July 10, 1934. C. M. SHAFFER 1,966,360

HOT AIR HEATING SYSTEM

Original Filed Sept. 19, 1929 2 Sheets-Sheet 1

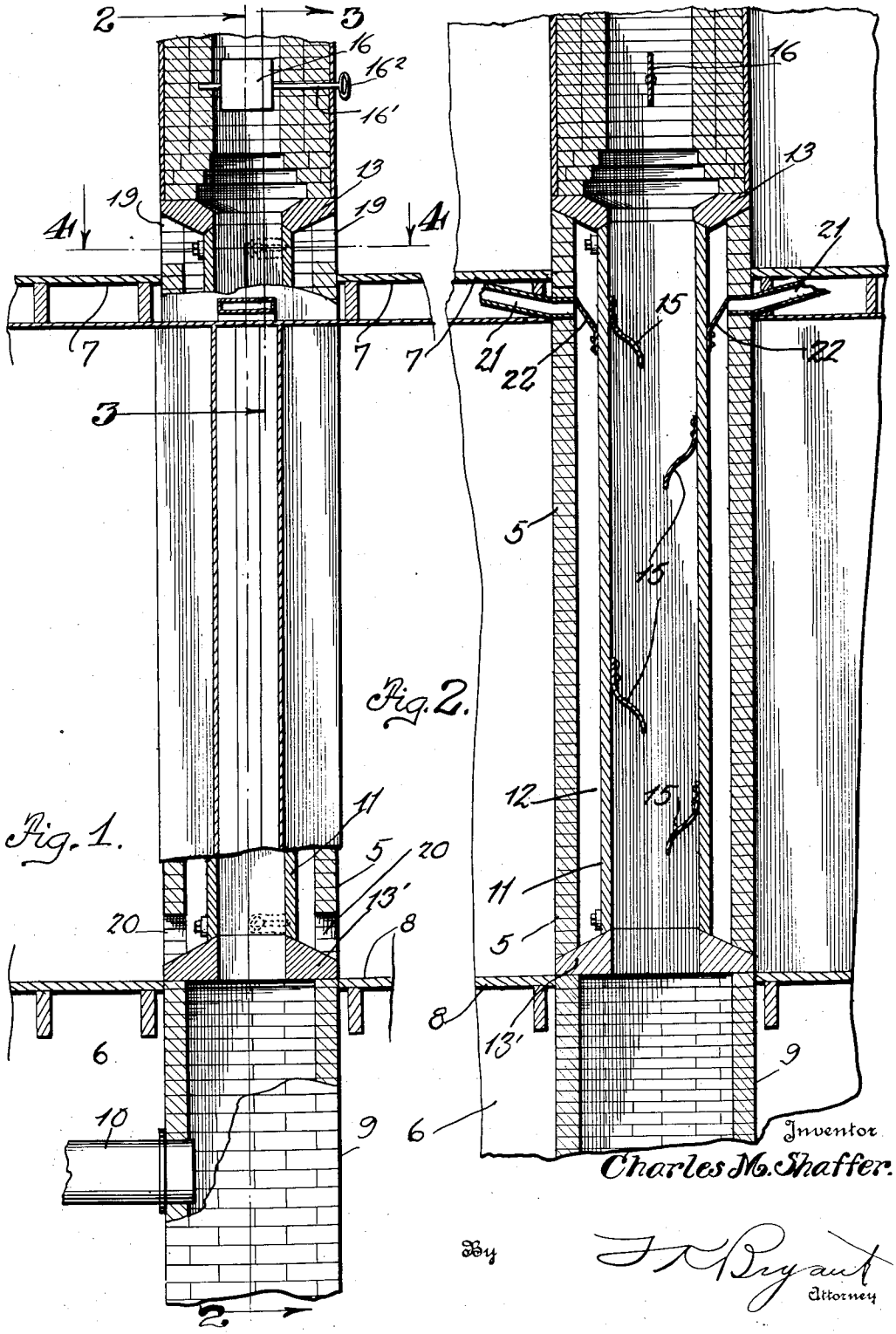

Fig. 1.

Fig. 2.

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Fig. 3.

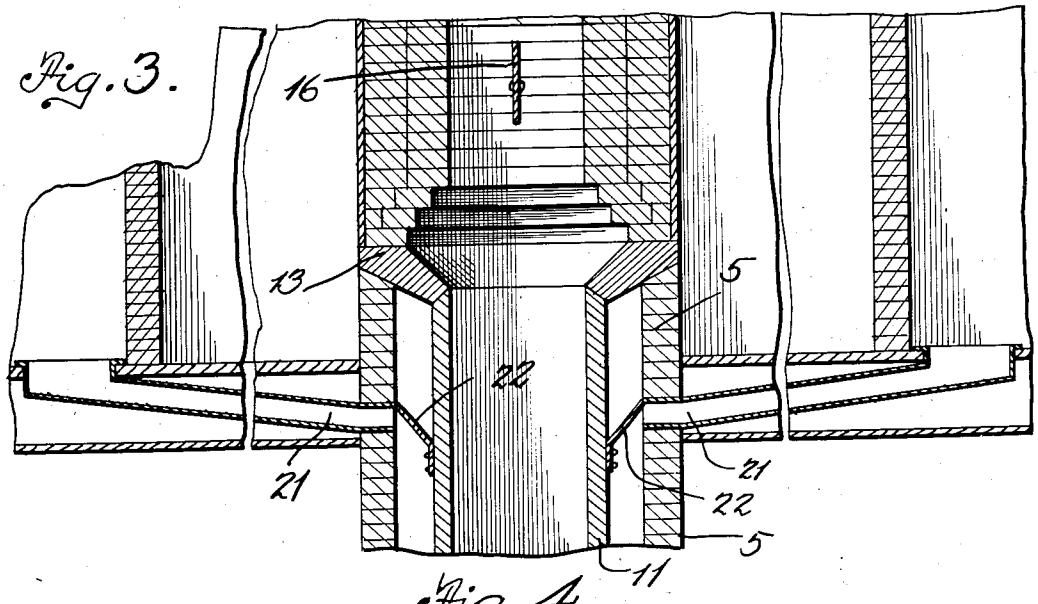

Fig. 4.

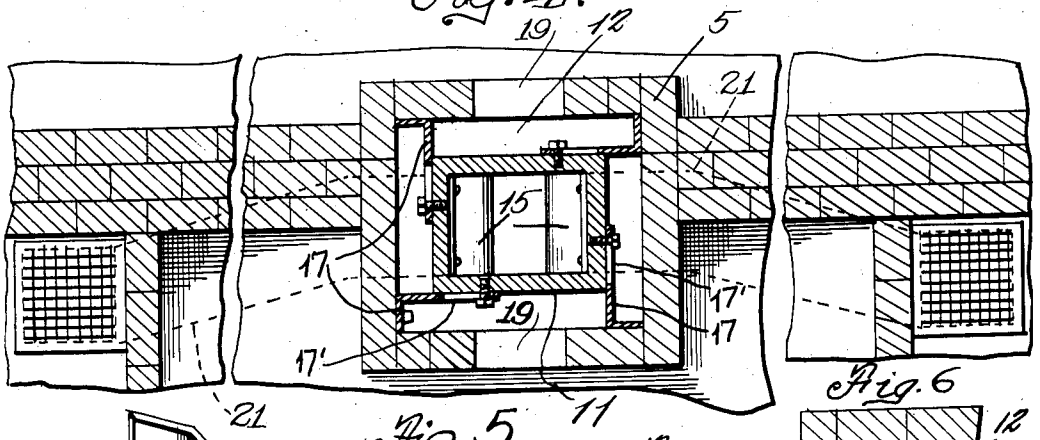

Fig. 5.

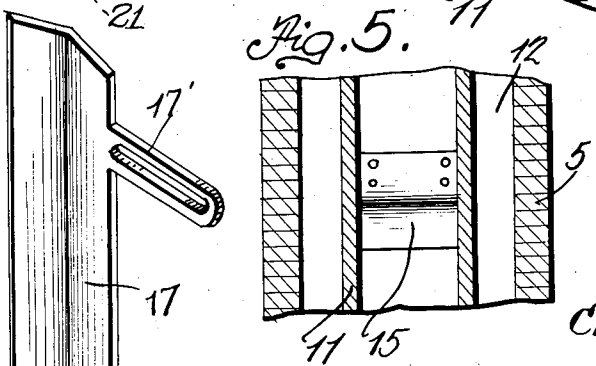

Fig. 6.

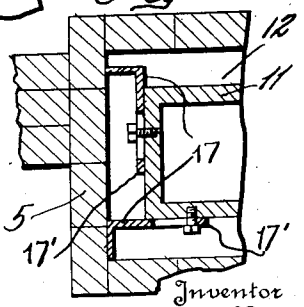

Fig. 7.

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UNITED STATES PATENT OFFICE

1,966,360

HOT AIR HEATING SYSTEM

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Application September 19, 1929, Serial No. 393,752
Renewed November 29, 1933

4 Claims. (Cl. 237—55)

This invention has relation to hot air heating systems for dwelling houses and other buildings having upper stories, and relates particularly to systems in which the lower or first story only is supplied directly with heated air from a furnace, located in the basement of the building, by means of air flues, and in which it is designed and intended that the heated air from the first story or ground floor compartment shall ascend therefrom and heat the upper stories.

It has been customary, in heating systems of this kind to provide means for heating the air in first story only by heated air conducted thereto from the heating chamber or drum of the furnace, and to depend on the ascent from the first story to the upper stories, by such passageways as are usual in buildings or by means of specially installed air flues running from the first floor or story to the second story, and those above the latter. The result has been inadequate heating, on account of the cooling of the air as it ascends from the lower stories or floor to those above. The object of the present invention is to provide means for increasing or supplementing the heat of the air ascending from the first floor or story, so that the temperature thereof may be maintained and the upper stories supplied with air at substantially the same temperature as that of the lower story, deriving heat directly from the furnace.

In accordance therefore, with my invention, I provide a system whereby the air heated in the furnace and supplied directly to the first or lower story or compartment will be conducted to the upper story or compartment through flues formed in the brick chimney of the building, and outside and around a metallic smoke flue extending upward from the fire chamber of the furnace, the arrangement being such that the air from the first floor or story will ascend by way of suitable openings in the chimney, to the story above, through the spaces around the smoke stack, and will be heated further by the heat radiated from the smoke stack.

As will be understood, and expressed briefly, the object of the invention is to heat the first floor of the building with the ordinary air pipes of the furnace, and to take the cold or partially heated air from the first floor, circulate it in contact with the inside flue or smoke stack of the furnace, and deliver it to the second floor, thereby stimulating the circulation to the second floor, heating the air more quickly and lessening the period of time required to heat the first floor, and consequently saving fuel.

My invention consists in the novel construction and combination of features intended and adapted to carry into effect the above described objects.

In the accompanying drawings illustrating a preferred embodiment of the invention,

Figure 1 is a vertical sectional view taken through a portion of a house or building having a chimney leading from the basement and passing through two floors;

Figure 2 is a sectional view on the line 2—2 of Figure 1;

Figure 3 is a sectional view of a part of the structure on the line 3—3 of Figure 1;

Figure 4 is a transverse sectional view on the line 4—4 of Figure 1;

Figures 5, 6 and 7 are detached fragmentary views.

In the construction here shown there is provided a chimney having a lower or base section 9 receiving combustion gases from a suitable furnace (not shown) through a smoke pipe 10. On top of the section 9 rest a heavy cast iron collar 13' of the same external dimensions in plan as the section 9. This collar also has a central rectangular opening for the passage of gases of combustion from the section 9. On the outer periphery of the collar 13' rests the lower end of an intermediate chimney section 5 and on this, in turn rests an upper collar 13 having a central opening of the same size and shape as that in the lower collar. A rectangular smoke flue 11 extends between the collars and connects their openings leaving an air space 12. The chimney is continued upward above the upper collar in the usual manner.

The numerals 15 designate staggered baffle plates located in the smoke flue. These plates, which are adjustable, to give ample room for the escape of the smoke and are directed downwardly to form heat pockets to intensify the heat of the smoke flue and hasten the circulation of the heated air.

The numeral 16 designates a suitable pivoted damper located in the upper part of the chimney, which can be opened and closed to check the escape of gases of combustion and hold them in the smoke flue. This damper is designed to be constructed of solid metal and is of such dimensions as to leave a surrounding space between its edges and the walls of the smoke flue, when it is turned to a horizontal position, so that it will close, not to exceed, three fourths of the flue opening. This damper has its operating shaft 16' in bearings set

in the brick work with a thumb piece 16^2 on one end.

In order that the heated air conducted from a lower to a higher floor may be conveyed to different rooms in the upper story, or to rooms distant from the hot air conducting flue 12, the space between the smoke flue and the air conductor is divided into a plurality of vertically running flues, by means of partitions 17 preferably located in the corners of the space 12 and formed of metallic bars or plates of L-shape in cross-section and disposed, as more clearly represented in Figs. 4 and 6, wherein the main air flue is shown divided into four sections or flues, which lead to different rooms in the upper story and communicate with openings 19, having the usual registers.

At their lower ends, these divided flues communicate with corresponding inlets 20 through the chimney walls. Where rooms to be heated are located distant from the chimney, lateral branch flues 21 may be connected to the main flues as shown more clearly in Figs. 1, 2 and 3. Deflecting plates 22 may be located in the flues to deflect the currents towards and into the branch flues 21.

To provide for the adjustment of the dividing partition 17 to enlarge or diminish the capacity of the flues, they are preferably provided with slotted brackets 17', which are secured to the walls of the smoke flue by bolts as shown in Figs. 4, 6 and 7.

The construction and operation of the system will be understood from the foregoing and while the description and illustrations refer to a specific embodiment of the invention, it is obvious that modifications in structure and arrangement may be made without material departure from the basic idea.

I claim:—

1. In a device of the kind described a rectangular chimney having a pair of vertically spaced collars interposed in its length and provided with rectangular central openings, a rectangular smoke flue held between said collars in spaced relation to the chimney wall, vertical plates provided with slotted arms and resting against the outer faces of said smoke flue at the vertical corners thereof, and bolts extending through the slots in said arms and engaging said flue, whereby said plates may be adjusted to engage the inner faces of the chimney wall in accordance with the extent of space between the smoke flue and said chimney wall, said plates serving to divide the said space into a plurality of air flues and the chimney being provided with air admittance and escape means at the tops and bottoms of the flues respectively.

2. In a device of the kind described a rectangular chimney having a pair of vertically spaced collars interposed in its length and provided with rectangular central openings, a rectangular smoke flue held between said collars in spaced relation to the chimney wall, vertical plates provided with slotted arms and resting against the outer faces of said smoke flue at the vertical corners thereof, and bolts extending through the slots in said arms and engaging said flue, said plates dividing the space around the smoke flue into a plurality of air spaces, each of said plates being provided with a flange at its free vertical edge engaging the face of the chimney wall confronting the face of the smoke flue to which the respective plate is attached, whereby adjustment of the plate by its slots and bolts adjusts the effective cross-section of the respective hot air flue, said chimney being provided with means to admit air at the bottom of said air spaces and to permit outflow of air from the upper parts of the air spaces.

3. In a device of the kind described a rectangular chimney having a pair of vertically spaced collars interposed in its length and provided with rectangular central openings, a rectangular smoke flue held between said collars in spaced relation to the chimney wall, vertical plates provided with slotted arms and resting against the outer faces of said smoke flue at the vertical corners thereof, bolts extending through the slots in said arms and engaging said flue, whereby said plates may be adjusted to engage the inner faces of the chimney wall in accordance with the extent of space between the smoke flue and said chimney wall, said plates serving to divide the said space into a plurality of air flues and the chimney being provided with air admittance and escape means at the tops and bottoms of the flues respectively, and downwardly inclined baffles in said smoke flue forming downwardly opening pockets into which gases of combustion pass.

4. In a device of the kind described a rectangular chimney having a pair of vertically spaced collars interposed in its length and provided with rectangular central openings, a rectangular smoke flue held between said collars in spaced relation to the chimney wall, vertical plates provided with slotted arms and resting against the outer faces of said smoke flue at the vertical corners thereof, and bolts extending through the slots in said arms and engaging said flue, said plates dividing the space around the smoke flue into a plurality of air spaces, each of said plates being provided with a flange at its free vertical edge engaging the face of the chimney wall confronting the face of the smoke flue to which the respective plate is attached, whereby adjustment of the plate by its slots and bolts adjusts the effective cross-section of the respective hot air flue, said chimney being provided with means to admit air at the bottom of said air spaces and to permit outflow of air from the upper parts of the air spaces, and downwardly inclined baffles in said smoke flue forming downwardly opening pockets into which gases of combustion pass.

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