

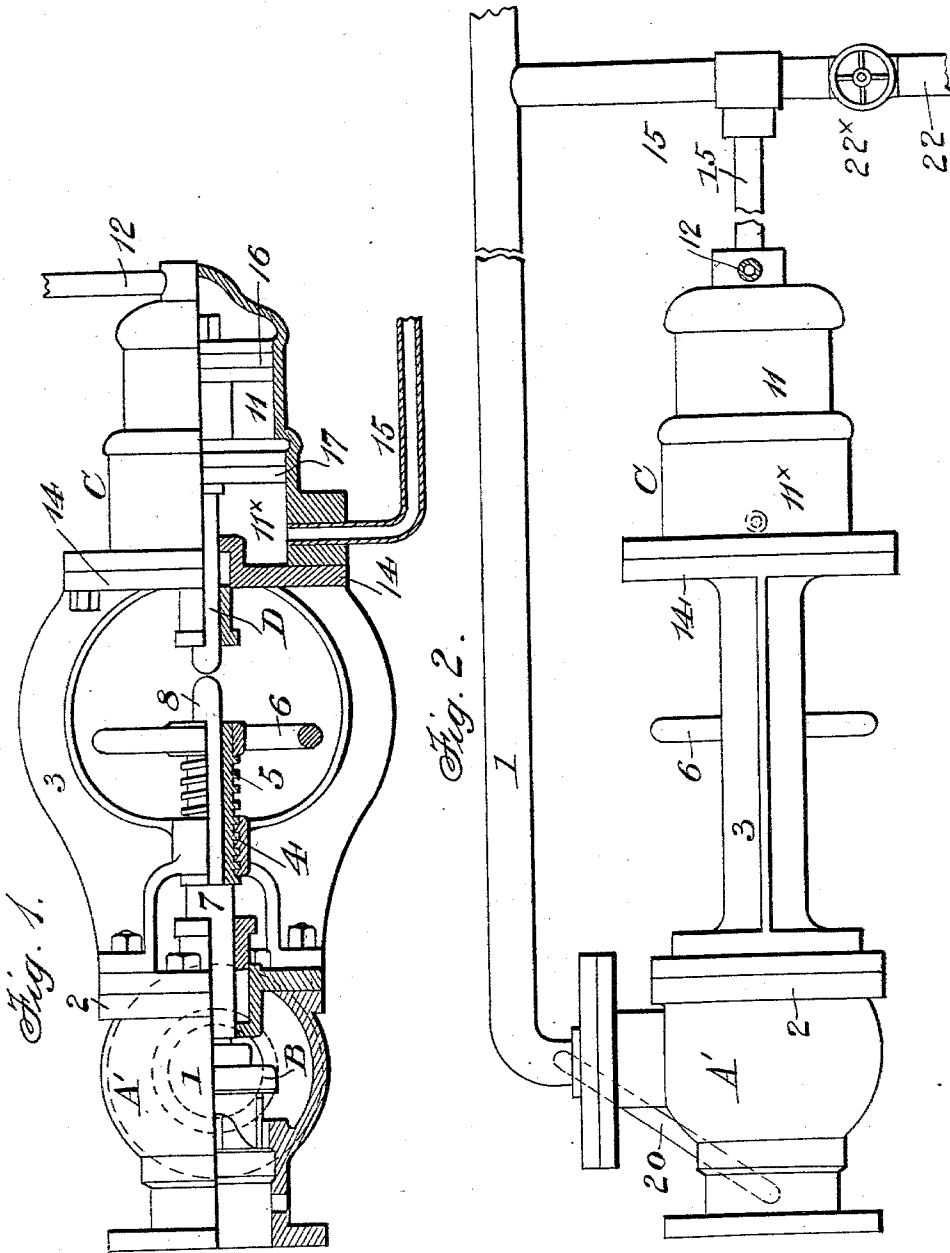
(No Model.)

2 Sheets—Sheet 1.

G. J. N. CARPENTIER.
SAFETY DEVICE FOR STEAM BOILERS.

No. 569,811.

Patented Oct. 20, 1896.



Witnesses
Frank L. Curand.
A. G. Kieffer.

Inventor
Georges J. N. Carpentier
by J. M. Yznaga.
Attorney

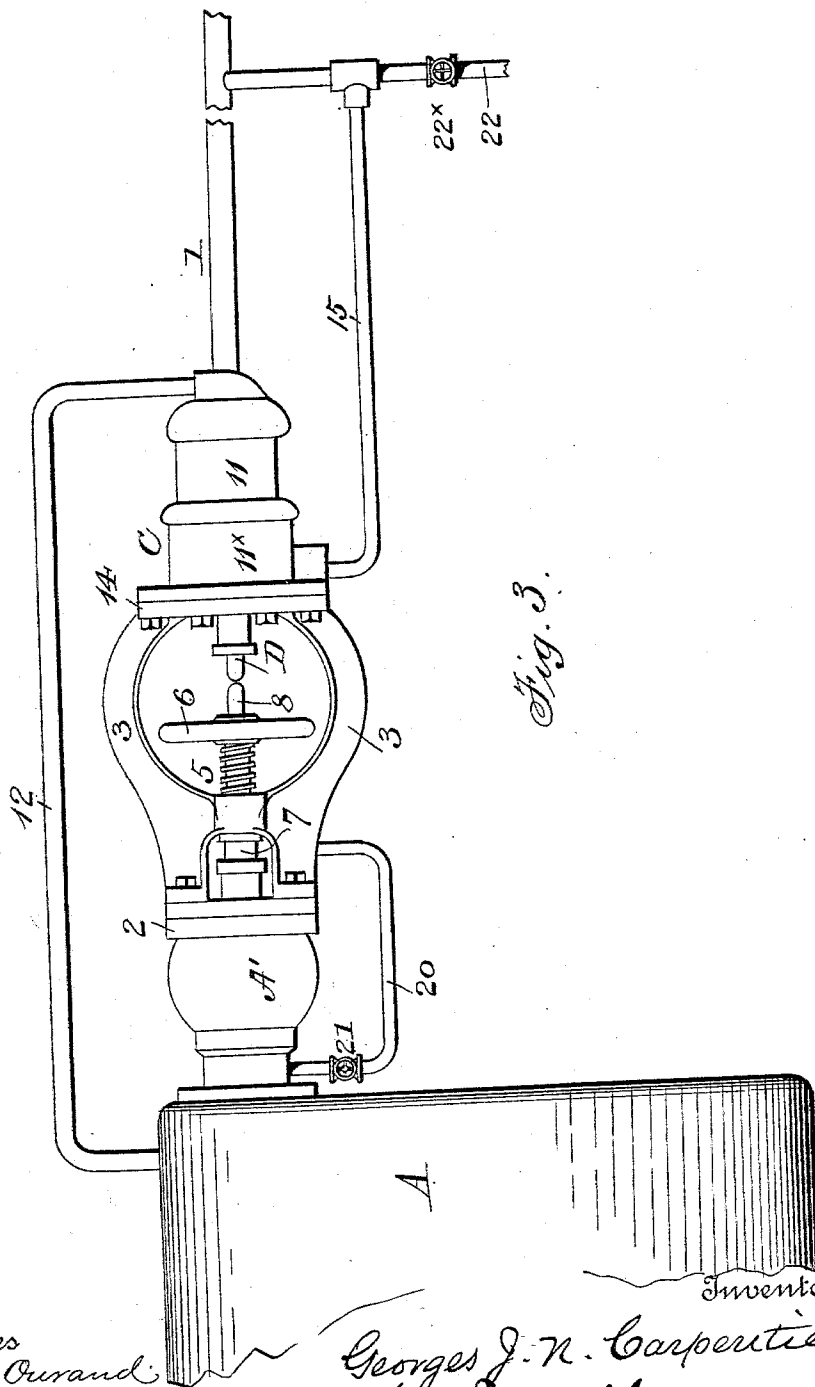
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Frank L. Ourand
A. G. Huffman.

Georges J. N. Carpentier
by J. M. Yznaga.
Attorney

UNITED STATES PATENT OFFICE.

GEORGES J. N. CARPENTIER, OF NEWPORT NEWS, VIRGINIA.

SAFETY DEVICE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 569,811, dated October 20, 1896.

Application filed June 9, 1896. Serial No. 594,888. (No model.)

To all whom it may concern:

Be it known that I, GEORGES J. N. CARPENTIER, a citizen of the United States of America, residing at Newport News, in the county of Warwick and State of Virginia, have invented certain new and useful Improvements in Safety Devices for Steam-Boilers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has relation to improvements in safety devices for steam-boilers; and the object is to improve and simplify the safety device for a steam-boiler shown and described in my former Letters Patent, No. 559,995, dated May 12, 1896, wherein the stop-valve of the boiler is operated through the agency or instrumentality of a lever connection between the stem of the stop-valve and the piston-rod of the safety device. In my present improvement I dispense with the said actuating-lever and arrange the double piston-cylinder opposite to the stop-valve, and effect the closing of the stop-valve by the immediate and direct action of the piston-rod of the double piston-cylinder on the valve stem or rod of the stop-valve. I also have devised certain other improvements by interposing small auxiliary escape-pipes through which steam may be let off in instances where a small pipe may have burst or any apprehended danger demanding the engine to be stopped may exist or happen.

I have fully and clearly illustrated my improvements in the accompanying drawings, wherein—

Figure 1 is a side view of the device, partly in section, showing the complete device. Fig. 2 is a plan view of the device. Fig. 3 shows the device operatively connected to a steam-boiler of a common construction.

A designates a steam-boiler in the head of which, at the usual and proper place, is secured the casing A' of the stop-valve, having suitable connection to the steam-pipe 1, leading to the engine. (Not shown.)

To the bonnet or cap 2 of the stop-valve

may be secured a bracket 3, formed with an open central portion, and having in the end adjacent to the stop-valve a screw-threaded opening 4, in which is fitted a screw 5, provided with a hand-wheel 6 to turn the end of the screw down and from the shoulder of the valve-stem to shut or open the valve.

B designates the shut-off valve, which may be of any suitable design adapted to close and open the steamway in the valve-chamber. The valve-stem 7 is slidingly arranged in proper packing and has its outer portion 8 reduced in diameter and projected through the bore formed in the screw 5, so that the end of the reduced portion of the valve-stem will project a sufficient distance beyond the outer end or head of the screw 5 to be operatively engaged and moved by the piston-rod of the double piston, substantially as shown in the drawings.

The outer end of the bracket 3 is formed to have secured thereto the piston-cylinder C. It will be perceived that in the present adaptation of the cylinder C it is disposed reversely to the position disclosed in my former-cited Letters Patent, the change of position being necessary to effect the improved operation intended, the larger chamber in the cylinder being adjacent to the valve-stem of the stop-valve and the smaller chamber being outward or farthest from the valve. In construction the cylinder C is identical with that shown and described in my former Letters Patent cited, and comprises a piston-cylinder formed with two piston-chambers 11 11^x of different diameters, the larger, 11^x, being, as stated, at the inner portion of the cylinder. Secured in and opening from the boiler is a pipe 12, the outer end of which opens into the smaller chamber 11 of the cylinder to carry steam from the boiler into the chamber. I have omitted the valve or turning plug from this pipe 12, in order that the action of the steam in the smaller chamber of the cylinder shall be constant and not subject to the manipulation of an interposed valve. In the inner end of the cylinder C is fitted and secured a cylinder-head 14, through which the piston-rod D is slidingly arranged and fitted, the end of the piston-rod also being projected through the head of the interposed and supporting bracket, substantially as shown in

the drawings. The piston-rod D has secured thereon and fitted to the smaller chamber of the cylinder C a piston-head 16, and at a determined point in the piston-rod is another piston-head, 17, fitting the larger chamber of the said cylinder and arranged on the piston-rod to suit the stroke required.

At a convenient point in the cylinder is let in and secured a pipe 15, the other end of which is secured in and opens into the steam-pipe 1, substantially as shown, through which steam is admitted to the larger chamber of the cylinder from the steam-pipe. The piston-rod D is disposed in direct longitudinal alinement with the stem of the stop-valve and arranged with its inner projecting end *d* to operatively contact with the projecting end of the valve-stem, so that the stop-valve will be closed by the movement of the piston-rod.

In the pipe 15, at any convenient point or points leading from the said pipe, may be arranged one or more small steam-escape pipes 22, provided with suitable valves 22^x, the object being to provide means for relieving the steam-pressure on the piston-head in the larger chamber of the cylinder whenever a small steam-pipe may have burst or any exigency happens which warrants the stopping of the engine. These escape-pipes may be arranged at any suitable points in the return-pipe 15 and have their free ends opening into the air to carry the steam off without danger to the surrounding objects.

As in my earlier cited invention a small by-pass pipe 20 is provided, having one end opening from the stop-valve and the other end opening into the steam-pipe, and in this by-pass pipe is disposed a stop-cock 21, to be manipulated by the engineer, as occasion may require, to equalize the pressure and permit a preliminary flow or charge of steam to the steam-pipe to act on the larger piston-head and drive it back. The valve 21 is closed and remains closed after the stop-valve is opened.

It will be observed that the area of the smaller cylinder and piston-head must be larger than the area of the stop-valve in the steam-pipe in order that the former will overcome the pressure in the latter.

It will now be perceived from the foregoing

description, taken in connection with the drawings, that in the ordinary action of the steam the pressure on the left-hand face of the larger piston-head 17 through the pipe leading back from the steam-pipe is to keep the piston in the position shown in Fig. 1 of the drawings; but should a pipe burst the pressure on the piston-head 17 will be immediately removed and the pressure on the smaller piston-head 16 assert its power and prevail in moving the piston inwardly, carrying with it the stem of the shut-off valve, and thus immediately stopping the flow of steam through the burst pipe.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A safety device for steam-boilers, comprising a stop-valve formed with a stem projecting beyond its valve-casing, a steam-pipe leading from the valve-casing, a steam-cylinder having chambers of different diameters and arranged with the chamber of greater diameter next adjacent to the valve-stem, a pipe connection leading from the boiler into the smaller chamber of the cylinder, a pipe connection leading from the steam-pipe into the larger chamber of the cylinder, pistons in the cylinder having heads fitted to the respective chambers thereof, and the rod of the pistons being arranged in alinement with the valve-stem and to stand normally free from the projecting end thereof and to contact therewith and close the stop-valve when the pressure in the steam-pipe ceases.

2. In a safety device for steam-boilers, the combination with the stop-valve the boiler and the steam-pipe, of a steam-cylinder having chambers of different diameters, a piston-rod provided with two piston-heads to fit the said chambers, a return steam-pipe leading from the larger cylinder-chamber to the steam-pipe, a steam-escape pipe in the return steam-pipe, and a valve in the escape-pipe.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGES J. N. CARPENTIER.

Witnesses:

A. G. HEYLMUN,
MYER COHEN.