

No. 629,375.

Patented July 25, 1899.

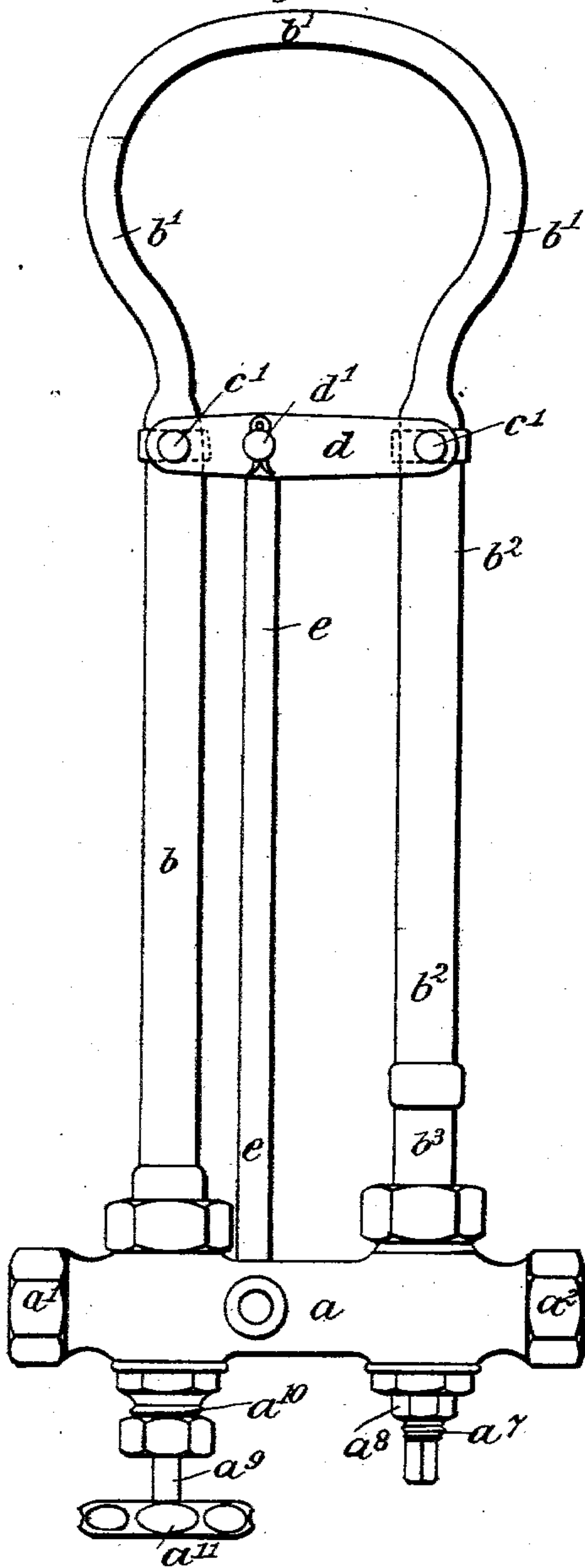
F. LAMPLOUGH.
HEAT REGULATING DEVICE.

(Application filed Feb. 28, 1899.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



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Inventor:
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by W. H. Finnerell
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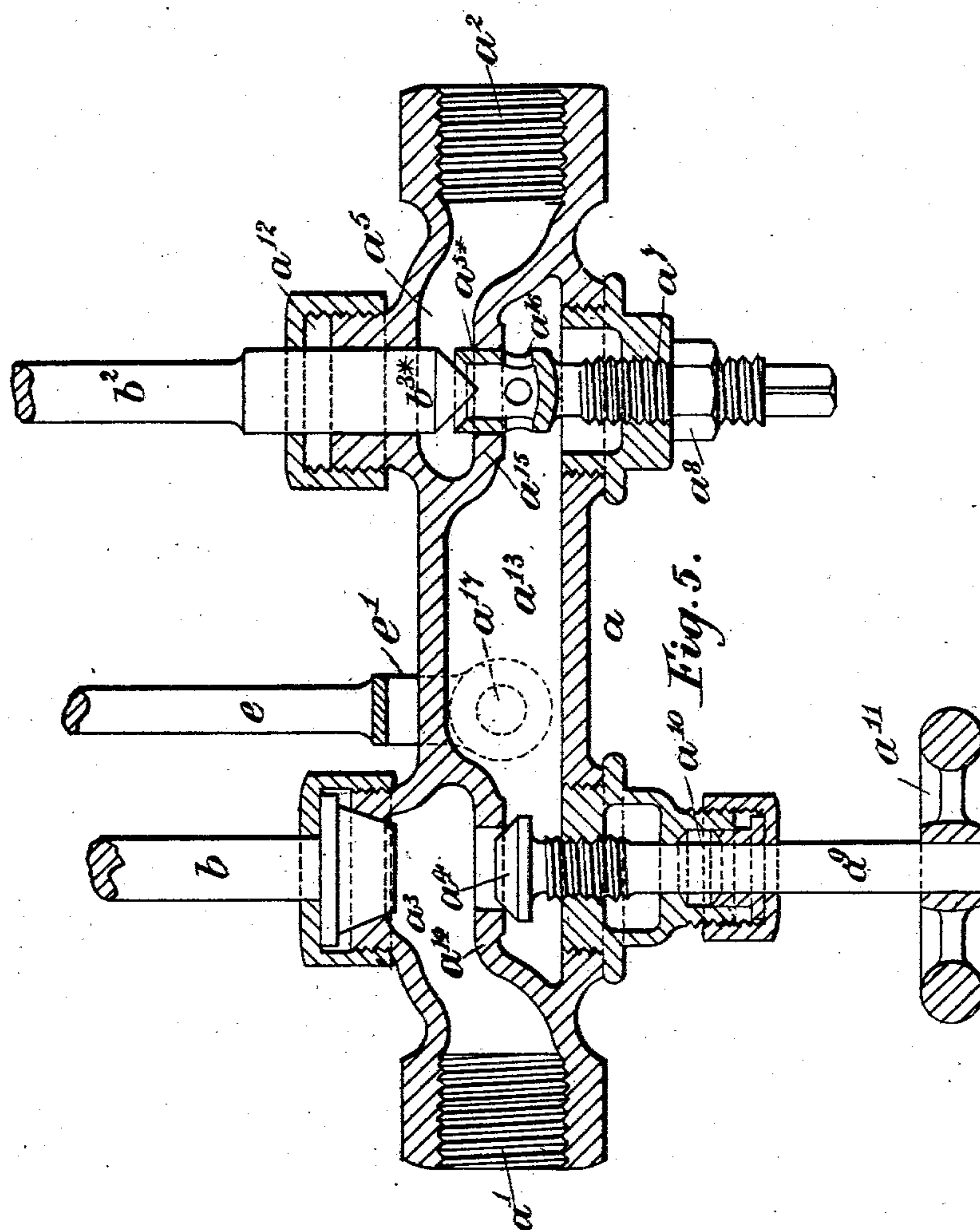
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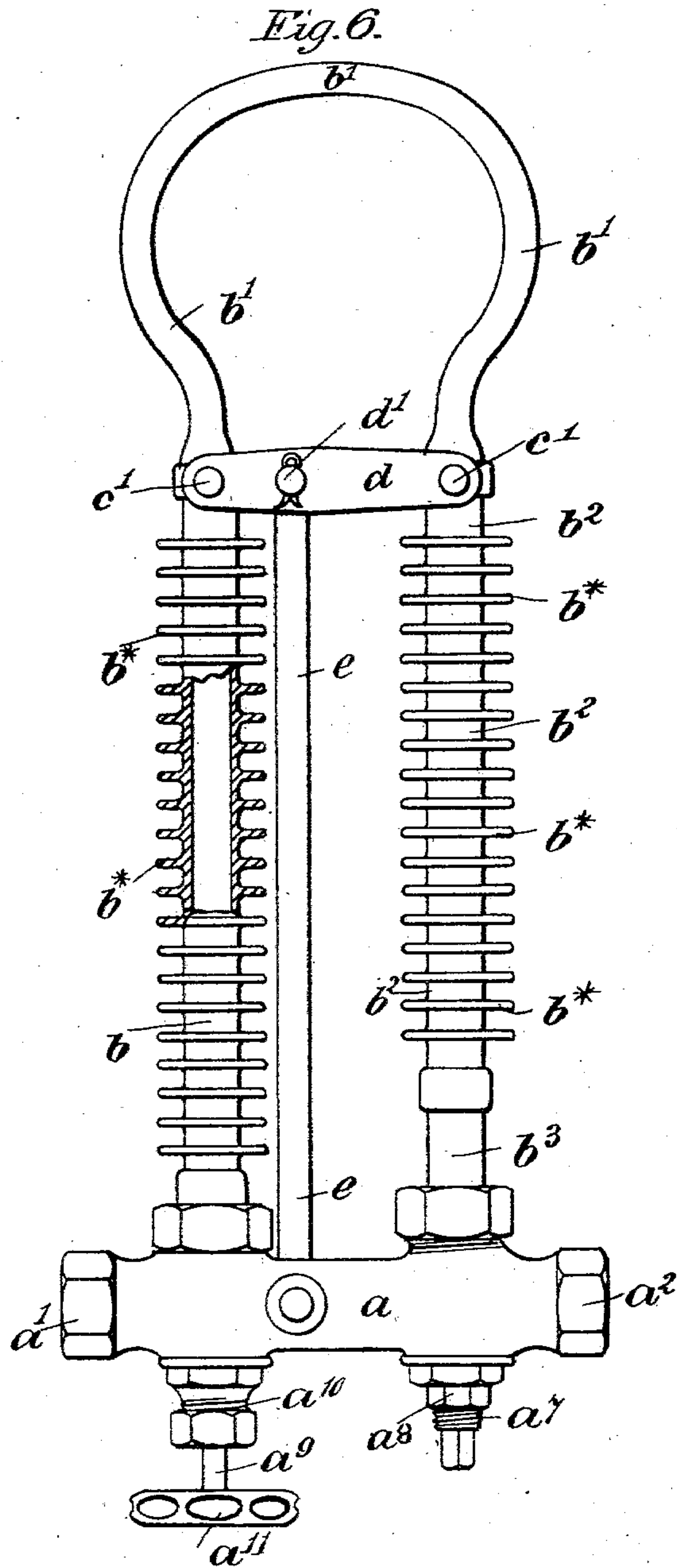
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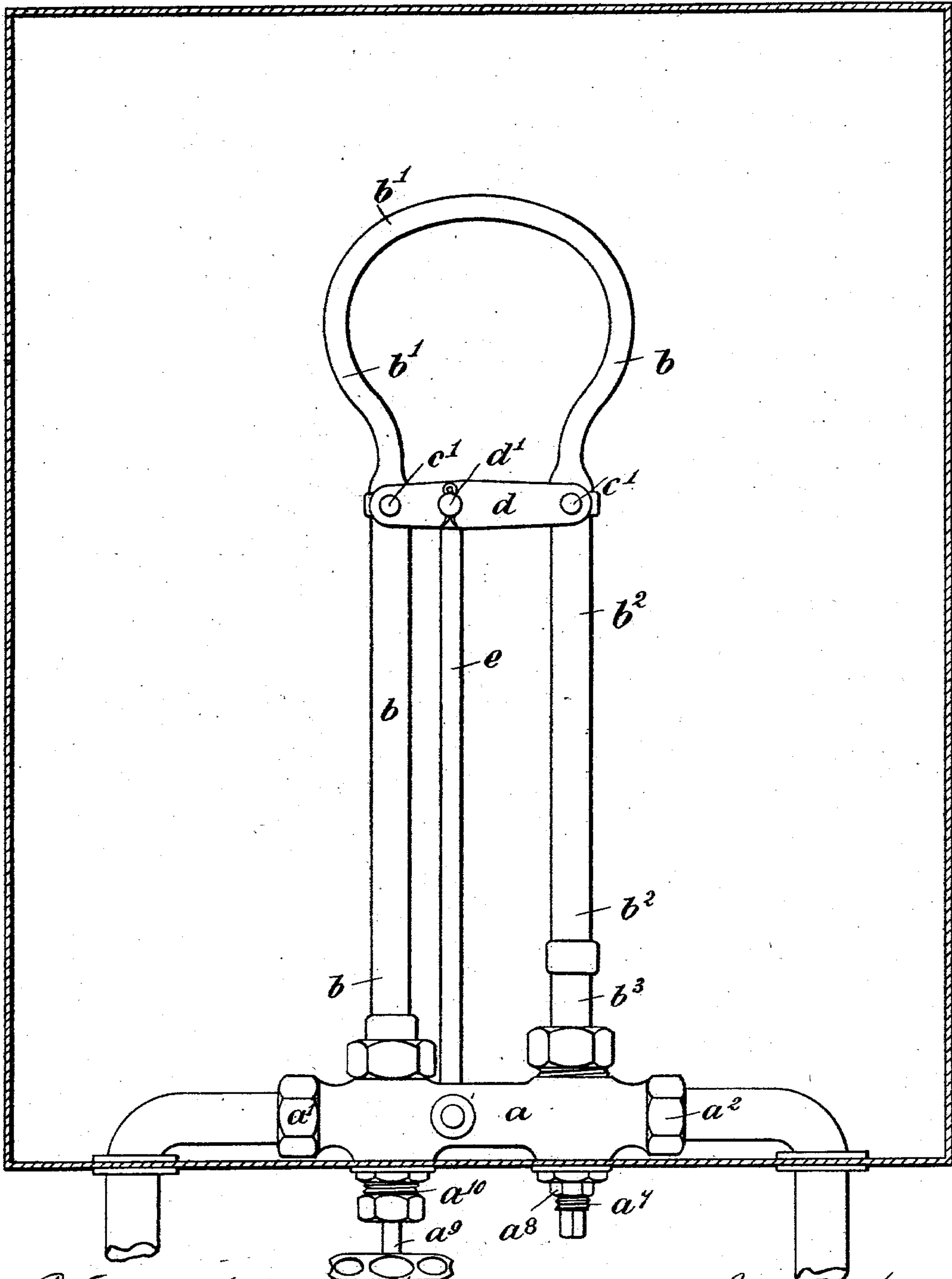
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5 Sheets—Sheet 5.



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Fig. 7.

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UNITED STATES PATENT OFFICE.

FREDERICK LAMPLOUGH, OF LONDON, ENGLAND.

HEAT-REGULATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 629,375, dated July 25, 1899.

Application filed February 28, 1899. Serial No. 707,241. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK LAMPLOUGH, a subject of the Queen of Great Britain, residing at London, England, have invented a new and useful Heat-Regulating Device, which device can also be used as a steam-trap and steam-radiator, of which the following is a full, clear, and exact description, and for which I have made application for British patent, No. 26,905, dated December 20, 1898.

The invention has for its object an improved construction and arrangement of apparatus which shall be very sensitive to differences of temperature and capable of regulating the supply of steam or gas to various apparatuses and which can be utilized as a steam-trap and steam-radiator.

I will describe my invention with the aid of the accompanying drawings, in which—

Figure 1 is an elevation of a heat-regulating device capable of regulating the supply of steam or gas to various classes of apparatus and which can be used as a steam-trap and as a heat-regulated steam-radiator. Fig. 2 is an elevation of the same, partly in section and drawn to an enlarged scale. Fig. 3 is a plan of the lower parts of Fig. 2. Fig. 4 is a cross-section of the loop portion of expansion-rod. Fig. 5 is a sectional elevation of parts, showing a modification. Fig. 6 is a partly-sectional elevation showing a modification of the device of Fig. 1. Fig. 7 is an elevation showing the device of Fig. 1 applied in the liquid-container of an incubator, said container being shown in section.

In all the figures like parts are indicated by similar letters of reference.

In carrying my invention into effect according to the arrangement shown at Figs. 1 to 4 I employ a casting or valve-body a , having at one end an inlet-opening a' and at the other end an outlet-opening a'' for the steam or gas used for heating purposes. Close to the inlet a' is a chamber a^3 , containing a screw-stop or inlet-valve a^4 , and close to the outlet a'' is a chamber a^5 , containing an outlet-valve or valve-seat a^6 , capable of ready regulation by means of a screwed rod a^7 , supporting it and extending through the valve-body a . This screwed rod is capable of being turned by a key applied to the outer end thereof and

of being fixed in its adjusted position by a lock-nut a^8 .

The screw-stop or inlet-valve a^4 has its stem a^9 passed through a stuffing-box a^{10} to the exterior, so that by means of the hand-wheel a^{11} it can be readily adjusted or so that the inlet-passage can be completely closed when desired.

Above the inlet-chamber a^3 is rigidly fixed to the valve-body one leg b of a looped hollow metal rod $b b' b^2$, and to the outlet-chamber a^5 is connected the other leg b^2 of said hollow rod, which leg b^2 passes through and is capable of motion in a stuffing-box a^{12} on said outlet-chamber a^5 . The inner end b^3 of the leg b^2 is of hard metal and serves as a valve-seat or valve to act in combination with the outlet-valve or valve-seat a^6 .

The legs $b b^2$ of the hollow rod extend any suitable distance from the valve-body a , and the loop-shaped part b' is flattened, as shown at Fig. 4, to enable it to act as a spring, while at the same time it affords free communication from the leg b to the leg b^2 of the hollow rod.

At or close to the junction of the loop-shaped portion b' with the legs $b b^2$ are brazed trunnion-rings c , and on the trunnions c' are mounted a pair of cross-bars d , forming a lever. At a point d' on said lever d between the two legs $b b^2$ of the hollow rod and preferably nearer the leg b is connected one end of a rod e , the other end of which is connected to the valve-body a .

The looped hollow rod $b b' b^2$ is made of an alloy or metal that will give good expansive properties, such as tin and copper combined or zinc and copper, the ordinary commercial brass, German silver, or copper tubes being suitable for the purpose. The rod e is formed of a metal that has poor expansive property when subjected to heat—preferably iron or steel.

The apparatus is equally applicable to gas-ovens as to boiling-vats; but in the former case the looped hollow rod $b b' b^2$ may be of much lighter material.

When the apparatus above described is used as a heat-radiator, it is, for example, laid lengthwise under the seat of a railway-carriage, and by adjusting the outlet-valve a^6

by its regulating-screw a^7 practically any range of temperature up to the maximum can be maintained. In this case the legs $b b^2$ may be constructed, as shown at b^* , Fig. 6, as in ordinary steam-radiators.

In the modification shown at Fig. 5 the hollow rod $b b' b^2$ hereinbefore described is replaced by a solid rod of like shape, but of smaller diameter, and in this case communication is made direct from the inlet-chamber a^3 to the outlet-chamber a^5 by a connecting-passage a^{13} , made in the valve-body a . In this case the seat of the inlet-valve a^4 is formed in a web a^{14} . The valve a^{5*} is attached to the screwed rod a^7 and passes through a hole in a web a^{15} , and such valve a^{5*} is hollow and is formed with holes a^{16} at the lower part to form communication between one side and the other of the web a^{15} . The end b^{3*} of the leg b^2 is coned or otherwise formed to act in combination with the valve a^{5*} . The rod e is also in this case formed with a forked lower end e' to fit outside the valve-body a and is connected thereto by pins or trunnions a^{17} , passed through the holes in the fork e' and screwed into the valve-body a .

The action of the arrangement shown at Figs. 1 to 4 is as follows: When used in connection with an incubator worked by gas or steam, the looped hollow rod $b b' b^2$ is placed in the liquid-container, as shown in Fig. 7, where it will expand and close off at any desired temperature, according to the adjustment of the outlet-valve a^6 . By the expansion of the leg b , transmitting its expansion by means of the lever d to the leg b^2 in an increased ratio, according to the position of the fulcrum or axle d' of said lever, and by the expansion of the leg b^2 I obtain a large ratio of expansion, which on a given temperature being reached acts more or less to close the outlet-valve a^6 , and thus regulate the supply of steam or gas. The apparatus represented at Figs. 1 to 4 may, however, be otherwise applied, and it may be used as a steam-trap. In this latter case the inlet-opening a' is connected to the lowest part of a steam-pipe, as usual, and the valves are so adjusted that when the apparatus is filled with condensation-water the outlet-valve a^6 will open to permit of its discharge, but on steam entering it the outlet-valve a^6 will close.

The modified construction of apparatus shown at Fig. 5 may be used in cases where

the steam or gas is not required to pass through the rod $b b' b^2$. In this case the said rod is solid, and the steam or gas passes directly from the inlet a' to the outlet a^2 through the passage a^{13} , formed in the valve-body a . Otherwise the action of this latter modification is similar to that of the apparatus shown at Figs. 1 to 4.

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

1. In a heat-regulating device capable of being used also as a steam-trap and steam-radiator, the combination with a valve-body having an adjustable inlet-valve and an adjustable outlet-valve, of a looped expansion-rod formed with two legs connected together by a flattened loop-shaped part, one of said legs being fixed rigidly to the valve-body, while the end of the other is capable of sliding in a stuffing-box and acts as the outlet-valve seat, a comparatively non-expanding rod attached at one end to the valve-body, and a lever attached at each end to trunnions fixed on the legs of the expansion-rod near their junction with the flattened loop part thereof and having its fulcrum at the upper end of the comparatively non-expanding rod, substantially as herein set forth and for the purpose stated.

2. In a heat-regulating device capable of being used also as a steam-trap and steam-radiator, the combination with a valve-body having an adjustable inlet-valve and an adjustable outlet-valve, of a looped expansion-rod formed with two legs connected together by a flattened loop-shaped part, one of said legs being fixed rigidly to the valve-body, while the end of the other leg is capable of sliding in a stuffing-box and acts as the outlet-valve seat, a comparatively non-expanding rod attached at one end to the valve-body, and a lever attached at each end to trunnions fixed on the legs of the expansion-rod near their junction with the flattened loop part thereof and having its fulcrum at the upper end of the comparatively non-expanding rod and nearer to the fixed leg than to the sliding leg thereof, substantially as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK LAMPLOUGH.

Witnesses:

B. J. B. MILLS,

CLAUDE K. MILLS.