D. F. MORTON.

COMBUSTION CONTROLLING DEVICE FOR FURNACES OR THE LIKE.

APPLICATION FILED JUNE 26, 1918.

1,402,083. Patented Jan. 3, 1922.

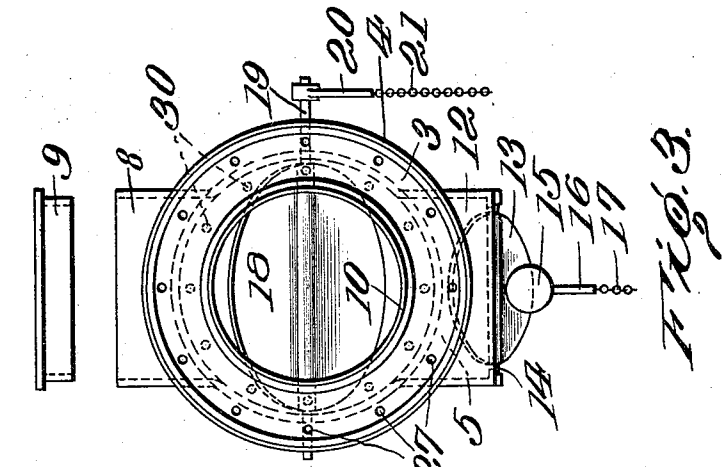


Fig. 3.

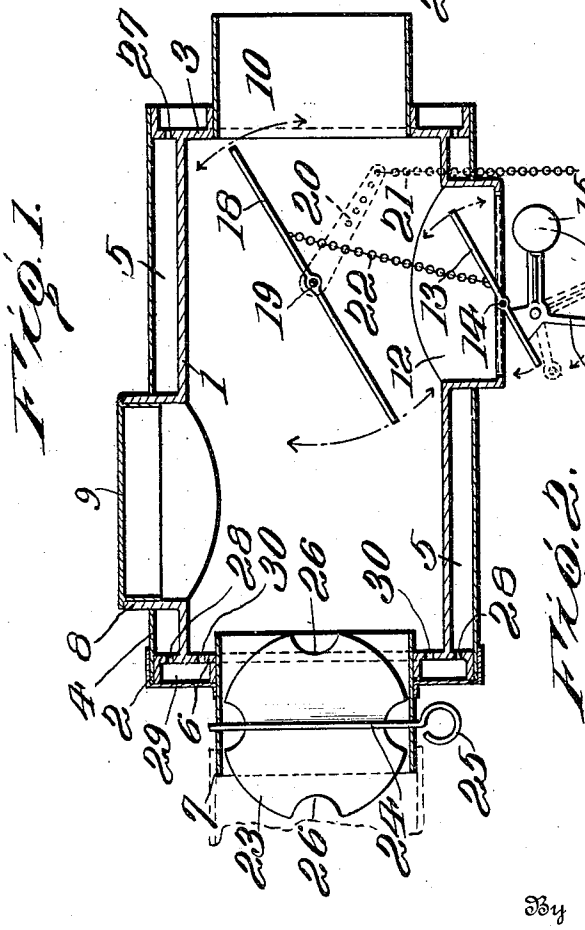


Fig. 1.

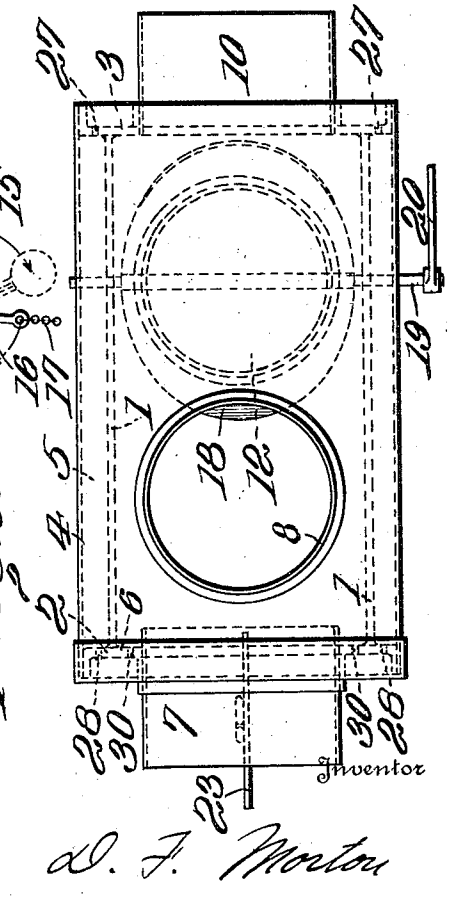


Fig. 2.

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COMBUSTION-CONTROLLING DEVICE FOR FURNACES OR THE LIKE.

1,402,083. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed June 26, 1918. Serial No. 242,033.

To all whom it may concern:

Be it known that I, DAVID F. MORTON, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Mass., have invented certain new and useful Improvements in Combustion-Controlling Devices for Furnaces or the like, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

The invention relates to new and useful improvements in combustion controlling devices for furnaces, water heaters, stoves, ranges or the like and more particularly to devices for controlling the flow of the flue gases to the chimney and the flow of air to the point of combustion.

An object of the invention is to provide a pipe section adapted for attachment to the smoke collar of a furnace, heater, stove, range or the like, which pipe section is provided with devices for controlling the flow of the flue gases through the pipe section and devices for admitting cold air through the pipe section to check the flow of the flue gases and means for admitting hot air through the pipe section in such a manner that it may flow in a direction opposed to the direction of flow of the flue gases and thus pass to the point of combustion.

A further object of the invention is to provide a pipe section of the above character which is so constructed that it may be attached in a vertical line of pipe leading to the chimney or in a horizontal line of pipe leading to the chimney.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show by way of illustration one embodiment of the invention;

Figure 1 is a longitudinal sectional view through the pipe section showing the device arranged for horizontal connection;

Fig. 2 is a top plan view of the same, and

Fig. 3 is a view from the chimney end of the device.

In carrying out the invention I provide a pipe section which is formed with a jacket or casing spaced therefrom so as to provide an air chamber through which air may pass along the heated pipe section and thus become heated, said pipe section having intake ports for the heated air, which are so disposed that the heated fresh air may seek or find the path of least resistance and pass in a direction opposed to the direction of travel of the hot flue gases. The pipe section is preferably provided with a hand damper which is so constructed as to permit a restricted or limited circulation of air or gases in either direction, even though the damper is fully closed. It is also provided with an automatic damper which serves to regulate the flow of the flue gases through the pipe section. It is further provided with an automatic cold air check so that if the draft is greatly increased by temporary disturbances of the draft, said damper will prevent the fire from racing in the furnace. This pipe section containing all the parts above specified is so constructed that it can be used as a straight run section of smoke pipe or elbow section of smoke pipe as the circumstances require.

Referring more in detail to the drawings, I have shown my improvements as embodied in a single enlarged section of smoke pipe 1, which at its ends has laterally extending portions 2 and 3 respectively and these portions carry a casing or jacket indicated at 4. Between the casing or jacket 4 and the main section 1 of the pipe, there is an annular chamber 5. The section 1 of the pipe at the end thereof nearest the furnace or stove, has an inwardly projecting flange 6 which is formed with an opening adapted to receive a short section of smoke pipe 7 for making connection to the smoke collar of the furnace, heater or the like. This connection is used when the main section 1 is used as a straight line section of smoke pipe between the furnace and the chimney. In the side wall of the main pipe section 1, there is an opening about which a flange 8 extends. This opening is closed by a cover 9 when the pipe section 7 is attached to the end of the main pipe section. When the main pipe section is arranged horizontally as in Fig. 1, the short section of smoke pipe 7 is inserted in the opening at the end of the section as shown in the figure, and the cover 9 shown in Fig. 3 is inserted in the opening formed by the flange 8. On the other hand when the main pipe section 1 is used as an elbow section and is arranged vertically, then the short section of smoke pipe 7 is inserted in the opening surrounded by the flange 8 and the cover 9 is inserted in the opening in the

end of the pipe section. At the other end of the pipe section 1 there is a short pipe section 10 which is connected to the pipe leading to the chimney. The main section 1 of the pipe has an inwardly projecting flange formed with an opening which receives this pipe section 10. It will be noted that the cross sectional area of the pipe section 1 is considerably larger than the cross sectional area of the smoke pipe sections 7 and 10. As a result the velocity of the flow of flue gases from the furnace or stove through the section 7 into the main section 1 and then out through the section 10 is materially reduced through the section 1, owing to this increased area. In the side wall of the section 1 is an opening 12 which is adapted to be closed by an automatic check damper or draft breaker 13. This draft breaker is pivoted at 14, which is a point off the central axis of the damper. The damper is counterbalanced by a weight 15. This weight is positioned so that the damper will just close when unhindered by the operating means therefor. Should the operation of a vacuum cleaner discharging its sweeping into the chimney or should the outside winds blowing over the top of the chimney, cause the draft to be materially increased, the draft breaker when properly balanced will open and prevent the fire from racing in the furnace. This operation is due to there being unequal forces because of the unequal pressures on the unequal areas on either side of the axis on which the draft breaker is pivoted. The damper or draft breaker 13 is provided with an arm 16 to which is attached a chain 17 which may be utilized for operating the cold air check or draft breaker by external means. Mounted in the main section 1 of the pipe is a damper 18 which is supported by a pivot shaft 19. Attached to this shaft is a lever or arm 20 to which is connected a chain not shown whereby said damper may be operated by external means. The damper 18 is connected by a chain 22 with the draft breaker 13. This chain is so arranged that when the draft breaker opens automatically through an abnormal increase in the draft, the damper 18 will not be operated but when the damper 18 is turned to check the flow of the flue gases, the damper 13 will be automatically opened to permit cold air to pass directly to the chimney, thus checking the draft.

In the pipe section 7 there is a hand damper 23 which is mounted on a shaft 24 having a handle 25 for turning the same. This damper 23 is formed with cut away portions or scallops 26 which are so disposed in the damper as to permit a limited or restricted circulation of air and gases in either direction while the damper is fully closed. The flange 3 of the pipe section 1 is formed with intake openings 27 through which air passes to the annular chamber 5. The air in the chamber 5 passes along the same coming in direct contact with the outer surface of the pipe section 1, which is heated by the outgoing flue gases. The air which is heated as it passes along the chamber 5, passes through the ports 28 into the chamber 29 and thence through ports 30 into the main chamber of the pipe section 1. The air in the mean time has been heated to a high temperature as it has passed along the hot metal plate forming the wall of the main section 1. In this manner the heat of these gases which would otherwise be wasted is utilized. The heated air passing into the chamber of the main section 1, travels around back of the smoke pipe 7 (where there is no motion to the flue gases) until it finds the place of least resistance or opposition to its travel and here the air turns and continues its course into the furnace or stove. It is well understood that a current of flue gas and a current of air will flow in opposite directions through a hot smoke pipe. Near the smoke collar or source of heat, the hot gases flow through the smoke pipe toward the chimney at the top side of the horizontal line of pipe and the side nearest the heater in a vertical line of pipe, and a limited amount of air taken into the pipe will pass in the opposite direction. The air coming in contact with the flue gases will be heated and as it proceeds toward the point of combustion in the furnace it comes in contact with still hotter gases and reaches the point of combustion in a very heated condition where it enters into and supports the combustion. The flow of the air to the point of combustion is further aided by the affinity of heated carbonmonoxid for oxygen.

From the above it will be apparent that I have provided a very compact arrangement of dampers and air controlling devices, which may be readily and quickly applied to a furnace either as a straight line of pipe or as an elbow section and when installed the flow of the flue gases will be automatically controlled by the dampers and by the automatic draft breaker; the flow of the flue gases may also be controlled by manually operated means. I have also provided a convenient method of introducing fresh air which is heated as it passes into the pipe section and is thence led to the point of combustion, very much aiding and increasing the efficiency of the combustion.

It is obvious that minor changes in the details of construction and the arrangement of parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A main pipe section having means at

its end and at its side for interchangeable connection with the smoke collar of a furnace, means for heating and admitting air to the pipe section whereby it may pass through the smoke collar to the combustion chamber, a hand damper associated with said pipe section and an automatic draft breaker connected with said pipe section.

2. The combination of a main pipe section having means for interchangeable connection with the smoke collar of a furnace whereby said pipe may be used as a horizontal section or elbow section, flanges at the ends of said main pipe section, said flanges having openings for receiving sections which are smaller in cross sectional area than the main pipe section, dampers associated with said section and means for admitting air to the pipe section at a point adjacent the attachment to the smoke collar.

3. The combination of a main pipe section having means for interchangeable connection with the smoke collar of a furnace whereby said pipe may be used as a horizontal section or elbow section, flanges at the ends of said main pipe section, said flanges having openings for receiving pipe sections which are smaller in cross sectional area than the main pipe section, dampers associated with said section, said main pipe section having outwardly projecting flanges, a casing or jacket connected thereto and forming an annular chamber, said flanges having ports formed therein whereby air may be admitted to said annular chamber at a point remote from the attachment to the smoke collar, pass along said chamber and enter the main pipe at a point adjacent the smoke collar.

In testimony whereof, I affix my signature in the presence of two witnesses.

DAVID FLOURNOY MORTON.

Witnesses:
ALFRED H. TAYLOR, Jr.,
CLARENCE N. COLLINS.