(No Model.)

S. H. PURDY.

STEAM HEATING APPARATUS.

No. 313,446. Patented Mar. 3, 1885.

Fig. 1

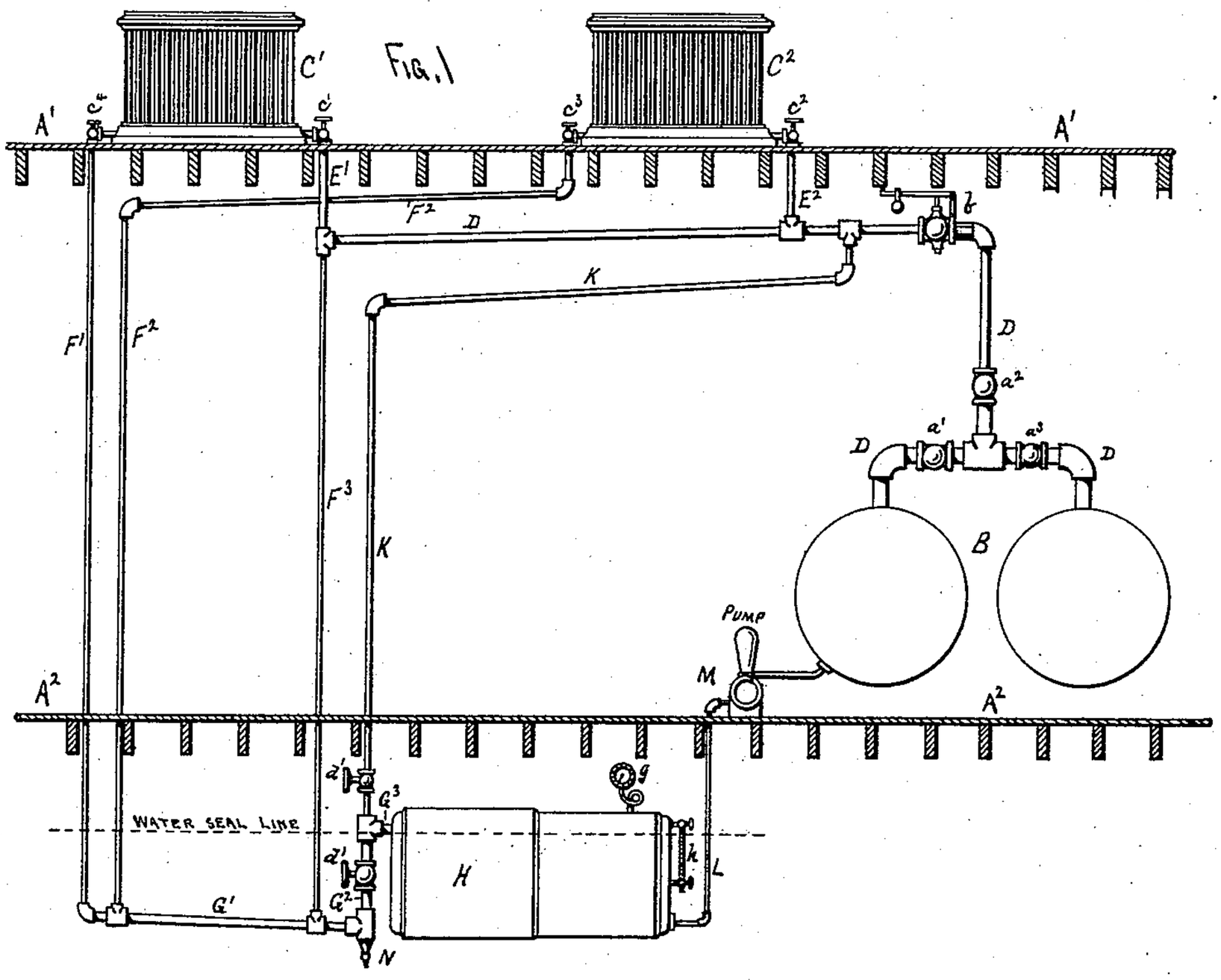


Fig. 2

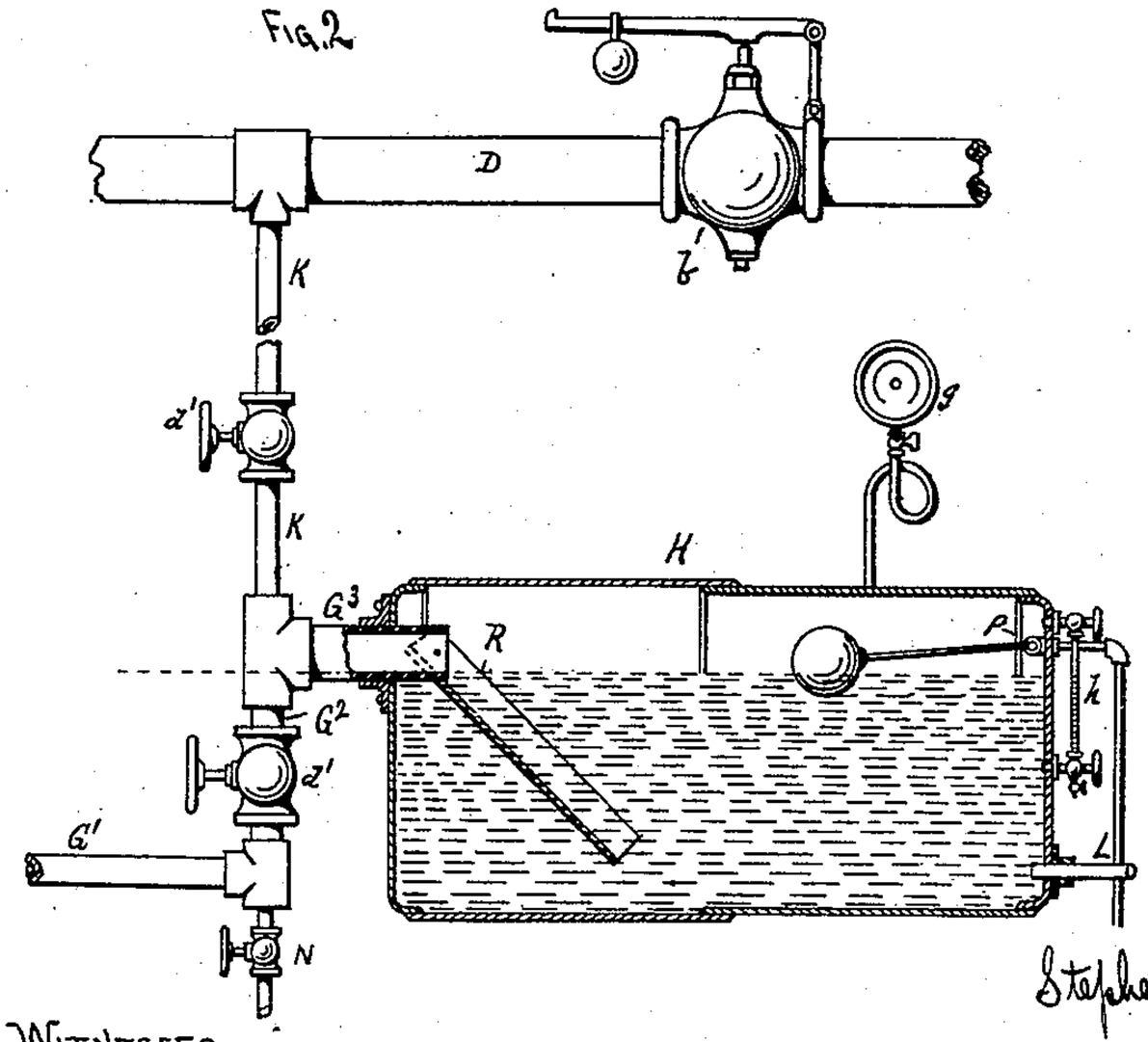
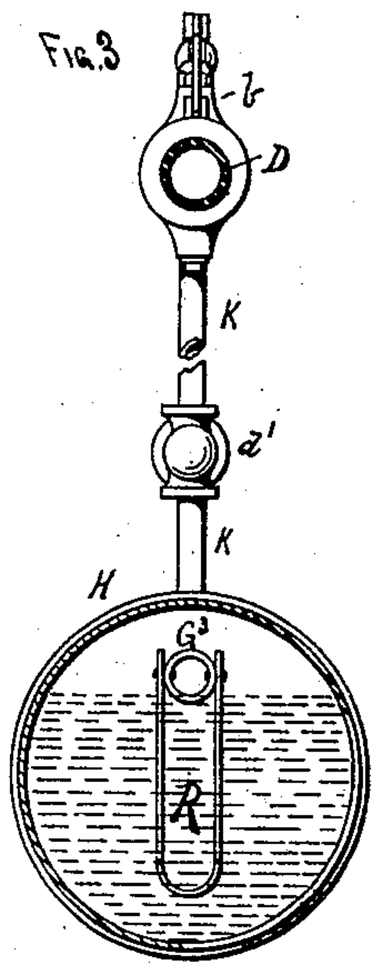


Fig. 3



WITNESSES.
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UNITED STATES PATENT OFFICE.

STEPHEN HUMBERT PURDY, OF ST. PAUL, MINNESOTA.

STEAM-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 313,446, dated March 3, 1885.

Application filed May 22, 1884. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN HUMBERT PURDY, a subject of the Queen of Great Britain and Ireland, and a resident of St. Paul, in the county of Ramsey, in the State of Minnesota, have invented certain new and useful Improvements in Steam-Heating Apparatus, of which the following specification is a full, clear, and exact description, reference being also had to the accompanying drawings.

For the purpose of illustrating my invention, I have shown in the drawings in Figure 1 a simple circuit of a steam-heating system arranged in a building and embodying my improvement, and in Fig. 2 an enlarged longitudinal sectional view of the surplus-water tank and its connections, and in Fig. 3 an enlarged cross-sectional view of the same.

A′ A² represent two floors of a building; B, the boilers for generating the steam, and C′ C² two radiators set upon the floor A′, these parts being of the ordinary form.

D is the main steam-supply pipe leading from the boilers, and connected by branches E′ E² with the radiators C′ C².

F′ F² are the returns leading from the radiators to a horizontal pipe, G′, having an upturned connection, G², on one end, and F³ is a drip-pipe leading from the main steam-pipe to the pipe G′, to convey away the water of condensation from the main steam-pipe.

K is an equalizing-pipe connecting the main steam-pipe D with the upright connecting-pipe G². By this means the steam can freely enter all the pipes, and will exert an equal pressure therein, as hereinafter shown.

H is a surplus-water tank lying with its lowest point on a line about even with or below the lowest point of the horizontal pipe G′, and connected, at or near its top, by a horizontal branch, G³, to the upright branch G² and the equalizing-pipe K. By this arrangement the condensed water from the radiators, coils, &c., and from the pipes and returns will all flow down into the pipe G′ and rise up into the returns F′ F² and branch G², and form a water-seal in the returns. When the water rises high enough, it will overflow into the tank H, but will never fall below the level of the pipe G³, or never rise above that point, unless the operator neglects to keep the tank pumped out. Thus the water-seal in the returns never varies after sufficient water has accumulated to form it, and the pressure of the steam in all the pipes, returns, drips, radiators, coils, &c., above the water-line will be equalized and all pounding and hammering in the system prevented. The main pipe D is supplied with valves a' a^2 a^3, by which the steam from one or both boilers may be used or shut off entirely, and is also supplied with a pressure-regulator, b, by which the pressure of steam in the whole system of pipes may be regulated. Each of the supply-connections E′ E², and also each of the returns F′ F², will be provided with valves c' c^2 c^3 c^4, by which one or all the radiators may be cut off from the supply. A valve, d', will also be arranged in the upright branch G², and also in the equalizing-pipe K, to control the passage of the steam and water.

L is a suction-pipe leading from the lower part of the tank H to the pump M by which the surplus water from the tank will be forced into the boilers, and N is a blow-off by which the water in the pipe G′ may be removed when required. The main supply-pipe D is shown slanting downward slightly from the pressure-regulator b to the drip-pipe F³, so that the condensed water will run down into the pipe G′. The returns F′ F² may be dispensed with, and the condensed water conveyed to the pipe G′ through the main D and drip F³, if preferred; but the end sought for—viz., the accumulation of a sufficient supply of water in the pipes G′ and G² to seal the circuit—will be gained by either means. As before stated, the water will never fall below the level of the pipe and will only rise above that point by the G³, neglect of the operator. No particular harm would result from this neglect, unless it were to continue until the condensed water should rise into the main steam-pipe and radiators and clog the system; but this result is not very likely to occur. It is sufficient for the perfect operation of my system that the water never falls below a certain point nor unseals the returns. Thus, in drawing the water of condensation out of the tank H the sealings in the return-pipes can never be broken nor disturbed. This is an important desideratum.

Another important advantage gained by my arrangement of the pipes G′ G², whereby the water flows into the top of the tank, is that

no bubbling or agitation of the water in the tank occurs; hence the equilibrium of the operation is not disturbed, and the sediment that may be present in the water when it reaches the tank is allowed to settle upon the bottom and is not kept stirred up by the bubbling of the water and carried off into the boilers by the pumps.

h is a water-gage by which the operator can ascertain the height of the water in the tank, and *g* is a pressure-gage by which the pressure of the air or steam in the tank may be ascertained.

R is a small spout or trough attached at one end to the branch G^3 inside the tank, and running downward at an angle to serve as a conduit for the water when running into the tank, to cause it to flow into the tank in a thin stream and without creating a noise or disturbing the water.

To prevent the overflowing of the tank by the neglect of the engineer, a float-operated valve, P, may be placed in the tank H, arranged to be opened only when the water rises above the required height.

Tanks for holding the water of condensation from which the water is returned to the boiler have before been used, and such tanks have been constructed to operate as seals to the return-pipes. Such I do not claim.

Having described my invention and set forth its merits, what I claim is—

1. In a steam-heating apparatus, the combination, with the steam-supply pipe or pipes, the return-pipes and drip-pipes, and an equalizing-pipe whereby an equal pressure is preserved throughout the whole circuit, of a surplus-water tank having the said return and equalizing pipes connected with it at or near its top and at a point sufficiently high above the lowest point of said returns to maintain a uniform and invariable water-seal in said returns independent of said tank, substantially as and for the purpose set forth.

2. The combination of the main steam-pipe D, adapted to supply steam to the radiators, &c., return main G′, having upright branch G^2, and connected to said radiators and main steam-pipe, equalizing-pipe K, and tank H, connected to said upright branch G^2 and equalizing-pipe K, at or near its top, and means for removing the surplus water from said tank without affecting the water-seal in said return main and its connections, substantially as described.

3. In a steam-heating apparatus, a surplus-water tank, H, adapted to be supplied with water at or near its top, and provided with means for the removal of the water therefrom at or near its bottom, and an inclined chute, R, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

STEPHEN HUMBERT PURDY.

Witnesses:

C. N. WOODWARD,

LOUIS FEESER, Sr.