

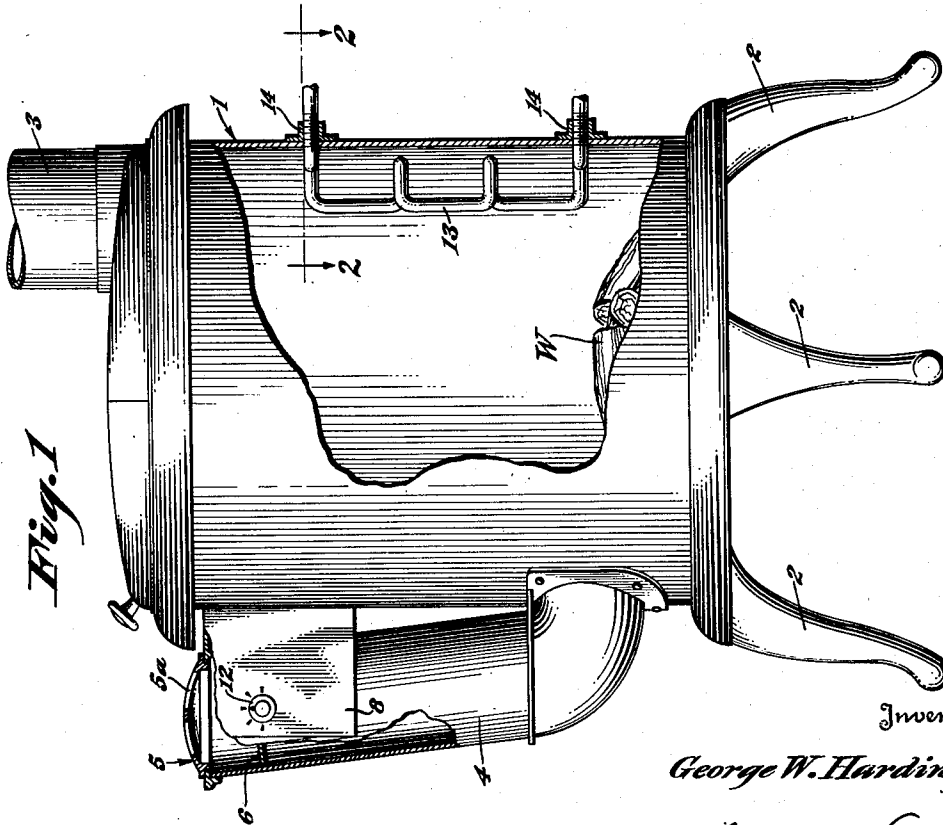
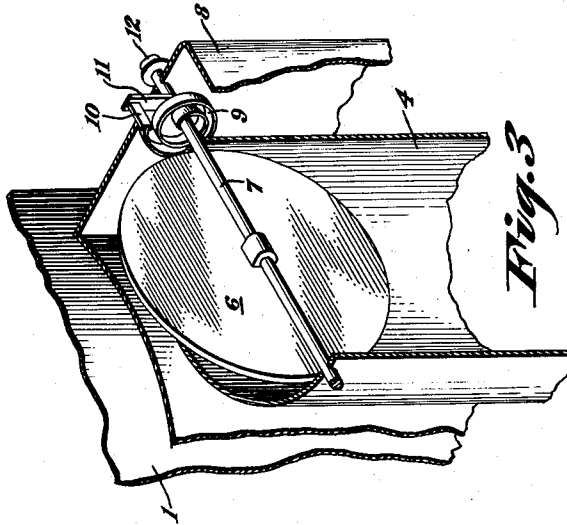
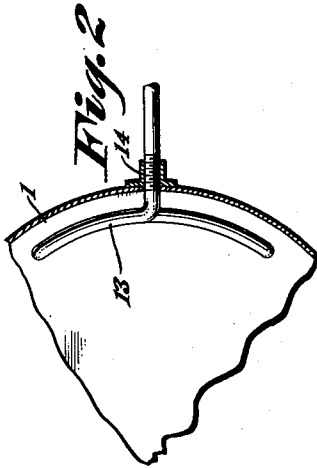
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2,607,335

WOOD BURNING STOVE, INCLUDING HEAT MAINTAINING MEANS

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WOOD BURNING STOVE, INCLUDING HEAT
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This invention relates to wood burning stoves, more particularly to an automatic draft regulator for a wood burning stove for providing relatively constant stove temperature.

Thermostatically controlled dampers in the downflow air pipe of wood burning stoves are broadly old in the art as shown by Ashley Patent No. 1,786,931, issued December 30, 1930, and Montague Patent No. 2,170,728 issued August 22, 1939. The advantages of incorporating such a thermostatically controlled damper in the downflow air pipe of such stoves is known in the art, such as that of forming a heated air column in the downflow air pipe which has a compensating effect on the heated air column in the smoke flue, preventing an onrush of air or draft through the stove and instead providing a smooth drift of air which can be regulated to a refined degree by the thermostat to effect slow and complete combustion of the wood, thereby conserving heat within the stove and, at the same time, providing relatively constant temperature in the stove.

Somewhat relatively constant stove temperature can be normally maintained during the day. At night, when the damper is closed the wood burns so slowly as to radiate very little heat. Difficulty, therefore, is experienced when it is attempted to rekindle the stove, such as in the morning by the opening of the damper. One of the reasons for such difficulty is that normally the wood is placed very closely to the downflow air pipe and, therefore, such little heat as is created by the fire will heat the air column in the downflow air pipe but not in the smoke flue hence there is over-compensation and little tendency for the proper draft to be created when the damper is opened to revive the fire. These cool periods of the stove may occur during the day also.

An object of the present invention, therefore, is to overcome the above mentioned difficulty by providing, in an automatically controlled wood burning stove having a downflow air pipe, means which will tend to continuously maintain a warm column of air in the smoke pipe or outlet pipe at all times, even during the night, so that in the morning, upon opening of the damper in the downflow air pipe, a quick response in the form of a draft of air through the stove will be had.

A more specific object of the present invention is to provide a hot water coil immediately beneath

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the smoke pipe or outlet stack so that the latent heat stored in water flowing through the hot water coil during the evening, for example, will be retained in the coil at night and will radiate heat internally of the stove in a manner so as to heat the column of air in the smoke pipe or outlet stack. Therefore, at the moment of opening of the damper in the downflow air pipe a draft of air will more quickly pass through the burning wood in the stove and increase the intensity of the fire so as to heat the stove more rapidly.

A further object of the present invention is to provide a wood burning stove of relatively constant temperature. This object is obtained inasmuch as the hot water coil unit by storing heat during very hot fires and dissipating such stored heat when the fire is low, has a temperature compensating effect and tends to maintain a more nearly constant stove temperature at all times.

Other objects and advantages will become apparent from a study of the following specification taken in conjunction with the accompanying drawings, in which:

Figure 1 is a side view of an automatic wood burning stove embodying the principles of the present invention and with parts of the wall cut away to more clearly illustrate the internal structure of the stove.

Fig. 2 is a fragmentary cross-sectional view taken along line 2—2 of Fig. 1; and

Fig. 3 is an enlarged perspective view of the draft controlling damper located within the top portion of the downflow air pipe, and the thermostat for controlling the damper located in a jacket surrounding the downflow air pipe.

Referring more particularly to Figure 1, numeral 1 denotes an airtight wood burning stove supported on legs 2 and having the conventional smoke flue or draft outlet pipe 3 and downflow air pipe 4. At the top of downflow air pipe 4 is a cap 5 having a plurality of holes 5^a which constitute the sole opening in the stove for admitting cold air. Within the top portion of the downflow air pipe 4 is mounted a damper 6 supported on rod or shaft 7, which rod is rotatably mounted in holes in the surrounding walls of the downflow air pipe. Within the space between downflow air pipe 4 and outer jacket 8 there is mounted a thermostat 9 of bi-metal and illus-

trated as being of spiral design, it being understood, however, that other designs of thermostats are equally suitable. One end of the bimetallic strip is connected to rod 7 and the other end to the lug 10 which, in turn, is connected to the outer part of rotatable arm 11, which arm is rigidly fixed to the shaft of knob 12. Knob 12 is mounted exteriorly of jacket 8. By suitably calibrating the portion of jacket 8 in the vicinity of knob 12 a visual indication of whether the shaft or damper has been turned to the high or low position is given. It will be apparent that as the knob is turned in one direction it will curl the bimetallic strip so as to make opening of the damper more difficult, that is require more heat to effect opening. If desired, suitable stops may be provided to positively force the damper to the closed or open position at the limits of rotation of knob 12.

Within the rear portion of the stove, that is immediately below the draft stack 3 there is provided a hot water unit or coil 13 of sinuous or other suitable shape through which is passed a continuous supply of hot water which may be connected to a hot water storage tank (not shown). The hot water coil or unit 13 may be fastened to the rear part of the stove by means of nuts 14 which may be screw-threadedly engaged to the coil portions extending through the rear wall portion of the stove.

In operation when the wood W on the bottom of the stove burns at a rapid rate so as to give out excessive heat much of this heat is stored in the hot water coil or unit 13 in the form of latent heat and in so doing tends to prevent excessive rise of the stove temperature. However, as the wood gradually burns away so as to give out only a small amount of heat the heat stored by the unit 13 is radiated interiorly of the stove so as to raise the otherwise low temperature it might have. Thus, the hot water coil 13 provides a temperature compensating effect to prevent abnormally high or abnormally low stove temperatures and, in this manner, tends to maintain a substantially constant stove temperature at all times.

A more important feature of the hot water coil 13 is that it will heat the column of air in the smoke pipe or outlet stack 3 at all times, even when the fire is low, such as occurs during the night when the damper in the downflow air pipe is closed. This continuously heated column of air in pipe 3 provides an important feature which greatly facilitates restarting of the fire in the wood at the moment of opening of the damper in the downflow air pipe. Thus, despite the retarding effect produced by the heated column of air in the downflow air pipe a draft or current of air will immediately pass through the pipe and stack at sufficiently high velocity to effect reburning of the wood at an increased rate thereby quickly increasing the intensity of the fire and the stove temperature. Stated differently, the warm air column in outlet pipe 3 makes the fire more quickly responsive to the opening of the draft regulating damper 6.

The temperature of the water in unit 13 is maintained at a relatively constant value, even during the night by virtue of the automatic draft controlling function of the thermostatically controlled damper. Its temperature is maintained constant in much the same manner as the stove so as to provide a useful source of hot water for household use throughout the day and night. A non-automatic wood burning stove normally goes

out at night making it impossible to keep hot water in the coil. The automatic features, of course, prevent the occurrence of steam pockets in the hot water unit 13 and excessive expansion and contraction of stove parts otherwise present in a non-automatic type of stove.

However, the outstanding function of hot water coil 13 is that it provides not only a compensating effect, tending to keep the stove temperature more nearly constant at all times, but provides a continuously heated column of air in the smoke or outlet pipe 3 so that immediately upon opening of the damper in the downflow air pipe the fire will quickly increase in intensity due to the relatively high velocity draft of air passing thereby as a consequence of such heated column. It should be noted that wood is normally stacked very closely to the downflow air pipe in a wood burning stove to obtain best results, and that as a consequence, during low fires, the column of air in the downflow air pipe is heated whereas that in the smokestack is not heated. Thus, overcompensation results and there is little tendency to provide the required draft of air when the damper in the downflow air pipe is opened. However, due to the important function of the water coil in continuously maintaining a warm column of air in the outlet stack, even at night, this difficulty is overcome.

Thus, it will be seen that by the present invention there is provided an efficient, economical and fully automatic wood burning stove which more nearly maintains constant stove temperature at all times and which is particularly advantageous in conditioning the stove during the night or at other times when the fire is low so as to insure quick restarting of the fire upon re-opening of the damper.

While a single embodiment of the invention is illustrated for purpose of illustration it will be apparent that other forms will be suggested to those skilled in the art after having had the benefit of the teachings of the present specification and within the purview of the invention, for which reason the invention should be restricted only insofar as set forth in the following claims.

I claim:

1. In combination with an airtight wood burning stove having a downflow air pipe emerging from one side of the lower portion of said stove, a smoke flue emerging from an opposite side of said stove, a pivotally mounted damper in the upper end of said pipe and a thermostat exteriorly of said pipe for controlling said damper, a hot water coil unit in said stove positioned beneath and immediately adjacent the entrance opening of said smoke flue for continuously maintaining a heated column of air in said flue.

2. A wood burning stove having a smokestack emerging from one side of the top thereof and a downflow air pipe emerging from the other side of the lower portion thereof and extending vertically in substantially parallel relationship with the stove, apertures provided at the top of the downflow air pipe and comprising the sole openings permitting entry of cold air into the stove, a damper pivotally mounted in the upper portion of said downflow air pipe, a jacket surrounding said upper portion, a thermostat inserted in said jacket so as to be responsive primarily to stove rather than room temperature, and adapted to control said damper, and a hot water coil unit having its terminals extending through the rear portion of the stove and screw-threadedly secured thereto, said coil unit being disposed be-

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neath and immediately adjacent the entrance opening of said smoke stack for continuously providing a heated air column in said smoke-stack at all times so as to insure quick creation of a draft through the stove upon opening of said damper and to overcome the draft checking, overcompensating tendency of the heated air column in the downflow air pipe during periods of low fire.

GEORGE W. HARDING. 10

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