

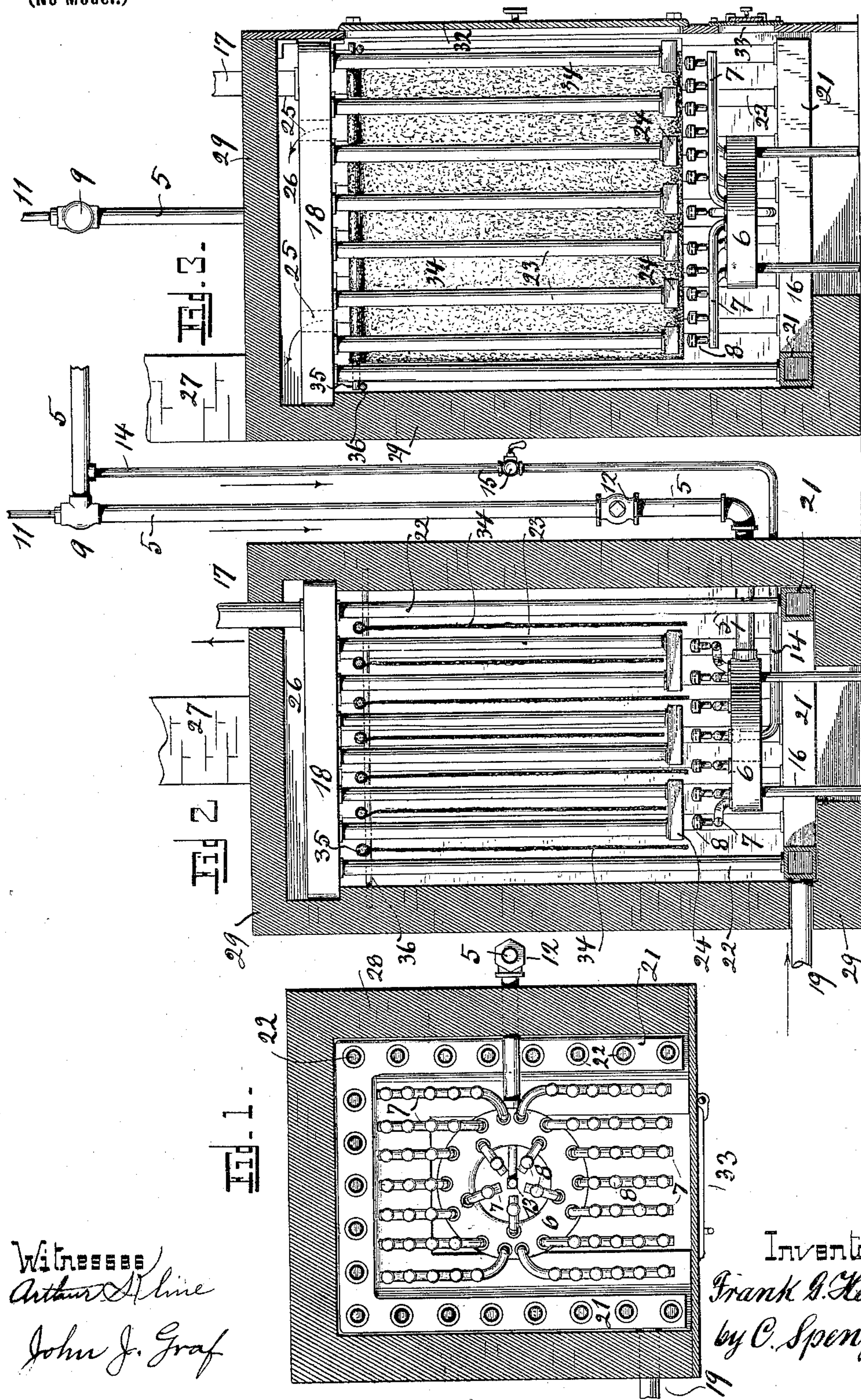
No. 705,077.

Patented July 22, 1902.

F. G. HAMER.  
GAS FURNACE.

(Application filed Nov. 17, 1900.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 705,077, dated July 22, 1902.

Application filed November 17, 1900. Serial No. 36,802. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK G. HAMER, a citizen of the United States, and a resident of Cincinnati, Hamilton county, State of Ohio, have invented a certain new and useful Gas-Furnace; and I do hereby declare that the following is a description thereof sufficiently clear, full, and exact as to enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form also a part of this specification.

This invention relates to heating-furnaces where the fuel is supplied in form of gas and where the heat-conveying agent is contained in pipes and tubes, like is the case in steam or hot-water heaters, for instance. It is described as used in connection with a hot-water heater and embraces several features, one of which is the combination, with a hot-water heater, of a multiple gas-burner to supply the heat and connected with a pipe system provided with certain valves.

Another feature is the construction of the means which contains the heat-conveying medium (water in this case) while the same is heated. These means consist of conduits which are in open communication with the system (other conduits) whereby the heat is distributed, and they are preferably of tubular shape.

There are finally features involving means whereby the capacity of the furnace to produce high temperature to be imparted to the heat-conveying medium is increased.

To this end my invention consists of a device arranged, used, and operating all as hereinafter described, and pointed out in the claims, the construction being also illustrated in the accompanying drawings, in which—

Figure 1 is a horizontal section of my gas-furnace, taken above the gas-burners. Fig. 2 is a vertical cross-section of the same, and Fig. 3 is a longitudinal section thereof.

The gas manufactured or produced from vaporized hydrocarbon or otherwise passes through a pipe 5 into the distributing-chamber 6 of a multiple gas-burner. This latter consists of this chamber 6, which is preferably of annular shape and from which project a number of horizontal bracket-arms 7,

which extend laterally—that is, outwardly and also inwardly—and are so arranged as to reach over and fill out the free interior area of the heating-chamber of the furnace. They are preferably secured to the top of the inclosure which forms chamber 6, and they are hollow, so as to be capable to supply gas to the burners 8, which, spaced apart, are secured to these brackets, from which they project upwardly. These burners may be of any approved construction to suit the kind of gas used, and they are preferably atmospheric or Bunsen burners. The supply of gas is controlled by a valve 9, the stem 11 of which is accessible from above, and whereby the supply of gas may be regulated to suit the temperature desired and whereby, if necessary, it may be entirely cut off.

12 is an adjusting-valve, which after once set is not used for general operating purposes, its object being merely to regulate and set by limits the flow of gas which it is intended should pass through the supply-pipe and which depends on the kind of gas used and its pressure.

Since such furnaces are usually situated in basements, it is desirable to have means which obviate the necessity to descend to such basements every time the furnace is to be lighted. For such purpose I provide a separate burner 13 of ordinary construction, usually called "pilot-light," which is supplied from a special pipe 14, which supply is taken from pipe 5 at a point beyond the control of valve 9, so that said burner will not be extinguished when the supply to the other burners is cut off. These latter will thus readily relight as soon as this supply is turned on again. By means of a stop-cock 15 this burner may also be entirely extinguished, as at the end of the cold season, when the furnace is put out of use.

Burner 6 is supported on suitable legs 16, provided for such purpose, unless the masonry or other parts of the furnace furnish suitable means for such support.

The heat-conveying medium, supposed to be water in this case, is supplied to the various pipes, coils, registers, &c., of the heating system by means of a pipe 17, leaving the furnace at its top, from the head 18 thereat, and after circulating through the aforesaid heating system reenters the furnace again at



its bottom by means of a pipe 19, entering the base 21 of the furnace. Between pipes 19 and 17 and within the heating-chamber of the furnace there is that part of it which is exposed to the action of the flames and heat generated by them and consisting of a number of conduits, pipes, and tubes disposed throughout the heating-chamber and so arranged therein as to produce the best results for the purpose. These devices consist, first, of tubes 22, connecting base 21 with head 18, thus providing for the necessary communication between these two parts, and they further consist of drop-tubes 23, depending from the under side of head 18 and terminating above the burners below. They are arranged in pairs by connecting two such tubes at their lower ends to provide for circulation, which is induced by having one tube of each pair longer or of smaller diameter than the other. The connection is by means of an independent joint 24 at their lower ends, which is box-shaped and preferably of copper. For purposes of obtaining the necessary draft and to carry off products of combustion there are a number of flues 25 through the head 18, above which they enter into a smoke-chamber 26, from which a general flue or chimney 27 provides a concentrated outlet for all. This interior part of the furnace—that is, base 21, head 18, and the intermediate parts—is supported on the brickwork 29, by which the furnace is inclosed. The front 31 is preferably of iron and contains two doors, one, 32, for access and the other, 33, being a draft-door.

The heat within the fire-chamber of the furnace is intensified as to its action upon the pipes and tubes within by sheets 34 of non-combustible material, which are vertically suspended in the spaces between the tubes and in the upper part of the fire-chamber, so as to be above the burner and directly subject to the effects of the heat produced by said burner below them. They operate by absorbing and retaining heat, which by radiation they give off again to said tubes, particularly at their upper parts. They are supported in lines parallel to the line of the draft and not transverse thereto, like the so-called “baffle-plates” or “walls” used to change the direction of the line of draft, which these sheets 34 do not do. A suitable material for these sheets is asbestos. By covering the sides of these sheets with fibrous asbestos or mineral wool held thereto by a suitable paste, as of silica, rough surfaces are produced, which materially improve the action for the intended purpose. These sheets are in this case supported on rods 35, the ends of which rest on suitable supports 36, which may be other rods. It is clear that this feature of my invention, which is interposing of draft-retarding and heat retaining and radiating sheets between conductors to be heated, is not limited to the furnace here shown, but is applicable in other cases where such effect is de-

sirable and where the construction and other conditions governing present no objections and reasons interfering therewith.

Having described my invention, I claim as new—

1. In a heating-furnace, the combination of an outer inclosure forming a heating-chamber within, a horizontally-disposed head 18 closing the upper part of this chamber by being supported all around on the outer inclosure, a smoke-chamber 26 above this head, smoke-flues passing through this latter and connecting the heating-chamber below it with the smoke-chamber above it, a horizontally-disposed hollow base 21 in the lower part of the heating-chamber arranged around the sides thereof, pipes 22 connecting this base with head 18 in a manner to leave a space between them, drop heating-tubes depending from head 18 filling this space and arranged in pairs by having the lower ends of two adjacent tubes connected for communication and one of the tubes in each pair being of larger diameter than the other tube thereof and a multiple gas-burner to supply heat to this furnace.

2. In a heating-furnace, the combination of an outer inclosure forming a heating-chamber within, a horizontally-disposed head 18 closing the upper part of this chamber by being supported all around on the outer inclosure, a smoke-chamber 26 above this head, smoke-flues passing through this latter and connecting the heating-chamber below it with the smoke-chamber above it, a horizontally-disposed hollow base 21 in the lower part of the heating-chamber arranged around the sides thereof, pipes 22 connecting this base with head 18 in a manner to leave a space between them, drop heating-tubes depending from head 18 filling this space and arranged in pairs by having the lower ends of two adjacent tubes connected for communication and one of the tubes in each pair being of larger diameter than the other tube thereof and means to supply heat to this furnace.

3. In a heating-furnace, the combination of an outer inclosure forming a heating-chamber within, a horizontally-disposed head 18 closing the upper part of this chamber by being supported all around on the outer inclosure, a smoke-chamber 26 above this head, smoke-flues passing through this latter and connecting the heating-chamber below it with the smoke-chamber above it, a horizontally-disposed hollow base 21 in the lower part of the heating-chamber arranged around the sides thereof, pipes 22 connecting this base with head 18 in a manner to leave a space between them, drop heating-tubes depending from head 18 filling this space and arranged in pairs, an independent joint 24, box-shaped and of copper which connects to the lower end of each pair, one of the tubes of such pair being of larger diameter than the other and means to supply heat to this furnace.

4. A gas-furnace having within its heating-



chamber pipes and tubes intended to be heated and vertically arranged with spaces between them, rods 35, horizontally supported in a fixed position in the upper part of these  
5 spaces and sheets of non-combustible material also vertically arranged and suspended on these rods in a line parallel to the line of draft and adapted to absorb and retain the

heat for radiation, substantially as shown and described. 10

In testimony whereof I hereunto set my hand in the presence of two witnesses.

FRANK G. HAMER.

Witnesses:

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ARTHUR KLINE.