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PATENTED NOV. 29, 1904.

C. A. GIFFORD.  
SOLID AND FLUID FUEL FURNACE.

APPLICATION FILED JULY 9, 1903.

NO MODEL.

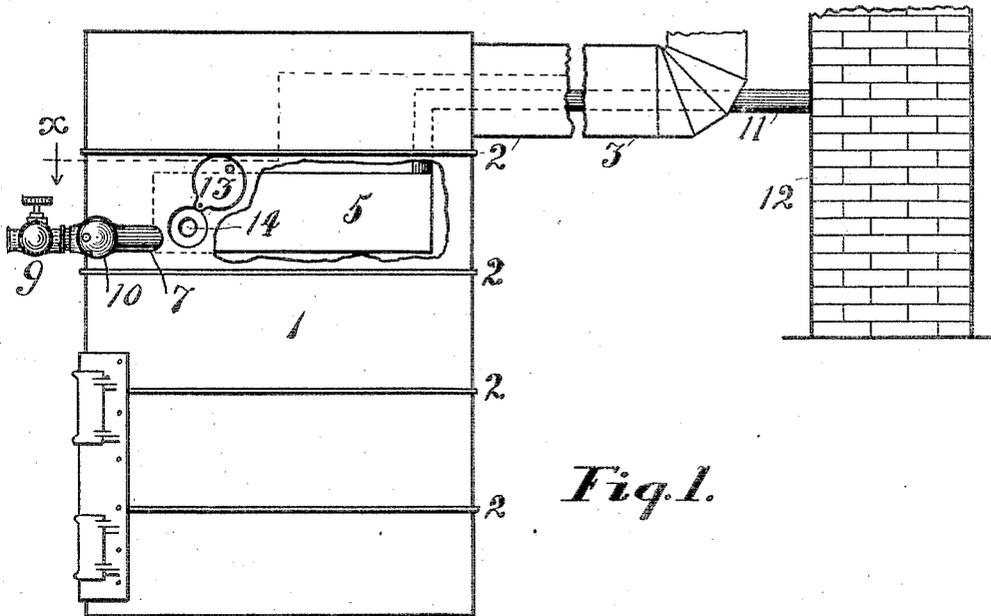


Fig. 1.

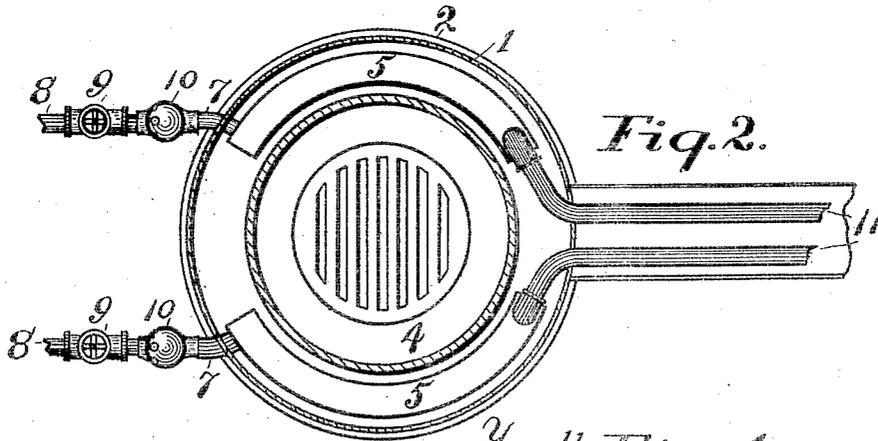


Fig. 2.

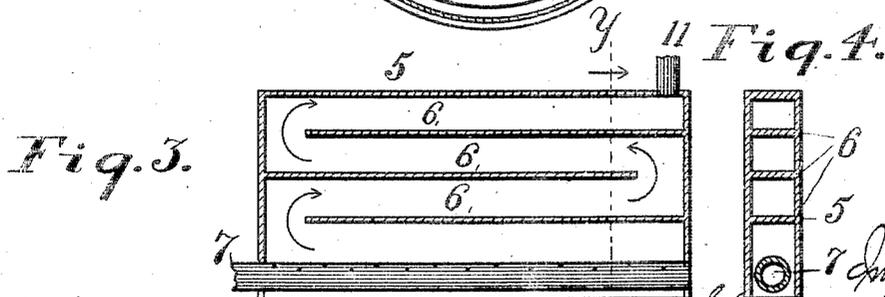


Fig. 3.

Fig. 4.

Witnesses:  
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# UNITED STATES PATENT OFFICE.

CHARLES A. GIFFORD, OF AKRON, OHIO.

## SOLID AND FLUID FUEL FURNACE.

SPECIFICATION forming part of Letters Patent No. 776,053, dated November 29, 1904.

Application filed July 9, 1903. Serial No. 184,909. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. GIFFORD, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Solid and Fluid Fuel Furnaces, of which the following is a complete specification.

My invention has relation to devices to be attached to ordinary solid-fuel-burning furnaces whereby a fluid fuel may be burned during substantially the majority of the time and when for any reason the supply of fluid fuel fails recourse may be had to the ordinary common solid fuel.

The objects of my invention are to provide means whereby a furnace normally burning solid fuel may be so adapted as to burn a fluid fuel; and another object of my invention is to so place a burner for burning fluid fuel that it will in no wise disturb or interfere with the fire-pot wherein is normally burned solid fuel.

It frequently happens in those communities where there exists large quantities of natural fluid fuel that it is the common fuel used both for heating and lighting, and where this fluid is conveyed to any considerable distance from its natural supply it not infrequently happens that the supply fails for some cause or other, necessitating a return to the use of a solid fuel, and as a consequence it is very desirable to have a furnace provided with means whereby either fuel may be used, or both, if necessary, without either one interfering with the other.

To the accomplishment of the aforesaid objects my invention consists in the peculiar and novel construction, arrangement, and combination of the various parts hereinafter described, reference being had to the accompanying drawings, in which drawings similar reference-numerals indicate like parts in the different figures.

In the drawings, Figure 1 is a side elevation of a furnace with a portion of the outer casing broken away to better illustrate the internal construction; Fig. 2, a section at the line *x* of Fig. 1; Fig. 3, a longitudinal section

of my improved burner, and Fig. 4 a section 50 of Fig. 3 at the line *y*.

In the drawings, 1 represents the outer casing of an ordinary furnace of any construction, this casing 1 being made up of sections or cylinders of galvanized iron which are held together by rings 2 at intervals, so that if for any reason access is required to the inside of a furnace it can be had by removing one of the rings at the desired point. From the upper part of this outer casing extends tubes or register-pipes 3, which lead to the registers in the apartment to be heated by the furnace. Between this outer casing 1 and the stove or fire-pot 4, in which the solid fuel is burned, is an air-space which forms a passage from the cold-air inlet (not shown) in the base portion of the casing, from which it rises around the heated fire-pot and through any auxiliary heating devices which are used to increase the superficial area of the solid-fuel heating devices up and out through the register-tubes 3. Within this space between the fire-pot 4 and the outer casing 1 I place a fluid-fuel burner, which is best described and illustrated in Figs. 3 and 4 and consists of a hollow box 5, having inwardly-projecting alternating baffle-plates 6, and in the bottom of which is an inlet-supply pipe 7 for the inlet of the fluid fuel. The upper portion of this pipe 7 is punctured with any number of minute openings for the escape of the fluid fuel. The bottom of this box or burner 5 is open and is wider than the outside of the inlet-pipe 7 to permit of the upward flow of air into the burner to permit of the complete combustion of the fluid fuel.

The fluid fuel is supplied from a supply-pipe 8 and controlled by a cock 9 and passes through a mixer 10 to permit of the mixing of atmospheric air with the fluid fuel.

From the upper end of the box or burner 5 extends an outlet-pipe 11 for the products of combustion produced by the burning of the fluid fuel to pass away. In order to save all the heat that can be saved from the burner, I customarily pass the exit-pipes 11 out through the register-pipes 3 to the chimney 12, which is also the chimney by which the products of combustion of the solid fuel are permitted to

escape, thus utilizing substantially all the heat radiated from the outlet-pipe 11.

In this description reference has only been made to one burner; but two or more may be placed within the air-chamber surrounding the fire-pot, and one or all of them may be used, as the requirements of the case shall dictate. In order to ignite the fluid fuel in these burners, I provide an opening closed by a door through the casing opposite to where the burner 5 is situated and also a smaller opening 14 in the side of the burner itself through which a lighted flame may be passed to cause the ignition of the fluid fuel. The door 13 can be closed after the fluid fuel is ignited; but the opening 14 in the burner 5 need not be closed, for the reason that the draft incident to the consumption of the fluid fuel within the burner will draw air into the burner and thereby prevent the escape of fumes into the register-pipes from the fluid-fuel burner. These burners 5 are preferably made in the arc of a circle to correspond to the general contour of the air-space surrounding the fire-pot 4. All the support that is generally necessary for the burner 5 is the inlet-pipe 7 and the outlet-pipe 11, as the burners are made of thin metal and are not heavy, their only purpose being to carry off the fumes due to the ignition of the fluid fuel.

What I claim, and desire to secure by Letters Patent, is—

1. The combination in a device of the class designated, of a solid-fuel-combustion chamber of a furnace arranged to heat air, a casing inclosing said solid-fuel-combustion chamber and cooperating therewith to form an air-heating space, a fluid-fuel burner arranged within said air-heating space between said

solid-fuel-combustion chamber and casing and an independent off-take flue to carry away the products of combustion from said fluid-fuel burner.

2. In a device of the class designated, the combination with a solid-fuel-combustion chamber having an off-take flue, a casing surrounding said combustion-chamber, a fluid-fuel burner placed between said combustion-chamber and said casing, and means independent of said off-take flue for the escape of the products of combustion from said burner.

3. The combination in a device of the class designated, of a solid-fuel-combustion chamber, an inclosing casing surrounding said combustion-chamber and separate therefrom, a fluid-fuel burner arranged between the two, an inlet to said burner for fluid fuel, and a separate outlet for the escape of the products of combustion from said burner, said inlet and outlet forming a support for said burner.

4. In a device of the class designated, the combination with a combustion-chamber having an off-take flue, a casing surrounding said combustion-chamber, a fluid-fuel burner arranged within the space between said chamber and casing, baffle-plates in said burner to cause the backward and forward movement of the products of combustion while in said burner, and means independent of said off-take flue for the escape of the products of combustion from said burner.

In testimony that I claim the above I hereunto set my hand in the presence of two subscribing witnesses.

CHARLES A. GIFFORD.

In presence of—  
C. E. HUMPHREY,  
MAUDE ZWISLER.