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DRAFT CONTROL DEVICE

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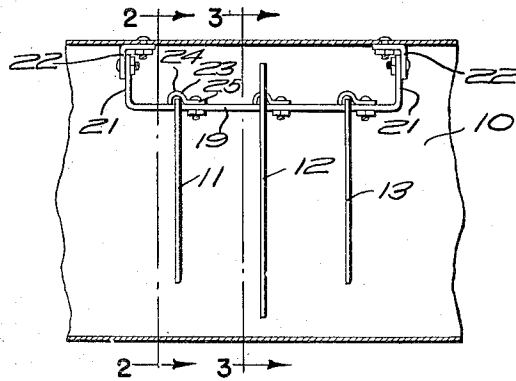


FIG. 1

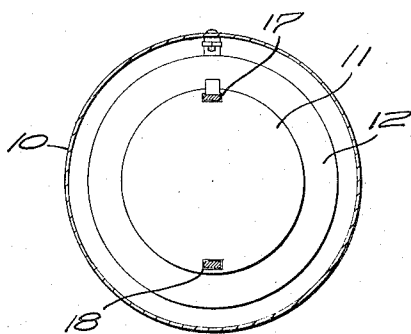


FIG 2

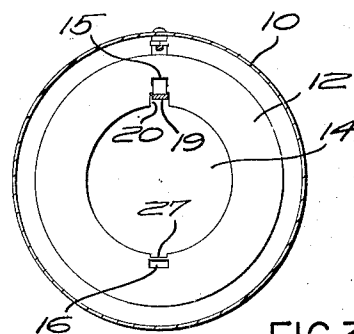


FIG.3

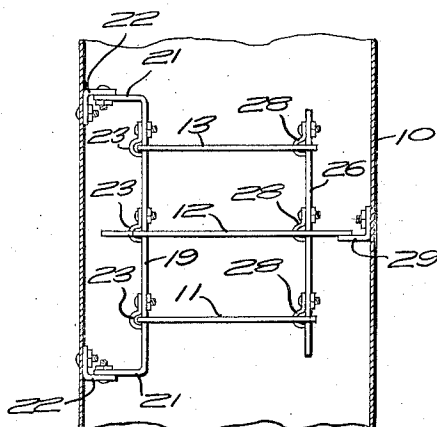


FIG.4

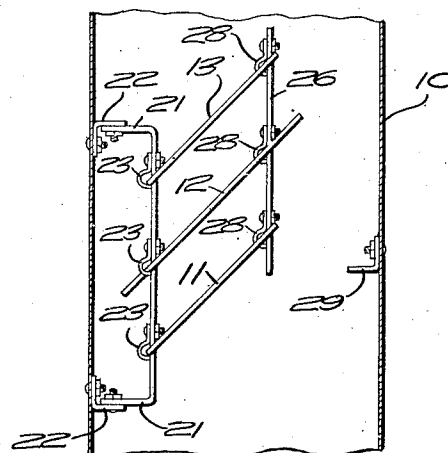


FIG. 5

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DRAFT CONTROL DEVICE

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2 Claims. (Cl. 110-163)

1

My present invention relates to fuel economizers and more particularly to a novel device for reducing the fuel consumption of a furnace.

The principal object of the present invention is to provide a device for reducing the fuel consumption of the furnace by retarding the rate of flow of warm air and combustion gases in the smokestack.

Another object of the present invention is to provide a device of the character described which will not choke off the furnace in the event of a sudden surge caused by puffing explosions of the oil burner.

Another object of the present invention is to provide a device of the character described which is simple in construction and easy and economical to manufacture and install.

With the above and other objects and advantageous features in view, my present invention consists of a novel arrangement of parts more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more particularly defined in the appended claims.

In the drawings,

Fig. 1 is a section of a horizontal smokestack showing my device installed therein.

Fig. 2 is a section taken on line 2-2 on Fig. 1.

Fig. 3 is a section taken on line 3-3 on Fig. 1.

Fig. 4 is a section of a vertical smokestack showing my device installed therein.

Fig. 5 is a view similar to Fig. 4 showing the action of the device in the case of a puff or explosion in the furnace.

Various devices have been constructed for lowering the fuel consumption of a furnace, particularly an oil burning furnace, by retarding the flow of hot air from the furnace up the smokestack. This will permit the furnace to extract a larger quantity of heat from the hot air before it is dissipated up the smokestack. Such devices employ various means such as thermostatic coils for interposing a baffle in the smokestack when the stack temperature reaches a certain height. While such devices actually operate to reduce fuel consumption, I have found that they are slow in operation and not as efficient as such a device should be.

In my present invention, I have provided a simple device for retarding the air flow, without interfering with the chimney draft. The retarding elements are constantly in position and the hot gases are slowed down so that a maximum amount of heat is extracted therefrom by the boiler. The device of the present invention

2

can readily be applied either to horizontal or vertical stack constructions.

Referring more in detail to the drawings illustrating my invention, Figs. 1-3 inclusive illustrate the device incorporated in a horizontal installation. The device is installed in the smokestack 10 leading from the furnace to the chimney. It comprises a set of three baffle plates 11, 12 and 13 suspended vertically in spaced relationship in the stack 10. The central plate 12 comprises a flat annular ring portion, as shown in Fig. 3, having a comparatively large central opening 14. At opposite vertical portions of the plate 12 are rectangular slots 15 and 16 adjacent the central opening 14, for a purpose hereinafter to be described. The plates 11 and 13 are identical and each comprises an annular disc, as shown in Fig. 2, of slightly larger diameter than the central opening 14 in the plate 12. The plates 11 and 13 are each provided with oppositely disposed vertically aligned rectangular openings 17 and 18 adjacent the periphery thereof, as shown in Fig. 2.

To retard the flow of hot gases through the stack 10, the plates 11, 12 and 13 are suspended in the center of the stack in spaced relation with the plates 11 and 13 on either side of the plate 12, as shown in Fig. 1. As the hot gases pass through the stack 10, they will first hit the plate 11 or 13, depending on the location of the furnace, and will be forced to travel around the plate 13. They will then meet the larger diameter of the plate 12 and be turned inwardly through the center opening 14 thereof. They will then meet the flat surface of the plate 11 or 13 and be forced around that. This forces the furnace gases through a circuitous path, thus retarding its rate of flow without interfering with the chimney draft. To make sure that the furnace is not blocked in case of sudden puffs or back drafts, the plates 11, 12 and 13 are suspended through the openings 17 in the plates 11 and 13 and the opening 15 in the plate 12, so that they will swing freely with the pull of the draft.

While any type of suspension device may be employed, I prefer to use the suspension device shown in Fig. 1. I provide a bar or strap 19 which passes through the openings 17 in the plates 11 and 13 and into a slot 20 beneath the opening 15 in the plate 12. The ends of the bar or strap 19 are turned upwardly as at 21 and are bolted to a pair of L-shaped supports 22 which are in turn bolted to the top of the stack 10, as shown in Fig. 1. To retain the plates 11, 12 and 13 in proper spaced relationship without interfering with the swinging action thereof, I

3

provide strap members 23 which comprise inverted U-shaped portions 24 terminating at one end with an integral flat portion 25. The flat portion 25 is bolted to the bar 19, as shown in Fig. 1, and the inverted U-shaped portion 24 passes over the top edge of the plates 11 and 13 and through the opening 15 of the plate 12 to lock each plate to its position along the bar 19.

The above construction must be varied as to the spacing and size of the various plates for different sizes of stacks. For example, I prefer that the plates 11, 12 and 13 be made out of sheet steel one-sixteenth inch thick. In a smoke-stack having an eight inch diameter, the plates 11 and 13 should be approximately five and one-eighth inches in diameter and the plate 12 should be approximately six and three quarters inches in diameter. The central opening of the plate 12 is approximately four and one-eighth inches in diameter. With the above sizes and constructions, the plates 11, 12 and 13 should be approximately two and one-sixth inches apart from each other. While these sizes may be varied, I have found that they produce a maximum efficiency in the saving of fuel.

To install the economizer, it should be positioned as close to the furnace in the stack as is conveniently possible. In a standard oil burner installation, a furnace relay switch is usually positioned either at the furnace or in the stack adjacent the furnace. The economizer should be positioned next in line in the stack, as close to the relay as possible without interfering with the operation thereof. I have found that with such an installation a considerable amount of fuel is saved. The plates 11, 12 and 13 retard the flow of the hot gases and, of course, get extremely hot themselves. The temperature of the smokestack on the furnace side of the device will be much higher than on the chimney side, indicating that the device is operating properly. This drop in temperature between the furnace and the stack should be from 12-28%, and the resultant economy in fuel consumption should be at least ten percent.

Where the stack 10 extends vertically from the furnace, the construction shown in Figs. 4 and 5 must be used. In this construction, the plates 11, 12 and 13 are attached to the strap or bar 19 by the members 23 similarly to the construction shown in Fig. 1. The ends 21 of the strap or bar 19 are bolted to the L-shaped members 22 which are in turn bolted to one side of the stack 10 now in vertical position. To retain the plates 11, 12 and 13 in horizontal position in the stack, I provide a second bar or strap 26 which passes through the lower openings 13 in the plates 11 and 13 and through a slot 27 adjacent the lower opening 16 in the plate 12. The plates 11, 12 and 13 are pivotally held in parallel spaced relationship by the members 28 on the bar 26 which are identical with the members 23 on the bar 19. This construction would normally allow the plates to swing downwardly into the stack. However, note that the plate 12 is of larger diameter than the plates 11 and 13. I, therefore, provide an L-shaped stop member 29 which is bolted to the stack 10 at a point opposite the strap 19, the horizontal portion of the member 29 extending into the path of movement of the plate 12 so that the edge of the plate 12 rests thereon as shown in Fig. 4. Inasmuch as the bars 19 and 26 and the members 23 and 28 lock the plates in spaced parallel relationship, the member 29 retains all the plates in the position shown in

4

Fig. 4. If desired, additional L-shaped members 29 may be positioned circumferentially about the edge of the plate 12 for additional support, or a single elongated L-shaped strip may be employed. With the parts positioned as shown in Fig. 4, the member 29 will prevent the plates from swinging downwardly into the stack, but will permit upward movement of the plates into the position shown in Fig. 5, should there be a puff or small explosion in the furnace. This construction is necessary for safety, as a fixed baffle may result in breakage in the case of such minor puffs or explosions. The operation of the vertically positioned device shown in Figs. 4 and 5 is similar to the operation of the horizontal device shown in Fig. 1. The device is extremely simple to manufacture and assemble and economical to install. The size and spacing of the plates and the method of suspension may, of course, be varied to suit the requirements of different stack constructions.

While I have described a specific embodiment of my invention, it is obvious that changes may readily be made in the size, shape or relative arrangement of parts, without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A draft retarder for a furnace flue comprising a tubular stack, three baffle plates positioned in spaced relation in said stack at right angles to the axis of said stack, said plates being of smaller diameter than said stack, the center plate being of a large diameter and having a large central opening and the end plates being of smaller diameter than said center plate but of larger diameter than said center plate opening, and hinge means connecting each plate adjacent one peripheral edge thereof to said stack in aligned relationship and permitting free swinging movement of the opposite ends of said plates in said stack.

2. A draft retarder for a furnace flue comprising a vertical tubular stack, three baffle plates positioned in spaced parallel relation in said stack at right angles to the axis of said stack, said plates being of smaller diameter than said stack, the center plate being of a large diameter and having a large central opening and the end plates being of smaller diameter than said center plate but of larger diameter than said center plate opening, hinge means connecting each plate adjacent one peripheral edge thereof to said stack in aligned relationship and permitting free swinging movement of the opposite ends of said plates in said stack, said opposite ends being hingedly connecting to a spacing bar to retain said plates in parallel relation in any swinging position in said stack, and stop means operatively associated with said stack and said plates preventing swinging movement of said plates from a horizontal position downwardly in said stack but permitting swinging movement upwardly in said stack.

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