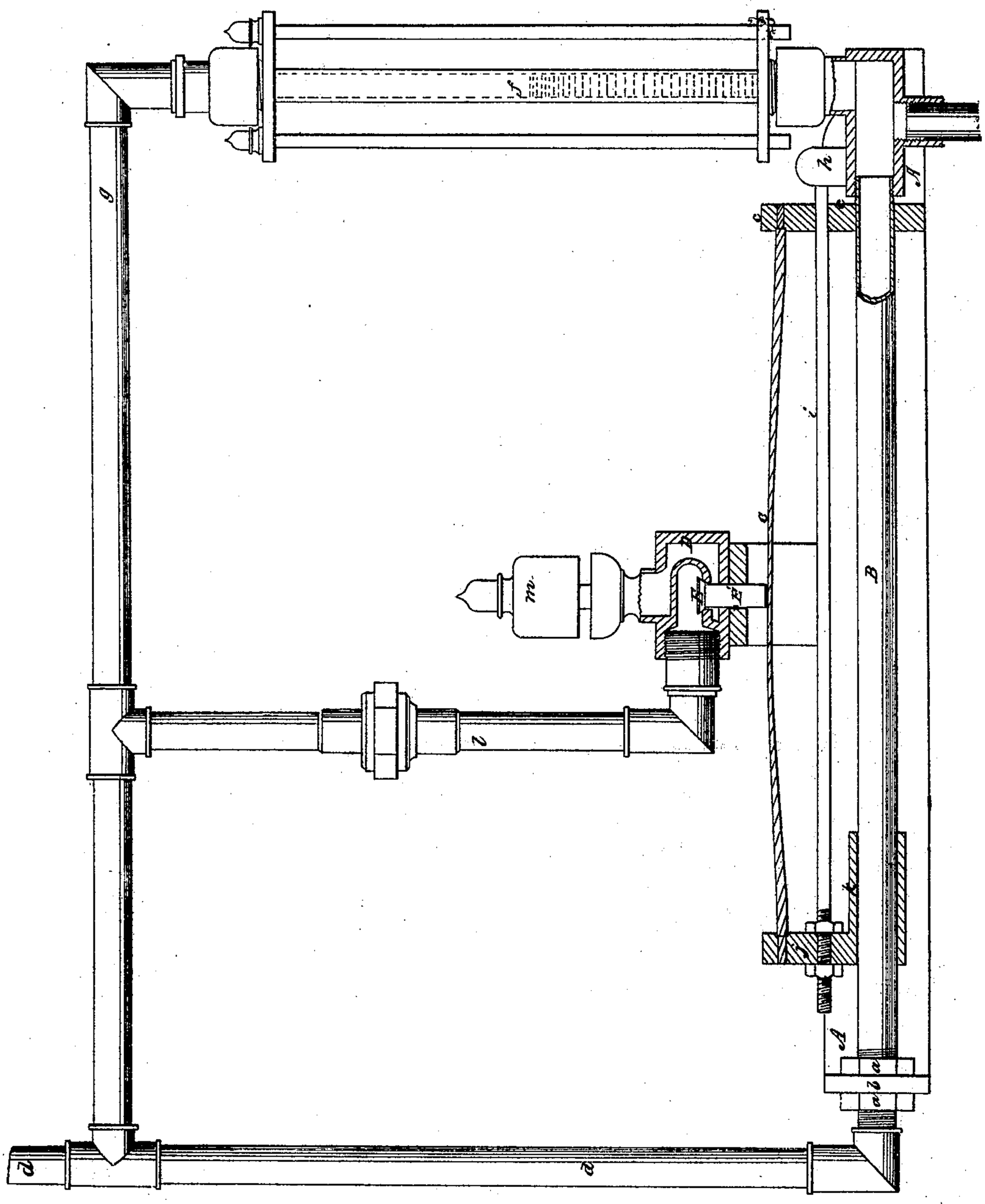
S. W. Warren.

Steam Indicator.

No. 20,835. Patented Jul. 6, 1858.



UNITED STATES PATENT OFFICE.

S. W. WARREN, OF BROOKLYN, NEW YORK.

STEAM-ALARM AND SAFETY APPARATUS.

Specification of Letters Patent No. 20,835, dated July 6, 1858.

To all whom it may concern:

Be it known that I, SYLVESTER W. WARREN, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and Improved Means of Operating the Valves of Alarm Water-Gages, Safety-Valves, and Feeders for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, said drawing representing a front view, partly in section, of an alarm water-gage with my invention applied.

This invention consists in a certain method of applying a spring in combination with a valve, and with a tube, one end of which is connected with the upper part constituting the steam space of a steam boiler, and the other with the lower part of the water space thereof, the said tube being arranged just below the proper water level of the boiler, so that it will remain full of water till the water in the boiler gets below the proper level, but at such a distance from the boiler that the water supplied to it by the boiler will never be at as high a temperature as the water in the boiler itself, when the steam is up in the boiler. When the water gets below the proper level in the boiler, the water leaves the tube and steam fills it and thereby causes an increase of its temperature by which it is caused to expand longitudinally and by its expansion made to act upon the spring to move the valve and permit the escape of steam to sound an alarm whistle or to open a feed pipe.

To enable others to make and use my invention I will proceed to describe its construction and operation.

A, is a plate of metal which is intended to be bolted to the wall of the engine room or other convenient place at some distance from the boiler, the said plate having a small bracket *b*, at or near one end to which is secured rigidly by nuts *a*, *a*, one end of the horizontal metal tube B, the top of which is intended to be on a level with what is considered the lowest safe water level in the boiler, and the said plate having at or near its other end a bracket *c*, in which is an opening through which the said tube is capable of working longitudinally but in which it is supported and confined vertically and laterally. The first named end of the tube B, is connected by a pipe *d*, with the upper part or steam chamber of the boiler and the other end by a pipe *e*, with the lower part of the boiler, and the latter end has connected with it the lower end of a glass tube *f*, the upper end of which is connected by a pipe *g*, with the steam pipe *d*.

h, is a small upright post or standard secured firmly to the free end of the tube B, outside of the bracket *c*, of the plate A, and having attached securely to it a rod *i*, which passes freely through an opening in the bracket *c*, and which is attached securely to the arm *j*, of a socket *k*, which is fitted to slide freely upon the tube B; the said rod being nearly as long as the said tube and occupying a position parallel therewith.

C, is a slightly arched steel spring the ends of which are fitted into and confined between the stationary bracket *c*, and the arm *j*, of the socket *k*. Above the center of the arched spring C, is situated a valve box D, containing a valve E, which is arranged to open and close a communication between a branch pipe *l*, from the steam pipe *g*, to a whistle *m*, the stem of which valve protrudes through an opening in the bottom of the box.

The operation of the alarm is as follows: When the water in the boiler is at a proper level the tube B, is full, but being arranged at a distance from the boiler there will be little or no circulation in it, and the water within it will remain comparatively cool, and in that condition of the tube the spring C, will remain near but out of contact with the valve stem E′, and the valve E, will be kept closed by the pressure of steam admitted to the part of the box D above it, by the pipe *l*, but so soon as the level of the water in the boiler gets below the tube B, the water will run by gravitation from the said tube down the pipe *e*, and its place will be supplied by steam, which being hotter than the water that has been contained by the tube causes the tube to expand. The movement of the tube being prevented in one direction by the nuts *a*, *a*, the expansion moves the free end through the guide in the bracket *c*, and moves the post *h*, which by means of the rod *i*, draws the socket *k*, along the tube B, toward the bracket *c*, and thus shortens the distance between the bearings of the spring C, and causes the said spring to become more deflected or arched and to rise at its center

and come in contact with the stem of the valve E, and push open the said valve, thus admitting steam to the whistle and giving the alarm. A very considerable deflection of the spring is produced by a very slight approach of its ends and hence a comparatively slight amount of expansion of the tube B, beyond a certain point serves to give a wide opening to the valve. When the tube B, is again filled with water it soon becomes cooler and contracts again, thus causing the elongation of the distance between the bearings of the spring E, and permitting the descent of the central portion of the spring, and the closing of the valve by gravitation aided by the pressure of steam.

By the above description of the method of applying my invention to the alarm gage, any engineer of ordinary skill will be enabled to adapt it to feeders or safety valves, it being only necessary to substitute for the whistle and valve E, a valve in the feed pipe, or a connection with a safety valve.

I do not claim the expanding tube nor any of the parts that have heretofore been used in boiler alarms. But—

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

The arrangement and combination, substantially as herein shown and described, of the arched or curved spring C, valve E, and tube B, for the purposes set forth.

SYLVESTER W. WARREN.

Witnesses:

M. H. Hughes,

J. W. Coombs.