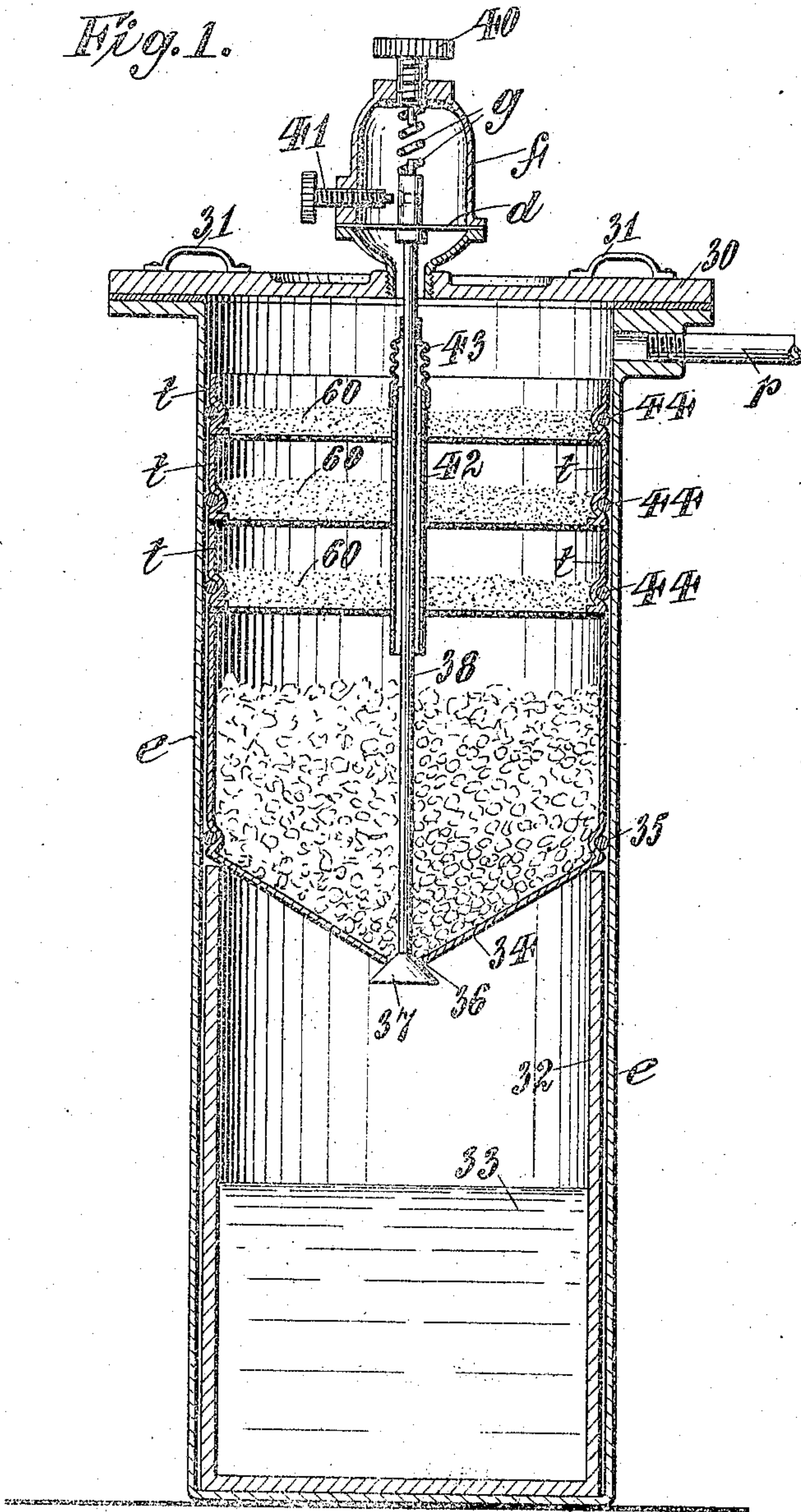


C. J. COLEMAN.  
 APPARATUS FOR OPERATING RAILWAY SIGNALS.  
 APPLICATION FILED JULY 30, 1907.

915,741.

Patented Mar. 23, 1909.  
 2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

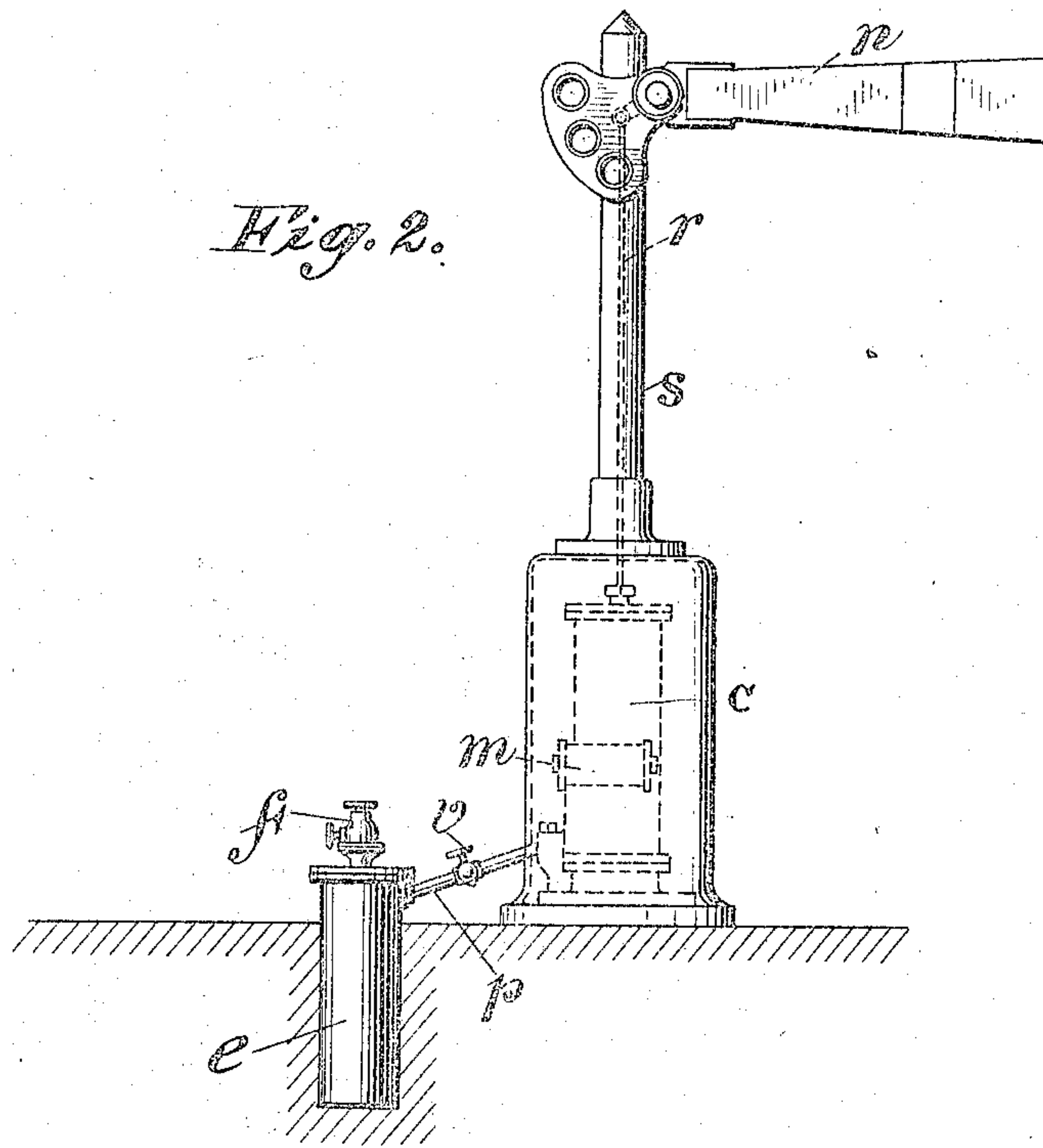
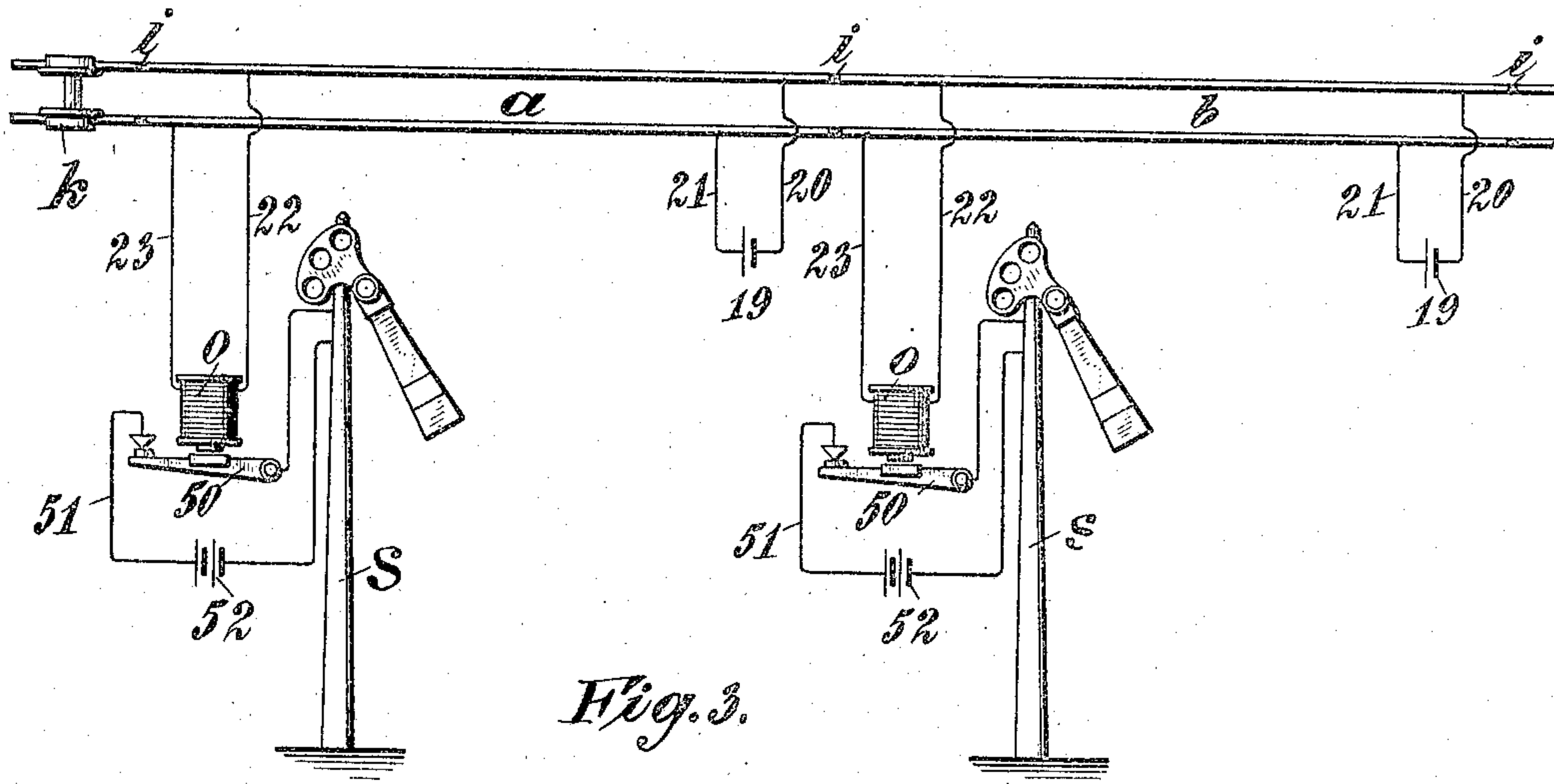
*Geoffrey*  
*John O. Gempster*

INVENTOR  
*Clyde J. Coleman*  
 BY  
*Keuym & Keuym*  
 ATTORNEYS.

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Witnesses  
*Geoffrey*  
*John O. Gempster*

*Clyde J. Coleman*  
 Inventor  
 By his Attorneys *Keuym & Keuym*



# UNITED STATES PATENT OFFICE.

CLYDE J. COLEMAN, OF NEW YORK, N. Y., ASSIGNOR TO THE HALL SIGNAL COMPANY, A CORPORATION OF MAINE.

## APPARATUS FOR OPERATING RAILWAY-SIGNALS.

No. 915,741.

Specification of Letters Patent.

Patented March 23, 1909.

Application filed July 30, 1907. Serial No. 386,184.

*To all whom it may concern:*

Be it known that I, CLYDE J. COLEMAN, a citizen of the United States, residing in the city of New York, in the county and State of New York, have made certain new and useful Improvements in Apparatus for Operating Railway-Signals, of which the following is a specification.

This invention relates to automatic railway signals in which the signal is shifted by means of a gas motor.

The object of my invention is to provide for generating the gas at or near the point where it is used, such generation being to a certain extent commensurate with the rate of use thereof.

There is combined with the signal at each signal station a gas motor by which the signal is shifted, a cell containing gas under pressure and means connected with the cell for automatically generating the gas; this means, in one form, consists of a compartment containing hydrochloric acid, a compartment containing finely divided marble, a passage between these compartments and a gate or valve controlled by the variation in the pressure of the gas in the cell by which the passage is opened and closed. After the gas is generated it is preferred that it be passed through some material, like bi-carbonate of soda to remove any acid from the gas. The motor may be arranged and connected with the signal substantially as shown and described in United States Letters Patent No. 743975, dated November 10, 1903, issued upon my application except that in the arrangement herein shown and described no reducing valve is employed.

Figure 1 is a central, vertical section of the gas generating cell; Fig. 2 is a view of the cell connected with the cylinder operating a semaphore signal; Fig. 3 shows the arrangement of the track circuits and electrical controlling device.

In Fig. 1 there is a steel receptacle or cell *e*; its interior is coated with celluloid cement, enameled, or otherwise made acid proof. It has a gas tight cover 30 with lifting handles 31. In the lower half of tank *e* is a suitable cell 32 containing acid 33; over the cell 32 is a cell or holder 34 which rests upon the cell 32; the cell 34 has a conical

bottom constituting a partition in the receptacle *e* and said bottom is provided with a gasket 35 so that the gas cannot escape between cell 34 and cell *e*. There is a perforation 36 in the bottom of cell 34. A valve or door 37 of suitable form to close the aperture 36 is fixed to a rod 38 which extends upward through the cell 34, through an opening in the cover 30 to a chamber *f* fixed upon the cover; within the chamber *f* is a diaphragm *d* to which the rod 38 is firmly attached; there is a helical spring *g* of considerable mechanical strength connected to the diaphragm *d* at one end and to an adjusting screw 40 passing through the wall of the chamber *f* at the other end. A thumb screw 41 passes through the wall of the chamber *f* in position to engage the connection between the spring *g* and the diaphragm *d*; the object being to firmly hold the rod and diaphragm in fixed position when the apparatus is taken apart for any reason, and to thus protect the diaphragm *d*. A pipe 42 surrounds the rod 38 and at its upper end is connected with said rod by a section of rubber tubing 43 to form an expansion joint. There are a series of trays *t* pervious to gas and preferably made of perforated hard rubber sheets with soft rubber gaskets 44. Within the cell 34 is a quantity of finely divided marble or marble dust and within each tray *t* is a layer or quantity of bi-carbonate of soda 60. At the top of the receptacle *e* there is a pipe *p* connecting the cell with the signal operating apparatus (see Fig. 2); in this pipe there is a valve *v* to be operated by hand and closed when it becomes necessary to replenish the gas producing material in the cell *e*.

In Figs. 2 and 3, *s* is a semaphore signal operated by the rod *r* and the cylinder *c* (see Fig. 2); a magnet *m* controls the passage for the gas from the cell *e*. In Fig. 3, there are two signal sections shown, *a* and *b*, with their signals *s*. The rails are separated by insulating joints *i*; at one end of each section there is a battery 19 connected by conductors 20 and 21 to the rails in a well known manner. At the opposite end of each section there is a magnet *o* connected in circuit with the conductors 22, 23, the rails of the section and the battery 19. Each magnet *o*



operates an armature bar 50 to open and close the local circuit 51 containing a battery 52 and the electro-magnet *m* before described. The arrangement of the track and signal circuit is well known. When a train *k* enters the track section *a*, it demagnetizes the magnet *o*, and the circuit 51 is broken. Magnet *m* operates a valve in the pipe connecting the cell *e* with the cylinder *c*, all as shown and described in United States Letters Patent 743975, dated November 10, 1903, except that in the present arrangement no reducing valve is employed. This admits gas to the cylinder which operates upon the piston to shift the signal *n* normally standing at danger. It is to be understood that there is a normal charge of gas in the cell *e* which exerts a pressure upon the diaphragm *d* and the diaphragm *d* operating through the rod 38 closes the door or valve 37 and thus prevents the further feeding of the finely divided marble from the cell 34 to the cell 32, and when by the operation of the signal the gas pressure in the cell *e* is reduced the valve *d* operating through the rod 38 opens the valve 37 to allow a further quantity of marble dust to pass through the aperture 36 into the acid 33, the gas generated from this union of the marble dust with the hydrochloric acid is the result of a well known process; the gas rising through the marble dust and through the perforated trays *t* containing the bi-carbonate of soda 60 frees itself from any trace of acid; the gas again exerts pressure upon the diaphragm *d* and the valve is again closed. This operation is repeated successively until the acid producing substances in the cell are exhausted. The quantity of acid producing substance in the cell *e* should be sufficient to operate the signal several thousand times.

What I claim and desire to secure by Letters Patent is:

1. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a holder for another gas producing element, a passageway between said holder and receptacle for permitting the two elements to come together, and a valve for regulating said passageway, and adapted to be controlled by the expansion of the gas in said gas tight receptacle and the withdrawal of the gas from the same, and a passageway between said receptacle and motor.

2. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a holder for another gas producing element, a passageway between said holder and receptacle for permitting the two elements to come together, a valve for regulating said passageway, and adapted to be controlled by the expansion of

the gas in said gas tight receptacle and the withdrawal of the gas from the same, and a passageway between said receptacle and motor, and said expansion and withdrawal of the gas being adapted to be caused by a train in different locations.

3. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a holder for another gas producing element, a passageway between said holder and receptacle for permitting the two elements to come together, a valve for regulating said passageway, and adapted to be controlled by the expansion of the gas in said gas tight receptacle and the withdrawal of the gas from the same, a passageway between said receptacle and motor, and a valve in said passageway controlling the passage of the gas to the motor.

4. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a holder for another gas producing element, a passageway between said holder and receptacle for permitting the two elements to come together, and a valve for regulating said passageway, and adapted to be controlled by the expansion of the gas in said gas tight receptacle and the withdrawal of the gas from the same, a passageway between said receptacle and motor, a valve in said passageway controlling the passage of the gas to the motor, and said valve adapted to be operated by a moving train.

5. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a partition in said receptacle separating said element from another gas producing element, a passageway for the gas connecting said receptacle with the motor, a valve in said partition, and said valve adapted to be controlled by the expansion of the gas in said receptacle and the withdrawal of gas from the same.

6. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a partition in said receptacle separating said element from another gas producing element, a passageway for the gas connecting said receptacle with the motor, a valve in said partition, and said valve adapted to be controlled by the expansion of the gas in said receptacle and the withdrawal of gas from the same, and said expansion and withdrawal of the gas being adapted to be caused by a train in different locations.

7. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a partition in



said receptacle separating said element from another gas producing element, a passageway for the gas connecting said receptacle with the motor, a valve in said partition, and said valve adapted to be controlled by the expansion of the gas in said receptacle and the withdrawal of gas from the same, and a valve in said passageway controlling the passage of the gas to the motor.

- 10 8. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a partition in said receptacle separating said element from  
15 another gas producing element, a passageway for the gas connecting said receptacle with the motor, a valve in said partition, and said valve adapted to be controlled by the expansion of the gas in said receptacle and the  
20 withdrawal of gas from the same, and said valve adapted to be operated by a moving train.

9. In a railway signal, the combination with the signal, a gas motor, a gas chamber  
25 connected therewith and means for automatically generating said gas to operate said signal consisting of a cell containing one of the gas producing elements, and another cell containing another gas producing element, a  
30 passage between said cells, a gate or valve controlling said passage, and said valve adapted to be controlled by the expansion of the gas in said chamber and the withdrawal of gas from the same.

- 35 10. In a railway signal the combination with the signal of a gas motor, a gas chamber connected therewith and means for automatically generating said gas to operate said signal consisting of a cell containing a finely  
40 divided solid substance, a cell containing acid liquid, a passage between said cells, a gate or valve controlling said passage and means for automatically operating said gate.

11. In a railway signal system the combination with the signal of a gas motor, means  
45 for automatically generating gas to operate said motor consisting of a cell having hydrochloric acid in one compartment and finely divided marble dust in a second compartment, a gate or passage between said compartments and means for automatically  
50 opening and closing said gate or passage.

12. In a railway signal the combination with the signal, a gas motor, a gas chamber  
55 connected therewith and means for automatically generating said gas to operate said signal consisting of a cell containing one of the gas producing elements, and another cell containing another gas producing element, a passage between said cells, a gate or  
60 valve controlling said passage, means for operating said gate, and gas purifying material in said chamber.

13. In a railway signal the combination  
65 with the signal, a gas motor, a gas chamber

connected therewith and means for automatically generating said gas to operate said signal consisting of a cell containing one of the gas producing elements, and another cell containing another gas producing element, a passage between said cells, a gate or valve controlling said passage, means for operating said gate, and gas purifying material in said chamber between the gas producing elements and the outlet passage from  
70 the same.

14. In a railway signal the combination with the signal, a gas motor, a gas chamber connected therewith and means for automatically generating said gas to operate  
80 said signal consisting of a cell containing a finely divided solid substance, a cell containing acid liquid, a passage between said cells, a gate or valve controlling said passage and means for operating said gate, and material for extracting acid from the gas in said  
85 chamber.

15. In a railway signal the combination with the signal, a gas motor, a gas chamber connected therewith and means for automatically generating said gas to operate said  
90 signal consisting of a cell containing a finely divided solid substance, a cell containing acid liquid, a passage between said cells, a gate or valve controlling said passage and  
95 means for operating said gate, material for extracting acid from the gas in said chamber between the gas producing elements and the outlet passage from the same.

16. In a railway signal the combination  
100 with the signal, a gas motor, a gas chamber connected therewith and means for automatically generating said gas to operate said signal consisting of a cell containing a finely divided solid substance, a cell containing  
105 acid liquid, a passage between said cells, a gate or valve controlling said passage and means for automatically operating said gate, and a partition pervious to gas situated in said chamber between the gas producing  
110 elements and the outlet passage from the same.

17. In a railway signal the combination with the signal, a gas motor, a gas chamber connected therewith and means for automatically generating said gas to operate said  
115 signal consisting of a cell containing a finely divided solid substance, a cell containing acid liquid, a passage between said cells, a gate or valve controlling said passage and means for  
120 automatically operating said gate, and a partition pervious to gas situated in said chamber between the gas producing elements and the outlet passage from the same and supporting a gas purifying material.  
125

18. An automatic railway signal apparatus comprising a gas motor for operating the signal, a gas tight receptacle containing one of the gas producing elements, a holder for  
125 another gas producing element, a passage-



way between said holder and receptacle for permitting the two elements to come together, a valve for regulating said passageway, and a diaphragm connected with said  
5 valve and adapted to be operated by the expansion of the gas in said gas tight receptacle, whereby the valve may be controlled, and a passageway between said receptacle and motor.

CLYDE J. COLEMAN.

Witnesses:

ANNA DALY,  
EDWIN SEGER.