M. CONRAD & W. G. KELLY.

TRAIN STOPPING MECHANISM FOR BLOCK SIGNALING SYSTEMS.

APPLICATION FILED APR. 11, 1911.

1,031,672. Patented July 2, 1912.

2 SHEETS—SHEET 1.

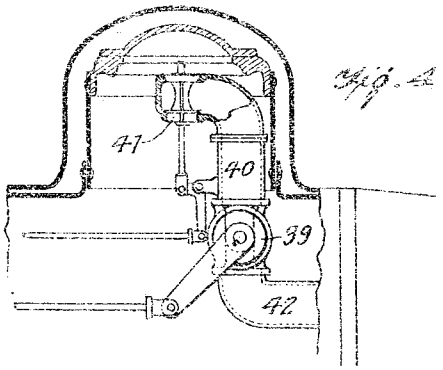


Fig. 4.

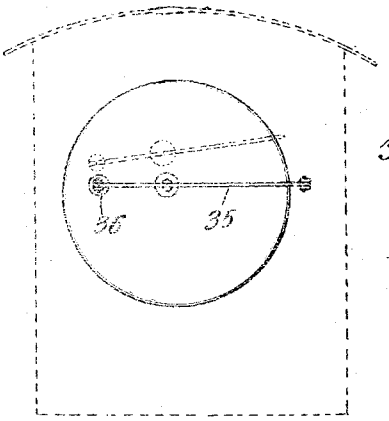


Fig. 1.

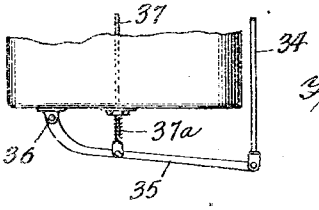
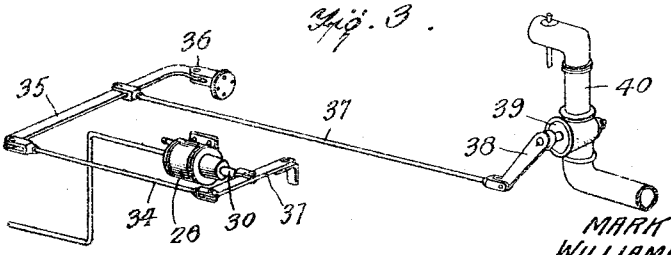


Fig. 2.

Fig. 3.



WITNESSES

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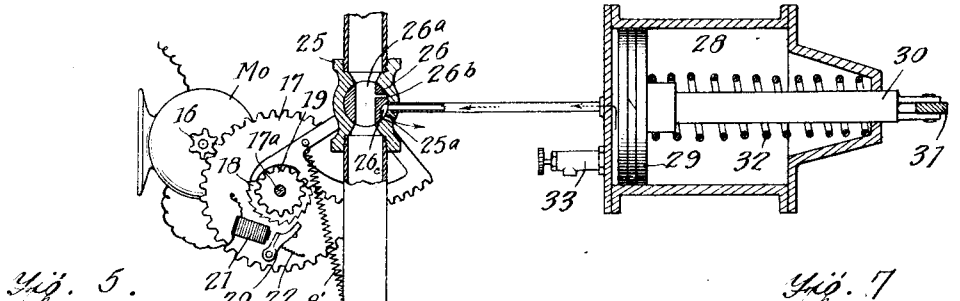

Fig. 5.

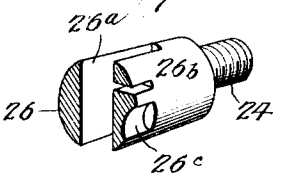

Fig. 7.

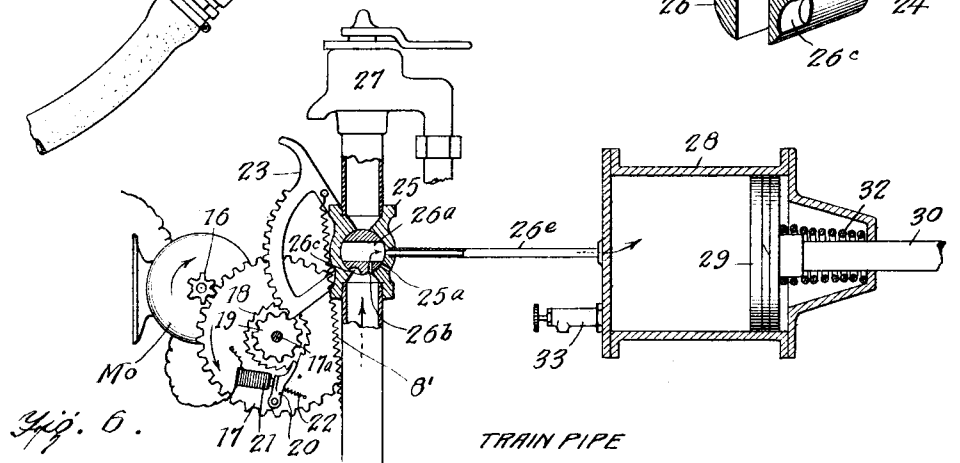

Fig. 6.

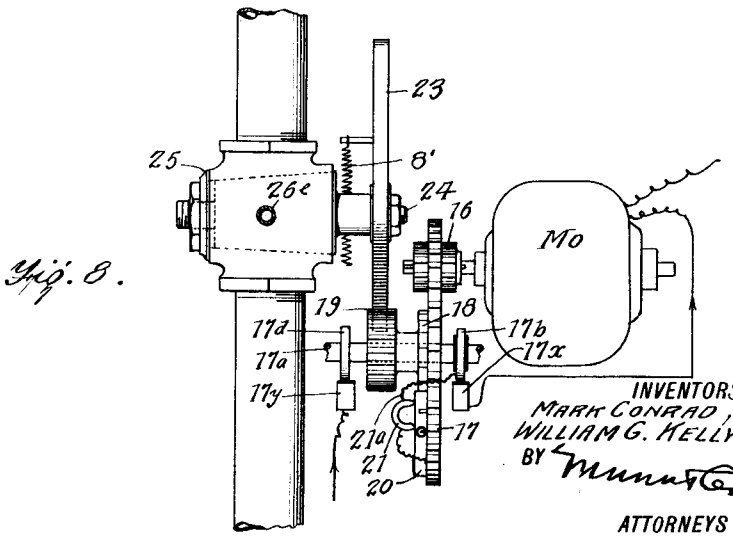

Fig. 8.

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UNITED STATES PATENT OFFICE.

MARK CONRAD, OF ADRIAN, MICHIGAN, AND WILLIAM G. KELLY, OF WINSLOW, ARIZONA.

TRAIN-STOPPING MECHANISM FOR BLOCK-SIGNALING SYSTEMS.

1,031,672. Specification of Letters Patent. Patented July 2, 1912.

Original application filed September 2, 1910, Serial No. 580,159. Divided and this application filed April 11, 1911. Serial No. 620,269.

To all whom it may concern:

Be it known that we, MARK CONRAD, a citizen of the United States, and a resident of Adrian, in the county of Lenawee and State of Michigan, and WILLIAM G. KELLY, a citizen of the United States, and a resident of Winslow, in the county of Navajo and State of Arizona, have made certain new and useful Improvements in Train-Stopping Mechanism for Block-Signaling Systems, of which the following is a specification.

Our invention relates to improvements in devices for stopping trains, and is designed to be used on those trains whose movements are controlled by electric block signaling systems, and it consists in the combinations, arrangements and constructions herein described and claimed.

The apparatus set forth in the present application was disclosed in a prior application, Serial Number 580,159, filed September 2, 1910, the present case being a divisional application.

An object of our invention is to provide means by which the on-coming train may be automatically stopped if the block is not clear.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

Our invention is illustrated in the accompanying drawings forming part of this application, in which similar reference characters indicate like parts in the several views, and in which—

Figure 1 is a rear view of the boiler in an engine showing the automatic throttle actuating lever, Fig. 2 is a plan view of the lever and a portion of the boiler shown in Fig. 8, Fig. 3 is a perspective view showing the cylinder for operating the automatic throttle lever, together with the valve in the steam pipe, Fig. 4 is a section through the steam dome showing the stand pipe and the automatic valve therein, Fig. 5 is a side view partly in section showing the operating mechanism for the train line cut-out cock and the air cylinder controlled thereby, Fig. 6 is a similar view showing the cut-out cock in a shifted position and the piston of the air cylinder in its forward position, Fig. 7 is a perspective view showing a fragmentary portion of the cut-out cock, and Fig. 8 is an enlarged side view showing the actuating mechanism for the cut-out cock.

The train stopping mechanism which forms the subject of the present application is designed to work in connection with the electric block signaling system set forth in our prior application #580,159 above referred to.

The engine is provided with a motor which is actuated by means of a local battery (not shown) when the circuits leading from the battery are closed. The means by which these circuits are closed is treated in another application, the present application being confined to the mechanism for stopping the train when the local circuit is closed.

Referring now to Figs. 5, 6, 7 and 8, M^o denotes the motor just referred to. On the shaft of the motor M^o is a gear 16, which meshes with a larger gear 17 on a shaft 17^a. A ratchet wheel 18 is loosely mounted on the shaft 17^a and has connected with it an integral gear 19. Pivotally secured to the gear 17 is a pawl 20, a portion of which constitutes an armature for a magnet 21, which is carried by the gear 17 on one side thereof. Mounted on the shaft 17^a, but insulated therefrom by suitable insulation, is the contact ring 17^b. This ring is adapted to be engaged by the brush 17^x (as shown in Fig. 8) which may be carried by any convenient portion of the frame of the device. At the opposite end of the shaft 17^a is a ring 17^d, which is in electrical communication with the shaft, and which is engaged by a brush 17^y, similar to the brush 17^x. As will be seen from Fig. 8, the motor M^o and the magnet 21 are connected up in series, the ring 17^b being connected with the magnet by means of the conductor 21^a. The pawl 20 is arranged to engage the teeth on the ratchet wheel 18, when the magnet 20 is actuated, but is normally held by means of a spring 22 out of engagement with the teeth. The teeth 19 are arranged to engage a segment 23, which is pivotally mounted on a shaft 24, as shown in Fig. 8. This shaft 24 extends into a casing 25 bearing a cut-out 26. The latter is provided with a central passage 26^a for permitting the air of the train pipe to have access to the engineer's brake valve 27 (see Fig. 6). This cut-out valve is

also provided with a passage 26^b at right angles to the passage 26^a (see Figs. 5 and 7.) It will be noticed that on one side of the cut-out cock there is a recess 26^c. This recess being for a purpose hereinafter described. Connected with the valve casing 25 is a pipe which communicates with the interior of a cylinder 28. The latter contains a piston 29 having connected with it a piston rod 30 for operating the throttle lever 31. The piston is held normally at one end of the cylinder by means of a spring 32. At 33, we have shown an automatic release valve, which will permit air in the cylinder 28 to escape when the pressure is over a certain amount.

In Fig. 3, we have shown the lever 31, which is connected with the piston rod 30. This lever is connected by a link 34 to the end of a lever 35, which is pivotally mounted at 36 on the boiler head. The lever 35 in turn is connected by means of a link 37 to an arm 38, which controls the throttle valve 39. The latter is disposed in the stand pipe 40.

In Fig. 4, we have shown the valve 39 as being between the engineer's throttle valve 41 and the dry pipe 42 which forms a continuation of the stand pipe 40. The purpose of disposing the valve 39 in this position is to cut off the control of the engine from the engineer so as to render the stoppage of the train absolutely automatic.

From the foregoing description of the various parts of the device the operation thereof may be readily understood.

When the train reaches certain sections of the track, current is supplied to the motor as stated above. The actuation of the motor M^o turns the gear 16 (see Fig. 5) thereby driving the gear 17. Since the magnet 21, carried by the gear 17, has pulled the pawl into engagement with the ratchet wheel 18, the latter turns the gear 19 and the segment 21 is shifted from the position shown in Fig. 5 to that shown in Fig. 6. In Fig. 5, the cut-out cock is shown turned in a position so as to give the air from the train pipe access to the brake valve, but the movement of the segment 21 into the position shown in Fig. 6 turns the cut-out cock, so as to cut off the air from the engineer's brake valve, and to permit the entrance of air into the cylinder 28 by means of the small inlet 26^b and the passage 26^a, which now register with the pipe 26^e, leading to the cylinder 28. The air being admitted to the cylinder 28 forces the piston 29 to the end of the cylinder against the tension of the spring 32. The movement of the piston rod 30, as heretofore explained, in connection with Fig. 3, causes a rotation of the valve 39, thereby cutting off the steam from the dry pipe, leading to the cylinders. As the air continues to come into the interior of the cylinder 28 through the pipe 26^e, the pressure rises and the relief valve 33 now opens the cylinder to the atmosphere, thereby permitting the train pipe to be drained enough so as to set the brakes. The release valve 33 may be gaged so as to gradually apply the air, thus permitting the brakes to set gradually and preventing accidents. As long as the circuit through the motor M^o is kept closed, the motor will revolve and the gear wheel 19 will tend to shift the segment upwardly, but the segment passes off from the gear, and thereby the gear revolves idly underneath the segment. As soon as the engine is stopped, the engineer brings the switch handle t into a neutral position, thereby breaking the circuit of the motor M^o. The retraction of the pawl 20 (see Fig. 6) allows the spring 81 to pull the segment downwardly, thereby rotating the cut-out cock into its original position, shown in Fig. 5. This brings the recess 26 in registration with the pipe 26^e and permits the air within the cylinder 28 to exhaust through the opening 25^a in the casing 25. The spring 32 pushes the piston to its original position and the throttle valve 39 is opened, the spring 37^a (see Fig. 2) on the rod 37 assisting the spring 32 in shifting the throttle 39 to its open position.

We claim:

1. In a train stopping mechanism, the combination with a brake valve, throttle lever and train pipe, of a branch pipe establishing communication between said train pipe and said brake valve, a cut-out valve in said branch pipe for cutting off or admitting air to said brake valve, means controlled by said cut-out valve for operating the throttle lever, and electrical means for operating said cut-out valve.

2. In a train stopping mechanism, the combination with the brake valve, throttle lever and train pipe, of a branch pipe establishing communication between said train pipe and said brake valve, a cut-out valve in said branch pipe, a cylinder, a pipe connecting said cylinder with said branch pipe, a piston in said cylinder, connections between said piston and said throttle lever, and electrical means for operating said cut-out valve, the movement of said cut-out valve serving to admit air to, or cut off air from said brake valve and said cylinder.

3. In a train stopping mechanism, the combination with the brake valve, throttle lever and train pipe, of a branch pipe establishing communication between said train pipe and said brake valve, a cut-out valve in said branch pipe, a cylinder, a pipe connecting said cylinder with said branch pipe, a piston in said cylinder, connections between said piston and said throttle lever, and electrical means for operating said cut-out valve, said means comprising an electric motor, a train of gears connected therewith, and a segment connected with said cut-out

valve, and arranged to mesh with one of said gears, the operation of said cut-out valve serving to admit air to, or cut off air from said brake valve and said cylinder.

4. The combination with a train pipe, brake valve and throttle lever, of a branch pipe between said train pipe and said brake valve, a valve casing carried by said branch pipe, a cylinder, a piston therein, connections between said piston and said throttle lever, a pipe establishing communication between said cylinder and said valve casing, and a three-way cut-out valve disposed within said valve casing, said three-way cut-out valve serving to establish communication between the train pipe and the brake valve, and simultaneously to connect the pipe leading from the cylinder with the outer atmosphere, when in one position, and to shut off communication between the train pipe and the brake valve, and simultaneously to establish communication between the train pipe and the cylinder, in another position.

5. The combination with the train pipe, brake valve, and throttle lever, of a branch pipe connecting said train pipe with said brake valve, a valve casing disposed in said branch pipe, a cylinder, a piston within said cylinder, connections between said piston and said throttle lever for operating the latter, a pipe establishing communication between said cylinder and said valve casing, a cut-out valve within said valve casing for controlling the admission of air from the train pipe to said brake valve and said cylinder, and means for operating said cut-out valve, said means comprising a motor, a gear on the axle of said motor, an auxiliary shaft, a gear on said auxiliary shaft in mesh with said first named gear, a pawl carried by the last named gear, a ratchet loosely mounted on said auxiliary shaft, and arranged to be engaged by said pawl, a gear integral with said ratchet and a toothed segment mounted on the stem of said cut-out valve and arranged to be driven by said last named gear.

6. In a train stopping mechanism, the combination with a train pipe, brake valve and throttle lever, of pneumatic means connected with said train pipe for operating said throttle lever, said pneumatic means including a cut-off valve, and means for operating said cut-off valve, said means including a motor, a train of gears between said motor and said cut-off valve, a magnet in series with said motor for controlling the train of gears, and means for actuating said magnet.

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WILLIAM G. KELLY.

Witnesses to the signature of Mark Conrad:
CLARKE E. BALDWIN,
VERD E. SNYDER.

Witnesses to signature of Wm. G. Kelly:
W. P. GEARY,
W. H. BURBAGE.