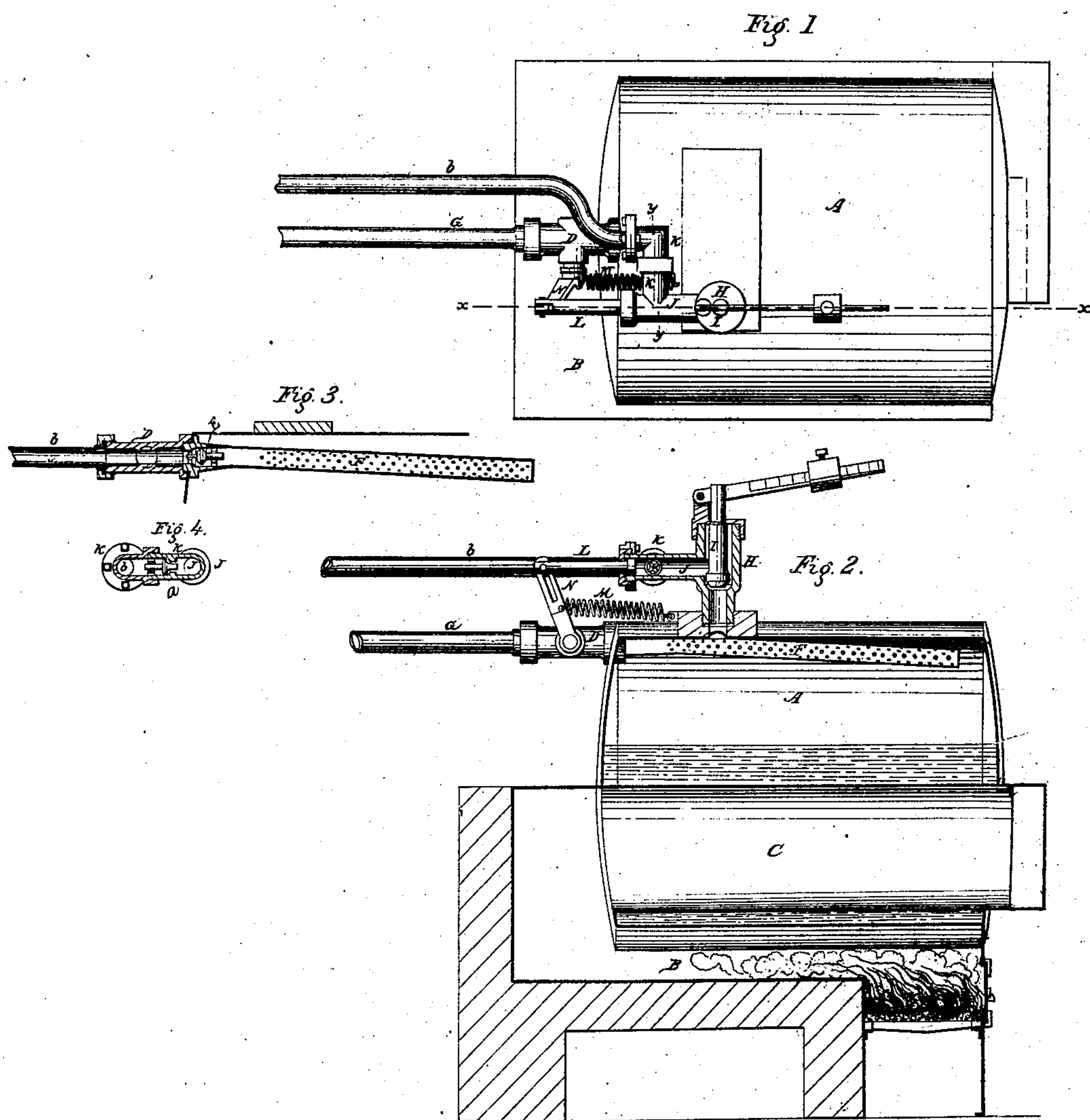


H. S. WILLIAMS.
MANNER OF CONTROLLING THE PRESSURE OF STEAM.
No. 10,526. Patented Feb. 14, 1854.



UNITED STATES PATENT OFFICE.

HENRY S. WILLIAMS, OF MALTA, OHIO.

APPARATUS FOR CONTROLLING THE PRESSURE OF STEAM.

Specification of Letters Patent No. 10,526, dated February 14, 1854.

To all whom it may concern:

Be it known that I, HENRY S. WILLIAMS, of Malta, in the county of Morgan and State of Ohio, have invented certain new and useful improvements in steam-boilers whereby the pressure of the steam can be perfectly regulated and controlled and consequently explosions prevented; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a plan or top view of a steam boiler and safety valve with my improvements applied. Fig. 2, is a vertical longitudinal section of the same through the red line x, x , in Fig. 2. This view shows the whole in operation. Fig. 3, is a detached vertical longitudinal section of the water cock of the boiler and the perforated pipe with which it communicates. Fig. 4, is a vertical central section of the pipe which supplies steam from the safety valve to a pipe leading to the "doctor" or steam pump, for the purpose of starting the flow of water from the pump to the boiler,—when the pump is not running. This section is taken in the line y, y , in Fig. 1.

Similar letters of reference in each of the several figures indicate corresponding parts. The nature of my invention consists in opening the water cock of the steam boiler, and admitting water in small equal jets into the boiler for the purpose of reducing the temperature and pressure of the steam and thereby preventing explosions, by means of a plunger and slotted arm or their equivalents when operated by the pressure of the escape steam of the safety valve or at the moment the pressure of the steam rises above the given point; and closing said cock at the moment the steam is reduced to the given pressure by means of a spring attached to the boiler and slotted arm which connects the cock and plunger together.

2nd, my invention consists in starting the steam pump or "doctor" running, in case it should not be in operation when the pressure of the steam in the boiler rises above the given point, by means of the escape steam from the safety valve—said steam being admitted to the pipe leading to the steam chest of the pump through a branch pipe of that carrying the plunger. This branch pipe is provided with a valve which

prevents the steam from the "doctor" passing into the boiler when the pump is running, but allows of steam being admitted to the steam chest when the pump is not running.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation more minutely.

A, represents the boiler, B, the fire chamber and C, the flue of the boiler.

D, is the water cock, and E, is the valve of the same which is opened by the pressure of the water from the pump as soon as the spigot is turned by the action of the escape steam—and closed by the pressure of the steam on the inside of the boiler.

F, is the perforated copper pipe through which the water escapes in small jets through the vapor or steam in the boiler when it is desired to reduce the temperature and pressure of the same. The arrangement and construction of this pipe as well as the manner in which the water escapes from it will be clearly seen in Figs. 2 and 3. G, is a pipe leading from the water cock to the ordinary pump which is not shown as its construction and operation is well known.

H, is the safety valve chamber and I its valve. Its construction is somewhat different from those in use, it having a horizontal pipe J, communicating with it, which pipe has a branch pipe K, leading to the "doctor", communicating with it and consequently with the safety valve chamber H. The pipe J, receives the plunger L, and allows it to move back and forth, freely, as it is operated upon by the pressure of steam or the spring M.

N, is the slotted arm which connects the plunger L to the water cock D; this arm is connected fast to the spigot of the water cock and turns it, and thereby opens or closes it, the slot in said arm allowing of the plunger moving in a straight horizontal line as will be evident from Fig. 2. The spring M, is connected to the slotted arm N and to the boiler in the manner shown in Fig. 2, this spring causes the arm to turn the spigot and close the cock after the steam has been reduced to the proper temperature. When the spigot is closed the arm occupies the position shown in Fig. 1, and when opened the position shown in Fig. 2, it being thrown to said latter position by

the steam coming into the safety valve chamber and exerting its pressure upon the plunger as shown in Fig. 2.

The branch pipe K, is provided with a valve *a*, Figs, 2, and 4, which opens when the steam passes from the safety valve to the "doctor" or steam pump, and allows of the steam passing from the safety valve and through the pipe *v*, and operating said pump and set it running when the steam rises too high in the boiler or rather its pressure exceeds the given point—and it closes when the doctor is running or commences to run and prevents the passage of the steam from the "doctor" to the interior of the boiler.

The safety valve I, fits snugly in the top of the chamber H, and prevents steam escaping when the pressure in the boiler is too high, thus causing all the escape steam to be thrown against the plunger and in contact with the steam pump in case of necessity, and when the pressure of the steam in the boiler is right the steam which may be in the branch pipes &c. is allowed to escape as the safety valve falls from its upper seat and leaves a passage. This arrangement requires no packing as will be evident from the latter part of this description relating to the valves, the steam always keeping the valves tight when necessary.

The operation is as follows. Suppose the weight on the end of the safety valve lever to be set to steam at a pressure of 75 lbs. to the square inch—and the pressure gets above that point the safety valve will rise and close the opening at the top and allow the steam to act on the plunger and drive it to the position it occupies in the draft Fig. 2, which causes the slotted arm to open the cock D, and admit a supply of water through the perforated pipe into the boiler which acts upon the steam and cools it down to the given pressure, when the safety valve will close and by means of the weight will be forced to the bottom of its chamber.

Again suppose the pipes K, and *b*, be connected together and that *b*, carried to, and made to communicate with the steam chest of the "doctor" and that the engine is stopped. Now let the pressure be greater than 75 lbs. per square inch the safety valve will rise—the plunger will be forced

to the position shown in Fig. 2—and the *d* cock opened—and the steam will rush through the pipe K, and open its valve and pass along the pipe, *b*, to the valve chest of the "doctor" and set the engine in motion and cause the water to run into the boiler through the pipe G, and cock D, and perforated pipe F, and reduce the pressure as before.

I do not claim admitting water from a steam pump or "doctor," for the purpose of controlling the pressure of steam in boilers, when said water is let on, and shut off, by the agency of a float. Neither do I claim causing an alarm to be sounded when the supply ceases, or when the pump is not running, through the agency of a float, and steam cylinders combined, but

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

1. Opening the water cock of the steam boiler, for the purpose of letting on water for reducing the temperature and pressure of the steam, and thereby preventing explosions, by means of a plunger and slotted arm, arranged and combined in the manner described and operated, when the supply should be let on, by the pressure of the escape steam of the safety valve, and by means of a spring, attached to the boiler and slotted arm, when the supply is being shut off, the whole being constructed and combined in the manner herein specified.

2. I also claim starting the steam pump or doctor running, in case it should not be in operation when the pressure of the steam in the boiler rises above the given point, by means of the escape steam from the safety valve, when admitted to the steam chest of the pump through a branch pipe of that carrying the plunger, L—said branch pipe being provided with a valve, which prevents the steam from the "doctor" passing into the boiler when the pump is running, but allows of the steam being admitted to the steam chest, when the pump is not running—substantially as herein set forth.

HENRY S. WILLIAMS.

Witnesses:

S. H. WALES,
I. W. COOMBS.