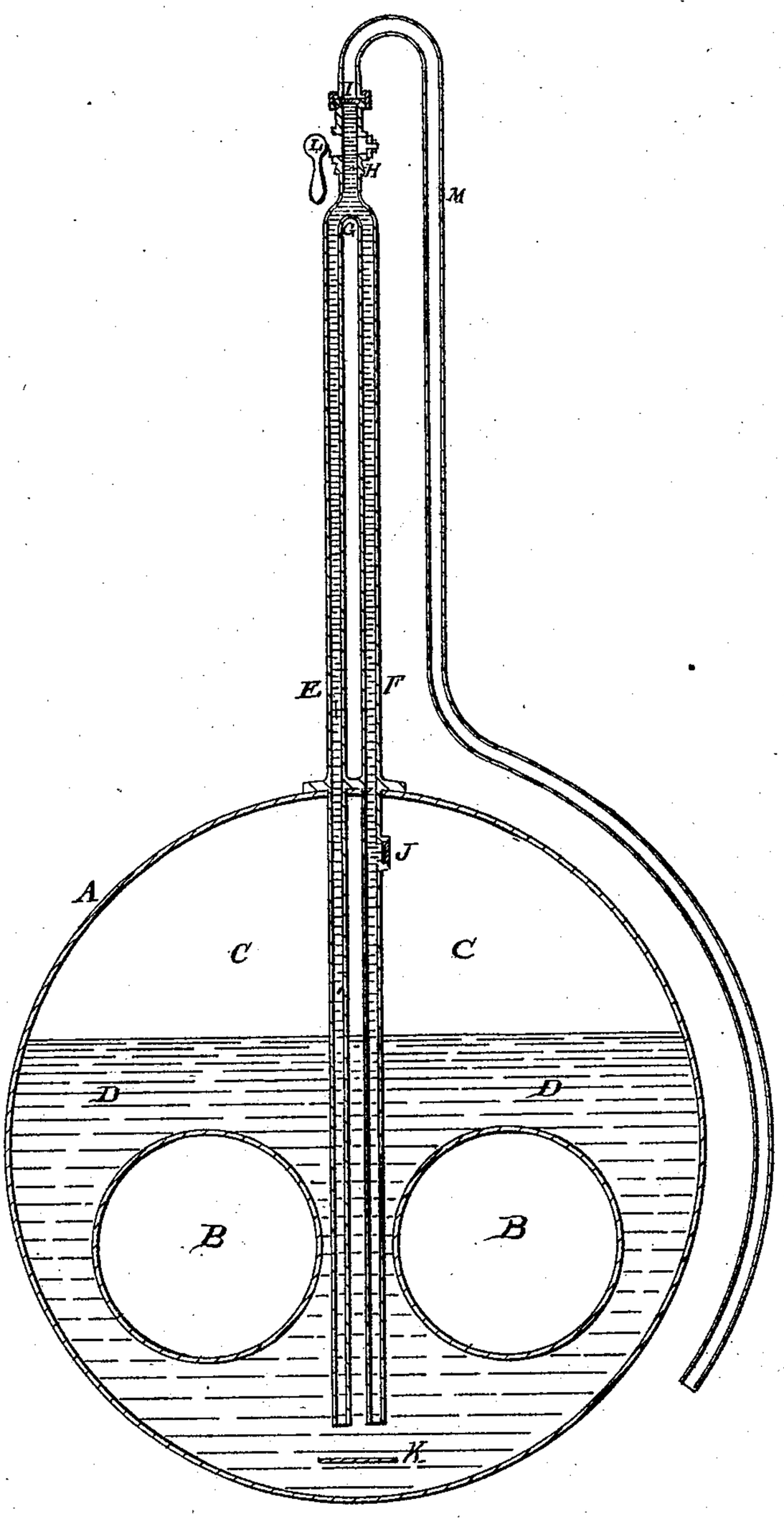
W. Burnett,

Steam Safety Valve.

No. 10,589. Patented Mar. 7, 1854.



UNITED STATES PATENT OFFICE.

WILLIAM BURNETT, OF BOSTON, MASSACHUSETTS.

ARRANGEMENT OF FUSIBLE PLUGS OR DISKS FOR STEAM-BOILERS.

Specification of Letters Patent No. 10,589, dated March 7, 1854.

To all whom it may concern:

Be it known that I, WILLIAM BURNETT, of Boston, in the county of Suffolk, in the State of Massachusetts, have invented a new and Improved Mode of Applying Fusible Plugs or Disks to Steam-Boilers for the Purpose of Preventing Explosion; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, and to letters of reference marked thereon.

The nature of my invention consists in a peculiar arrangement of plugs or disks of fusible alloy, which insures that they will melt with great certainty and accuracy; and by which the difficulties found in the use of such plugs or disks, as generally applied, are obviated, viz., liability to be forced from their seat, by the pressure of the steam, before the fusing point is actually arrived at, and, also, from being exposed to a high temperature, the great liability to have the more fusible metal of the compound, forced, by the pressure of the steam, out of the interstices of the metal combined with it, leaving a porous metal which is not easily fused, and therefore unable to perform its intended function.

To enable others skilled in the art to make and use by invention, I will proceed to describe its construction and operation, reference being had to the accompanying drawing, which is a transverse section of a common cylindrical boiler with two internal return flues.

A, A, represents the boiler; B, B, two return flues.

C, C, represents the steam, and D, D, the water.

Through the top of the boiler are inserted two pipes, E, and, F, which reach so low in the boiler as to prevent the steam above the surface of the water from ever entering at the ends thereof. At G, the pipes, E, and, F, are united in the pipe H, which is stopped up, in any convenient manner, by a plug or plate of fusible alloy, I, which is so compounded as to fuse at a temperature much lower than that to which it is intended to limit the steam in the boiler. The plug or plate J, is that which is to measure the temperature of the steam, and is so compounded as to fuse at the highest pressure the boiler is intended to sustain. As this plug, J, has not to withstand the pressure of the steam, it should be made thin, as thereby great certainty of fusing at the proper temperature is attained; it should also be slightly beveled on the edge, having its seat of a corresponding form, and should be driven into its place firmly, so as to be water tight.

K, is a small plate attached either to the pipes, E and F, or to the boiler, as may be found convenient, to prevent the steam generated on the surfaces below from entering the said pipes.

The operation of my invention is as follows: The lower ends of the pipes E and F, being open, and always immersed, the pressure of steam on the surface of the water will force it up into said pipes, and as far as the plate of fusible metal, I, which will prevent its further egression and although the plate, I, is compounded so as to melt at a much lower temperature than that of the steam and water in the boiler, its distance from the boiler is such that by a free exposition of the intermediate pipes to the atmosphere the temperature of the water contained therein is so far reduced by radiation as to preserve said plate from being fused. But if the steam in the boiler should ever reach its assigned limit of temperature, the plate of fusible metal, J, will be melted from its seat, and the water contained in the pipe, F, above this point, will be discharged through the pipe E, into the boiler, and the steam of the boiler, entering at J, will be rapidly brought in contact with the plug or plate I, which will readily fuse, and permit the steam to pass through the pipe M, into the furnace, for the purpose of extinguishing the fire therein. The stop cock, L, may or may not be used, but is here employed to stop the flow of steam into the furnace when the fire therein has been sufficiently extinguished. The great advantage of this arrangement consists in bringing the pressure of the steam on both sides of the plate of fusible metal, J, whereby decomposition of the alloy, from being exposed to the temperature of the boiler, and at the same time having the pressure only on one of its sides, is prevented. It also has the advantage of the alloy giving way accurately at its fusing point, and not at a lower temperature, as is the case when subjected to pressure, which temperature cannot be known with certainty, as it will vary with the size and thickness of the plate.

I do not claim to have invented the application of fusible plates to steam boilers, for the purpose of permitting the steam to escape when it has reached any assigned limit. Nor do I claim to have invented the method here described of preventing the plate, which is remote from the boiler, from being fused by the heat of the boiler.

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

The application to steam boilers of two plates or plugs of fusible alloy, arranged as herein described, one of said plates being remote from the boiler, and the other in the interior thereof, by which arrangement the pressure of the steam is admitted on both sides of the interior plate, in the manner and for the purposes herein specified.

WILLIAM BURNETT.

Witnesses:
J. H. THOMPSON,
JOHN C. PAIGE.