing the detonator on the rail, to the intermediate position Y for moving it to the off position X when the main-track signal is moved to the safety, and to the position Z for moving the jaws into the magazine 13. When lever D is moved to the position Y, the movement of the rod-and-crank connections C will, through the half crank or lever 30<sup>a</sup>, turn the shaft 30 and lamp E so that the lens 36 will be moved away from the opening 35 in the casing 34 and the lens 37 will be moved into line with said opening, so that the green light or safety-signal is visible. Again, when lever D is moved to the position X, placing the detonator-jaws in the magazine 13, the lamp will be turned so that the lens 37 moves away from opening 35 and lens 36 comes in line with said opening, thus showing another green light or clear signal. The lamp E is arranged in a convenient position to be seen by the engine-driver. Now assuming that the last but one detonator has been removed from the magazine, the weight or cam 25 will be in the position shown in Figs. 4 and 6, and when the detonator gripping-jaws 2 and 3 are moved into the magazine (by the operation of lever D to position Z, Fig. 1) the upper jaw 2 will strike the lower part (28<sup>a</sup>,



Fig. 8) of finger 25<sup>a</sup>, so that the cam 25 will be turned on rod 27 and the projection or finger 25<sup>a</sup> will move through the opening 29 in the back of the magazine 13 (see dotted-line position, Fig. 7) and the sloping surface 28 on the part 25<sup>a</sup> will act on the sloping surface 24, Figs. 5 and 6, on the outer end of lever 19, so that the end 23 of said lever is depressed and the end 21 raised, the latter into engagement with the slot or recess 22 in the rack 26, so that when the rack 26 has been moved a certain distance by the movement of lever D from the normal safety position Z, Fig. 1, the shoulder at the end of the recess 22 in the rack will engage the end 21 of lever 19, so that further movement of the rack 26, and consequently further movement of the gripping-jaws and the operating connections thereto, will be prevented, and the fogman will thus be immediately informed that the magazine 13 is empty and must be replaced by a full one. The weight or cam 25 operating on the end 23 of lever 19 retains the lock on the mechanism. The fogman now goes to the machine with a full magazine, and by disengaging spring 16 from the flange or plate 15 at the rear of the magazine the magazine can be lifted off its supporting-bracket 14. The action of lifting the magazine from the supporting-bracket 14 will cause the flange 15 on the magazine to strike the end of the lever 19, so as to insure its end 21 being disengaged from the recess 22 in the rack, thus taking the lock off the jaw mechanism. It will be observed that when the jaws were locked against movement to place the detonator on the rail by the end of lever 21 engaging recess 22 a live detonator is in the jaws, (having been taken from the magazine,) so that, if necessary, the fogman can when the lock is taken off the mechanism, as just described, push the jaws, with the detonator, onto the rail by hand without having to go back to the operating-lever to move the jaws into the magazine to get another detonator. Should the fogman in error move the jaw mechanism from the position 40 back into the magazine, (instead of onto the rail,) he will still have another detonator to place on the rail, as the jaws entering the magazine will grip the remaining detonator therein, and when the empty magazine is removed, as above described, the jaws can be moved by hand, with the detonator, onto the rail; the detonator that was held by the jaws when in the position 40, Figs. 1 and 6, being knocked out of the jaws (in the known manner) as they passed into the magazine to grip the last detonator. The full magazine is placed on the shelf or bracket 14, so that the recess 18, Fig. 7, registers with the pin 17 on the bracket 14, and by depressing the back of the magazine the flange or plate 15 will push spring 16 (see Figs. 5 and 6) outward, and when the magazine is properly placed said spring 16 will automatically engage the flange

or plate 15, and so hold the magazine in position. When the detonator gripping-jaws are locked against movement to place the detonator on the rail, as above described, the position of the jaws and detonator will be as indicated by the number 40, Figs. 1 and 6, and the movement of the jaws to this position will move the rod-and-crank connection C C and turn the lamp E to a position in which neither of the lenses 36, 37, and 38 registers with the opening 35 in the casing 34, Figs. 1, 2, and 3, or, if desired, it might be arranged to have another lens in the lamp, which would in said position of the detonator register with the opening 35 in the casing 34 and give another danger-signal—for instance, showing a red or white light.

When the detonator-magazine is full, the cam or weight 25 rests on the top detonator and acts to steady the detonators in the magazine and to insure their proper downward movement into position to be gripped by the jaws 2 3. The shelf or bracket 14, Figs. 4, 5, and 6, is provided with an intumed flange 41, Fig. 5, forming a recess with which the front edge of the bottom plate of the magazine 13 engages, so that the flange 41 retains that side of the bottom bolt in position on the bracket 14, the magazine being tilted slightly forward when being placed in position, so that the front edge of the bottom plate will be under the flange 41.

The locking end 21 of lever 19 is weighted, so that under normal conditions when the cam 25 is not holding it in engagement with the recess 22 in the rack 26 said end 21 will drop out of the recess 22. Should, however, the end 21 of lever 19 from any cause remain up in engagement with recess 22 when the magazine 13 is removed from its support 14, as previously described, the end 23 of lever 19 will be engaged by the rearward flange 15 on the magazine, whereby the end 21 will be disengaged from the recess in the rack.

Although I have hereinbefore described the means for locking the detonator gripping-jaws in the position adjacent to, but with the detonator off the rail, as consisting of a lever and have also described and shown said lever as being pivoted or arranged inside the magazine-casing, yet I do not limit myself entirely to said constructions or arrangements, and the details of the mechanism generally may be varied without departing from the main features of the invention.

Although I have described and shown the locking of the jaws against movement to place the detonator on the rail when the last but one detonator has been removed from the magazine, yet it is obvious that they may be locked when the last detonator is being moved from the magazine to the rail.

By providing a detachable magazine the recharging of the apparatus with detonators



can be rapidly, easily, and safely effected, as the empty magazine can be replaced by one already filled without the fogman having to stand over the machine adjacent to the line to fill the magazine.

What I claim, and desire to secure by Letters Patent, is—

1. In a fog-signal, the combination, with a magazine for detonators, and a carrier for removing the detonators from the magazine and placing them on the rail; of automatic locking mechanism for the said carrier which comes into operation when a prearranged number of detonators have been removed from the said magazine.

2. In a fog-signal, the combination, with a magazine for detonators, and a carrier for removing the detonators from the magazine and placing them on the rail; of a weight normally supported by the detonators in the magazine, and a locking device for the said carrier which is operated by the said weight when a prearranged number of detonators have been removed from under the said weight.

3. In a fog-signal, the combination, with a casing, and carrier mechanism for the detonators arranged in the said casing; of a magazine formed separate from the casing, and guides and fastening devices for connecting the magazine to the casing in a prearranged position with respect to the said carrier mechanism.

4. In fog signaling apparatus for railways, the combination, with the rotatable detonator gripping-jaws, and the means controlled by the operator for moving said jaws to and from the magazine and rail, of a locking device operated by the movement of the jaws into the magazine so as to lock the jaws when moved to a position adjacent to the rail.

5. In a fog-signal, the combination, with a magazine for detonators, a carrier for removing the detonators from the magazine and placing them on the rail, and a visible signal op-

eratively connected with the said carrier; of automatic locking mechanism for the said carrier and visible signal which comes into operation when a prearranged number of detonators have been removed from the said magazine.

6. In fog signaling apparatus for railways, the combination, with the detonator gripping-jaws, the rack operatively connected to said jaws and the means operatively connected to the rack for moving said jaws to and from the magazine and rail, of a detachable detonator-magazine, a locking-lever pivoted on the machine-casing, a notch or recess in the rack with which said lever is adapted to engage, and a pivoted part in the magazine adapted to be operated by the movement of the jaws into the magazine so as to cause said lever to engage with the notch in the rack, substantially as and for the purposes described with reference to the drawings annexed.

7. In fog signaling apparatus for railways, the combination, with the detonator gripping-jaws, the rack operatively connected to said jaws and the means operatively connected to the rack for moving said jaws to and from the magazine and rail, of a detachable detonator-magazine, a locking-lever pivoted on the machine-casing, a notch or recess in the rack with which said lever is adapted to engage, a pivoted part in the magazine adapted to be operated by the movement of the jaws into the magazine so as to cause said lever to engage with the notch in the rack, and a lamp-signal operatively connected to the apparatus, substantially as and for the purposes described with reference to the drawings annexed.

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

HERBERT FITZROY CLAYTON.

Witnesses:

KAYE RAMSDEN,  
FRANK PEARSON.