

No. 682,802.

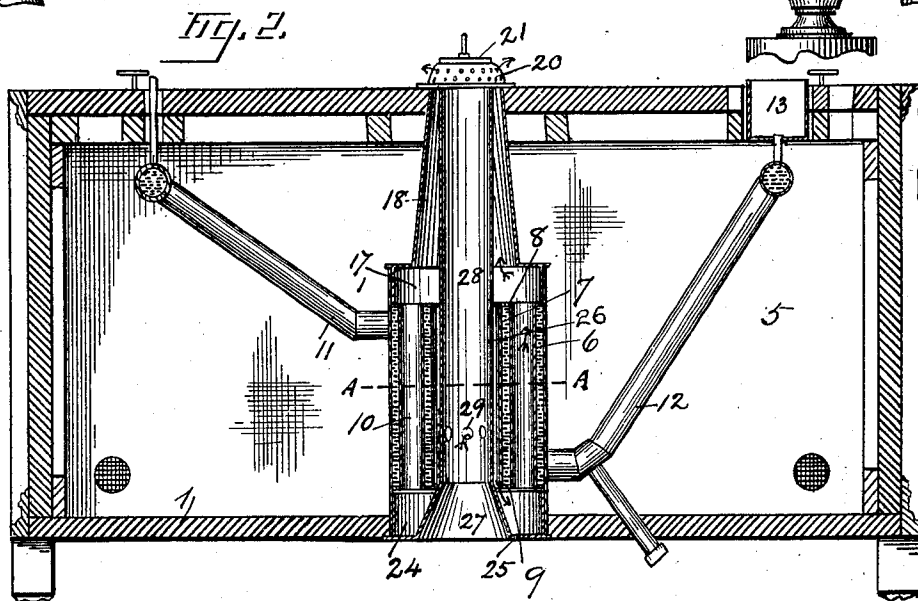
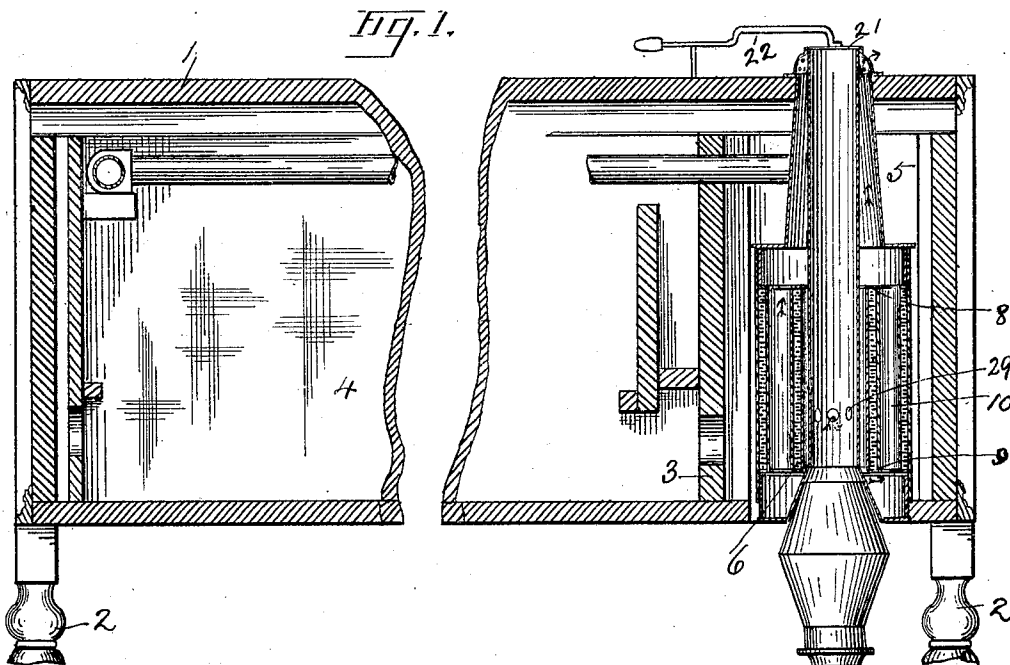
Patented Sept. 17, 1901.

J. H. MADISON.  
INCUBATOR HEATER.

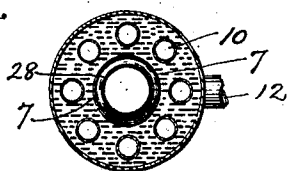
(Application filed Sept. 25, 1900.)

(No Model.)

2 Sheets—Sheet I.



*Fig. 3.*



WITNESSES:

*W. R. Daniels*  
*J. A. Daniels*

INVENTOR.

*John H. Madison*  
BY *Francis M. Wright,*  
ATTORNEY.

No. 682,802.

Patented Sept. 17, 1901.

J. H. MADISON.  
INCUBATOR HEATER.

(Application filed Sept. 25, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.

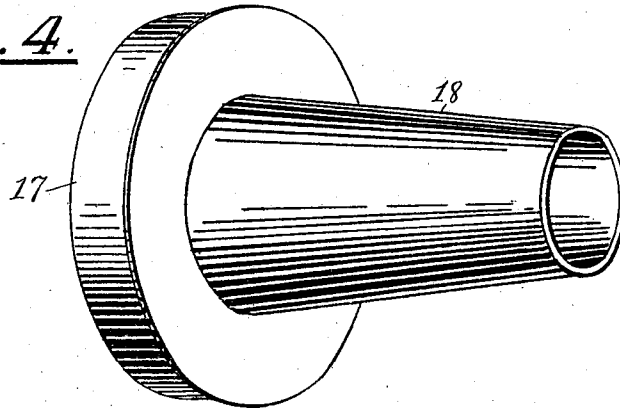


Fig. 5.

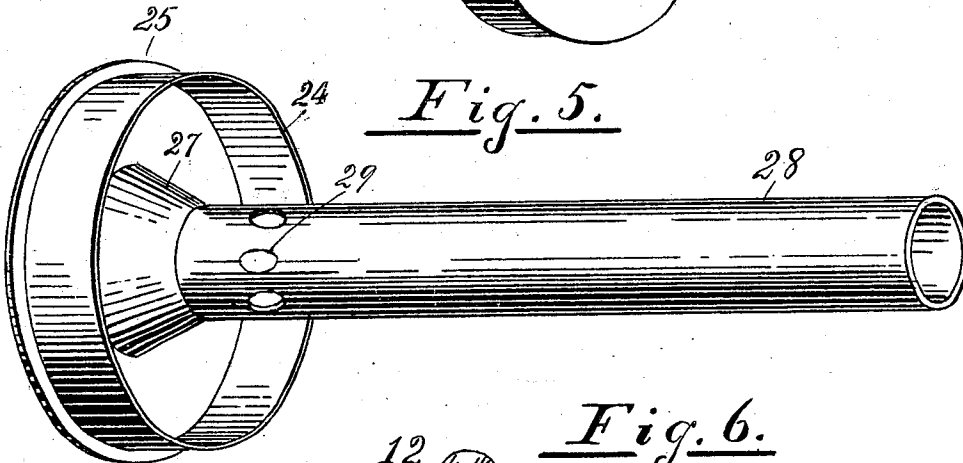
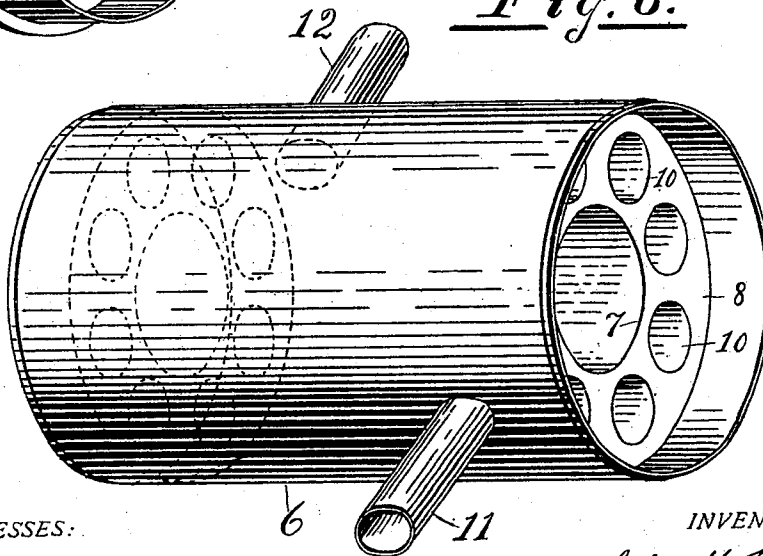


Fig. 6.



WITNESSES:

K. Lockwood Merins,  
J. A. Daniels

INVENTOR.

BY John H. Madison  
Francis M. Wright  
ATTORNEY.

# UNITED STATES PATENT OFFICE.

JOHN HARRY MADISON, OF PETALUMA, CALIFORNIA.

## INCUBATOR-HEATER.

SPECIFICATION forming part of Letters Patent No. 682,802, dated September 17, 1901.

Application filed September 25, 1900. Serial No. 31,110. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN HARRY MADISON, a citizen of the United States, residing at Petaluma, in the county of Sonoma and State of California, have invented certain new and useful Improvements in Incubator-Heaters, of which the following is a specification.

My invention relates to heating apparatus for incubators, the object of my invention being to provide an improved construction of reservoir and of the means for applying heat thereto which, while permitting the water in the reservoir to be quickly heated when desired and while also permitting the heat of the lamp to be conducted away from said reservoir when desired to lower the temperature, will admit of the flues or passages for the products of combustion being readily cleaned of deposits of lampblack, so that the rate of conduction of heat to the water in the reservoir may be maintained uniform.

In an apparatus for heating incubators in which the products of combustion from a lamp are conducted into contact with the surface of a water-reservoir much annoyance has been experienced by the deposits of lampblack upon such surfaces. Lampblack is a very bad conductor of heat, and if any considerable amount thereof is deposited upon the surface of the reservoir through which the heat passes the rate of conduction of heat is materially decreased. The consequence is that the temperature of the incubator falls unless great care and attention are given to so increase the size of the flame of the lamp as to compensate for the increased resistance to the passage of the heat to the water in the reservoir. It is very important, therefore, that the flues of said reservoir should be kept perfectly clean from deposits of this character; and my invention has for its object to provide a construction of reservoir and of flues in connection therewith which will permit of said reservoir and flues being readily detached from one another and cleaned with ease and rapidity, thereby facilitating the care of the incubator.

My invention therefore resides in the novel construction, combination, and arrangement of parts for the above ends, hereinafter fully specified, and particularly pointed out in the claim.

In the accompanying drawings, Figure 1 is a broken longitudinal vertical section of the incubator equipped with my improved apparatus. Fig. 2 is a transverse section of the same, and Fig. 3 is a horizontal section on the line A A of Fig. 2. Fig. 4 is a perspective view of the outer flue. Fig. 5 is a perspective view of the inner flue. Fig. 6 is a perspective view of the water-reservoir.

Referring to the drawings, 1 represents the casing of an incubator, supported by suitable legs 2 and provided near one end with a partition 3, dividing the incubator into two compartments, whereof the compartment 4 contains trays for the eggs and the heating-pipes, and the compartment 5 contains the hot-water reservoir 6 and the means for heating the same. Said reservoir 6 is cylindrical in form and has an inner cylindrical wall 7, being closed at the top and bottom by end plates 8 9, and between said plates extends a circular series of hot-water tubes 10. The space between the inner and outer walls and the upper and lower end plates and around the tubes 10 is filled with water, which circulates through the incubator by means of the outlet-pipe 11, leading from the upper end of the reservoir, and the inlet-pipe 12, leading to the lower end of said reservoir, said inlet-pipe being provided with suitable means for supplying water to the reservoir, as shown at 13.

The outer wall of the reservoir has upper and lower extensions beyond the upper and lower end plates 8 9 to form guides, the upper extension receiving the cylindrical base 17 of the outer flue 18, which tapers slightly upward from the base and extends through the top of the incubator, its upper end being surmounted by a perforated cap 20. Said cap has a large central opening, which is closed by a valve 21, operated by a lever 22, fulcrumed upon the top of the incubator. The lower extension forms a guide for the cylindrical wall 24 of the base 25 of the inner flue 26, the lower part of which is conical, as shown at 27, and enters the lower end of the cylindrical hole formed by the inner wall, and the upper portion 28 of which is cylindrical in form, its top fitting snugly in the central opening of the cap 20.

The operation of the device is as follows: When the valve 21 is down and the central

opening in the cap 20 is closed, the products of combustion from the lamp pass through perforations 29 in the upper part 28 of the flue 26 into the space around said flue and below the reservoir. Thence they pass up through the tube 10, and being thus broken up and distributed into several bodies or currents of hot gases the water in the reservoir is quickly heated. The hot gases pass up within the outer flue 18 and around the inner flue 28 and pass out through the perforations in the cap 20. When, however, the heat becomes too great, the valve 21 is opened and the products of combustion pass directly upward through the flue 26 and out through the central opening in the cap 20, and since the flue 26 is spaced apart from the central wall 7 of the reservoir very little heat is communicated to the water in the reservoir from the products of combustion when they thus pass out directly through the central opening in the cap. By this construction I am enabled either to increase the temperature of the water in the reservoir very rapidly or to permit it to cool, as may be desired, to adjust it to the required conditions of the incubator.

It will be seen that the reservoir 6 is symmetrical with respect to its two ends, so that either of the flues may be fitted into either end. Said flues are readily removed from the reservoir, so that access is readily obtained to every portion of the surface of the flues themselves and also of the flue-passages from the reservoir. The three parts shown in Figs. 4, 5, and 6 may be detached from each other, thoroughly cleaned from lampblack with a

brush, and attached to each other again ready for use in an extremely short space of time. The device may therefore be readily cleaned at frequent intervals without requiring undue attention and labor, thereby insuring absolutely uniform conduction of the heat from the lamp to the water-reservoir, and also a uniform temperature in the incubator.

I claim—

In an apparatus for heating incubators, the combination of a cylindrical water-reservoir, having a cylindrical axial flue there-through, and also an annular series of longitudinal apertures or flues around the axial aperture, an outer flue having an enlarged base fitting snugly upon one end of said reservoir and removable therefrom, an inner flue having a cylindrical flue portion of less diameter than the axial flue of the reservoir, a flaring lower portion, a base having a central aperture through which base and around which aperture the flaring portion extends, and an annular portion adapted to engage the other end of the reservoir to fit snugly therewith, but removable therefrom, said inner flue communicating with said cylindrical axial flue, and means for changing the direction of the gases through the flues, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN HARRY MADISON.

Witnesses:

DAVID E. ROBERTS,  
H. B. HIGBEE.