F. H. DUKESMITH.

AIR BRAKE TESTING APPARATUS.

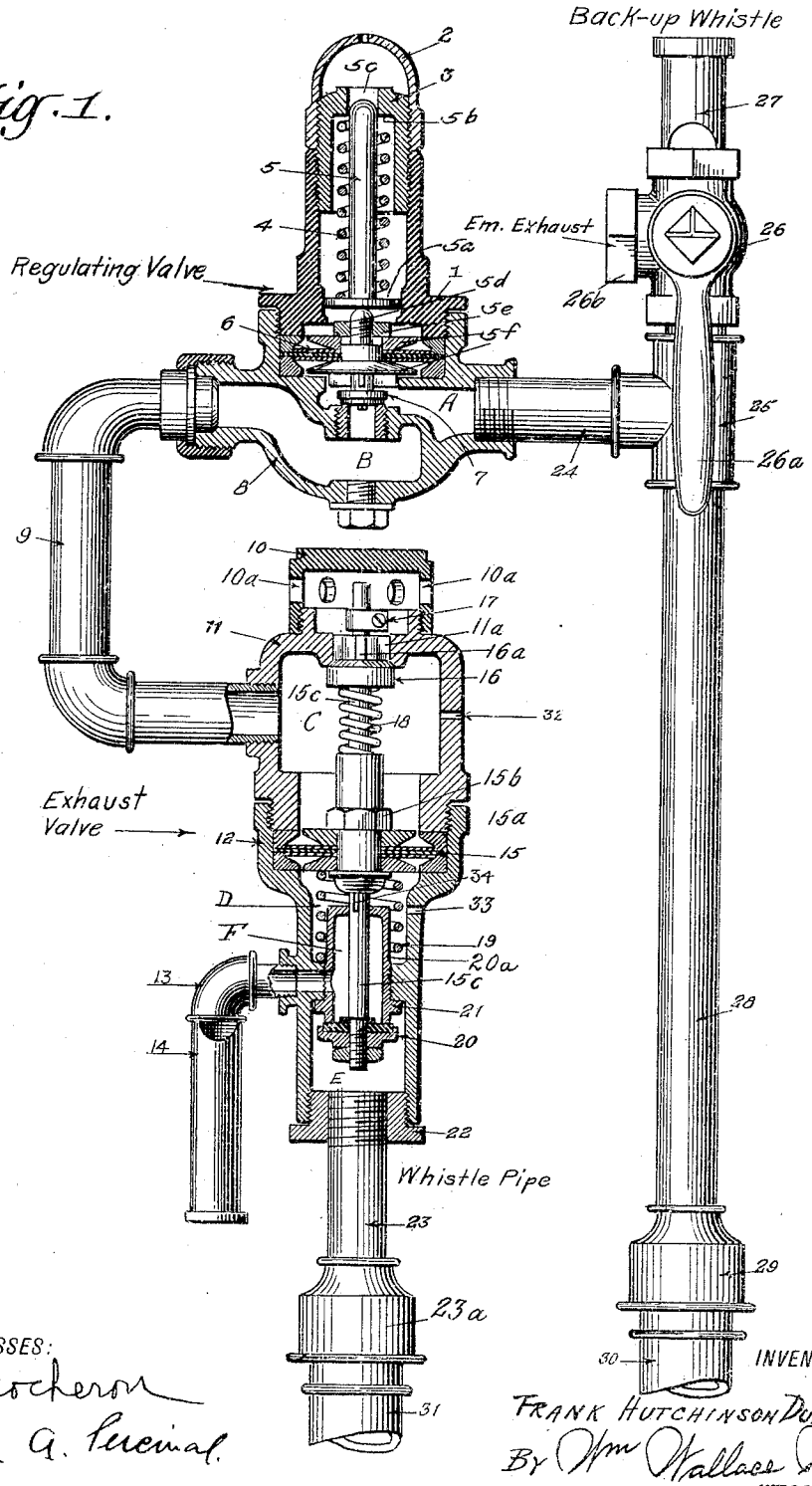
APPLICATION FILED JULY 9, 1909.

959,123.

Patented May 24, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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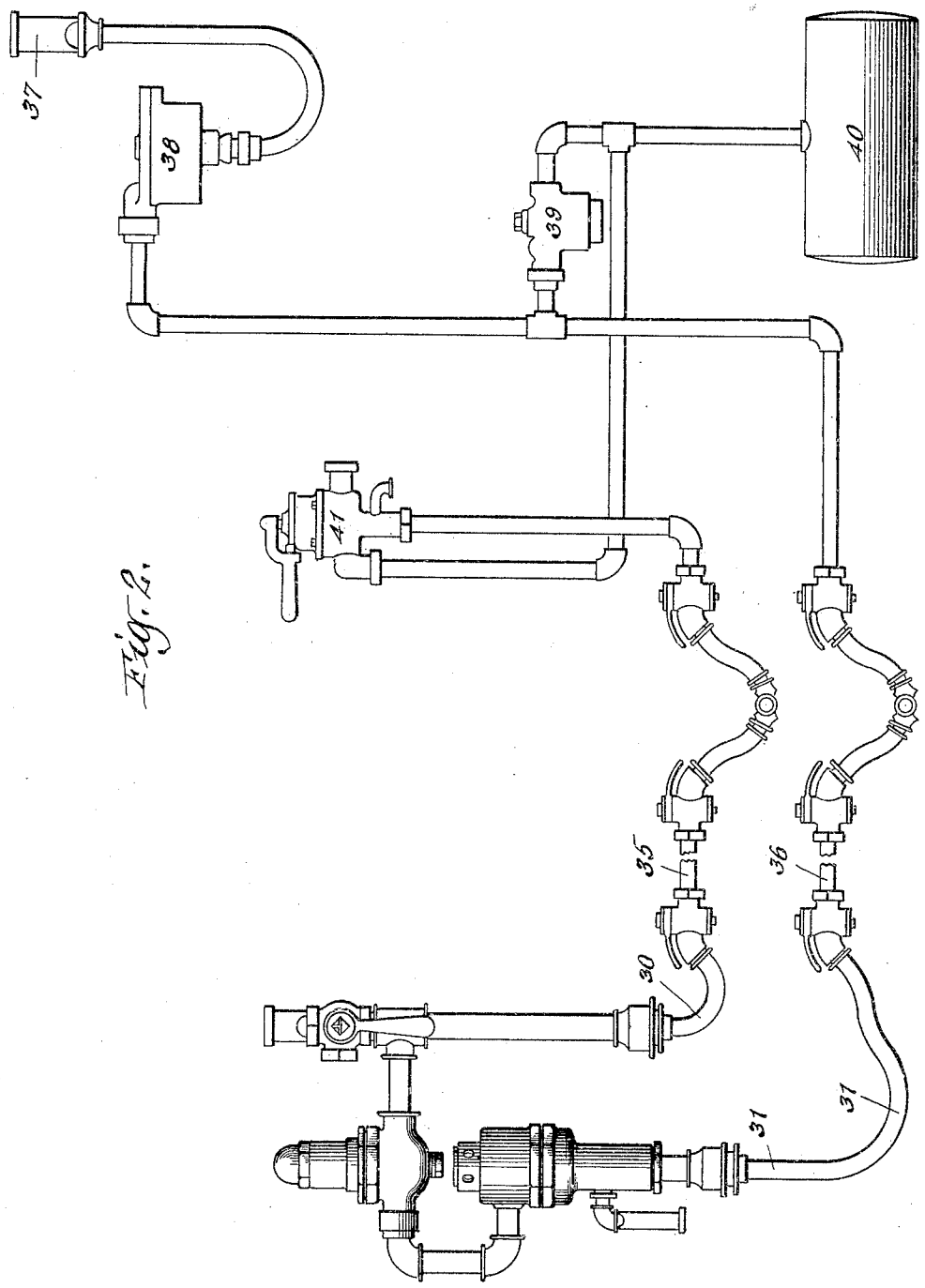

Fig. 2.

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UNITED STATES PATENT OFFICE.

FRANK HUTCHINSON DUKESMITH, OF MEADVILLE, PENNSYLVANIA, ASSIGNOR TO THE GENERAL RAILWAY EQUIPMENT COMPANY, A CORPORATION OF MAINE.

AIR-BRAKE-TESTING APPARATUS.

959,123. Specification of Letters Patent. Patented May 24, 1910.

Application filed July 9, 1909. Serial No. 506,759.

To all whom it may concern:

Be it known that I, FRANK HUTCHINSON DUKESMITH, a citizen of the United States, residing at Meadville, Pennsylvania, have invented new and useful Improvements in Air-Brake-Testing Apparatus, of which the following is a specification.

The object of my invention is to provide a means of testing air brakes when prepared for service through the agency of a valve mechanism attached to the train pipe.

Moreover, my invention enables an engineer in the cab of the locomotive to discover if the air brake conduit or train pipe is properly coupled up, and whether all angle cocks are open.

It also enables a brakeman at the rear of the train to test the train pipe, signal the engineer in the cab when the train pipe is ready for service, operate a signal at the rear end of the train, or set the emergency brakes.

My invention also embraces improvements on the system set forth in my application Serial No. 495615, filed May 13, 1909.

In the accompanying drawings, wherein is shown one embodiment of my invention, Figure 1 is a view partly in section of the testing apparatus. Fig. 2 is a diagrammatic view showing the relative position of the apparatus to the train brake and signal system.

In Fig. 1 is shown apparatus adapted to be attached to the train pipe and the whistle pipe at the rear end of the train. In this figure is shown a regulating valve, comprising a cylindrical portion 1, and a cap 2, joined together by a threaded cylindrical piece 3, in which is located a spindle 5, which is pressed downward by means of a coil spring 4, one end of which rests against the shoulder 5^a, and the other end of which is seated against the shoulder 5^b in the cylindrical piece 3. By adjusting the position of the member 3 with respect to the portion 1, the tension of the spring 4 may be varied, and the member 2 acts as a lock nut to retain the parts in position. An aperture 5^c is provided for the free passage of the upper end of the spindle 5. The bottom of the spindle rests upon the tip of a valve spindle 5^d, which is threaded. This spindle by means of a nut 5^e and washers 5^f is secured to the diaphragm 6. The spindle 5^d carries at its lower end a valve 7, which covers the port betwen the chambers A and B, the chamber A communicating with the train pipe 28, and the chamber B forming a part of the signal conduit. Chambers A and B and the port connecting them are preferably formed in a casting 8. A conduit or passage 9 connects chamber A with the chamber C, in the top of which is located an exhaust valve, 16, and in the bottom a diaphragm 15. The chamber C which is preferably formed in a casting 11, is provided with a cap piece 10, containing perforations 10^a, and a port 11^a. Secured to the casting 11 in any suitable manner is a cylindrical portion 12, provided with an opening with which a pipe 13 communicates, and which leads to a test whistle or signal 14.

Secured to the diaphragm 15 in any suitable manner, as, for example, by washers 15^a and nut 15^b, is a spindle 15^c. The spindle 15^c carries loosely at its upper end the valve 16, which co-acts with the exhaust port 11^a. This valve is preferably provided with ribs 16^a to guide the valve within the port, the openings between the ribs permitting the free passage of air from the chamber C when the valve is opened. Secured also to the stem 15^c is a lug or stop 17 out of contact with the top of the valve. As the diaphragm 15 is depressed by pressure in the chamber C, the spindle 15^c descends, and after it has traveled a suitable distance as the pressure rises, the lug 17 engages the valve 16 opening the port, thus permitting the escape of pressure from the chamber C, and allowing the diaphragm to return to its normal position.

On the lower end of the spindle 15^c is secured a valve 20 which closes a port between a chamber F and a chamber E, the latter chamber being connected with the whistle pipe 23 as by means of a screw coupling 22. The chamber F is formed within a cylindrical piece 20^a, the upper portion of which forms a partition between chambers D and E, so that when the valve 20 uncovers its port, the pressure from the whistle pipe will not immediately affect the diaphragm 15. The diaphragm is supported by the spring 19 which tends to close the valve 20. A spring 18 acts upon the valve 16 to help close it, as the spindle 15^c ascends to its normal position, which movement of the spindle is aided by fluid passing through groove 34 formed therein.

To supply the foregoing parts with pressure, the pipe 24 is connected by means of a T joint 25 to the brake pipe 28. The pipe 28 is adapted to be united to a standard air-hose connection 30, which is coupled in the usual way to the brake pipe hose on the rear of the train. Similarly, the whistle pipe 23 is united by a corresponding hose connection 31, which is coupled to the signal hose at the rear of the train. In this way the apparatus shown is separably connected to the fixed pipes of the train. Attached to the T joint 25 is a three-way valve 26 operated by a handle 26^a in such a way as to admit pressure to the whistle or signal 27 which may be used as a signal for the engineer, though located at the rear of the train, or as a warning when the train is backing; and also adapted to permit the pressure in the train pipe to be exhausted slowly or rapidly through a vent 26^b to set the air brake either gradually or rapidly.

Referring to Fig. 2, 40 indicates the main air reservoir which supplies air to the train pipe 35, the supply being regulated by an engineer's valve 41 in the usual manner. The reservoir 40 also serves to supply air to the whistle pipe 36 in the usual manner, the air first passing through a reducing valve 39 of any suitable construction. A branch from the whistle pipe 36 communicates with the usual signal valve 38, which controls the cab signal 37 in the wellknown manner. The train pipe 35 and whistle pipe 36 are connected to the testing apparatus by the hose connections 30 and 31 respectively, as above described.

The system operates as follows: When the pressure in the train pipe is normal, the valve 7 closes the port between the chambers A and B. Under this condition no signal is operated. If the engineer desires to test the train pipe system, he, from the cab, admits to the pipe 28, an excess of pressure sufficient to deflect the diaphragm 6, thereby lifting the valve 7 from its seat, and permitting pressure from the train pipe to pass into the signal conduit, consisting of chambers B and C, and conduit 9. When the pressure reaches the chamber C it depresses the diaphragm 15, thus opening the valve 20, and permitting pressure to pass from the whistle pipe 23 into the test whistle 14. This operation causes a drop of pressure in the whistle pipe, which is indicated to the engineer in the cab by the whistle 37, operated by the reduction of pressure in the whistle pipe in the usual and well known manner. In this way, the test whistle indicates to the man at the rear of the train that the train pipe couplings and angle cocks are all in suitable order, and the cab whistle indicates the same fact to the engineer in the cab. In order that this whistle may not be prolonged, the exhaust valve 16 is opened as soon as the lug 17 engages it to permit the escape of pressure in chamber C to the outer air. As the valve 20 operates in advance of the valve 16, the test signal will be operated before the valve 16 permits the diaphragm 15 to return to its normal position. When the exhaust valve 16 closes the port 11^a, some residual pressure is left in the signal conduit, and to exhaust this pressure a vent 32 having a small area is provided. Furthermore, this vent is to provide an outlet for any air which might leak past the valve 7, or to carry off any slight excess pressure which may get into the train pipe through the carelessness of the engineer.

A vent 33 is provided beneath the diaphragm 15 on the side where the spring is located to prevent the accumulation of pressure in the chamber D, which might interfere with the efficient operation of the signals.

It is obvious that many variations in the forms of devices and the connections between them and their relation to each other may be made without departing from the spirit of my invention.

What I claim is:

1. In combination with a train, a train brake pipe extending between the engineer's cab and a distant point of the train, signaling means at said distant point, and means responsive to an increase in pressure in the train brake pipe for controlling the operation of said signaling means.

2. In combination with a train, a train brake pipe extending between the engineer's cab and a distant point of the train, signaling means at said distant point, and valve mechanism responsive to an increase in pressure in the train brake pipe interposed between said train brake pipe and said signaling means for controlling the operation of the latter.

3. In combination with a train, a train brake pipe extending between the engineer's cab and a distant point of the train, signaling means at said distant point, and means responsive to an increase in pressure in the train brake pipe, and interposed between said train brake pipe and said signaling means, for controlling the operation of the latter.

4. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, signaling means at said distant point, a valve interposed between said train pipe and said signaling means for controlling the operation of the latter, pressure operating means for maintaining said valve in its closed position when the pressure in said train pipe is normal and permitting said valve to be opened when the pressure exceeds normal, and means for varying the effective pressure of said last

mentioned means whereby said valve may be adjusted to operate at different pressures.

5. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, fluid operated signaling means at said distant point, a valve to control the operation of said signaling means, a second valve responsive to an increase in pressure in said train pipe, and interposed between said train pipe and said first valve, for controlling the operation of the latter.

6. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a whistle pipe extending between the engineer's cab and said distant point, fluid operated signaling means operatively associated with said whistle pipe at said distant point, and means responsive to an increase in pressure in said train pipe for controlling the operation of said signaling means.

7. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, means to operate said signal from the cab, an emergency exhaust for said train pipe to set the air brakes, and a valve to control the operation of said exhaust.

8. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, means to operate said signal, a back-up signal associated with said train pipe, and means to control the operation of said back-up signal.

9. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, a source of pressure for operating said signal, a signal conduit containing a diaphragm and a spring, a valve operatively connected thereto to control the access of pressure to said signal, and an exhaust valve operatively connected to said diaphragm to silence said signal when the pressure in said signal conduit attains a predetermined degree.

10. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, a source of pressure for operating said signal, an exhaust valve associated with said signal conduit, a valve operated in advance of the opening of said exhaust valve to control said pressure and operate said distant signal, and means to silence said signal consisting of a diaphragm and spring and adapted to open said exhaust valve when the pressure in said conduit attains a predetermined degree.

11. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, a source of pressure, a valve adapted to control the operation of said signal, and means to silence said signal.

12. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, a source of pressure for operating said signal, a signal conduit, an exhaust valve associated therewith, a valve to open a port between said source of pressure and said signal in advance of the opening of said exhaust valve, and means to silence said signal consisting of a diaphragm and spring to open said exhaust valve when pressure in said conduit attains a predetermined degree, said exhaust valve and diaphragm having a loose connection arranged to operate in sequence.

13. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, a source of pressure operating said signal, a signal conduit, an exhaust valve associated therewith, a valve to open a port between said source of pressure and said signal in advance of the opening of said exhaust valve, and means to open said exhaust valve when pressure in said chamber attains a predetermined degree, whereby said signal will be silenced.

14. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said cab, a signal at said distant point, means to operate said signals comprising a signal conduit, means opening a port between said pipe and conduit adjusted to resist normal pressure but to yield under an excess of pressure and open said port, thereby admitting pressure to the signal conduit, a source of pressure, and a signal diaphragm to open a port between said source of pressure and said signal.

15. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, means to operate said signal consisting of a signal conduit and means for opening a port between said train pipe and said conduit, said means comprising a spring actuated diaphragm adjusted to resist normal pressure but to yield under an excess of pressure and open said port, thereby admitting pressure to the signal conduit.

16. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, means to operate said signal from the cab consisting of a signal conduit and devices for opening a port between said train pipe and said conduit.

17. In combination with a train, a train pipe extending between an engineer's cab and a distant point of the train, a signal at

said cab, a signal at said distant point, and means controlled from the cab to operate said signals.

18. In combination with a train, a train brake pipe extending between the engineer's cab and a distant point of the train, a signal at said distant point, and means to operate said signal from the cab.

19. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a signal at said cab, a signal at said distant point, and means to operate simultaneously said signals.

20. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, signaling means at said distant point, means for controlling the operation of said signaling means, a conduit extending between said train pipe and said controlling means, and a valve positioned in said conduit, said conduit having an exhaust port formed therein.

21. In combination with a train, a train pipe, a whistle connection, a chamber connected with the train pipe, a valve therein, a diaphragm acted on by the train pipe pressure for opening the valve, a second chamber connected with the first and having a diaphragm to which pressure is admitted by said valve, a valve in the second chamber connected with said second diaphragm and controlling the exhaust from the whistle connection, substantially as described.

22. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a whistle pipe extending between the engineer's cab and said distant point, a signal operatively associated with said whistle pipe at said distant point, a second signal operatively associated with said whistle pipe at the cab, and means responsive to a variation in pressure in said train pipe for controlling the operation of said signals.

23. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a whistle pipe extending between the engineer's cab and said distant point, a signal operatively associated with said whistle pipe at said distant point, a second signal operatively associated with said whistle pipe at the cab, and means at said distant point responsive to a variation in pressure in said train pipe for controlling the operation of said signals.

24. In combination with a train, a train pipe extending between the engineer's cab and a distant point of the train, a whistle pipe extending between the engineer's cab and said distant point, a signal operatively associated with said whistle pipe at said distant point, a second signal operatively associated with said whistle pipe at the cab, and a valve responsive to variations in pressure in said train pipe for controlling the operation of said signals.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK HUTCHINSON DUKESMITH.

Witnesses:
ELLA L. GILES,
WILLIAM P. JONES.