(No Model.) 2 Sheets—Sheet 1.

C. S. SHALLENBERGER & L. O. RAND.

AIR BRAKE.

No. 506,739. Patented Oct. 17, 1893.

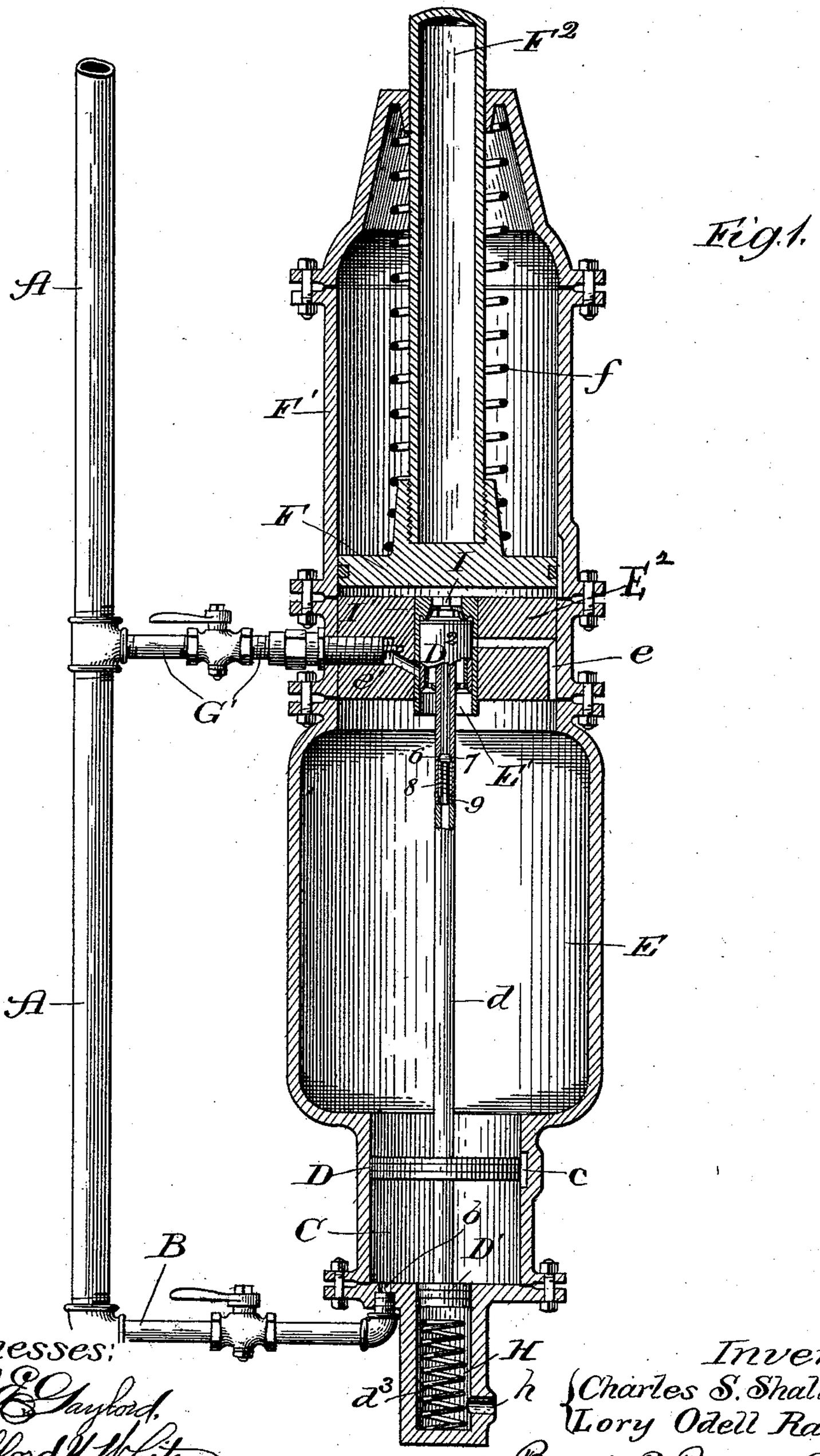

Fig. 1.

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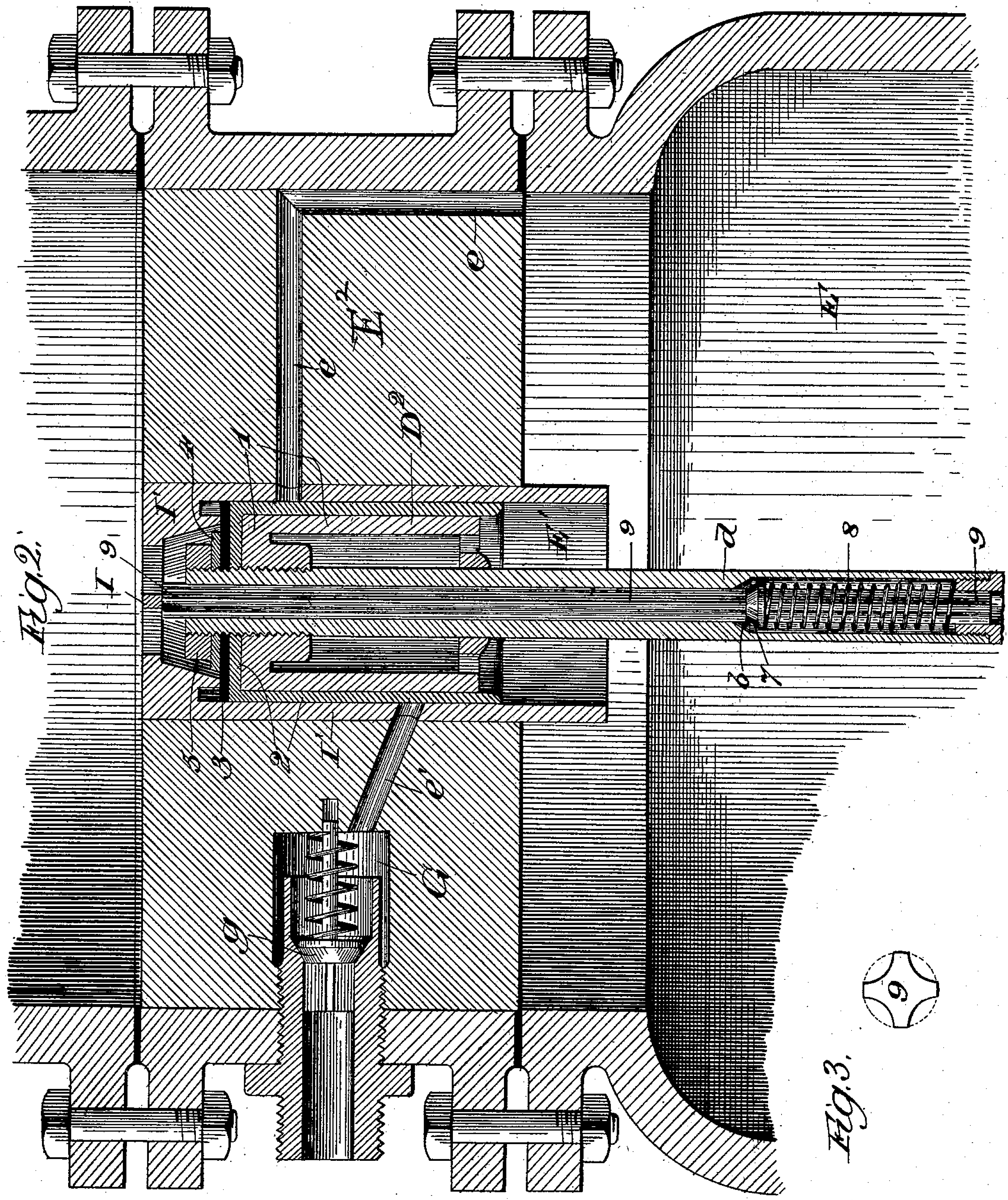

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES S. SHALLENBERGER AND LORY ODELL RAND, OF FORT MADISON, IOWA.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 506,739, dated October 17, 1893.

Application filed September 3, 1891. Serial No. 404,616. (No model.)

To all whom it may concern:

Be it known that we, CHARLES S. SHALLENBERGER and LORY ODELL RAND, citizens of the United States, residing at Fort Madison, in the county of Lee and State of Iowa, have invented certain new and useful Improvements in Air-Brakes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in air brakes and consists in the combination and arrangements of parts hereinafter specified and particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal, sectional view, partly in elevation, of our improved air brakes. Fig. 2 is a longitudinal sectional view, enlarged, of the central cylinder and piston; and Fig. 3 is a plan detailed view of one of the parts.

In making our improved air brakes, we employ a train pipe A, having proper connection with the engineer's valve and other parts for increasing or reducing pressure in it, as now in use. We make a pipe B leading from the train pipe through a port *b* into a piston C. In one side of this chamber we arrange a by pass *c*, normally open, consisting preferably of a channel or groove in one of the side walls of the chamber. A piston D is arranged in the piston chamber C, mounted on a piston rod or stem *d*, which is also provided with a piston D′ at the lower end of the chamber C. We may here say that we shall use the terms "upper" and "lower" in speaking of the arrangement of the parts, simply as relative terms, as it is convenient in looking at Fig. 1 to regard the device as in a vertical position, though of course it will be understood that it will be in a horizontal position when in use. At the upper end of the rod or stem *d* is arranged a piston D^2. These pistons are all mounted on the same stem or rod, and are adapted to be moved in the one direction or the other in unison. Above the piston D is arranged an auxiliary reservoir E, and at the upper end of this reservoir there is a service port *e*, normally closed, leading from the reservoir E into a central piston valve chamber E′, in which the piston valve D^2 is placed. Above the piston valve D^2 is arranged a piston F, that is adapted to be moved back and forth in the brake cylinder F′. The piston valve chamber E′ and the port *e* are arranged in a fixed partition E^2 separating the auxiliary reservoir from the brake cylinder. The piston F is mounted on a piston rod F^2, surrounded by a spring *f*, which serves to hold the piston F in its down position when the brakes are released. The piston valve D^2 is preferably composed of a head 1, surrounded by a leather packing 2, and having a rubber gasket 3 held securely against the leather by a washer 4, which is fastened in place by a nut 5. This makes an air tight piston, but at the same time capable of free and easy movement back and forth in the piston valve chamber E′. The rod *d* is hollow and provided with a valve seat 6, against which a valve 7 is held by a spring 8, so as to close the opening at the valve seat. This valve 7 is mounted on an angular or fluted spindle 9, of which a plan or end view is shown in Fig. 3. The spring holds the valve securely against its seat until the upward movement of the piston D^2 has brought the end of the valve stem against a bridge I in the upper end of the bushing I′. This bridge is preferably a simple spider, as used in ordinary valve construction, so as to permit the free passage of air through it. When the valve stem strikes against this bridge in the upward movement of the piston D^2, the valve 7 is unseated, so that the air from the brake cylinder F′, below the piston F, may pass down through the rod *d* and out at its lower end, and escape through a port hereinafter mentioned. Opening into the piston valve chamber E′ is an emergency port *e′*, normally closed, leading from a chamber G in which is arranged a spring seated valve *g*, closing the opening of a pipe G′ connected with the train pipe. This port, valve, and pipe, are intended for use only when an emergency stop is required, and its operation will be explained hereinafter.

The air from the train pipe passes into the piston chamber C and up through the by pass *c* into the auxiliary reservoir E, so that the pressure in the train pipe and in the aux-

iliary reservoir are equalized. While the pressure thus remains equalized, the piston valve D^2 is held up to close the opening of the service port *e*, so that the air cannot pass from the auxiliary reservoir into the piston valve chamber, and thence into the brake cylinder. When it is desired to set the brake, the pressure in the train pipe is moderately reduced, when the pressure in the piston chamber C becomes less than that in the auxiliary reservoir E. The greater pressure in the auxiliary reservoir instantly causes the pistons D, D′ and D^2 to move down, closing the by pass *c* and opening the service port *e*. The air from the auxiliary reservoir then rushes through such port below the piston F, and forces it along the brake cylinder F′, so that through the piston rod F^2 the brake is set. When it is desired to apply an emergency stop, the pressure in the train pipe is greatly reduced, or to a much greater extent than when an ordinary service stop is needed. This great reduction of pressure in the train pipe, and in the piston chamber C, causes the pistons D, D′ and D^2 to be instantly forced back to a much greater extent than in the application of a service stop, and to a sufficient extent to uncover the emergency port *e′*, as well as the service port *e*. The air from the train pipe instantly rushes through the valve *g* and the emergency port *e′* into the piston valve chamber E′, so as to add its pressure to the pressure of the air entering through the service port *e*. Of course, it will be understood that this operation is practically an instantaneous one. The greatly increased pressure admitted below the piston F forces it out to a much greater extent than in the ordinary application of the brakes, so that a quicker stop will be effected. When the pistons D, D′ and D^2 are forced down for the setting of the brake, the piston D′ comes against the spring d^3 in an exhaust chamber H, provided with a port *h*. This spring operates as a cushion to receive the piston when it is forced against it by reducing the pressure in the piston chamber C.

In order to release the brakes and to permit the air from the brake cylinder below the piston F to be exhausted, pressure is increased by the engineer in the train pipe, which increases the pressure in the piston chamber C. This causes the piston D^2 to move upward until the stem of the valve 7 strikes the bridge I, when the valve 7 will be unseated, and the air pass down through the rod *d* into the exhaust chamber H, and out through the port *h* to the atmosphere.

What we regard as new, and desire to secure by Letters Patent, is—

1. In air brakes, the combination with the auxiliary reservoir and brake cylinder of a partition between the two provided with a valve chamber and a port to the brake cylinder, a passage in the partition leading from the valve chamber to the auxiliary reservoir a piston valve in the chamber controlling said passage, and means for operating the piston valve by the variation in train pipe pressure, substantially as described.

2. In air brakes, the combination with the auxiliary reservoir and brake cylinder of a partition between the two provided with a valve chamber and a port to the brake cylinder, a passage in the partition leading from the valve chamber to the auxiliary reservoir, a piston valve in the chamber controlling said passage, a rod for said valve, and a piston on said rod controlled by variation in the train pipe pressure, substantially as described.

3. In air brakes, the combination with the auxiliary reservoir and brake cylinder of a partition between the two provided with a valve chamber and a port to the brake cylinder, a passage in the partition leading from the valve chamber to the auxiliary reservoir, an emergency passage leading from the valve chamber to the train pipe, a piston valve in the chamber controlling said passages, a rod for said valve, an operating piston on said rod controlled by variation in the train pipe pressure, substantially as described.

In testimony whereof we have hereunto affixed our signatures in the presence of two witnesses.

CHARLES S. SHALLENBERGER.
LORY ODELL RAND.

Witnesses:
DEVORE F. ALLEY,
JOHN G. GRIGGS.