

Oct. 10, 1950

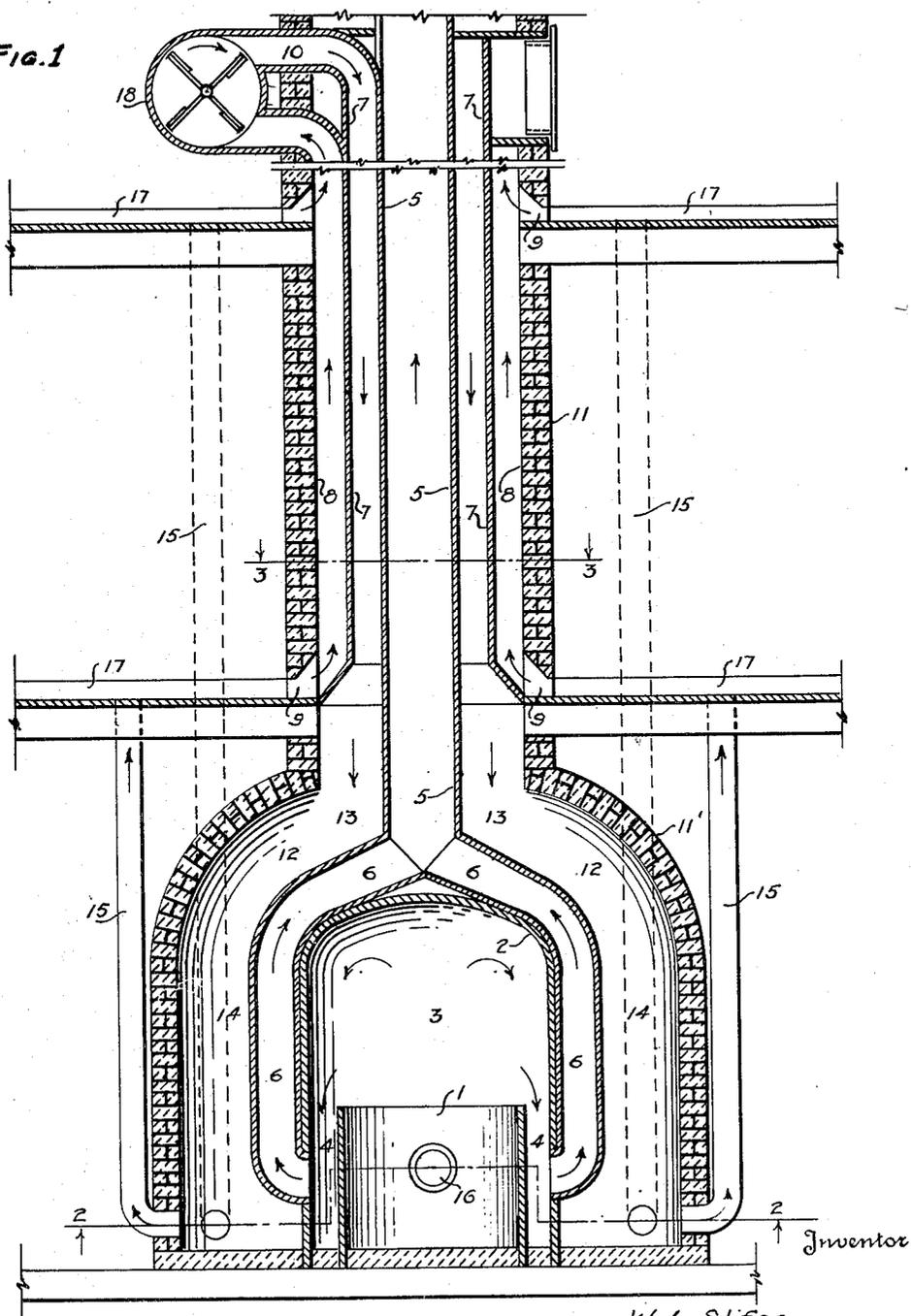
W. L. SLIFER ET AL  
HOT-AIR HEATING SYSTEM

2,524,843

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3 Sheets-Sheet 1

Fig. 1



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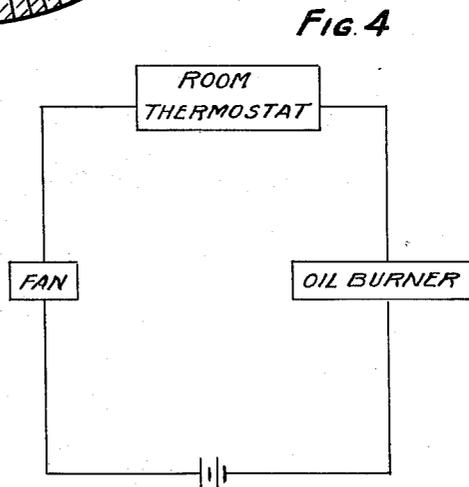
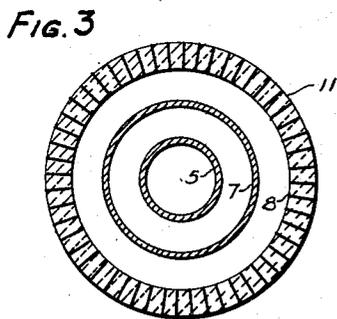
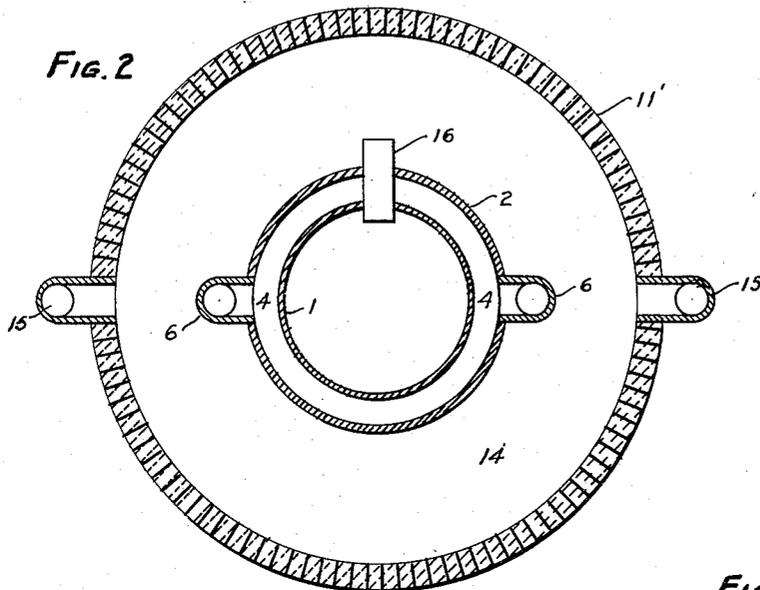
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FIG 5

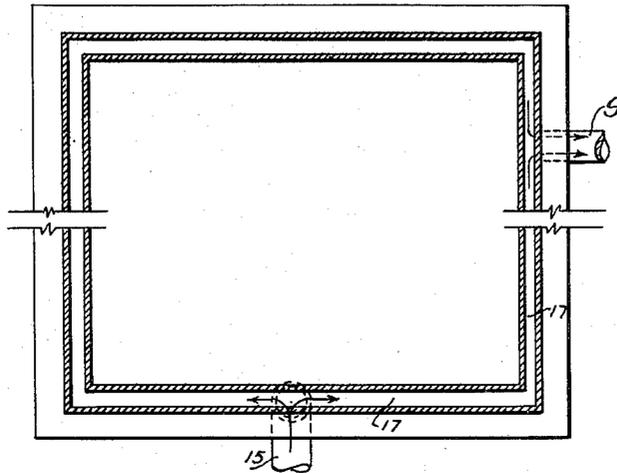


FIG 6

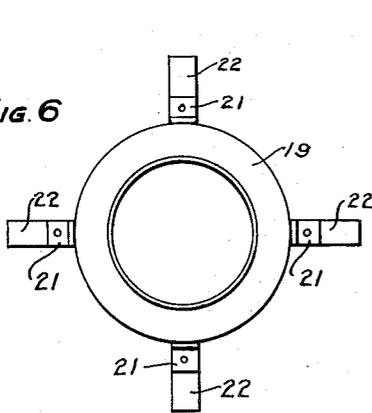


FIG 8

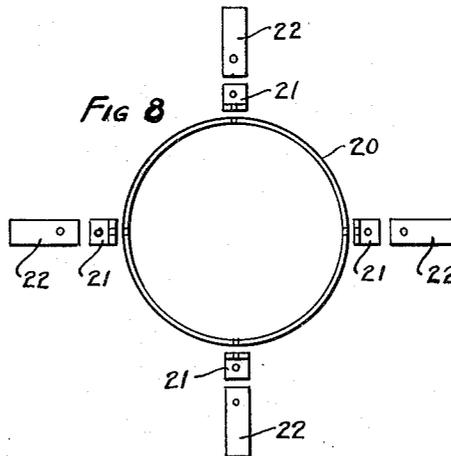
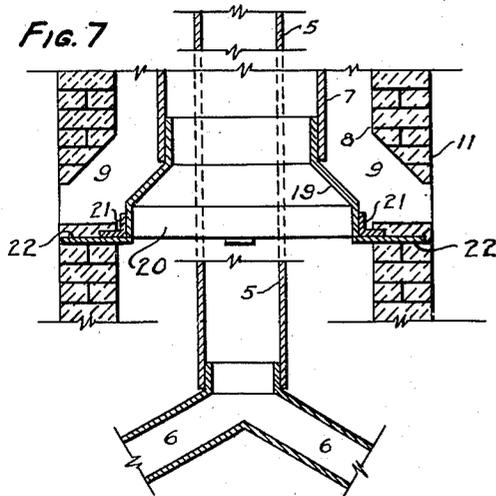


FIG 7



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# UNITED STATES PATENT OFFICE

2,524,843

## HOT-AIR HEATING SYSTEM

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Application September 10, 1948, Serial No. 48,714

2 Claims. (Cl. 237-55)

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The invention relates to hot air heating systems, having for an object to provide such a system adapted to operate more efficiently and economically and to deliver heated air to the rooms to be heated in a minimum time after the furnace is fired. Other objects and advantages will appear hereinafter or will be obvious.

The invention consists in the novel construction and combinations of parts as hereinafter set forth in the claims.

In the accompanying drawings,

Figure 1 is a central vertical section of the invention, partly broken away.

Figure 2 is a section on the line 2-2, Figure 1.

Figure 3 is a section on the line 3-3, Figure 1.

Figure 4 is a diagrammatic view showing the room thermostat circuit through the oil burner and the fan.

Figure 5 is a detail horizontal section taken through the peripheral hot air duct of one of the rooms to be heated, the vertical hot air duct being shown as partly broken away.

Figure 6 is a detail plan view of the frusto-conical end piece and associated parts.

Figure 7 is a fragmentary vertical section, showing the frusto-conical end piece and its chimney supports.

Figure 8 shows detail plan and sectional views of the ring support for the frusto-conical end piece and associated parts.

In these drawings, the furnace comprises an open-top firepot 1, and a closed-top drum 2, inverted over the firepot, and higher than the firepot to provide an upper chamber 3 above the firepot for smoke and gaseous products of combustion, said drum having a diameter greater than that of the firepot and at its lower portion being spaced from the firepot to provide an annular reverting flue 4 for smoke and gaseous products of combustion from the upper chamber 3. A central smoke flue 5 has the longitudinal axis thereof aligned with the longitudinal axes of the firepot and of the drum, said smoke flue having lower diverging branches 6 overlying the drum, extending downwardly along the sides of the drum and at their lower ends communicating with said annular reverting flue 4.

An intermediate down-draft hot air flue 7 is concentric with and surrounds said smoke flue 5, and an outer up-draft cold air flue 8 is concentric with and surrounds said hot air flue and said smoke flue and at its lower end has

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communication at 9 with the interiors of the rooms to be heated to withdraw cold air therefrom and at its upper end has communication at 10 with the upper end of said hot air flue.

A chimney 11 contains the three concentric flues, namely the smoke flue 5, the hot air flue 7 and the cold air flue 8, the brickwork of the chimney constituting the outer wall of said cold air flue 8, the chimney being either square or round and having a lower enlargement 11' surrounding and of greater height and cross-sectional area than that of said drum 2 to provide an upper hot air chamber 12 above the drum with which the lower end of said hot air flue 7 communicates at 13 and a peripheral hot air chamber 14 surrounding the drum 2, ducts 15 connecting this hot air chamber 14 with the rooms to be heated, to deliver the hot air thereto.

The firepot 1 is preferably of sheet metal such as stainless steel, being preferably fired with a gun-type oil burner 16, said firepot being heated to a high degree or to a red heat, and the draft being somewhat choked by the annular reverting flue 4 and the comparative dimensions of the smoke flue 5 and its branches 6, the inverted drum 2 which is also preferably of stainless sheet steel will also become heated to a high degree.

The lower diverging branches 6 of the smoke flue 5, overlying the drum 2 and extending downwardly along the sides thereof contiguous or close thereto leave the exterior of the drum 2 exposed so that it will radiate the heat to a maximum degree to the hot air chamber 12 above the drum, and the hot air chamber 14 surrounding the drum.

The cold air withdrawn from the rooms to be heated through the ports 9, travels first upwardly within the cold air flue 8, and becomes heated by the heat radiating from the exterior of the hot air flue 7 of tubular sheet metal; this air so withdrawn and heated thence passing through the passages 10 downwardly through the hot air flue 7, which latter is heated by the heat radiating from the smoke flue 5, also of tubular sheet metal, so that this air becomes further heated, this heated air having its temperature again raised as it travels downwardly over the top of the drum 2 in the hot air chamber 12 and in the hot air chamber 14 surrounding the drum.

Thus the hot air delivered through the ducts 15 to the rooms to be heated will reach a maxi-

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mum degree of temperature in a minimum time after the furnace is fired.

This heated air delivered through the ducts 15 is preferably given a course around the rooms to be heated along the outer walls thereof at the base of said walls in peripheral ducts 17, which may be of sheet metal, replacing the original base boards in old houses.

The customary room thermostat will start and stop the oil burner 16 and will simultaneously start and stop the fan 18 located in the air passage 10 to facilitate the updraft of air in the cold air flue 8 and the downdraft through the hot air flue 7. An independent thermostatic control may be suitably located to stop the oil burner and the fan in the event the furnace becomes too highly heated. Any suitable filters may be used to filter the air delivered to the rooms to be heated.

The tubular sheet metal cold air flue 8 may be made in sections as customary, with the lower end of the lower section telescoping over the upper tubular end of a frusto-conical end piece 19 the exterior of which leads downwardly to the ports 9, an annulus or ring 20 located close to the brick work of the chimney supporting the lower end of the frusto-conical end piece 19, said ring having angle irons 21 connecting the same with horizontal metal plates 22 set in the said brick work. The tubular sheet metal smoke flue 5 may also be made in sections as customary, and have the lower end of the lower section thereof telescoping over the tubular upper end of the joint 23 connecting the upper ends of the branches 6 of the smoke flue.

We claim:

1. In a hot air heating system, a furnace comprising an open-top firepot and a closed-top drum inverted over higher than and concentric with the firepot to provide an upper chamber for smoke and gaseous products of combustion, said drum having a closed bottom and a diameter greater than that of the firepot and at its lower portion being spaced from the firepot to provide an annular reverting flue, said reverting flue having a plurality of lateral openings, a central smoke flue the longitudinal axis of which is aligned with that of said firepot and said drum, said smoke flue having a plurality of spaced branches comprising converging portions and parallel portions, said parallel portions communicating at their lower ends with said lateral openings, and a chimney within which said smoke flue is located, said chimney having a base enlargement entirely surrounding and of greater height and cross-sectional area than that of said drum to provide an upper hot air chamber above the drum and within which said converging portions of the smoke flue branches are located and to provide a pe-

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ripheral hot air chamber within which said parallel portions of the smoke flue branches are located, said upper hot air chamber having a source of air supply and said peripheral hot air chamber having air ducts communicating with the interiors of the rooms to be heated.

2. In a hot air heating system, a furnace comprising an open-top firepot and a closed-top drum inverted over higher than and concentric with the firepot to provide an upper chamber for smoke and gaseous products of combustion, said drum having a closed bottom and a diameter greater than that of the firepot and at its lower portion being spaced from the firepot to provide an annular reverting flue, said reverting flue being provided with a plurality of lateral openings, a central smoke flue the longitudinal axis of which is aligned with that of said firepot and said drum, said smoke flue having a plurality of spaced branches comprising converging portions and parallel portions, said parallel portions communicating with said lateral openings, a downdraft hot air flue concentric with said smoke flue, an outer up-draft cold air flue concentric with said hot air flue and said smoke flue and communicating with the interiors of the rooms to be heated to withdraw cold air therefrom and at its upper end communicating with the upper end of said hot air flue, and a chimney within which said three concentric flues are located, said chimney having a base enlargement entirely surrounding and of greater height and cross-sectional area than that of said drum to provide an upper hot air chamber above the drum with which the lower end of said down-draft hot air flue communicates and within which are located said converging portions of the smoke flue branches and to provide a peripheral hot air chamber within which said parallel portions of the smoke flue branches are located, said peripheral hot air chamber having air ducts communicating with the interiors of the rooms to be heated to deliver the hot air thereto.

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