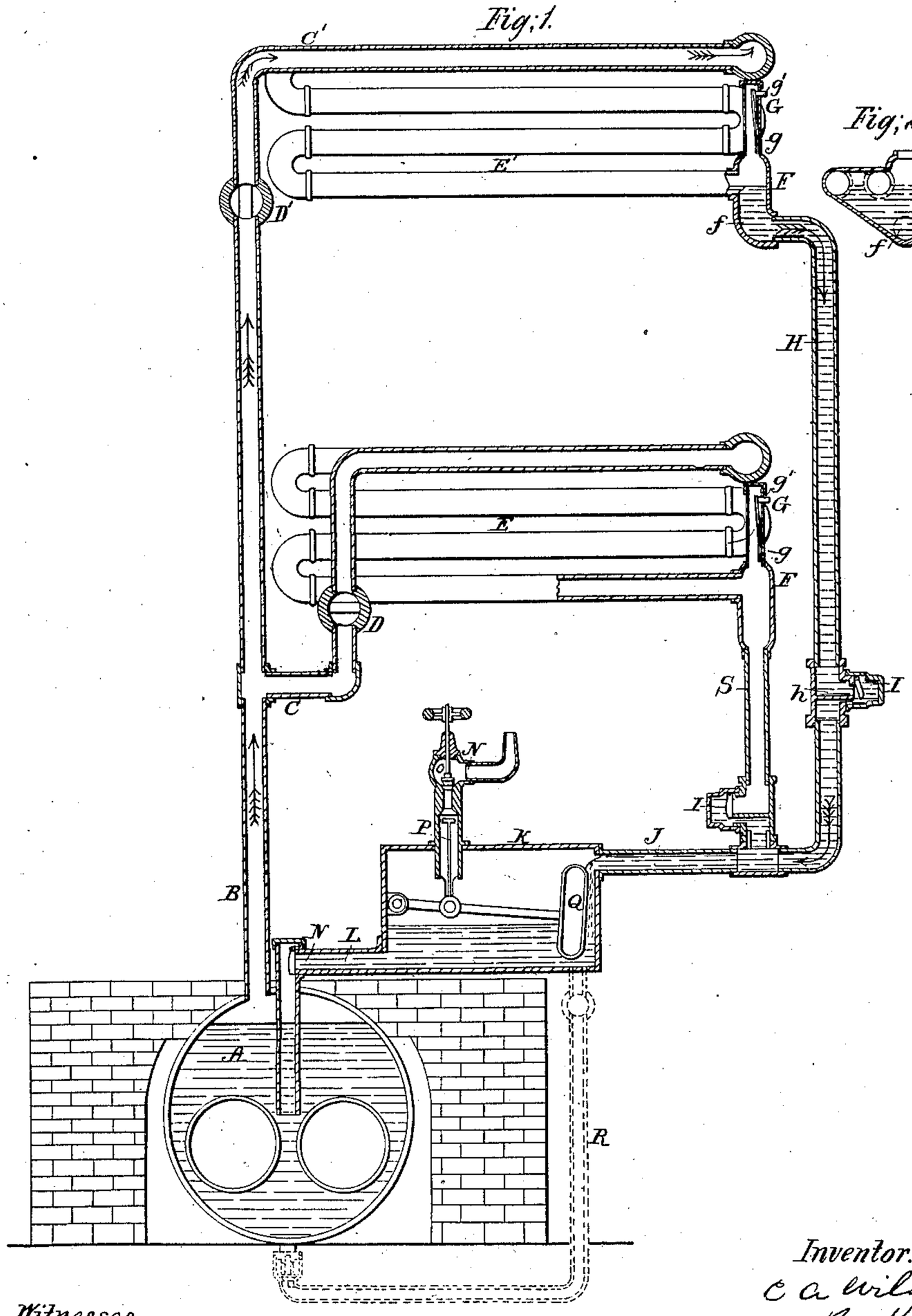
C. A. Wilson.

Steam Heater.

No. 50,294. Patented Oct. 3, 1865.

Fig; 1.



Fig; 2.

Witnesses.
F. Hillyard
James H. Layman.

Inventor.
C A Wilson
By Knight Bros
attys.

UNITED STATES PATENT OFFICE.

CHAS. A. WILSON, OF CINCINNATI, OHIO.

STEAM-WARMING APPARATUS.

Specification forming part of Letters Patent No. 50,294, dated October 3, 1865.

To all whom it may concern:

Be it known that I, CHARLES A. WILSON, of Cincinnati, Hamilton county, Ohio, have invented new and useful Improvements in Steam-Warming Apparatus; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My improvements relate to the class of house-warming apparatus which comprises a steam-generator and a system of ascending and descending pipes for the conduction of steam and for the discharge or return of air, water, &c.; and my invention is particularly directed to automatic provisions for insuring the regular performance of said discharging and returning operations.

Figure 1 is a sectional elevation of an apparatus which embodies my improvements. Fig. 2 is a cross-section of the manifold.

A is the boiler or steam-generator.

B is the steam supply or service pipe, having any requisite number of branches, C C′, each of which has a stop-cock, D or D′, and communicates with the upper part of a radiator, which may consist of a coil substantially such as represented at E and E′, and which discharges into a manifold, F, which is surmounted by a thermostat or steam-trap; G, having the customary flexible metallic valve, *g*, which acts to automatically close the ventage *g′* the instant that the escape of air is followed by that of steam. The manifold F, instead of possessing the usual contracted dimensions, expands below its junction with the coil, so as to form a basin or sink, *f*, communicating at bottom with the discharge-pipe H. The said discharge-pipe H is immediately below the manifold converted into a hydrostatic chamber, S, having a side opening at its extreme bottom provided with a check-valve, I, whose distance below the sink is such as to afford a column of condensation-water adequate to overcome the steam-pressure upon the outer and consequently larger effective surface of the valve I. The valve I is so arranged relatively to the pipe H as to entirely drain that part of the latter on the receiving side of said valve, the lower edge of the valve-opening being, for that purpose as low or lower than the diaphragm *h*, which separates the upper from the lower portion of the pipe H, and said diaphragm being made level or sloping outward, so as to retain no water upon it after the valve I has been opened. This arrangement prevents any lodgment or detention of water at this point, which would otherwise be liable to burst the pipe by collecting and freezing therein, and the floor of the chamber S draining directly out at the valve-opening, so as to enable the other volume of water in the column to run off at each lift of the valve.

The several return-pipes discharge through a single pipe, J, into a tank, K, which tank, emptying through a pipe, L, into the boiler A, completes the circuit.

M is a check-valve, which automatically closes the pipe L the instant that the pressure in the boiler A exceeds that in the tank K.

N is an air-vent, provided with a throttle, O, which closes downward, and a self-acting valve, P, connected with a peculiarly-formed float, Q, which valve closes upward. The float Q is of the represented elongated or oblong form, for a purpose presently explained.

The operation is as follows: Let E′ represent the coils which it is desired should be put in operation, and let E represent those which are to remain inactive, and let the boiler be supposed charged with a due supply of water, and let the cock D of the inactive coil E be closed. The fire being now started, steam will ascend the pipe B, and, by its superior levity, displacing the air in the coil E′, will oblige the air to descend and to escape into the manifold F. This stage in the operation in former arrangements has been accompanied by an inconvenient escape of water from the thermostat in consequence of the impossibility of the water falling through the restricted passages of the common manifold during the very limited space of time within which the accumulation of condensation-water takes place at first starting. This defect I have entirely cured by the provision of the described basin, sink, or enlargement *f* at the bottom of the manifold, which basin presents a temporary receptacle for the condensation-water of sufficient capacity to hold all that can possibly accumulate at the first charging of the coil. The aperture of the thermostat is made just sufficient to let

out the air without sensibly detracting from the steam-pressure, which pressure is hence enabled to hold the water quietly down in the bottom of the manifold until it can escape into the return-pipe H.

Another evil, heretofore of frequent occurrence, has grown out of the neglect of persons in charge to close at the same time the return as well as the supply cock of each inactive coil, and the consequence has been that the condensation-water from one or more active coils above has "backed up" into the inactive coil and has flooded the apartment by escaping at the thermostat, or, where no thermostat has been used, the inactive coil has become filled with water, which, owing to the substantially equal pressure at both ends, has opposed the entrance of steam when it has been desired to use that particular coil. This evil, together with the lodgment of water subject to freeze within the coils and return-pipes, I have removed by the provision of self-acting check-valves I, placed at a suitable distance below the manifold, as above described, and by the provision of my air-discharging and water-returning tank K, which completes the circuit of operations in the following manner: The elongated float Q having been lifted by the condensation-water so as to close the valve P, an equilibrium of pressure takes place between the tank and the boiler, and, the hydrostatic column in the former being now more than sufficient to overcome the excess of outside area of the valve M, the entire, or nearly entire, volume of water in the tank runs off into the boiler.

The above complete evacuation could not take place if the float Q were of the customary spherical form, because the least depression of the water would act to open the valve P, and by relieving the pressure within the tank would enable the pressure within the boiler to almost immediately reclose the valve M, while, on the other hand, the elongated float Q being so proportioned as to swim with two-thirds or more of its height out of the water, and the length of the float being nearly equal to the caliber of the tank, the float does not drop until the water has nearly all left the tank. The retention of the valve P to the closed condition is still further prolonged by the preponderating effective pressure-surface of the lower side of the valve P while the latter is closed; but when the valve P is open, as in the drawings, the tank must nearly fill before the valve P will close again, because the steam, pressing equally on all sides of the now open valve, possesses no preponderating influence to close it; hence the tank is enabled by use of said elongated float to discharge nearly its entire volume at each lift of the valve M, instead of only a very small part of its volume, as would occur with a spherical float. In other words, the elongated form of float Q, acting in conjunction with the unequal areas of the upper and lower sides of the valve P, results in holding said valve both longer closed as well as longer open, so as to afford time for the return-pipes to empty themselves into the tank and for the tank to empty itself into the boiler.

In the drawings the tank K is shown in the act of filling up after having discharged its contents, the ventage N at the same time permitting the escape of all air, gas, and vapor that would otherwise interfere with the action of the tank.

The above-described process having been allowed to continue until steam alone is seen to escape at the ventage N, the throttle O may be closed down, and the tank will afterward, during active operation, discharge a portion of its contents at brief intervals whenever the excess of hydrostatic pressure in the tank overcomes the excess of effective pressure-surface on the boiler side of the valve M.

By the above-described means I provide for an effectual escape of the superabundant air and condensation-water incident to the first starting of the apparatus in the morning or an increased activity after partial or entire inaction of one or more coils.

A modification of my arrangement may conduct the return-water to the bottom of the boiler by a pipe such as that indicated by dotted lines R in Fig. 1.

Being aware that steam-warming apparatus have long been provided with check-valves in their discharge-passages, I make no claim, broadly, to such.

I claim herein as new and of my invention—

1. The provision of the manifold F, having the automatic air-vent G *g g'* or its equivalent at its upper part and the water-receptacle *f* at its lower part, substantially as and for the purpose set forth.

2. The provision, in the return-pipe H, of the diaphragm *h* and valve I, so arranged as to open and close automatically by the alternate action of the back-pressure of the steam and the forward pressure of the water of condensation, the latter being completely emptied at each discharge, substantially as set forth.

3. In the described combination, with the tank K, pipe L, water-discharge valve M, ventage N, and air-discharge valve P, or their equivalents, the provision of the elongated float Q, arranged and operating as set forth.

In testimony of which invention I hereunto set my hand.

C. A. WILSON.

Witnesses:
GEO. H. KNIGHT,
JAMES H. LAYMAN.