

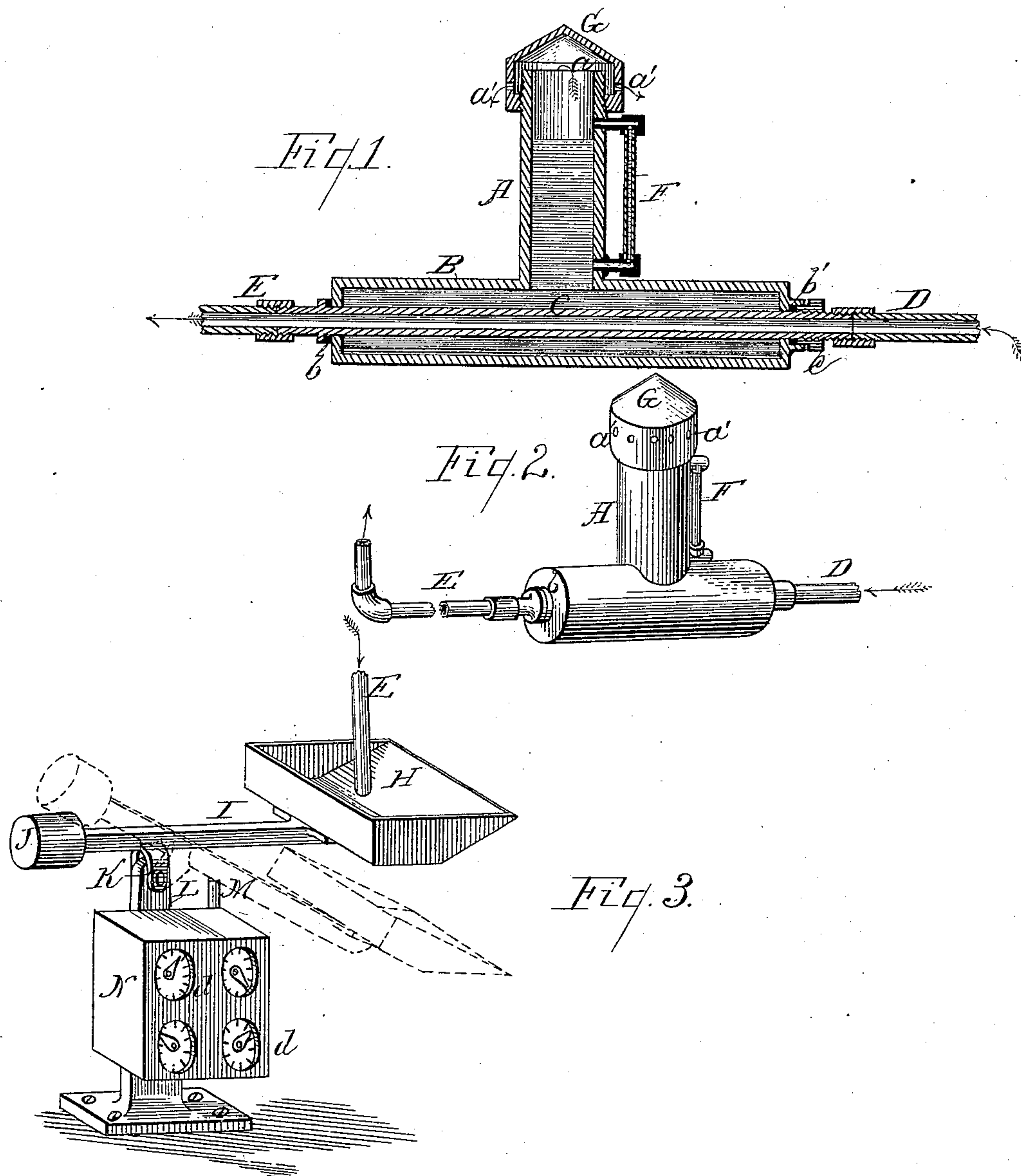
(No Model.)

L. SHERMAN.

APPARATUS FOR MEASURING HEAT CONVEYED THROUGH PIPES.

No. 246,564.

Patented Aug. 30, 1881.



Witnesses:  
E. A. Ames  
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by *[Signature]*  
Attorney.



# UNITED STATES PATENT OFFICE.

LEWIS SHERMAN, OF MILWAUKEE, WISCONSIN.

## APPARATUS FOR MEASURING HEAT CONVEYED THROUGH PIPES.

SPECIFICATION forming part of Letters Patent No. 246,564, dated August 30, 1881.

Application filed May 5, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS SHERMAN, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Heat-Meters; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to devices for measuring heat as it passes from its source to a given point.

Figures 1 and 2 are respectively a central vertical section and a perspective view of that portion of my invention that has for its purpose the determining of the average temperature of the heating medium passing through it in any given period. Fig. 3 is a perspective view of a receptacle for the water of condensation when steam is the heat-conducting medium, and a tally-machine for recording the number of times it is filled and dumped.

A B is a casting for containing the fluid by the evaporation of which I propose to ascertain the mean temperature of the heating medium as it passes through the pipe C, that is coupled to and between the pipes D and E, the pipe D leading from either a boiler or furnace, and pipe E leading to the room or building to be heated, or in which the heat is to be utilized. The terminal end of pipe E depends into or over a catch-basin, H. The ends of the portion B of the casting are packed tightly about the pipe C, so as to prevent leakage, and the fluid (preferably glycerine, on account of the high temperature necessary to evaporate it) is poured in through the opening *a* in the top of the upright portion A. I then screw on a cap, G, which has one or more perforations, *a'*, to allow the escape of vapor. I either make the portion A of glass, suitably graduating and scaling it, or I provide it with a gage, F, so that the height of the fluid may be readily observed.

Now, supposing that steam is our heating medium, as it passes from pipe D on its passage through the pipe C it will give out sufficient heat to raise the temperature of the fluid in the casting to the temperature of the heating medium, and the fluid in A B will evaporate with a rapidity in direct proportion to the intensity of the heat imparted to it by the

steam or other heat-conveying medium, the vapor passing out through the perforations in cap G, and after ascertaining the amount of evaporation obtained from an ascertained temperature of the pipe we have a basis for future calculation in determining the average temperature of the steam or other heating medium when it enters the building.

To determine the amount of steam that enters the building, I use a catch-basin, H, having a handle, I, that is weighted at its opposite end at J, and is pivoted to the post L of a tally-machine, N, having dials *d*, a rod, *m*, projecting up from the machine just beneath the handle I, and connected with the gearing by which the indexes are worked. The weight J is sufficiently heavy to counterbalance the catch-basin H until it has been nearly filled with the water of condensation that drops from pipe E; but when it has quite filled it will overbalance the weight, and thus automatically dump itself, and in the act of dumping will carry its handle I down upon the rod *m*, which, connecting in any suitable manner with the gearing in the tally-machine, will cause the index to jig one point on the unit-dial, and thus record each dump of the contents of the catch-basin H. Therefore, if the basin has a capacity of one pound of water and the dial registers ten dumps in a given time, we know that during that time the steam that passed through the pipe contained ten (10) pounds of water. The result is determined by multiplying the number of pounds of water that makes its exit from the pipe by the number of inches of the fluid evaporated.

Of course, I do not confine myself to the exact device shown. I may vary the form and material of the casting and the water-meter, and I may place the casting in, instead of about, the service-pipe, hang it in front of the register, or utilize it in various other positions without departing from the spirit of my invention.

I claim as my invention—

1. In a heat-meter, the combination, with a heating-pipe, of a fluid-receptacle placed in, about, or upon the same, and adapted to indicate the mean temperature of the heating medium as it passes to its destination by evaporation, as set forth.

2. The combination, with the pipes for sup-

plying steam, of a fluid-receptacle, A B F, for determining the temperature of the steam as it enters, and a device for measuring the water of condensation as it drops from the terminal  
5 end of the pipe E, as set forth.

3. In a heat-meter, the casting A B, provided with a gage, and adapted to permit the passage of a heating-pipe through it and to contain fluid by the rate of evaporation of  
10 which the temperature of the heating medium can be computed.

4. The casting A B, having gage F and a perforated cap, G, as set forth, and for the purpose described.

In testimony that I claim the foregoing I 15  
have hereunto set my hand this 19th day of April, 1881.

LEWIS SHERMAN.

Witnesses:

MARY R. TUTTLE,  
STANLEY S. STOUT.