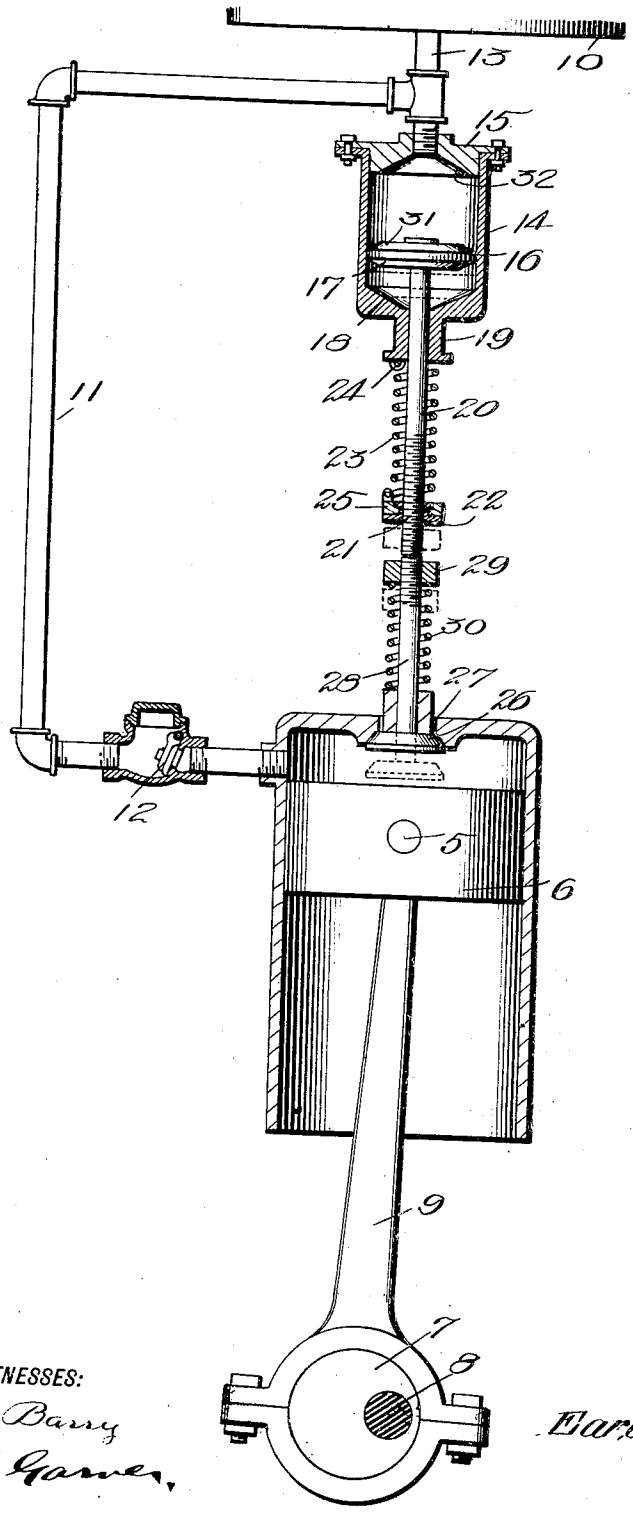
E. W. BROWN.

UNLOADING VALVE.

APPLICATION FILED JUNE 14, 1915.

1,240,664.

Patented Sept. 18, 1917.




WITNESSES:

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# UNITED STATES PATENT OFFICE.

EARL WILLIAM BROWN, OF ANACORTES, WASHINGTON.

## UNLOADING-VALVE.

1,240,664. Specification of Letters Patent. **Patented Sept. 18, 1917.**

Application filed June 14, 1915. Serial No. 34,048.

*To all whom it may concern:*

Be it known that I, EARL W. BROWN, a citizen of the United States, and a resident of Anacortes, in the county of Skagit and State of Washington, have invented a new and useful Improvement in Unloading-Valves, of which the following is a specification.

One of the principal objects of the invention is to provide an improvement in automatic unloading valves for air pumps of the type operated by gas engines and the like, whereby the inlet valve of the air pump is adapted to be actuated and controlled automatically by pressure of air in the tank, in such manner that when the pressure reaches a certain predetermined point, the inlet valve will be opened, whereby the compression of air in the pump will cease during the maintenance of pressure in the tank at said predetermined point, the operation of the device being such that when the pressure in the tank falls below the predetermined point, the inlet valve in the pump will again close, whereby the compression of air by the pump may be resumed.

Another object of the invention is to provide a device of the class described, in the nature of an auxiliary cylinder connected with the air tank, and inclosing a piston so related to the intake valve of the pump cylinder, that the action of the compressed air within the tank will, upon attaining a certain degree of pressure, actuate the piston whereby to operate the intake valve, so as to suspend the compression of air within the pump cylinder.

A still further object of the invention is to provide a device of the class described, which will be extremely simple, durable, efficient in operation and inexpensive to manufacture.

With these and other objects in view, which will become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts hereinafter more fully described and claimed, and illustrated in the accompanying drawing in which like characters of reference indicate like parts throughout the drawing, which represents a vertical, longitudinal, sectional view taken through an apparatus constructed according to my invention.

The device is adapted to be utilized in connection with air pumps operated through the medium of gas engines and the like, and the drawing represents an approved embodiment of the device.

In the drawing, 5 represents the cylinder of an air pump, in which a piston 6 is disposed for reciprocation, said piston being adapted to be actuated through the medium of an eccentric indicated at 7, mounted upon a driven shaft 8 of an engine. The eccentric is connected with the piston through the medium of the usual link 9. It will, of course, be understood that any other suitable means may be utilized for driving the air pump.

At 10 is indicated an air tank, which is connected through the medium of a pipe 11 with the upper end of the pump cylinder 5. A check valve 12 arranged in this pipe prevents return passage of air from the tank to the cylinder. The pipe 11 adjacent tank 10 is connected with a pipe 13, forming a section of the conduit between the tank and pump cylinder, and to the end of this pipe section 13 beyond the point of connection therewith of pipe 11, is suitably connected an auxiliary cylinder 14. The latter is provided with a head 15 through an opening in which the pipe 13 is threaded. Any suitable connection between pipe 13 and the auxiliary cylinder, may, of course, be employed.

A piston 16 is mounted for reciprocation within the cylinder 14, and is provided with a ground under surface 17 adapted to seat against the ground lower end 18 of cylinder 14, when the piston is shifted to the outer extremity of its path of movement to provide an air tight joint. The piston 16 is similarly provided with a beveled ground upper surface 31 adapted to be seated against a ground valve seat 32 provided on the under face of the cylinder head 15, so as to form an air tight joint when the piston is shifted into the inner extremity of its path of movement and against the cylinder head. When the piston is at either end of the cylinder, the coöperation of the ground bevel surfaces with the seat 32 and with the end 18 of the cylinder prevents leakage from the tank 10. Through a suitable bearing 19 provided on the cylinder 14, extends a stem 20 which is rigidly connected with and adapted to be actuated by, the piston 16. Upon the lower threaded end 21 of the stem is turned a suitable adjusting nut 22, between which and the adjacent end of bearing 19 is arranged a retractile spring

23. At its upper end the spring is connected by suitable means, such as a bolt or eye 24, with bearing 19. Spring 23 surrounds stem 20 in the manner shown, and at its lower end is connected with a collar 25 carried and movable with the nut 22 in such manner that by turning the nut in one direction or another, the collar will be shifted longitudinally relatively to the stem 20, whereby to adjust the tension of spring 23. Any suitable device whereby the tension of this retractile spring may be varied at will, may be used in place of the means shown. Arranged in the pump cylinder 5 is an intake valve 26 which controls the passage of air through the ducts 27 to the interior of the pump cylinder. This valve is provided with a stem 28 extending in alinement with and toward the stem 20, and upon the upper threaded end of stem 28 is provided a nut 29, between which and the adjacent pump cylinder head is disposed a coil spring 30 which surrounds valve stem 28 and which tends to keep valve 26 in normal seated position.

As the piston 6 reciprocates within the pump cylinder air will be alternately drawn into the cylinder and compressed and forced through the pipe line 11 into the air tank 10. When the pressure of the air in the tank reaches a predetermined point, it will act upon the piston 16 in such manner as to force the latter downwardly against the tension of spring 23, thus shifting the stem 20 into engagement with the valve stem, and force the intake valve 26 open, so that the compression of air within the pump cylinder will be suspended, although the pump piston may still be working. When the pressure within the tank falls, the spring 23 will withdraw the stem 20 from engagement with valve stem 28 and allow the latter to close through the medium of spring 30, and the pumping action will again be resumed. By adjusting the tension of spring 23 the pressure at which the device will be actuated may be varied, so that the intake valve may be actuated upon a comparatively low pressure point being attained within the tank 10 or upon the attainment of a comparatively high pressure point. Such a device as I have described will eliminate the necessity of watching the gage, ordinarily used, until the pressure is up to the desired point and then stopping the action of the air pump, and will also eliminate the necessity of providing a safety valve in the air tank. The device is entirely automatic in its operation and is capable of adjustment to a very fine degree.

Although I have described the preferred embodiment of my invention, I may desire to make such changes in the construction, combination and arrangements of parts thereof, as do not depart from the spirit of the invention and the scope of the appended claim.

I claim:

In a device of the class described the combination with an air tank and an air pump adapted to compress air within the tank, of an auxiliary cylinder communicating with the air tank and having its opposite ends provided with ground valve seats, a piston mounted for reciprocation in the cylinder and adapted to be controlled by the pressure of air in the tank, said piston having its opposite faces ground whereby to snugly seat against one of the valve seats when the piston is at one end or the other of the cylinder, a stem connected with the piston, the inlet valve of the air pump being in alinement with the stem and having a stem adapted to be engaged by the stem of the piston when said piston is shifted outwardly to open the inlet valve of the pump, a spring normally holding the said valve closed, a spring normally maintaining the piston stem in retracted position, and means for varying the tension of the spring.

EARL WILLIAM BROWN.

Witnesses:
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FRANK O. CLENBURG.