

(No Model.)

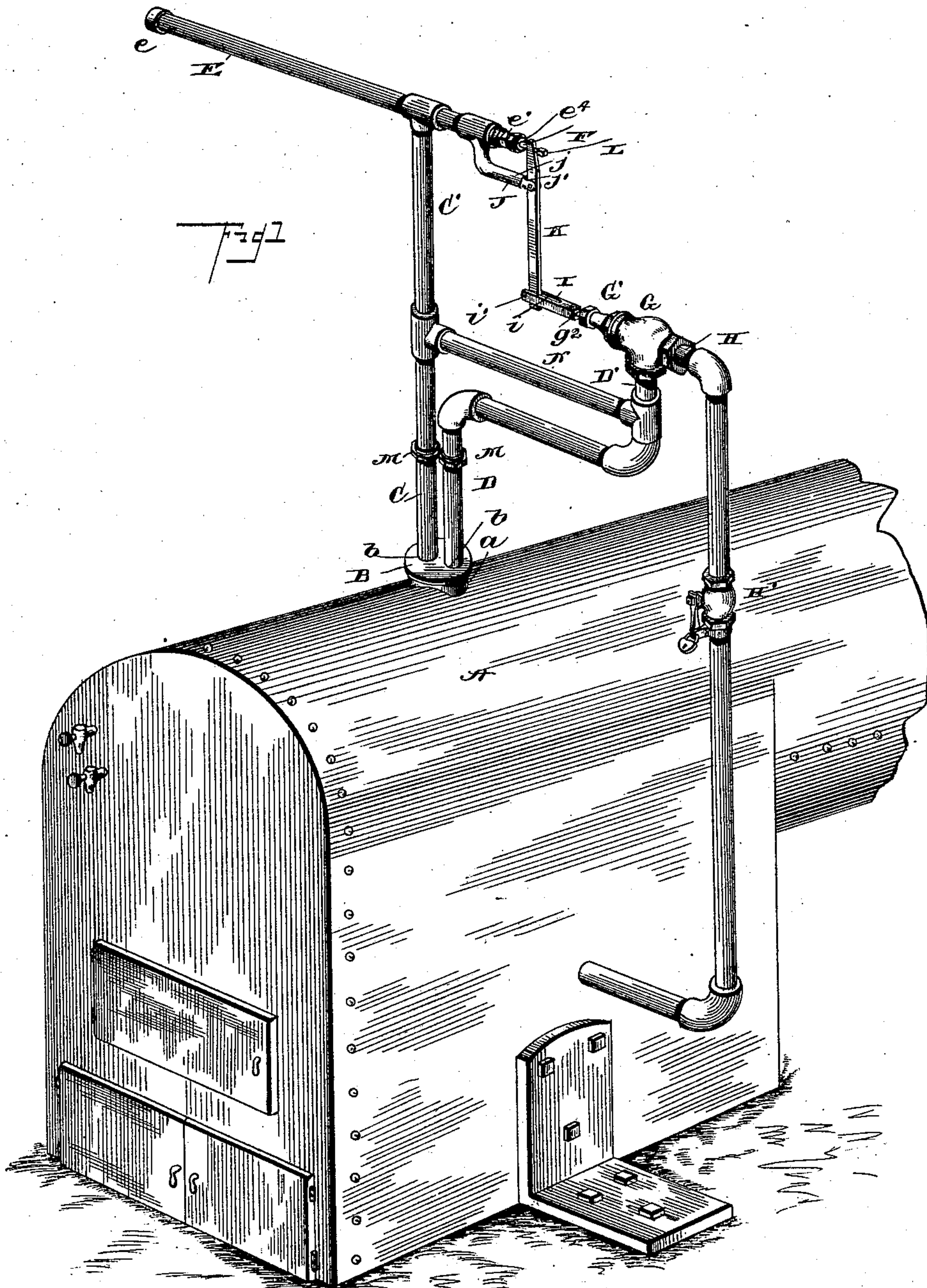
2 Sheets—Sheet 1.

F. G. PARKINSON & A. H. MERCER.

SAFETY DEVICE FOR STEAM BOILERS.

No. 466,365.

Patented Jan. 5, 1892.



Witnesses

John D. Smith
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Inventors

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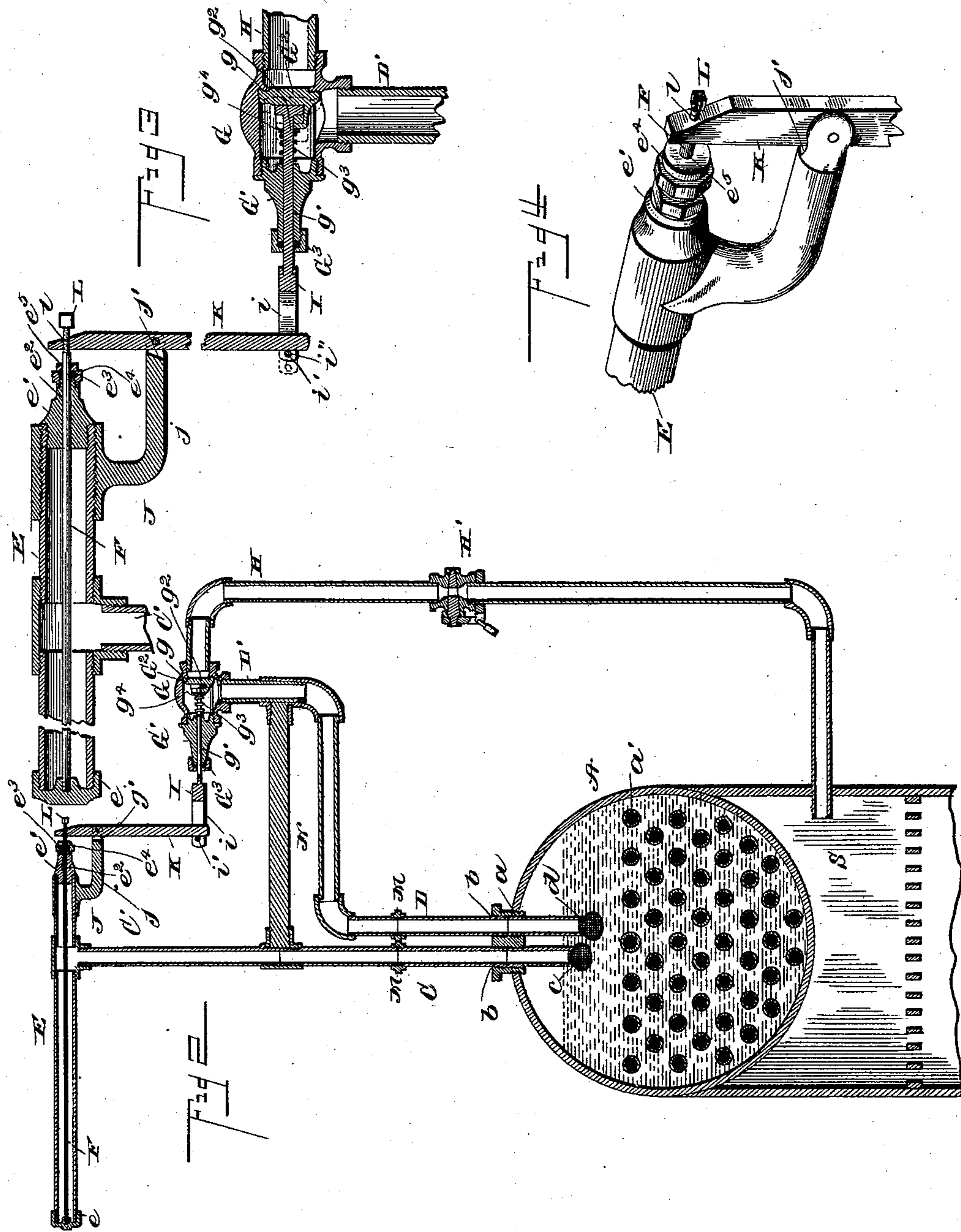
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UNITED STATES PATENT OFFICE.

FREDERICK G. PARKINSON AND ANDREW H. MERCER, OF BUFFALO, NEW YORK, ASSIGNORS OF ONE-THIRD TO WILLIAM J. PARKINSON, OF SAME PLACE.

SAFETY DEVICE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 466,365, dated January 5, 1892.

Application filed November 18, 1890. Serial No. 371,847. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK G. PARKINSON and ANDREW H. MERCER, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Safety Devices for Steam-Boilers; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of safety devices or attachments for steam-boilers which are designed to extinguish the fire before the water within the boiler reaches a low or dangerous point.

The object of the invention is to provide a simple and improved device of this character which shall be thoroughly automatic in its operation, designed to utilize the water from the boiler to extinguish the fire, and which is adapted to resume its normal state when water is pumped into the boiler above a given level.

A further object of the invention is to provide a safety device of this character of simple and inexpensive construction and which is adapted to be readily applied to the various constructions of boilers.

To this end our invention consists, substantially, of a steam-pipe and a water-pipe projecting within the boiler, the former being provided with an expansion rod or tube and the latter with a valve, and a lever connected with the valve and adapted to be operated by the expansion-rod, as will be hereinafter more fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a perspective view illustrating the application of our invention. Fig. 2 is a vertical transverse sectional view of Fig. 1. Fig. 3 is an enlarged detail sectional view of parts of Fig. 2, the operation being illustrated in dotted lines. Fig. 4 is a detail perspective view.

Corresponding parts in all the figures are denoted by the same letters of reference.

Referring to the drawings, A designates a boiler tapped at a suitable point thereon, as shown at *a*, and into the opening thus formed

is screwed a plug B. The latter is provided with two apertures *b b*, within which are fitted the lower sections C D, respectively, of a steam-pipe and a water-pipe. The sections of pipes just referred to project within the boiler, and are provided at their inner ends with strainers *c d*, respectively, the water-pipe section D extending a short distance below the steam-pipe section C, but terminating some distance above the boiler-flues *a'*, the purpose of which will be hereinafter set forth.

To the outer end of the steam-pipe section C is connected a second section C', which carries at its free end a barrel or pipe E, disposed at right angles thereto and having communication therewith. The barrel or pipe E projects for its greatest length in a direction opposite to the position occupied by the water-pipe in its relation to the steam-pipe, and is provided at its further end with a cap or head *e*. The opposite end of the barrel or pipe E is provided with a head *e'*, having a central bore *e²*.

F designates a centrally and longitudinally disposed expansion rod or tube located within said barrel. The rod or tube F is secured rigidly at one end to the cap or head *e*, from which it extends entirely through the barrel, through the bore of the head *e'*, and projects a short distance beyond the latter. The expansion-rod is of slightly less diameter than the bore *e²* to permit movement of the rod therein when said rod is expanded, and to prevent escape of steam through the bore the head *e'* is provided in its outer face with a recess *e³* for the reception of packing. A cap *e⁴* is screwed upon the exterior of the head *e'* for the purpose of compressing the packing closely around the expansion-rod, said cap being provided with a bore *e⁵*, through which the end of the rod passes. In practice the expansion-rod may be constructed of any suitable metal; but we prefer to employ such combination of metals as will be most sensitive in their action.

D' designates a section of pipe connected with the water-pipe section D at its outer end, said section D' carrying at its free end a valve-casing G, the latter having a valve-seat

g. The outlet of the valve-casing is tapped by a delivery-pipe II, leading to the fire-box S of the boiler and arranged therein in any suitable or preferred manner. The valve-casing G is closed by a sleeve G', the latter being provided with a central bore g'. A valve G² is normally seated upon the valve-seat g, and has its stem g² projecting through and working in the bore of the sleeve G'. For normally holding the valve to its seat a coil-spring g³ is provided, which encircles the interior portion of the valve-stem and bears against the inner face of the sleeve G' and a washer g⁴ interposed between said spring and the adjacent side of the valve. A packing-collar G³ is mounted upon the exterior end of the sleeve G' and is adapted to contain packing to prevent leakage from the casing G.

The exterior end of the valve-stem is provided with an enlarged extension I, bifurcated from its free end for nearly its whole length, forming a slot i, the latter being closed at its open end by a pin i', passed through apertures i'' i''' therefor in said extension.

Upon the end of the barrel or pipe E nearest the valve is provided a right-angular standard J, having its free arm j extending parallel with the end of the barrel to which it is connected and beyond the same. The latter end of the standard is bifurcated, forming a slot j' in a plane with a line taken through the sectional center of the barrel. Within the slot j' is pivoted a lever K, the location of the standard being such that when the lever is secured thereto its respective ends bear against the projecting end of the expansion-rod and engage the slot of the valve-stem.

The lever K is so arranged or pivoted that when the end thereof bearing against the expansion-rod is actuated by the latter the movement of the opposite end or the end actuating the valve is tripled. Thus, for instance, should the longitudinal expansion of the rod E equal one-eighth of an inch the valve would consequently be withdrawn from its seat three times that distance or three-eighths of an inch. The stroke of the valve, however, is readily controlled by means of a set-screw L, passed through a threaded eye l in the end of the lever adjacent to the expansion-rod, the opposing end of said screw bearing against the end of said rod. The adjustment of the screw toward the expansion-rod lengthens the stroke of the valve, while a contrary adjustment effects a contrary result.

The sections C' and D' of the steam-pipe and the water-pipe are connected with the sections C and D by unions M M, and said sections C' and D' are braced by a connecting rod or pipe N. The entire exterior part of the mechanism may be inclosed by a casing, (not shown,) and being thus placed beyond interference by the engineer positive automatic operation will ensue in case of danger from low water.

The delivery-pipe H is provided with a lock-

valve H' to further insure safety, the key of which may be under the control of the proper person. When the valve is locked, the delivery-pipe is in condition to permit the passage of water therethrough, the lock-valve being designed to be closed only in case of accident.

The operation and advantages of our invention will be readily understood by those skilled in the art to which it appertains. As the water within the boiler lowers below a given point, the interior end of the steam-pipe is partially cleared. In this state the steam passes up through the pipe and acts on the expansion rod or pipe to expand the same. By the expansion of said rod the lever is operated, which in turn opens the valve, thus permitting water from the boiler to pass through the water-pipe and delivery-pipe and into the fire-box, extinguishing the fire therein.

Action of the device is checked when water is pumped into the boiler to a level above the end of the steam-pipe. Steam is thus shut off from the latter, when the expansion-rod cools and contracts, permitting the valve to be forced to its seat by the tension of the spring bearing thereon.

It will thus be obvious that the device is entirely automatic in its operation, and that by reason of the pipes terminating above the boiler-flues the action of the device ensues before the water is permitted to descend below said flues, thus preventing subjection of the latter to the action of heat when not surrounded by water.

The mechanism is simple and durable in its construction, positive in its operation, and its various parts are such as will render the cost of manufacture comparatively inexpensive.

We claim as our invention—

1. In a safety device for steam-boilers, the combination, with the boiler and fire-box, of a water-pipe connecting the same and provided with a valve, a steam-pipe carrying a barrel or pipe, an expansion rod or tube located in the latter, secured thereto at one end and projecting therefrom at the opposite end, and a lever connecting the valve and the expansion rod or tube, substantially as and for the purpose set forth.

2. In a safety device for steam-boilers, the combination of the steam-pipe carrying a barrel or chamber, an expansion rod or tube disposed in the latter, secured thereto at one end and projecting therefrom at the opposite end, a water-pipe, a valve interrupting the latter, a lever connecting the valve and expansion rod or tube, and an adjusting-screw passing through one end of the lever and opposing said expansion rod or tube, substantially as and for the purpose set forth.

3. In a safety device for steam-boilers, the combination of the T-shaped steam-pipe, an expansion rod or tube disposed in the outer arm thereof, said rod or tube being secured

at one end in said arm and having its opposite end projecting therefrom, a water-pipe, a valve interrupting the same and having its stem parallel with the expansion rod or tube, and a pivoted lever connecting the latter with the valve-stem, substantially as and for the purpose set forth.

4. In a safety device for steam-boilers, the combination of a steam-pipe adapted to project within the boiler and having its inner end provided with a strainer, a barrel or pipe carrying an expansion-rod projecting from one end thereof, a water-pipe adapted to project within the boiler below the steam-pipe and carrying a strainer at its interior end, said pipe affording communication between the boiler and fire-box, a spring-held valve in

said pipe, a pivoted lever connected with said valve at one end and having its other end bearing against the exterior end of the expansion-rod, an adjustable screw in the latter end of the lever, adapted to bear against the expansion-rod, and a lock-valve in the water-pipe between the first-mentioned valve and the exterior end of said pipe, substantially as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

FREDERICK G. PARKINSON.
ANDREW H. MERCER.

Witnesses:

FRED. F. KOEHLER,
SILAS J. DOUGLASS.