A. CASALE.

ELECTRIC RAILWAY SAFETY SYSTEM.

APPLICATION FILED JUNE 18, 1909.

971,249. Patented Sept. 27, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

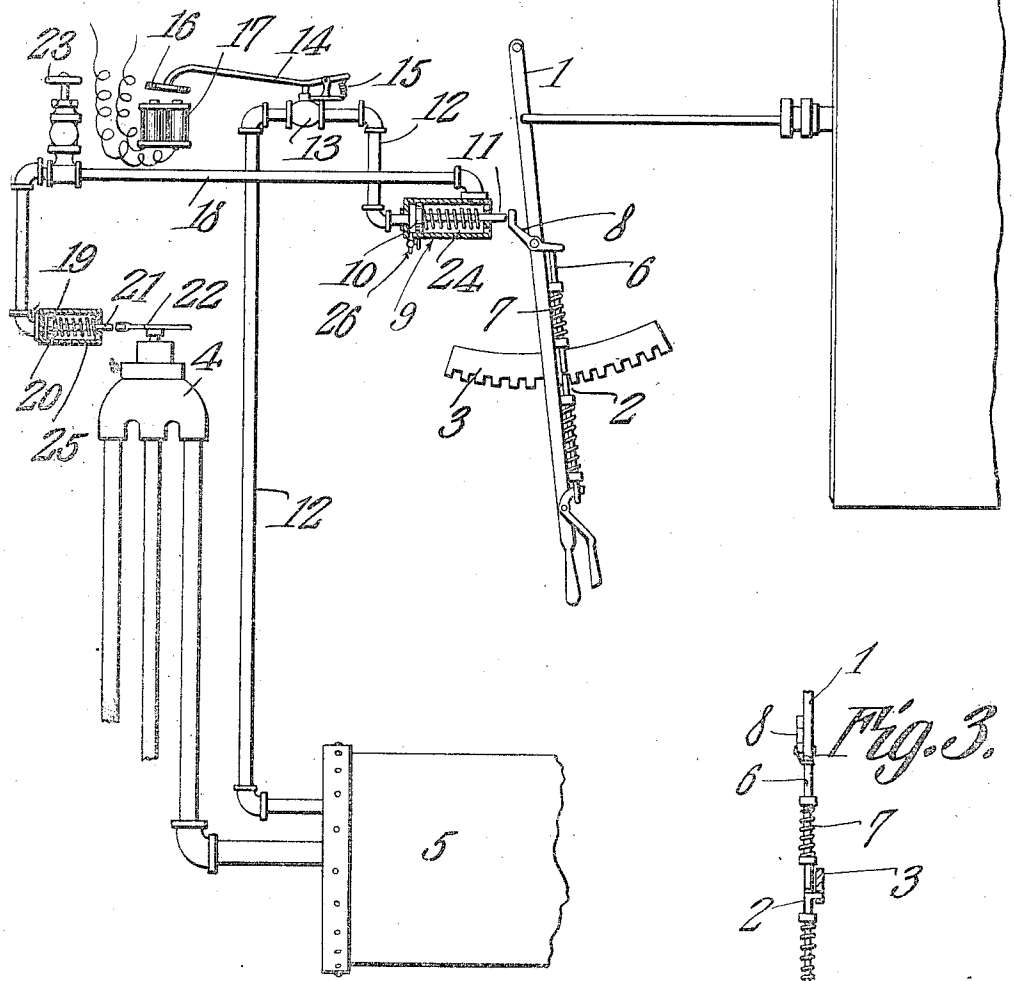

Fig. 3.

Witnesses

E. F. Ellwood

F. T. Chapman

Inventor

Antonio Casale.

By A. Snow & Co.

Attorneys

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2 SHEETS—SHEET 2.

Fig. 2.

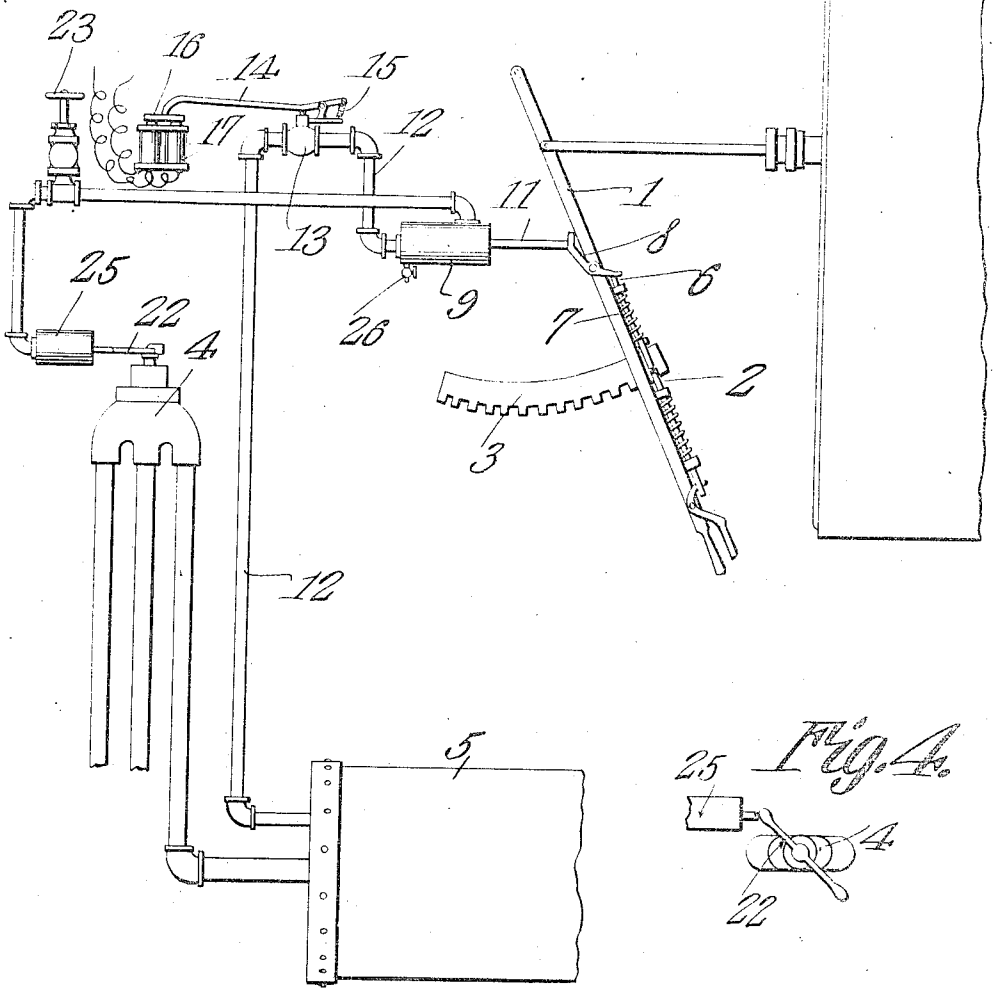

Fig. 4.

Witnesses

E. F. Stewart

F. T. Chapman

Inventor

Antonio Casale.

By Church & Co.

Attorneys

UNITED STATES PATENT OFFICE.

ANTONIO CASALE, OF SCRANTON, PENNSYLVANIA.

ELECTRIC RAILWAY SAFETY SYSTEM.

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Application filed June 18, 1909. Serial No. 502,976.

To all whom it may concern:

Be it known that I, ANTONIO CASALE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a new and useful Electric Railway Safety System, of which the following is a specification.

This invention has reference to improvements in electric railway safety systems and is designed to prevent the accidental or careless running of a train past a block signal set against the train or past a point where the train should always be brought to a stop.

The present invention comprises means for closing the throttle valve and subsequently applying the brakes should the engineman pass a point where a full stop should be made, the shutting off the steam to the engine and the application of the brakes being entirely outside the volition of the engineman under such circumstances, but the invention is so applied that the engineman has full control of the throttle and of the air brakes under the ordinary running conditions of the train, nor does the invention interfere in any manner with the locking of the throttle in adjusted positions.

By the present invention there is provided an actuating device designed to be moved by main reservoir air pressure to first release the throttle lever from the ordinary rack and then to move the throttle lever from whatever running position it may at the time be in to the closed position, after which the main reservoir air pressure is directed to another operating mechanism designed to move the engineer's valve to service position, or if desired to emergency position, for the application of the brakes, the structure being under the control of an electrically operated device energized on the passage of the train beyond the place where the train should be stopped.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a structural diagram illustrating the invention and showing the parts in normal running condition. Fig. 2 is a similar view showing the position of the parts when automatically shutting off the steam and causing the application of the brakes. Fig. 3 is a detail view of the throttle lever. Fig. 4 is a detail view of the main brake applying valve with adjacent portions of the operating mechanism therefor.

Referring to the drawings there is shown a throttle lever 1 with its ordinary thumb latch 2 and rack 3 by means of which the throttle lever may be adjusted to any desired position by the engineman and there held against accidental displacement. There is also shown the main brake applying valve 4 which may be of any ordinary construction and therefore the showing is to be taken only as typical. Furthermore, there is shown the main air reservoir 5 of the air brake system, which reservoir is situated on the engine. The parts so far described may be of any ordinary or approved construction and hence no effort has been made in the drawings to show these parts in any particular detail nor is it deemed necessary to describe these parts in detail.

Mounted on the throttle lever so that when moved longitudinally it will engage the thumb latch 2 and push the same out of engagement with the rack 3 is a rod 6 normally held in the inactive position by a spring 7. Also mounted on the throttle lever 1 is another lever 8 having one end in operative relation to the rod 6.

Suitably supported on a fixed portion of the engine is a cylinder 9 in which there is located a piston 10 mounted on one end of a piston rod 11 extending through and beyond one end of the cylinder 9 and into operative relation to that end of the lever 8 remote from the end engaging the rod 6. The end of the cylinder 9 remote from that through which the piston rod 11 extends is entered by a pipe 12 extending to the main air reservoir 5. In this pipe 12 there is located a valve 13 to the valve stem of which there is secured a lever 14 normally held in inactive position by a spring 15. The free end of the lever 14 carries an armature 16 in operative relation to an electromagnet 17 which is assumed to be included in a charged electric circuit adapted to be closed by the passage of the train by a predetermined point under abnormal conditions. For instance, when a target is set against the train and the engineman fails to stop his train then the electric circuit including the magnet 17 is closed thus energizing the magnet and attracting the armature 16, or where a stop is always to be made and the engineman through negligence or from other

causes over-runs such point, the arrangement may be such as to always close the circuit to the magnet 17 at this point along the line of way.

The means for causing the closure of an electric circuit for the purpose of stopping a train is not at all uncommon in safety systems for railways, and since the particular means employed forms no part of the present invention and may be the same as any of the known means for the purpose it is not deemed necessary to illustrate such means in the drawings.

Connected to the cylinder 9 near the end through which the piston rod 11 extends is another pipe 18 and this pipe leads to one end of a cylinder 19 within which there is located a piston 20 on one end of a piston rod 21 which projects beyond the end of the cylinder remote from that entered by the pipe 18 and in the path of the piston rod is located a lever 22 which may be an extension of the ordinary operating lever of the valve 4. Included in the pipe 18 is a valve 23.

The piston rod 11 is surrounded by a spring 24 tending to maintain the piston 10 at the end of the cylinder 9 entered by the pipe 12 and surrounding the piston rod 21 is a spring 25 tending to maintain the piston 20 at the end of the cylinder 19 entered by the pipe 18.

Let it now be assumed that the engine is to be run under normal conditions then the throttle lever 1 may be moved by the engineman to any desired position and locked to the rack 3 in the usual manner, thus admitting steam to the cylinders of the engine as the engineman may desire. When the engineman desires to stop the engine he may manipulate the throttle lever in the usual manner and also the valve 4 for the application of the air brake. So long as the normal conditions prevail the engineman has full control over the throttle lever and the air brake valve. Suppose now that the engineman passes a target set against him or overruns a point where a stop is always to be made, then the magnet 17 is energized and the armature 16 attracted thus moving the lever 14 about its pivot against the action of the spring and opening the valve 13, which valve under normal conditions is closed, the said valve being either of the self-closing type or being closed by the normal action of the spring 15, in which case the valve stem is connected to the lever 14 positively. On the opening of the valve 13 air under full main reservoir pressure passes through the pipe 12 and into the cylinder 9 thus exerting full reservoir pressure against the piston 10 and forcing the said piston toward the other end of the cylinder thereby causing the projection of the piston rod 11, the spring 24 being too weak to offer noticeable resistance to the air pressure. The piston rod 11 first engages the corresponding end of the lever 8 thus turning the latter on its pivot and forcing the rod 6 in a direction toward the latch 2, against the action of the spring 7, and the air pressure within the cylinder being amply sufficient the spring 7 is compressed and the rod 6 will move the latch 2 out of engagement with the rack 3 against the action of the usual spring holding the latch 2 in engagement with the rack 3. As soon as the latch 2 is released from the rack 3 then the continued movement of the piston 10 will move the throttle lever 1 toward the position where the steam is cut off from the engine, the parts being so proportioned that the full stroke of the piston 10 will move the throttle lever to the full closed position thus cutting the steam off entirely from the engine. The full movement of the piston 10 is sufficient to put the pipe 18 in communication with the power side of the cylinder 9, the said piston moving beyond the point of communication of the pipe 18 with the cylinder 9. Air now flows through the pipe 18 to the cylinder 19 and the air pressure is exerted against the piston 20 thus causing the outward movement of the piston rod 21 from the corresponding end of the cylinder 19. This outward movement of the piston rod 21 causes it to engage the lever 22 and move the same from the ordinary running position to either the full service position or to the emergency position in accordance with the desired predetermined arrangement of the parts. It will be observed that the air does not reach the cylinder 19 until the throttle lever has been moved to the full closed position so that the brakes are applied only after the steam has been cut off and consequently have but to check the momentum of the train, thus following the usual practice of stopping a train.

Since a train going at any considerable speed cannot be stopped before the train has traveled a limited distance, the circuit to the magnet 17 may be maintained closed for an appropriate time to permit the flow of air through the pipe 12 to the cylinder 9 to cause the full movement of the piston 10 and to then pass through the pipe 18 and cause the movement of the piston 20, or the devices employed along the line of way may cause a closure of the circuit to the magnet 17, the circuit closing devices remaining in the closed position until purposely opened. Whatever means be employed for causing the closing of the circuit the magnets 17 should remain energized sufficiently long to cause the operation described. The cylinder 9 may be provided with a bleeding valve 26 to permit the return of the piston 10 under the action of the spring 24 when the valve 13 has been again closed. As soon as

the piston 10 returns toward its normal position the end of the pipe 18 entering the cylinder 9 is opened to the atmosphere and consequently cut off from the main reservoir pressure and under these circumstances the piston 20 will return of its own accord under the action of the spring 25 to its normal position.

If it be desired that the valve 4 should be operated to a less extent than that to which it is operated by the full air pressure of the reservoir 5 then the valve 23 may be manipulated to allow an escape of a portion of the air entering through the pipe 18 so that the pressure against the piston 20 is not so heavy as the full air pressure of the reservoir and the spring 25 may be so adjusted as to respond to a less extent than it would under the full air pressure of the reservoir 5. Under these circumstances the lever 22 will not be moved to such an extent as it would under the full air pressure and only a moderate service application may be made, or the application may be made much slower than the full service or emergency application and the train be brought to a standstill after a longer lapse of time.

From the foregoing it will be seen that the system shown and described is susceptible of various slight modifications without however affecting the salient features of the invention.

What is claimed is:—

1. In a railway safety system, a throttle lever actuating means responsive to air pressure and unconnected with the throttle lever, an engineer's brake valve operating means responsive to air pressure and unconnected with the brake valve, means for admitting compressed air to the throttle lever actuating means, and connections from the throttle lever actuating means to the means for operating the brake valve for admitting air to the said brake valve operating means subsequent to the action of the throttle lever actuating means.

2. In a railway safety system, a throttle lever actuating means comprising a cylinder, a piston therein, a piston rod controlled by the piston, a throttle lever in the path of but not connected with the piston rod, means for admitting compressed air into the cylinder under predetermined conditions, another cylinder, an air connection between the first named cylinder at the end thereof near the termination of the power stroke of its piston and the second cylinder, a piston in the second cylinder, and a piston rod controlled by the last named piston and adapted to engage and actuate the engineer's air brake controlling valve when the piston is moved actively, but not connected with said valve.

3. In a railway safety system, a throttle lever, actuating means comprising a cylinder, a piston therein, a piston rod controlled by the piston, a lever mounted on the throttle lever with one end in the path of but not connected with the piston rod, a movable member controlled by said lever for moving the throttle lever latch to inactive position, a connection between the cylinder and the source of compressed air, and means for admitting compressed air to the cylinder under predetermined conditions.

4. In a railway safety system, a throttle lever, actuating means therefor comprising a cylinder, a piston therein, a piston rod controlled by the piston, a lever mounted on the throttle lever in the path of but not connected with the piston rod, a movable member controlled by said lever in operative relation to the throttle lever latch for moving the latter to inactive position, manually operable means on the throttle lever for controlling the throttle lever latch, a connection between the cylinder and a source of compressed air and means for admitting compressed air to the cylinder under predetermined conditions.

5. In a railway safety system, a throttle lever actuating means responsive to air pressure, connections between said actuating means and the main reservoir of an air brake system, an engineer's brake valve operating means also responsive to air pressure, means controlled by the throttle lever actuating means for causing admission of air to the brake valve operating means subsequent to the operation of the former, and means for regulating the action of compressed air on the brake valve operating means at will.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ANTONIO CASALE.

Witnesses:

E. HUME TALBERT,

F. T. CHAPMAN.