Sept. 26, 1944. W. R. BROOKS 2,359,197

FIREPLACE HEATER

Filed May 11, 1943 3 Sheets-Sheet 1

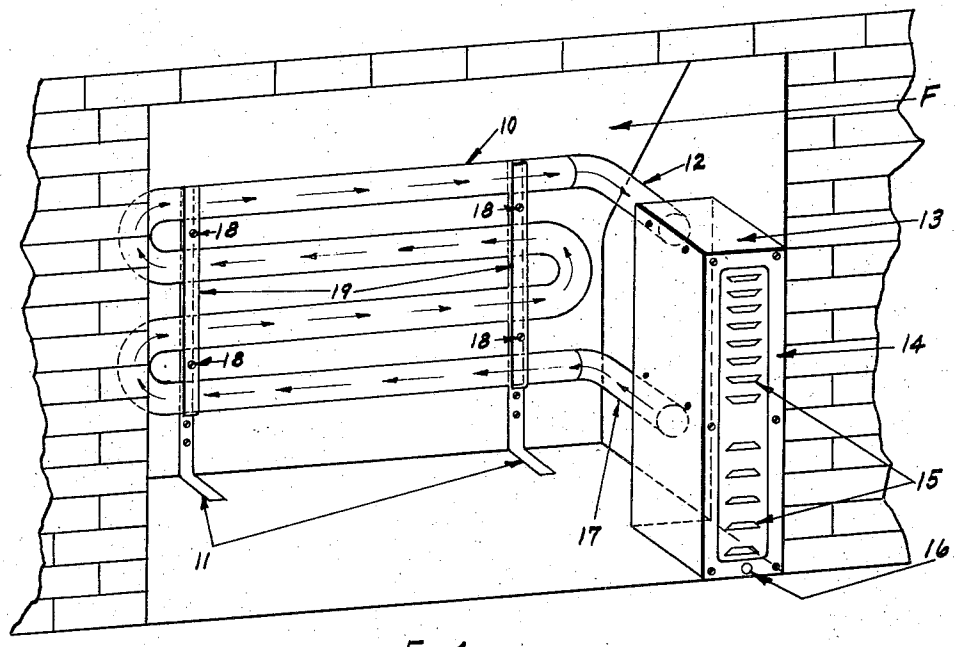


FIG 1.



FIG 2.

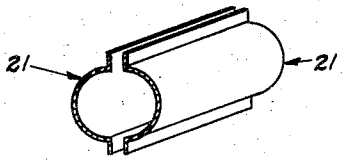


FIG 3.

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FIREPLACE HEATER

Filed May 11, 1943 3 Sheets-Sheet 2

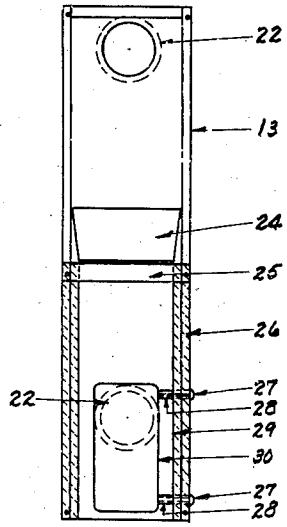


FIG. 4.

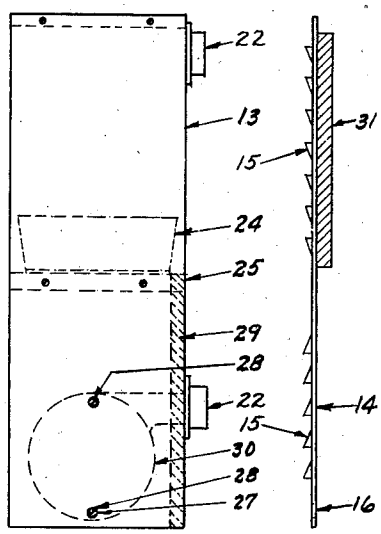


FIG. 5.

FIG. 7.

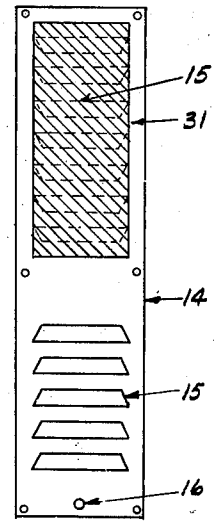


FIG. 8.

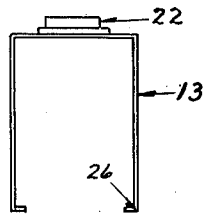


FIG. 6.

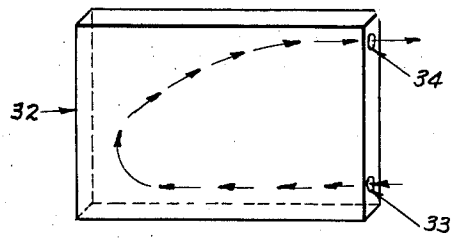


FIG. 9

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FIREPLACE HEATER

Filed May 11, 1943 3 Sheets-Sheet 3

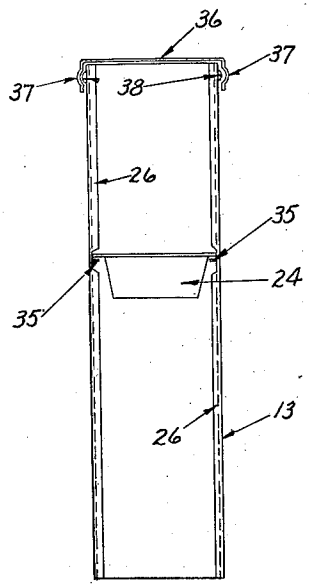


FIG. 10

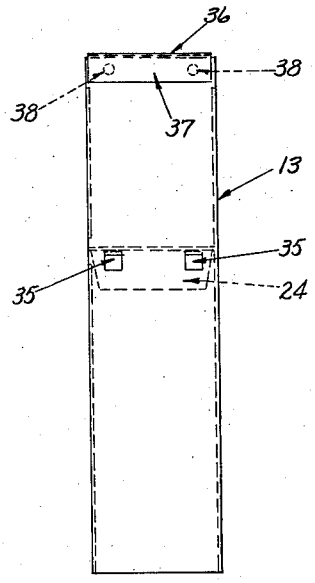


FIG. 11

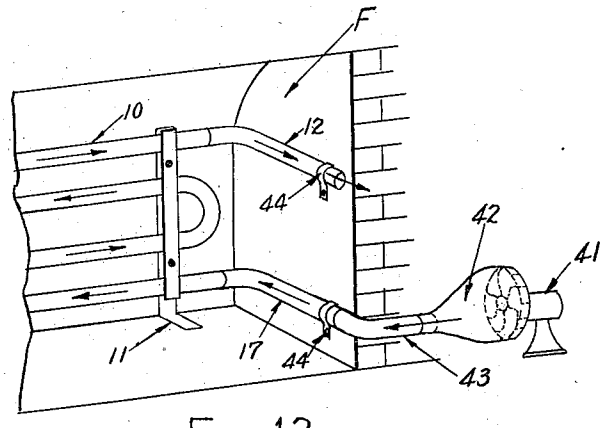


FIG. 12

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Patented Sept. 26, 1944

2,359,197

UNITED STATES PATENT OFFICE

2,359,197

FIREPLACE HEATER

Wilbur R. Brooks, West Hartford, Conn.

Application May 11, 1943, Serial No. 486,530

9 Claims. (Cl. 126—121)

This invention relates to a fireplace heater and particularly to one which is adapted to be placed in a fireplace and utilize some of the normally wasted heat generated by a fire therein, whereby the room or other area adjacent said fireplace may be more effectively and thus efficiently heated by the heat from said fire in the fireplace.

It is a generally accepted fact that heating an enclosure, such as a room by a fire in a conventional fireplace is substantially the least efficient means by which to accomplish said heating. This is due to the fact that most of the heat generated by the fire passes up the chimney or flue; only a small percentage of the total heat generated passing from the fireplace into the room. Even when a well designed fireplace is utilized and the back thereof comprises a good heat reflector, of the total heat generated, the amount usefully reflected or radiated into the room is a relatively small percentage.

It is therefore an object of the present invention to provide a heater adapted to be placed in a conventional fireplace, said heater being provided with a continuous conduit having spaced portions to be directly heated by a fire in said fireplace.

Another object of the invention is to provide a blower attachable to the inlet end of said conduit and an outlet attachable to the other end of said conduit, the blower and outlet being disposable adjacent one side of the fireplace and disconnectible from the respective ends of the conduit to permit reversal of the conduit and the disposal of the blower and outlet on the other side of the fireplace.

Still another object of the invention is to provide a casing disposable adjacent one side of the fireplace and connectible to the inlet and outlet of the conduit, the casing being provided with louvers to permit passage of air into and from the conduit.

A further object of the invention is to provide a filter adjacent the outlet louvers of said casing.

Incident to said last object, it is an additional object to provide adjacent said casing outlet louvers a reservoir adapted to hold humidifying fluid, said reservoir, in one embodiment of the invention, serving to divide the casing into a plurality of compartments.

The details and advantages of these objects, as well as further objects of the invention, will be apparent from the following specification and drawings forming a part thereof and in which:

Fig. 1 is a perspective view showing one complete embodiment of said fireplace heater.

Fig. 2 is a front elevation of one embodiment of sinuous conduit per se.

Fig. 3 is a fragmentary exploded view showing sections forming a portion of said conduit.

Fig. 4 is a front elevation of the casing connectible to said conduit, the front grill of the casing being removed.

Fig. 5 is a side elevation of Fig. 4.

Fig. 6 is a top plan view of the casing shell per se.

Fig. 7 is a side elevation of the casing grill and the air filter carried thereby.

Fig. 8 is a rear elevation of Fig. 7.

Fig. 9 is a perspective view of another embodiment of air heater unit.

Fig. 10 is a front elevation of the casing, front grill removed, containing another embodiment of reservoir.

Fig. 11 is a side elevation of the casing shown in Fig. 10.

Fig. 12 is a perspective view of another complete embodiment of a fireplace heater including principles comprising the present invention.

Referring to the drawings, and particularly Fig. 1, a conventional fireplace recess or cavity is indicated as F. A heater unit 10, preferably formed of a continuous length of seamless tubing, is portably disposed in the fireplace recess F. Said unit is also preferably formed from metal having good heat conducting characteristics although said unit may be formed from any other suitable, non-combustible material. In order to render the unit compact and afford a large heat exchange area in a relatively small space, the preferred embodiment of the invention comprises bending the tubing into a sinuous shape, all of the straight and curved portions of the sinuously shaped unit being disposed in a single plane, whereby said unit may be maintained by footed supports 11 adjacent and substantially parallel to the rear wall of the fireplace recess.

The various substantially parallel and straight sections of said unit 10 comprise a plurality of spaced portions which are adapted to be adjustably disposed adjacent a fire in the fireplace cavity. As the fire burns to a bed of coals, the unit 10 may be moved nearer the coals inasmuch as the unit is portably mounted in said fireplace cavity. The open ends of the continuous sinuous unit 10 preferably terminate or extend from the same end of the sinuous unit and adjacent one side wall of the fireplace cavity.

An outlet 12 is secured to one of said open ends of unit 10, said outlet being connectible, prefera-

bly detachably, to a port provided in the rear wall of casing 13 adapted to be disposed adjacent one side wall of the fireplace cavity F. Casing 13 is provided with a detachable front cover 14 having a plurality of air inlet and outlet louvers 15. Cover 14 is also provided with an aperture 16 for purposes to be described.

The other open end of unit 10 is secured to one end of an inlet 17, the other end of said inlet being connected to another port provided in the rear wall of casing 13. Air may thus pass inward through the lowermost louvers 15, the inlet 17, unit 10, outlet 12, and then outward into the room through the uppermost louvers 15.

Suitable bolts or screws 18 are used to secure heater unit brackets or clamping members 19 to heater unit supports 11 and clamp the heater unit 10 in proper position to be heated by a fire in the fireplace. By loosening screws 18, the relative position of unit 10 with respect to supports 11 may be varied and the screws again tightened to maintain the adjusted position.

Another embodiment or form of heater unit is shown in Fig. 2, as indicated at 20. Said unit 20 is formed from two complementary sections 21 and 22 which are each semi-circular in cross section and the edges of each section are respectively provided with co-planar flanges adapted to be secured to the similar flanges of the other section in any suitable manner which will render the joint air or gas tight. Said sections, prior to being joined, are shown in Fig. 3.

The ports in the cabinet 13, to which the outlet 12 and inlet 17 are joined, are preferably provided with collars or flanges 22 to facilitate detachably connecting said inlet and outlet to their respective ports in said cabinet.

If preferred, a container 24 for humidifying fluid such as water, which may contain medicament or disinfectant if desired, is supported on a shelf or partition 25 which separates the casing 13 into two compartments disposed one above the other. The uppermost compartment serves as a plenum chamber into which the outlet 12 discharges heated air and from which chamber said air emerges at a reduced speed through the the louvers in the front of said chamber after first having been humidified by the fluid in container 24. Cover 14 is preferably detachably secured to a flange 26 formed on each edge of the front of casing 13.

The lower compartment of casing 13 serves as an air inlet chamber and is provided with a plurality of bolts 27 passing through one wall thereof and on each of which a spacer 28 is carried. Said lower compartment is lined with heat insulating material 29 which is preferably sheet-like and composed of rock wool, fiber glass, or the like to protect from the heat of the fireplace a power blower 30 supported in said lower compartment on said bolts 27 and held in proper position thereon by said spacers 28.

Power blower 30 preferably comprises a fan driven by an electric motor. The fan may be of small capacity, likewise the motor, since the pressure necessary to be generated thereby need only be sufficient to force air, in the direction of the arrows shown in Fig. 1, through said inlet 17, heating unit 10, outlet 12 and exit louvers 15 at such speed as to cause an appreciable flow of heated air to be continuously discharged from said exit louvers 15. The power cord for the electric motor may pass through aperture 16 of cover 14.

The air emerging from outlet 12 may be also filtered, prior to passing through exit louvers 15, by first passing through a filter 31 composed of fiber glass steel wool, or any other suitable material. Said filter is supported by the cover 14 on the inner side thereof by any suitable securing means and may be detachably secured to said cover to permit readily renewing the filter material or removing the same for cleaning purposes.

In Fig. 9, another embodiment of heater unit is indicated 32. Said unit comprises a generally rectangularly-shaped box enclosed on all sides, composed preferably of metal or other similar non-combustible material, and provided in one end wall with an air inlet port 33 and an air outlet port 34. The inlet and outlet ports are adapted to be respectively connected to an inlet and outlet similar to inlet 17 and outlet 12 shown in Fig. 1. A blower such as 30 will force air in the direction of the arrows, through port 33, into unit 32, where it will be heated by heat from fire in the fireplace, and out of port 34 for passage through outlet 12.

A further embodiment of the invention is illustrated in Figs. 10 and 11 and in which the container 24 serves as the partition dividing casing 13 into upper and lower compartments. Container 24, in this embodiment, is supported by suitable brackets or flanges 35 respectively secured to opposite sides of the casing 13. The casing 13 is also provided with a top 36 provided with grooved side flanges 37, the grooves being adapted to cooperate with lugs or protuberances 38 projecting from the opposite sides of the casing adjacent the upper edges thereof. Said construction is adapted to prevent upward movement of the top 37 but permits slidable movement of said top in a substantially horizontal plane. Top 37 may be readily and slidably moved rearward or forward from the casing to permit filling of container 24 with humidifying fluid. Grooves 37 and lugs 38 comprise an inexpensive means for removably securing the top to the casing.

Still another embodiment of the invention is shown in perspective in Fig. 12. A heater unit 10 is provided with inlet 17 and outlet 12, as in the embodiment shown in Fig. 1. In Fig. 12, however, the embodiment shown is considerably more simple than that shown in Fig. 1 and would be correspondingly less expensive to manufacture inasmuch as the air is circulated under pressure through the conduit comprising heater unit 10 by a conventional, and preferably small sized, electric fan 41 which may be placed on the floor of the room to be heated.

Fan 41 is connected to inlet 17 by a tubular flexible member 42 which is formed of any suitable substantially air-tight material such as paper, closely woven cloth, or the like. One end of said member 42 encloses the conventional guard of fan 41 and the other end is formed so as to be restricted for closely engaging the open or outer end of inlet 17 or, preferably, to an angular extension 43 secured to inlet 17. If desired, the member 42 may be secured at its ends respectively to fan 41 and inlet 17 by providing draw strings in the ends of said member or by folding said ends about the fan and inlet in a closely engaging manner and then securing said ends, in said folded condition, by suitable bands of cord, twine, gummed tape, wire, or the like.

From the foregoing, it will be seen that the embodiment shown in Fig. 12 provides an extremely simple and inexpensive type of fireplace heater utilizing a fan such as is available in practically

every household. The fan may be, for example, one of the popular small sized synchronous motor driven fans which consume only a small amount of electric current. Said type of fan will be ample to quietly force sufficient air through inlet 17, heater unit 10 where it is heated, exist 12, and from the open end of exit 12 into the room.

If desired, fireplace heaters of the type just described may be permanently installed in fireplaces and secured therein by one or more brackets 44 which are secured to one or more walls of the fireplace recess. If the material from which the unit 10 is formed is sufficiently rigid, said brackets 44 may comprise the supporting means for the unit 10 in lieu of the supports 11.

In all embodiments of the invention, the heater unit, such as 10 or 32, may be disconnected from the inlet 17 and outlet 12 to permit the reversal of the heater unit end for end. In so reversing the unit, the unit supports 11 will have to be changed in position on the unit in order to dispose the footed ends of the supports in proper position to engage the floor of the fireplace recess F. After reversing the heater unit, the inlet 17 and outlet 12 are respectively re-attached to the open ends of the heater unit and said inlet and outlet will then be disposed on the opposite side of the fireplace from that on which they were disposed prior to reversing the heater unit. In the case of the embodiment shown in Fig. 12, to reverse the heater unit, it will only be necessary to disconnect extension 43 from inlet 17 and attach it to outlet 12. Said inlet and outlet will then respectively be the outlet and inlet after said reversal of the heater unit in the fireplace recess.

In order to increase the heat transfer areas of heater units 10 and 32, the surfaces of the same may be corrugated either longitudinally or transversely, or provided with fins.

It will thus be seen that the present invention, in its various embodiments, provides a fireplace heater adapted to more efficiently utilize the heat developed by a fire in a fireplace for heating a room containing said fireplace. The inlet and outlet of the heater unit are selectively disposable on either side of the fireplace by a simple rearrangement of certain parts of the heater. Being portable, the heater is also adapted to be adjusted with request to the fire in the fireplace so as to be effectively heated by even a small fire in the fireplace. In one embodiment of the invention, the heated air may be filtered and humidified. In another embodiment, a conventional and popular type of small sized electric fan may be used to force air through said heater and into a room. All of the embodiments may also be inexpensively manufactured.

While the invention has been illustrated and described in its preferred embodiment and has included certain details, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways, falling within the scope of the invention as claimed.

What I claim is:

1. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane, a support detachably connected to said conduit and provided with a base adapted to be placed on the floor of the fireplace and maintain said conduit adjacent and substantially parallel to the rear wall of said fireplace recess whereby it may be heated by a fire in the fireplace, said continuous conduit having an inlet and an outlet respectively projecting at an angle to said spaced portions and said angular projections being of sufficient length to respectively locate the open ends of said inlet and outlet adjacent the front and one side of the fireplace recess when the heater is disposed therein, a power driven fan mounted adjacent the open end of said inlet, a casing at least partially enclosing said fan and detachably connected to said open end of the inlet to effect passage of air from the fan through the heated spaced portions of the conduit and from the exit of said conduit, said fan casing and conduit support being respectively detachable from said inlet and conduit to permit reversing said conduit and its inlet and outlet in said fireplace recess to dispose said inlet and outlet adjacent the side of the fireplace opposite said first mentioned side, following which said fan casing and conduit support may be respectviely re-connected to said inlet and conduit.

2. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane, a support detachably connected to said conduit and provided with a base adapted to be placed on the floor of the fireplace and maintain said conduit adjacent and substantially parallel to the rear wall of said fireplace recess whereby it may be heated by a fire in the fireplace, said continuous conduit having an inlet and an outlet respectively projecting at an angle to said spaced portions and said angular projections being of sufficient length to respectively position the open ends of said inlet and outlet adjacent the front and at one side of the fireplace recess when the heater is disposed therein, a power driven fan mounted adjacent the open end of said inlet, a flexible casing substantially impervious to air and at one end at least partially enclosing said fan and constricted at its other end to fit and be detachably connected to said open end of the inlet to effect passage of air from the fan through the heated spaced portions of the conduit and from the exit of said conduit, said fan casing and conduit support being respectively detachable from said inlet and conduit to permit reversing said conduit and its inlet and outlet in said fireplace recess to dispose said inlet and outlet adjacent the side of the fireplace opposite said first mentioned side, following which said fan casing and conduit support may be respectively reconnected to said inlet and conduit.

3. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane and adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a partition in said casing defining a plurality of compartments respectively provided with a port to which said inlet and outlet of said conduit are respectively communicatively connected, one wall of each compartment being provided with an air passage, and a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw

air through the air passage of its compartment and circulate said air through the spaced portions of the conduit and force said air outward of the opening in the compartment with which the conduit outlet communicates.

4. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane and adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a partition in said casing defining a plurality of compartments respectively provided with a port to which said inlet and outlet of said conduit are respectively communicatively connected, one wall of each compartment being provided with louvers to pass air, a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw air through the louvers of its compartment and circulate said air through the spaced portions of the conduit and force said air outward of the louvers in the compartment with which the conduit outlet communicates, and an air filter mounted adjacent the louvers in said last mentioned compartment.

5. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane and adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a partition in said casing defining a plurality of compartments respectively provided with a port to which said inlet and outlet of said conduit are respectively communicatively connected, one wall of each compartment being provided with louvers to pass air, a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw air through the louvers of its compartment and circulate said air through the spaced portions of the conduit and force said air outward of the louvers in the compartment with which the conduit outlet communicates, and a container adapted to hold a supply of water mounted adjacent said louvers in said last mentioned compartment, whereby the air which is heated in passing through said spaced portions of the conduit is also humidified before passing through said louvers.

6. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane and adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a partition in said casing defining a plurality of compartments respectively provided with a port to which said inlet and outlet of said conduit are respectively communicatively connected, one wall of each compartment being provided with louvers to pass air, a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw air through the louvers of its compartment and circulate said air through the spaced portions of the conduit and force said air outward of the louvers in the compartment with which the conduit outlet communicates, and an air filter and container adapted to hold a supply of water both mounted adjacent the louvers in said last mentioned compartment, whereby the air passing through said louvers is first humidified and then filtered.

7. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a container adapted to hold a supply of water mounted horizontally in said casing to serve as a partition defining a plurality of compartments respectively provided with a port to which said inlet and outlet of said conduit are respectively communicatively connected, one wall of each compartment being provided with louvers to pass air, and a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw air through the louvers of its compartment and circulate said air through the spaced portions of the conduit and force said air through said outlet and over said water container to humidify it and lastly outward of the louvers in the compartment with which said conduit outlet communicates.

8. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane and adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a partition in said casing defining a plurality of compartments respectively provided with a port to which said inlet and outlet of said conduit are respectively communicatively connected, one wall of each compartment being provided with a louver to pass air, a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw air through the louver of its compartment and circulate said air through the spaced portions of the conduit and force said air outward of the louver in the compartment with which the conduit outlet communicates, and insulation disposed in said power driven fan compartment between said fan and fire in the fireplace to shield said fan from the heat of said fire in the fireplace.

9. A portable fireplace heater adapted to be disposed in a fireplace recess and comprising in combination, a continuous air conduit having a plurality of spaced portions disposed in a substantially vertical plane and adapted to be adjustably disposed adjacent a fire in the fireplace and be heated thereby, the ends of said continuous conduit respectively comprising an inlet and an outlet, a casing adapted to be disposed adjacent one side of said fireplace cavity, a partition in said casing defining a plurality of com-

partments respectively provided with a louver and also a port to which said inlet and outlet of said conduit are respectively communicatively and detachably connected to permit separation of said casing and conduit, whereby said conduit may be reversed within and the casing may be placed adjacent the other side of the fireplace and the conduit inlet and outlet also then reconnected to their respective ports in the casing, and a power driven fan mounted in the compartment with which the conduit inlet communicates, said fan being adapted to draw air through the louver of its compartment and circulate said air through the spaced portions of the conduit and force said air outward of the louver in the compartment with which the conduit outlet communicates.

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