May 11, 1943. J. T. HARRINGTON 2,319,131

FUEL AND HEAT ECONOMIZER

Filed March 27, 1941

Fig. 1.

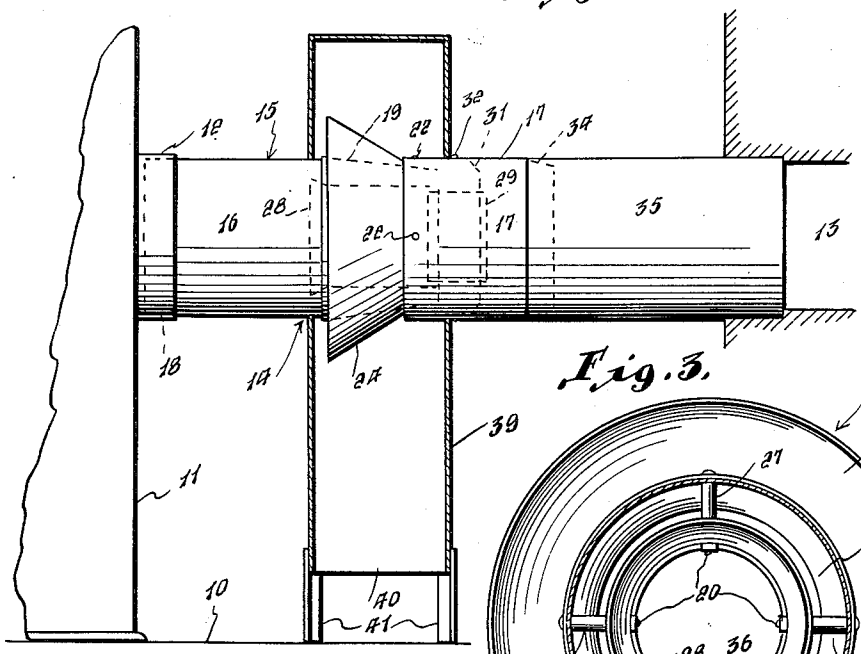


Fig. 3.

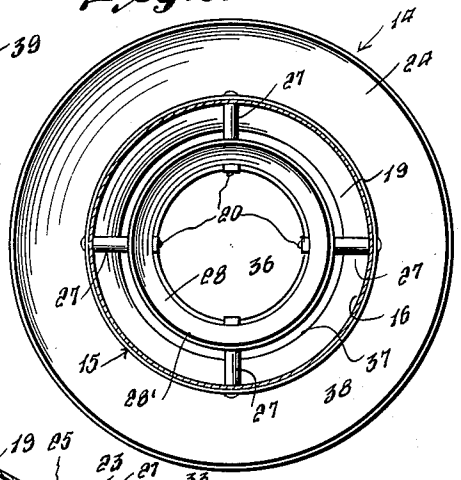
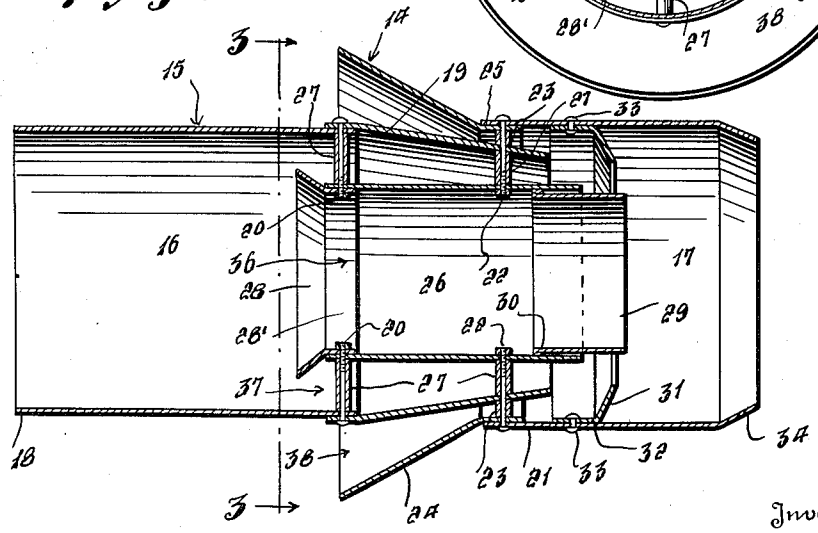


Fig. 2.



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FUEL AND HEAT ECONOMIZER

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4 Claims. (Cl. 126—312)

This invention relates to an improved economizer for use between casings of heating units and chimneys to replace or form a part of a smoke-pipe and to provide a control for the smoke-pipe to check the free escape of heat from the heating unit to the chimney.

More particularly, it is an aim of the invention to provide an economizer which will act as a check on the draft of the chimney to prevent excess suction in the smoke-pipe and to thereby afford means for retaining the heat in the heating unit sufficiently long so that all of the heat from the products of combustion may be utilized and absorbed in the heating unit before the products of combustion pass therefrom pass into the smoke-pipe.

More particularly, it is an aim of the invention to provide a control for smoke-pipes wherein the hot air and products of combustion from the heating unit will check the old air entering the smoke-pipe, when the drafts of the heating unit are open and wherein the cold air entering the smoke-pipe will check the passage of the products of combustion and heated air therethrough, when the drafts of the heating unit are closed.

Still another aim of the invention is to provide a device having means whereby the control may be readily varied by adjustment of a single part, to vary the extent to which the products of combustion may be checked in their passage through the smoke-pipe to adapt the economizer to use on any type of heating unit.

Still a further aim of the invention is to provide an economizer control for a smoke-pipe having means whereby the cold air which is drawn into the smoke-pipe will be drawn from adjacent the floor so that only the coldest air available will be utilized to thus provide means for heating and ventilating a basement or other enclosure in which the heating unit is situated.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, which illustrates a preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view partly in vertical section of the device,

Figure 2 is an enlarged longitudinal central sectional view of the control or economizer, and

Figure 3 is a cross sectional view of the same taken substantially along the plane indicated by the line 3—3 of Figure 2.

Referring more particularly to the drawing, wherein like reference characters designate like or corresponding parts throughout the different views, for the purpose of illustration, 10 designates a portion of the floor of a basement, 11 a portion of the casing of a heating unit which rests thereon and which is provided with an outlet 12 for the products of combustion therefrom, and 13 designates the flue of a chimney. These parts are illustrated in Figure 1 and described merely to illustrate the application of the invention, designated generally 14.

The fuel and heat economizer 14 includes a conduit 15 comprising pipe sections 16 and 17. The pipe section 16 forms the intake end of the conduit 15 and has an intake end 18 which is adapted to be attached to the outlet 12, as seen in Figure 1. A conical shaped member 19 is attached at its large end to the opposite end of the pipe section 16 by means of nut and bolt fastenings 20 and projects therefrom into the inlet end 21 of the pipe section 17 and is attached thereto by nut and bolt fastenings 22. The tapered end of the conical member 19 is of a diameter substantially less than that of the end 21 and is held in substantially concentric relationship therein by means of spacing sleeves 23 which are carried by the bolts of the fastenings 22.

A conical member 24 is provided with a restricted annular end 25 which fits into the end 21 and which is attached thereto by means of the fastenings 22 and which is held between the end 21 and the spacing sleeves 23. A flared end of the conical member 24 projects outwardly of the end 21 and is flared outwardly relatively to the conical member 19, as best seen in Figure 2. A tube 26, which is of substantially less diameter than the conical member 19, is disposed therein and longitudinally thereof and has one end projecting into the outlet end of the pipe section 16 and its opposite end extending into the end 21 of the pipe section 17. The tube 26 is mounted by the fastenings 20 and 22 and is held in spaced apart, substantially concentric relationship to the pipe sections 16 and 17 and the conical member 19 by spacing sleeves 27 which are carried by the shanks of the bolts of the fastenings 20 and 22. A conical member 28 is provided with a restricted annular portion 28' which is disposed in the end of the tube 26, which extends into the pipe section 16, and is attached thereto by the fastenings 20. A flared portion of the conical member 28 projects outwardly of said end of the tube 26 and into the pipe section 16 to form the flared inlet end of the tube 26. A tubular member 29 is mounted in the opposite, outlet end of the tube 26 and is provided with

a rolled edge 30, at one end thereof, for frictionally engaging the inner wall of the tube 26 sufficiently tight to normally hold the tubular member 29 in an adjusted position relatively thereto, yet sufficiently loose so that the member 29 may be slid relatively thereto to provide a telescoping connection. The opposite end of the member 29 projects from the outlet end of the tube 26 and into the pipe section 17. The pipe section 17 is provided with an annular baffle 31 having an annular flange 32 which is fastened to the inner wall of the pipe section 17 by fastenings 33. The baffle 31 projects from the wall of the pipe section 17 inwardly thereof and toward its outlet end, as best seen in Figure 2, and the tube 29 may be disposed so that its outlet end projects through the opening formed by the baffle 31.

The outlet end 34 of the pipe section 17 is tapered and is adapted to be connected either to a flue outlet 13 or, as seen in Figure 1, it may be connected to a section 35 of a conventional smoke-pipe where the distance from the casing 11 to the flue 13 is greater than the length of the conduit 15 and under such conditions the pipe section 35 is employed and has one end attached to the outlet end 34 and its opposite end disposed in the chimney flue 13.

It will be obvious that the conduit 15, intermediate of its ends, is provided with a passage 36, which is centrally disposed relatively thereto, an annular passage 37, surrounding the passage 36, and an annular passage 38, surrounding the passage 37. It will also be apparent that the passages 37 and 38 converge toward their outlet ends, as best seen in Figure 2.

The passage 36, at the center of the conduit 15, forms the passage for the products of combustion from the heating unit 11 and may obviously be made in various sizes for heating units of different capacities and for different grades and types of fuel in order to take care of the proper amount of exhaust gases. The passage 38 forms an intake for cold air from a cellar or other enclosure in which the heating unit 11 is situated which cold air enters the pipe section 17 close to the exhaust end of the passage 36, formed by the tubular member 29, to check the flow of the products of combustion at this point. However, when the drafts, not shown, of the heating unit 11 are open the pressure of the products of combustion passing through the passage 36 will reduce the amount of air entering through the passage 38 thereby giving the passage 36 a better draft for freer flow of the burnt gases, thus providing a control 14 having the necessary flexibility required for modern heating units. The heat of the products of combustion heats the member 19, and the heat radiated therefrom would check the flow of the cold air through passage 38 except for the fact that member 24 is flared outwardly and away from the member 19 and is sufficiently spaced therefrom so that the cold air can follow the inner side of member 24 and thereby enter the conduit 15 in sufficient quantity to function efficiently as a check. Likewise, the free edge of the conical member 24 is spaced a sufficient distance from pipe 16 so that heat radiated from pipe 16 will not repel the cold air sufficiently to prevent it from reaching the inlet end of passage 38. In order to afford further adjustment on the check of the flow of the hot air and combustion gases from the heating unit, the sliding tubular member 29 is provided which, by being moved inwardly of the tube 26 will tend to restrict the flow of the products of combustion and by being moved outwardly thereof will increase the flow of the products of combustion and decrease the flow of the cold air through the passage 38. The flared inlet 28 of the passage 36 tends to increase the intake of exhaust gases thereto and also to deflect hot air through the passage 37. The baffle or deflector 31 when used with the conduit 15 in a horizontal position, as illustrated, deflects the cold air from the passage 38 over the outlet end of the passage 36 to check the flow through passage 36. If the conduit 15 is disposed in an upright position the baffle or deflector 31 prevents any back pressure in the conduit which might otherwise force soot outwardly through the passage 38. Due to the fact that the passage 38 entirely surrounds the unit a uniform checking action at the outlet end of the passage 36 is produced. Furthermore, the passage 38 eliminates condensation in the chimney, in the pipe 35 and the conduit 15.

As illustrated in Figure 1, if desired, the fuel and heat economizer 14 can also include a box like casing 39 through which the conduit 15 extends and into which the passage 38 opens. The casing 39 is open only at its bottom at 40 and is provided with depending supporting legs 41 which rest on the floor 10 for supporting the open end 40 in an elevated position yet adjacent the floor so that the cold air entering the conduit 15 will be drawn through the casing 39 and from adjacent the floor to thereby provide means whereby only the coldest air in the enclosure will be drawn through the conduit 15.

Various modifications and changes are contemplated and may obviously be resorted to as only a preferred embodiment of the invention has been disclosed.

I claim as my invention:

1. A fuel and heat economizer for furnaces and the like comprising a conduit adapted to replace a smoke-pipe including end sections of pipe, said pipe sections having adjacent overlapping ends, one of said pipe sections forming the inlet end of the conduit and the other of said pipe sections forming the outlet end thereof, said outlet section having one end disposed around the end of the inlet section and spaced therefrom to form an annular passage therebetween opening outwardly of the conduit intermediate of its ends, and a tube of substantially less diameter than said pipe sections and disposed in the inlet section and coaxially thereof and having one end extending into the outlet pipe section.

2. A device as in claim 1, said tube having a flared inlet end, and said tube combining with the adjacent ends of said pipe sections to form an annular connecting conduit therebetween.

3. A device as in claim 1, said tube being provided with a slidably mounted section projecting from its outlet end and extending into the outlet pipe section, said outlet pipe section being provided with an annular inwardly projecting baffle disposed adjacent its connected end and through which said slidable section extends, said baffle having its inner, free edge extending toward the outlet end of the conduit.

4. A smoke pipe as in claim 1, said tube forming a restricted centrally disposed passage between the inlet and outlet ends of the smoke-pipe, and provided with a slidably mounted section having one end projecting therefrom and toward the outlet end of the smoke-pipe.

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