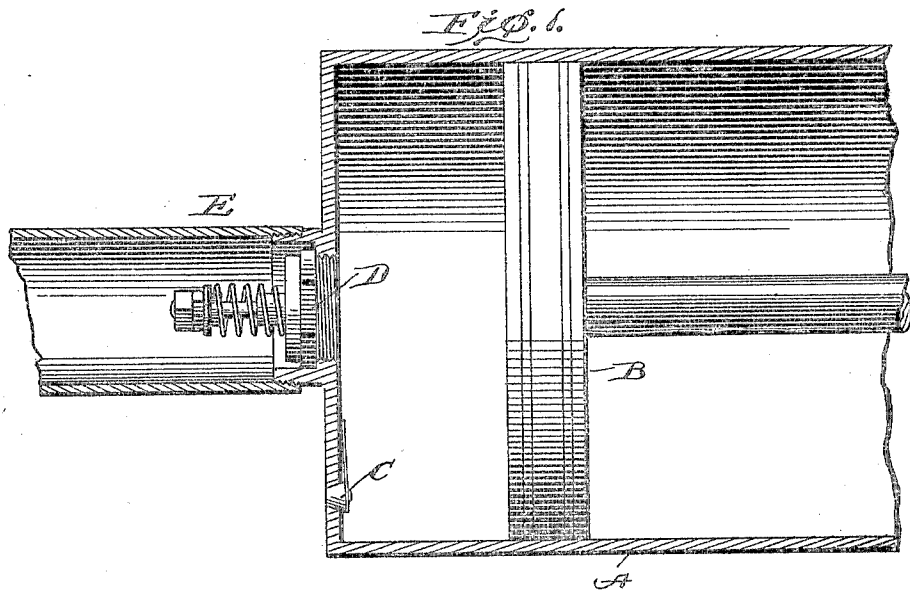
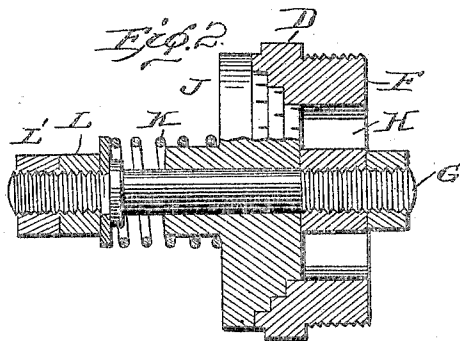
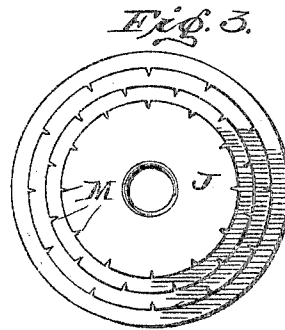
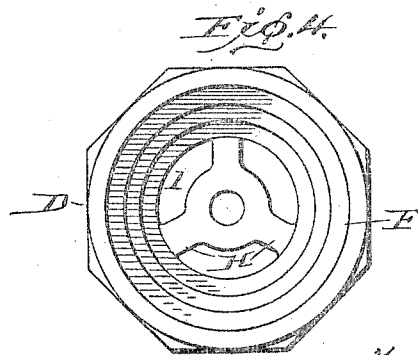


F. J. GILROY.
HEATING FLUIDS MECHANICALLY.
APPLICATION FILED MAY 24, 1902.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK J. GILROY, OF BUFFALO, NEW YORK.

HEATING FLUIDS MECHANICALLY.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK J. GILROY, a citizen of the United States, residing at No. 100 Carolina street, Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Heating Fluids Mechanically; and I do hereby 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.

My invention relates to a method of heating fluids mechanically, and it involves forcing the fluid to be heated through a long attenuated passage or between very slightly separated surfaces. This method has been practically and successfully used for cooking, heating apartments, and the like, and experimental temperatures of 780° Fahrenheit have been obtained with the same apparatus. In the apparatus thus practically used I have attached to an ordinary air-compressor, such as is used for operating railway-switches, an outlet-valve of brass, adapted to discharge from the compressor a very thin stratum of air through a passage not of uniform cross-sectional area having abrupt change in direction, great internal surface, and devices offering yielding resistance to increasing the distance between its surfaces; but not all these conditions are essential to producing useful results.

In the accompanying drawings, which merely illustrate one embodiment of apparatus for carrying out my method, Figure 1 represents a portion of an air-compressor with my devices operatively connected therewith. Fig. 2 is an axial section of a certain valve. Figs. 3 and 4 show the meeting faces of two coacting members of the same valve.

In the figures, A represents the cylinder of an ordinary air-compressor; B, a plunger therein; C, an inlet-valve; D, a novel outlet-valve; E, a pipe inclosing the outlet-valve and leading to any point where the heated fluid is to be utilized.

In the form selected for illustration the valve D consists of a seat member F, fixed in the wall of the cylinder and having an axial rod G, supported by arms H, extending inward from the walls of a large central opening I in the member F. This member is recessed upon its outer side to receive a second circular member J, loosely yet accurately fitting upon the rod G and normally held against the member F by a spring-coil K, whose tension may be regulated by means of nuts LL' work-

ing upon the threaded free end of the rod G. The working side of the member J is accurately turned down to cone-pulley form, so that upon this side the member shows a series of approximately equal steps and consists of a series of short cylindrical portions whose end faces are planes perpendicular to the axis of the valve. Preferably each of these portions is provided with a series of slight marginal notches M, the notches of each portion being between radial lines passing through the notches of the next preceding or following portion. The working side of the seat member F is very accurately recessed to form a seat for the member J, the depth of each cylindrical recess being such that when the valve is closed all the end faces of the member J lie in contact with the corresponding faces of the seat members; but the diameter of each is very slightly greater than the diameter of the corresponding portion of the member J. The pipe E incloses the other portion of the valve and is shown as screwed upon an annular nipple upon the compressor. If the spring be adjusted to press the member J into its seat with moderate force and if the plunger be forced forward, the compressed air will ultimately overcome the force of the spring, move the member J slightly from its seat, and escape into the pipe E on all sides of the valve in an extremely thin stratum which has passed for a long distance between slightly-separated surfaces or, in this instance, between the alternating plane and curved surfaces of the valve members. When it thus escapes, it is highly heated, its temperature being far higher than that of the air in the compressor. The degree of heat depends upon the tension of the spring, which may be regulated at will. The notches are provided to aid in the even distribution of the air and to insure the equal lifting of all sides of the valve member J.

What I claim is—

1. The method of heating fluids which consists in compressing the fluid to be heated and causing a thin stratum of the compressed fluid to pass between slightly-separated confining-walls.

2. The method of heating fluids which consists in compressing the fluid to be heated and causing a thin stratum of the compressed fluid to pass between slightly-separated confining-walls and further subjecting the fluid to numerous changes in velocity during its passage between the walls.

3. The method of heating fluids which con-

sists in compressing the fluid to be heated and causing a thin stratum of the compressed fluid to pass between slightly-separated confining-walls the direction of flow of the fluid being changed at many points.

4. The method of heating fluids which consists in compressing the fluid to be heated, and causing a broad, relatively very thin stratum of the compressed fluid to pass over a correspondingly broad frictional surface while strongly pressed against that surface.

5. The method of heating fluids which consists in compressing the fluid to be heated, and gradually decreasing the cross-sections of several streams of the fluid under pressure and then allowing these streams to unite and advance as a thin relatively very broad, laterally-confined stratum.

6. The method of heating fluids which consists in compressing the fluid to be heated, and compelling a thin relatively very broad stratum of fluid under pressure to advance and causing the thickness of said advancing stratum to alternately increase and decrease.

7. The method of heating fluids which consists in compressing the fluid to be heated, and forcing the fluid under pressure through an

attenuated passage offering frictional resistance to the fluid's advance and yielding resistance to lateral expansion of the advancing body of fluid.

8. The method of heating fluids which consists in compressing the fluid to be heated, and forcing the fluid under pressure through a series of attenuated passages alternating with passages of greater width.

9. The method of heating fluids which consists in compressing the fluid to be heated, and forcing the fluid under pressure through a series of attenuated passages alternating with passages which vary in cross-section under fluctuations of pressure of said fluid.

10. The method of heating fluids which consists in compressing the fluid to be heated and causing it to pass through attenuated, laterally unyielding passages alternating with a series of connecting-passages each having a laterally-yielding wall.

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

FRANK J. GILROY.

Witnesses:

E. FITZGERALD,
P. J. CURRAN.