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C. A. HOWARD & H. V. COES.

SAFETY APPLIANCE FOR STEAM LOCOMOTIVES.

APPLICATION FILED MAY 21, 1907.

2 SHEETS—SHEET 1.

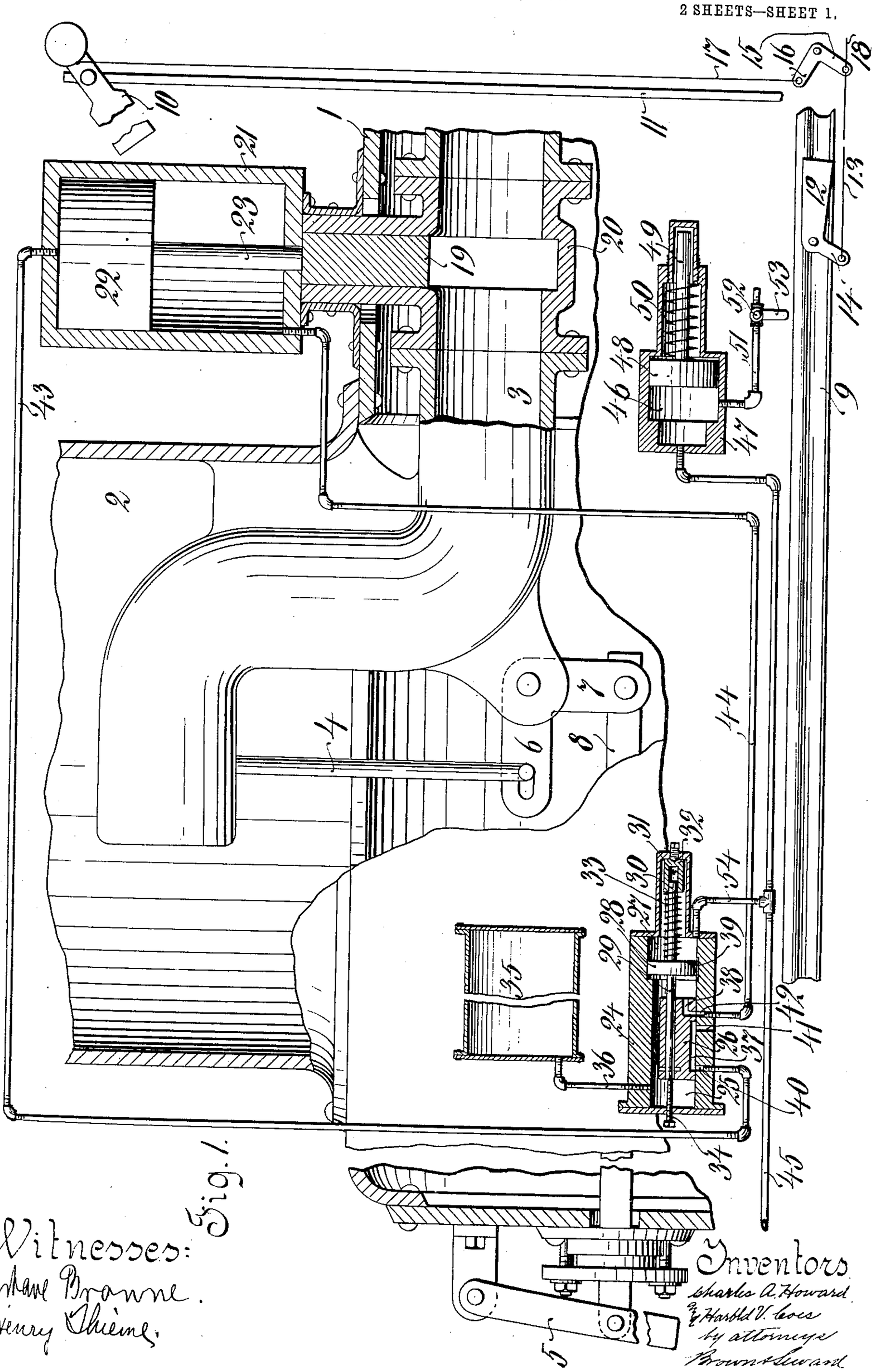

Fig. 1.

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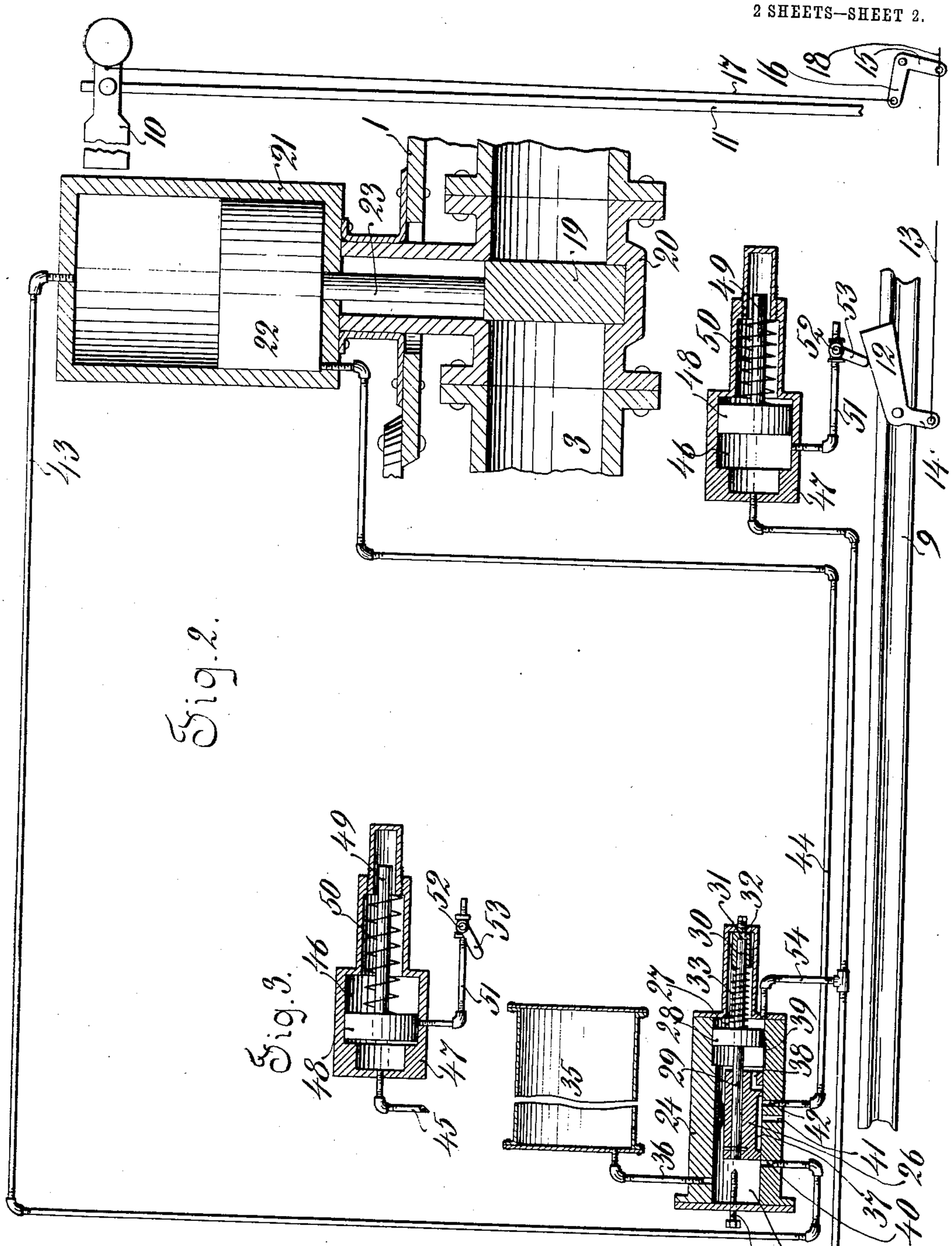

Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES A. HOWARD AND HAROLD V. COES, OF NEW YORK, N. Y.

SAFETY APPLIANCE FOR STEAM-LOCOMOTIVES.

No. 879,467. Specification of Letters Patent. Patented Feb. 18, 1908.

Application filed May 21, 1907. Serial No. 374,874.

To all whom it may concern:

Be it known that we, CHARLES A. HOWARD and HAROLD V. COES, citizens of the United States, and residents of the borough of Manhattan, in the city and State of New York, have invented a new and useful Safety Appliance for Steam-Locomotives, of which the following is a specification.

The object of our invention is to provide means controlled by a visible signal for automatically shutting off the power in a passing locomotive independent of the engineer, said means being beyond the control of said engineer.

A practical embodiment of our invention is represented in the accompanying drawings, in which

Figure 1 represents diagrammatically in detail section and elevation so much of a locomotive, its track and visible signal as will give a clear understanding of the present improvement, the parts being in the position which they assume when the visible signal at the side of the track is set at "safety", Fig. 2 is a similar view with the parts of the locomotive removed showing the position which the parts assume as the locomotive is passing a visible signal set at "danger", and Fig. 3 is a detail section of the device for automatically closing the train air pipe outlet when the pressure is reduced to a predetermined point.

In the accompanying drawings, the locomotive boiler is denoted by 1, the steam dome by 2 and the steam pipe by 3.

The stem of the throttle valve is denoted by 4 and it is connected to the throttle valve lever 5 within the locomotive cab through the usual bell crank lever 6, 7, and longitudinal rod 8.

The track is denoted by 9 and adjacent to the same is shown a visible signal 10 mounted to swing on a suitable support 11. A tripping lever is suitably mounted at the side of the track 9, one arm 12 of the said lever being arranged to be swung above and below the track by the movement of a rod 13 connected at one end to the depending arm 14 of said lever and at its other end to one arm 15 of the visible signal operating lever 15, 16. The arm 16 of said signal operating lever is connected to the signal by a rod 17. This lever 15, 16, is operated in any suitable manner by a rod 18.

A gate valve 19 is located in the steam pipe 3, the housing 20 for which is surmounted by a cylinder 21. A piston 22 is fitted to move in said cylinder and is secured to move with the valve 19 through the rod 23.

An automatic controlling device for the gate valve 19 comprises a valve chest 24 having a chamber 25 therein in which is located a slide valve 26. This valve chest 24 is further provided with a piston chamber 27 in which a piston 28 is fitted to slide. A rod 29 extends forwardly from said piston 28, to which rod the slide valve 26 is fixed. This piston 28 is further provided with a rearwardly extended rod 30, the end of which is fitted to slide in a guide 31 within a rearward extension 32 of the valve chest. A spring 33 surrounds the piston rod 30 and tends to hold the piston and slide valve at the limit of their forward movement. This forward limit is determined by a set screw 34. An air reservoir 35 is in open communication with the valve chamber 25 through a pipe 36. The valve 26 is provided with a bridge port 37 in its face and a through port 38 leading from its face to the interior of the chamber 25. A small bridge port 39 is provided in the wall of the piston chamber 27 serving as a communication between the valve chamber 25 and the piston chamber 27, back of the piston 28 when the piston is at the limit of its forward movement.

The valve chest 24 is provided with three ports 40, 41, 42, the port 40 being in open communication with the interior of the cylinder 21 above the piston 22 through a pipe 43 and the port 42 being in open communication with the interior of the said cylinder 21 beneath the piston 22 through a pipe 44. The intermediate port 41 leads to atmosphere. The train air pipe is denoted by 45 and it opens into the end of the piston chamber 46 within the cylinder 47 of the air escape device in front of the piston 48. This piston 48 is provided with a rearwardly extended rod 49. A spring 50 surrounds the piston rod and tends to hold the piston 48 at the limit of its forward movement. An outlet pipe 51 leads from the chamber 46 at a point spaced from the front end of the said chamber, which pipe has an emergency valve 52 therein. When the handle 53 of this emergency valve is projecting vertically downward, the valve is closed and when swung away from its vertical position the valve is opened. This handle is arranged in the same vertical plane as the arm 12 of the lever 12, 14, so that when the arm 12 is raised, it will

engage the handle 53 and open the valve 52. This main air pipe 45 is in open communication with the piston chamber 27 at the rear of the piston 28 through a pipe 54.

In operation: When the train is running, the pressure in the train air pipe 45 will be sufficient to hold the piston 28 and thereby the slide 26 at the limit of their forward movement thus opening the top of the piston 22 of the steam pipe valve 19 to atmosphere through the pipe 43, bridge port 37 and ports 40, 41. At the same time, the air pressure within the train pipe which has passed through the bridge port 39 will pass through the pipe 44 into the cylinder 21 below the piston 22 thus holding the piston and thereby the valve in its open position. At the same time the reservoir 35 is also filled with the train pipe pressure. The train pipe pressure will also hold the piston 48 at the limit of its rearward movement against the tension of its spring 50. If the handle 53 of the emergency valve 52 be swung by its engagement with the arm 12 when the arm 12 is raised by the moving of the visible signal to "danger"; the emergency valve 52 will be immediately opened and the pressure in the train pipe will fall to such a point that the pressure within the reservoir 35 will move the piston 28 and thereby the slide valve 26 rearwardly. This rearward movement of the slide valve will open the under side of the piston 22 of the steam pipe valve to atmosphere through the pipe 44, bridge port 37 and ports 41, 42, and open the interior of the reservoir 35 to the top of the piston 22 through the pipe 36, chamber 25 port 40 and pipe 43. This arrangement will close the valve 19 thus shutting off the motive power from the locomotive. To prevent too great a reduction of pressure in the train pipe and consequent waste of air, owing to the opening of the emergency valve 52, the spring 50 is made of sufficient strength to move the piston 48 forwardly into position to close the escape of air through the pipe 51 when a predetermined lower pressure than that originally carried in the train pipe has been reached. This last device saves the necessity of raising the pressure in the entire system from atmosphere all the way up to the necessary train pipe pressure every time the device is operated. The handle 53 will stay in any position in which it is swung and it is therefore necessary that the train shall be stopped sufficiently long to permit the engineer to swing the handle 53 back into its vertical position. It will be seen that this device is entirely independent of the throttle control and is also entirely beyond the control of the engineer.

What we claim is:—

1. In a steam locomotive, its steam pipe and air pipe and a valve in the steam pipe automatically opened and closed by predetermined variations in the air pipe pressure.

2. In a steam locomotive, its steam pipe and air pipe, a valve in the steam pipe automatically opened and closed by predetermined variations in the air pipe pressure and an automatic device for preventing the reduction of air pipe pressure below a predetermined point.

3. In a steam locomotive, its steam pipe and air pipe, a pressure controlled steam pipe valve opened and closed by predetermined variations in the air pipe pressure and an emergency valve in the air pipe arranged to be opened by the locomotive passing an abutment for causing the steam pipe valve to close by the predetermined reduction in the air pipe pressure.

4. In a steam locomotive, its steam pipe and air pipe, a pressure controlled steam pipe valve opened and closed by predetermined variations in the air pipe pressure, an emergency valve in the air pipe arranged to be opened by the locomotive passing an abutment for causing the steam pipe valve to close by the predetermined reduction in air pipe pressure and an automatic device for preventing the reduction of air pipe pressure below a predetermined point.

5. In a steam locomotive, its steam pipe, air pipe and throttle valve control and a pressure controlled valve for automatically closing and opening the steam pipe independently of the throttle valve control, said pressure controlled valve being closed by a predetermined reduction in air pipe pressure and opened by a predetermined increase in the air pipe pressure.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two witnesses, this thirtieth day of April 1907.

CHARLES A. HOWARD.
HAROLD V. COES.

Witnesses:
F. GEORGE BARRY.
HENRY THIÈME.