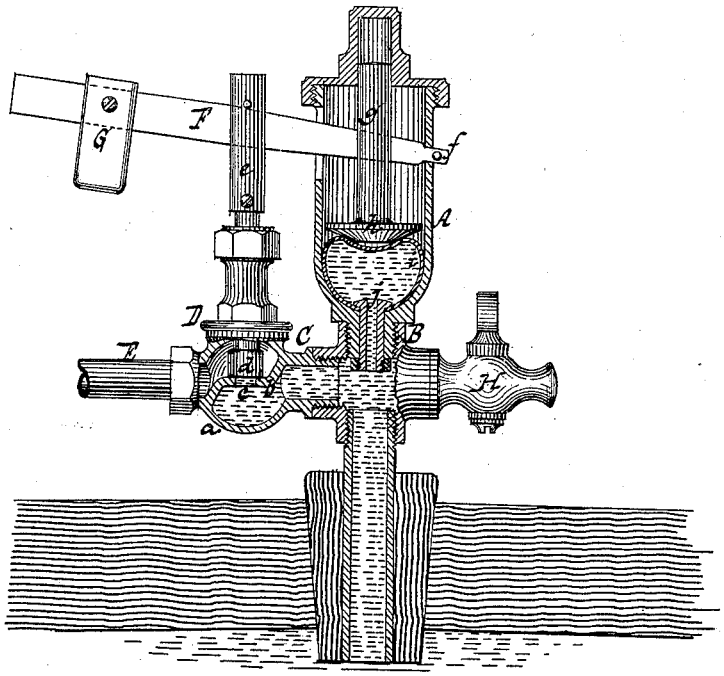
J. C. SCHAEFER.
Safety-Valves.

No. 212,576. Patented Feb. 25, 1879.




Witnesses
Otto Stufeland.
Wm Miller.

Inventor.
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by
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his attorneys.

# UNITED STATES PATENT OFFICE.

JOHN C. SCHAEFER, OF NEW YORK, N. Y.

## IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **212,576**, dated February 25, 1879; application filed December 4, 1878.

*To all whom it may concern:*

Be it known that I, JOHN C. SCHAEFER, of the city, county, and State of New York, have invented a new and useful Improvement in Safety-Valves, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing, which represents a longitudinal vertical section.

This invention consists in the combination, with a discharge-pipe, of an elastic ball or diaphragm arranged to actuate a lever which is connected with a blow-off valve, said lever being provided with a stem resting upon said diaphragm, and depressed by a weight, which has a tendency to keep the blow-off valve closed, so that the position of said blow-off valve is regulated by the pressure acting on the elastic ball or diaphragm, and that when the blow-off valve is forced down a slight diminution in the pressure allows the same to close. The discharge-pipe permits an exhaust independently of the blow-off valve.

Safety-valves are usually constructed with conical faces fitting corresponding conical seats; and if such a valve is closed, its inner smallest surface is exposed to the action of the pressure produced by steam, compressed air, or other liquids or fluids under pressure. If a valve of this class is adjusted so that it will be raised when the pressure reaches a certain point, the steam or other fluid flows off whenever the pressure exceeds this point; but as soon as the valve has been raised from its seat the surface of the valve which becomes exposed to the pressure of the steam or other fluid is increased, and the valve does not return to its seat until the pressure is reduced considerably below the point to which the valve has been adjusted—that is to say, if the valve has been set to, say, seventy pounds, it will commence to blow off as soon as the pressure rises to a little above seventy pounds; but after the valve has been raised from its seat it will continue to blow off until the pressure has been reduced to sixty-five pounds, or even less, according to the diameter of the valve. This difficulty is well known; but in safety-valves for steam-boilers it is of little consequence. But if a safety-valve is to be used for very low pressures—for instance, in ripening casks for lager-beer, where the pressence of carbonic acid generated in said casks does not exceed four pounds to the square inch—it becomes of the greatest importance that the valve shall blow off exactly at the point desired, and that it shall close down upon its seat immediately when the pressure has been reduced a little below said point. This object I have attained by my safety-valve, which is intended more particularly for ripening casks, but which may also be used for other purposes.

In the drawing, the letter A designates a chamber which connects by a pipe, B, with the cask or other vessel in which a uniform pressure is to be maintained. From the pipe B extends a branch pipe, C, to which is secured a safety-valve, D. This safety-valve consists of a shell, *a*, which is divided by a partition, *b*, in two compartments, one of which communicates with the branch pipe C, and the other with the blow-off pipe E.

In the partition *b* is an opening, *c*, which is closed by the valve *d*, and the valve-stem *e* straddles a lever, F, which extends through the chamber A, and on which is secured an adjustable weight, G, which is set to hold the valve *d* down upon its seat.

The lever F has its fulcrum at a point, *f*, in the side of the chamber A, and it extends through the stem *g*, having a head, *h*, that rests upon an elastic ball or diaphragm, *i*, secured in the bottom part of the chamber A, which special arrangement is not particularly or specifically claimed herein; nor do I claim anything shown in the patent of A. De Beaumont, dated April 6, 1875. A small channel, *j*, permits the gas or other fluid contained in the cask or other vessel to act on the elastic ball or diaphragm *i*. The weight G is so adjusted that it firmly depresses the valve *d* upon its seat, and that the elastic ball or diaphragm is slightly depressed by the head *h*. If the pressure in the cask or other vessels rises, the elastic ball or diaphragm causes the stem *g* to rise, and the valve *d*, being relieved of the pressure of the weight G, blows off; but as soon as the pressure in the cask recedes the elastic ball or diaphragm is again compressed, and the valve *d* is returned to its seat by the action of the weight G.

It will be seen from this description that

the time when the valve *d* blows off or returns to its seat depends upon the action of the gas upon the elastic ball or diaphragm *i;* and since the exposed area of this ball or diaphragm remains uniform at any pressure, and, furthermore, such area is much larger than the area of the valve *d*, the weight G can be readily so adjusted that the valve *d* blows off as soon as the pressure reaches the required point, and that when the pressure recedes the valve *d* will be immediately closed by the action of said weight, the position of which is controlled by the elastic ball or diaphragm.

For the purpose of discharging the casks, to which my safety-valve is applied, I provide a second branch pipe, H, which can be connected to an air-forcing apparatus.

What I claim as new, and desire to secure by Letters Patent, is—

The combination of the chamber A, having a ball or diaphragm and a pipe-extension, a plunger arranged within said chamber and connected to a weighted lever, a safety-valve, also connected to said lever and applied to an opening in the pipe C, which is a branch of the pipe-extension of chamber A, and the pipe H, branching also from said extension, and provided with a suitable cock, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 29th day of November, 1878.

JOHN C. SCHAEFER. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.