

Nov. 24, 1953

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2,660,159

UNIT HEATER WITH DRAFT HOOD

Filed June 30, 1950

3 Sheets-Sheet 1

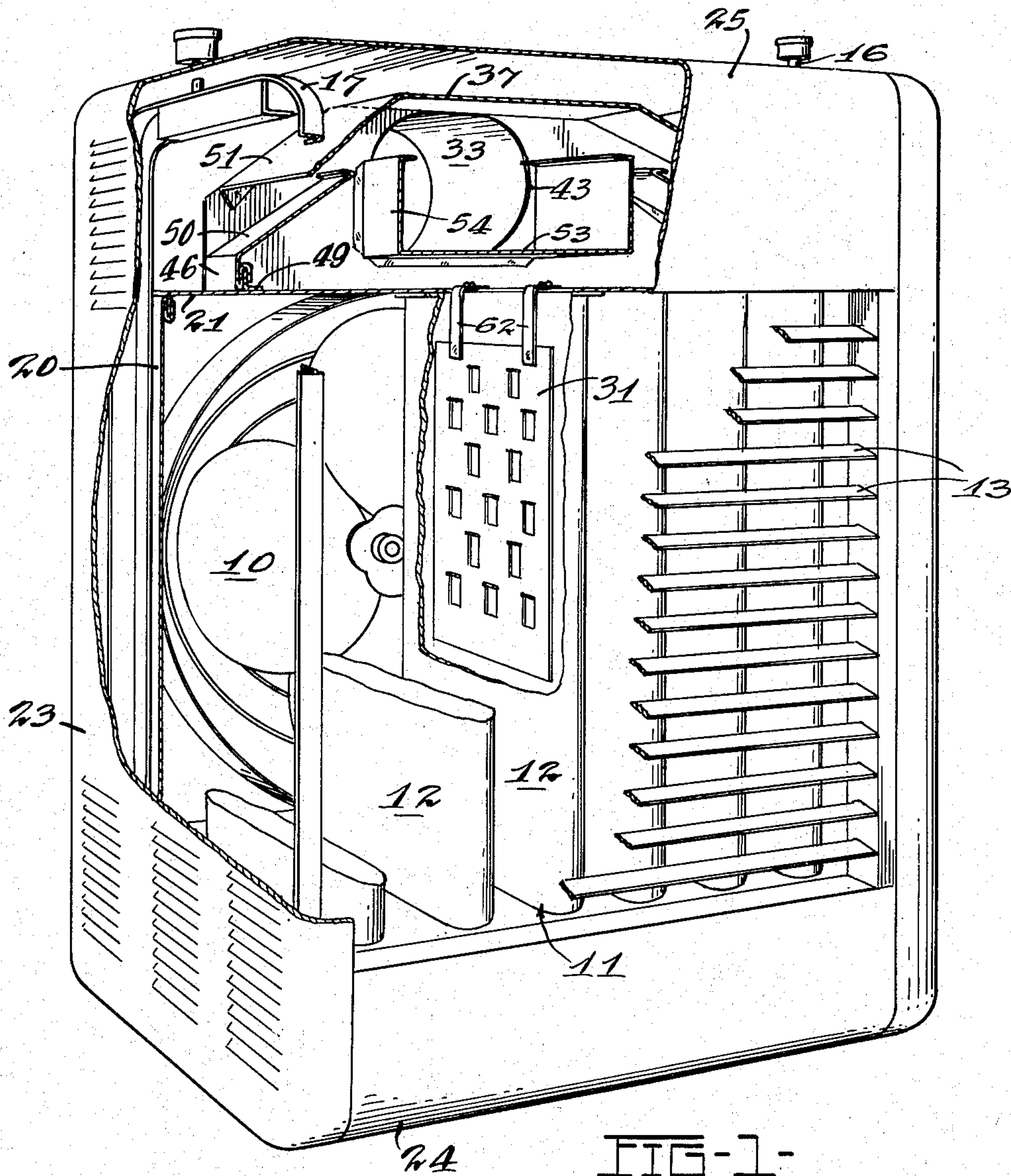


FIG-1-

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3 Sheets-Sheet 2

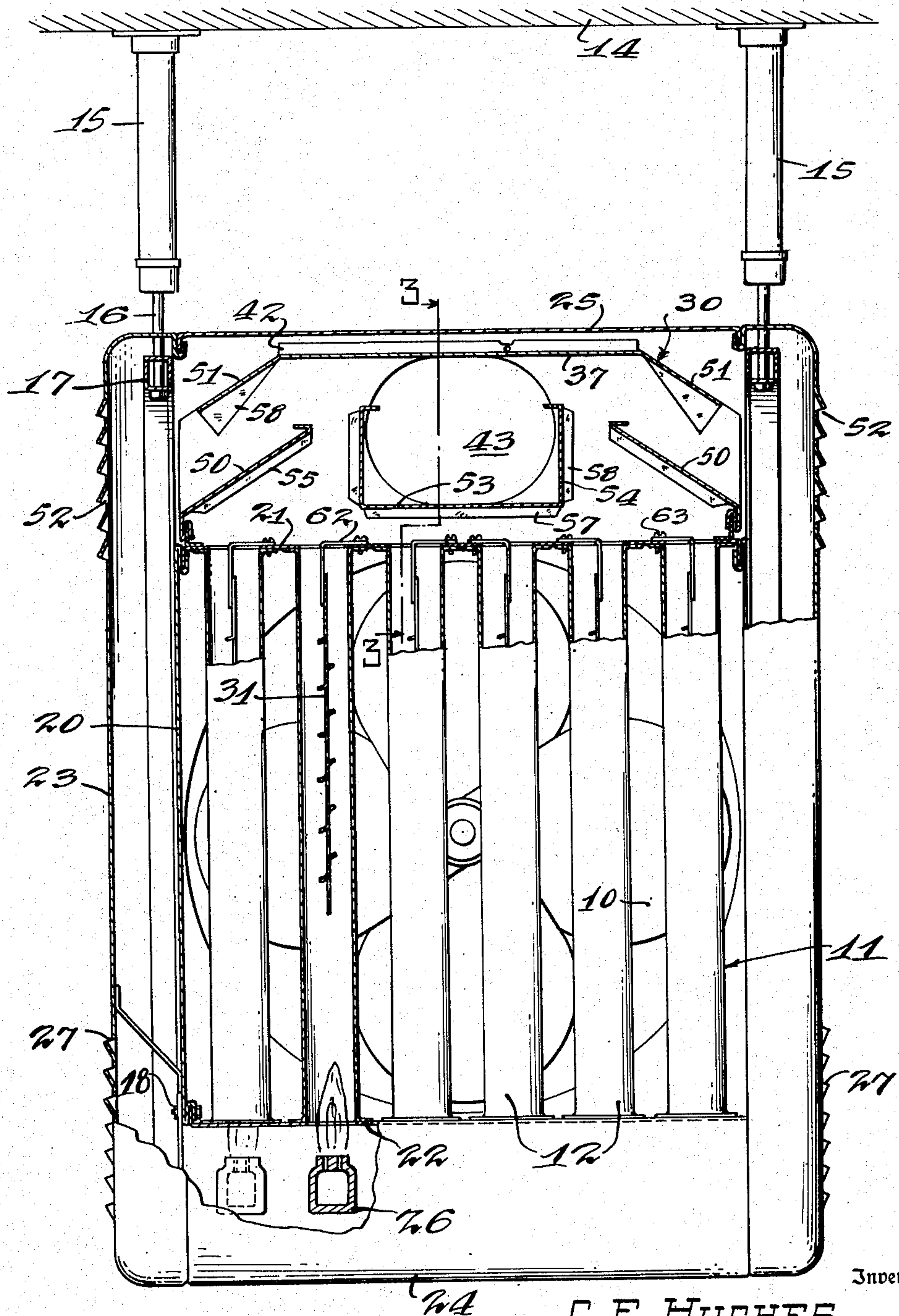


FIG-2-

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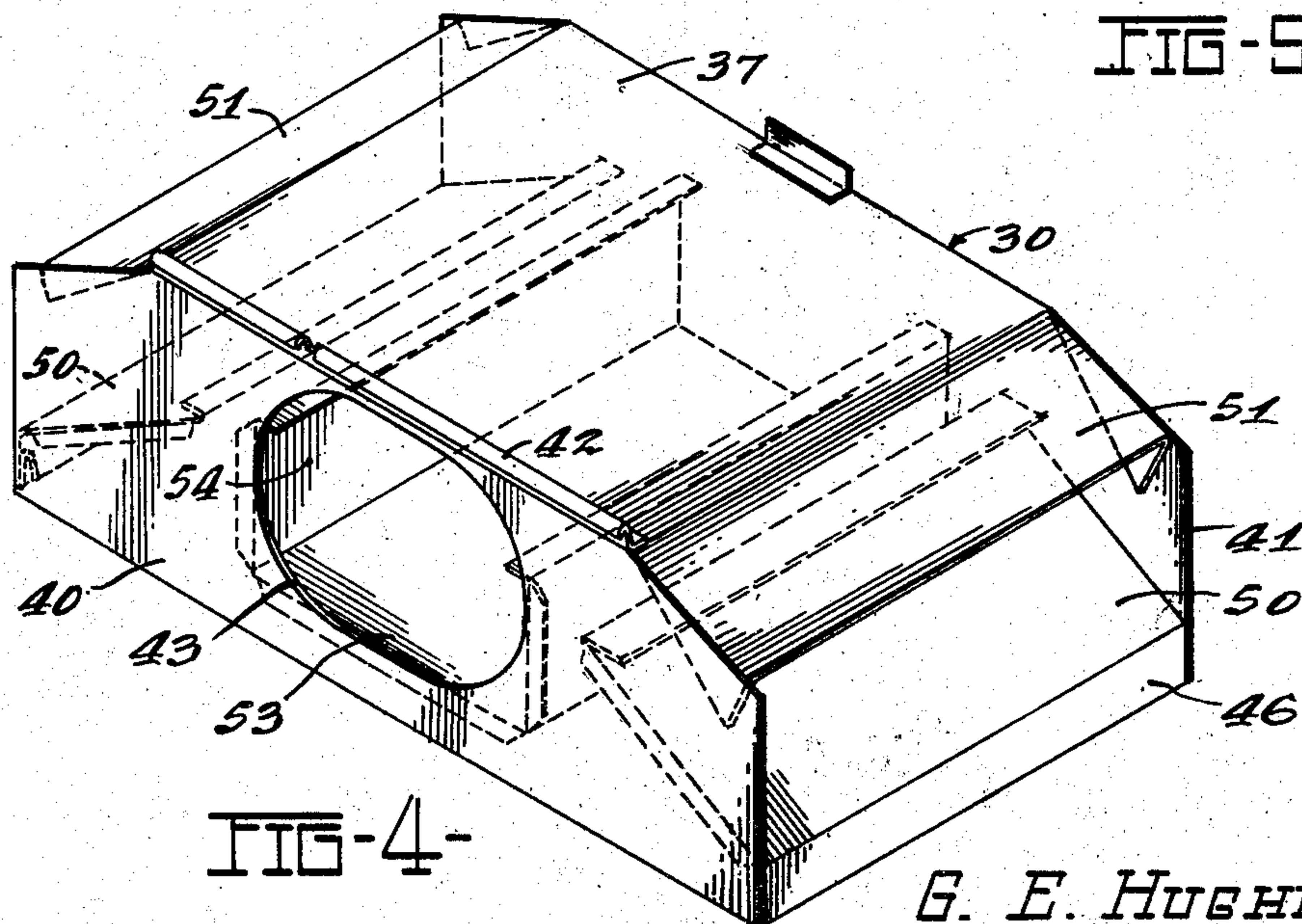
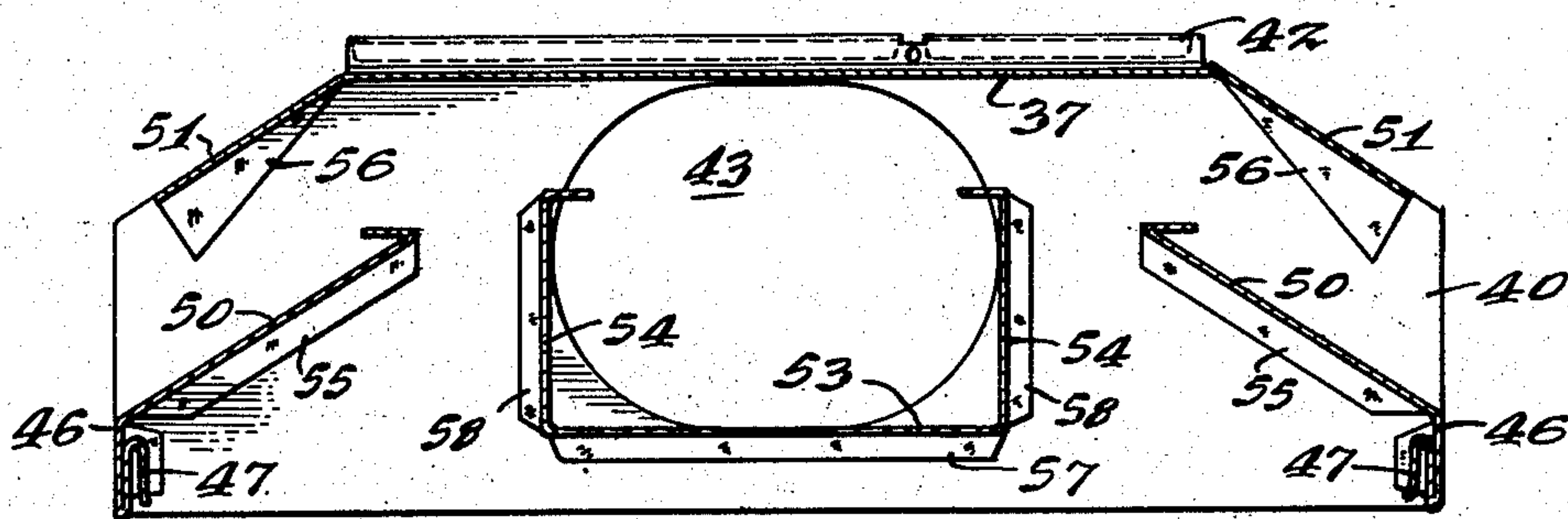
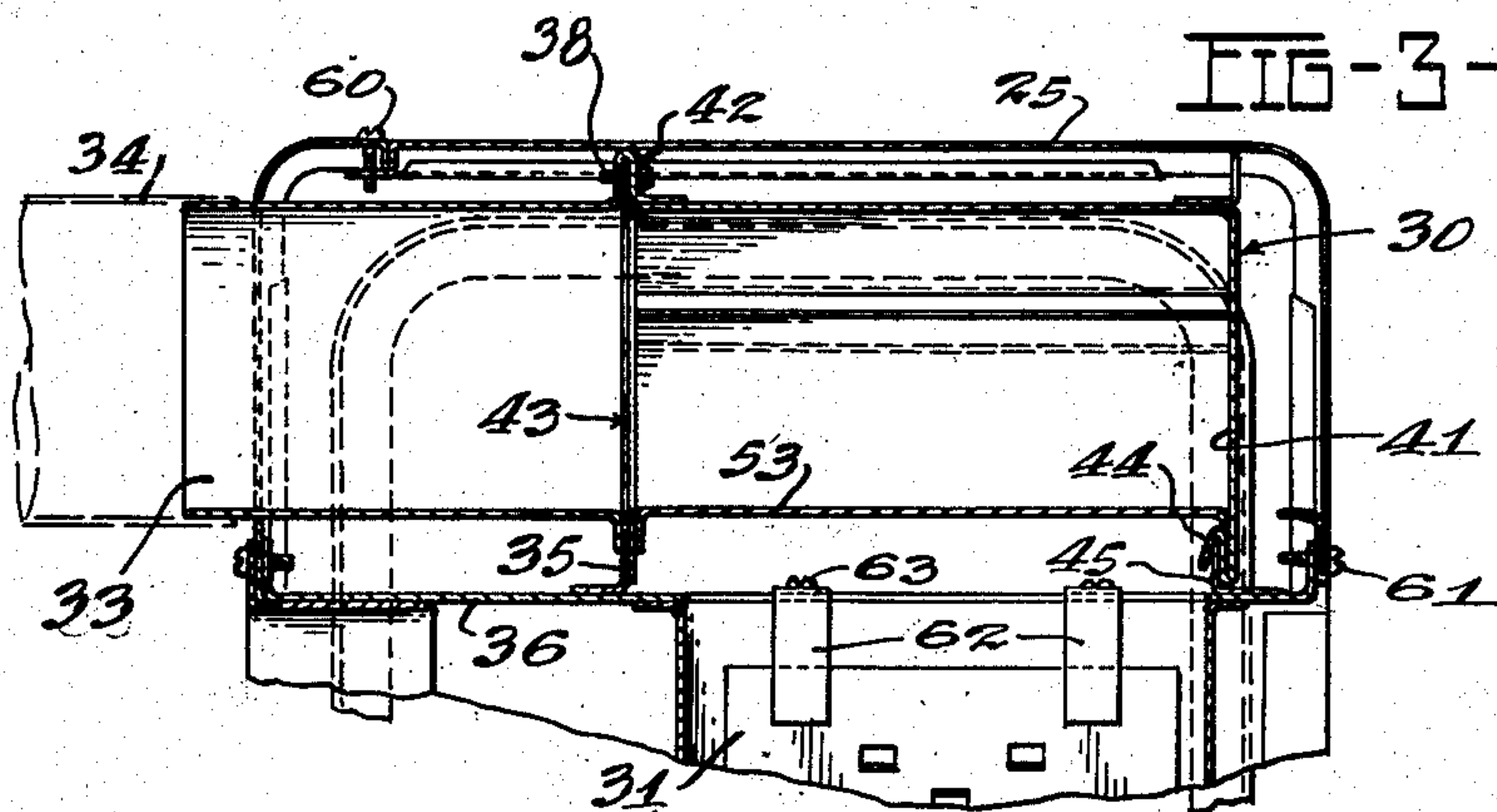
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UNIT HEATER WITH DRAFT HOOD

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,660,159

UNIT HEATER WITH DRAFT HOOD

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1 Claim. (Cl. 126—110)

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The present invention relates to an air heater of the type adapted to be suspended in the space to be heated and embodying an air heating radiator of the type comprising a plurality of upright combustion tubes between which air to be heated is forced to flow as by a motor driven fan and through which combustion gases pass. Products of combustion must be vented to the outside atmosphere, usually through a chimney flue leading outside the space to be heated, so that persons may safely occupy the space. The heater embodies a draft hood to direct flue gases from the combustion tubes to the chimney flue in a manner to prevent reverse flow of air from entering the combustion tubes and extinguishing the fire of the heater. The present invention provides a draft hood which shall be readily removable from its setting above the combustion tubes to the end that access may be more readily had to the combustion tubes from above for inspection or cleaning as circumstances may require.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and the claim appended thereto.

In the drawings—

Fig. 1 is an isometric view looking at the front and left side of the improved heater with parts broken away and in section.

Fig. 2 is a front elevation of the improved heater with parts broken away and in section.

Fig. 3 is a fragmentary sectional view on line 3—3 of Fig. 2.

Fig. 4 is an isometric view of draft hood removed from its setting.

Fig. 5 is a vertical sectional view of the element of Fig. 4.

The heater comprises a motor-driven fan 10 at one side of a multi-tube radiator 11 for forcing the air to be heated between the tubes 12 of the radiator for heating thereby. Movable louvers 13 ordinarily extend across the front or air-exit side of the radiator to permit the out-coming air stream to be directed in the desired direction. The heater is designed to be suspended in the space to be heated as below a ceiling 14 from which hangers 15 depend for connection with up-standing supporting members 16 mounted on the frame-work 17 of the heater. It is desirable that the heater be suspended as near to the ceiling, and to the sidewalls, as possible with proper allowance for servicing of the unit in situ and without causing a fire hazard by overheating the walls and ceiling of said space.

The air duct wherein the radiator 11 is posi-

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tioned is defined by right and left hand side walls 20 and top and bottom tube sheets 21 and 22. The bottom tube sheet 22 is attached to frame work 17 by bolts 18 and the top tube sheet 21 is free to move with respect thereto. The exterior casing of the heater comprises right and left hand side walls 23, a bottom portion 24 and a top portion 25.

Each radiator tube 12 is oblong in horizontal section and each is individually heated by a gas burner 26 directly therebelow so that it is within the tube that combustion of the fuel takes place rather than below the bottom tube sheet 22; hence said tubes may properly be referred to as combustion tubes. The phrase combustion tubes, however, is not intended as a limitation to this relationship of radiator tubes and burners, but rather as any tubes wherethrough hot combustion gases pass for heating the tubes. Secondary air for combustion enters the burner compartment through slot-type inlets 27 in the side walls 23 of the exterior casing of the heater.

The top portion 25 of the heater casing is removable to permit removal of a draft hood 30 from above the combustion, or fire tubes 12 through the casing. The draft hood is in turn removably mounted on the top tube sheet 21 to permit access from above to the interior of the combustion tubes 12 and to the baffle plates 31 suspended in said tubes. As shown in Figs. 1 and 2 the removable portion 25 of the heater casing extends between the vertical supports 16 and into the vertical front wall so that the draft hood may be removed forwardly without dismounting the heater from the ceiling or disturbing the vent pipe connection. The flue which connects the draft hood with the outside atmosphere comprises a relatively short vent pipe 33 which at its discharge end is adapted for connection with a chimney flue 34 indicated in broken lines in Fig. 3. The vent pipe 33 is supported at its inner end by an upright supporting plate 35 mounted on the top wall 36 of the air tunnel between the fan 10 and the back or air inlet side of the radiator 11.

The draft hood 30 comprises a roof 37 and first and second upright walls 40 and 41. The first wall 40 is normally disposed next adjacent the intake end of the vent pipe 33 and is held in that position by a hook-type flange 42 along the upper edge of the wall 40 for releasably straddling the upper edge of the plate 35 and said wall 40 has an opening 43 aligned with the adjacent end of the vent pipe 33 so that flue products entering the hood from the combustion tubes may find

outlet from the hood and into said vent pipe through said outlet opening 43. The lower edge of the wall 41 has a hook-type flange 44 for releasably straddling the upper edge of a sheet metal rail 45 mounted on the upper tube sheet 21.

The hood 30 additionally comprises a vertically short side wall 46 between the adjacent ends of the walls 40 and 41 and the lower edge of said wall 46 has a hook-type flange 47 for releasably straddling the upper edge of a sheet metal rail 49 mounted on the upper tube sheet 21. By virtue of the several hook-type flanges 42, 44 and 47 and the edges straddled by the same, the hood 30 may readily be removed from its setting by upward displacement.

The hood 30 further comprises upwardly slanting walls 50 of which the lower edge is coincident with the top edge of the vertically short side wall 46. The top wall or roof 37 of the hood has downwardly sloping side portions 51 and the space between said portions 51 and the upwardly slanting walls 50 constitute an air inlet for atmospheric air which is free to enter the upper end of the heater casing through a plurality of slot-type inlets 52. The hood further comprises a horizontally extending trough comprising a wall 53 at a level below that of the exhaust opening 43 in the rear end wall 40 of the hood for diverting upwardly moving products of combustion laterally for upward flow in the space between side walls 54 extending upwardly from the lateral edges of said wall 53 and the slanting walls 50.

The hood 30 as a whole is made of sheet metal. Angular tabs 55, 56, 57 and 58 at the ends of the walls 50, 51, 53 and 54 respectively facilitate the spot welding of said walls to the end walls 40 and 41 of the hood 30.

The top portion 25 of the heater casing is detachably secured to the main body of said casing by screws 60 and 61 thereby permitting ready removal of said portion when access is desired to the draft hood 30 for the purpose of removing said hood from its setting to permit access to the interior of the radiator tubes for the interior cleaning thereof and for removing the baffle plates 31 from the tubes. The baffle plates 31 are hung from hangers 62 secured to the upper tube sheet 21 by screws 63.

By providing a separable back draft diverter, or draft hood, next adjacent the upper tube sheet the safety of avoiding undesirable back drafts as well as the conventional function of breaking the chimney stack effect upon the combustion tubes is most aptly accomplished yet in a way to allow easy accessibility of service to the combustion tubes and the turbulence elements therewith with a minimum of head room required between the heater unit and the ceiling. By making the draft hood removable as a unit, rather than by dis-

assembly, relationships of baffles thereof are held constant.

What I claim is:

A fuel consuming air heater adapted to be suspended in the space to be heated, comprising, in combination, a heat exchanger comprising apertured upper and lower tube sheets with fire tubes extending therebetween and aligned with said apertures, a frame for supporting said heater and adapted to be attached to support means for hanging therefrom, said heat exchanger being secured to said frame for support thereby, a horizontally disposed vent pipe having an inlet terminating above and laterally offset from said fire tubes, burner means for supplying burning fuel to said fire tubes, said burner means being disposed below said lower tube sheet, a sheet metal casing surrounding said burner means and said heat exchanger and having rear and front apertures for supply of cold air to said heat exchanger and for passing heated air therefrom, a draft hood adapted to be removably disposed next adjacent the upper tube sheet and comprising sidewalls adapted to form a conduit for combustion gases from the fire tubes, said walls forming a first aperture to receive combustion gases into the hood, the hood having a second aperture for discharge of combustion gases therefrom and into said vent pipe, baffle means between said apertures, and wall means forming a second gas conduit through the hood whereby gases entering the hood through the second gas conduit are deflected into the second aperture by the baffle means, said casing having air apertures next adjacent said burner means for supplying combustion air thereto and said casing forming with sidewalls of said heat exchanger air passages from said air apertures to said second gas conduit whereby air is drawn through said passages and into said draft hood and maintains said casing relatively cool.

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