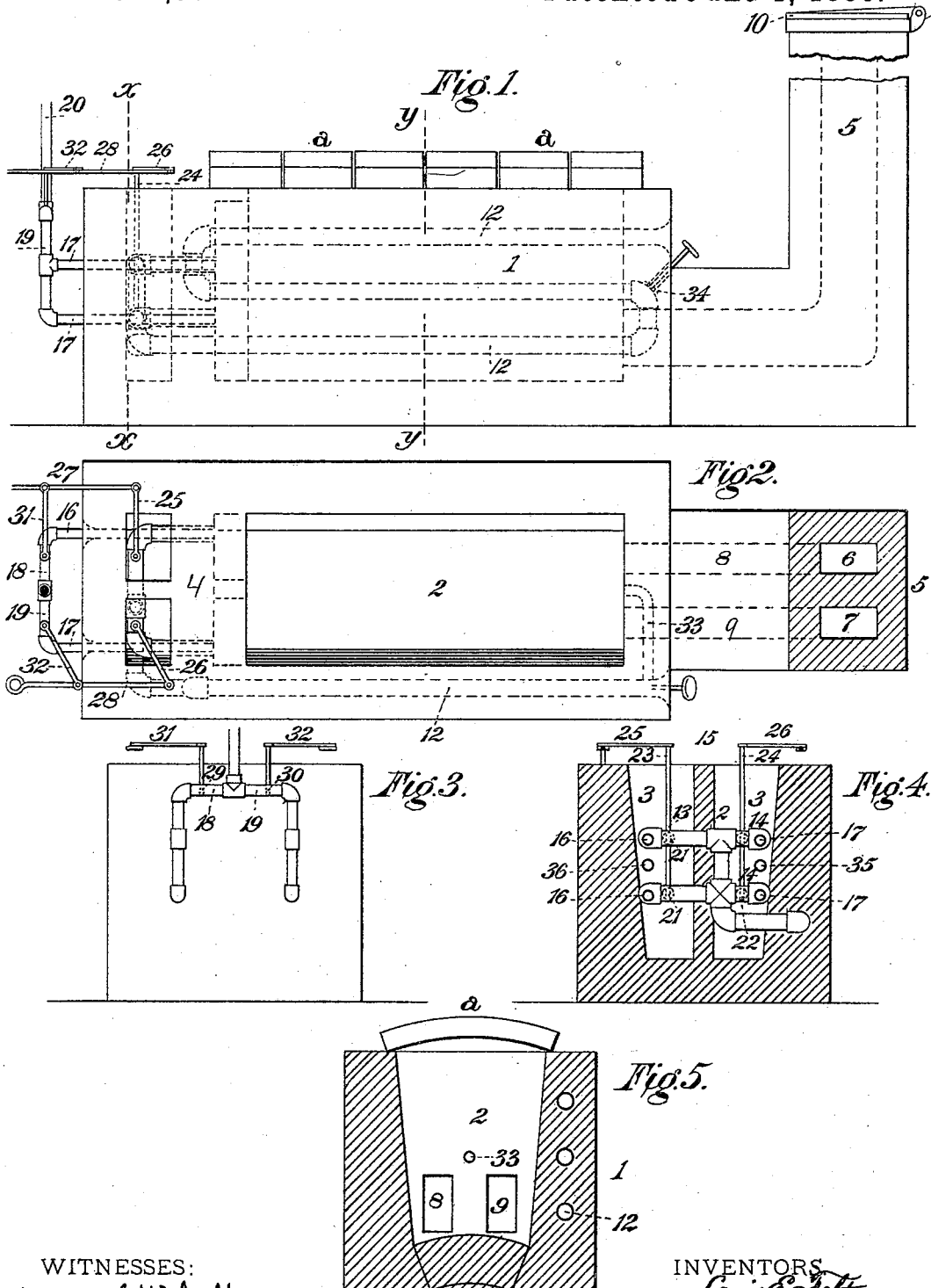


(No Model.)

L. E. FELTY & W. FLOYD.  
HEATING FURNACE.

No. 342,904.

Patented June 1, 1886.



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# UNITED STATES PATENT OFFICE.

LEVI E. FELTY AND WILLIAM FLOYD, OF HOMESTEAD, PENNSYLVANIA.

## HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 342,904, dated June 1, 1886.

Application filed January 7, 1886. Serial No. 187,858. (No model.)

*To all whom it may concern:*

Be it known that we, LEVI E. FELTY and WILLIAM FLOYD, citizens of the United States, residing at Homestead, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Heating-Furnaces, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a view in side elevation of our improved heating-furnace. Fig. 2 is a top plan view of the same. Fig. 3 is a view in elevation of the front end of the furnace. Fig. 4 is a vertical transverse section on the line *x x*, Fig. 1. Fig. 5 is a similar section on the line *y y*, Fig. 1.

The invention herein relates to certain improvements in heating and annealing furnaces wherein gaseous fuel is employed for generating the necessary heat, and has for its object such a construction and arrangement of parts as to effect a thorough combustion of the gas, and also to permit of the regulation of the heat in the different parts of the furnace as circumstances may require; and to these ends the invention consists in the construction and combination of parts, substantially as hereinafter more fully described and claimed.

The furnace 1 consists of the heating or working chamber 2 and the hot-air chamber 3, said chambers being separated by a wall or partition, 4, (see Fig. 2,) and provided with suitable removable covers, *a*. The inner walls of the heating-chamber 2 are made to incline outwardly from the floor, which is arched upwardly, all as clearly shown in Fig. 5. The purpose of this construction will be more fully stated hereinafter.

The stack 5 is provided with two independent flues, 6 and 7, which are connected by independent horizontal flues 8 and 9 with the rear end of the furnace. To the top of the stack are attached the dampers 10, adapted to regulate the draft of the flues 6 and 7, respectively.

In one or both of the side walls of the furnace are formed a series of horizontal passages, 12, connected at the adjacent ends, forming a continuous passage, as shown. One of said passages opens at the rear end of the furnace into the open air, or may be connected by a pipe to any suitable air-forcing apparatus. The opposite or front end of said passage ter-

minates in the hot-air chamber 3, and is provided with lateral branches 13 and 14, two on each side of its vertical portion. The branches 14 project rearwardly through the partition 4, separating the chambers 2 and 3, and the branches 13 are passed through the partition 15, transversely dividing the hot-air chamber, and are then bent at right angles so as to project through the partition 4, as in the case of the branches 13.

Through the ends of the branches 13 and 14, which project through the partition 4, are passed the branches 16 and 17, projecting rearwardly from the arms 18 and 19 of the gas-supply pipe 20. The branches 16 and 17 are arranged to lie on the lower side of the branches 13 and 14, as shown in Fig. 4, so that the air, which is heavier than the gas, may be delivered above the gas in order to effect a thorough commingling of the air and gas as they enter the heating-chamber 2.

The hot-air branches 13 and 14 are provided with valves, (represented at 21 and 22,) the valves 21 in the branches 13 being operated by the rod 23, and the valves 22 in the branches 14 being operated by the rod 24, these rods 23 and 24 being connected by the arms 25 and 26 to the operating-levers 27 and 28.

The arms 18 and 19 of the gas-supply pipe 20 are provided with valves (represented at 29 and 30,) said valves being connected to the operating-levers 28 and 29 by the arms or links 31 and 32. By the above-described construction the gas and air can be simultaneously turned on or cut off from either side of the furnace, as required.

At the rear end of the furnace the hot-air pipe or passage 12 is provided with a lateral branch, 33, which enters the heating-chamber through the end wall, as shown in Fig. 5, and is provided with a regulating-valve, 34. Through the front of the furnace are arranged the pipes 35 and 36, which project through the partition 4, and are designed to introduce cold air into the heating-chamber for the purpose of cooling the same whenever necessary.

In starting the furnace, the valves in the gas and hot-air branches will be turned so as to admit gas and air through all the branches, the dampers on the stack being also raised, and the valve 34 being opened so as to admit hot air at the rear end of the furnace, thereby effecting a

further and complete combustion. The articles to be heated are then arranged in the furnace along the side thereof, the arched bottom and outwardly-inclined sides facilitating such arrangement of the articles. If, during the operation of the furnace it is found that one side is too hot, the air and gas on that side can be partially or entirely cut off by means of the valves in the air and gas pipes, the air and gas pipes and their valves being so proportioned as to always admit the proper proportions of air and gas as to effect through combustion in the heating-chamber. In case one side of the furnace near the rear end should become too hot, the damper of the flue in the stack on that side is closed and the damper of the other flue is raised, thus drawing the flames from the hot side of the furnace. In case the rear end of the furnace becomes too cool, the valve 34 is opened so as to increase combustion at that end.

When it is desired to quickly cool down either side of the furnace or its contents, cold air can be forced into the heating chamber through the pipes 35 or 36.

It will be observed that in the above construction perfect control of the heat in the furnace or any portion thereof is had, it being possible to increase or diminish the heat in any portion at will by the proper adjustment of the various valves and dampers.

We claim herein as our invention—

1. A furnace having in combination a heating-chamber, an air and gas jet at one end of such chamber on each side of a longitudinal vertical plane passing through the chamber in the direction of the draft, a waste-heat flue on each side of said plane at the other end of the chamber, and an arrangement of valves for alternately supplying gas and air to one side and cutting it off from the other, substantially as set forth.

2. A furnace having in combination a heating-chamber, an air and gas jet at one end of such chamber on each side of a longitudinal vertical plane passing through the chamber in the direction of the draft, a waste-heat flue on each side of said plane at the other end of the chamber, an arrangement of valves for alternately supplying gas and air to one side and cutting it off from the other, and a hot-air jet entering the chamber against the general direction of the draft at the waste-flue end and between the flues, substantially as set forth.

3. A furnace having in combination a heating-chamber, an air and gas jet at one end of such chamber on each side of a longitudinal vertical plane passing through the chamber in the direction of the draft, and a waste-heat flue on each side of said plane at the other end of the chamber, said flues being separated by a partition extending to the top of the stack and each provided with a separately-operated damper, substantially as set forth.

4. In a heating-furnace, the combination of a chamber having backwardly-sloping side walls and an upwardly-arching bottom, in combination with suitable means for heating said chamber located at one end thereof and exit-flues at the opposite end, said flues being arranged on opposite sides of a vertical plane passing longitudinally through the furnace, substantially as set forth.

In testimony whereof we have hereunto set our hands.

LEVI E. FELTY.  
WILLIAM FLOYD.

Witnesses:

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