

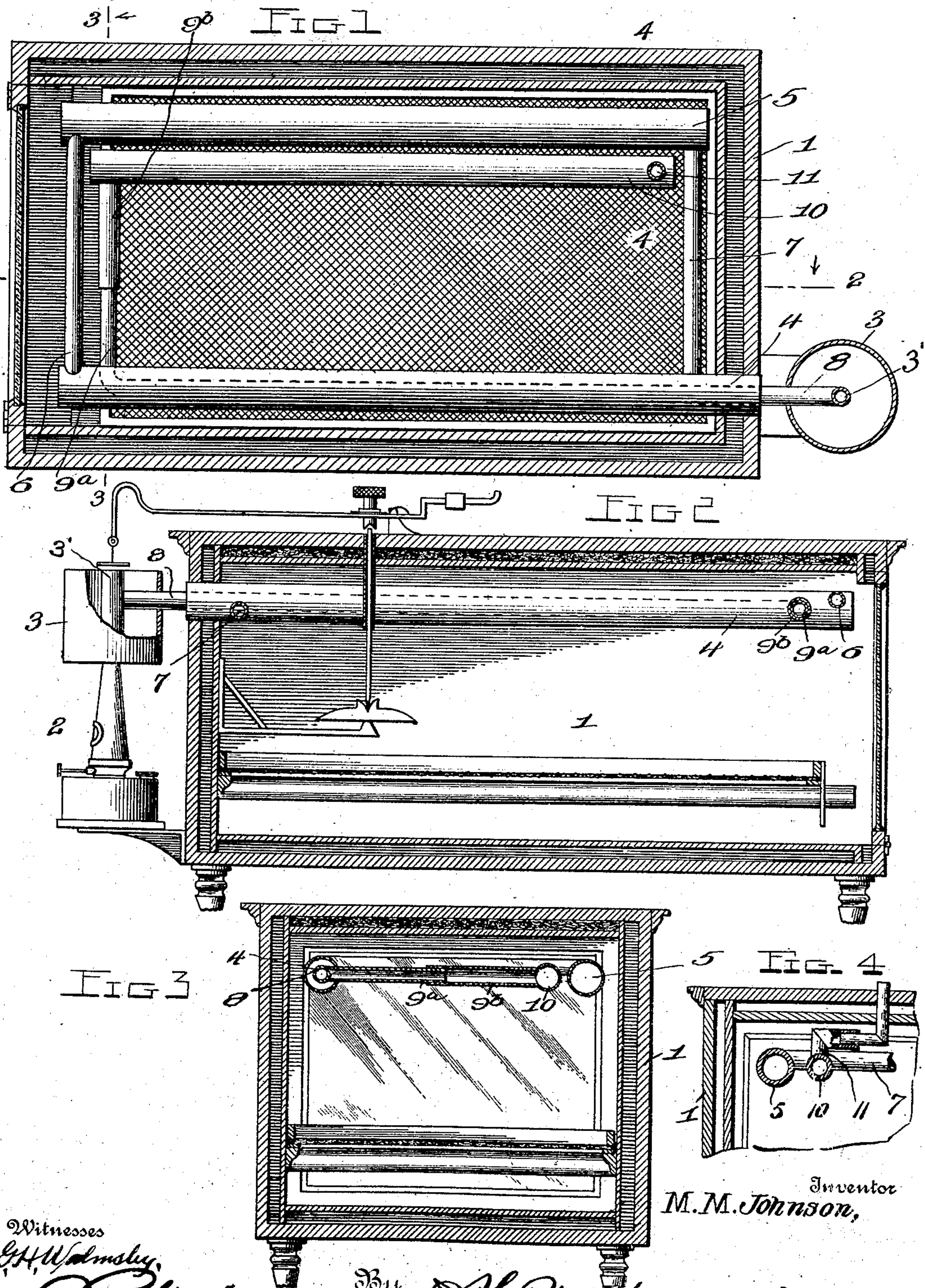
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Patented June 10, 1902.

M. M. JOHNSON.
HEATING APPARATUS.

(Application filed Mar. 6, 1902.)

(No Model.)



Witnesses
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HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 702,219, dated June 10, 1902.

Application filed March 6, 1902. Serial No. 96,983. (No model.)

To all whom it may concern:

Be it known that I, MANANDER M. JOHNSON, a citizen of the United States, residing at Clay Center, in the county of Clay and State of Nebraska, have invented certain new and useful Improvements in Heating Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to heating-chambers and means for heating the same.

The object of the invention is to provide a combined hot-water and hot-air heating device for incubators, brooders, &c., which is simple of construction, comparatively inexpensive of production, efficient in use, and so constructed as to maintain a substantially equal temperature at all parts of the heating-chamber.

The invention consists of certain novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a horizontal section through the heating-chamber of an incubator, showing the application of the invention thereto. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a vertical transverse section on line 3 3 of Fig. 1. Fig. 4 is a sectional view on line 4 4 of Fig. 1, illustrating the telescopic construction of the outlet-pipe.

Referring now more particularly to the drawings, the numeral 1 represents a heating-chamber, which may be embodied in an incubator, brooder or other device, or may be used for any desired purpose for which it is adapted. Supported alongside this chamber is a hot-air heater 2, consisting in the present instance of an oil-lamp, and located above this heater is a hot-air drum 3, in which is arranged a flue 3' for conveying the hot air to the heating system embodying the present invention. The parts of the said system are disposed in the upper portion of the chamber 1, and consist of longitudinal water-circulating pipes 4 and 5, which are arranged at the front and rear of said chamber. The ends

of these pipes are connected at the sides of the chamber by cross-pipes 6 and 7, which, with said pipes 4 and 5, form a conduit for the circulation of the water around the chamber.

A hot-air-conducting pipe 8 extends longitudinally within the pipe 4 and is connected at one end with the flue 3' and at the opposite end to a pipe 9^a, which extends alongside the pipe 6 and telescopes within a pipe 9^b, which leads to one end of a heat-radiating pipe or drum 10. This drum 10 extends alongside the pipe 5 and is provided at its opposite end with an outlet 11, by which the hot air, after circulating through the pipes 8, 9^a, 9^b, and 10, passes out to the atmosphere.

In order to secure the effective continuous circulation of the water through the pipes 4, 5, 6, and 7, the pipe 6 is connected at the top and the pipe 7 at the bottom of the pipes 4 and 5, so as to have a rise and fall of the water at opposite portions of the conduit. By this means the water discharging from the pipe 7 into the bottom of pipe 4 is caused to rise in said pipe 7 on being heated by radiation from the pipe 8 and to pass therefrom into pipe 6, whereby a circulation through the hot-water pipes is created. It will of course be understood that the water is heated from the pipe 8 and on its circulation transfers the greater portion of its heat to the pipes 5, 6, and 7, thus heating all sides of the chamber, and that upon the return of the water to the pipe 4 it is reheated and the rising action reproduced, and this is continued as long as the device is kept in operation.

It will be readily seen from the foregoing description that as the water in the pipe 4 is heated directly from the pipe 8 a greater amount of heat is radiated from said pipe 4 than from the pipe 5. This is, however, compensated for by arranging the drum 10 adjacent to the pipe 5, so that an approximately equal amount of heat will be supplied at the front and rear of the chamber. The amount of heat thrown out at the sides of the chamber is substantially the same, since the pipe 7, though conducting water of a lower temperature than the pipe 6, is located closer to the heater, whereby the difference in the amount of heat radiated by the two pipes 6 and 7 is compensated for.

The drum 10 is made adjustable toward

and from the pipe 5 by the two telescopic sections 9^a and 9^b and the pipe 11 of two telescopic angular sections, so that said drum 10 may be adjusted to the front or rear in order
 5 that the amount of heat radiated at the rear of the chamber may be varied to correspond approximately to the amount of heat being supplied at the front of the chamber by the pipe 4, thus insuring an even temperature on
 10 all sides of the chamber. By this means after the pipes have been mounted in the chamber and the heater set in operation the drum 10 may be adjusted back and forth until set in the proper position for regulating the supply of heat to secure an even temperature.

In practice pipes 4, 5, 6, and 7 are preferably made of copper and pipes 9^a, 9^b, and 10 of galvanized sheet iron or steel, thus securing a saving in the cost of material over heaters employing copper tanks and at the same
 20 time providing a simpler and more efficient apparatus.

From the foregoing description, taken in connection with the accompanying drawings,
 25 it is thought that the construction, operation, and advantages of my improved heating apparatus will be readily apparent without requiring a more extended explanation.

It will be seen that the device is simple of
 30 construction, efficient in operation, comparatively inexpensive of production, and adapted for heating incubators, brooders, and other forms of heaters.

Various changes in the form, proportion,
 35 and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, what
 40 I claim as new, and desire to secure by Letters Patent, is—

1. In a heating apparatus the combination of two water-radiators situated at opposite sides of the apartment to be warmed and hav-
 45 ing communication with each other forming

a water-circuit, of hot-air drums in communication with each other, one being situated within one of the hot-water radiators and the other disposed on the opposite side of the apartment and adapted to radiate heat di-
 50 rectly into the apartment, and a heater in direct communication with that hot-air drum which is situated within the radiator.

2. A heating apparatus comprising main water-circulating pipes, cross-pipes connect-
 55 ing the ends of the main pipes, a hot-air-conducting pipe arranged within one of the main pipes, and a hot-air drum located adjacent to and adjustable toward and from the other main pipe, and in communication with said
 60 hot-air pipe, substantially as set forth.

3. A heating apparatus comprising main water-circulating pipes, cross-pipes connect-
 65 ing the ends of the main pipes, a hot-air-conducting pipe arranged within one of the main pipes, a hot-air drum located adjacent to the other main pipe, and a telescopic pipe connecting the drum with the hot-air pipe, where-
 70 by the drum is made adjustable toward and from the contiguous main pipe, substantially as set forth.

4. A heating apparatus comprising main water-circulating pipes, cross-pipes connect-
 75 ing the ends of the main pipes, a hot-air-conducting pipe arranged within one of the main pipes, one of said cross-pipes being connected at the top and the other at the bottom of the main pipes, a hot-air drum located adjacent to the other main pipe, and a telescopic pipe
 80 connecting the drum with the hot-air pipe, whereby the drum is made adjustable toward and from the contiguous main pipe, substantially as set forth.

In testimony whereof I have hereunto set
 my hand in presence of two subscribing wit-
 85 nesses.

MANANDER M. JOHNSON.

Witnesses:

WM. SEELIG,
 JOHN M. JONES.