

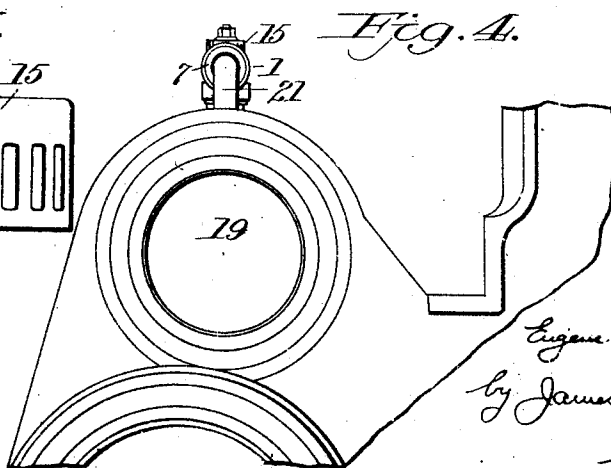
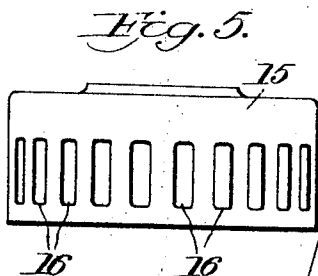
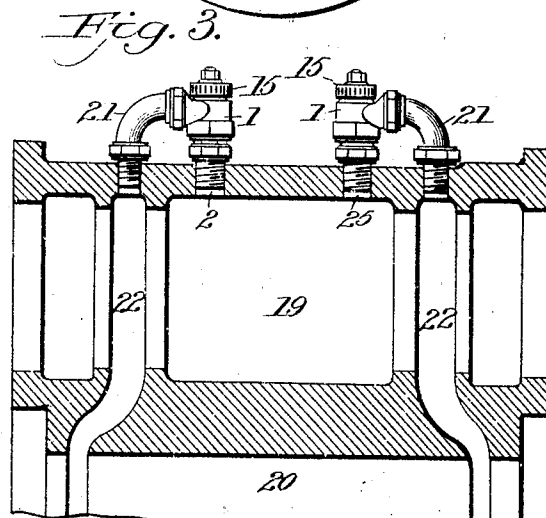
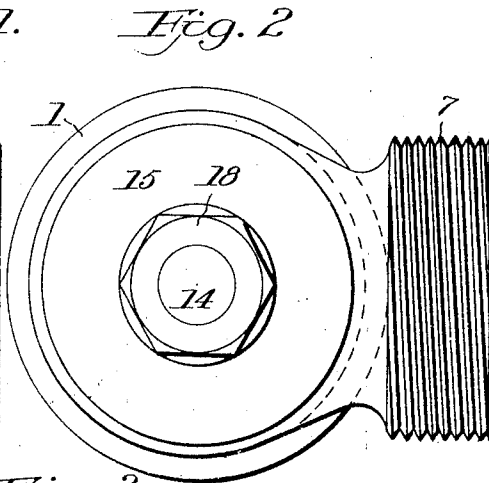
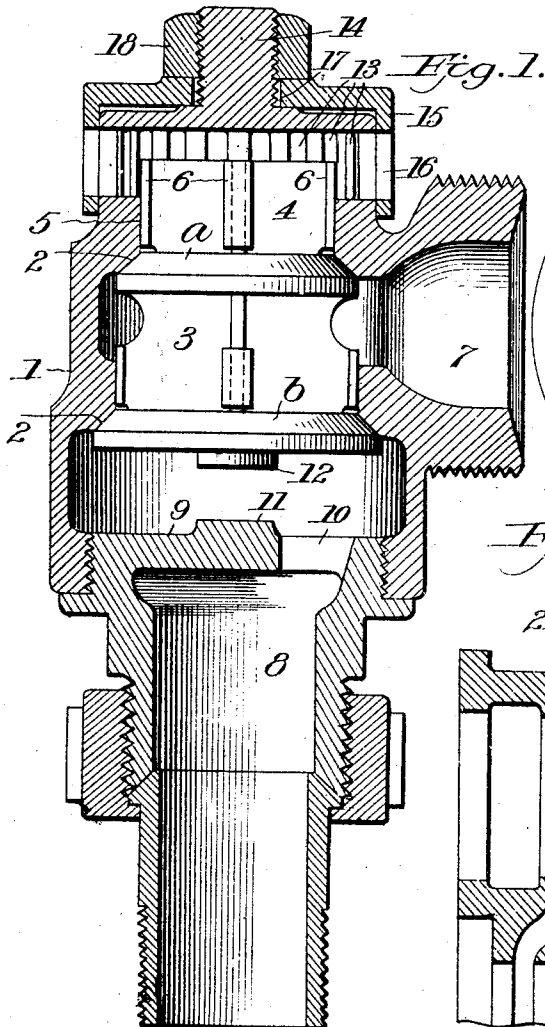
No. 839,912.

PATENTED JAN. 1, 1907.

E. B. WHELAN.
COMPRESSION AND VACUUM RELIEF VALVE

APPLICATION FILED MAR. 1, 1905.

2 SHEETS—SHEET 1.



Witnesses
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E. U. Shepard.

Inventor
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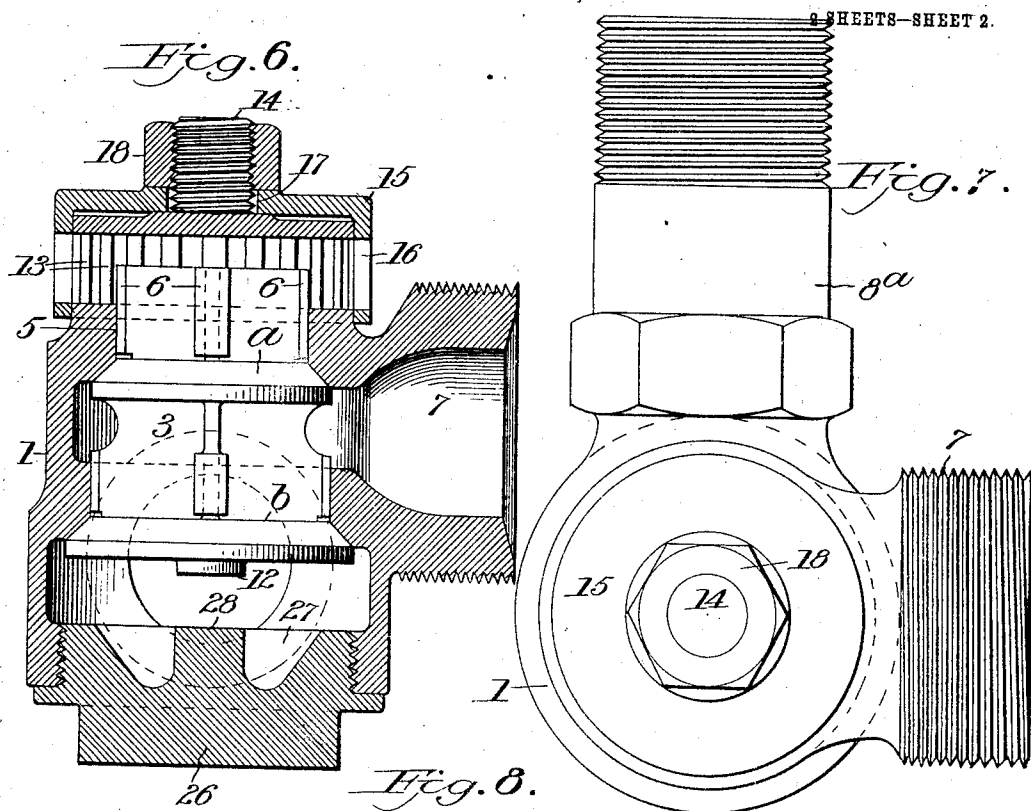
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2 SHEETS—SHEET 2.



Witness.

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UNITED STATES PATENT OFFICE.

EUGENE B. WHELAN, OF ST. LOUIS, MISSOURI.

COMPRESSION AND VACUUM RELIEF-VALVE.

No. 839,912.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed March 1, 1905. Serial No. 247,833.

To all whom it may concern:

Be it known that I, EUGENE B. WHELAN, a citizen of the United States, residing at St. Louis, State of Missouri, have invented new and useful Improvements in Compression and Vacuum Relief-Valves, of which the following is a specification.

This invention relates to improvements in combined compression and vacuum relief-valves for steam-engines; and the object is to provide a simple and effective relief-valve which may be adjusted to admit air directly from the atmosphere to the cylinder and steam-chest of an engine or to form a by-pass relief-valve, the improved valve being particularly adapted for use in connection with simple engines employing either a piston-valve or a D slide-valve.

With the above object in view the invention consists in the novel features of construction hereinafter fully described, particularly pointed out in the claims, and clearly illustrated by the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a valve constructed in accordance with my invention; Fig. 2, a top plan view; Fig. 3, a vertical sectional view through the steam-chest and adjacent portion of a simple engine of the piston-valve type, showing my improved valve applied thereto; Fig. 4, an end elevation of the same; Fig. 5, a side elevation of the regulating-cap for the air-inlet of the valve; Fig. 6, a longitudinal sectional view of my valve, showing the arrangement of connections when the valve is used with an engine using a D slide-valve; Fig. 7, a top plan view of the same; and Fig. 8, a vertical sectional view through the steam-chest and cylinder of a simple engine of this type, showing my valve attached thereto.

Referring now more particularly to the drawings, 1 designates the valve-housing having the spaced valve-seats 2, disposed one above the other, for the double-seating valve 3. This valve is reduced intermediately of its seats *a* and *b* or channeled, so that said seats operate only to close the escape-ways. Said valve is provided above its upper seat with an extension 4, working in the upper portion or extension 5 of the valve-housing, said extension 4 being cored or channeled to form guide-ribs 6, that serve to guide the valve in its movement. Extending from the housing, intermediately of the seats thereof,

is a threaded connection 7, and extending from the lower end of said housing is a threaded connection 8, the inner end of which is closed by a diaphragm or partition 9, in which an inlet-opening 10 is formed. This diaphragm is formed centrally with a boss 11, with which a boss 12 of the lower end of the valve contacts when the valve is unseated, the boss 11 acting as a stop to limit the downward movement of the valve.

The extension 5 of the valve-housing is formed about its circumference with a plurality of air-inlets 13 and upon its upper end with a central threaded stem 14.

15 designates a cap having about its circumference a plurality of openings 16, said cap being formed in its upper wall with a central opening 17, whereby it may be fitted loosely upon the stem 14, so that it may be swung about the valve-housing to bring said openings 16 into or out of line with the air-inlets 13, and thus open or close the latter. A nut 18 on said stem is provided to hold the cap in its adjusted position.

In Figs. 3 and 4, 19 indicates the steam-chest and 20 the cylinder of a simple engine of the piston-valve type. In adapting my invention to the engine two valves are employed, as shown in Fig. 4. In each valve the threaded connection 7 is connected by a suitable pipe 21 with the steam-passage 22, leading from the steam-chest or valve-housing 19 by a suitable pipe 24. The valves are held to their seats by live steam from connection 8, which steam is under control of the throttle. As soon as said steam is shut off the valves will unseat, and if the cap is adjusted so that the air-inlets are open air from the atmosphere will be drawn into the cylinder through connection 8 and into the steam-chest through connection 7, the air in the latter case passing around the lower seat of the valve and through opening or port 10, the valve when unseated being held from closing this port by the bosses 11 and 12. By adjusting the cap to close the air-inlet parts, the intake of air is prevented and a by-pass formed.

The valve shown in Figs. 6, 7, and 8 is constructed substantially like that described, excepting that the lower end of the housing is closed by a plug 26, formed with a dished portion 27, from which a centrally-projecting

boss 28 projects to coact with boss 12 of the valve. The connection 8 extends laterally from the lower portion of the housing. In Fig. 8, 29 designates a steam-chest and 30 the cylinder of a simple engine of the D-slide-valve type to which my valve is applied. Connection 7 is connected with the steam-chest and connection 8 with the steam-passage of the cylinder. The valves are held to their seats by the live steam in the steam-chest and when the supply is cut off the valves unseat. If the air-inlets are open, air passes through connection 7 to the chest and through connections 8 to the cylinder. By closing the caps the valves act as by-pass valves. In both arrangements, Fig. 3 and 8, the valves communicate with the cylinder and chest at or near the respective ends of the latter.

From the above description it will be seen that I have provided a very simple construction of valve for admitting air to the cylinder and steam-chest of a simple engine, the valve being held to its seat by live steam, so as to insure perfect seating. There is no pulsating of the valve, thus preventing unnecessary wear and possible breaking of the valve. Also by a simple and convenient arrangement the valve may be converted into a by-pass valve.

I do not desire to limit myself to the exact details of construction shown and described, as various modifications may be made without departing from the spirit and scope of my invention.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A combined compression and vacuum relief-valve, comprising a casing, a valve movable therein having spaced seats, a communication between the casing intermediately of said seats and the steam-chest, a communication between the casing at one end of the valve and the cylinder, and a communication between the casing at the opposite end of the valve and the atmosphere.

2. A combination compression and vacuum relief-valve comprising a casing, air-inlets formed therein, communications between the casing and the steam-chest and cylinder of an engine, a valve controlling communication between said communications and the inlet of air thereto, and a cap adjustable on said casing for varying the size of or entirely closing said air-inlets.

3. A combined compression and vacuum relief-valve comprising a casing having air-inlet ports at one end, a valve movable therein having spaced seats, a communication between the casing intermediately of said seats and the steam-chests, a communication between the casing at one end of the valve and the cylinder, and means for varying the size of or entirely closing, the air-inlet ports.

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

EUGENE B. WHELAN.

Witnesses:

WM. C. BOLM,
F. W. BALTHASAR.