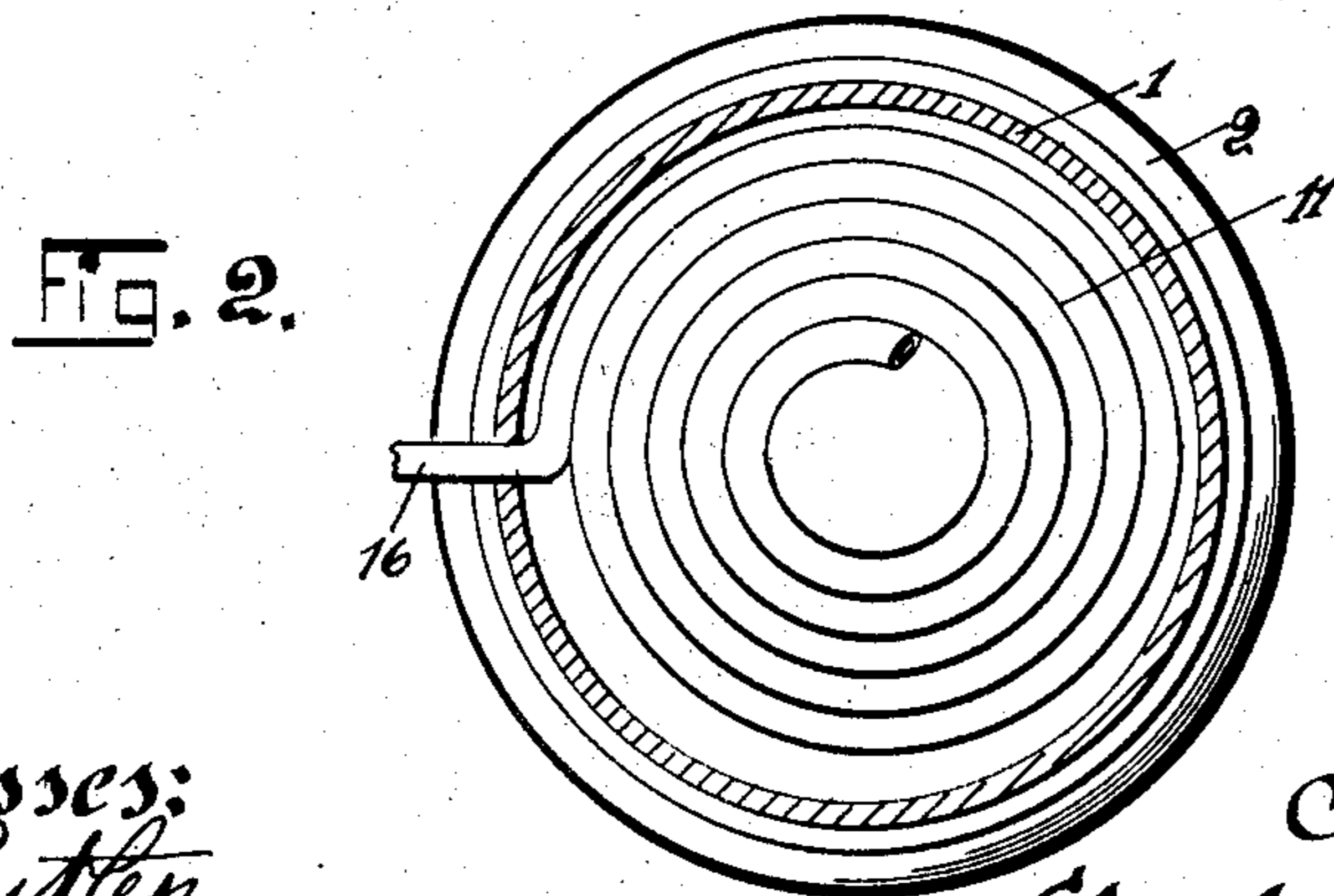
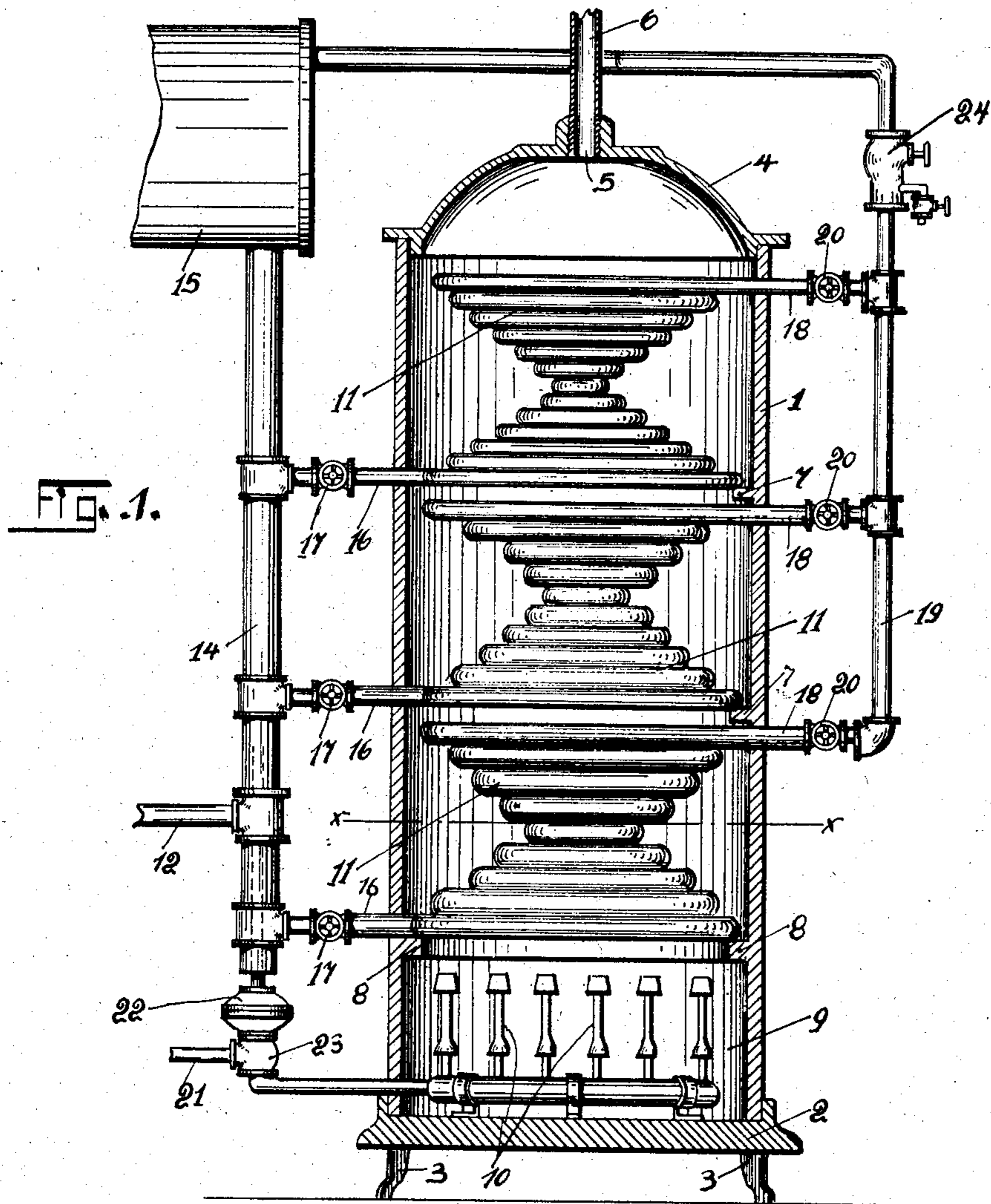


No. 790,119.

PATENTED MAY 16, 1905.

C. S. FOLSOM.
HEATER.

APPLICATION FILED OCT. 11, 1904.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES S. FOLSOM, OF ALLEGHENY, PENNSYLVANIA.

HEATER.

SPECIFICATION forming part of Letters Patent No. 790,119, dated May 16, 1905.

Application filed October 11, 1904. Serial No. 228,008.

To all whom it may concern:

Be it known that I, CHARLES S. FOLSOM, a citizen of the United States of America, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to certain new and useful improvements in heaters, and more particularly to that type commonly known as "instantaneous" heaters.

The object of this invention is to provide a heater which may be used as a storage or non-automatic heater, and in constructing my improved heater I have provided means whereby a greater heating-surface will be obtained than has heretofore been accomplished in heaters of this type.

Briefly described, my improved heater comprises a cast-iron jacket having formed therein two compartments. One compartment forms a combustion-chamber in which gas-burners are mounted, while in the other compartment a plurality of coils of copper tubing are arranged, said coils being so formed as to be exposed to the heated air of said burners.

The above construction will be hereinafter more fully described and then specifically pointed out in the appended claims, and, referring to the drawings accompanying this application, like numerals of reference designate corresponding parts throughout both views, in which—

Figure 1 is a vertical sectional view of my improved heater, and Fig. 2 is a transverse sectional view taken on the line $x x$ of Fig. 1.

In the accompanying drawings the reference-numeral 1 designates a cast-iron jacket which is preferably annular in form, and this jacket is supported upon a suitable base-plate 2, having legs 3 3. Upon the top of the jacket is supported a cover or lid 4, having an outlet 5, in which is secured the exhaust-flue 6. The jacket 1 is formed with a plurality of inwardly-extending annular flanges 7 7 and 8, and between the base-plate and the annular flange 8 is formed the combustion-chamber 9. In this combustion-chamber gas-burners 10

are mounted, which may be of any desired form, and upon the flanges 7 7 and the flange 8 are supported a plurality of double helico-volute coils of copper tubing 11 11 11.

The reference-numeral 12 designates a cold-water-supply pipe which is connected to a stand-pipe 14, that communicates with a cylinder or reservoir 15, located in the vicinity of the heater, and this stand-pipe is connected by the pipes 16 16 to the base of each coil 11.

The reference-numeral 17 designates valves which are carried by the pipes 16.

The top of each coil is connected by a pipe 18 to a stand-pipe 19, which communicates with the top of the cylinder or reservoir 15.

The reference-numeral 20 designates a valve carried by each of the pipes 18.

The gas-inlet pipe is designated by the reference-numeral 21, and the gas-inlet is controlled by the thermostat 22, mounted within the stand-pipe 14 and the valve 23 of the gas-inlet pipe 21.

The operation of my improved heater is as follows: Cold water is admitted to the coils of pipes through the stand-pipe 14 and the pipes 16 16, and the gas is admitted through the pipe 21, which when ignited at the burners heats the coils of pipe, and the hot water is carried from the same through the pipes 18, stand-pipe 19, to the reservoir or cylinder, and as the hot water commingles with the water in the stand-pipe 14 the thermostatic valve 22 will be operated to reduce the supply of gas to the burner and permit of the coils becoming sufficiently cool until the hot water has been consumed.

It will be observed from the accompanying drawings that I have so formed the coils of copper tubing that a greater heating-surface will be provided for said coils, which will facilitate the more rapid heating of the cold water, which is adapted to pass through said coils. The particular construction of these coils increases the capacity of the heater, reduces the amount of gas used, and provides an instantaneous and economical heater. By referring to Fig. 1 of the drawings it will be observed that the diameter of the tubing employed in various coils of pipe varies and that the tubing of which the lowermost coil of tub-

ing is composed is of a greater diameter than the tubing of which the uppermost is composed, whereby it will take a greater period of time to heat the water in the lower coil than what it would to heat the water in the upper coil. This construction is employed owing to the lowermost coil being in close proximity to the burner, therefore having a greater heating-surface, and it is for this reason that the uppermost coil is formed with a smaller capacity for water than the lower coil; but I do not care to confine myself to this construction, as the diameter of the tubing may be equal in each coil. By forming each coil of tubing of a different diameter the heating-surface of the water in proportion to the capacity of each coil of the tubing is not changed—that is, where the diameter of the tubing is increased a shorter length of tubing is used in each coil than if the diameter of the tubing were smaller. Naturally the heating-surface per square inch in each coil is equal; but a greater circulation is given the water in a smaller diameter of tubing of a greater length than what the water would have in a shorter tubing of a larger diameter.

While I have herein shown one form of thermostat which may be used in connection with the same, also a burner, it is obvious that any desired type of gas-burner or thermostat may be used in connection with the heater.

My improved heater can be used as an instantaneous heater or as a storage-heater.

I may employ valves, as shown, and in case any accident should happen to one of said coils the valves can be closed, the damaged coil removed, and the heater operated with the remaining coils.

On the riser-pipe leading from the coils to the reservoir a regulating-valve 24 is placed, the object being as follows: When the heaters are first fitted up or should get out of order, it is possible to regulate the temperature of the water by means of the thermostat to the temperature desired by simply closing this valve and opening a small cock that will allow a small quantity of water to pass from the boiler down through the return-pipe and up through the coils, so that the time for adjusting and putting the heater in shape is very much reduced.

It will also be observed that my improved heater may be constructed whereby artificial or gasolene gas or gasolene fluid may be em-

ployed as a heating medium, and while I have herein shown the preferred form of constructing my improved heater it is obvious that various changes may be made in the details of construction without departing from the general spirit and scope of the invention.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A heater comprising a jacket having burners mounted therein, a plurality of separate double helico-volute coils of tubing arranged within said jacket, a cold-water supply connecting with one terminal of each coil of tubing, the other terminals of said coils of tubing connecting with a common discharge-pipe leading to a suitable reservoir, means for automatically controlling the burner located within said jacket, substantially as described.

2. In a heater of the type described, the combination with a jacket having gas-burners mounted therein, of a plurality of separate coils of tubing, said coils being of substantially a double helico-volute contour, a cold-water supply connecting, by a separate branch having a valve, with each coil, said coils connecting by other separate branches each provided with a valve with a suitable reservoir, valves controlling the inlet and outlet of water to said coils, means for automatically controlling the gas admitted to said burner, substantially as described.

3. In a heater of the type set forth, the combination with a jacket having a combustion-chamber formed therein, of a plurality of separate coils of tubing, supported within said jacket, said coils being of substantially a double helico-volute contour, the diameter of the tubing of one or more of said coils being greater than the diameter of the tubing of the other coils, a cold-water supply connecting with one terminal of each of said coils, means for controlling said supply, the other terminals of said coils connecting by separate branches, each having a valve, with a suitable reservoir, means to control said outlet of water from the other terminal of each of said coils.

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

CHARLES S. FOLSOM.

Witnesses:

E. E. POTTER,

K. H. BUTLER.