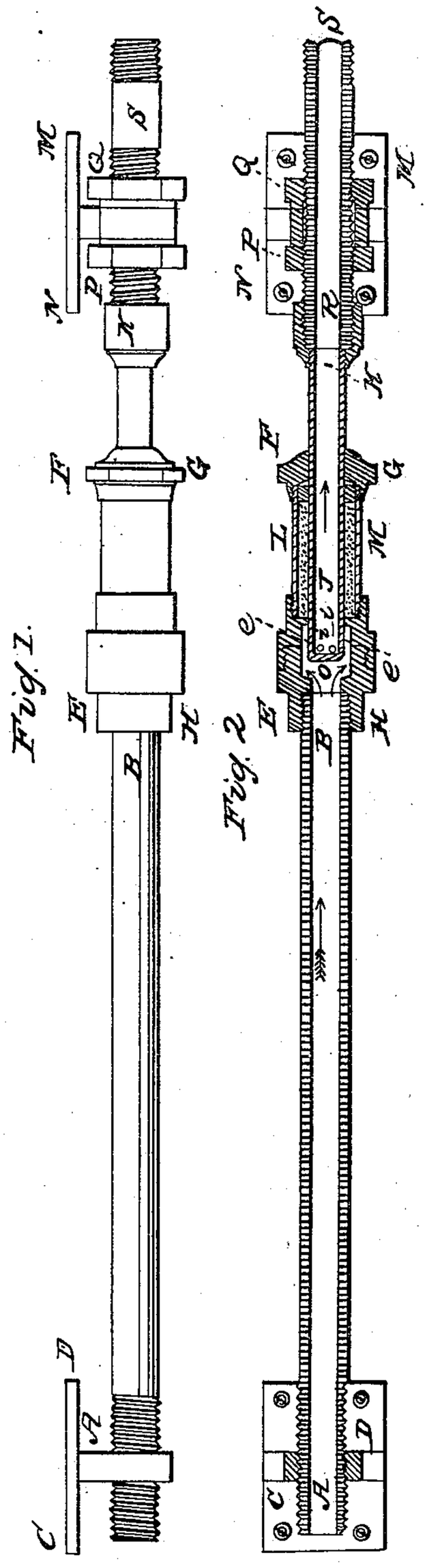
R. CORNELIUS.

Steam Heater.

No. 14,348. Patented March 4, 1856.

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ROBERT CORNELIUS, OF PHILADELPHIA, PENNSYLVANIA.

## ARRANGEMENT OF STEAM-TUBING FOR REGULATING THE HEATING OF BUILDINGS.

Specification of Letters Patent No. 14,348, dated March 4, 1856.

*To all whom it may concern:*

Be it known that I, ROBERT CORNELIUS, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Regulating Apparatus for Warming Buildings by Steam, &c.; and I do declare the following to be a full and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is an outside view of my improved regulator. Fig. 2 is a vertical section of the same.

The nature of my improvement consists in so arranging a section of the exit steam pipe from a building or room that the pipe itself shall operate to open or close a valve and thus restrain the escape of steam and water and consequently the amount of entering steam and water and therefore the heat of the building or apartment.

It has been found difficult heretofore to regulate effectually the amount of steam and hot water flowing through the tubes of heaters in buildings warmed thereby. I have discovered that by using a pipe or tube about twenty feet long and attaching one end thereof to the building and leaving the other end free to operate a valve or valve box the exit pipe itself may be made a complete and reliable regulator as stated above.

A B (in the figures) is a piece of iron tubing say twenty feet long placed in the course of the regular steam tubing at or near the point of discharge from a room or building. This pipe is connected consecutively with the other pipes at A, in any ordinary manner, as by screw joint. The end A is also secured permanently against the wall of the room or building by means of the bracket C, D. The other end of the tube, B, fits into a valve box E G arranged as follows.

E, H, forms the top of the valve box.

J, K, is a piece of ordinary steam tubing closed at its extremity J and having several small apertures *i*, *i*, near that extremity. L, M, is a packing box, through which the tube J, K can slide.

F G is the bottom of the valve box which serves to keep the packing in its place.

The tube J, K, is attached at K to the regular discharging tube R, S, and also by means of the bracket N, M, to the wall of the building, or apartment. As the tube A, B, is fixed at its extremity A to the wall of the building, and as the piece J, K, is also permanently fixed at its extremity K to the wall it is evident that if A, B, expands and elongates by the heat of its contents the box E G must be forced to slide upon the tube J, K, and the aperture *o* which is attached to E H must approximate to J the extremity of the tube.

*o* is the terminal aperture of A, B, and it forms at the same time a valve seat for the closed extremity J of J, K, to fit upon. As J approaches *o* it tends to diminish the aperture for the steam to pass through into the space *e*, *e*, and thus checks the escape of steam from A B into the space *e*, *e*; the escape of steam from *e*, *e*, is through the aperture *i*, *i*, near to the extremity J of the tube J, K. When J fits close upon *o*, no steam or water can flow from the tube A, B, into the space *e e*. As J recedes from *o* the annular passage for the escape of steam from A, B, into the space *e*, *e*, is proportionately increased. Hence as the tube A B becomes heated the points O and J approach, the flow of steam is decreased from A, B, and the consequent circulation of steam through all the preceding tubes is correspondingly checked and, vice-versa, when A, B, becomes cooled and contracts. I have found that if the tube A, B, be made about twenty feet long it gives about $\frac{5}{8}$ of an inch practical play or slide between the points *o* and J and this is amply sufficient.

The advantages of this improvement are that the exit pipe through which the steam flows is made to regulate the temperature of the building the steam at that point having performed its function of heating is then properly a test of the temperature of the preceding parts of the piping and of the temperature of the rooms. Second, the pipe itself is so constructed and adapted as to form the regulating agent and being most directly influenced by the steam contained therein it is superior to any exterior thermostatic appliance. Third, its obvious cheapness and its practical efficiency commend it. I may also add that a regulating tube and valve box constructed as above and opening directly into the atmosphere may be advantageously interposed in the course of the tubing at the highest point of the building with advantage. When the pipe is heated by the flowing of steam the aperture to the atmosphere is closed; and at night when the supply of steam to the building is cut off entering air is allowed to enter there and

then all the water in the pipe in the building will flow off and prevent freezing.

A small adjusting or set screw is interposed at P Q whereby the sliding play of the tube A B on J K may be slightly increased or diminished; but it will be found necessary to change this very seldom.

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

The arrangement of one section of the steam tubing within another section whereby the steam tube itself is made to serve as a regulator and controller of the heat of the building.

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