Feb. 11, 1958 S. J. D'AMICO ET AL 2,823,026

HEATER ASSEMBLY FOR SALVAGING HEAT LOST WITH PRODUCTS OF COMBUSTION

Filed Sept. 21, 1956 2 Sheets-Sheet 1

FIG. 1.

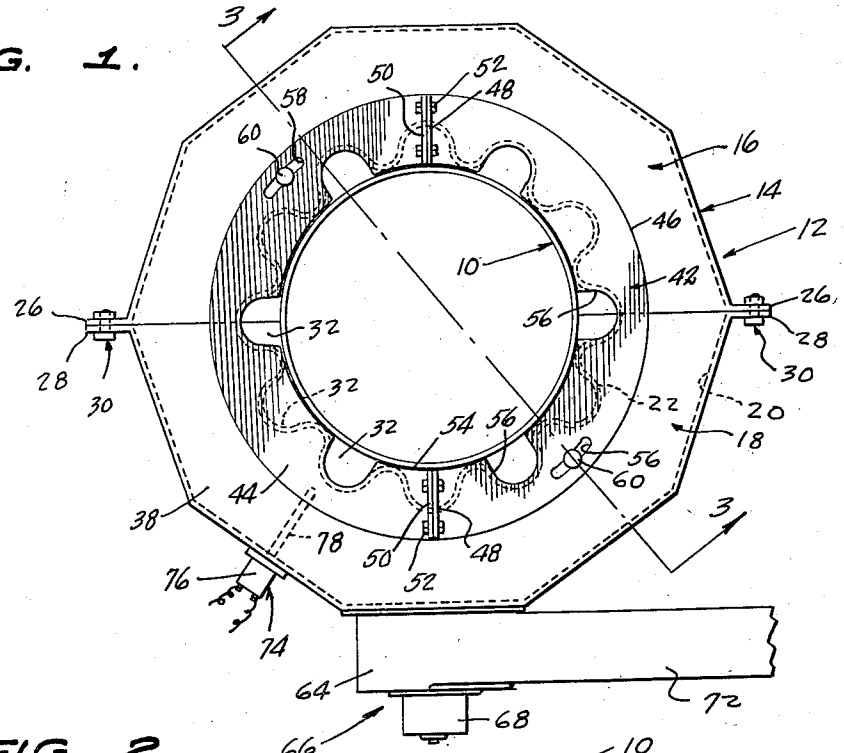
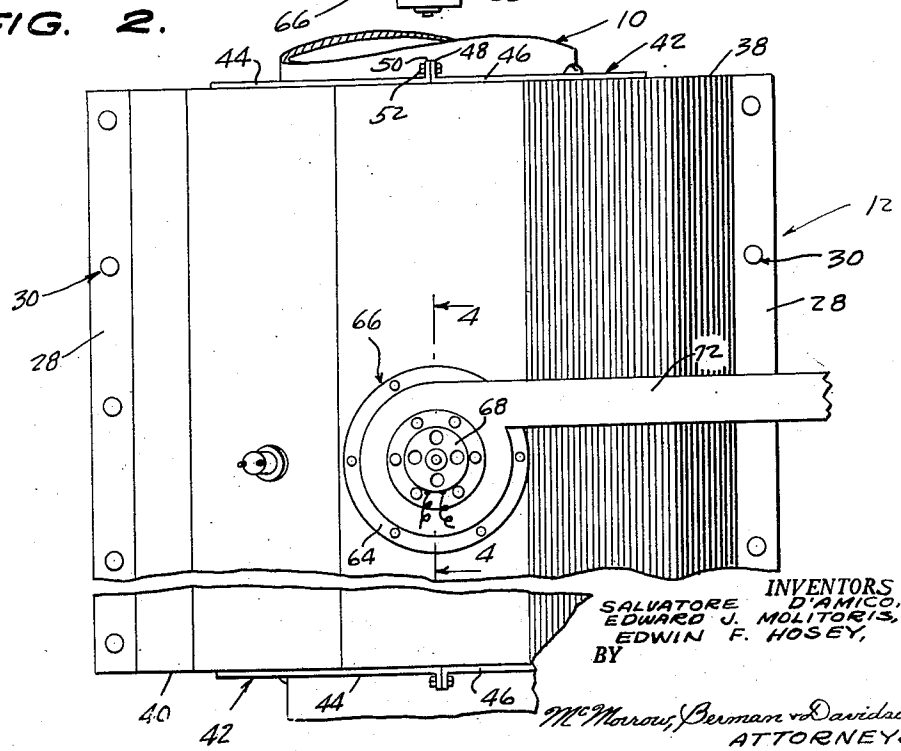


FIG. 2.



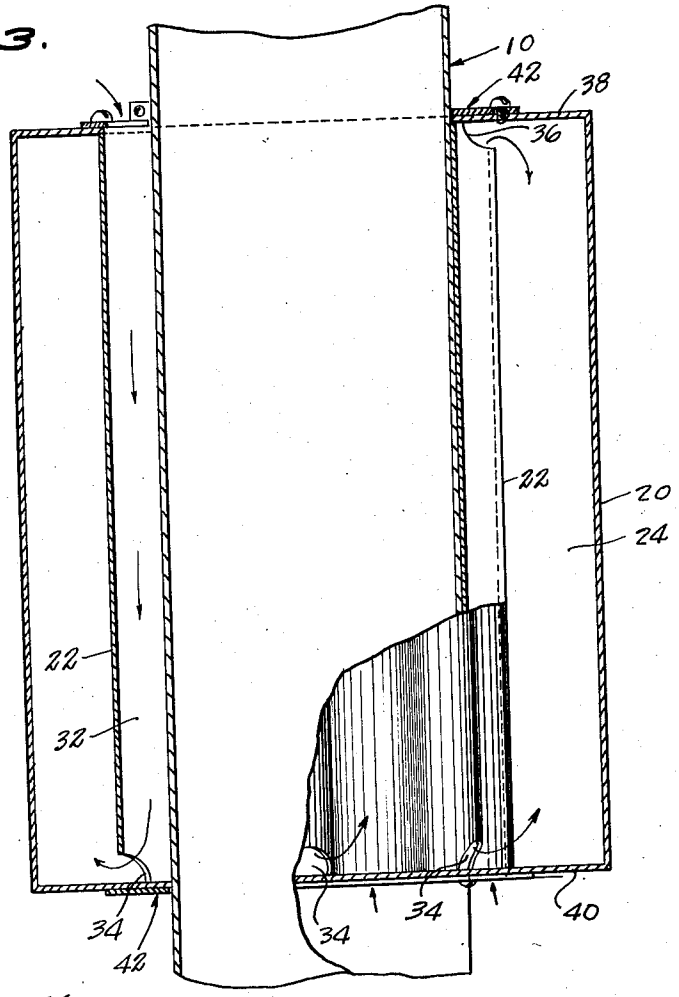
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FIG. 3.



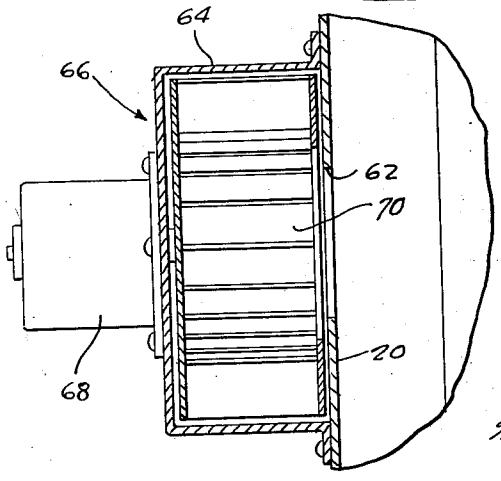


FIG. 4.

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HEATER ASSEMBLY FOR SALVAGING HEAT LOST WITH PRODUCTS OF COMBUSTION

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Application September 21, 1956, Serial No. 611,097

4 Claims. (Cl. 263—20)

This invention relates generally to furnaces and the like and is more particularly concerned with a novel heater assembly usable with exhaust conduits for products of combustion providing means for readily salvaging heat normally lost when the products of combustion are expended.

When heating a building, furnace or the like with a combustable material, a great amount of the heat being generated is expended through an exhaust conduit such as a chimney or smokestack during the process of such generation, this being undesirable and costly. Various types of equipment have heretofore been proposed for the purpose of salvaging the aforementioned heat loss, however, none have proved satisfactory.

A primary object of invention is to provide a novel heater assembly for use on an exhaust conduit for products of combustion wherein some of the heat which normally would be lost is salvaged through novel means permitting clean and uncontaminated air to pass externally of the outer surface of the exhaust conduit and to be heated by conduction and convection and to be ultimately dispensed by means of a force draft.

A further object of invention is more specifically concerned with providing a novel heater assembly of the character involved incorporating a jacket member securable in circumposed relationship about an intermediate portion of an exhaust stack or conduit for products of combustion, said jacket member incorporating spaced inner and outer walls, said inner walls incorporating an undulated cross section providing a plurality of grooves which normally will be juxtaposed on the outer surface of the exhaust conduit wherein air contained therein will be heated, said jacket member incorporating means for controlling the entrance of air drawn into said grooves, said grooves incorporating means for communication with a hot-air compartment formed between the inner and outer walls, and a fan assembly in communication with the hot-air compartment for drawing air through the grooves after having been heated by the exhaust conduit, through the hot-air compartment and out of an egress portion of the fan assembly.

And yet a further object of invention in conformance with that set forth is to provide a novel heater assembly of the character involved which is readily and economically manufactured, easily installed and maintained, and highly practical, serviceable and acceptable for the purpose intended.

These together with other objects and advantages which will subsequently become apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a top plan view of the novel heater assembly installed on an intermediate portion of a tubular exhaust conduit such as a smokestack;

Figure 2 is a side elevation view of Figure 1, looking from the bottom toward the top thereof;

Figure 3 is a vertical section view taken substantially on line 3—3 of Figure 1, portions being broken away and shown in section for clarity; and

Figure 4 is an enlarged fragmentary sectional view taken substantially on line 4—4 of Figure 2.

Referring to the drawings in detail, indicated generally at **10** is a section of an exhaust conduit which has clampingly secured on an intermediate portion thereof about its outer periphery a novel heater assembly **12** constituting the invention.

The heater assembly **12** comprises a jacket member indicated generally at **14** incorporating a pair of mating sections or halves indicated generally at **16** and **18** for the purpose of simplicity, the jacket member **14** will have the parts thereof described as an integral construction.

The jacket member **14** incorporates an outer wall **20** and inner wall **22** disposed in spaced relationship and defining therebetween a hot-air compartment **24**. The jacket member **14** may have the outer wall **20** thereof formed as a plurality of angularly related panels, see Figure 1, providing a greater area of contact with hot air when compared with a cylindrical outer wall, for example. Each of the sections **16** and **18** incorporate diametrically opposed longitudinally extending flanges **26** and **28**, respectively, said flanges **26** and **28** being juxtapositionable on each other and incorporating aligned apertures therethrough for receiving nut and bolt assemblies **30** for retaining the jacket member in circumposed relationship on the exhaust conduit **10**.

The inner wall **22** has a uniformly undulated cross section, see Figure 1, defining a plurality of longitudinally extending open ended grooves **32** extending the length thereof and opening away from the hot-air chamber **24**. Adjacent grooves **32** have extending transversely through opposite ends thereof notched out portions **34** and **36** at the respective lower and upper ends thereof.

The jacket member **14** incorporates on the respective sections **16** and **18** a mating transverse top and bottom wall **38** and **40**, respectively, each of which having rotatably supported thereon an annular ring **42**, conveniently formed as two sections **44** and **46** joined by means of juxtapositionable flange portions **48** and **50**, respectively, see Figure 1, secured by means of suitable nut and bolt assemblies **52**. Extending about the inner periphery **54** of the rings **42** are a plurality of notched out portions **56** which are alignable with some of the open ends of the grooves **32**, see Figure 1, for accordingly controlling the amount of air to be drawn within said grooves and subsequently pass into the hot-air compartment **24**. The rings **42**, see Figure 1, have conveniently formed therethrough arcuate slots **58** through which extend suitable retaining screws **60** engageable in the bottom or top wall of the jacket member and accordingly retaining the rings **42** in various positions of adjustment on the jacket member.

The outer wall **22** has extending therethrough, see Figure 4, an aperture portion **62** which has circumposed thereon an overlying housing **64** of a conventional suction fan assembly indicated generally at **66**. The fan assembly **66** incorporates a suitable power source such as an electric motor **68** for rotating a "squirrel cage" type blade assembly **70**, the central portion of which constituting the ingress portion of the fan assembly, said housing **64** of the fan assembly incorporating an egress conduit **72** in communication with the fan housing **64** for directing heated air therefrom. Indicated generally at **74** is a conventional thermostat control assembly incorporating a housing portion **76** having extending therefrom a thermocouple portion **78** extending into the hot-air compartment **24**. The control assembly **74** may be

utilized in the controls of the heater assembly for activating the fan assembly **66** when the temperature within the hot-air compartment has attained a particular predetermined value.

Accordingly, air is drawn through the upper and lower ends of the jacket member **24** through the grooves **32** of the inner wall of said jacket member, said air being heated by the exhaust conduit **10**, and accordingly heated air is drawn into the hot-air compartment **24** to subsequently be dispensed by means of the fan assembly **66**.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A heater assembly for salvaging heat from exhaust conduits for products of combustion comprising a jacket member including spaced tubular inner and outer walls and a transverse bottom and top wall, means on the jacket member for retaining the jacket member circumposed about an intermediate portion of an exhaust conduit, the inner and outer walls defining a hot-air compartment therebetween, the inner wall including an undulated cross section providing a plurality of elongated, uninterrupted, open-ended grooves opening away from the hot-air compartment, means on the inner wall providing communication with the hot-air compartment through said grooves, means on the jacket member controlling air movement into the grooves, and a fan assembly on the jacket member including an ingress portion in communication with the hot-air compartment and an egress portion for distributing heated air drawn from said compartment.

2. A heater assembly for salvaging heat from exhaust conduits for products of combustion comprising a jacket member including spaced tubular inner and outer walls and a transverse bottom and top wall, means on the jacket member for retaining the jacket member circumposed about an intermediate portion of an exhaust conduit, the inner and outer walls defining a hot-air compartment therebetween, the inner wall including an undulated cross section providing a plurality of elongated, uninterrupted, open-ended grooves opening away from the hot-air compartment, means on the inner wall providing communication with the hot-air compartment through said grooves, means on the jacket member controlling air movement into the grooves, and a fan assembly on the jacket member including an ingress portion in communication with the hot-air compartment and an egress portion for distributing heated air drawn from said compartment, said jacket member comprising a pair of mating sections including means for clampingly engaging the same about an exhaust conduit.

3. A heater assembly for salvaging heat from exhaust conduits for products of combustion comprising a jacket member including spaced tubular inner and outer walls and a transverse bottom and top wall, means on the jacket member for retaining the jacket member circumposed about an intermediate portion of an exhaust conduit, the inner and outer walls defining a hot-air compartment therebetween, the inner wall including an undulated cross section providing a plurality of elongated, uninterrupted, open-ended grooves opening away from the hot-air compartment, means on the inner wall providing communication with the hot-air compartment through said grooves, means on the jacket member controlling air movement into the grooves, and a fan assembly on the jacket member including an ingress portion in communication with the hot-air compartment and an egress portion for distributing heated air drawn from said compartment, the grooves being uniformly and radially spaced on the inner wall, the means on the inner wall providing communication with the hot-air compartment comprising apertures extending transversely through opposite ends of adjacent grooves on the inner wall, said means controlling air movement into the grooves comprising annular rings rotatably mounted on the top and bottom walls of the jacket member, said rings including intermediate notch portions on the inner periphery thereof alignable with the open ends of certain grooves for permitting air to be drawn into the hot-air compartment adjacent the outer surface of an exhaust conduit upon which the jacket member is disposed.

4. A heater assembly for salvaging heat from exhaust conduits for products of combustion comprising a jacket member including spaced tubular inner and outer walls and a transverse bottom and top wall, means on the jacket member for retaining the jacket member circumposed about an intermediate portion of an exhaust conduit, the inner and outer walls defining a hot-air compartment therebetween, the inner wall including an undulated cross section providing a plurality of elongated, uninterrupted, open-ended grooves opening away from the hot-air compartment, means on the inner wall providing communication with the hot-air compartment through said grooves, means on the jacket member controlling air movement into the grooves, and a fan assembly on the jacket member including an ingress portion in communication with the hot-air compartment and an egress portion for distributing heated air drawn from said compartment, and thermostatic control means on the jacket member inuluding a heat responsive end portion disposed in the hot-air compartment for controlling operation of the fan assembly in response to temperature changes in the hot-air compartment.

No references cited.