

W. G. DARING.
 AUTOMATIC SAFETY APPLIANCE FOR RAILWAYS.
 APPLICATION FILED APR. 27, 1909.

941,233.

Patented Nov. 23, 1909.
 3 SHEETS-SHEET 1.

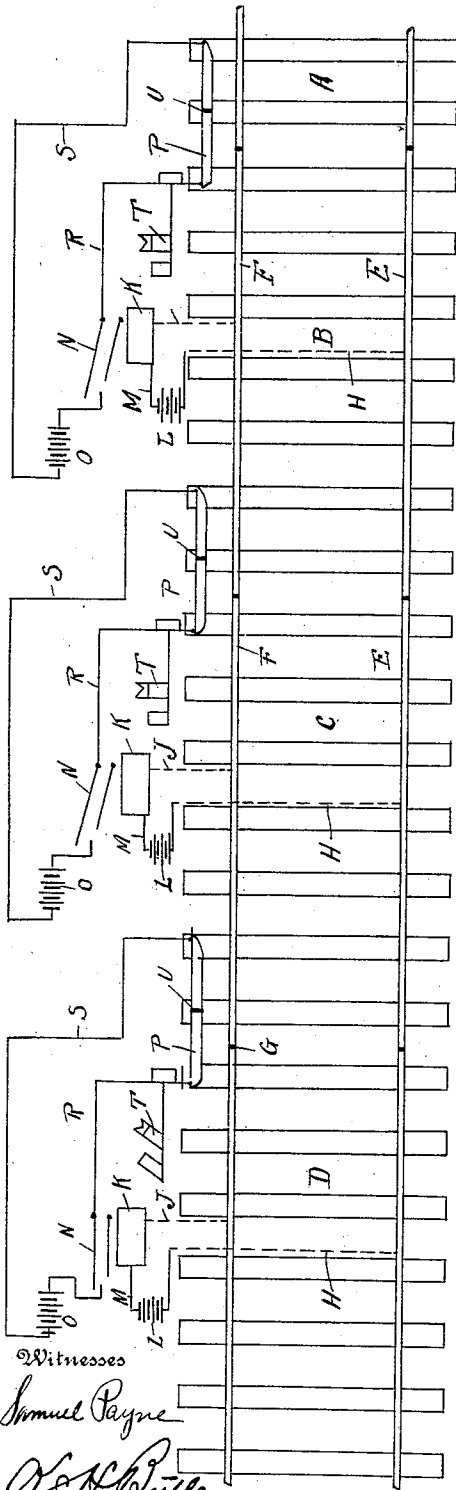
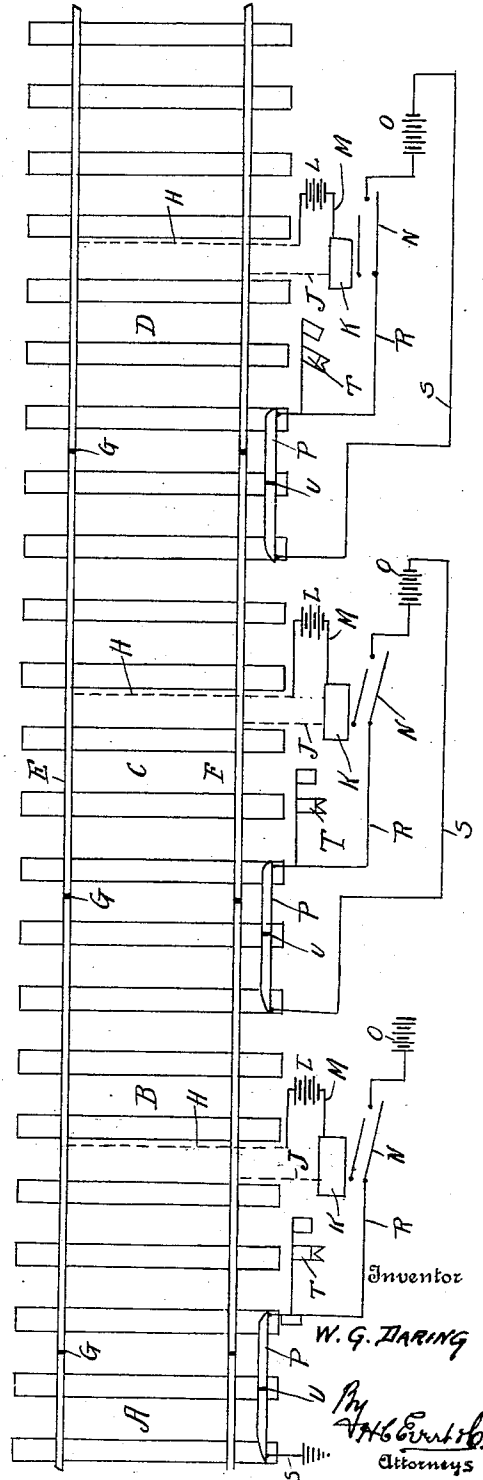


Fig. 1.



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Fig. 2.

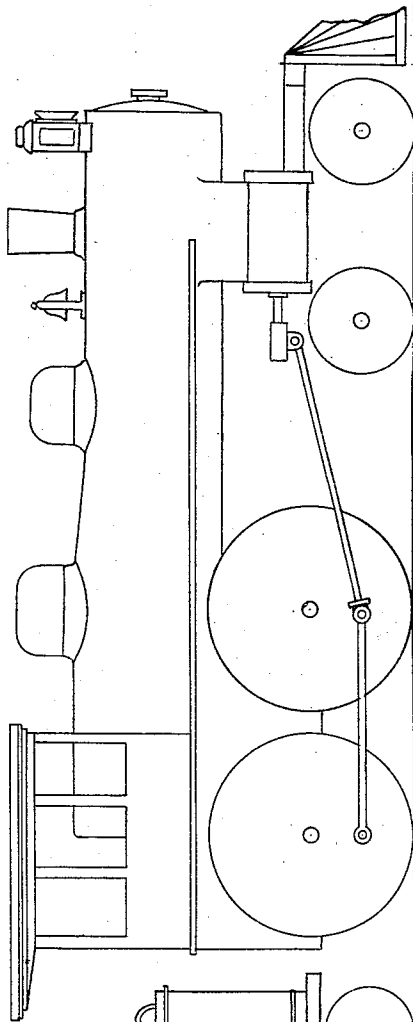
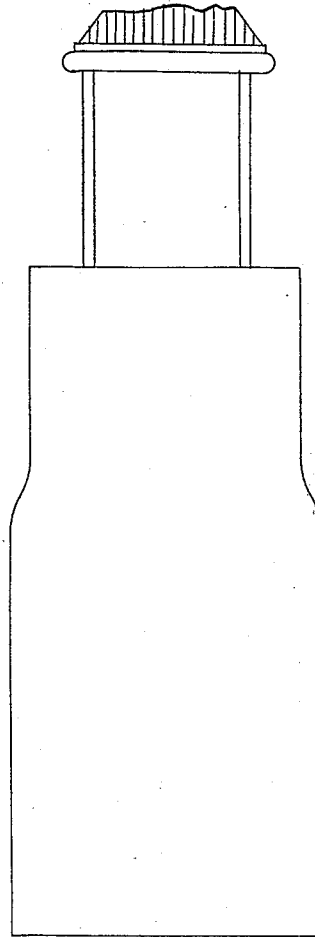
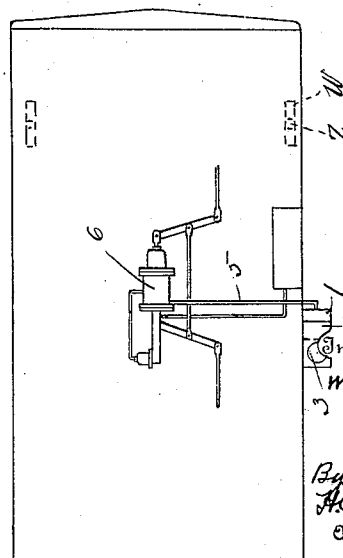
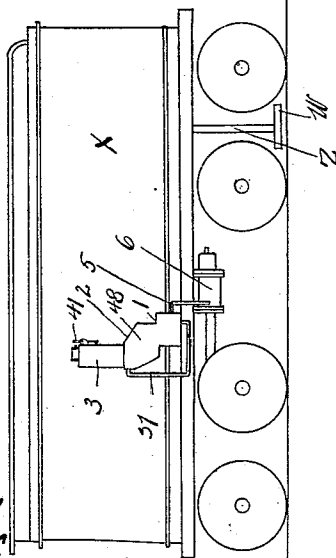


Fig. 3.



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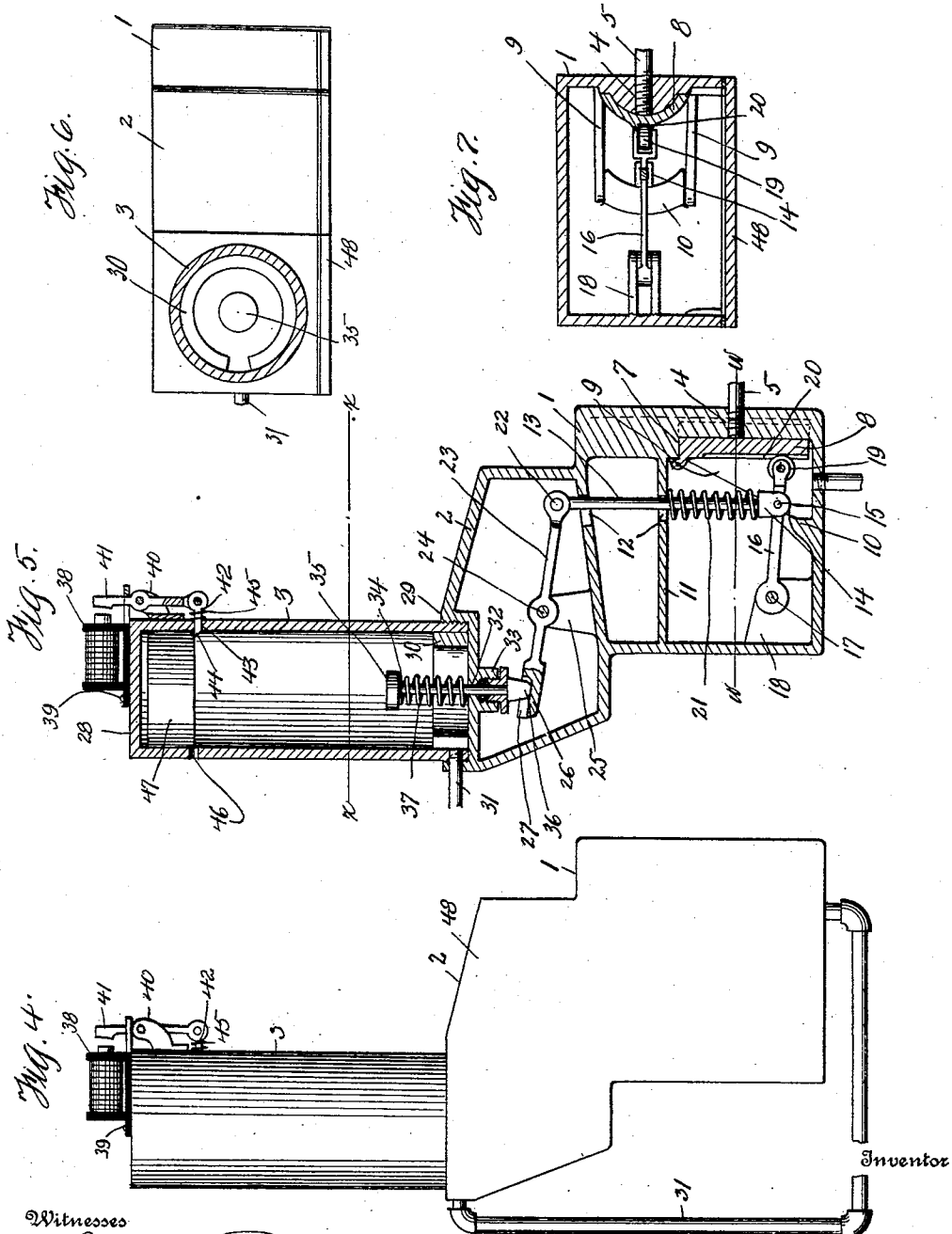
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UNITED STATES PATENT OFFICE.

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AUTOMATIC SAFETY APPLIANCE FOR RAILWAYS.

941,233.

Specification of Letters Patent.

Patented Nov. 23, 1909.

Application filed April 27, 1909. Serial No. 492,473.

To all whom it may concern:

Be it known that I, WILLIAM G. DARING, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Safety Appliances for Railways, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to automatic safety appliances for railways, and more particularly to a novel block system for preventing railway accidents and collisions.

The object of the invention is to provide the rolling stock of a railway with novel electrically released valves adapted to set the brakes of the rolling stock when the valves are released through the medium of electrical circuits established by the rolling stock passing into certain blocks on to certain sections of track that are constructed to maintain signals and to operate the safety appliance.

Another object of this invention is to provide a block signal that will prevent rear-end or head-on collisions, the system being easily maintained independent of telegraphic systems used in connection with a railroad.

A further object of the invention is to provide a novel electrical release valve for setting the air brakes of a train by releasing air from the brake cylinder, and utilizing the released air to automatically close or restore the valve to its normal position.

These and such other objects as will hereinafter appear are attained by a safety appliance or system that can be used in connection with a railroad having one or more tracks, and since the safety appliance of one track is operated independently of the safety appliance of another track, a complete system of appliances can be maintained at a comparatively small cost, and in a great many instances in connection with signal systems at present installed.

The invention will be hereinafter considered in detail and then pointed out in the appended claims, and reference will now be had to the drawing forming a part of this application, wherein there is illustrated a preferred embodiment of the invention, but it is to be understood that the structural elements thereof can be varied or changed, as

to the shape, proportion and manner of assemblage without departing from the spirit of the invention.

In the drawings:—Figure 1 is a diagrammatic view of two tracks equipped with the safety appliance, one track representing an east bound track and the other a west bound track, Fig. 2 is a diagrammatic elevation of a locomotive illustrating the tender thereof provided with the electrically released valve of the appliance, Fig. 3 is a diagrammatic plan of the same, Fig. 4 is an enlarged elevation of the detached valve forming a part of the safety appliance, Fig. 5 is a vertical sectional view of the same, Fig. 6 is a horizontal sectional view of the valve taken on the line X—X of Fig. 5, and Fig. 7 is a similar view taken on the line W—W of Fig. 5.

In the accompanying drawings, A, B, C and D denote blocks or sections of a track, each block having rails E and F insulated, as at G, from the rails of adjoining blocks or sections. These blocks or sections are of sufficient length for a train, and the movement of a train from one block to another is controlled by the succeeding blocks, as will presently appear.

The rail F is connected by a wire J to a relay K and the rail E by a wire H to a battery L or a suitable source of electrical energy, said battery being connected by a wire M to the relay K, whereby when a train passes onto the block C or one of the other blocks, the relay K will be energized. When the relay K is energized, an armature N is moved, completing the circuit through the battery O or a similar source of electrical energy, and a contact block P, located at one side of the rail F at the juncture of the blocks. The battery O is connected to the contact block P by wires R and S, and in this circuit can be located a suitable mechanism for operating signals T. It is in this connection that I reserve the right to use the electrical circuit through the wires R and S and the contact block P with the present system of block signal.

The contact block P is made in two sections, insulated one from the other, as at U, and this block is adapted to be engaged by a contact shoe W suspended from the tender X of a locomotive, the shoe being located at each side of the tender, whereby safety ap-

pliances on either east bound or west bound tracks can be used. The contact shoe W is made in two sections insulated, as at Z, and the sections of this shoe are adapted to wipe the sections of the contact block P as the tender X passes the same.

Located at a convenient place upon the locomotive tender X is an electrical release valve, comprising a valve body 1, a housing 2, and a cylinder 3, said body and housing being preferably made integral, while the cylinder 3 is detachable. The valve body 1 is provided with a port 4 and connecting with said port is a pipe 5 adapted to connect with the exhaust port of a brake cylinder 6 carried by the tender X. The inner side of the valve body 1 adjacent to the port 4 is recessed, as at 7, to provide a seat for a flap valve 8, pivotally connected to the inner side of the valve body 1. This flap valve 8 is rectangular in plan and when seated in the recess 7 is adapted to close the port 4. The flap valve 8 is guided by two oppositely disposed flanges 9 located in the valve body 1, these flanges in conjunction with an enlargement 10 at the bottom of the valve body 1 limiting the opening movement of the flap valve 8.

The valve body 1 is provided with a horizontal partition 11, and this partition together with the top of the valve body is provided with vertically alining openings 12. Extending through the openings 12 is a vertical rod 13 having the lower end thereof provided with a bifurcated head 14, which is pivotally connected as at 15, to an arm 16. This arm 16 has the rear end thereof pivotally connected as at 17, to an enlargement 18 formed in the bottom of the valve body 1, while the forward end thereof is bifurcated and supports a revoluble roller 19 adapted to engage in a vertical groove 20 formed in the inner side of the flap valve 8.

Encircling the rod 13 between the bifurcated head 14 and the partition 11 is a coil spring 21, the tension of this spring normally maintaining the rod 13 in a lowered position, such position of the rod maintaining the flap valve 8 in a closed position through the medium of the arm 16.

The upper end of the rod 13 within the housing 2 is pivotally connected, as at 22, to a lever 23, fulcrumed as at 24, between bearings 25 located in the housing 2. The opposite end of the fulcrumed lever 23 is provided with a head 26 having a groove 27 formed therein, the object of which will presently appear.

The cylinder 3 has the upper end thereof closed, as at 28, while the lower end is opened and is exteriorly threaded to screw in a socket 29 provided therefor in the housing 2. Arranged within the lower end of the cylinder 3 and supported by the housing 2 is a split spacing ring 30, and extending into

the cylinder 3 at the spread portion of this spacing ring is a pipe 31, said pipe tapping into the bottom of the valve body 1 in proximity to the flap valve 8.

Centrally of the socket 29 of the housing 2 is a vertical opening 32, and surrounding said opening is a depending stuffing box 33. Extending through the opening 32 and the stuffing box 33 is a plunger 34 having the upper and lower ends thereof provided with heads 35 and 36, the latter engaging in the groove 27 of the fulcrumed lever 23. Encircling the plunger 34 between the socket 29 and the head 35 is a coil spring 37, said spring normally holding the plunger in an elevated position.

Located upon the closed end 28 of the cylinder 3 is an electro-magnet 38 adapted to be connected by wires 39 to the sections of the contact shoe W of the tender, whereby a circuit will be established through the electro-magnet 38 when the shoe W contacts with the block B. The cylinder 3 is provided with a bracket 40 for a pivoted armature lever 41, the upper end of which is adapted to be attracted when the electro-magnet 38 is energized, while the lower end of said armature lever is pivotally connected to a latch 42 extending into an opening 43 formed in the cylinder 3 adjacent to the upper end thereof. The inner end of the latch 42 is beveled, as at 44, and interposed between said cylinder and the lever 41 encircling said latch is a retractile spring 45, said spring normally retaining the inner end of the latch 42 within the cylinder 3. The cylinder 3 diametrically opposite the latch 42 is provided with an exhaust port 46 and within said cylinder is located a weight or block 47 adapted to slide in said cylinder and serve functionally as a piston head.

In order that the mechanism can be easily assembled within the valve body 1 and the housing 2, one side of said valve body and housing is provided with a detachable plate 48.

Operation: Assuming that a train is in block D, one of the axles of the train bridges rails E and F and completes a circuit through the battery L, energizing the relay K, and completing a circuit through the battery O, whereby a circuit will be immediately completed in the contact block P when the sections thereof are bridged. Should the engineer of a train approaching on block C neglect to observe the danger signal T, or should something happen to the engineer that would incapacitate him for work, the train approaching on block C will be immediately stopped upon the contact shoe W wiping or engaging the contact block P. The manner in which this is accomplished is as follows: When the shoe W contacts with the block P, a circuit is immediately established in the electro-magnet 38, at-

tracting the upper end of the armature lever 41 and causing the lower end of said lever to withdraw the latch 42, whereby the weight or block 47 will immediately descend and impinge the head 35 of the plunger 34. The weight or block 47 is sufficient to lower the plunger 34 and said plunger is maintained in a lowered position by the weight or block 47 resting upon the split spacing ring 30, with the spring 37 under tension. A downward movement of the plunger 34 actuates the fulcrumed lever 23 and elevates the rod 13, allowing a pressure of air within the pipe 5 to swing the flap valve to an open position. With the flap valve 8 in an open position, the spring 21 encircling the rod 13 is retained under tension and the revoluble roller 19 in the upper end of the groove 20 of the flap valve. When opening the port 4 the air is released in the brake cylinder 6 and the brakes immediately set, whereby the train cannot proceed on to the block D. The air released through the pipe 5 passes into the pipe 31 by reason of the flap valve 8 in conjunction with the flanges 9 and enlargement 10 partitioning the lower part of the valve body 1 and deflecting air into the pipe 31. The air then passes into the cylinder 3 beneath the weight or block 47 and forces said block to the upper end of the cylinder 3 where the latch 42 again engages the underneath edge of the weight or block. The air is adapted to exhaust through port 4 of the cylinder 3, while the spring 37 restores the plunger 34 to its normal position, causing the arm 16 to close the flap valve 8.

The application of the brakes is sufficient to call the attention of the locomotive engineer, fireman or brakeman of the train that a danger signal has been passed, and either party can immediately act in accordance with instructions issued in such cases.

I would have it understood that the electrically released valve can be installed upon any type of vehicle equipped with air brakes.

From the foregoing description, it will be observed that I have devised a novel electric safety signal system for railways wherein two normally open circuits are provided, one of which is adapted to be closed by a train for closing the other circuit, and through the medium of the last mentioned circuit releasing a valve to set brakes at a remote point from the first mentioned circuit, whereby the medium supporting the valve cannot collide with the medium establishing the first circuit.

My automatic safety appliance can be used in connection with switch frog points, draw-bridges and at such places where it might be necessary for a train to stop in order that the engineer or operator of the train can

ascertain that the track ahead is clear. The contact blocks can be temporarily installed at any danger points, for instance, upon each side of a wreck, whereby trains will be brought to a standstill prior to passing 70 around the wreck.

Having now described my invention what I claim as new, is:—

1. In an electric safety signal system for railways, the combination with normally open circuits, the closing of one adapted to close the other, and a contact block in connection with the last mentioned circuit, of a tender equipment, said equipment embodying an electrically released valve for releasing air from the brake cylinder of a train and setting the brakes thereof, a depending contact shoe adapted to engage said block to actuate said valve, said valve comprising a valve body adapted to connect with a brake cylinder, a flap valve in said valve body for controlling the release of air from the brake cylinder, a superimposed cylinder supported by said valve body, a normally elevated weight within said cylinder, an electro-magnet supported by said cylinder and in circuit with said shoe and adapted to release said weight when energized, and means supported by said valve and actuated by said weight to release said flap valve and the air from said brake cylinder.

2. In an electric safety signal system for railways, the combination with normally open circuits, the closing of one adapted to close the other, and a contact block in connection with the last mentioned circuit, of a tender equipment, said equipment embodying an electrically released valve for releasing air from the brake cylinder of a train and setting the brakes thereof, a depending contact shoe adapted to engage said block to actuate said valve, said valve comprising a valve body adapted to connect with a brake cylinder, a flap valve in said valve body for controlling the release of air from the brake cylinder, a superimposed cylinder supported by said valve body, a normally elevated weight within said cylinder, an electro-magnet supported by said cylinder and in circuit with said shoe and adapted to release said weight when energized, means supported by said valve and actuated by said weight to release said flap valve and the air from said brake cylinder, and means in connection with said valve for conveying exhaust air from the brake cylinder to the superimposed cylinder for restoring said weight to its normal position.

3. In an electric safety signal system for railways, the combination with a track circuit, of a tender equipment, said equipment embodying an electrically released valve adapted to be actuated by said track circuit for releasing air from the brake cylinder of

a train to set the brakes thereof, said valve comprising a valve body, a flap valve located in said valve body for controlling the exhaust of air from the brake cylinder, a
 5 cylinder carried by said valve body, a weight normally located in the upper end of said cylinder, a latch adapted to normally support said weight in an elevated position, means carried by said cylinder and actuated by the track circuit for releasing said
 10 weight, means actuated by said weight for releasing said flap valve and allowing air to exhaust from the brake cylinder, and means in connection with said valve body
 15 for utilizing the exhaust air of the brake cylinder for restoring said weight to its normal position.

4. In a safety appliance for railways, the combination with a track circuit, of a valve
 20 adapted to be released by said circuit for setting the air brakes of a train, said valve comprising a valve body, a valve in said body for controlling the exhaust of air from the brake cylinder of a train, a cylinder supported by said valve body, means
 25 normally retained in the upper end of said cylinder and adapted to be released by the track circuit for moving said flap valve and releasing air from the brake cylinder, and
 30 means in connection with said valve body and said cylinder for utilizing exhaust air from the brake cylinder for restoring the first mentioned means to its normal position.

5. In a safety appliance for railways, the
 35 combination with a track circuit, of an electrically released valve, said valve comprising a body, a flap valve for controlling the air from a brake cylinder, an elevated weight adapted to be released by the track circuit
 40 for moving said flap valve, means in connection with said valve for utilizing the exhaust of air from the brake cylinder for restoring said weight to its normal position.

6. In a safety appliance for railways, the
 45 combination with a track circuit, of an electrically released valve adapted to be carried by rolling stock for releasing air from a brake cylinder to set the brakes of a rolling stock, said valve comprising a body, a flap
 50 valve arranged in said body for controlling the exhaust of air from a brake cylinder, a superimposed cylinder carried by said valve

body, an electro-magnet supported by said cylinder and adapted to be energized by said track circuit, a weight located in the upper
 55 end of said cylinder and adapted to be released when said electro-magnet is energized, a mechanism in connection with said valve body and said cylinder and adapted to be actuated by said weight for moving said flap
 60 valve, to release air from the brake cylinder, and means in connection with said valve body and said cylinder for utilizing the exhaust air from the brake cylinder for restoring the weight to its normal position. 65

7. In a safety appliance for railways, an electrically released valve for controlling the exhaust of air from the brake cylinder of rolling stock, said valve comprising a body, a
 70 flap valve arranged in said body for controlling the exhaust of air through said body, a housing supported by said body, a cylinder detachably connected to said housing, a weight normally supported in the upper end
 75 of said cylinder, a mechanism in connection with said cylinder, housing and valve body, and adapted to be actuated by said weight for moving said flap valve, means for normally retaining said weight in the upper end
 80 of said cylinder, and means in connection with said valve body and said cylinder for utilizing the exhaust air through said valve body for restoring said weight to its normal position. 85

8. In a safety appliance for railways, an electrically released valve adapted to be actuated by a track circuit for releasing air
 90 from the brake cylinder of rolling stock to set the brakes thereof, said valve comprising, a valve body, a flap valve located in said body for controlling the exhaust of air through
 95 said body, means supported by said valve body for moving said flap valve to permit air to exhaust through said body, and means in connection with said body for utilizing the exhaust of air to restore the first mentioned means to its normal position.

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

WILLIAM G. DARING.

Witnesses:

MAX H. SROLOVITZ,
 DAVID FURNIER.