

(No Model.)

J. K. LEEDY.

PNEUMATIC SIGNAL FOR RAILWAYS.

No. 398,632.

Patented Feb. 26, 1889.

Fig. 1.

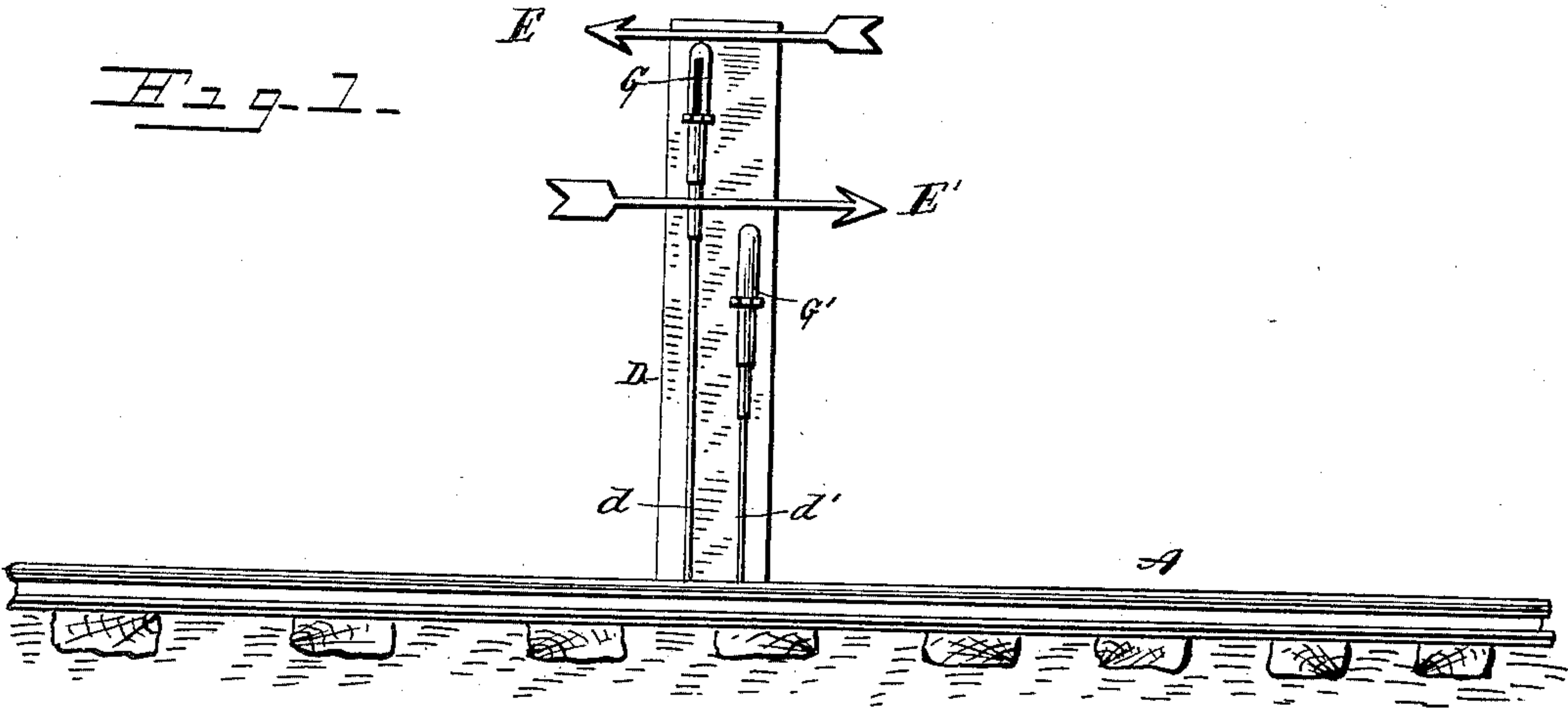


Fig. 2.

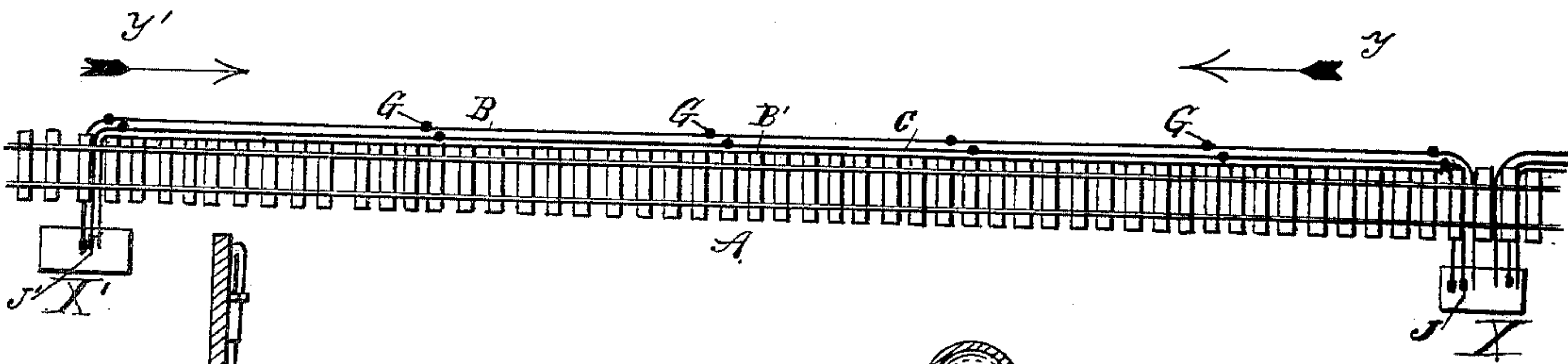


Fig. 3.

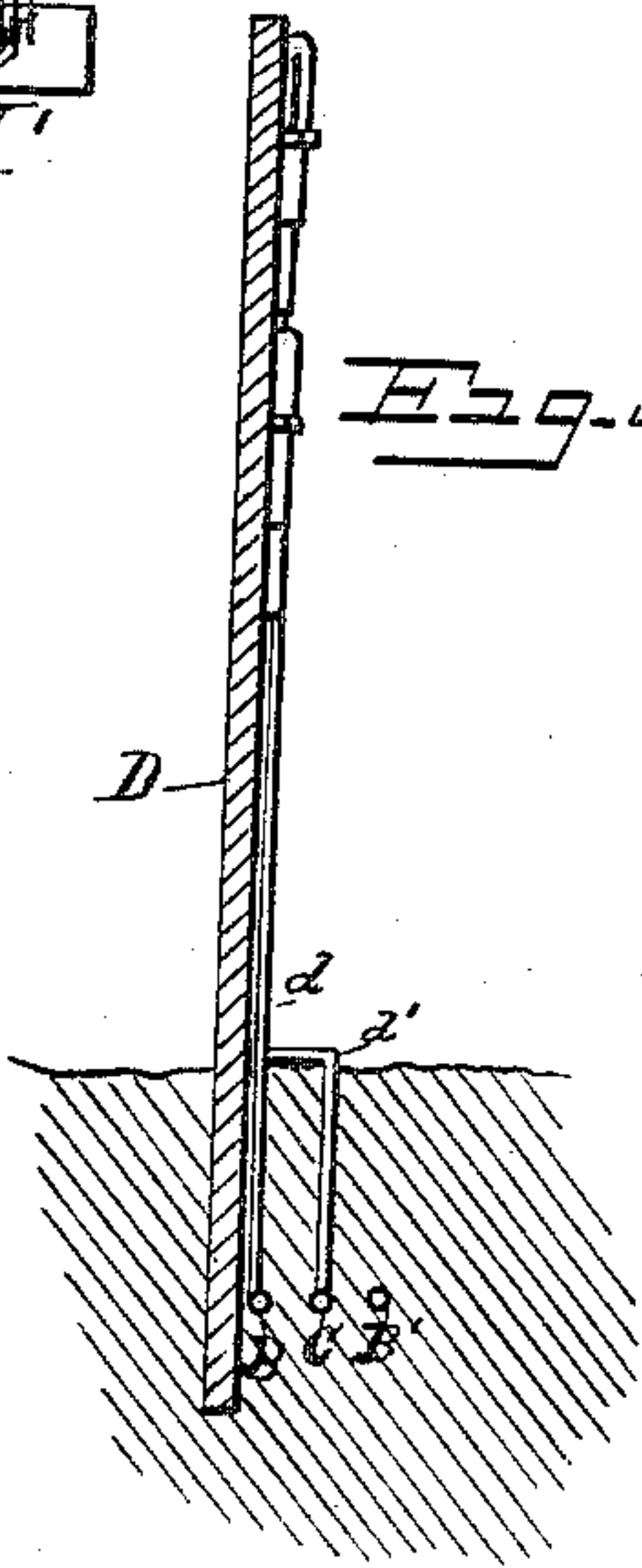
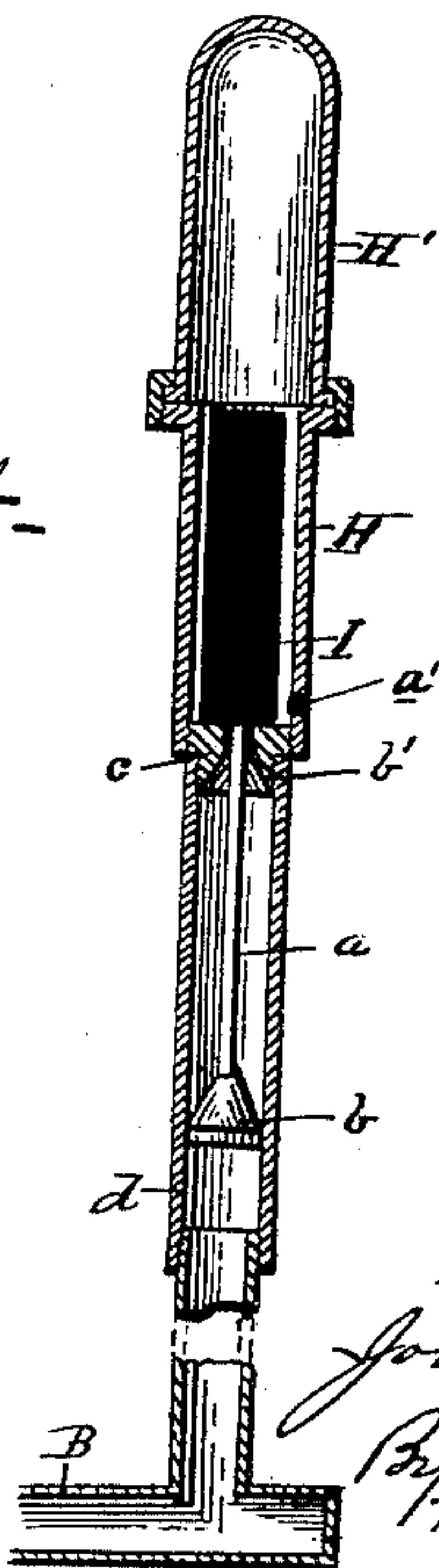


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JOHN K. LEEDY, OF TOM'S BROOK, ASSIGNOR OF TWO-THIRDS TO NOAH W. SOLENBERGER AND GERMAN SMITH, OF WINCHESTER, VIRGINIA.

## PNEUMATIC SIGNAL FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 398,632, dated February 26, 1889.

Application filed December 8, 1887. Serial No. 257,337. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN K. LEEDY, a citizen of the United States, residing at Tom's Brook, in the county of Shenandoah and State of Virginia, have invented certain new and useful Improvements in Pneumatic Railroad-Signals, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

10 Figure 1 is an elevation of a section of a railway-track, showing a post supporting two of my improved signals and their respective arrows pointing in opposite directions. Fig. 2 is a diagram showing my improved system  
15 of signals between two stations. Fig. 3 is a vertical sectional view illustrating a post, its signals, their connections with two ground-pipes, also showing the ground-pipe which establishes direct communication between two  
20 stations. Fig. 4 is an enlarged vertical sectional view of one of the signals used at the terminus of a ground-pipe and without the plug in the main pipe, as generally used.

This invention relates to a new and improved railway system of signal service, the  
25 object of which is to insure greater safety in travel and to enable the employes on a railroad to prevent collisions of cars; also to warn persons along the line of a railroad of an approaching train and the direction from which  
30 a train may be approaching.

The following description of my invention, when taken in connection with the annexed drawings, will enable others skilled in the art  
35 to understand it.

Referring to the annexed drawings by letter, A designates a single line of railroad-track connecting the signal-stations X X'. At these stations are located the train-starters or  
40 signaling-officers of the road. From one signaling-station to another, and preferably buried beneath the surface of the ground, extend three air-pipes, B, B', and C, as indicated in the diagram, Fig. 2, which pipes communi-  
45 cate with certain visible signals, hereinafter fully described.

I usually locate at each signal-station a suitable air-receiver or storage-vessel and an engine for compressing air therein, together  
50 with suitable cocks or cut-off valves under control of the station-keeper or signaling-

officer. The storage-vessel and engines at the stations are not herein shown, as they may be constructed and connected to the ends of the air-conducting pipes in any suitable manner. 55  
At suitable intervals along the track A, and on one side thereof, I erect posts D, firmly established in the ground. Each post D is provided on that side nearest the track with two signals, G G', under control of the station-keepers at the stations X X', and with two arrows, E E', of a suitable color, which arrows are rigidly secured to said post and point in opposite directions, for a purpose hereinafter explained. The movable signals on each post D are arranged one (G) above the other, (G'), and both signals present when exposed to view the same color, preferably red. Each movable signal is constructed as follows: 60

H designates a cylinder, which is opaque and of any suitable length and diameter. On top of this cylinder is suitably secured a transparent vessel or cylinder, H', of a length and diameter sufficient to contain and clearly expose to view a cylindrical signal, I, when the latter is raised out of the socket or opaque cylinder H. On the lower end of the signal I, and coinciding with the vertical axis thereof, is a valve-stem, a, having secured on its lower end a cone piston-valve, b, adapted when fully raised to hermetically close against an inverted conical ground seat, b', formed in the end of a screw-threaded neck, c, through which the stem a passes freely, which neck c is or may be integral with the opaque cylinder H. 85

Both signals G G' on each post are constructed alike. The higher signals of the said posts are connected air-tight with vertical branches d of the underground line-pipe B, and the lower signals, G', on said posts are similarly connected by vertical branch pipes d' with the underground line-pipe C. 90

The line-pipe B communicates at one end with an air compressing and forcing device of any suitable construction located at the station X, the opposite end of which line-pipe B is closed by a plug. The line-pipe C communicates at one end with an air-compressing engine located at the station X', the opposite end of which pipe B' is also closed by a suitable plug. 100



It will be observed that when air under pressure from the air-compressing apparatus is let into the vertical branches  $d d'$  through the pipes B and C the valves  $b$  in the said vertical branches will be forced up tightly against their seats  $b'$ , and be held in such elevated position until the pressure in the pipes is reduced, when they will fall of their own weight. The air above these valves  $b$  when they are elevated may find its exit between the joints of the parts, or through an orifice,  $a'$ , in the cylinder H, as may be desired.

The arrows E point in one direction for the upper signals, G, and the arrows E' point in an opposite direction for the lower signals, G'. The underground line-pipe B' has connected to its ends signals J J', located in a convenient position in the station-houses X X', which are at the termini of the track A, and these signals J J' are preferably constructed like the signals G G', but of a different color. A similar system of signals is adapted for every section of track between two stations, the system terminating in each station house or office in two red signals, and one signal of a different color in full view of the station-keeper and completely under his control.

The operation of my improved system is as follows: Suppose a train of cars leaves the station X in the direction of the arrow  $y$ , indicated in full lines on Fig. 2. The officer at this station will immediately indicate this fact to the officer at the station X' by causing the signal J' to be exposed to view in the manner above described. At the same time the officer in station X will cause all of the signals G on posts D (over which he alone has control) to indicate that a train is on the track A, moving in the direction of the arrows  $y$  and E. If there is no train on section A, this fact can readily be made known to the offi-

cers at both stations X X' through the medium of the signals J J', which are specially designed to signal the officers at the two remote stations of the arrival of trains at their respective stations.

If a train leaves the station X', moving in the direction of the arrow  $y'$  on Fig. 2, this fact will be immediately made known to the officer in station X through the special signals J J', and the officer in station X' will cause the signals G' to appear along the entire line of track from one station to another.

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

1. The combination, with pneumatic signals mounted on posts and communicating with signals in remote stations, of signal-arrows fixed to said posts and pointing in opposite directions, substantially in the manner and for the purposes described.

2. A pneumatic signal composed of an opaque cylinder, a superimposed transparent cylinder, a guiding cylinder or barrel, and a colored vertically-movable signal provided with a valve-stem, and a valve adapted to close against a seat when the colored signal is raised and exposed to view, substantially as described.

3. The combination of an opaque cylinder, a transparent cylinder, an inclosed vertically-movable visible signal, a pneumatic tube, and a valve, substantially in the manner and for the purposes described.

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

JOHN K. LEEDY.

Witnesses:

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