

Sept. 21, 1926.

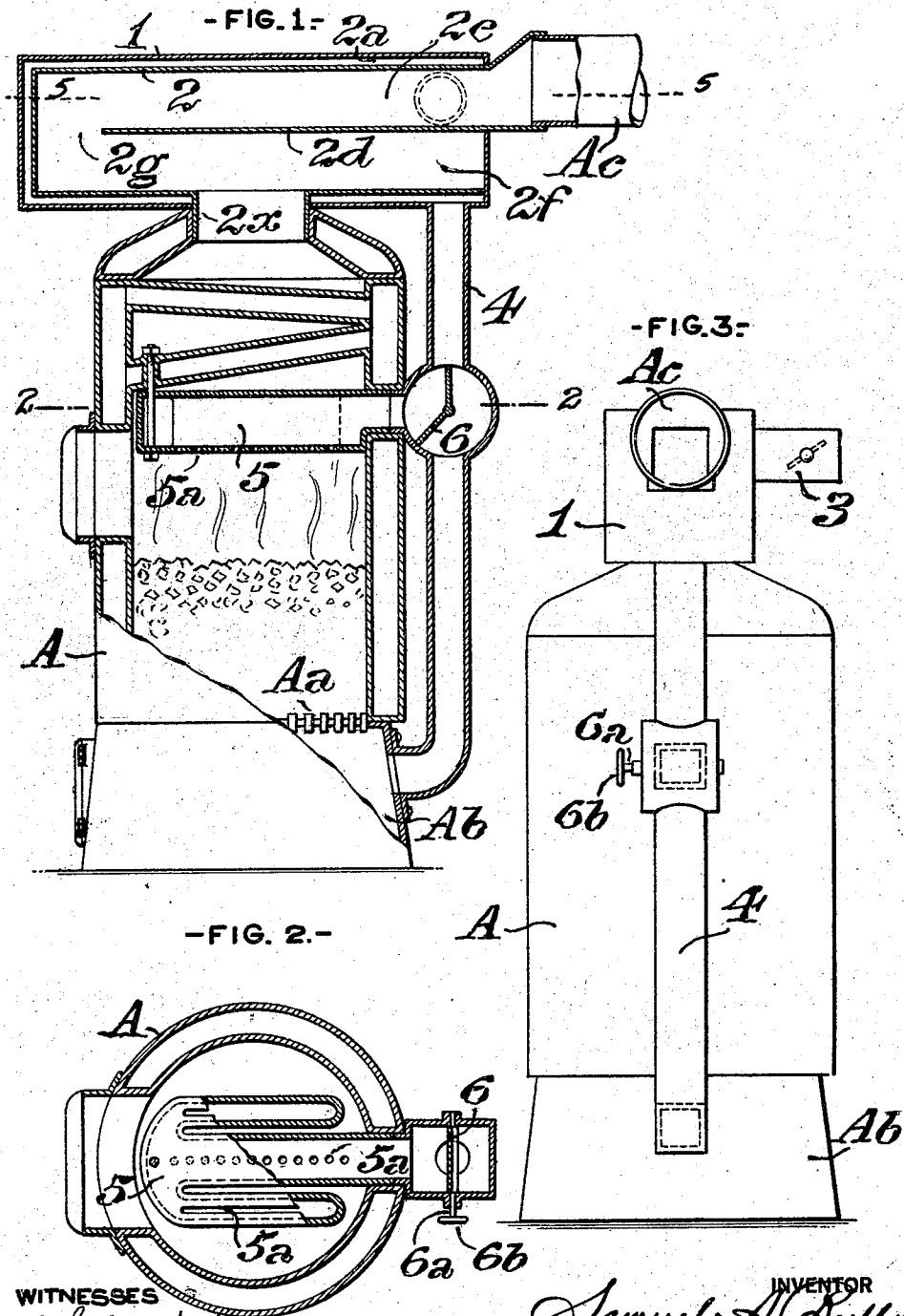
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1,600,711

FUEL ECONOMIZER

Filed Feb. 25, 1926

2 Sheets-Sheet 1



WITNESSES

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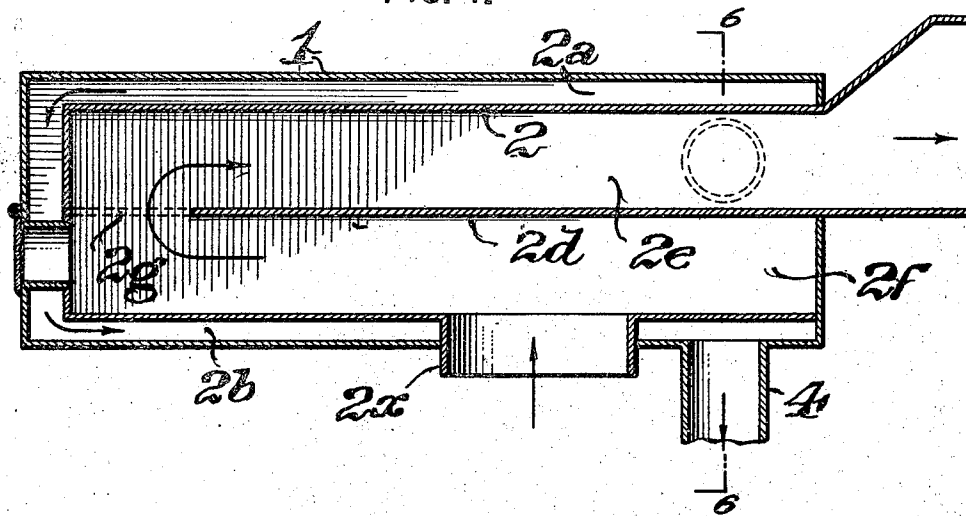
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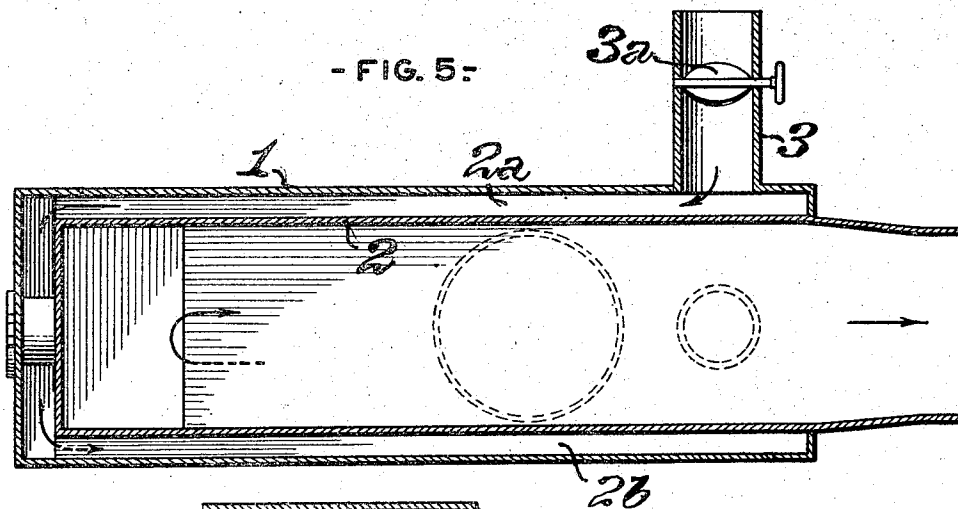
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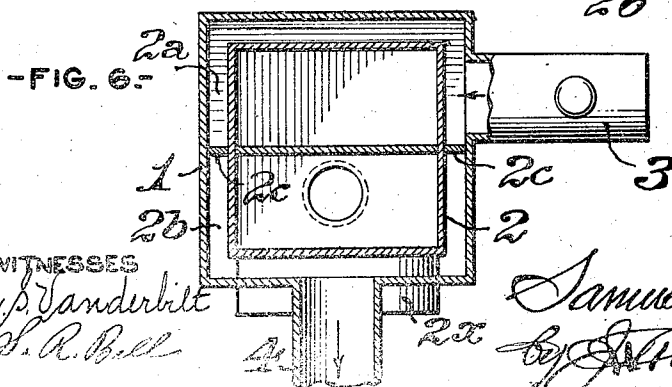
- FIG. 4.-



- FIG. 5.-



- FIG. 6.-



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UNITED STATES PATENT OFFICE.

SAMUEL A. BULLOCK, OF PORT WASHINGTON, NEW YORK, ASSIGNOR TO ALLY COMPANY, INC., OF PORT WASHINGTON, NEW YORK, A CORPORATION OF NEW YORK.

FUEL ECONOMIZER.

Application filed February 25, 1926. Serial No. 90,533.

My invention relates to means for heating the air supplied to support combustion in a furnace, by the waste gases of combustion discharged therefrom, and its object is to provide a device of such type which will be of simple and inexpensive construction; of ready applicability in connection with furnaces of various forms now in use; and be capable of extracting, from the waste gases of combustion, the maximum degree of heat available therefrom and of effectively imparting it to the air which supports combustion in the furnace.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a vertical central section through a furnace, in connection with which my invention is applied; Fig. 2, a horizontal section through the same on the line 2—2 of Fig. 1; Fig. 3, a side view, in elevation, as seen from the right; Fig. 4, a vertical longitudinal central section, on an enlarged scale, through the heating chamber; Fig. 5, a horizontal section, through the same, on the line 5—5 of Fig. 1; and, Fig. 6, a vertical transverse section, on the line 6—6 of Fig. 4.

The application, in practice, of my invention, will be herein described as in the specific embodiment thereof which is herein exemplified, in which it is illustrated in connection with a house heating furnace, A, of the ordinary construction, having a grate A^a, an ash pit, A^b, below the grate, and an upper discharge opening for the delivery of the gases of combustion from the fire chamber of the furnace to the chimney flue, A^c.

An air supply casing, 1, is located above the furnace, A, said casing being preferably, as shown, of rectangular transverse section. A hot gas or heating chamber, 2, of substantially similar form in transverse section, as the casing, 1, but of less height and width, and having a pipe, 2^x, on its lower side which fits into the discharge opening at the top of the furnace, extends from one end of said casing to within a short distance of the opposite end thereof, spaces, through which the air to be heated, traverses, thus intervening between the top, bottom, sides, and one end of the chamber, 2, and the similarly extending walls of the casing, 1. Said spaces constitute an air supply channel, which is divided into continuous upper and lower sections, 2^a and 2^b, by horizontal parti-

tions, 2^c, said sections communicating at one end of the chamber. The interior of the chamber, 2, is divided by a longitudinal partition, 2^d, into upper and lower sections, 2^e and 2^f, which communicate, through an opening, 2^g, at one end of the partition, 2^d, and the upper section of the chamber, 2, communicates directly with the discharge flue, A^c.

A cold air supply pipe, 3, controlled by a valve, 3^a, opens into the upper section, 2^a, of the air supply channel, near the end thereof which is adjacent to the flue, A^c, and further from the end at which the lower and upper sections communicate.

A hot air supply pipe, 4, opens out of the lower section, 2^b, of the supply channel which intervenes between the casing, 1, and the hot gas chamber, 2, and leads into the ash pit, A^b, said pipe being also connected to a superheating chamber, 5, which is of what may be termed "anchor" form, having a body and a reversely turned arm on each side thereof, and extends transversely in the fire chamber of the furnace. Communication, through the pipe, 4, between the lower section of the supply channel and the ash pit, and between said section and the superheating chamber, 5, is controlled by a valve, 6, fixed on a pin, 6^a, and movable about the axial line thereof, by a hand wheel or handle, 6^b. The valve, 6, is of angular or curved section, and is manually adjustable into positions in which (a) it reduces the extent of, or entirely cuts off, communication between the pipe, 4, and the superheating chamber, 5, (b), acts similarly as to communication between the supply channel and the ash pit, (c), permits communication between the pipe, 4, and both the superheating chamber and ash pit, or, (d), entirely cuts off communication between said pipe and both the superheating chamber and the ash pit.

The heated air is delivered into the fire chamber of the furnace, from the superheating chamber, 5, through perforations, or slots, 5^a, therein, which may be located, as shown, in the bottom of the body of said chamber, and in the tops of the arms thereof.

In the operation of an appliance of the construction substantially as herein set forth, atmospheric air, in regulated quantity, is drawn into the air heating casing, 1, by the natural draft of the flue of the furnace

on the fuel in combustion therein, and passes, in successively reversed directions, through the channels formed by the spaces between said casing and the chamber, 2. In its traverse through said channels, it is subjected to the heat of the gases of combustion which escape from the fire chamber of the furnace through the pipe, 1^a, into the chamber, 2, and pass, in successively reversed directions, through the lower and upper sections, 2^b and 2^a, of said chamber, to the discharge flue, A^c.

It will be obvious to those skilled in the art that my invention is structurally and operatively inexpensive, and that it is readily applicable in connection with furnaces of the ordinary forms, without involving substantial modification or reconstruction of their general features of construction. The air heating appliances present a large extent of surface for the action of the waste gases of combustion upon the incoming supply of air, within a compass which does not materially or inconveniently increase the volume of the complete furnace installation, and tests in practical operation have developed a substantial economy in fuel.

I claim as my invention and desire to secure by Letters Patent:—

1. The combination with a heater, comprising a firebox, an ash-pit and an outlet for the products of combustion, of a rectangular casing on the top of the heater communicating with said outlets and having a horizontal partition therein, stopping short of one end of the casing, the space above said partition having an outlet communicating with the chimney, a second rectangular casing surrounding said first casing so as to leave a space between their walls; having horizontal partitions along its sides; an air

inlet near the top of one end, and an air outlet from the bottom of said end, and a pipe leading from said air outlet into the ash-pit.

2. The combination with a heater, comprising a fire box, an ash-pit and an outlet for the products of combustion, of a rectangular casing on the top of the heater communicating with said outlet and having a horizontal partition therein, stopping short of one end of the casing, the space above said partition having an outlet communicating with the chimney, a second rectangular casing surrounding said first casing so as to leave a space between their walls; having horizontal partitions along its sides; an air inlet near the top of one end, and an air outlet from the bottom of said end; an air superheater in the firebox provided with outlet holes, pipe connections between said air outlet, said superheater and the ash-pit, and a valve in said connections to control the flow of heated air.

3. An air-heating attachment for domestic furnaces, comprising an outer and an inner rectangular casing adapted to be placed above the furnace, a pipe connection leading from the inner casing and adapted to be connected to the outlet flue of the furnace, said inner casing having an outlet for the gases, a pipe connection leading from the outer casing and adapted to be connected to the ashpit of the furnace, said outer casing having a cold air inlet, a superheater adapted to be placed in the firebox of the furnace and to be connected to said outer casing, and valve mechanism to control the flow of air from said outer casing into said superheater and ashpit.

SAMUEL A. BULLOCK.