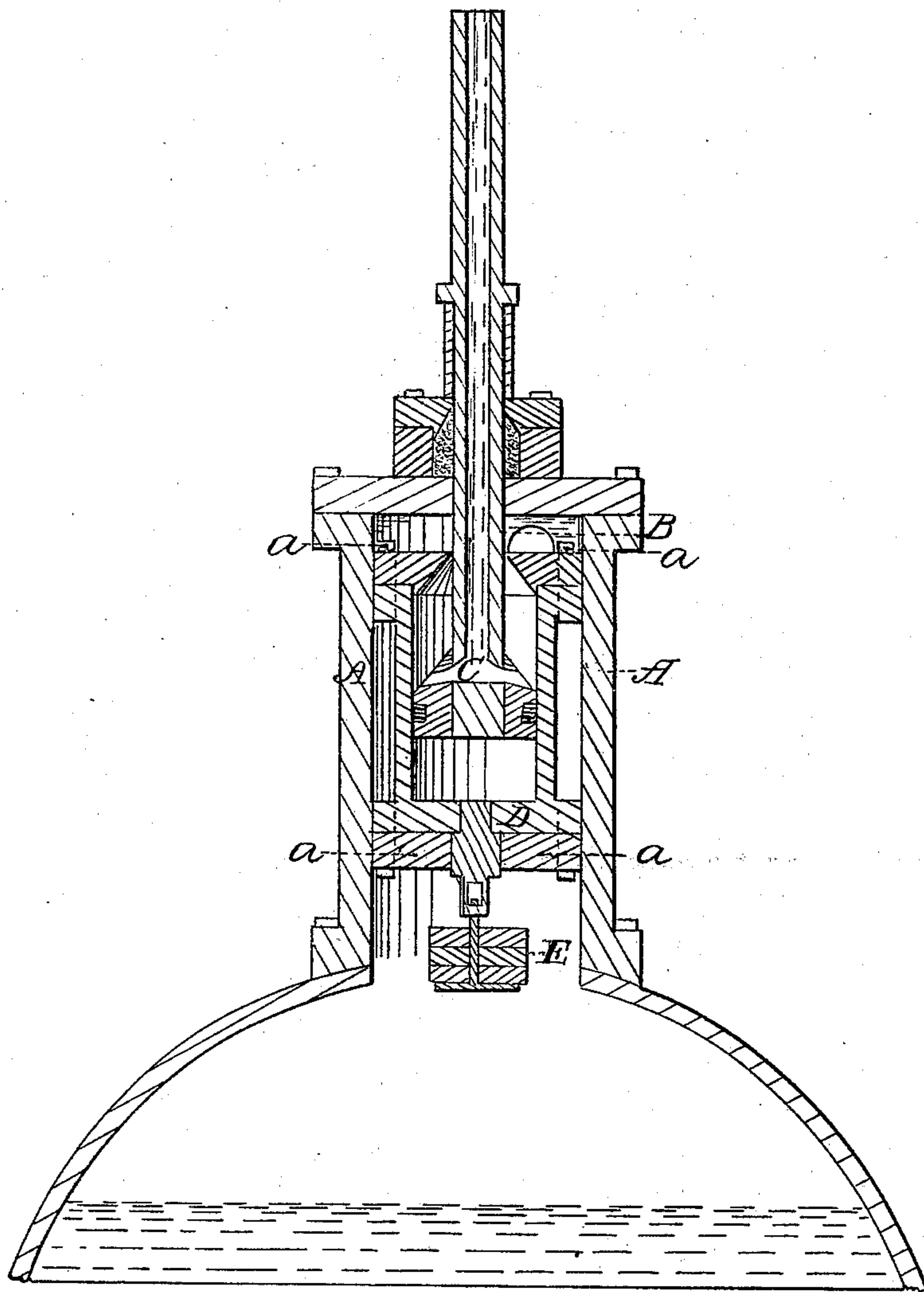


*J. Mc Clintic,*  
*Steam Safety Valve.*  
*Nº 8,923.      Patented May 4, 1852.*





# UNITED STATES PATENT OFFICE.

JOHN McCLINTIC, OF PHILADELPHIA, PENNSYLVANIA.

## DIFFERENTIAL SAFETY-VALVE.

Specification of Letters Patent No. 8,923, dated May 4, 1852.

*To all whom it may concern:*

Be it known that I, JOHN McCLINTIC, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a novel, useful, and Improved Safety-Valve for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and letters marked thereon, forming a part of this specification, which represents a vertical section of the same with a portion of a boiler.

The object of my invention is to construct and apply a safety valve to a steam-boiler which shall prevent the possibility of overloading, or working steam at a higher pressure than the capacity of the boiler will allow, and which will not admit of any exterior pressure or weight applied in any way or manner to secure or fasten it down so as to prevent its sure and faithful action when said pressure exceeds the fixed standard of the capacity of the boiler.

It consists of a cylinder or case A firmly secured to the boiler to receive the safety valve, having a stuffing box through which passes a tubular valve rod B carrying a conical valve C. This valve has for its seat the upper end or head of a steam-tight movable cylinder box D, which serves at once to close the passages to the lower end of the tubular valve rod, and also, acts as a weight, which weight may be increased by suspending small weights E from its bottom. This cylinder box D or weight will be elevated when the excess of pressure on the surface of its under head above that on the surface of its upper head shall be superior to the weight of the movable cylinder box itself and weights attached thereto. The steam then finds a passage up the sides of the cylinder box D through openings cut through the flanges of the same shown in dotted lines *a, a*, and around the valve rod into the movable cylinder box D and then out through the tubular valve rod into the open air.

Thus it will be seen that the action of my valve depends upon the difference in areas of the surface of the upper and lower heads of the cylinder box D and its own weight. By proportioning these any desired degree of pressure to the inch can be determined to suit the capacity of the boiler.

The steam having free access to the upper head of the cylinder box D through openings in the flanges thereof as well as its

bottom. We will suppose that the valve is designed to blow off when the pressure exceeds 20 lbs. to the inch. Now to do this, the area of the lower head of the cylinder box must be 8 inches and the upper 7 and the weight of it 20 lbs. When the pressure reaches 20 lbs. to the inch it will be equal to 160 pounds on the lower head and 140 pounds on the upper head, 20 lbs. less on the upper than on the lower consequently there will be an equilibrium the cylinder being equal in weight to the difference in pressure on the upper and lower heads viz. 20 lbs., but as soon as the pressure exceeds 20 pounds to the inch it will produce an excess of pressure on the lower end of the cylinder box and elevate it and allow the excess to escape. Thus the steam is discharged when the pressure of steam within the boiler exceeds the fixed standard corresponding with the capacity of the boiler and no capricious management or maneuvering of the engineer can prevent its faithful, sure, and certain action.

When the cylinder box is elevated and steam is allowed to escape an additional capacity is given to the boiler equal to the capacity of the hollow surface of the cylinder box D in which the conical valve works which is an advantage.

An ordinary safety valve may be used in addition to my improved valve for the purpose of blowing off at the end of the trip or exhausting the boilers of steam when desired.

Having thus fully described my improved safety valve I would state that I do not claim constructing a valve that shall act upon the differential principle or one which will not admit of the application of external weight or pressure, but

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

The peculiar arrangement and combination of the hollow cylinder box D sliding in case A, with the conical valve and tubular valve rod and escape pipe B constructed and operating substantially as in the manner and for the purpose herein fully set forth.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

JOHN McCLINTIC.

Witnesses:

T. S. SMITH,  
H. H. YOUNG.