(No Model.)

A. J. McGEHEE.

PNEUMATIC SIGNALING SYSTEM.

No. 569,120. Patented Oct. 6, 1896.

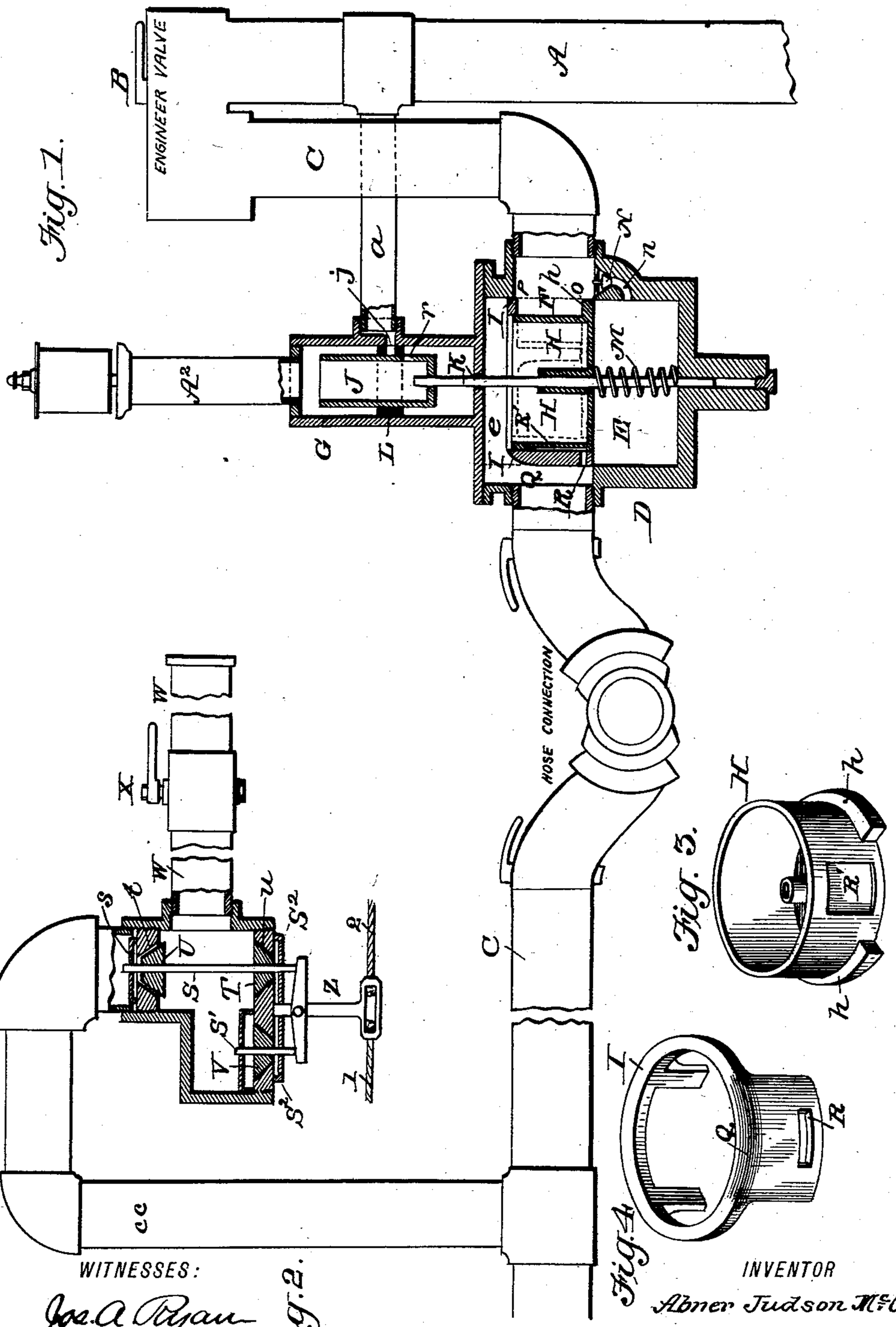

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

INVENTOR
Abner Judson McGehee
BY Munn & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ABNER JUDSON McGEHEE, OF JACKSON, TENNESSEE.

PNEUMATIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 569,120, dated October 6, 1896.

Application filed October 24, 1895. Serial No. 566,764. (No model.)

To all whom it may concern:

Be it known that I, ABNER JUDSON McGEHEE, of Jackson, in the county of Madison and State of Tennessee, have invented a new and useful Improvement in Pneumatic Railway-Train Signaling Systems, of which the following is a specification.

The purpose of this invention is to provide simple, cheap, and reliable means whereby a pneumatic or whistle signal may be transmitted by the conductor from any part of a train to the engineer on the engine by using the air-brake pipe as the channel through which said signals are transmitted without interfering with or operating the brakes.

By means of this invention a separate system of train pipe and hose connections is dispensed with, and also the extra reservoir, extra coils of pipe, and complicated extra valves that have been devised by some in the effort to accomplish this purpose.

My invention consists of a "conductor's" release-valve located on the cars, in which is combined in one both the brake-operating valve and the signal-valve, so constructed that a limited volume of air may be discharged by the signal-valve to operate a whistle on the engine without applying the brakes.

It also comprises a signal-valve, located on the engine, having two chambers, one of which chambers is placed in the air-brake pipe of the train between the engineer's valve and the train, and the other of which chambers is adapted to be put in communication with the main-reservoir pipe between the engineer's valve and the main reservoir, so that the air employed to sound the whistle is taken directly from the main reservoir, said valve being so constructed in its brake-pipe connection or lower chamber that when a slight reduction of pressure is made in the brake-pipe on the cars (but not enough to set the brakes) it will move upward and open a port, letting the air flow from the main reservoir to the whistle, but when the engineer discharges and recharges the brake-pipe the said valve in both instances moves downward and allows the air to flow freely through it, yet keeping the port in the whistle-valve closed, so that no signal is given. Under this arrangement the small amount of air taken from the brake-pipe to move the valve is at once restored through the engineer's valve, and that taken from the main reservoir to sound the whistle does not drain the brake-pipe and is restored by the pump.

Figure 1 is a sectional view of the double-acting valve located on the engine. Fig. 2 is a sectional view of the double-acting valve located on the train and under the control of the conductor, and Figs. 3 and 4 are detached views in perspective of parts of the double-acting valve on the engine.

Referring to Fig. 1, showing the valve located on the engine, A is the pipe from the main reservoir to engineer's valve; B, the engineer's valve; C, the air-brake pipe leading to the train; D, my signal-valve case, (shown in section,) in which E is the lower chamber; *e*, the upper chamber; F, a concentric annular chamber; H, the operating-valve; I, a fixed ring held on the case. M is a spring, and N a gravity valve. On the top of case D is the chamber G, having the stationary ring L with port *j*, and the valve J with port *r*, and *a* is the pipe from main-reservoir pipe A to chamber G, and A^2 the pipe to whistle.

The conductor's valve, Fig. 2, is located on the car and is a double-service valve, in which V is the brake-valve and T U the signal-valve, connected together on a common stem; S, S′, and S^2 the valve-stem guides; W, a pipe extending from the valve-chamber, closed at its end and forming a supplementary air-chamber. X is a stop-cock, and Z a T-shaped handle, by which the valves are operated, one arm resting beneath stem of brake-valve V and the other arm beneath stem of signal-valve T U. 1 is the brake-valve cord, and 2 the signal-valve cord.

Fig. 3 is a perspective view of valve H, and Fig. 4 a similar view of the stationary ring I, showing the two guide-legs within which the valve slides, and the extension bearing port R. These two parts H and I, placed together, form the circular chamber F indicated by the dotted line from P to O in Fig. 1. The ring I, which is keyed fixedly in place, has in the downward extension a port R, and this extension interrupts the chamber F, so that the latter is not a complete circle. Just opposite this extension with port R there is in

valve H a recess R′, which at times serves to connect port R with chamber E below the valve.

In operation, when the conductor pulls the cord 2, the valve U is forced upward and opens port *u*, leading to the outer air, and closes port *t* of the air-brake pipe *c c*, (which is normally open.) Then all the air escapes from the valve-chamber and pipe W, and when he releases the cord port *t* opens again and port *u* closes, so that the chamber and pipe W are recharged from the train-air-brake pipe *c c*, thus reducing the pressure therein suddenly by a definite amount, sufficient to cause valve H of Fig. 1 to rise, but not to move the brake. When the conductor pulls the cord 1, valve V is held open as long as desired, and air being continuously discharged from air-brake pipe a reduction of pressure is made therein sufficient to cause an emergency application of the brakes in the the well-known way.

In very long trains it will require the discharge of a greater volume of air to operate valve H than it will in average ones. For this reason I put the stop-cock X in the supplementary air-chamber pipe W at such a distance from the valve that the amount of air chambered therein will reduce the pressure enough to signal in the average length of train, but when the length of train is largely increased then the cock X may be opened and the volume of air discharged by the signal-valve will be increased accordingly, thus making the supplementary air-chamber adjustable to the size of the train.

Now, referring to Fig. 1, a reduction of pressure made as above in the train-pipe will reduce the pressure in chamber *e*, so that valve H will move upward till its bottom *h* rises above port R, and the air then flows under the edge O of valve H into chamber E and through port R till the pressure is restored in train-pipe; but when the valve H thus rises its rigid stem K, with valve J, is carried upward until port *r* in said valve registers with port *j*, and thus the air from main reservoir is allowed to escape to and sound the whistle. The air taken from train-pipe is restored through the engineer's valve at once, except when it is blanked. Then the signal is made all the same, but the reduction is not restored till the engineer's valve is moved off the lap; but it is not desired that the whistle shall sound except when the reduction of pressure is made from the train, nor when the engineer discharges or recharges the train-pipe. So when the engineer's valve is opened to set the brakes the pressure is reduced in chamber F, but it is also reduced in chamber E below what it is in chamber *e* by the opening of valve N and port *n*, so that then the valve H moves downward and the air passes through port Q, chamber *e*, and through the opening formed at P between the top of valve H and ring I. Valve J moves downward too, but does not open the port *r*, and no signal is made.

When the engineer recharges the train-pipe to release the brakes, valve N stays closed and the pressure is increased in chamber F, made by flange *h* and ring I, which forces valve H downward. Port R opens into recess R′, and thence into chamber E, to let the air out from chamber E, and the opening at P is formed again between valve H and ring I and lets the air flow through it, the chamber *e*, and port Q to train-pipe, but does not sound the whistle, as port *r* is kept closed, as in the instance of discharging the pipe.

From the foregoing it will be observed that these valves will work on any brake system without requiring any change of any of the brake mechanism or valves or in any manner interfering with them.

While I prefer the shapes and arrangements shown in the drawings, I do not limit myself to them, as various modifications of my valves might be made without departing from my invention.

The advantages of my invention are as follows: All extra train-pipes and hose connections and conductor's brake-valve on car are dispensed with. Conductor's valve is adjustable to length of train. Air to blow the whistle is taken from main reservoir back of engineer's valve. Hence no signal-reservoir is needed, nor no valve-locking nor antirebound devices are necessary. It requires no change to be made in any brake system. It is simple, sure, and cheap.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the air-brake pipe and its engineer's valve; of a conductor's release-valve arranged in the train-pipe and comprising a valve opening to the outer air to discharge air for applying the brakes, a supplementary air-chamber, and a double-acting signal-valve arranged to close the connection of the main air-pipe and discharge the supplementary air-chamber, a single lever operating both the brake and signal valve and a valve and whistle located on the engine, said valve being constructed to admit air to the whistle to sound a signal when a limited reduction of air-pressure is made in the train-pipe, and to permit free passage of air through it without sounding the whistle when applying or removing the brakes substantially as and for the purpose described.

2. The combination with the air-brake pipe, and its engineer's valve; of a conductor's release-valve arranged in the train-pipe and comprising a valve opening to the outer air to discharge air for applying the brakes, a supplementary air-chamber with means for adjusting its capacity and a double-acting signal-valve arranged to close the connection of the main air-pipe and to discharge the supplementary air-chamber, a single lever oper-

ating both the brake and signal valve and a valve and whistle located on the engine, said valve being constructed to admit air to the whistle to sound a signal when a limited reduction of air-pressure is made in the train-pipe, and to permit free passage of air through it without sounding the whistle when applying or removing the brakes substantially as and for the purpose described.

3. In a pneumatic signaling system, the combination with the train brake-pipe; of a double-service conductor's valve having in one valve construction both a brake-valve and a signal-valve, and an air-chamber, said signal-valve being arranged as described whereby when the signal-cord is pulled the air escapes from the air-chamber to the atmosphere and when the signal-cord is released the air-chamber is recharged from the brake-pipe, causing a sudden limited reduction in the train-pipe substantially as shown and described.

4. In a pneumatic signaling system the combination with the train brake-pipe; of a double-service "conductor's" valve having in one valve construction both a brake-valve and a signal-valve, and an adjustable air-chamber, said signal-valve being arranged as described whereby when the signal-cord is pulled the air escapes from the chamber to the atmosphere, and when the signal-cord is released the chamber is recharged from the brake-pipe, causing a sudden limited reduction in train-pipe substantially as shown and described.

5. The combination with the brake-pipe; of a double signal-valve located on the engine having one of its chambers lying in the brake-pipe and the other of its chambers connected to the main-reservoir pipe between the main reservoir and the engineer's valve and also to the whistle-pipe, and constructed substantially as described whereby when a limited reduction of pressure is made in the brake-pipe on the train one portion of said valve will move in a predetermined direction and will cause the other portion in the signal-chamber to also move in the same predetermined direction and discharge air to sound the whistle, but when the reduction of pressure is made on the engine by the engineer's valve to apply the brakes, and also when the brake-pipe is recharged by the engineer's valve to release the brakes, no signal will be given as set forth.

6. In a pneumatic signal system operating by a reduction of pressure in the air-brake pipe, the combination with said air-brake pipe; of a supplementary air-chamber constructed in the form of an extended pipe provided with a stop-cock or cut-off in its length to adjust its discharging capacity, and a double-acting signal-valve located at the junction of the supplementary air-chamber and the air-brake pipe and operating substantially as shown and described.

7. In a pneumatic signal system operating by a reduction of pressure in the air-brake pipe, the combination with said air-brake pipe; of the supplementary air-chamber W having stop-cock X, the brake-valve V, the double signal-valve T U connected together by the same stem, the T-shaped handle Z having its opposite arms resting against the two valve-stems, and operating-ropes for pulling this handle in opposite directions substantially as shown and described.

8. In a pneumatic signal system operating by a reduction of pressure in the air-brake pipe, the combination with the air-brake pipe, the engineer's valve, and the air-reservoir pipe; of a double valve having its upper chamber connected with a whistle and connected directly to the air-reservoir pipe and its lower chamber with the air-brake pipe, one portion of said valve playing in one valve-chamber and controlling the whistle-ports, and the other portion of the valve playing in the other valve-chamber but connected to the first-named portion and operating the same without interfering with the charging and discharging of the air-brake pipe substantially as shown and described.

9. In a pneumatic signal system operating by a reduction of air-pressure in the air-brake pipe of the train, the combination with the air-brake pipe and engineer's valve; of a whistle connected to the reservoir air-pipe between the reservoir and the engineer's valve, and a valve operating the whistle-port located in the air-brake pipe between the engineer's valve and the train-pipe substantially as shown and described.

10. The combination of valve-chamber D having subchambers E, F, *e* connecting with the air-brake pipe and having port *n* and valve N, the valve-chamber G communicating with the whistle and having a port leading to the air-reservoir, the signal-valve J with port *r*, and stem K and rigidly-attached valve H, stationary ring I with extension bearing port R, and the spring M substantially as and for the purpose described.

ABNER JUDSON McGEHEE.

Witnesses:
HERMON HAWKINS,
ROBERT A. ALLISON.