908,189.

H. M. ABERNETHY.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 24, 1906.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 1.

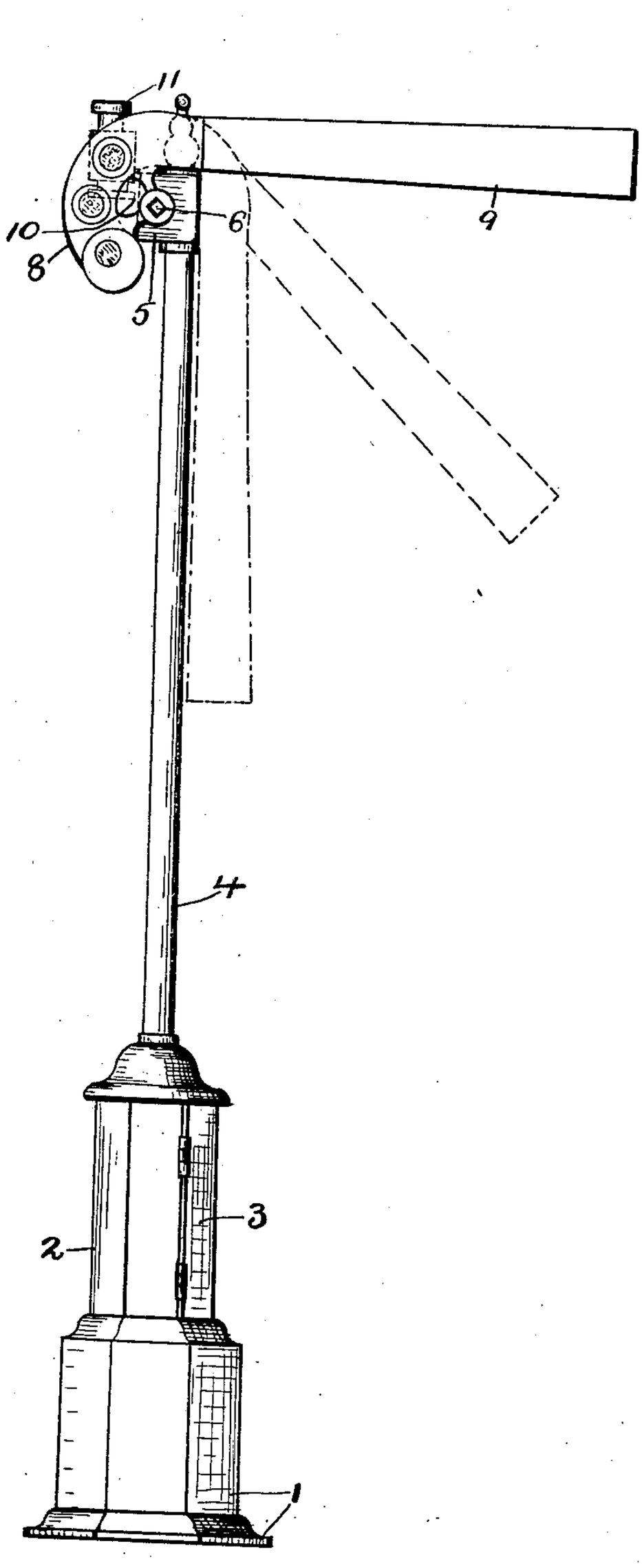


Fig. 1.

WITNESSES:

Daniel E. Daly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy

BY

Lynch & Dorr

his ATTORNEYS.

908,189

H. M. ABERNETHY.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 24, 1906.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 2.

Fig. 2.

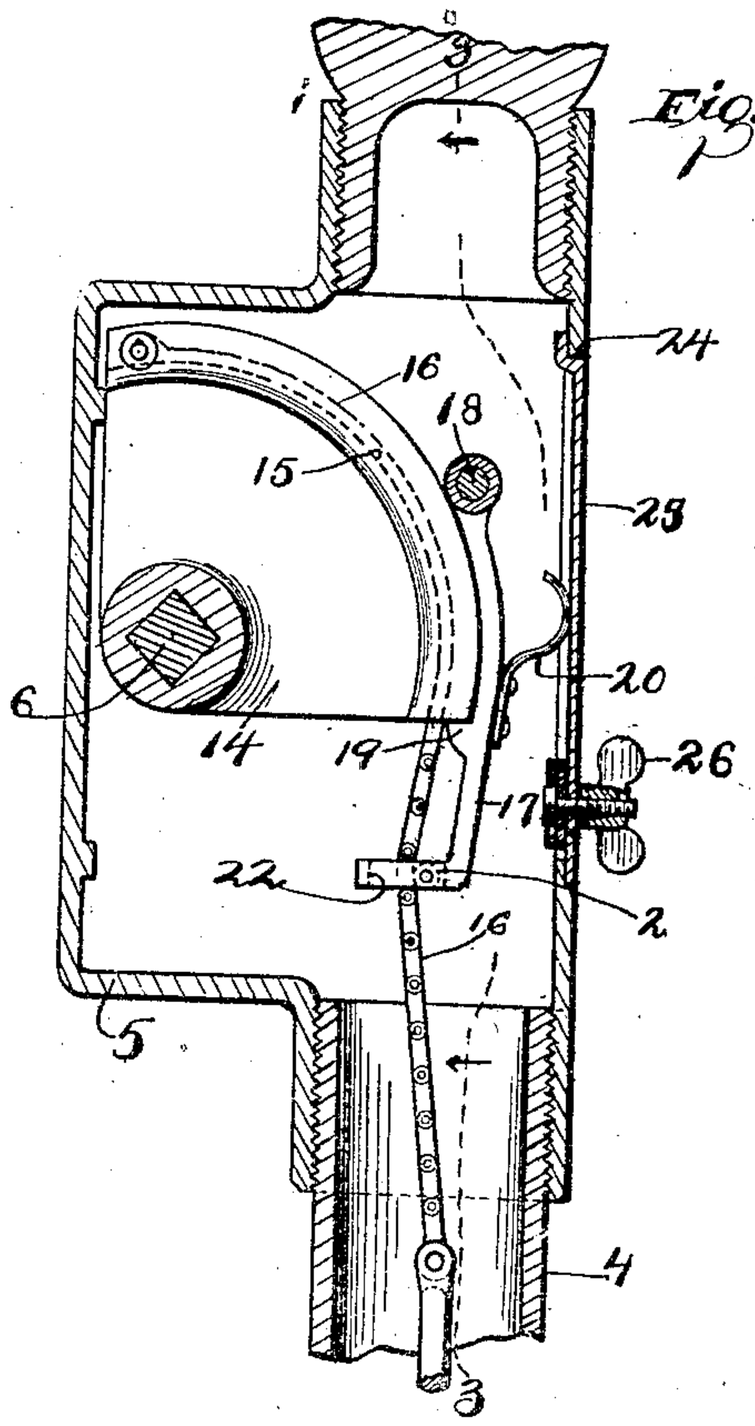


Fig. 3.

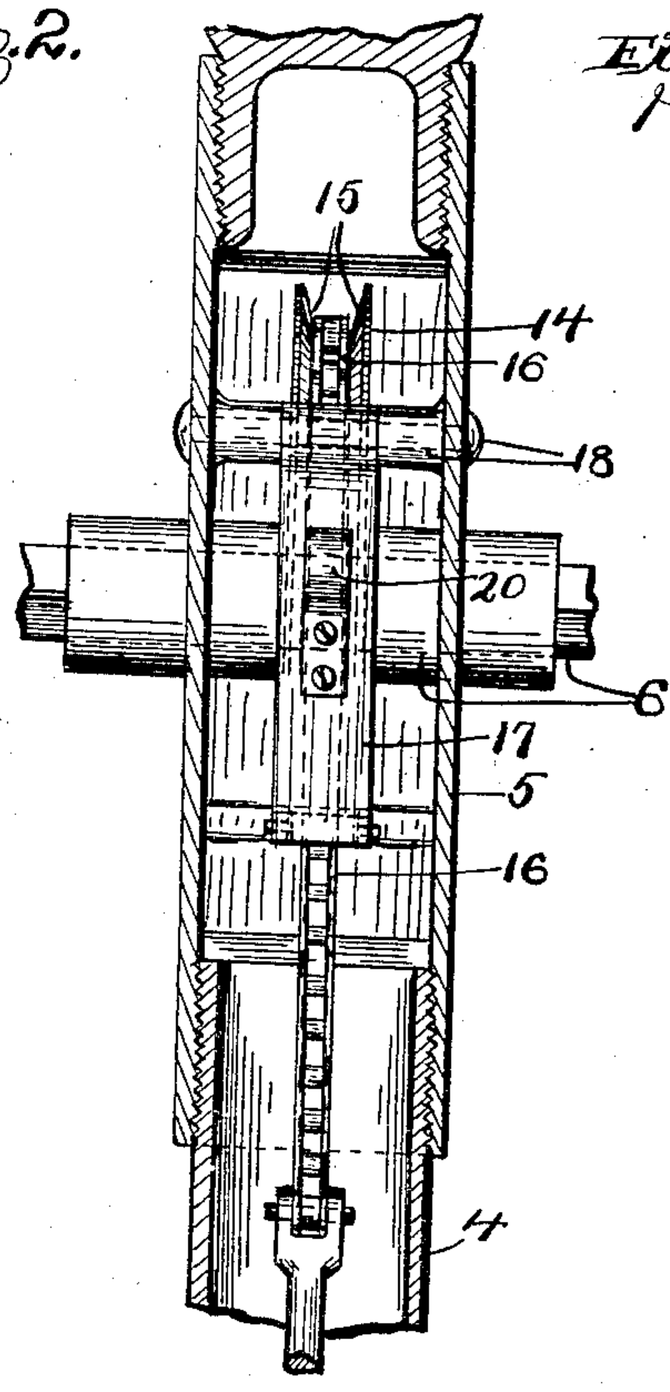
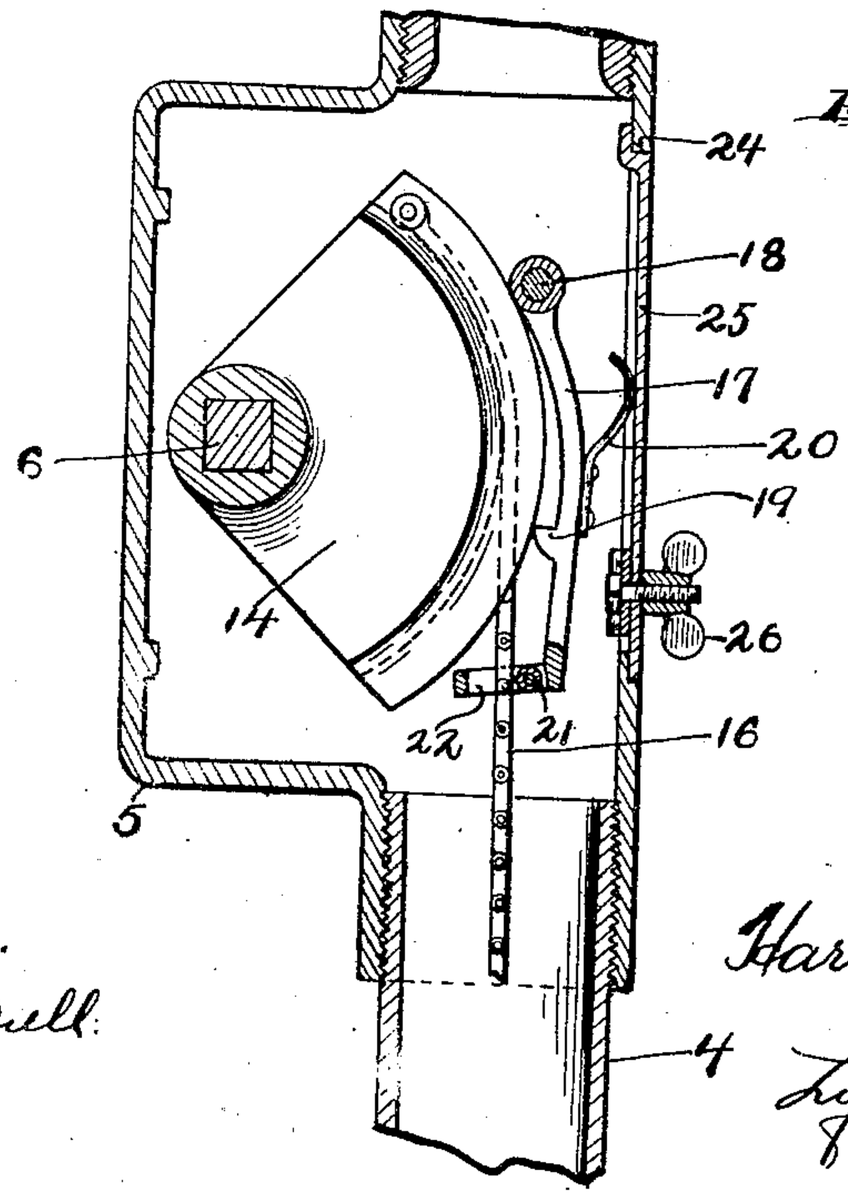


Fig. 4.



WITNESSES:

Daniel E. Haly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy.

BY

Lynch & Dorer

his ATTORNEYS.

908,189.

H. M. ABERNETHY.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 24, 1906.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 3.

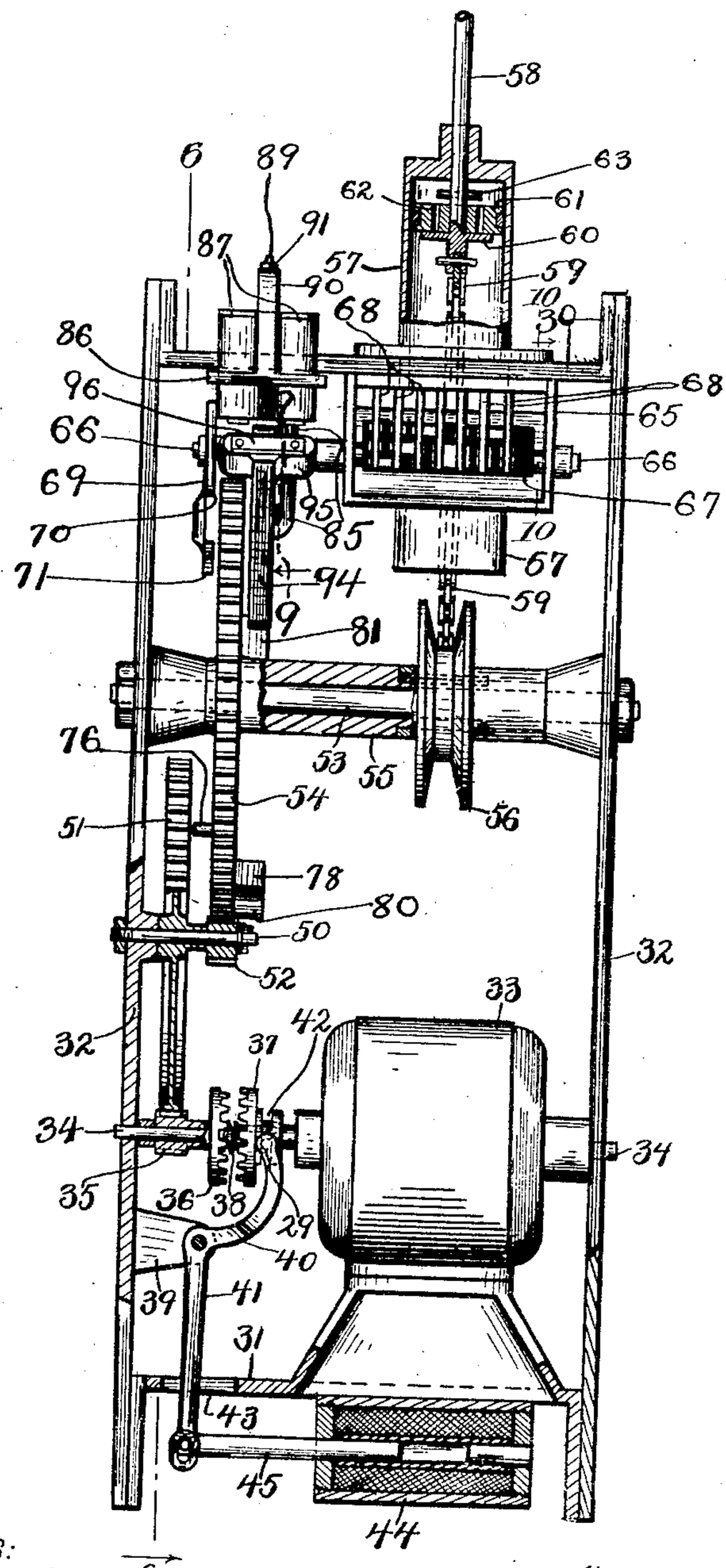


Fig. 5.

WITNESSES:

Daniel E. Daly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy

BY

Lynch & Dour

his ATTORNEYS.

H. M. ABERNETHY.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 24, 1906.

908,189.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 4.

Fig. 6.

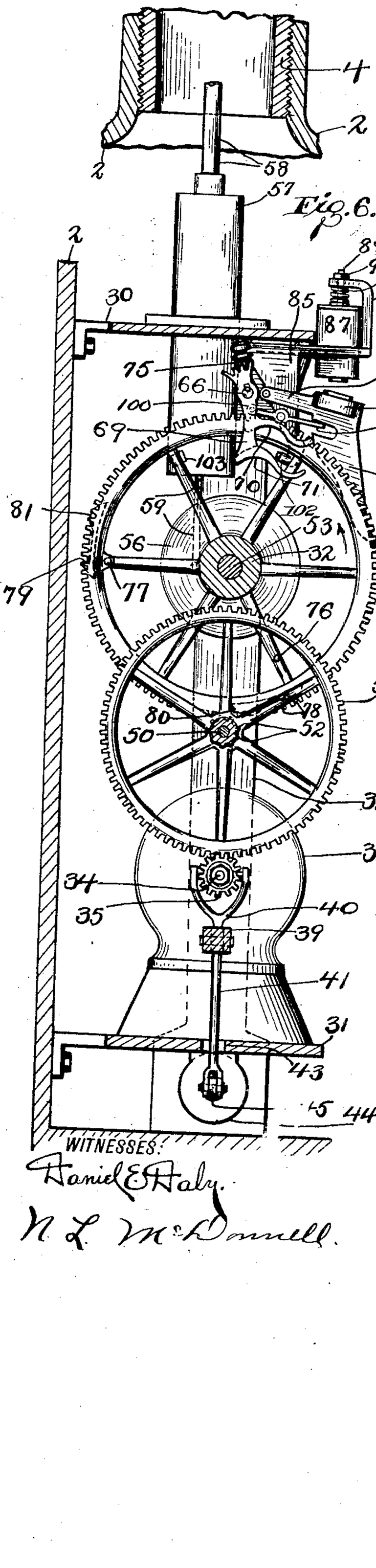


Fig. 7.

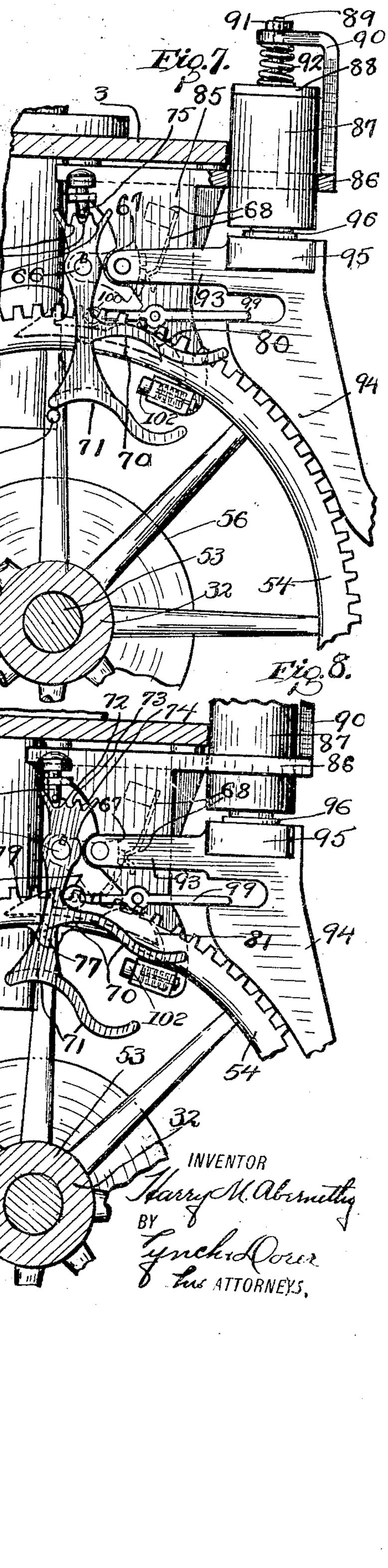


Fig. 8.

WITNESSES:

Daniel E. Haly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy

BY

Lynch & Dorr

HIS ATTORNEYS.

908,189.

H. M. ABERNETHY.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 24, 1906.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 5.

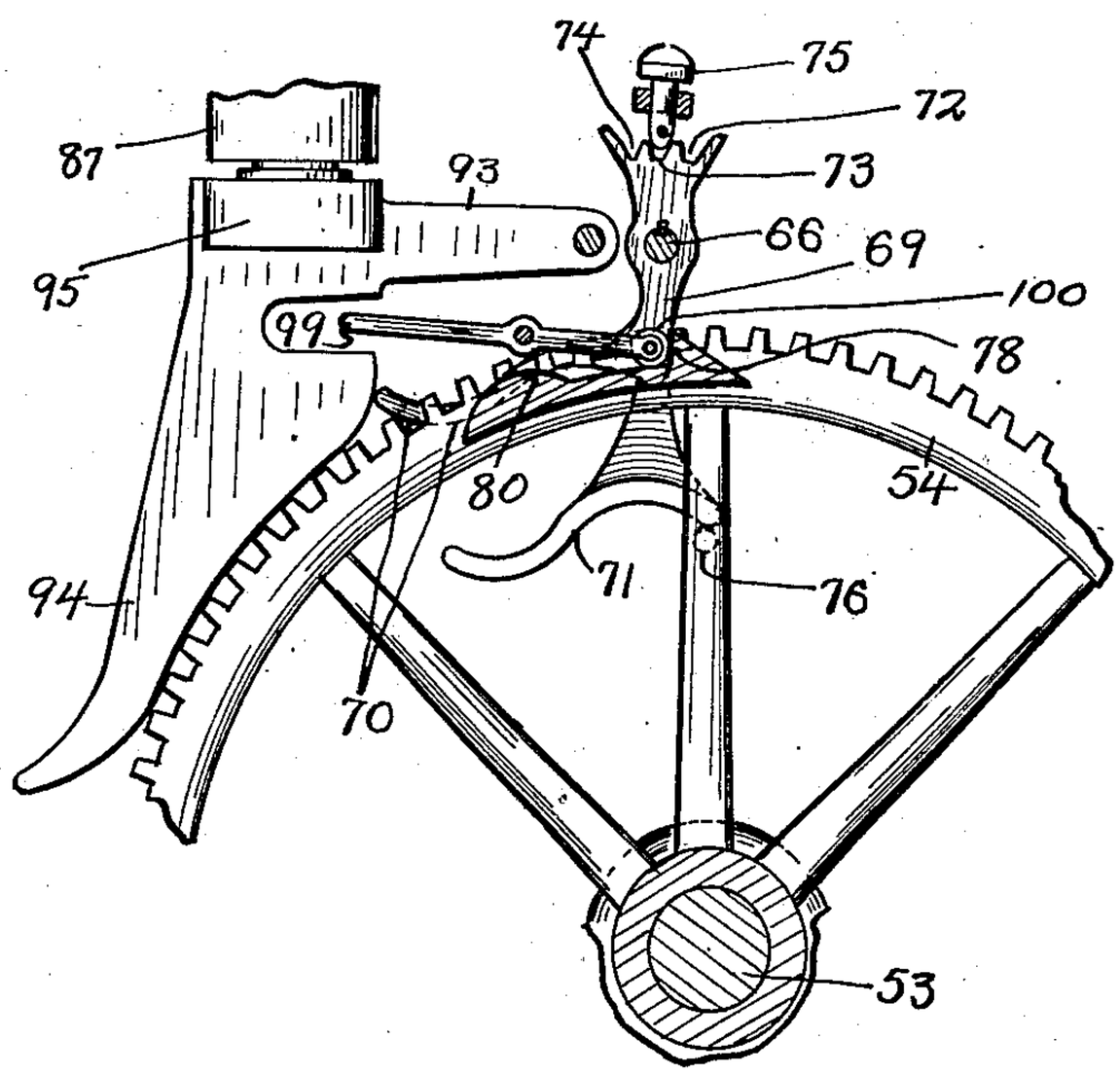


Fig. 9.

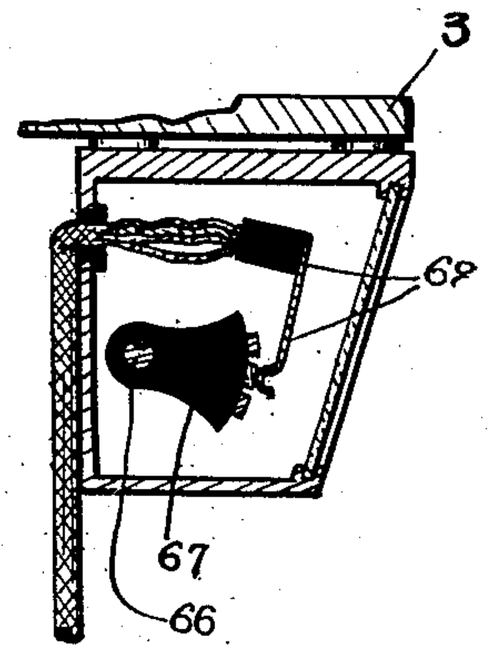


Fig. 10.

WITNESSES:

Harold E. Daly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy

BY

Lynch & Lorer

his ATTORNEYS.

908,189.

H. M. ABERNETHY.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 24, 1906.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 6.

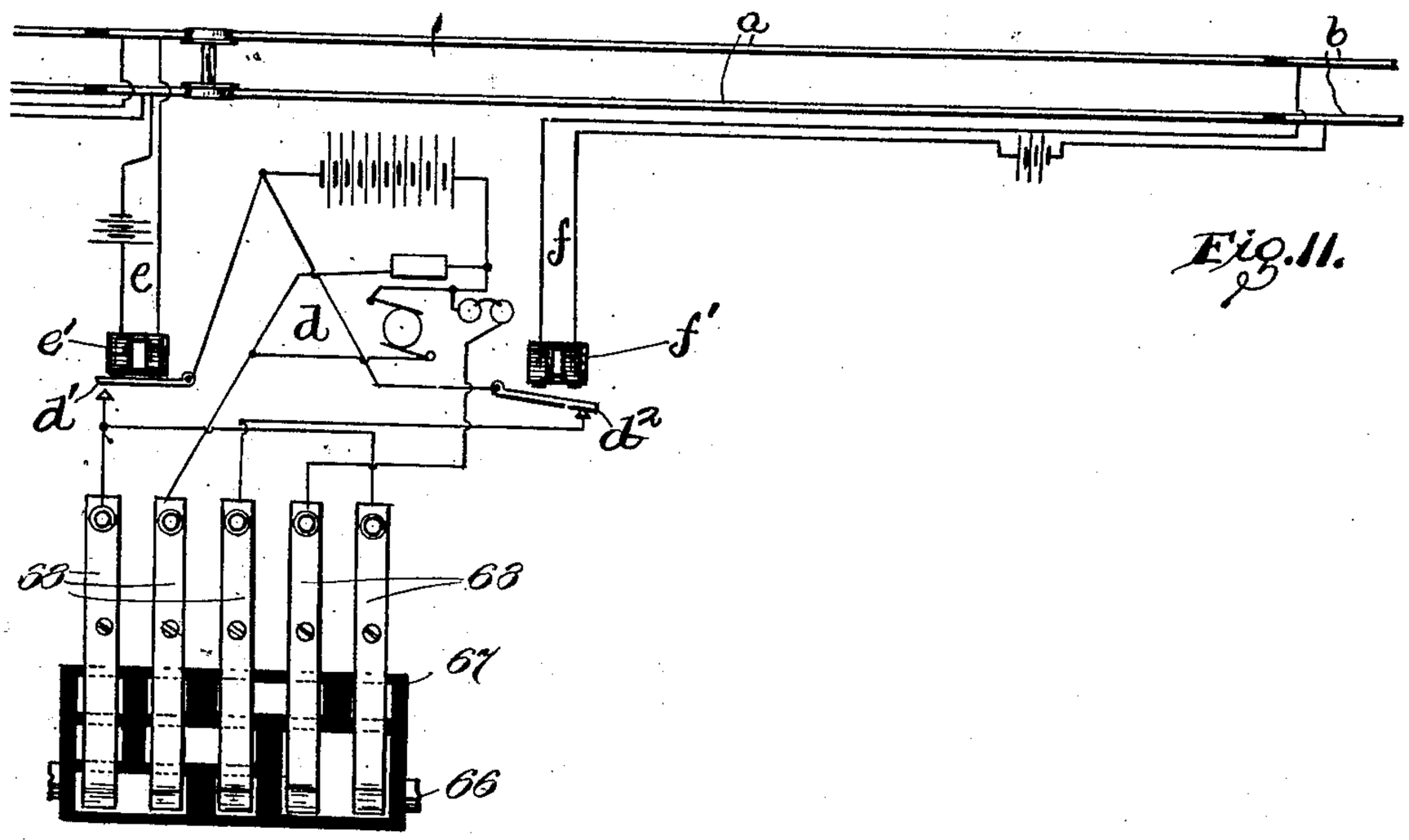


Fig. 11.

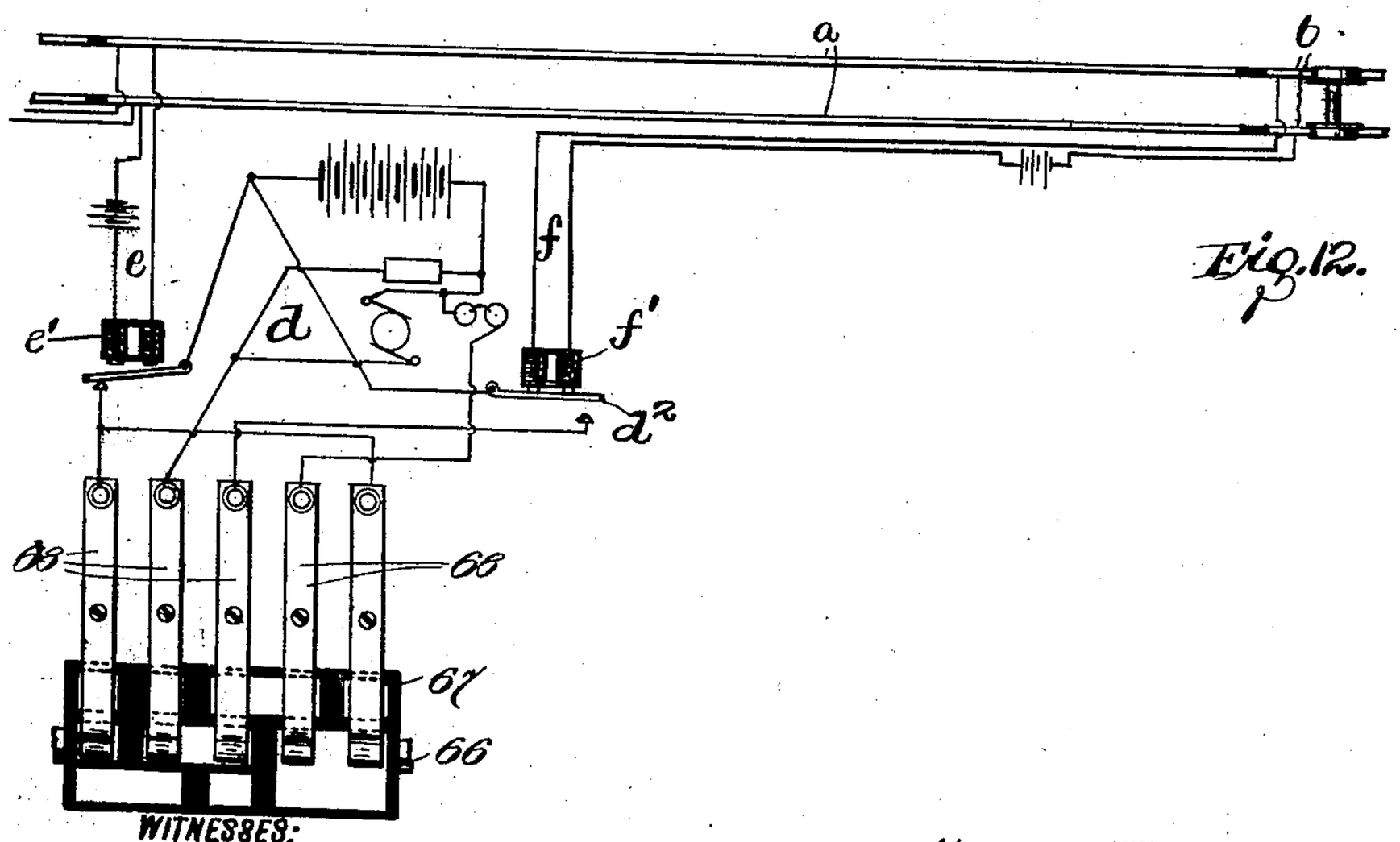


Fig. 12.

WITNESSES:

Samuel E. Daly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy

BY

Lynch & Dore

his ATTORNEYS.

H. M. ABERNETHY.

RAILWAY SIGNAL.

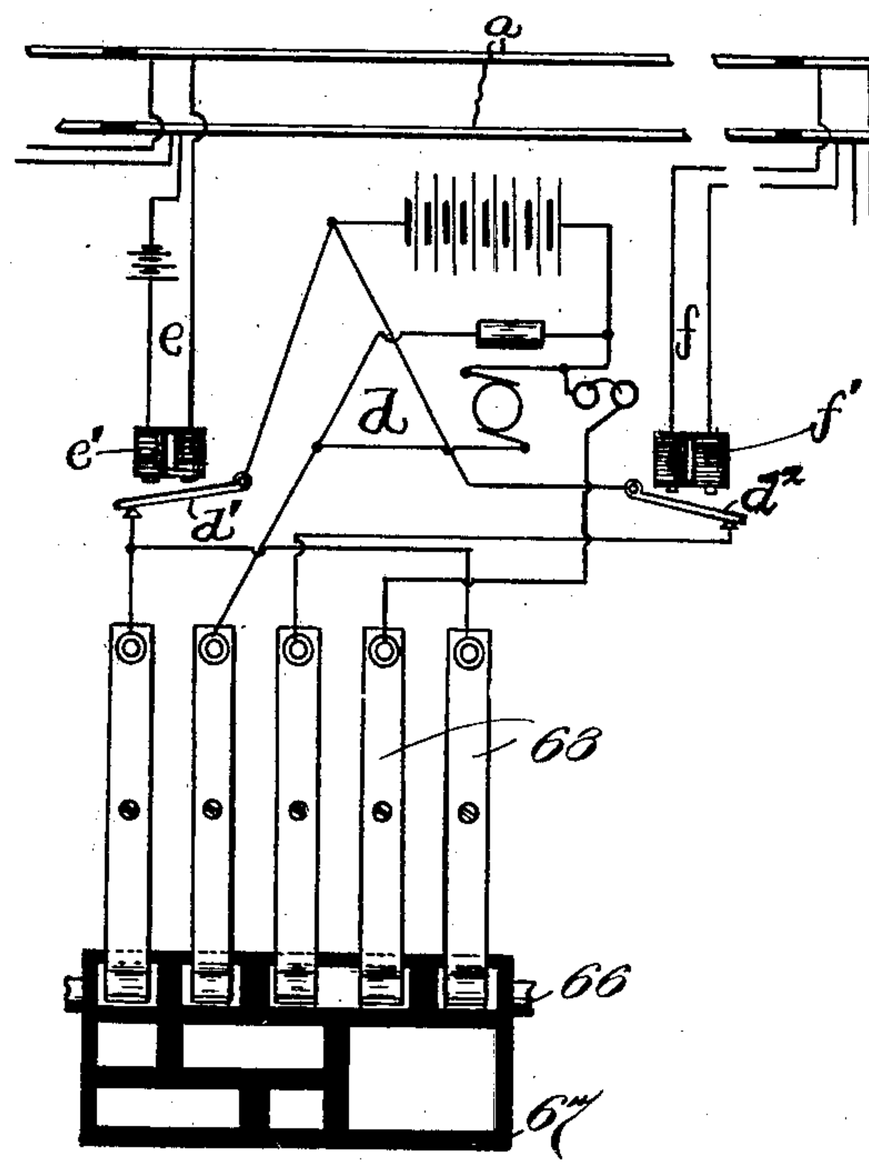
APPLICATION FILED MAR. 24, 1903.

908,189.

Patented Dec. 29, 1908.

7 SHEETS—SHEET 7.

Fig. 13.



WITNESSES:

Daniel E. Daly.

N. L. McDonnell.

INVENTOR

Harry M. Abernethy

BY

Lynch & Dorer

his ATTORNEYS.

UNITED STATES PATENT OFFICE.

HARRY M. ABERNETHY, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN RAILWAY SIGNAL COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

RAILWAY-SIGNAL.

No. 908,189. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed March 24, 1906. Serial No. 307,811.

To all whom it may concern:

Be it known that I, HARRY M. ABERNETHY, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Railway-Signals; and I 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 pertains to make and use the same.

This invention relates to improvements in railway signaling apparatus and especially to electrically operated signals.

The object of this invention is to provide a device of the character indicated which can be used for automatic block signal purposes and also for displaying or operating a signal wherever such a device may be necessary.

Another object of this invention is to provide a device of this character which can be operated with a minimum expenditure of electric current.

This invention consists in providing a device of this character in which the normal position of the signal blade will be the position which indicates danger so that on the failure of the setting mechanism to operate the signal blade will either remain in the danger position or else assume the danger position.

My invention further consists in providing a device of this character in which the full operating current is only utilized when changing the signal from danger to distant and from distant to clear and in which the signal blade is mechanically locked in its different positions.

My invention also consists in the features of construction and combination of parts as described in the specification, pointed out in the claims and illustrated in the accompanying drawings.

In the accompanying drawings Figure 1 is an elevation of a device embodying this invention. Fig. 2 is an enlarged sectional view of the head portion thereof. Fig. 3 is a section on line 3—3, Fig. 2. Fig. 4 is a similar view to Fig. 2, showing the parts in a different position. Fig. 5 is a front elevation of the mechanism in the mechanism case. Fig. 6 is a section on line 6—6, Fig. 5. Fig. 7 is an enlarged detail view of the upper part of the mechanism shown in Fig. 6, with the parts in a different position. Fig. 8 is a view similar to Fig. 7, with the parts in a different position. Fig. 9 is a view similar to Fig. 7, looking at the parts from the opposite side of the wheel 54. Fig. 10, is a section on line 10—10, Fig. 5. Figs. 11, 12 and 13 are diagrams showing the controller and circuits when the signal blade is in the danger, distant and clear positions.

Referring to the drawings, 1 represents the base of the signal post, which is preferably made hollow, and is utilized for storing the battery which provides the electric current for operating the signal, but the battery which is preferably a storage battery, may be placed in any other position or at a distance from the post if desired. On the base 1 is arranged the mechanism case 2, which is preferably provided with a door 3 for giving access to the interior thereof. On top of the mechanism case 2 is arranged the signal post or mast 4 which consists of a hollow iron tube, and on the upper end of the signal post 4 is arranged a head or casing 5. A semaphore shaft 6 extends horizontally through the head 5 and on the projecting end thereof is secured a semaphore 8 which is provided with a signal blade 9. The semaphore is counterweighted so that it will fall by gravity to its normal position causing the signal blade to extend in a horizontal direction, which is the position used to indicate danger. On the head 5 is arranged a bracket 10 which supports the signal lamp 11. On the semaphore shaft 6, within the casing or head 5, (see Figs. 2 3 and 4), is rigidly secured the semaphore shaft sheave 14 which is in the form of a sector-shaped plate having a cable or chain groove 15. One end of a chain 16 is secured at the upper end of the groove 15 and the other end of the chain extends down into the signal post 4. A latch 17 is supported on a pin 18 in proximity to the plate 14 and is provided with a lug 19 which extends under the sheave 14 and locks the sheave 14 against downward rotation. The latch is normally held in its locking position by a spring 20. The lower end of the latch 17 is arranged to lie in the path of the chain 16 and is preferably provided with a roller 21, and a guard ring 22 which prevents the chain running off of the roller 21. When the chain 16 is slack it will therefore curve around the lower end of the latch but when the chain is pulled taut, by the means here-

inafter described, it will cause the latch 17 to move back leaving the sheave 14 free to swing down. The object of this arrangement is to mechanically lock the semaphore and blade in the danger position so that they cannot be changed by any exterior force and to automatically unlock them as soon as the mechanism for changing the same is put into operation. In the head 5 is preferably formed a hand hole 24 which is closed by a cover 25 held in position by a button 26. To the rear wall of the mechanism case 2, (see figs. 5 and 6), near the upper end thereof, is secured a plate or table 30 and near the lower end is secured a plate or table 31. A pair of uprights 32 are arranged at the sides of the said tables and form a side frame or support therefor. On the table 31 is mounted an electric motor 33 of any preferred pattern and on the motor shaft 34 is loosely mounted a pinion 35 having a serrated clutch member or disk 36 formed integral therewith. On the motor shaft 34 is slidably secured a serrated clutch member or disk 37. The clutch members are normally held apart by a spring 38. Below the motor shaft 34 is arranged a clutch lever bracket 39 on which is pivotally arranged a clutch lever having a short arm 40 and a long arm 41. The short arm 40 is forked and carries a pin 29 which extends into an annular groove 42 formed in the shank portion of the clutch member 37 and the longer arm 41 of the clutch lever extends down through an opening 43 in the table 15. To the under side of the table 15 is secured a solenoid or sweeping magnet 44 having a plunger 45 which is free to slide therein. To the outer end of the plunger 45 is pivotally secured the lower end of the arm 41 of the clutch lever.

When the solenoid is energized by the passing of an electric current therethrough the plunger 45 is drawn in, actuating the clutch lever which causes the clutch member 37 to move out on the shaft 34 and engage the clutch member 36 thereby connecting the pinion 35 and the motor shaft 34. When the current ceases to flow through the solenoid, the spring 38 will cause both a disengagement of the clutch members and the withdrawal of the plunger from the solenoid. The action of the spring 38 insures the prompt disengagement of the clutch members but may be omitted as the members will not remain in engagement after the solenoid ceases to be energized. A stud shaft 50 is secured in one of the uprights 32 and thereon is rotatably mounted a gear wheel 51 which is arranged to mesh with the pinion 35. A pinion 52 is preferably formed integral with the gear wheel 51. A shaft 53 extends between the uprights 32 and thereon is mounted a gear wheel 54 which is arranged to mesh with the pinion 52 on the stud shaft 50. A sleeve 55 is formed integral with the hub of the gear wheel 54 and thereon is keyed a sheave 56. On the table 30 is supported a dash pot 57 which consists of a cylindrical casing open at the bottom and having a small opening at the top through which the piston rod 58 enters. The upper end of the piston rod 58 is secured to the chain 16 and from the lower end thereof a chain 59 extends to the sheave 56. On the lower end of the piston rod 58 is secured a disk 60 above which is slidably mounted a piston head 61 provided with air holes 62 which are closed when the piston head rests on the disk 60. A pin 63 limits the upward movement of the piston head. When the piston rod moves down in the dash pot it will slide through the piston head until the pin 63 comes in contact with the piston head and the air holes in the piston head will therefore be uncovered and the air will pass freely through the piston head on its downward movement. When the piston rod moves up in the dash pot the piston rod will slide through the piston head until the disk 60 comes in contact with the under surface of the piston head and covers the air holes and then when the piston head moves up the escape of the air from the dash pot will be greatly impeded and the upward movement of the piston rod will be consequently retarded or cushioned.

To the under side of the table 30 is secured the controller box or casing 65 in which is journaled a shaft 66, one end of which extends out over the gear wheel 54. On the shaft 66 is mounted a movable switch member 67 which is preferably sector-shaped in cross section and is arranged to make contact with a stationary switch member 68. On the end of the shaft 66 is secured a lever arm 69 which extends alongside of the wheel 54. On the lower end of the lever arm 69 are formed two cam-surfaces 70 and 71 and on the upper end of said lever arm 69 are formed three notches 72, 73 and 74. Above the lever arm 69 is mounted a gravity latch or dog 75 which is arranged to enter the notches in the lever arm 69 and lock the movable switch member against accidental displacement. On the wheel 54 are mounted two pins 76 and 77. When the wheel is rotated backward (*i. e.* in the direction indicated by the arrow) the pin 76 is arranged to come in contact with the cam surface 71 causing the lever arm 69 to swing up thereby rotating the shaft 66 and causing a downward movement of the movable switch member 67 and on the forward movement of the wheel 54 the pin 76 will again pass under the cam surface 71 causing the lever arm to swing down rotating the shaft 66 and producing an upward movement of the movable switch member 67. The pin 77 on the backward movement of the wheel 54 will pass under the cam surface 70 and similarly to the pin 76 will cause the lever arm 69 to swing up ro-

tating the shaft 66 and producing a downward movement of the movable switch member 67, and likewise on the forward movement of the wheel 54 the pin 76 will pass back under the cam surface 70 causing the lever arm 69 to swing down rotating the shaft 66 and producing an upward movement of the movable switch member 67. The controller box is provided with a front plate of glass or other transparent material which makes the box moisture proof.

On the wheel 54 are arranged two stationary pawls 78 and 79 which are preferably provided with cam shaped extensions 80 and 81, respectively. To the table 30 is secured a bracket 85 and near the upper end thereof is formed a double strap 86 in which are slidably mounted the coils of an electromagnet 87. To the top of the magnet 87 is secured a plate 88 which carries a screw-threaded stem 89 which passes through a support 90 which extends up from the strap 86. The stem 89 is secured to the support 90 by means of a nut 91 and by adjusting the nut the magnet can be raised or lowered accordingly. Around the stem 89 between the plate 88 and the support 90 is arranged a coil spring 92 so that the magnet is held down by the pressure of the spring but is free to move up under pressure. To the side of the bracket 85 is pivotally secured an arm 93 to which is secured a cam shaped plate 94. On the arm 93 is arranged a weight 95 and on the surface of the weight 95 is secured a plate 96 of iron or other magnetic metal which is so placed that when the arm 93 is raised the plate 96 will come in contact with the poles of the magnet 87. On the bracket 85 below the arm 93 is pivotally secured a trip latch 99, which is arranged to engage with the teeth on the wheel 54 and lock the wheel against rotation. When the arm 93 falls to its lowest position it trips the latch and frees the wheel 54. On the end of the latch 99 is preferably secured a roller 100. On the lower end of the bracket 85 is mounted a spring bumper 102 and on the wheel 54 is formed a projection 103 arranged to come in contact with the bumper 102 so as to stop the movement of the wheel 54.

In the accompanying diagrams (Figs. 11, 12 and 13) the home block is indicated as *a*, the distant block as *b* and the clear block as *c*. The terms home, distant and clear, of course, being relative to the signal located within the block *a*, and for a signal located within the block *b*, the block *b* becomes the home block, and *c* becomes the distant block, and so on. The signal circuit is indicated by *d* and includes a storage battery, motor, solenoid, the locking magnet and the stationary and movable switch members of the controller. The signal circuit is opened and closed, aside from the operation of the controller, by two electric switches d' and d^2, the operations of which are controlled by the operation of the electromagnets, e' and f' arranged in the relay or track circuits *e* and *f*, respectively. When a train enters the home block *a* the home track circuit *e* will be closed energizing the electric switch e' which opens the switch d' completely cutting off all current from the signal, for although the switch d^2, controlled by the distant circuit *f* is closed, the controller switch members are not in position to complete the circuit through the switch d^2, and the signal mechanism will assume the position shown in Figs. 5 and 6, and the circuits will be as represented in Fig. 11. When the train leaves the home block and enters the distant block *b*, the track circuit *e* of the home block is opened and the track circuit *f* of the distant block is closed which energizes the electro magnet f' which opens the switch d^2. The circuits will then be in the position as shown in Fig. 12, and as the controller switch members are in position to complete the circuit through the switch d' the solenoid, the electric motor and the electro magnet will all be energized. The solenoid, therefore draws in the plunger causing an engagement of the clutch members on the motor shaft and the train of gears between the motor shaft and the shaft 53 are actuated, rotating the sheave 56 which winds up the chain 59, drawing down the piston rod 58 and the chain 16 which is secured to the upper end of the piston rod and to the semaphore sheave 14. The pull on the chain 16 automatically unlocks the semaphore sheave and pulls it down thereby swinging down the semaphore blade until it has reached the position termed the distant position. When the signal blade has about reached the distant position the pin 76 on the wheel 54 will pass under the cam surface 71, thereby shifting the movable switch member of the controller, which cuts out the motor and the solenoid, but does not cut out the current from the storage battery of the signal circuit which is at that time passing through the electro magnet and at the same time the extension 80 on the pawl 78 will pass under the plate 94, lifting the arm 93 and bringing the plate 96 thereon in contact with the poles of the electro magnet 87.

Perfect contact between the magnet 87 and the plate 96 is always secured as the magnet is both adjustably and resiliently supported and is preferably so adjusted that the plate 96 will come in contact with it before the arm 93 has been raised sufficiently to allow the cam 80 to clear the plate 94, and the magnet 87 will of course move up against the pressure of the spring 92. On the further movement of the wheel 54 the trip latch will fall behind the pawl 78 and lock the wheel 54 against the tendency of the semaphore to actuate it in the opposite direction from that in which it was actuated by the motor. When the train leaves the

distant block and enters the clear block *c*, the track circuit *f* of the distant block is opened and the electro magnet *f'* ceases to be energized and the switch d^2 closes. The circuits will then be in the position as shown in Fig. 13, and as the controller switch members are in position to complete the circuit through the switch d^2 the solenoid, the electric motor and the locking electro magnet will all be energized. The solenoid, therefore, draws in the plunger causing an engagement of the clutch members on the motor shaft and the train of gears between the motor shaft and the shaft 53 are again actuated, rotating the sheave 56 which through its operative connection pulls down the semaphore sheave thereby swinging down the semaphore blade until it has reached the position termed the clear position. When the signal blade has about reached the clear position the pin 77 on the wheel 54 will pass under the cam surface 70, thereby shifting the movable switch member of the controller, which cuts out the motor and the solenoid, but leaves a weak current passing through the locking electro magnet. If another train enters the home block the relay circuit *e* will then be closed and the switch *d'* will open cutting off all current from the motor, solenoid and locking electro magnet. The arm 93 which was held up by the locking magnet 87 will fall tripping the latch 99 and thereby freeing the wheel 54 and the semaphore will then fall by gravity to its original position and all the mechanism connected therewith will be actuated in the reverse direction to that in which it was actuated by the motor.

What I claim is:—

1. In a railway signal, the combination of signal mast, a semaphore shaft journaled a on said mast, a semaphore mounted on said shaft and counterweighted so as to assume a predetermined position, a sheave mounted on said shaft, a chain secured to said sheave, a locking device for securing said sheave against rotation arranged to project in the path of said chain and means for exerting a pull on said chain.

2. In a railway signal, the combination of a signal mast, a semaphore shaft journaled on said mast, a semaphore secured on said shaft and counterweighted so as to assume a predetermined position, a sector-shaped sheave mounted on said shaft, a chain secured to said sheave, a pivotally supported latch arranged to lock said sheave against rotation and having its end extending into the path of said chain, a roller arranged on the end of said latch where the chain passes over it and means for exerting a pull on said chain.

3. In a railway signal, the combination of a semaphore arranged to rotate in an arc of a circle and counterweighted so that when free it will assume a predetermined or normal position, means for mechanically locking said semaphore in its normal position, means for rotating said semaphore to other predetermined positions, means for mechanically locking said means for rotating said semaphore, means for electrically unlocking said locking means, means for unlocking the semaphore automatically when the means for rotating the semaphore is set in operation, a signal circuit, an electric motor arranged in said circuit and operatively connected with said means for rotating said semaphore, a controller arranged in said signal circuit, means for operating said controller, an electric switch arranged in said circuit, and a track circuit, opened and closed by the movement of trains, arranged to control the operation of said switch.

4. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore mounted on said signal mast so as to rotate in an arc of a circle, means for mechanically locking said semaphore in its danger position, means for rotating said semaphore to other predetermined positions, means for mechanically locking said means for rotating said semaphore, means for electrically unlocking said locking means, means for automatically unlocking the semaphore when the means for rotating the semaphore is set in operation, a signal circuit, an electric motor arranged in said circuit, a clutch arranged to form an operative connection between the mechanism for rotating said semaphore and the electric motor, a solenoid, a plunger arranged in the solenoid and means actuated by the movement of the said plunger for operating said clutch.

5. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft and counterweighted so that it will assume a predetermined position, a sheave secured on the semaphore shaft, a shaft mounted in the mechanism case, a sheave secured on the last-mentioned shaft, a flexible connection between said sheaves, a wheel secured on said last-mentioned shaft, a latch for locking said wheel against rotation, an arm pivotally mounted above said latch and arranged so that in its lowest position it will trip said latch, an electro-magnet supported above said arm for holding said arm above said latch, means for energizing and deënergizing said electro-magnet and means for rotating said wheel.

6. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft and counterweighted so that it will assume a predetermined position, a sheave secured on the semaphore shaft, a shaft mounted in the mechanism case, a sheave secured on the

last-mentioned shaft, a flexible connection between the said sheaves, a wheel secured on said last-mentioned shaft, a latch for locking said wheel against rotation, an arm pivotally mounted above said latch and arranged so that when in its lowest position it will trip the latch, an electro-magnet, yieldingly supported above said arm, for holding said arm above said latch, means for energizing and deënergizing said electro-magnet and means for rotating said wheel.

7. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft and counterweighted so that it will assume a predetermined position, a sheave secured on the semaphore shaft, a shaft mounted in the mechanism case, a sheave secured on the last-mentioned shaft, a flexible connection between the said sheaves, a wheel secured on said last-mentioned shaft, an electric motor, a gear wheel loosely mounted on the shaft of the motor, a train of gears connecting said gear wheel with said first-mentioned wheel, a clutch member formed integral with said gear wheel, a clutch member slidably mounted on the motor shaft, a solenoid, a plunger arranged in said solenoid and a pivotally supported lever having one end operatively connected with said plunger and the other end operatively connected with the last-mentioned clutch member.

8. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft, a shaft mounted in the mechanism case, means for operatively connecting said shafts, a wheel secured on said shaft in the mechanism case, a latch for locking said wheel against rotation, an arm pivotally mounted above said latch and arranged so that in its lowest position it will trip said latch, an electro-magnet supported above said arm, means arranged on said wheel for lifting said arm against said electro magnet, means for energizing and deënergizing said electro-magnet and means for rotating said wheel.

9. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft, a shaft mounted in the mechanism case, means operatively connecting said shafts, a wheel secured on said shaft in the mechanism case, a stationary switch member arranged in said mechanism case, a movable switch member arranged to make contact with the stationary switch member, an arm secured to said movable switch member, cam surfaces arranged on said arm, projections arranged on said wheel a d arranged to travel under said cam surfaces and actuate said arm, an electric circuit having its terminals connected to said switch members and an electric motor arranged in said electric circuit and operatively connected with said wheel.

10. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft, a shaft mounted in the mechanism case, means for operatively connecting said shafts, a wheel secured on said shaft in the mechanism case, a stationary switch member arranged in said mechanism case, a movable switch member arranged to make contact with said stationary switch member, an arm secured to said movable switch member means for holding said arm against accidental displacement, cam surfaces arranged on said arm, projections arranged on said wheel and arranged to travel under said cam surfaces and actuate said arm, an electric circuit having its terminals connected to said switch members and an electric motor arranged in said electric circuit and operatively connected with said wheel.

11. In a railway signal, the combination of a signal mast, a semaphore shaft journaled on said mast, a semaphore secured on said shaft and counterweighted so as to assume a predetermined position, a sheave mounted on said shaft, a chain secured to said sheave, a pivotally supported latch arranged to lock said sheave against rotation and having its end extending into the path of said chain, a mechanism case, a shaft mounted in said mechanism case and operatively connected with said chain, a wheel secured on said last-mentioned shaft, a latch for locking said wheel against rotation, an arm pivotally mounted above said latch and arranged so that when in its lowest position it will trip the latch, an electro-magnet yieldingly supported above said arm, for holding said arm above said latch, means arranged on said wheel for lifting said arm against said electro-magnet, an electric motor, a gear wheel loosely mounted on the shaft of the motor, a train of gears connecting said gear wheel with said first-mentioned wheel, a clutch member connected with said gear wheel, a clutch member slidably mounted on the motor shaft, a solenoid, a plunger arranged in said solenoid and a pivotally supported lever having one end operatively connected with said plunger and the other end operatively connected with said clutch member.

12. In a railway signal, the combination of a signal mast, a semaphore shaft journaled on said mast, a semaphore secured on said shaft and counterweighted so as to assume a predetermined position, a sheave mounted on said shaft, a chain secured to said sheave, a pivotally supported latch arranged to lock said sheave against rotation and having its end extending in the path of said

chain, a mechanism case, a shaft mounted in said mechanism case and operatively connected with said chain, a wheel secured on said last-mentioned shaft, a latch for locking said wheel against rotation, an arm pivotally mounted above said latch and arranged so that when in its lowest position it will trip the latch, an electric circuit, an electro-magnet yieldingly supported above said arm for holding said arm above said latch, means arranged on said wheel for lifting said arm against said electro-magnet, an electric motor, a gear wheel loosely mounted on the shaft of the motor, a train of gears connecting said gear wheel with said first-mentioned wheel, a clutch member connected with said gear wheel, a clutch member slidably mounted on the motor shaft, a solenoid, a plunger arranged in said solenoid, a pivotally supported lever having one end operatively connected with said plunger and the other end operatively connected with said sliding-clutch member, a stationary switch member arranged in said mechanism case, a movable switch member arranged to make contact with the stationary switch member, an arm secured to said movable switch member, cam surfaces arranged on said arm, projections arranged on said wheel which pass under said cam surfaces and actuate said arm, an electric switch arranged in said circuit, a track circuit, opened and closed by the movements of trains arranged to control the operation of said switch.

13. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft, a wheel operatively connected with said shaft, a latch for locking said wheel against rotation an arm pivotally mounted above said latch and arranged so that when in its lowest position it will trip the latch, an electro-magnet adjustably supported above said arm, for holding said arm above said latch, means for energizing and deënergizing said electro-magnet and means for rotating said wheel.

14. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft, a motor, mechanism operatively connecting said motor and said semaphore shaft, a latch for locking said mechanism, an arm pivotally mounted above said latch and arranged so that when in its lowest position it will trip the latch, an electro-magnet supported above said arm, for holding said arm above said latch, means for energizing and deënergizing said electro-magnet and means for rotating said wheel.

15. In a railway signal, the combination of a mechanism case, a signal mast, a semaphore shaft mounted on said mast, a semaphore secured on said shaft, a motor, mechanism operatively connecting said motor and said semaphore shaft, a latch for locking said mechanism, a movable arm arranged to trip said latch, an electro-magnet means for bringing said arm in contact with said electro-magnet, means for yieldingly supporting said electro-magnet and means for adjusting said magnet.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

HARRY M. ABERNETHY.

Witnesses:
VICTOR C. LYNCH,
DANIEL E. DALY.