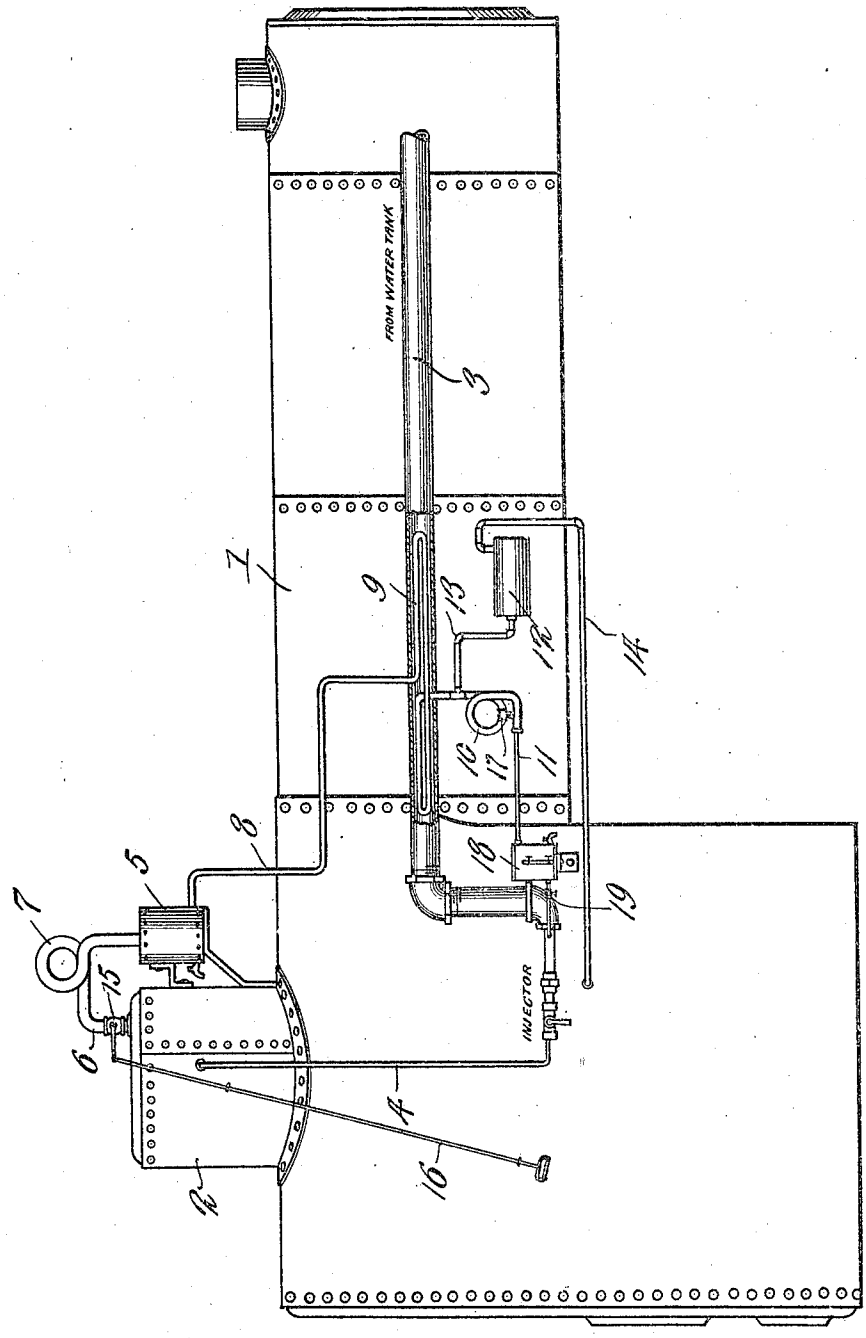
J. V. HOFFMANN.

MEANS FOR PREVENTING BOILER EXPLOSIONS.

APPLICATION FILED OCT. 19, 1909.

948,881. Patented Feb. 8, 1910.



Inventor
Julius V. Hoffmann

Witnesses
Frank B. Hoffman
C. B. Hillyard.

By Victor J. Evans
Attorney

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JULIUS V. HOFFMANN, OF JASPER, INDIANA.

MEANS FOR PREVENTING BOILER EXPLOSIONS.

948,881. Specification of Letters Patent. Patented Feb. 8, 1910.

Application filed October 19, 1909. Serial No. 523,456.

To all whom it may concern:

Be it known that I, JULIUS V. HOFFMANN, a citizen of the United States, residing at Jasper, in the county of Dubois and State of Indiana, have invented new and useful Improvements in Means for Preventing Boiler Explosions, of which the following is a specification.

It has been observed that steam boilers explode when the fires are banked and the gage indicates a comparatively low pressure. This has been attributed to the formation of a powerful gas, possibly the resolving of the steam into the constitutent elements of water, such as hydrogen and oxygen. Whatever may be the cause it is generally conceded that the same is due to the formation of a gas and the purpose of the present invention is to relieve the boiler of such gas and the consequent internal pressure exerted thereby.

Referring to the drawing, forming a part of the specification, the figure represents a steam boiler of the horizontal type provided with safety means embodying the invention.

The steam boiler is indicated at 1 and 2 is the usual steam dome. The supply pipe 3 leads from any source of water supply and connects with an injector by means of which the water is forced into the boiler under pressure, said injector being operated by means of a pipe 4 connected with the steam dome 2. In accordance with this invention an expansion tank 5 is provided and connected by means of a pipe 6 with the highest point of the steam dome, said pipe being provided in its length with a condensing coil 7, whereby any moisture contained in the steam may be removed and returned to the boiler through the pipe 6. A pipe 8 connects the expansion tank 5 with a condensing coil 9 arranged in the supply pipe 3 so as to be cooled by the water passing therethrough. The pipe 8 is of less internal diameter than the pipe 6, so as to reduce the pressure of the steam passing therethrough. A condensing coil 10 is located below the condensing coil 9 and exterior to the supply pipe 3. A pipe 11 connects the condensing coil 10 with the supply pipe 3 at a point between the injector and the condensing coil 9. The pipe 11 is of less internal diameter than the pipe 8. In order that an understanding may be had of the relative sizes of the pipes 6, 8, and 11, it may be stated that the pipe 6 is one inch, the pipe 8 one-half inch, and the pipe 11 one-fourth inch. A gas tank 12 is provided and connected by means of a pipe 13 with the pipe connecting the coils 9 and 10. A pipe 14 connects the gas tank 12 with the furnace so as to deliver the gas separated from the steam into the fire box for consumption.

The arrangement of parts substantially as shown has been found to overcome the objections and to eliminate the cause or causes productive of steam boiler explosions under conditions where the gage does not indicate abnormal pressure and where the fires are banked.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

A valve 15 is located in the pipe 6 to admit of controlling the amount of dry steam or gases passing from the dome, said valve being adapted to be conveniently operated by means of a rod 16. A drip cock 17 is provided at the lowest point of the condensing coil 10. A tank 18 is located in the pipe 11 and contains water of condensation and prevents the injector from drawing the water from the coil 10. A valve 19 is located in the pipe between the tank 18 of the supply pipe 3, thereby enabling said tank 18 to be cut off when required. The tank is provided with a side gage and with a drain cock.

Having thus described the invention what is claimed as new, is:—

1. In means for preventing explosion of steam boilers, a pipe having connection with the highest point of the steam boiler so as to carry off the dry steam or gases, a second pipe of less diameter than the first mentioned pipe and connected therewith, and a third pipe of less diameter than the second pipe and having connection therewith and with the water supply pipe.

2. In means for preventing explosion of steam boilers, a pipe connected with the

highest point of the steam boiler so as to carry off dry steam and gases and having connection with the water supply pipe, and a series of condensing coils in the length of said pipe.

3. In means for preventing explosion of steam boilers, a pipe having connection with the highest point of the steam boiler and connected with the water supply pipe and provided in its length with a series of condensing coils, and an expansion tank in the length of said pipe.

4. In means for preventing explosion of steam boilers, a pipe connected with the highest point of the steam boiler and having connection with the water supply and provided in its length with a series of expansion coils, a gas tank, a pipe connecting the gas tank with the first mentioned pipe at a point between the last condensing coil in the length thereof and the next condensing coil, and a pipe for carrying off the gas from said gas tank.

5. In means for preventing explosion of steam boilers, a condensing coil located in the water supply pipe, a pipe connecting said condensing coil with the highest point of the steam boiler, a second pipe connecting the condensing coil with the supply pipe at a point between the injector and said condensing coil.

6. In means for preventing explosion of steam boilers, a water supply pipe, a condensing coil located in said supply pipe, a pipe connecting the condensing coil with the highest point of the boiler, a second pipe connecting the condensing coil with the supply pipe at a point between the boiler and condensing coil, said second pipe having a condensing coil in its length, a gas tank connected with said second pipe between the two condensing coils, and a pipe connecting the gas tank with the fire box of the boiler furnace.

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

JULIUS V. HOFFMANN.

Witnesses:

WINFIELD S. HUNTER,

JOHN F. MEHRINGER.