

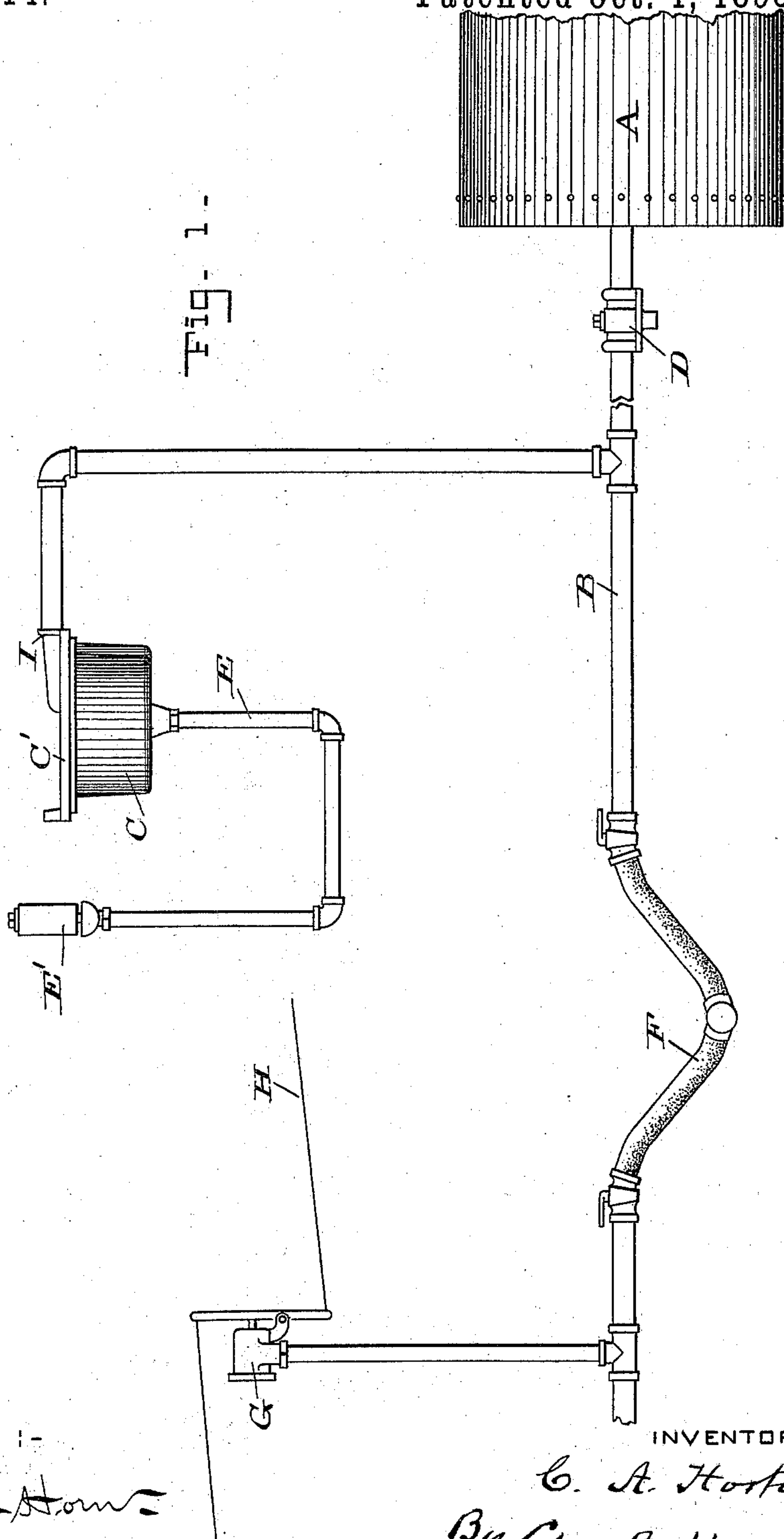
(No Model.)

2 Sheets—Sheet 1.

C. A. HORTON.  
PNEUMATIC SIGNAL VALVE.

No. 547,214.

Patented Oct. 1, 1895.



WITNESSES :-

*L. J. Van Horn*  
*Charles B. Mann Jr.*

INVENTOR :

*C. A. Horton*  
*By Chas B. Mann*

ATTORNEY .

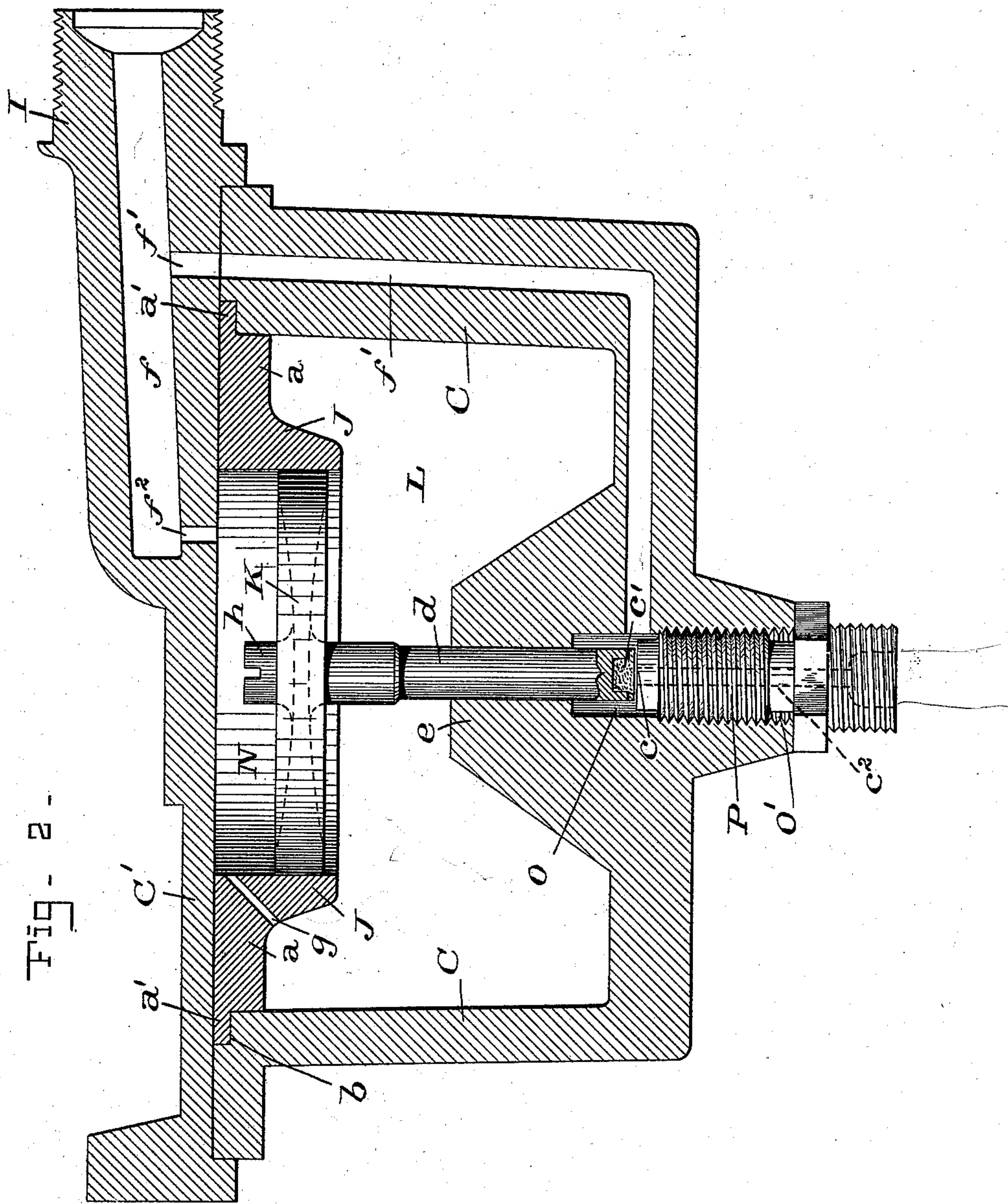
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# UNITED STATES PATENT OFFICE.

CHARLES A. HORTON, OF STEUBENVILLE, OHIO.

## PNEUMATIC SIGNAL-VALVE.

SPECIFICATION forming part of Letters Patent No. 547,214, dated October 1, 1895.

Application filed March 15, 1895. Serial No. 541,867. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. HORTON, a citizen of the United States, residing at Steubenville, in the county of Jefferson and State of Ohio, have invented certain new and useful Improvements in Pneumatic Signals for Railway-Trains, of which the following is a specification.

This invention relates to certain improvements in pneumatic signals for railway-trains and will first be described and then pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation showing the several parts composing an air-whistle system. Fig. 2 is a vertical longitudinal section of the signal-valve parts.

The letter A designates the reservoir for storing the compressed air; B, the train-pipe leading therefrom; C, the case of the signal-valve; D, the reducing-valve in the train-pipe between the storage-reservoir A and signal-valve C; E, a pipe leading from the signal-valve to whistle E', the foregoing parts being usually on the locomotive; F, a hose and coupling between the sections of a train-pipe; G, an escape-valve carried on a car, and H a cord connected with said escape-valve. By pulling on this cord the conductor may transmit signals to the engineer.

The valve-case C is cylindrical, with a closed integral bottom and an attached cover or head C', which is provided with a connection I for attachment to the train-pipe. The cylinder J, in which the piston K moves, is made of brass, while the case and cover are made of iron. This cylinder has a rim *a* and a peripheral flange *a'*, which latter takes in an annular rabbet *b*, formed on the top edge of the case C where it adjoins the cover C'. Thus the said flange *a'* of the cylinder is clamped between the case and cover. The piston K fits neatly, but without packing-ring, in the cylinder J and will move freely. The piston itself does not act as a valve. It separates the two compartments, the main lower compartment L being below the piston and the small upper compartment N above the piston. In the bottom of the case is a valve-chamber O and an orifice O' below it, and a screw-plug P fits in and closes the said orifice. This screw-plug has a discharge-passage *c*<sup>2</sup>

leading to the whistle and denoted by two parallel broken lines, and on top has a valve-seat *c*. The piston carries a stem *d*, which plays up and down in a boss *e* above the valve-chamber O. This stem fits snug or airtight in the boss at all times, either when up or down. The lower end of the stem is in the valve-chamber O and carries a valve *c'*, which when seated at *c* closes the said passage leading to the whistle. The valve *c'* is kept normally seated by action of the gravity of the piston. The connection I has an in-and-out passage *f*, from which lead two passages of different sizes. One passage *f'*, of three-sixteenths inch size, leads through the wall of the case to the valve-chamber O, and the other passage *f*<sup>2</sup>, of two-sixteenths size, leads into and out of the upper compartment N above the piston. A third passage *g*, which is smaller than either of the other two, being one-sixteenth of an inch, is through the rim *a* of the cylinder and constitutes an always-open communication between the upper and lower compartments N L. The lower compartment has no other passage or communication. This smallest passage *g* serves both for charging the lower compartment L and to produce an equalization of pressure between the two compartments. The top side of the piston has a knob *h*, which, when the piston moves up, bumps against cover C' and prevents the piston raising so high as to close the smallest passage *g*.

In operation the apparatus is charged by air-pressure passing from the reducing-valve D to the in-and-out passage *f*, and from thence by the largest passage *f'* to the valve-chamber O, and by the medium-size passage *f*<sup>2</sup> to the upper compartment N, and by the smallest passage *g* in the piston-cylinder to the lower compartment L. Now supposing there is a pressure of forty pounds in the train-pipe beyond the reducing-valve D and in the valve-case C on both sides of the piston the piston by its own gravity will move down and the valve *c'* on the lower end of the stem will seat and close the discharge-passage. Upon a reduction of pressure in the train-pipe by opening any one of the escape-valves G air-pressure will pass from the upper compartment N by the medium passage *f*<sup>2</sup>, and this reduction of pressure in said upper compart-



ment will cause the preponderant pressure in the lower compartment L to lift the piston K and its stem and unseat the valve  $c'$ , and thus allow air-pressure from the train-pipe to pass by way of the largest passage  $f'$  to the discharge-passage  $c^2$ , and thence to the whistle E, producing a blast. The moment the pressure in the upper compartment N is reduced below that existing in the lower compartment L air from the latter will pass through the small equalizing-passage  $g$ , and thus lower the pressure which holds the piston up, and allow it to descend and the valve  $c'$  to seat. This construction, where the lower compartment has but one inlet or outlet consisting of the small always-open passage  $g$  directly between the two compartments and of less size than the supply-passage  $f^2$  to the upper compartment, prevents small leaks in the train-pipe from unseating the valve  $c'$ , and also prevents said valve from unseating by reason of variations of pressure produced by the varying action of the reducing-valve D. Under the conditions just mentioned some whistles now in use, having a diaphragm instead of a piston to carry the valve, will sound whenever an unusual jolt of the moving locomotive occurs. These unintentional sounds are very objectionable to the engineer; but with this structure such jolts have no effect because slight displacement of air-pressure above the piston is at once compensated for by the small passage  $g$ , producing an equal displacement of pressure below the piston and transferring it above.

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

1. The combination of a valve case; a cover for said case having a single train-pipe connection, I; a separate cylinder, J, secured in said case; a valve-chamber, O, in the bottom of the case; a piston movable in said cylinder and having a stem which plays up and down in a boss in the bottom of the case above said valve-chamber—said stem being air-tight at all times, and at its lower end in the valve-chamber carrying a valve,  $c'$ , which controls the air-passage leading to the whistle; a passage,  $f'$ , leading from said train-pipe connection to the valve-chamber; an in-and-out passage,  $f^2$ , leading from said train-pipe connection to the upper compartment above the piston; and a passage always-open and directly communicating between the upper and lower compartments—said passage being relatively smaller than said in-and-out passage to the upper compartment.

2. The combination of a valve case; a cover

for said case having a train-pipe connection, I; a valve-chamber in the bottom of the case; a movable piston separating an upper and lower compartment and having a stem which plays up and down in a boss in the bottom of said lower compartment and above said valve-chamber—said stem fitting the boss air-tight at all times and actuating the valve which controls the air-passage leading to the whistle; a passage,  $f'$ , leading from the said train-pipe connection to the valve-chamber; an in-and-out passage,  $f^2$ , leading from said train-pipe connection to the upper compartment; and a single communication only with the said lower compartment, said communication being an always-open passage directly between the upper and lower compartments.

3. The combination of a valve case; a cover for said case having a train-pipe connection, I; a valve chamber in the bottom of the case; a movable piston separating an upper and lower compartment and having a stem which plays up and down in a boss in the bottom of said lower compartment and above said valve-chamber—said stem fitting the boss air-tight at all times and actuating the valve which controls the air-passage leading to the whistle; and three always-open air-passages of relatively different size—the largest,  $f'$ , leading from the train-pipe to the said valve-chamber, the medium,  $f^2$ , leading from the train-pipe to the upper compartment, and the smallest,  $g$ , communicating directly between the upper and lower compartments.

4. The combination of a valve-case having a rabbet,  $b$ , on its top edge; a cover for said case; a cylinder, J, having a rim-flange,  $a'$ , which takes into the said rabbet on the case and is there clamped by the said cover; a valve-chamber in the bottom of the case; a piston movable in said cylinder and separating an upper and lower compartment and having a stem which plays up and down in a boss in the bottom of said lower compartment and above said valve-chamber—said stem fitting the boss air-tight at all times and actuating the valve which controls the air-passage leading to the whistle; a passage,  $f'$ , leading from the train-pipe to the said valve-chamber; a passage,  $f^2$ , to the upper compartment; and an always-open passage directly between the upper and lower compartments.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES A. HORTON.

Witnesses:

M. S. GILLET,

JAMES A. LEIGHLEY.