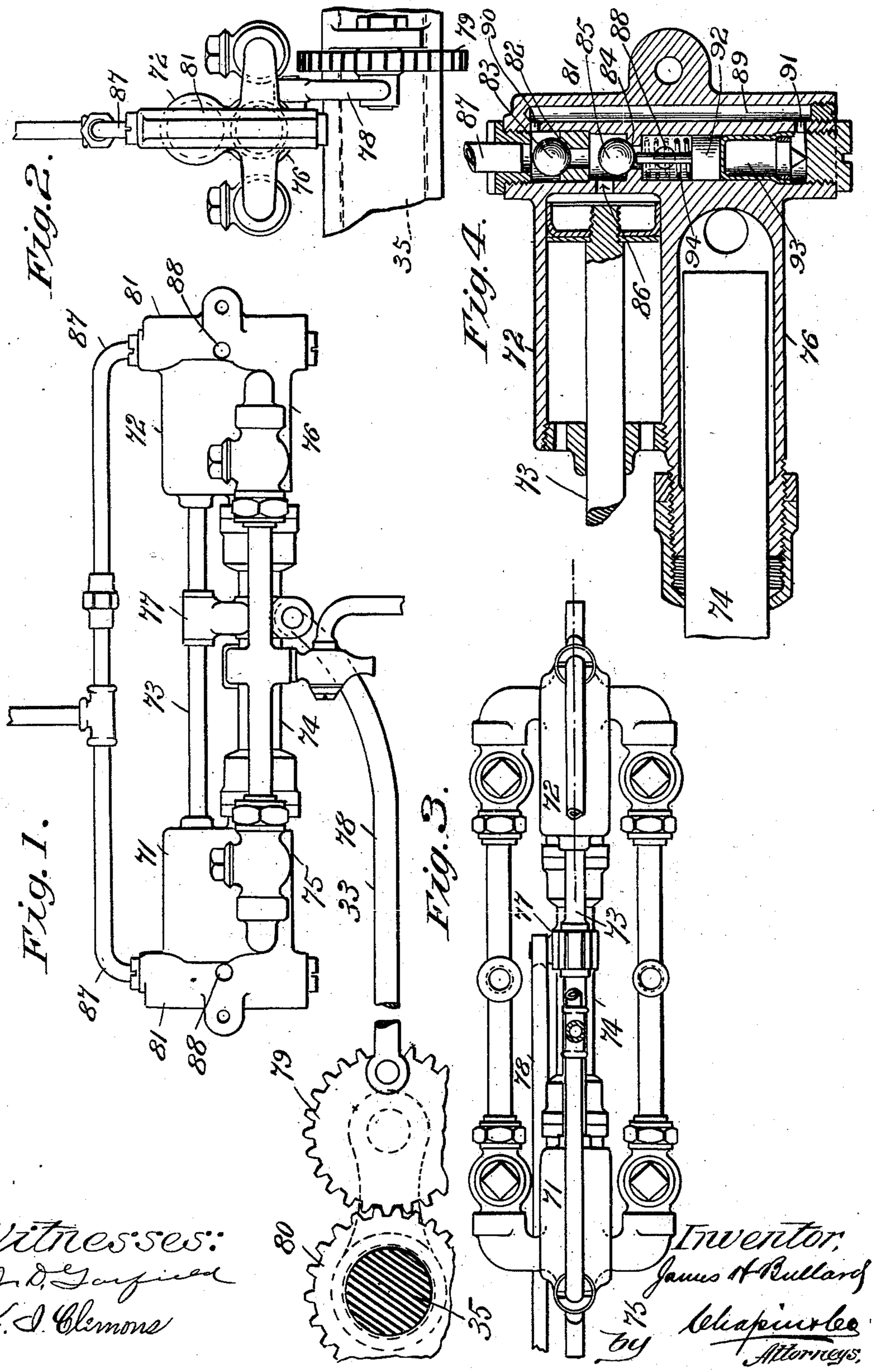
No. 713,848. Patented Nov. 18, 1902.

J. H. BULLARD.

AIR COMPRESSING DEVICE.

(Application filed Nov. 25, 1901.)

(No Model.)



Witnesses:
J. D. Garfield
K. I. Clemons

Inventor:
James H. Bullard
by Chapin & Lee
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES H. BULLARD, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO THE OVERMAN AUTOMOBILE COMPANY, OF CHICOPEE, MASSACHUSETTS, A CORPORATION.

AIR-COMPRESSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 713,848, dated November 18, 1902.

Application filed November 25, 1901. Serial No. 83,593. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BULLARD, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Air-Compressing Devices, of which the following is a specification.

This invention relates to air-compressors and means for controlling the delivery of air therefrom, the object of the invention being to provide means for rendering ineffective the action of the piston in a continuously-running pump when the air in a receiving-tank attains a certain pressure; and the invention consists in the construction fully described in the following specification and particularly pointed out in the claim.

In the drawings forming part of this application, Figure 1 is a side elevation of the pump embodying my invention, but it is shown as forming part of a feed-water pump and is actuated by the same means as the latter. Fig. 2 is an end elevation of Fig. 1. Fig. 3 is a top plan view of Fig. 1; and Fig. 4 is an enlarged sectional elevation through one end of the air-compressor, showing the air-compressing cylinder and its controlling devices and showing the water-feeding cylinder.

In Fig. 1 of the drawings the two air-pumping cylinders (indicated by 71 and 72) are shown in side elevation. The pistons of these cylinders—one of which is shown in Fig. 4—have a common piston-rod 73, which is parallel with and vertically over the piston of the water-cylinders, which piston is indicated by 74 and the water-cylinders by 75 and 76. A rigid connection 77 secures these two piston-rods together, as shown in Figs. 1 and 3, both being driven by a connecting-rod 78, extending from said connection 77 to a pin on the side of a gear 79, supported to mesh with a second gear 80, fixed on the axle of the vehicle or some other convenient rotating part thereof.

At each end of the pump there is cast integrally with the cylinders a vertical cylindrical casing 81, which is bored out axially, as shown in Fig. 4, and in which bored-out portion there is provided a seat 82 for the ball 83 and another seat 84 for the ball 85, these balls constituting check-valves, between which there is a port 86, leading into the air-cylinder. An eduction-pipe 87 leads out of the upper end of said cylindrical casing, and an induction-port 88 (see Figs. 1 and 4) extends through the wall of said end casing and leads into the interior thereof beneath the seat of the ball 85. Upon the suction-stroke of the piston air enters through the induction-port, passes upward under the ball 85, and into the cylinder through the port 86. Upon the forcing-stroke the air so drawn in is forced out through the same port at which it enters the cylinder and lifting the ball 83 from its seat passes up through the eduction-pipe, which leads to the air-reservoir.

Parallel with the centrally-bored-out portion of the cylindrical casing 81 there is an air-passage 89, extending from one end to the other of the casing, and at each end of this air-passage there is a port leading into the central bored-out portion of the casing. The port 90 leads from the chamber in which is located the ball 83, and the second port 91 at the bottom of the passage leads into a chamber located below the ball 85 and the induction-port. This chamber, also cylindrical in form in cross-section, has located therein a plunger 92, having a stem thereon extending upwardly approximately to the under side of the ball 85. Between the top of said plunger and the bottom of the shoulder formed by the seat of said ball there is a spiral spring which normally holds the plunger 92 down against the top of an inverted expansible sack 93, whose open end is secured near the lower end of the chamber in which said plunger is located by a ring expanded against the wall of the chamber, as shown, or otherwise. Now when the back pressure on the eduction-pipe exceeds the resistance of the spring 94, which holds the plunger away from the ball 85, said sack will by the pressure of air entering it through the port 90, the passage 89, and the second port in the lower end of said passage be expanded vertically to a sufficient degree to raise the plunger 92 and force the ball 85 away from its seat and hold it out of contact therewith during the maintenance of said excessive

pressure. The result of this operation will be that the air drawn in through the induction-port will on the forcing-stroke of the piston pass out again through the same induction-port, the ball 83 being firmly held to its seat by the pressure from the reservoir. As soon as the pressure in the latter, however, drops sufficiently to permit the ball 85 to seat itself air will be again forced into the reservoir to restore the pressure therein to its maximum. This construction (shown in Fig. 4) is common to both of the air-cylinders of the pump, the eduction-pipes of both running into a common branch connecting with the air-reservoir.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

A pump consisting of a cylinder, a valve-chest therefor, an induction and an eduction pipe in said chest, a check-valve in the latter for each of said pipes and opening in the same direction, a single port for the cylinder located between the check-valves and serving both for an induction and an eduction port; a passage outside the valve-chest communicating with opposite ends of the latter, and in communication only with the eduction-pipe, and an expansible and retractable sack in proximity to the check-valve for the induction-pipe, adapted to be inflated by back pressure from the eduction-pipe whereby an excess of pressure in the latter will effect the lifting of the check-valve in the induction-pipe from its seat, to render the pump ineffective.

JAMES H. BULLARD.

Witnesses:
W. H. CHAPIN,
K. I. CLEMONS.