

C. DAVENPORT.

Steam Heater.

No. 14,392.

Patented March 11, 1856.

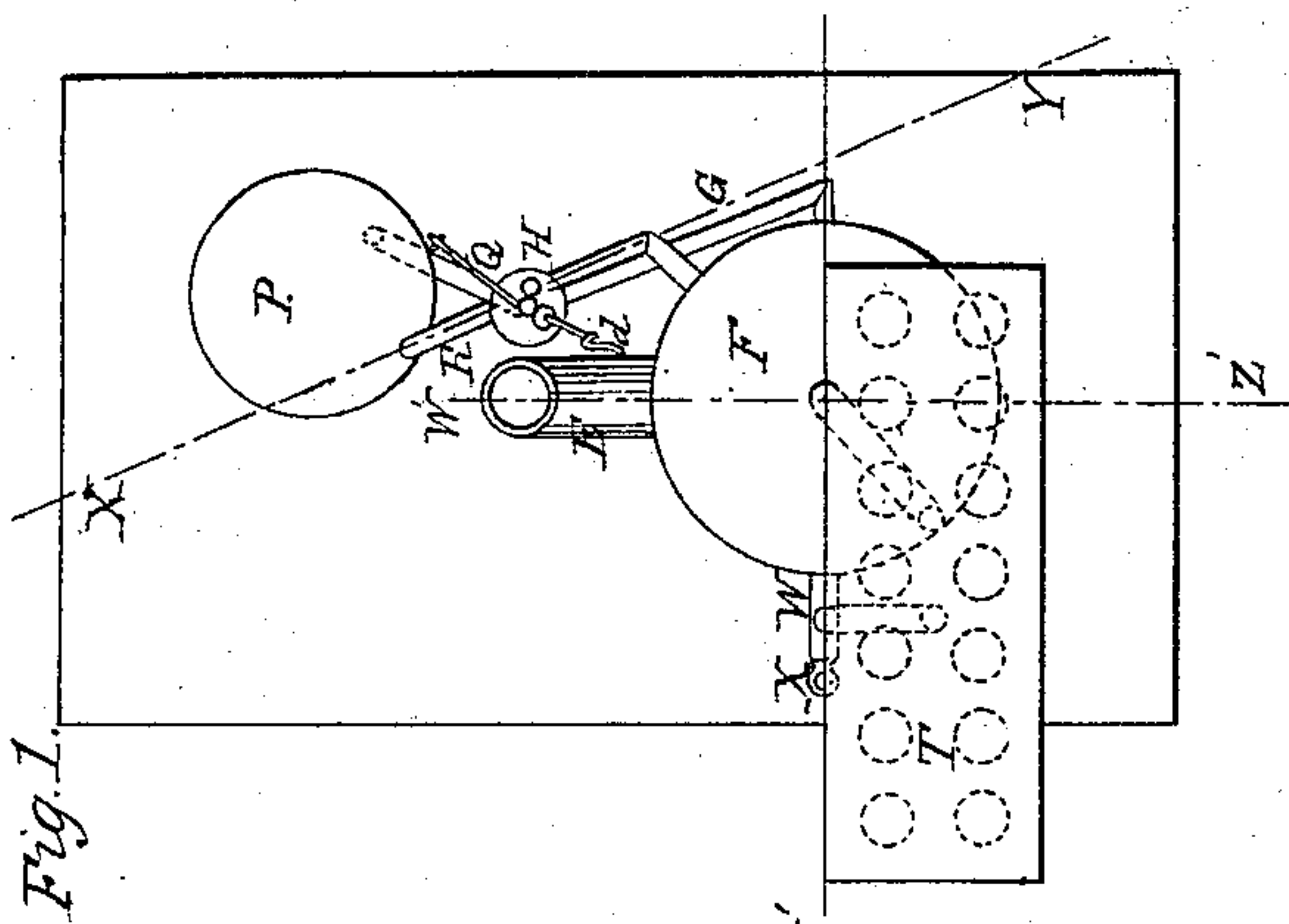


Fig. 1.

Fig. 5.

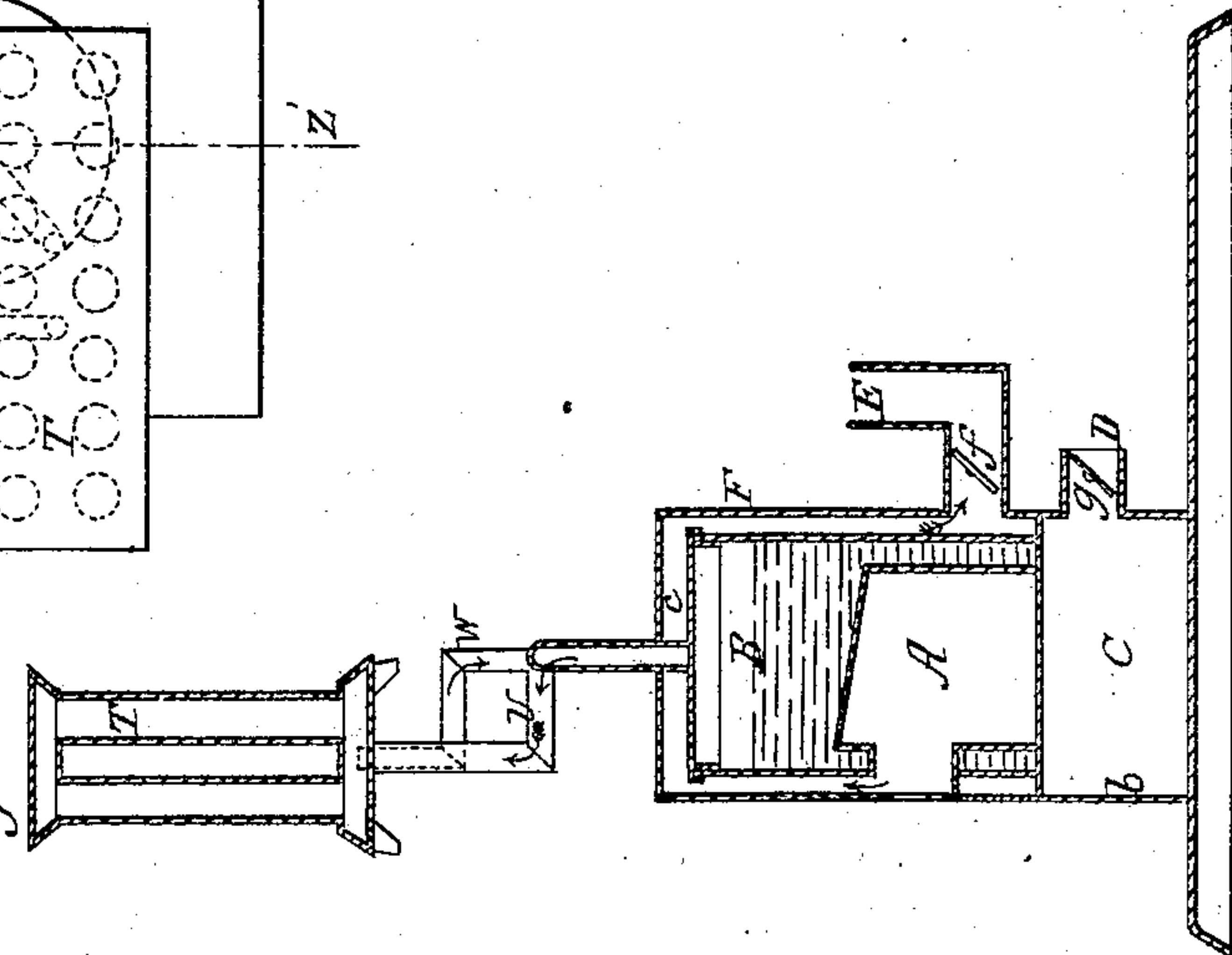


Fig. 4.

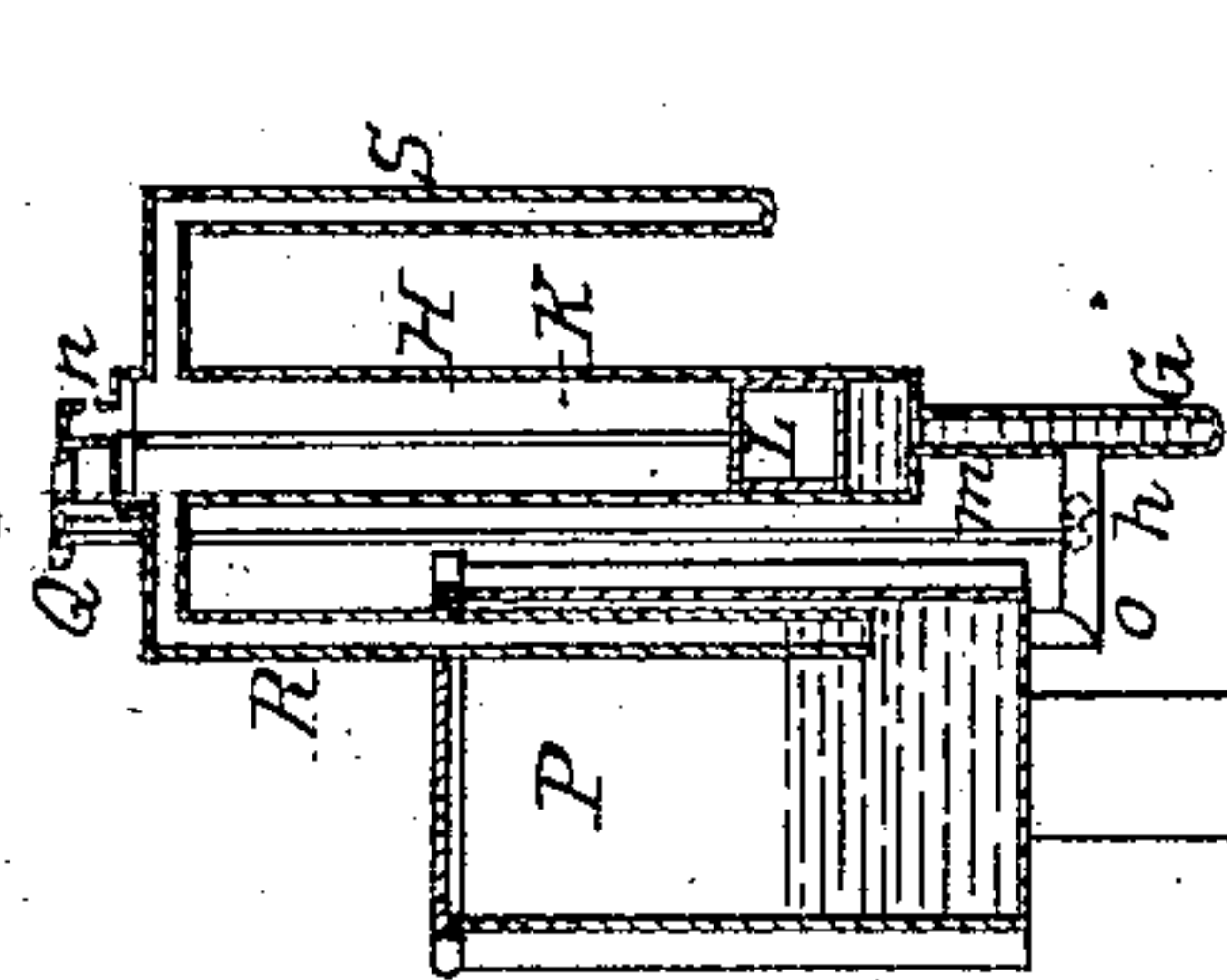


Fig. 3.

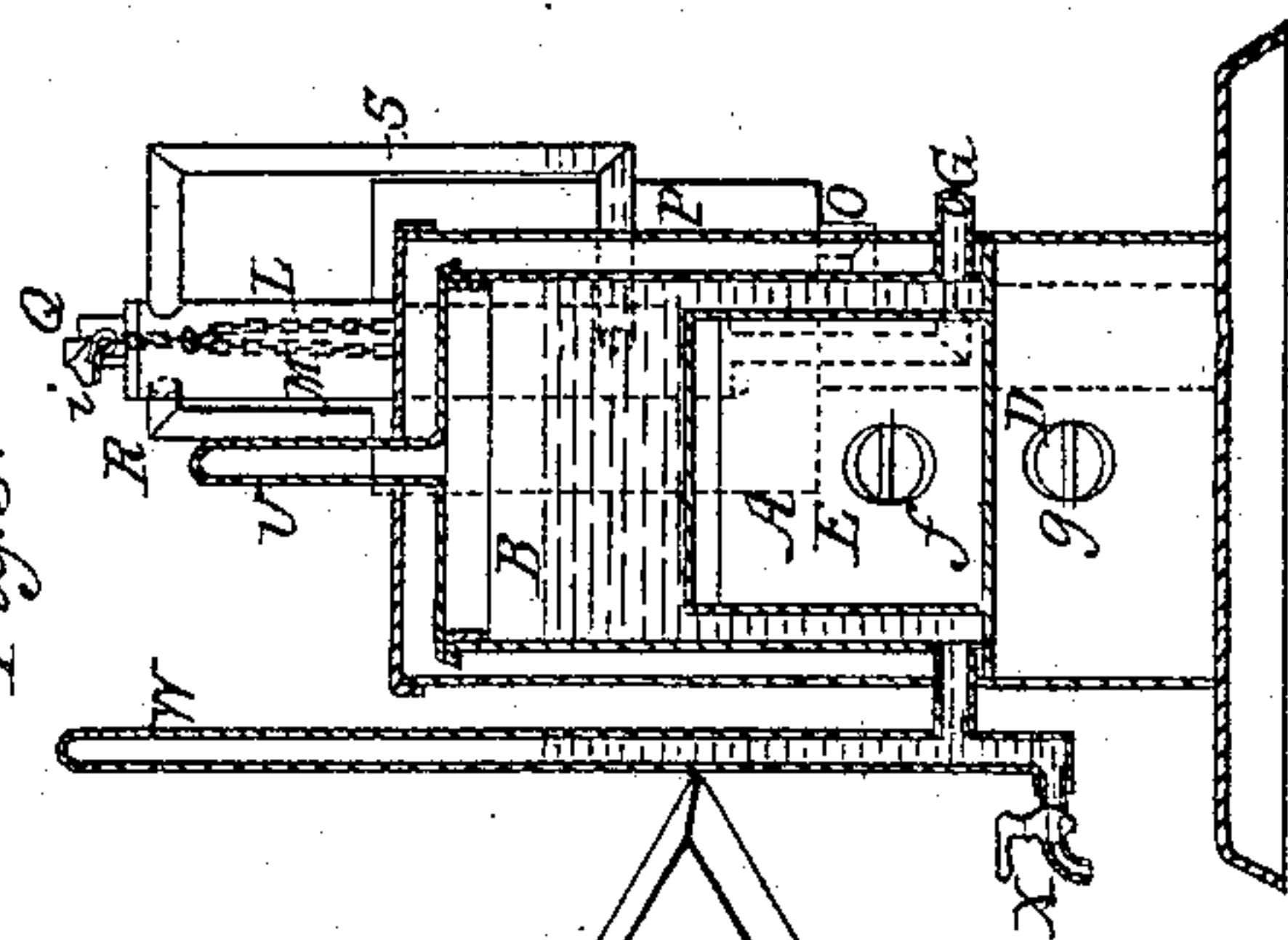
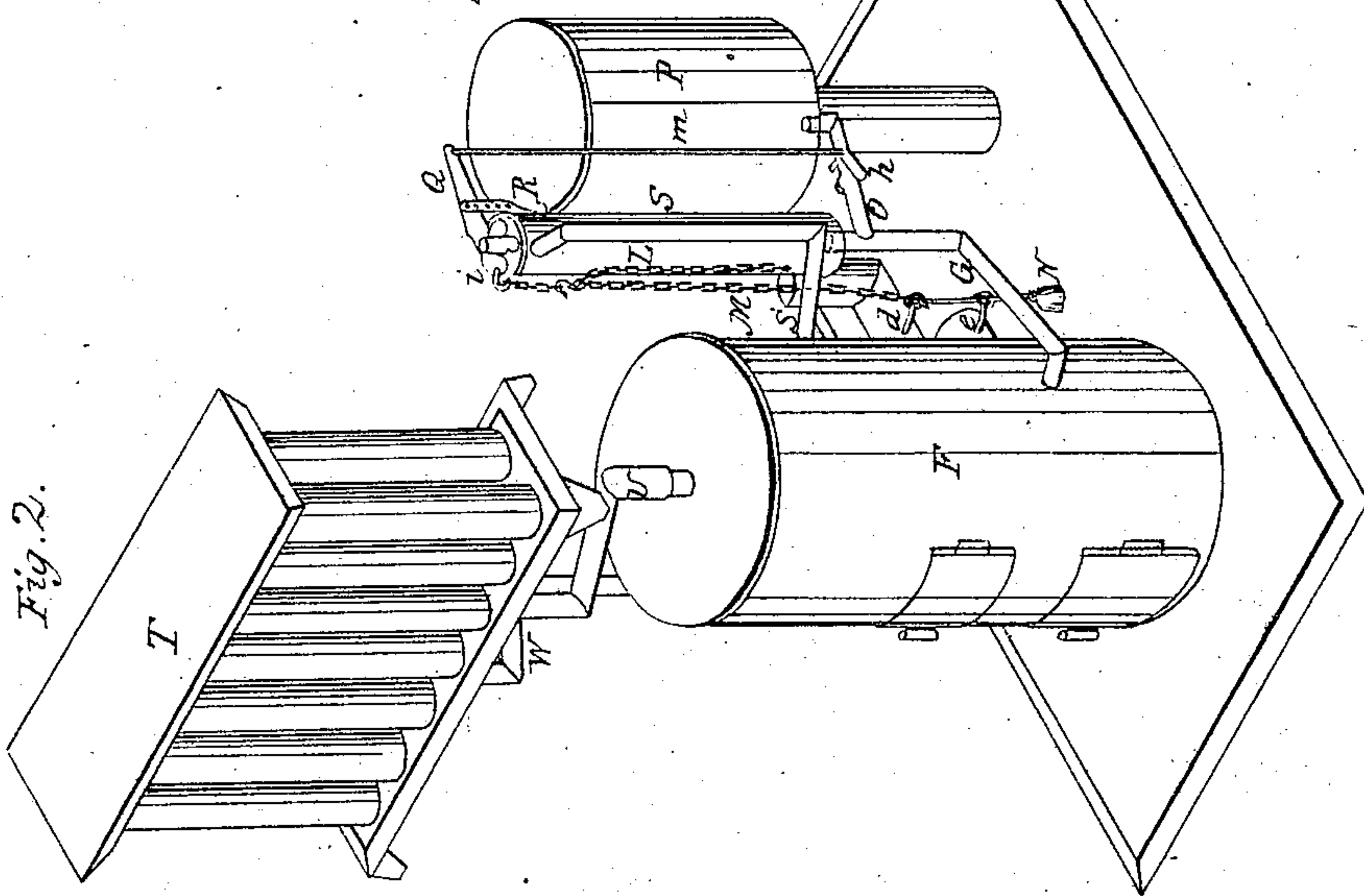


Fig. 2.





# UNITED STATES PATENT OFFICE.

CHARLES DAVENPORT, OF WATERTOWN, MASSACHUSETTS.

## IMPROVED APPARATUS FOR HEATING BUILDINGS BY STEAM.

Specification forming part of Letters Patent No. 14,392, dated March 11, 1856.

*To all whom it may concern:*

Be it known that I, CHARLES DAVENPORT, of Watertown, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Heating Buildings by Steam, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a plan; Fig. 2, an isometric perspective of the apparatus; Fig. 3, a vertical section on U' V' of Fig. 1; Fig. 4, a vertical section on X' Y' of Fig. 1; Fig. 5, a vertical section on W' Z' of Fig. 1.

My invention has for its object to render the apparatus self-regulating, so that the vehemence of the fire shall always be proportionate to the number and size of the rooms to be heated, and also to the temperature to which they are required to be raised; and my invention consists in so connecting the dampers of the smoke and draft flues with the float which indicates the pressure within the boiler that they may be adjusted to close whenever the temperature of the house reaches a certain given degree, or whenever the steam is shut off from any of the rooms, and also to open whenever the temperature of the house falls, or an additional number of rooms is to be heated.

My invention also consists in so connecting the float with the cock which admits the water to the boiler that whenever the float descends below a certain point the cock shall be opened and the level of the water within the boiler restored.

To enable others skilled in the art to understand my invention, I will proceed to describe the manner in which I have carried it out.

In the accompanying drawings, A is the furnace, which is entirely inclosed within the boiler B.

The fire-door *a* and ash-pit door *b* are made to fit close, the draft being admitted to the ash-pit C through the pipe D, and the products of combustion passing off immediately over the fire-door through the space *c*, between the boiler and the casing out from the smoke-flue E.

F is the casing which surrounds the boiler,

and may be of brick, sheet-iron, or other suitable material.

G is a pipe leading from near the bottom of the boiler to the vertical float-chamber H, by which a free communication is at all times opened from the boiler to this chamber, which also has free communication with the external atmosphere through the whistle *n*.

I is a hollow float from which rises the rod K, to the upper end of which is attached the chain L. Into this chain is hooked another chain M, which is so attached to the stems *d* and *e* of the dampers *f* and *g* of both the smoke and draft flues that when the chain is raised the dampers shall be closed, and when the chain drops they shall be opened by the counterbalance-weight N. By means of these connections whenever there exists any pressure within the boiler the water will be caused to rise in the chamber H, which will raise the float, and as this takes place the dampers *f* and *g* are closed, and the fire is deadened. The object of this arrangement will be more fully explained hereinafter.

O is a branch pipe leading from the supply-cistern P to the pipe G, by which means the boiler is replenished whenever the water descends below a certain level, the cock *h* being employed to open and shut the communication with the supply-cistern. This cock is operated by the rod *m*, the upper end of which is attached to the lever Q, through the opposite end of which at *i* passes the rod K, attached to the float. This rod is bent at its upper end where it passes through the lever Q, as seen in Fig. 2, and thus as the surface of the water in the boiler descends the rod *m* is raised and the cock *h* is opened to admit a fresh supply. When the float again rises, the weight of the rod *m* is sufficient again to close the cock and prevent the reflux of the water and also the circulation by which the water in the cistern would become heated. If at any time the steam be shut off from several rooms at the same moment, or if from any other cause the pressure within the boiler be raised and the generation of steam continue even after the dampers are closed, the water will rise in the chamber H and overflow through the pipe R into the supply-cistern, and if this should continue until the level of the water within the boiler fall below the pipe S, steam



will pass through this pipe and sound the whistle *n*, giving notice that something is wrong. This can only take place when the apparatus is improperly adjusted.

In each of the rooms to be heated are one or more radiators or heaters *T*, to which the steam passes through the pipe *V*, which enters the bottom plate of the heater and rises a short distance above its interior surface that the water of condensation may pass down through the tube *W*, which also enters the bottom plate of the heater, but does not pass up through it. That the scales and sand from the castings of which the heater is composed may not fall into the boiler and accumulate there the pipe *W* is furnished with a cock at *X*, through which such sediment may be drawn off.

It is evident that in order that an apparatus of this kind may be completely effective it should be so arranged as to operate with different degrees of pressure, as the temperature of the external atmosphere varies. For this purpose I have so arranged the connection between the float *I* and the dampers that the latter may be closed by a greater or less motion of the float. Thus in mild weather, when a moderate heat only is required, the chain *M* is hooked so high upon the chain *L* that the slightest motion of the float shall begin to close the dampers and thus a pressure of a single inch within the boiler may be made to deaden the fire. In colder weather, when hotter steam, and consequently a greater pressure is required, the chain *M* is hooked into the other chain at a point lower down, which allows the float to rise higher before it operates the dampers. The apparatus may thus be adjusted to any degree of temperature of the external atmosphere.

Operation: The cock *h* is opened and water poured into the supply-cistern *P* until it reaches the required level within the boiler. The fire being kindled, the steam rises through the pipe *V* into the heater *T*, there being one or more of these heaters in each of the apartments to be heated. The chains *M* and *L* are then adjusted to each other, according to the

temperature of the weather and the pressure required, as before explained. If now the steam be shut off from one or more of the heaters the pressure within the boiler will be increased and the float *I* will rise and close the dampers, checking the fire until the pressure is reduced to the point at which the chains *M* and *L* are adjusted. Should the cold become severer, the chain *M* is hooked lower down upon the chain *L*, and the float *I* will then rise higher in its chamber before the dampers are affected.

Among the advantages possessed by the above arrangement may be enumerated the following: First, under no circumstances can an accident take place from explosion or other cause; second, the apparatus adjusts itself to the number of rooms to be heated and regulates its fire according to the exact amount required without the assistance of the attendant; third, it may be regulated by the attendant to the exact heat required within the house, whatever may be the temperature of the atmosphere without; fourth, owing to its self adjustment no fuel is burned to waste, and great economy results.

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

1. So connecting the float with the dampers of both the draft and smoke flues by means of the chains *M* and *L* or their equivalents that the pressure of the steam within the boiler may be graduated to the temperature of the atmosphere and the degree of heat required within the building, as set forth.

2. So connecting the float which actuates the dampers of the draft and smoke flues with the cock *X*, which admits water from the supply-cistern to the boiler by means of the lever *Q* or its equivalent, that while the float is left free to rise to any required distance it will open the cock whenever the water falls below its level, as described.

CHARLES DAVENPORT.

Witnesses:

SAM. COOPER,

P. E. TESCHEMACHER.