F. W. OFELDT.

Improvement in Oil-Burning Steam-Boilers.

No. 131,966. Patented Oct. 8, 1872.

Fig. 1

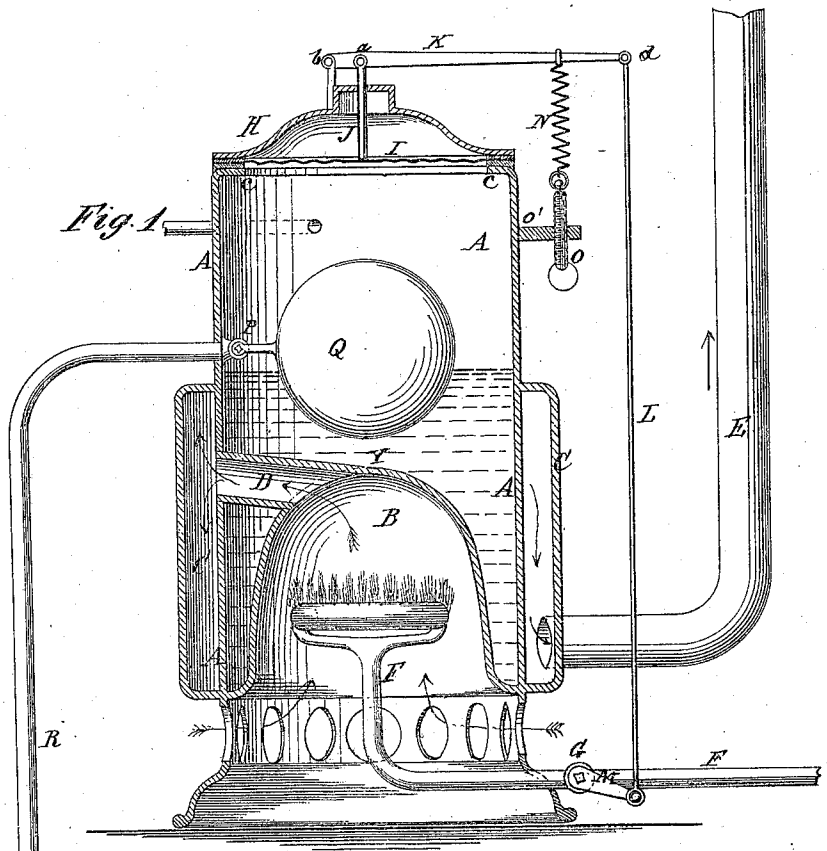
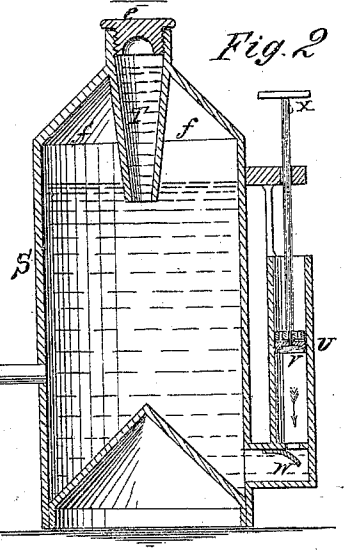


Fig. 2



Witnesses.
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UNITED STATES PATENT OFFICE.

FRANK W. OFELDT, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF AND GEORGE W. HALL, OF SAME PLACE.

IMPROVEMENT IN OIL-BURNING STEAM-BOILERS.

Specification forming part of Letters Patent No. 131,966, dated October 8, 1872.

To all whom it may concern:

Be it known that I, FRANK W. OFELDT, of the city of Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Steam-Boilers, of which the following is a specification:

The object of my invention is to produce a simple, cheap, and safe steam-boiler for light power, such as required for running a sewing-machine, and for other purposes. The invention consists in a combination of devices whereby the amount of fluid fuel admitted to the fire-place of the boiler through an ordinary gas-pipe will be automatically regulated according to the different pressures required and gaged for different purposes, so that the pressure cannot exceed that to which the gage has been permanently or temporarily adjusted; and also in the combination therewith of an automatic water-feeding device to the boiler, the construction of all of which will be hereinafter described.

In the accompanying drawing, Figure 1 represents a sectional elevation of the said steam-boiler, and Fig. 2 a similar section of its water-supply tank.

A is the shell of the boiler. B is the fire-place, preferably made of the shape shown in the drawing, whereby a large heating-surface is obtained. C is a jacket surrounding the water-space of the boiler A. The upper parts of B and C are connected by a flue, D, passing through the water-space. In the lower part of the jacket C, and on the opposite side to that of the flue D, is placed the chimney E. Below the fire-place B the shell A is provided all around with openings similar to those of an ordinary lamp-burner to supply a sufficient quantity of air to support combustion. F is supply-pipe, and G supply-faucet for the fluid fuel. F terminates in the fire-place B with one or more gas-burners, or a perforated torus, according to the size of the boiler. The heated air and products of combustion rise and move in direction of the arrows through the fire-place B, flue D, and jacket C to the chimney E. The boiler is provided with a cap, H. I is a metallic diaphragm covering the whole or a portion of the upper part of the boiler A, and is packed steam-tight and clamped between the flange *c* and the cover H. The diaphragm I thus actually constitutes the top or crown-plate of the boiler A. On the center of the diaphragm I rests the lower end of a pin, J, inserted loosely through a hole in the cap H, and pivoted at its upper end at a point, *a*, to a lever, K, which latter has its fulcrum at a fixed point, *b*, on the cap H. The point *a* of attachment for the pin J should be as near as possible to the fulcrum *b* of the lever K. The other end *d* of the lever K is connected with the handle M of the gas-supply faucet G by a rod or link, L. The distance between *d* and *a* should be several times larger than that between *a* and *b*. N is a coiled spring attached by one end to the lever K, and by the other end to the screw O in the lug or bracket O′ in such a manner that by the said screw O the tension of the spring N and the pressure caused thereby on the lever K and (through the pin J) on the diaphragm I may be regulated at will. The upper side of the diaphragm I being exposed only to the atmospheric pressure, while the lower side is subjected to the greater pressure of the steam, the said diaphragm will cause the pin J to rise as soon as the steam pressure is sufficiently strong to overcome the combined counter pressure of the diaphragm J and the spring N. This will cause the end *d* of the lever K to rise a distance as many times larger than the rise of the pin J as the distance *d b* contains the distance *a b*. The handle M, connected with *d* by the rod L, will be raised thereby and gradually close the faucet G, diminishing the supply of fluid fuel, and consequently causing the boiler to cool off until the pressure equals the ultimatum of pressure gaged by the screw and spring O N. An ordinary oil-lamp may be used to supply the fuel, in which case the handle M should be attached to the axle of the toothed wheel, by which the wick is operated. Instead of the spring N a weight may be used, and the lever K may be graduated like the beam of an ordinary scale.

I am aware that a diaphragm has been used in connection with dampers to regulate the draft in marine steam-boilers; but the fuel in that case remaining in the furnace to the same amount as before its radiant heat prevents cooling, whereas by my device the fuel itself is diminished, while all the apertures for draft remain open, and the heated air instantly

passes off through the chimney E and is replaced by a current of cold air.

Q is an ordinary float, operating the valve P to regulate the water in the boiler supplied from the tank S through the pipe R. In order to cheaply secure strength of the tank S, the same is made cylindrical with conical ends, the upper end being provided with a pipe, T, projecting downward into the tank S, and through which pipe T, after removing the air-tight screw-plug *e*, the tank may be supplied with water. When, in supplying the tank S, the water-level has reached the lower end of the pipe T, the air in the space *f* cannot escape and is compressed, until balanced by the weight of the water-column in T, always leaving an amount of air of uniform pressure in the space *f*. To produce this air-cushion is the object of the pipe T. U is an air-pump, connected with the tank S and operated by the handle X. The piston of the said pump is perforated, and the piston-packing, attached to the lower face thereof, serves at the same time as a valve, opening inward, admitting air on the upward stroke, while the valve W is closed, preventing the escape of air from the tank, and closing on the downward stroke while the valve W opens and admits compressed air to the tank. The air ascends to the space *f* above the water, which latter is constantly in contact with the pump-valves, keeping the same always tight. This would be impossible to accomplish with such simple mechanism if the pump U were connected with the air-space *f*, as in that case the pump-valves would always remain dry, and the air being of far less density than water would constantly escape and make it impracticable to maintain sufficient pressure to force the feed-water into the boiler A; but by my arrangement the compressed air forces the feed-water into the boiler whenever, by evaporation, the water-level has been lowered to cause the float Q to descend enough for opening the valve P. The tank S should be provided with a pressure-gage. Should the float Q ever happen to stick and cease opening the valve P, and the water-level sink too near to the fire-place, a fusible plug, Y, consisting merely of a little soft-solder inserted in a hole in the plate of the furnace B above the gas-flame will melt, and the steam and water descend and instantly put out the fire.

I do not claim to be the inventor of diaphragms, floats, and fusible plugs, which are all very old; but

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

1. A steam-boiler for light power, constructed as described and shown, and provided with the combination of automatic-regulating devices severally shown and described, in combination with the tank S, constructed and operating substantially as and for the purpose specified.

2. The combination of the diaphragm I, pin J, lever K, rod L, and handle or lever M, with the valve G or equivalent, for the purpose of regulating the supply of fluid fuel according to any required steam pressure while maintaining the draft-apertures open, substantially as specified.

3. The combination of the screw O and spring N, or equivalent, with the lever K, pin J, diaphragm I, rod L, lever M, and valve G, or equivalent, substantially as and for the purpose specified.

FRANK W. OFELDT.

Witnesses:
T. H. GOULD,
J. H. KING.