

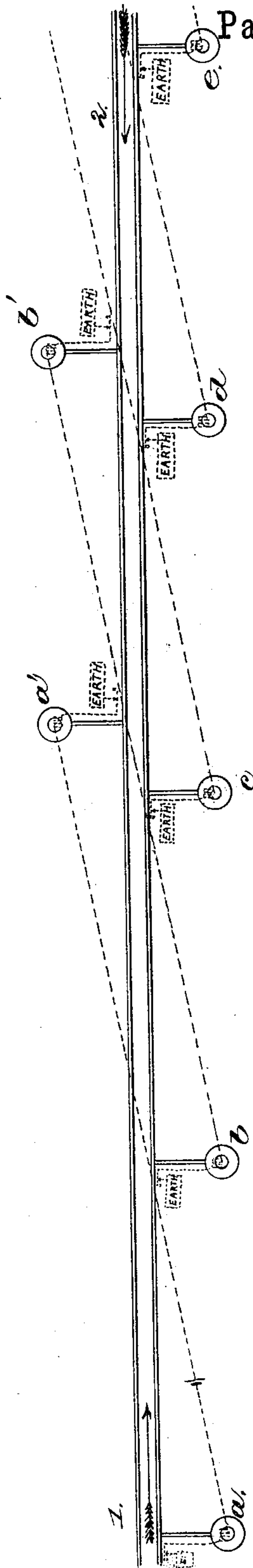
(No Model.)

C. D. TISDALE.

RAILWAY SIGNAL APPARATUS.

No. 273,639.

Patented Mar. 6, 1883.



Witnesses.
John F. C. Pinkert.
Fred A. Powell.

Inventor.
Charles D. Tisdale.
by Crosby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

CHARLES D. TISDALE, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN RAILWAY SIGNAL COMPANY, OF NEW YORK, N. Y.

RAILWAY SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 273,639, dated March 6, 1883.

Application filed April 25, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. TISDALE, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Railway Signal Apparatus, of which the following description, in connection with the accompanying drawing, is a specification.

My invention, relating to railway signal apparatus, is embodied in an arrangement of the signals for a single-track road, having for its object to prevent the possibility of two trains approaching one another in opposite directions without each giving the proper danger-signal to the other to prevent collision.

In the signal apparatus employed two signals are operated by electro-magnets included in the same electric circuit, so that the said signals operate simultaneously, the circuit being provided with controlling-instruments operated by the train in such manner that when a train passes into the section of track included between them both the said signals will be simultaneously set to "danger," and when the train passes out of the said section both will be simultaneously set to "safety." Thus when a train passes a given signal it sets it to "danger," and also sets one in advance of the train to "danger" to warn a train approaching from the opposite direction. If, however, two trains should enter both ends of such a section simultaneously, each operating to set the signals, each engineer would suppose that it was only his own train that was operating the signals and would not be aware of the approach of the other train.

The present invention consists in so overlapping the sections, as hereinafter described, that two trains cannot arrive simultaneously at opposite ends of the same section without having previously set other intermediate signals which will serve as a warning to the trains before they meet one another in the said section. The pairs of signals in the same circuit are arranged on opposite sides of the track, so that the signal passed in entering a section will always be on the same side relative to the engineer, and the signal passed on leaving the section will be on the opposite side relative to the engineer, regardless of the way in which he is traveling. For instance, if the signal that he sets on passing into the section

is on his right hand, the signal that is simultaneously set at the end of the section in advance is on his left hand, and each engineer will consequently pay no attention to the signals on his left hand, as they are set by his own train, but he will be stopped by the signals on his right hand, as he will know that they were either set by another train in advance of his own and traveling in the same direction or by a train approaching him from the opposite direction. In passing along the track in either direction the signal at the advance or remote end of each section is beyond the signal at the nearer end of the second section in advance by more than double the distance required to stop any train.

The drawing shows a track having two entire sections and portions of others arranged in accordance with this invention.

The two signals in the same circuit are connected by the dotted lines, and have the same letter of reference, one of them being distinguished by the mark ', as $a\ a'$, $b\ b'$, &c.

It will be seen that, looking in either direction, as from left to right, the remote signal, as a' , of one section is beyond the nearer signal of the second section in advance—namely, the one marked c —by a distance at least double what is necessary to stop a train. This arrangement is continued throughout, the signal b' being such a distance beyond the one d , and so on. A train moving from left to right, as indicated by the arrow 1, on arriving at or near the signal a sets both the signals a and a' to "danger," and it will be seen that a train moving in the opposite direction, as represented by the arrow 2, cannot arrive at the signal a' , which is thus set to "danger," without first passing both the signals c' and b' , and thus setting the signals c and b , which would serve as a warning to the train which had passed the signal a . If the train 2 arrives at the signal b' before the train 1 had arrived at the signal b , the said train 1 will be warned by the said signal b and would stop, while train No. 2, continuing beyond the signal b' , would be warned by the signal a' . If, however, both trains should arrive at the signals $b\ b'$ so nearly simultaneously that each engineer might think that the signals were set by his own train, they would both continue on, when train No. 1 would per-

ceive the signal *c* set at "danger" and would immediately stop, while train No. 2 would find a danger-signal at *a'* and would also stop, there being sufficient space, as before mentioned, between the said signals *c* and *a'* to permit both trains to be brought to rest before actually meeting. The signal *a'* cannot be restored to "safety" until train No. 1 passes it, and the signal *c* cannot be restored to "safety" until train No. 2 passes it, and it will be seen that neither train can restore the corresponding signal to "safety" without passing the danger-signal set by the other train, which it is not permitted to do.

15 The construction of the signal apparatus is not herein described, as it does not constitute any part of the present invention.

Any apparatus in which two signals at a distance from one another are capable of being moved simultaneously when arranged as herein shown can be employed in carrying out this invention.

25 A signal apparatus which is adapted for carrying out this invention is fully described in Letters Patent No. 252,545, granted to me January 17, 1882, to which reference may be had.

The term "section," as herein used, means the space along the track included between a

connected pair of signals on opposite sides of the said track, as between *a* and *a'*, *b* and *b'*, &c. It does not refer to the rails of the track themselves, but merely to space or distance, so that the said sections may be properly described as overlying, extending into, or overlapping one another.

I claim—

That improvement in the art or method of signaling trains upon a single-track railway or track over which trains normally pass in both directions, which consists in dividing the road into blocks or sections having a signal at each end thereof and on opposite sides of the track, the said signals being operated simultaneously when a train enters and leaves the section included between them, each section overlapping or extending into the second section beyond for a distance that is at least double what is required to bring a train to rest, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHAS. D. TISDALE.

Witnesses:

JOS. P. LIVERMORE,
FRED A. POWELL.