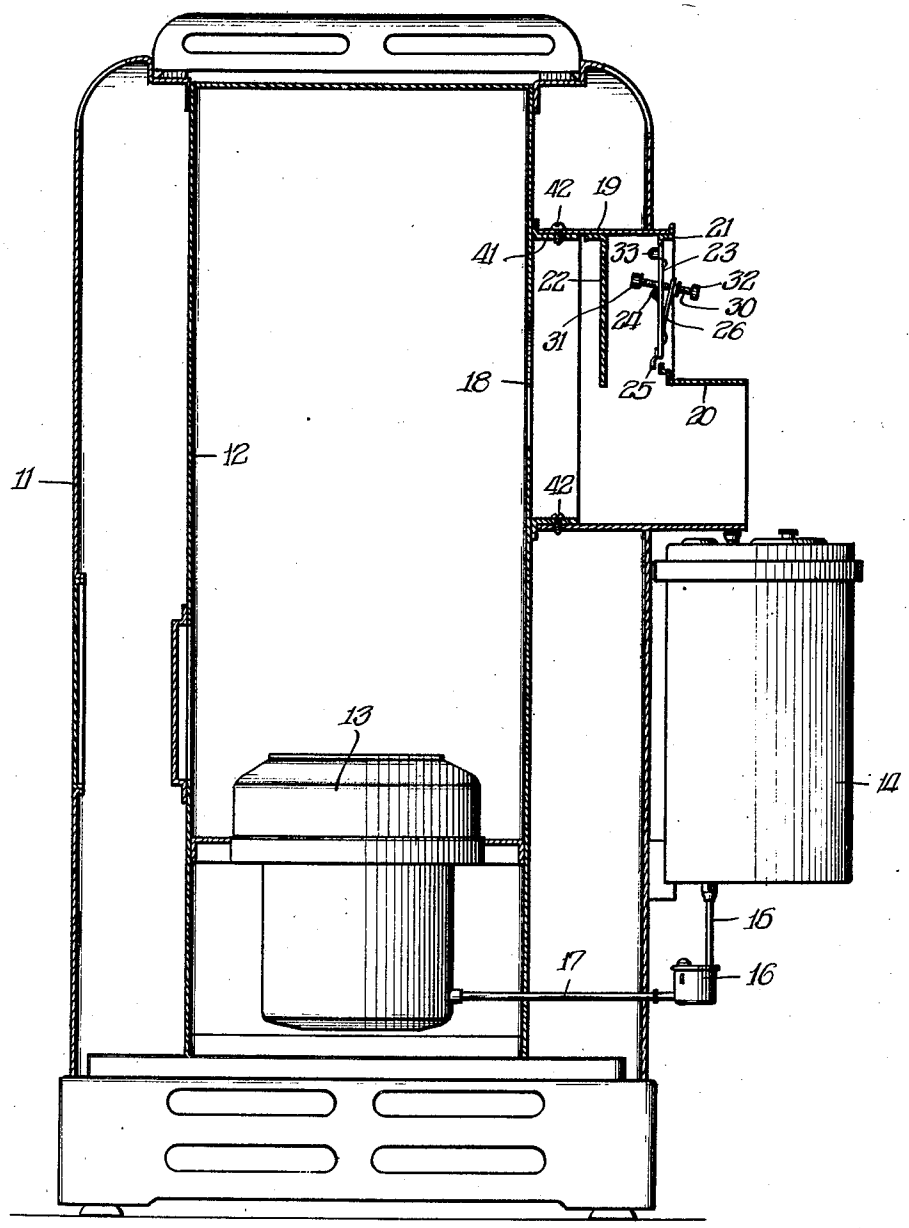
June 9, 1942. R. C. SABINS 2,285,746

CONSTRUCTION FOR STOVES

Original Filed Feb. 15, 1939 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2

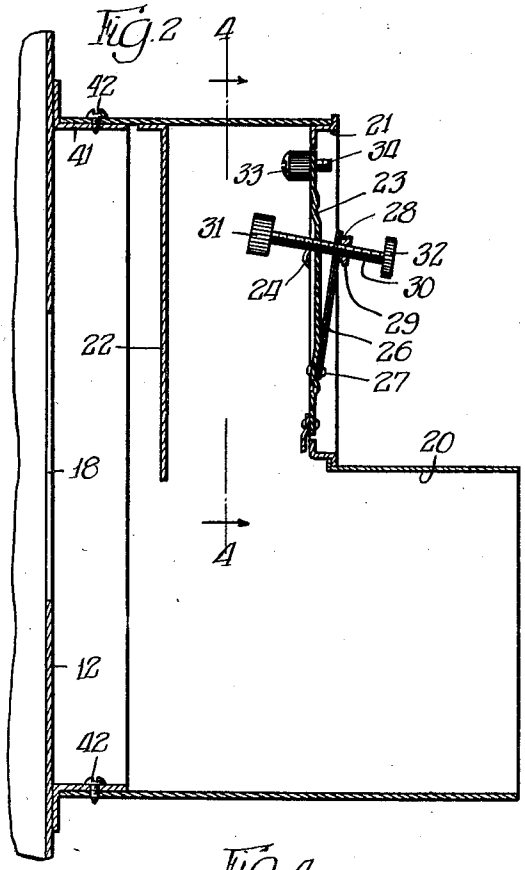


Fig. 3

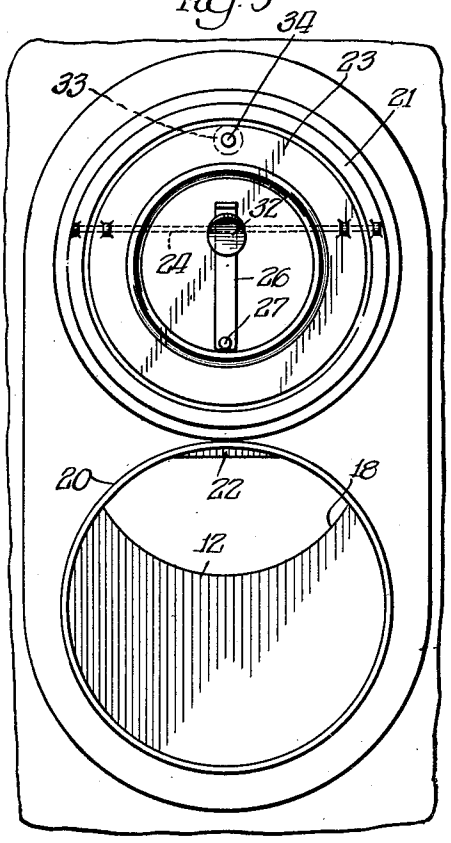
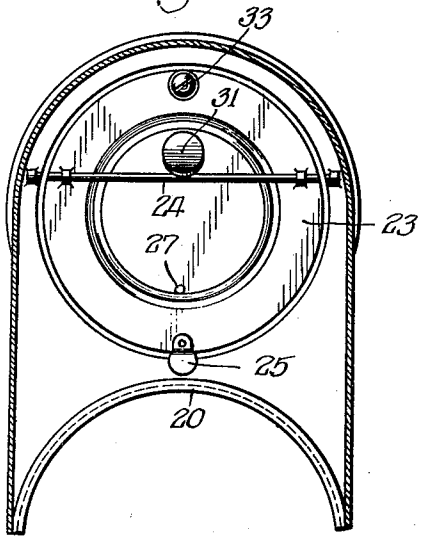


Fig. 4



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UNITED STATES PATENT OFFICE

2,285,746

CONSTRUCTION FOR STOVES

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Original application February 15, 1939, Serial No. 256,448. Divided and this application April 1, 1940, Serial No. 327,163

4 Claims. (Cl. 126—58)

This invention relates to a new and improved draft control construction for stoves and more particularly to the location and design of a control damper and of the walls and passage adjacent the damper. While my invention is especially adapted for use in connection with space heating stoves of the oil fired type, it may be used in connection with other types of stoves or furnaces.

My invention is directed to the type of draft control which includes a pivoted damper located in the wall of a passage or chamber connecting the stove and stack and carrying off the products of combustion. In oil fired stoves the amount of fuel burned, and consequently the heat generated, is controlled by means of a valve which regulates the flow of fuel to the burner. Such burners have heretofore been equipped with a draft control damper located in the wall of the flue or stack and in some cases these dampers are provided with manually adjustable means for varying the draft. With heaters of this character a single adjustment of the damper is not effective since the draft requirements change with different positions of the fuel regulating valve. With greater fuel flow and greater generation of heat, a greater draft is required in order to maintain proper combustion and to carry off the increased volume of the products of combustion than is required with smaller fuel flow and a low flame. The proper draft for a high flame is too great for efficient combustion with the smaller flame.

This application is a division of my copending application Serial No. 256,448, filed February 15, 1939.

It is an object of the present invention to provide a new and improved draft control construction.

It is an additional object to provide apparatus of this character which is automatic in operation to provide the draft required by the combustion in the heater or stove.

It is a further object to provide apparatus of this character comprising a damper shielded from the direct flow of gases and capable of effective draft control by relatively small movements.

It is an additional object to provide apparatus comprising a balanced damper with a manually adjustable weight provided with additional automatic thermostatic adjustment.

It is also an object to provide a draft control construction in which the outgoing products of combustion from the stove are deflected downwardly below the variable draft intake opening.

It is a further object to provide apparatus which may be located directly at the stove or heater and attached thereto.

Other and further objects will appear as the description proceeds.

I have shown certain preferred embodiments of my invention in the accompanying drawings, in which—

Figure 1 is a vertical elevation of a liquid fuel stove with my improved draft control applied thereto;

Figure 2 is a fragmentary vertical section through the draft control on an enlarged scale;

Figure 3 is a view of the construction of Figure 2 as seen from the right; and

Figure 4 is a fragmentary section taken on line 4—4 of Figure 2.

Referring first to Figure 1, the stove construction comprises an outer housing 11 and a combustion chamber or drum 12 in which is located the firepot 13. The liquid fuel is contained in a tank 14 from which the liquid passes through pipe 15 to the adjustable control valve 16. The pipe 17 connects the valve 16 and the pot burner 13. Details of the stove construction itself form no part of the present invention and need not be further described herein.

The products of combustion rising from the pot burner 13 through the combustion chamber or drum 12 pass from the chamber 12 through the opening 18 formed in the rear wall of the combustion chamber. The rear wall of the combustion chamber is provided with the collar 41 secured thereto by welding or by other suitable means. The draft housing 19 fits over the collar 41 and may be secured against accidental displacement by the screws 42 threaded into the metal. The discharge passage 20 leads from the lower portion of the control chamber 19 from the side opposite to the opening 18. It will be noted, however, that the passage 20 is not in alignment with the opening 18 but is offset in the downward direction a distance equal to approximately one-half the diameter of the opening. The damper supporting member 21 is fitted into the control housing above the discharge passage 20. The lower edge of the damper extends to a point closely adjacent the discharge opening 20, being located above that opening.

The deflecting wall 22 is located in the control housing and extends in front of the damper 23. It will be noted that the deflecting wall 22 extends down opposite approximately the upper half of the discharge opening 18.

The damper construction is shown in detail in Figures 2, 3 and 4. The supporting member 21

is preferably circular in shape and provides a circular opening for the damper **23**. The damper **23** is supported upon a transverse pivoted member **24**, the ends of which are secured to the member **21**. This pivot is located preferably somewhat above the center of the damper, so that the normal tendency of the weight of the damper itself is to maintain the damper in vertical position closing the opening. The lower edges of the damper is provided with a stop lug **25** adapted to engage the member **21** to prevent the lower edge of the damper from swinging outwardly beyond the vertical.

The bi-metallic strip **26** is secured to the outer face of the damper by means of rivet **27**, and the upper end of the strip has a threaded opening receiving the threaded rod **30**. This rod **30** carries the lock nut **28** provided with the enlarged portion **29** by means of which it may be manually rotated to lock the rod **30** in adjusted position in the strip **26**. This rod **30** is provided upon its inner end with the weight **31**. The outer end of the rod **30** carries the adjusting knob **32** by means of which the rod may be rotated to screw it inwardly or outwardly, thus adjusting the effective lever arm of the weight **31**. A fixed weight **33** is secured to the damper **23** adjacent its upper edge by means of the screw **34**.

The adjustment of the automatic control will depend somewhat upon local conditions, as the natural draft will vary with the barometric pressure and consequently with the altitude of the point where the stove is used. It will also vary with the character and length of the piping and chimney connected to the stove. It will be understood that with the pot type of fluid burner, such as shown in the drawings, the valve **16** will have a number of predetermined adjustments which control the amount of oil flowing into the burner and consequently the amount of oil burned in a given time. The weight **31** is adjusted relative to the damper by turning the knob **32** until with a given valve setting the damper is adjusted to give the desired draft in the stove. Thereafter the bi-metallic strip **26** will automatically take care of the draft when different adjustments are made of the control valve **16**.

This bi-metallic strip **26** is of such a character that when the strip becomes heated it tends to curve to the left, as shown in Figure 2, and move in toward the face of the damper **23**. This movement carries the weight **31** to the left and increases its lever arm in acting upon the damper **23**. This increase in leverage causes the damper to swing toward the closed position. With the damper closed or more nearly closed, the amount of air coming in through the opening is decreased and consequently the effective draft upon the stove itself is increased. This effective draft is necessary to take care of the increased combustion in the stove.

The device operates in the opposite direction when the valve **16** is adjusted to cut down the flow of oil to the burner, and consequently to cut down the flame. As the strip **26** cools it swings to the right, moving the weight **31** to the right and tending to swing the damper **23** in the direction to open the damper and permit a greater influx of air at this point. This cuts down the effective draft upon the stove and the lower flame in the stove burns properly. Thus the bimetallic member serves to increase or reduce the draft in proportion to the heat applied thereto, which heat is in proportion to the draft demands of the stove.

The secondary or counter-adjusting weight **33** serves a dual purpose in combination with the automatically variable adjustable weight **31**. The primary purpose of this weight **33** is to balance the damper vane when the weight **31** is in a position toward the right, as seen in Figure 2. As the heat in the stove increases and the bi-metallic strip **26** moves to the left swinging the weight **31** to the left and increasing its leverage upon the damper **23**, the fixed weight **33**, since it is in a fixed position, tends to shorten the travel of the weight **31** necessary to accomplish the desired adjustment. The weight **33** is applied on the inside of the damper vane **23** and above the pivot. Its effect in swinging the vane increases as the vane leaves the vertical position. This fixed weight has the reverse effect when the automatically movable weight moves in the opposite direction and again aids in causing the effective movement of the damper to take place with a minimum travel of the weight **31**.

The baffle or deflecting wall **22** is important in that it prevents flue gases and smoke from rising up and sweeping across the face of the draft vane or damper **23**. Such gases or smoke would tend to deposit carbon and change the draft adjustment. The wall **22** also serves to direct the flue gases downwardly toward the passage **20** and causes them to move past the lower edge of the damper opening rather than across the face of the opening. The wall **22** also has a further practical effect of preventing light from the combustion chamber being reflected through the damper opening upon the wall back of the stove, which is usually considered undesirable.

With the movable damper vane located in the manner shown, a considerable by-pass of room atmosphere into the flue **20** is accomplished by a very small movement of the damper, which affords very close draft regulation. The air passes directly under and past the lower edge of the damper into the flow of gases through the passage **20**. With dampers located in the conventional manner parallel to the passage, a considerable movement of the damper is required to afford any substantial opening for the flow of air inwardly past the damper. A further advantage of the present location of parts, including that of the damper and of the deflecting wall **22**, is that the heated products of combustion coming out from the stove must pass down to a level below the center of the stove outlet opening **18**. This downward flow of the gases at this point causes some resistance to the gas flow and gives a favorable pressure differential to the flow of air through the damper controlled opening. This again aids in affording very close draft regulation, as any sudden increase in draft is applied more directly to the draft vane than to the gases coming through the flue opening. If the damper opening and draft opening **18** were in line with each other, any sudden change in draft would be applied more directly to the firebox than to the damper. Consequently the construction minimizes sudden fluctuations and affords a more stable and efficient control of draft.

The use of the improved damper control has been discussed in connection with an oil burning stove for space heating. With such a stove the control of the amount of flame is afforded by the valve which limits the flow of fuel to the heater burner. Consequently the draft control is a secondary control and it is desired to

have it operate in accordance with the temperature in the heater to increase draft with increased temperature or with increased combustion so as to supply adequate draft for the combustion.

The damper and control construction may be applied to other types of stoves or heaters burning other fuel, such as coal or wood. In the case of such stoves there is no control of combustion by controlling the admission of fuel to the stove. Consequently in such cases the damper must act as the primary control. This means that the damper will ordinarily have the reverse adjustment from that just described in connection with the oil burning pot burner type of stove. In other words, it will be desirable with coal or wood stoves to reduce the draft as the heat grows great so as to prevent excessive heat and prevent the fuel from burning up too rapidly. On the other hand, when the fire gets low it may be desirable to have the draft automatically increase so as to keep up the proper combustion. Therefore, in some applications it may be desirable to reverse the damper control construction and have the bi-metallic strip **26** turned in the opposite direction so as to increase draft as it gets cold, rather than when it gets hot. It will be noted that the bi-metallic strip is located externally of the control chamber. This makes the strip in part responsive to surrounding atmosphere, but more particularly it has the effect of making the strip less responsive to sudden fluctuations in temperature. It also prevents corrosion of the strip due to contact with flue gases.

While I have shown certain preferred embodiments of my invention, these are to be understood to be illustrative only as the apparatus may be varied to meet differing conditions and requirements and I contemplate such modifications as come within the spirit and scope of the appended claims.

I claim:

1. In a stove construction, a combustion chamber, a wall of the chamber having an opening therein for the discharge of products of combustion, a control chamber communicating with the combustion chamber through the opening, a discharge passage leading from the wall of the control chamber opposite to the opening and offset downwardly relative to the opening, and a damper-controlled opening in the control chamber wall opposite to the opening to the combustion chamber and offset vertically above said combustion chamber opening.

2. In a stove construction, a combustion chamber, a wall of the chamber having an opening therein for the discharge of products of combustion, a control chamber communicating with the combustion chamber through the opening, a discharge passage leading from the wall of the control chamber opposite to the opening and offset downwardly relative to the opening, a damper-controlled opening in the control chamber wall opposite to the opening to the combustion chamber and offset vertically above said combustion chamber opening, and a deflecting wall in the control chamber between the combustion chamber opening and the damper-controlled opening, said deflecting wall being spaced from both said openings.

3. In a stove construction, a combustion chamber, a wall of the chamber having an opening therein for the discharge of products of combustion, a control chamber communicating with the combustion chamber through the opening, a discharge passage leading from the wall of the control chamber opposite to the opening and offset relative to the opening, and a damper-controlled opening in the control chamber wall opposite to the opening to the combustion chamber and offset relatively thereto, the damper being a pivotally supported swinging damper, the discharge passage and damper opening being closely adjacent each other and each being opposite a substantial portion of the combustion chamber opening.

4. In a stove construction, a combustion chamber, a wall of the chamber having an opening therein for the discharge of products of combustion, a control chamber communicating with the combustion chamber through the opening, a discharge passage leading from the opposite side of the control chamber and offset relative to the opening, a damper-controlled opening in the control chamber wall opposite to the opening to the combustion chamber and offset relative thereto, the damper being a pivotally supported swinging damper, the discharge passage and damper opening being closely adjacent each other and each being opposite a substantial portion of the combustion chamber opening, and a deflecting wall in the control chamber between the damper controlled opening and that part of the combustion chamber opening opposite the damper opening.

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