

938,331.

Patented Oct. 26, 1909.

4 SHEETS-SHEET 1.

Fig. 1.

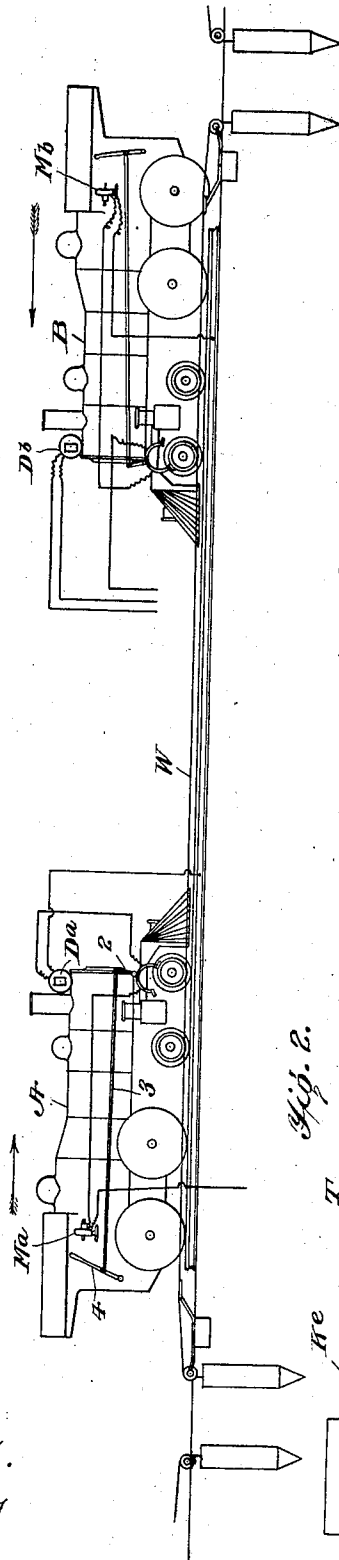


Fig. 2.

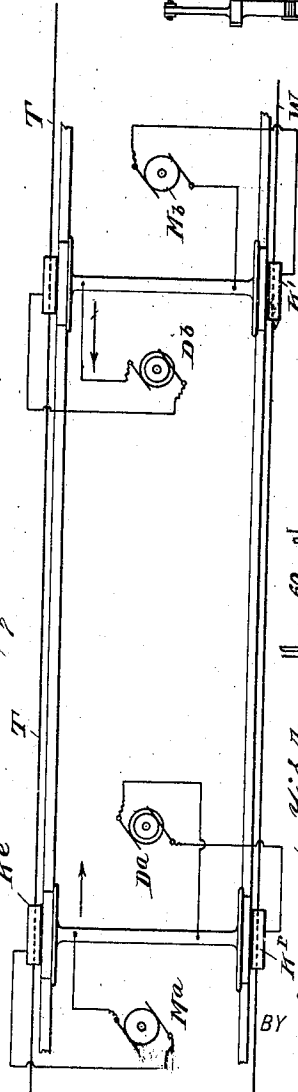
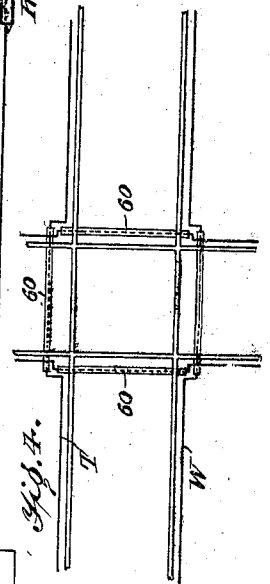
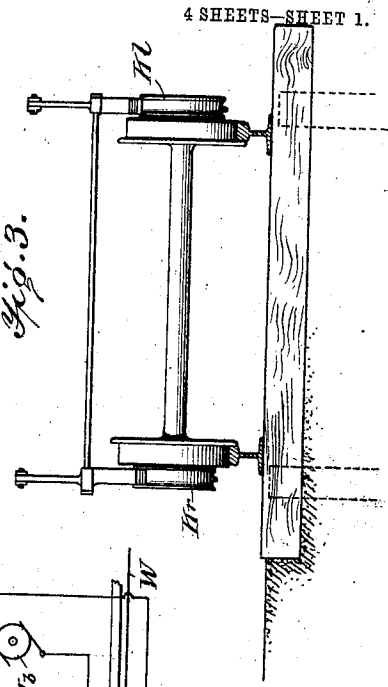


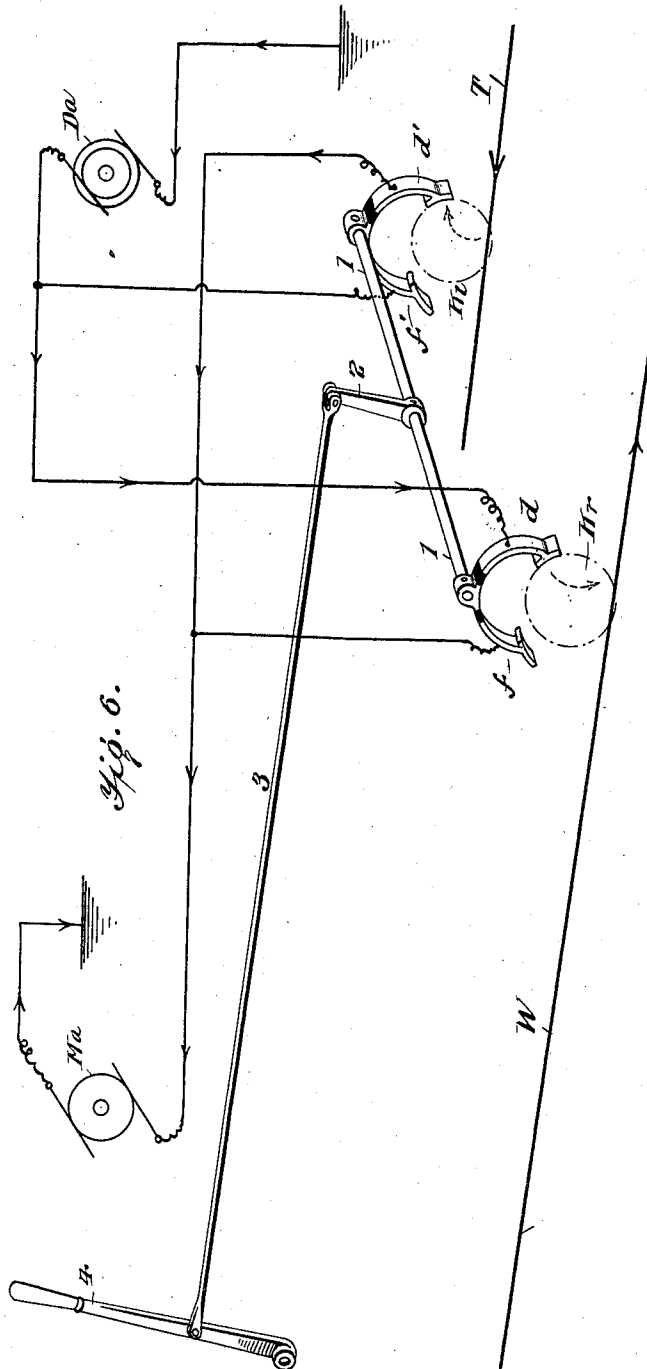
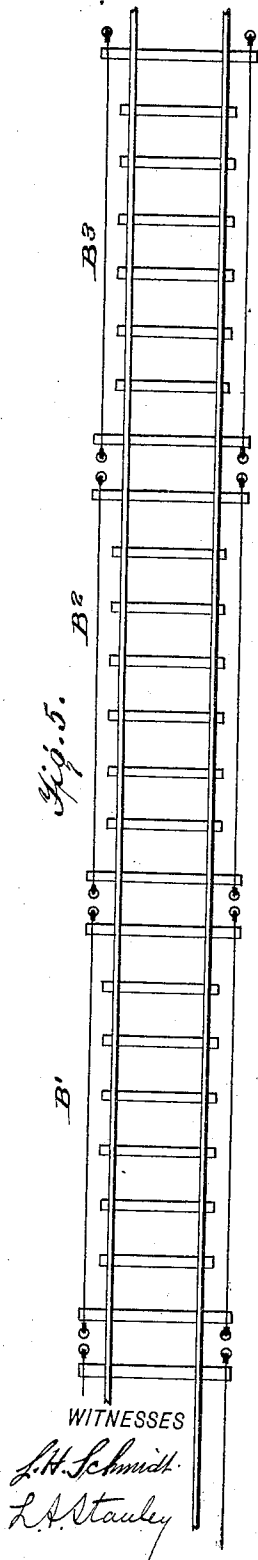
Fig. 3.



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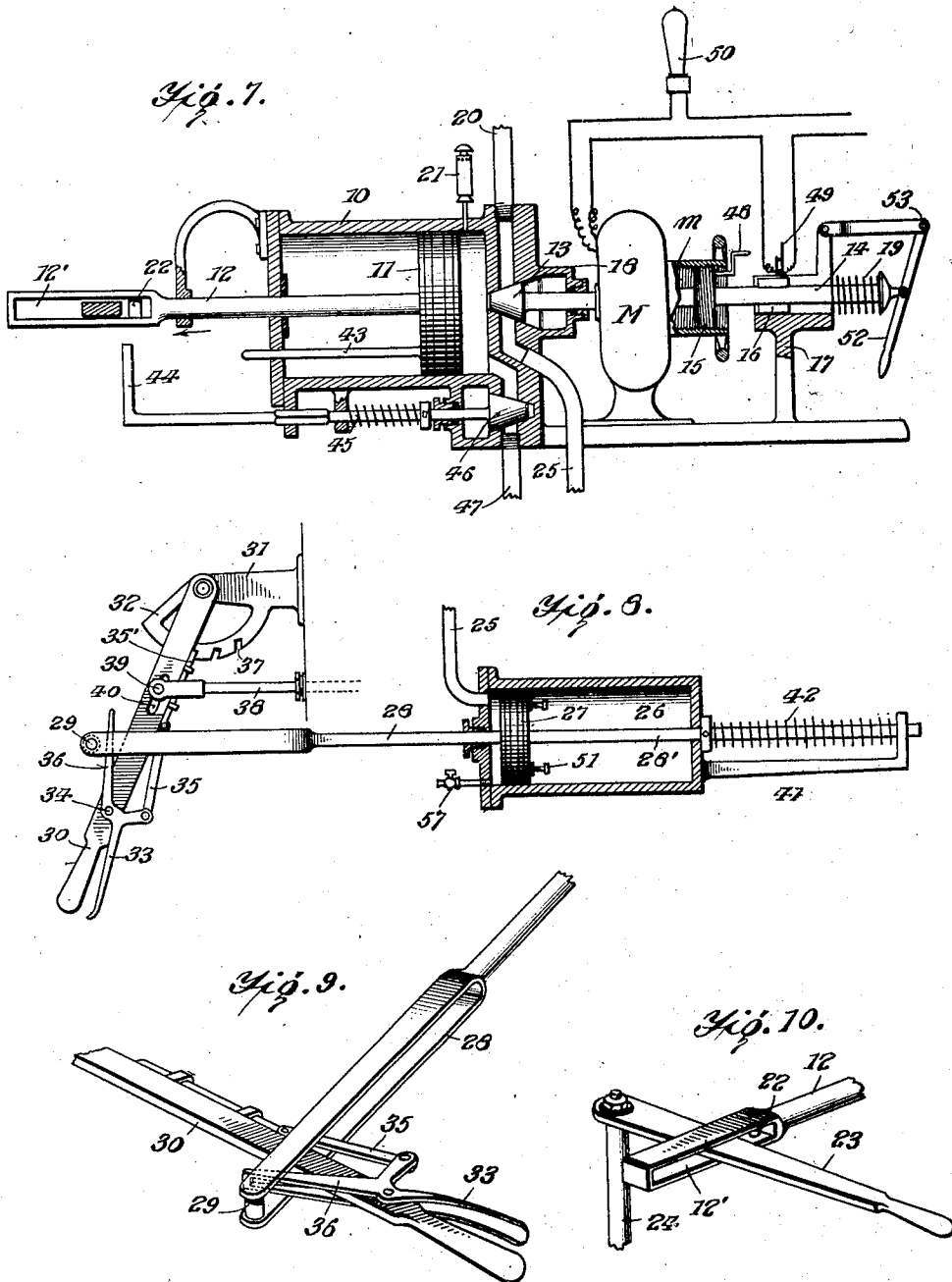


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J. D. NIX.
BLOCK SIGNAL SYSTEM.
APPLICATION FILED SEPT. 11, 1908.

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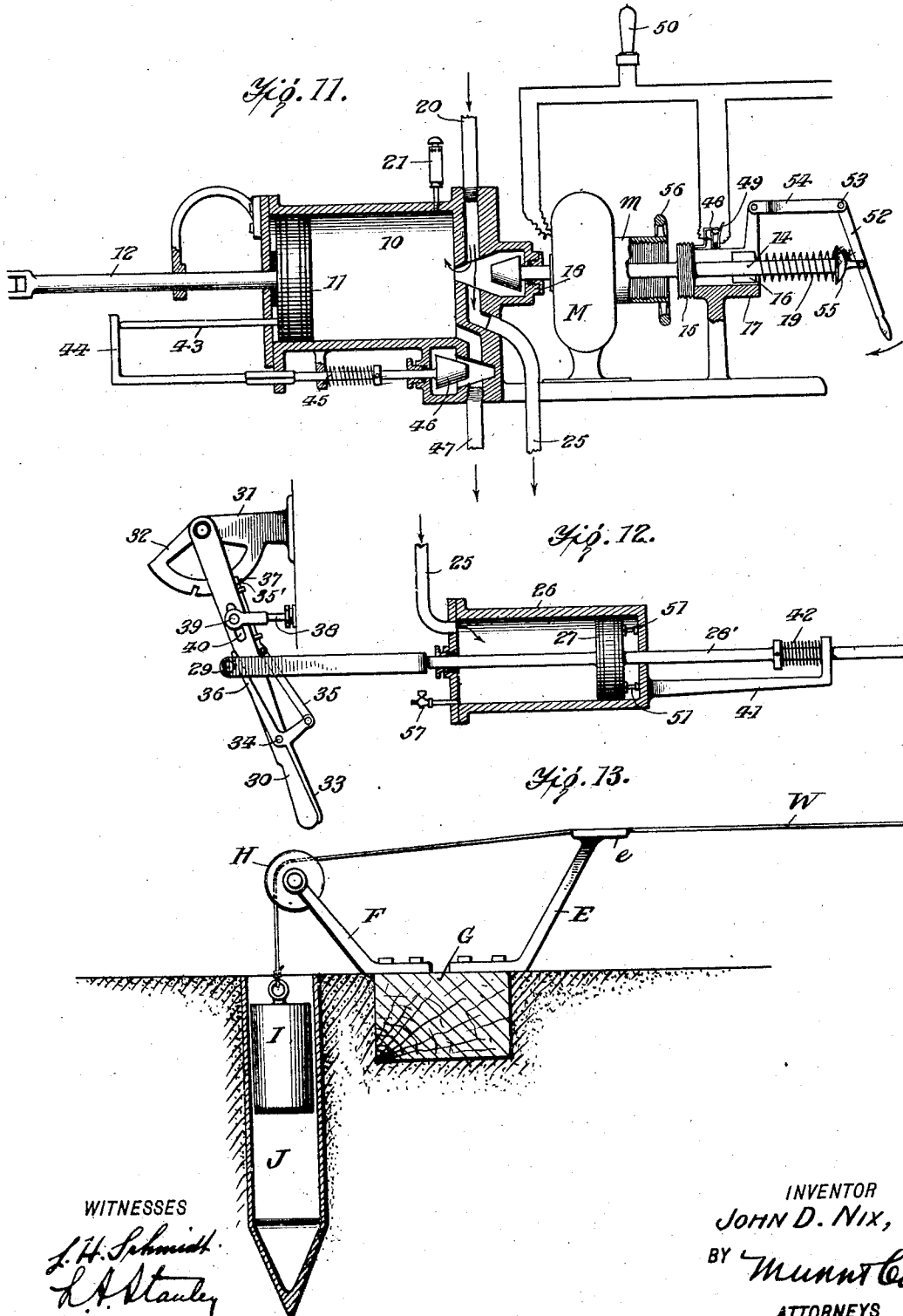
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BLOCK-SIGNAL SYSTEM.

938,331.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed September 11, 1908. Serial No. 452,545.

To all whom it may concern:

Be it known that I, JOHN DAY NIX, a citizen of the United States, and a resident of Ferriday, in the parish of Concordia and State of Louisiana, have made certain new and useful Improvements in Block-Signaling Systems, of which the following is a specification.

My invention relates to improvements in safety devices for use on locomotives for the prevention of accidents, and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of my invention is to provide mechanism which is located on the engine and forms part of the mechanism thereof which may be automatically operated by an electric current from a generator carried on another engine which is in the same block. The generators for furnishing the electric current may be either dynamos or batteries.

In carrying out my invention I provide means on each engine for shutting off the steam and at the same time applying the brake. I may operate the throttle closing and brake setting means either by steam or compressed air as will readily appear from the following description.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a diagrammatic view showing two engines equipped with my safety devices approaching each other in the same block; Fig. 2 is a diagrammatic plan view showing the operation of the actuating circuits; Fig. 3 is a detail view showing the trolley wheels and their engaging brushes; Fig. 4 is a plan view of the means for continuing the trolley wires past the track crossing; Fig. 5 is a plan view of a railroad track showing a plurality of blocks equipped with my apparatus; Fig. 6 is a perspective view showing the reversing mechanism for the trolley brushes; Fig. 7 is a sectional detail view showing the brake operating mechanism in its normal position; Fig. 8 is a sectional view of the throttle controlling mechanism in its normal position; Fig. 9 is a perspective view of the throttle lever; Fig. 10 is a perspective view of the brake lever; Fig. 11 is a sectional view showing the valve open for actuating the brake mechanism; Fig. 12 is a sectional view showing the throttle lever in its closed position; Fig. 13 is a sectional

view showing the means of supporting the trolley wires.

Referring now to Fig. 1, I have shown therein diagrammatically two engines A and B, going in the direction indicated by the arrows, the engine A being provided with a dynamo D^a and a motor M^a, and B being provided with a similar dynamo D^b and motor M^b. The dynamos are such as are ordinarily used for the production of the electric lights for the head lights of the engines and are usually run by rotary engines directly connected with the dynamo shaft. The motors are placed in a convenient position in the cab of the engine for operating the safety devices in the manner hereinafter described. Arranged along either side of the track are the trolley wires T and W. These consist of a series of insulated strands which are arranged on either side of the track and which extend the entire length of one block as shown in Fig. 5. In this figure three blocks are represented and denoted respectively by B¹, B², and B³. The trolley wires are supported at their ends by the standards E and F which are attached to the ties G in the manner clearly shown in Fig. 13. The standard E is a spring standard and is provided with a saddle e at the upper end thereof arranged to receive a trolley wire, while the standard F is a rigid standard and is provided at its upper end with a pulley H over which the end of the trolley wire is stretched. The downwardly turned end of the trolley wire is secured to a weight I which is adapted for vertical movement in a pointed pipe J which is driven into the ground. The weight I has its exterior surface of insulated material so that there is no electrical connection with the trolley and the ground. The standard E is made of spring metal so that when the trolley wheel suddenly comes upon the trolley wire the standard gives slightly and re-assumes its position after the wheel has passed by. The trolley wheels K^r and Kⁱ are carried on the front guide wheels of the engine in the manner clearly shown in Fig. 3. These trolley wheels are, of course, insulated from the guide wheels and also from the shaft. These wheels are grooved as shown in the figure to permit the entrance of the trolley wires and they are adapted to be placed into electrical relation with the

brushes connected with the dynamo and the motor. The manner in which these brushes are connected is clearly shown in Fig. 6. It will be seen that the brushes are located on a common rock-shaft 1, to which is attached an upright lever 2 the latter being pivoted at its top to a link 3 controlled by a hand lever 4 in the cab of the engine. The hand lever is arranged to be set in one of three positions, a forward, a center and a back position. In the first position the brushes d , d' will be in contact with the trolley wheels K^r and K^l respectively. In the central position neither of the brushes will be in contact with the trolley wheels and in the back position the rear brushes f , f' will engage the trolley wheels K^r and K^l respectively. The purpose of this arrangement is to provide means for readily connecting the motor or dynamo of the engine with the right or left hand trolley wire at will.

Referring now to Fig. 2, it will be seen that with the engines approaching each other in the same block in the direction indicated by the arrow and the levers 4 thrown forward in the direction indicated in Fig. 1, the dynamo D^a of engine A will be connected with the wire W on one side through the trolley K^r and on the other side to the ground through the axle of the car of the engine. The motor M^a is connected similarly to the wire T by means of the trolley K^l and to the ground through the axle of the engine. In order to make a return circuit the rails are preferably connected together by conductors at their ends in the manner of an ordinary electric railway. The dynamo D^b and the motor M^b of the on-coming engine B is connected in a similar manner but being reversed, the dynamo would be connected to the wire T while the motor would be connected to the wire W. If now the two engines are in the same block with their dynamos running, it will be apparent that the dynamo of one engine will set the motor running in the other one. Take for instance, the dynamo of the engine A, the current will flow from the dynamo to the trolley wheel K^r thence by the wire W to the trolley wheel K^l of the engine B, thence through the motor M^b and through its grounded connection back to the dynamo on the other engine. The same thing will occur with the current from the dynamo D^b , thereby operating the motor M^a . It will be observed that this will not take place unless the engines are in the same block because of the interruptions of the circuit at the ends of the block. When an engine is being backed up, or when the engineer is aware that a train is on the track close ahead of him, he may shift the connections of the motor and dynamo to the opposite trolley wire by means of the lever 4 in the manner already explained. This will connect the

dynamo of the preceding engine with the motor of the one following so that when the trains come into the same block the motor of the rear train will be set in motion.

The foregoing explanation of the electrical circuits will be sufficient for an understanding of the remaining operating mechanism which constitutes the principal part of my invention. In Figs. 7 to 12 inclusive I have shown mechanism for shutting off the steam for operating the brake when the motor of the engine is operated in the manner heretofore described.

Referring now to Fig. 7 I have shown therein a cylinder 10 provided with a piston 11 and piston rod 12. At one end of the cylinder is an inlet controlled by a valve 13 which may be operated by the motor M whenever the latter is energized. The motor M is provided with a shaft m which is hollow and internally threaded as shown in the figure. Passing through the hollow shaft is the valve stem 14 which is provided with a screw-threaded enlargement 15 arranged to coact with the hollow shaft m for moving the valve stem. The valve stem is guided in its movement by the guides 16 on a standard 17 at one end and at the other end by the valve casing 18. When the motor is actuated the hollow shaft in revolving causes the valve stem to be moved outwardly through the engagement of the shaft with the enlargement 15 on the stem. As the motor continues to revolve the enlargement 15 of the valve stem is forced out of engagement with the shaft and immediately springs away from the same due to the action of the spring 19 thus opening the valve 13 to its fullest extent. The pipe 20 is designed to permit the entrance either of steam or compressed air, the mechanism being adapted for actuation by either of these media. When the valve 13 is open the steam enters the cylinder 10 and causes the piston 11 to be forced in the direction indicated by the arrow, at the same time the whistle 21 sounds an alarm. The piston rod 12 is provided with a slot 12' and a roller 22 is journaled in one end thereof. The brake lever 23 passes through the slot 12' as is clearly shown in Fig. 10, and is secured to the brake valve rod 24. As the piston 11 is forced to the end of the cylinder the roller 22 engages the edge of the brake lever 23 and turns the latter, thereby opening the air-valve by means of the rod 24 and setting the brake. At the same time the steam or hot air also passes through the pipe 25 and into one end of the cylinder 26. It will be noted that Fig. 8 is drawn on a smaller scale than Fig. 7 and that ordinarily the throttle valve mechanism would be located above the brake mechanism instead of below it. The piston rod extending through both ends of the cylinder is provided with stuffing boxes of the

ordinary type. The two portions of the rod I have designated as 28 and 28'. The rod 28 is forked as shown in Fig. 9 and is provided with a roller 29 which is journaled between the forked ends. The throttle lever 30 is pivoted on the frame 31 and is provided with the usual slotted arc 32 for holding the lever in its various positions. The locking mechanism for the lever consists of the hand lever 33 which is pivoted at 34 upon the throttle lever 30 and is connected by means of the pivot link 35 to a sliding locking member 35' arranged to enter one of the slots 37 in the arc. The lever 33 is provided with an extension 36 which is slotted for permitting the passage of the throttle, thus providing a construction in which the locking lever virtually straddles the throttle lever. The extension 36 enters the slot in the forked lever 28 and is arranged to be engaged by the roller 29 when the rod 28 is moved. The throttle valve stem 38 is provided with a roller 39 arranged to play in a slot 40 in the throttle lever 30. The rod 28' extends through the opposite end of the cylinder 26 and through a guide member 41 on the rear end of the cylinder which is provided with a spring 42. When the steam enters the pipe 25 the piston 27 moves the rod forward and the movement of the rod 28 causes the roller 29 to engage the extension 36 of the lever 33 thereby withdrawing the locking pin 35'. On a further movement of the rod 28 and the extension 36 engaged by its roller, the lever 30 will be moved thereby operating the valve stem 38 and closing the throttle.

It will be observed that the action of the two pistons 11 and 27 are practically simultaneous since the steam is admitted into the cylinder 10 and the cylinder 26 simultaneously by the opening of the valve 13. Now when the guide rod 43 which is attached to the piston 11 engages the upturned end 44 of the sliding valve stem 45 of the valve 46, the latter is opened thereby providing an exhaust 47 for the steam and thus bringing the piston 11 to a stop. Before this has happened, however, the arm 48 on the threaded enlargement 15 of the valve stem 14 in springing away from the hollow shaft *m* has engaged the spring contact 49 on the standard 17 and forced it away from its anvil thereby breaking the motor circuit, thus stopping the motor, and at the same time extinguishing the lamp 50 which is a danger signal lamp, that was caused to glow the moment current came to the motor. The brake actuating mechanism and the throttle valve operating mechanism are now in the positions shown in Figs. 11 and 12. The position of the throttle lever may be regulated by means of the adjustable stop members 51 attached to the piston 27 and arranged to engage the rear end of the cylinder 26. The

operation of the valve closing and brake setting mechanism as described causes the stopping of the train. In order to set the brake actuating devices I have provided the lever 52 which is pivoted at 53 to the link 54 which is in turn pivoted to an upright extension of the standard 17. The lever 52 is pivoted at its central part to the head 55 of the valve stem 14 so that when the lever is pushed inwardly in the direction indicated by the arrow in Fig. 11, the valve stem and its enlargement 15 may be moved toward the hollow shaft *m*. The latter is provided with a hand wheel 56 which may now be turned while pressure is applied to the lever 52. Thus the threaded enlargement 15 again engages the internally threaded shaft *m* through the turning of the hand wheel. The valve 13 may be again closed thereby shutting off the steam or compressed air.

The steam in the cylinder 26 may be released by means of a stop-cock 57, when the piston 27 will immediately be forced to the other end of the cylinder and the brake actuating mechanism and the throttle valve actuating mechanism will be restored to the normal position. The brake lever and the throttle lever will remain in their closed positions until moved again by the engineer. The mechanism which I have provided enables these parts to be freely moved under normal conditions without interference from or interference with the automatic safety devices heretofore described, but it will be seen that these devices will be actuated in the manner described when two trains approach each other in the same block.

In Fig. 4 I have shown means by which the trolley wires may be placed out of danger of injury at the crossing of two tracks. These means consist in the provision of a metal tube preferably of iron which may be buried a suitable distance beneath the track and through which the trolley wire may be carried. The portion of the trolley wire in the track is, of course, preferably insulated.

It will be understood that the steam cylinders and the valve casings are provided with suitable stuffing boxes to prevent the loss of steam or compressed air.

I am aware that other modifications of the herein described apparatus based upon the same general idea might be made, but I consider as my own and desire to claim all such modifications as clearly fall within the spirit and scope of the invention.

I claim:

1. In a block signaling system, a track provided with insulated trolley sections on each side thereof constituting blocks, in combination with engines, each provided with a generator and a motor, a valve controlled by said motor, means for automatically disconnecting said valve from said

motor while the latter is being operated and means for causing the operation of the motor of an engine by the current from the generator of an approaching engine in the same block.

2. In a block signaling system, a track provided with insulated trolley sections on each side thereof constituting blocks, in combination with engines each provided with a generator and a motor, a valve operated by the shaft of said motor, means for disconnecting said valve from said motor shaft throttle lever operating mechanism, brake setting mechanism controlled simultaneously by said valve and means for stopping said motor after the actuation of said valve.

3. In a block signaling system, an engine provided with a dynamo and a motor, a valve, a valve stem arranged to be engaged by the shaft of said motor to open said valve, a pair of cylinders controlled by said valve, a piston in said cylinders provided with piston rods, a brake lever controlled by one of the piston rods and a throttle lever controlled by the other of said piston rods.

4. In a block signaling system, a track, a series of insulated trolley sections on each side thereof, in combination with engines each provided with a dynamo and a motor, the latter having a hollow shaft, a valve stem extending through said hollow shaft

and provided with a threaded enlargement arranged to engage said shaft for longitudinal movement thereof, means for actuating the motor by current from the dynamo of an approaching engine in the same block, a pair of cylinders provided with pistons arranged to be actuated through the opening of said valve, a throttle lever normally locked and adapted to be unlocked and to be moved by the piston rod of one of said pistons, a brake lever arranged to be moved by the piston rod of the other piston, and an exhaust valve for the brake operating cylinder arranged to be opened after the cylinder has completed its stroke.

5. In a block signaling system, an engine provided with a throttle lever and a brake lever, a motor having a hollow threaded shaft, a valve stem arranged to project through said hollow shaft and provided with a threaded enlargement adapted to engage said shaft, an arm on said enlargement, a spring surrounding one end of said valve stem and arranged to bear on the head thereof, a standard for said valve stem, and a circuit breaker mounted on said guide stem and arranged to be actuated by the arm on said enlargement.

JOHN DAY NIX.

Witnesses:

JOHN DALE,
SAM FRESHMAN.