

C. E. ADAIR.  
INCUBATOR HEATER.  
APPLICATION FILED MAR. 11, 1908.

953,310.

Patented Mar. 29, 1910.

FIG. 1.

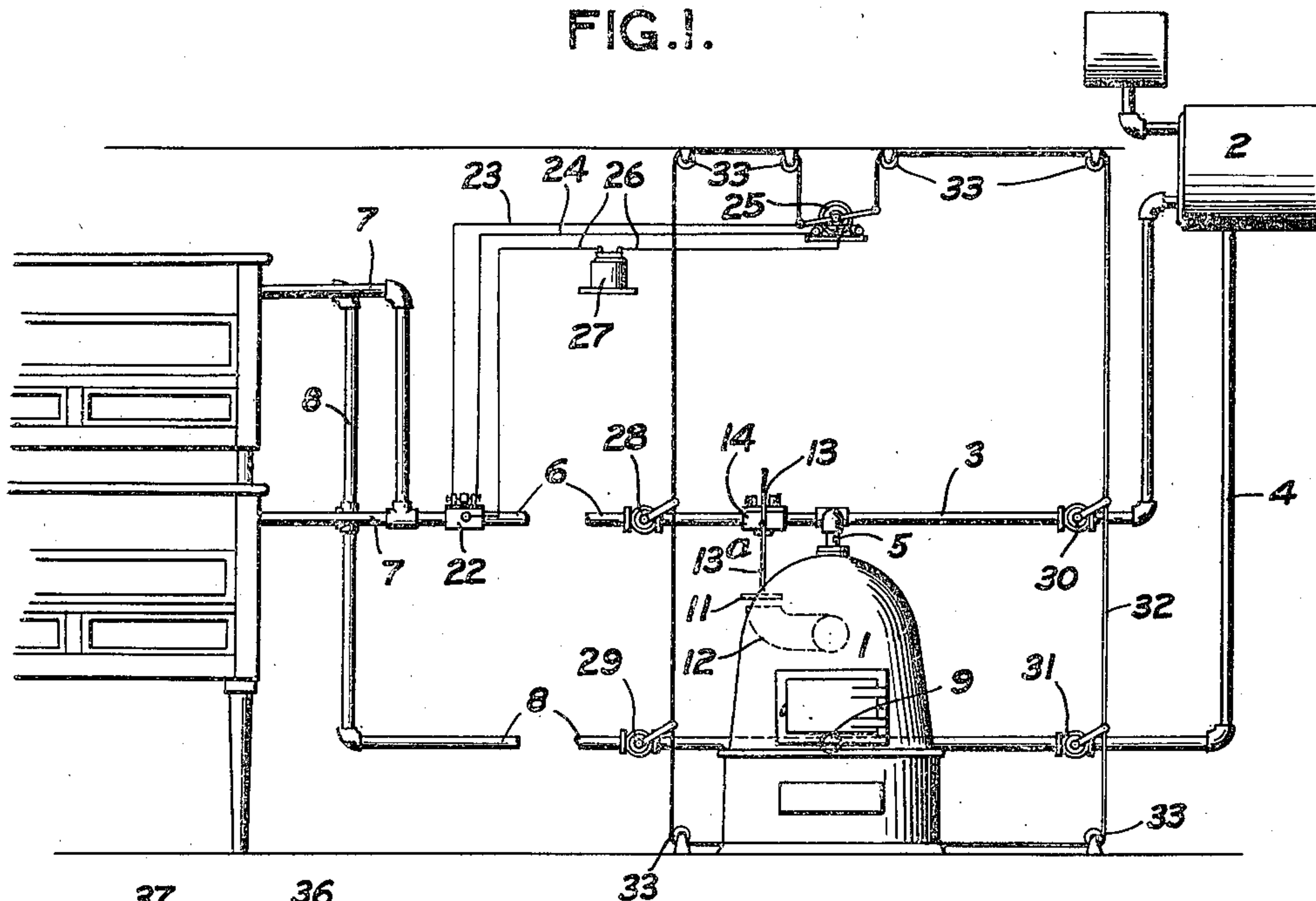


FIG. 3.

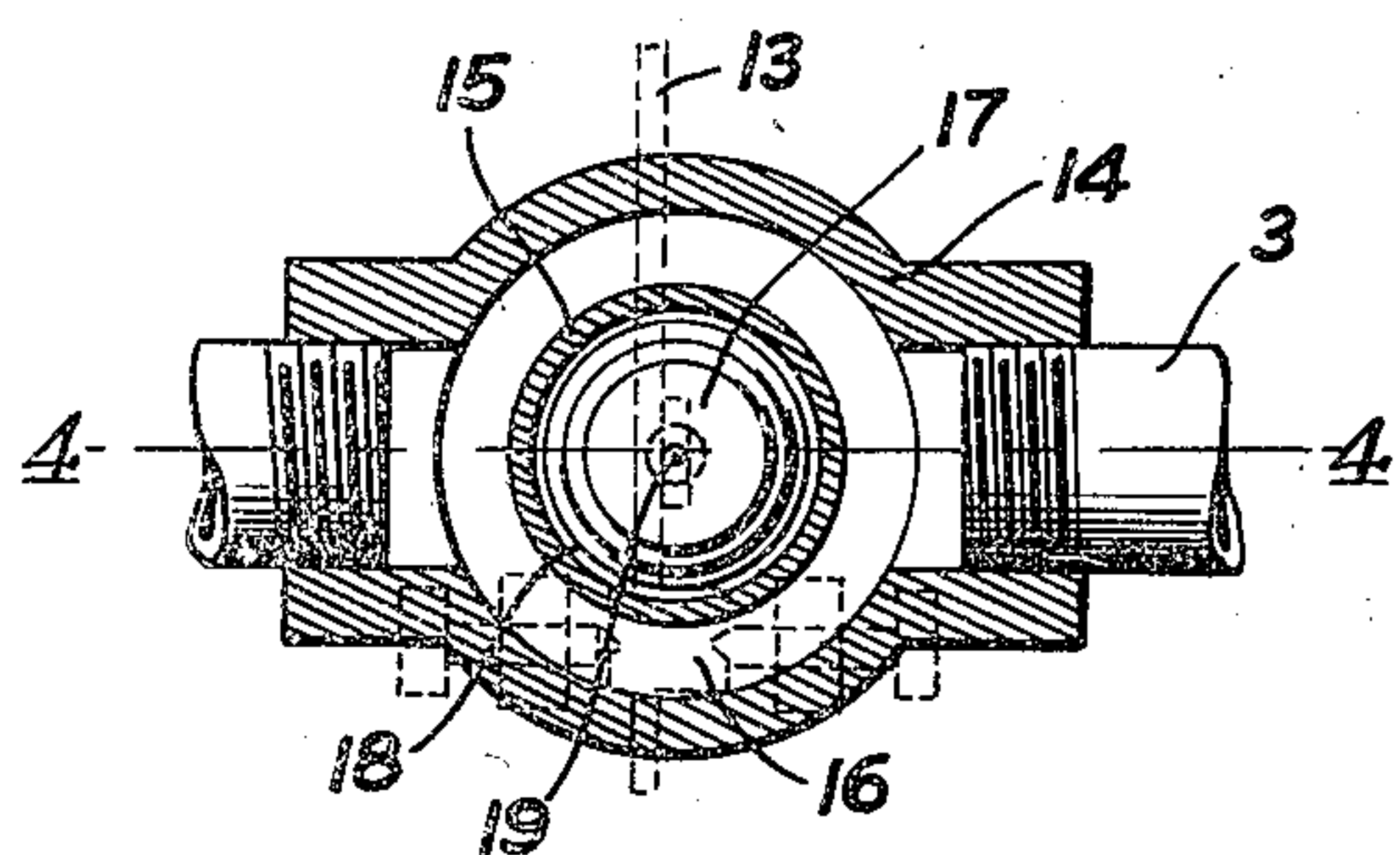


FIG. 4.

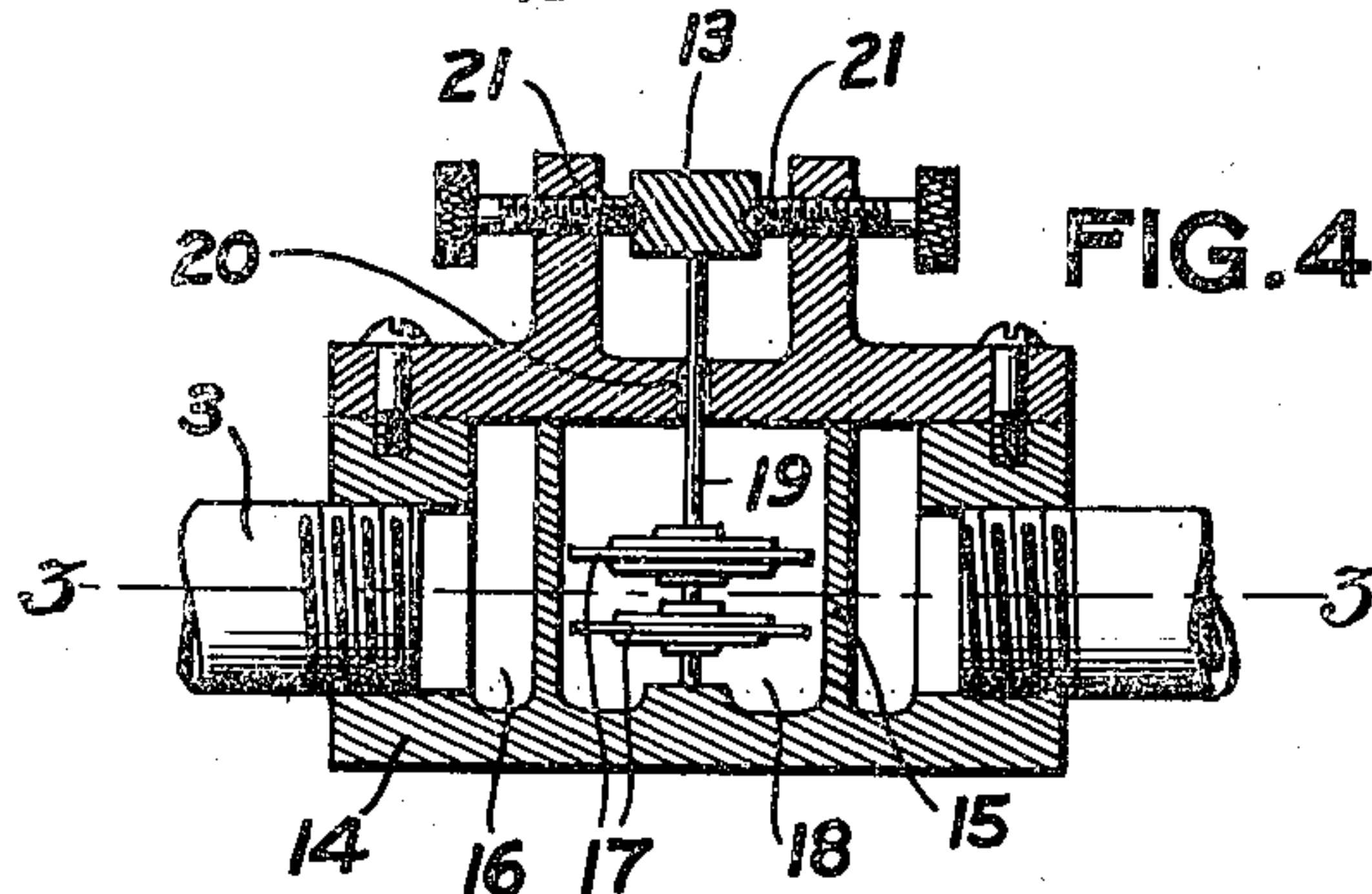


FIG. 2.

WITNESSES:  
C. W. Carroll  
D. Gurnee.

INVENTOR:  
Charles E. Adair  
by Osgood & Davis  
his Attys.



# UNITED STATES PATENT OFFICE.

CHARLES E. ADAIR, OF BUFFALO, NEW YORK, ASSIGNOR TO CYPHERS INCUBATOR COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

## INCUBATOR-HEATER.

953,310.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed March 11, 1908. Serial No. 420,493.

*To all whom it may concern:*

Be it known that I, CHARLES E. ADAIR, a citizen of the United States, and resident of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Incubator-Heaters, of which the following is a specification.

This invention relates to incubator heaters, and consists in the apparatus herein-  
after described and claimed.

The object of the invention is to provide means for heating incubators, with means for accurately and automatically controlling such heating.

In the drawings: Figure 1 is a front elevation of an apparatus embodying this invention; Fig. 2 is a side elevation of the heater and certain adjuncts thereof; Fig. 3 is a horizontal section on the line 3—3 of Fig. 4, of a controlling device employed in connection with the said invention; Fig. 4 is a vertical section on the line 4—4 of Fig. 3; and Fig. 5 is an end view of a similar controlling device.

In the drawings, 1 is a heater, which may burn coal, gas, or other suitable fuel, and which heats the water contained in a circuit of pipes; 2 is the water supply tank for keeping the system full, and 3 and 4 are pipes leading from said water supply tank to connect with the heater and the fluid circulation system. Inside the heater 1, (but not shown) is suitable piping, as usual, that is connected by the supply pipes 5, 6, 7, with the incubators that are to be heated. Inside the incubators are suitable radiators, as will be well understood by any one skilled in this art, and the water, after passing through said radiators, is led back to the heater by the return pipes 8, 9. The heater 1 causes circulation through the radiators in the incubators, and the water, after having parted with some of its heat, returns to the heater to be reheated. The heater is provided with a draft damper 10, Fig. 2, controlling the supply of air to the space under the grate, and is also provided with a check draft damper 11 controlling an opening in the smoke pipe 12. These two dampers are connected by rods or wires 13<sup>a</sup> to opposite ends of a balance beam 13, so that when one end rises and opens the draft damper 10, the check draft damper 11 will be closed and the draft through the grate will be increased. If the heat in the pipes

increases, however, the draft damper 10 is automatically closed, and the check draft damper 11 is opened, thus checking the fire. The beam 13 is actuated by a thermostatic regulator that is set in the delivery pipe 6, so that the temperature of the water in said pipes determines the movement of said beam.

In the supply pipe 6, at a suitable point, for the purposes just described, adjacent to the heater 1, is a casing 14 (Fig. 3) through which the water of the system passes. Within said casing is a closed compartment containing the thermostat, to which compartment the water of the system has no access. This is produced by the wall 15, leaving the annular water channel 16 outside the same. The wall 15 is cylindrical in the present form of the device, and is quite thin, and within the water tight chamber formed by it is a thermostatic motor part, which, in the present instance, consists of a pair of hermetically sealed capsules 17 containing some volatile fluid, such as ether. The said capsules are well known in this art, and are made of corrugated, convex, circular shells, fastened together at their peripheries. Two of these capsules are fastened together at their central points of contact, and the lower one has a bearing on the bottom of the thermostat chamber 18. The upper capsule bears a rod 19 that passes through a hole 20 in the top of the chamber 18, and is connected with the beam 13 at one side of its pivotal bearings 21. When the temperature of the water in the system changes, the capsules 17 expand or contract, the rod 19 is moved, and the beam 13 is tilted, so as to produce the desired result, and the draft is checked or increased, as conditions require. A second regulator is also provided, actuated by a similar thermostatic arrangement set in the supply pipe 6 adjacent to the incubators, and this thermostatic device is of such character that in consequence of changes in the temperature of the water at this point it makes and breaks electric circuits, by which an electric motor is controlled, and valves in the delivery and return pipes are opened or closed by the motor, as the case may be. The same regulator above described may be used for this purpose, and the tilting beam may be employed in an obvious manner to make one circuit when the beam is raised, and another cir-



cuit when the beam is lowered. Two conducting wires 23, 24, lead from the regulator 22 to an electric motor 25, which is connected by a common return wire 26 through a  
 5 battery 27, or other source of electric power to the regulator 22. The motor may be of the common double-wound variety. When current passes through the wire 23, the  
 10 motor rotates in one direction, and when current passes through the wire 24, the motor revolves in an opposite direction.

In the supply pipe 6 is a valve 28, in the return pipe 8 is a valve 29, and, if desired, in the connections 3 and 4 from the tank 2 are  
 15 valves 30 and 31. These valves are connected together in any suitable way, such as by the band or chain 32 passing around a series of pulleys 33, so that movement of the chain in either direction will operate all of the  
 20 valves. The chain or band is actuated by the motor 25, and when the heat of the water in the system rises above the predetermined degree, the valves will be closed and the circulation of the water interrupted until ra-  
 25 diation from the piping and radiators has reduced its temperature, whereupon the movement of the thermostat will cause the motor to revolve in the other direction and to open the valves and permit renewed move-  
 30 ment of the water.

The circuits through the wires 23 and 24 are made and broken by the regulator 22 as follows:—In the circulation pipe 6 is in-  
 35 serted a water-tight casing 34, Fig. 5, containing one or more capsules 34<sup>a</sup> arranged to move a rod 35, in the same manner as the capsules 17 operate the rod 19. The rod 35 projects upward and is pivoted to an arm 36 that is hung in trunnions 37. The arm 36  
 40 strikes one or the other of two contacts 38,

39, connected respectively with the wires 23, 24. The arm 36 is connected with the re-  
 turn wire 26 through a binding post 41, the casing 34 and the trunnions 37. When the  
 temperature of the heating water rises, the  
 45 capsules raise the rod 35 in one direction and when the arm 36 strikes the contact 38, a circuit from the battery 27 is made through one winding of the motor, and the motor ro-  
 tates in one direction and closes the valves, 50 and the valves remain closed until the temperature of the heating water at the regulator 22 has fallen so far as to cause the cap-  
 sules 34<sup>a</sup> to lower the rod 35 and tilt the arm  
 55 36 in the opposite direction, so that the arm strikes the contact 39 and the circuit is made through the other winding of the motor which then rotates in the opposite direction and opens the valves again, whereupon the  
 60 circulation of the heating water is resumed.

What I claim is:

In an incubator heating apparatus, a fluid circulating system including supply and re-  
 turn pipes, a heater for heating the fluid, 65 regulators having their motor parts in the fluid of the system, a draft damper and a check draft damper for the heater controlled by a regulator adjacent to the heater, valves  
 in the supply and return pipes, an electric motor for opening and closing said valves, a 70 source of electricity, and a regulator having its motor parts in the supply pipe and having contacts and connections therefrom to said source of electricity and motor to actuate  
 75 the motor for opening and closing its valves.

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Witnesses:

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 JOHN P. ABBOTT.