March 24, 1925. 1,530,809

O. S. BOWMAN

HEAT RECOVERING AIR CONTROL DEVICE FOR FURNACES

Filed Nov. 7, 1922

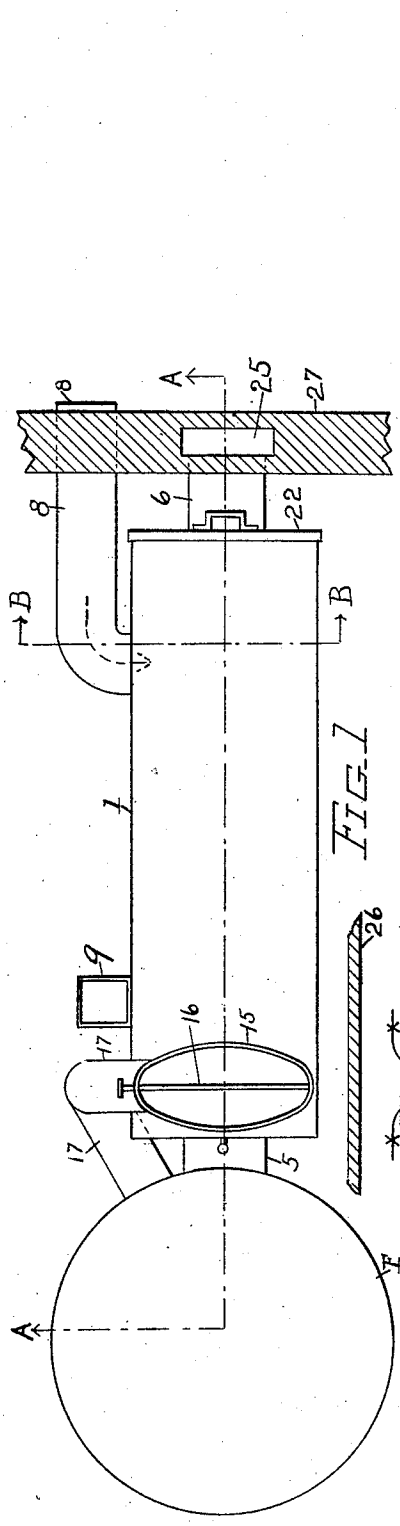


FIG. 1

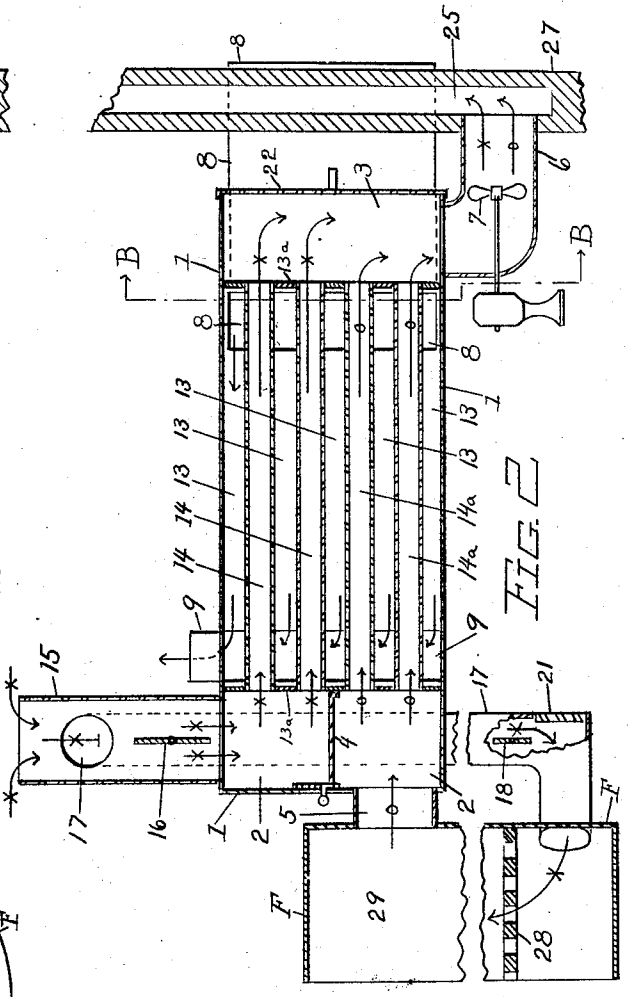


FIG. 2

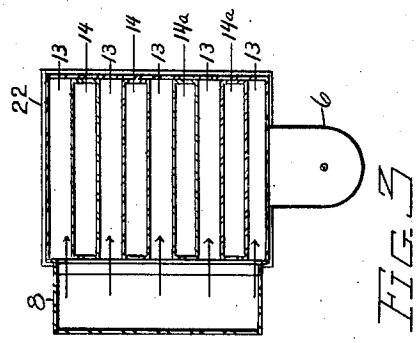


FIG. 3

INVENTOR
Oliver S Bowman
By Fred E Mefford
Attorney

Patented Mar. 24, 1925. 1,530,809

UNITED STATES PATENT OFFICE.

OLIVER S. BOWMAN, OF COLORADO SPRINGS, COLORADO.

HEAT-RECOVERING AIR-CONTROL DEVICE FOR FURNACES.

Application filed November 7, 1922. Serial No. 599,538.

To all whom it may concern:

Be it known that I, OLIVER S. BOWMAN, a citizen of the United States, and a resident of Colorado Springs, in the county of El Paso and State of Colorado, have invented a new and useful Heat-Recovering Air-Control Device for Furnaces, of which the following is a specification.

My invention relates to heat recovering air control devices for furnaces, and has for its object the provision of a device of this class which will control the air movements incident to ventilation so that a part of the foul air from near the ceiling will be used to maintain combustion, and heat will be recovered from the remainder of the foul air and from the smoke. Other objects will appear as the description progresses.

Figure 1, is a plan view of the invention; Fig. 2, a vertical longitudinal section on the line A—A in Fig. 1, and Fig. 3, a vertical transverse section on the lines B—B in Figs. 1 and 2.

I do not confine myself to the precise form as herein shown, but it is understood that various changes in the details of construction may be made within the scope of the claims.

The reference character 1 denotes a casing, having chambers 2 and 3 therein, 4, a vertically movable partition dividing chamber 2 into an upper and a lower compartment; 5, a smoke conduit in open communication with the smoke chamber of a furnace F and with the lower compartment of chamber 2; 6, an exhaust conduit, having a fan 7 therein, in open communication with chamber 3; 8, a fresh air conduit connected to one side of casing 1; 9, a pipe connected to the opposite side of casing 1; 13, a plurality of channels, having end walls 13^a, in open communication with fresh air conduit 8 and pipe 9; 14, and 14^a, a plurality of channels in open communication with chambers 2 and 3; 15, a foul air conduit, having a damper 16 therein, in open communication with the upper compartment of chamber 2; and 17, a draft conduit, having dampers 18 and 21 therein, in open communication with the combustion chamber of a furnace F and with foul air conduit 15.

Foul air from near the ceiling 26 (indicated by X-arrows) is drawn downward through pipe 15, a part of which passes into and downward through conduit 17 into furnace F beneath grate 28, thence into combustion chamber 29. The smoke (indicated by O-arrows) passes through conduit 5 into the lower compartment of chamber 2, thence through channels 14^a into chamber 3, through conduit 6, and out through chimney flue 25. The remainder of said foul air passes from pipe 15 into the upper compartment of chamber 2, thence through channels 14 into chamber 3, and through conduit 6, into chimney flue 25. Fan 7 provides an induced draft.

Fresh air enters via conduit 8, (extending through wall 27) passes through channels 13 into pipe 9, and from thence directly into the room. The incoming cool air, flowing through channels 13, absorbs heat from the outgoing warm foul air and from the hot gases of combustion, flowing through channels 14 and 14^a, respectively.

All the foul air may be diverted through the upper compartment of chamber 2, by closing damper 18, or through draft conduit 17, by closing damper 16. The number of channels for the passage of foul air may be decreased and the number for the passage of the gases of combustion increased, by raising partition 4.

When my invention is used with a furnace, the usual draft openings are closed and the air for the maintenance of combustion may either be drawn from near the ceiling 26, as described, or admitted directly through conduit 17, by closing damper 18 and opening damper 21.

Access may be had to channels 14 and 14^a by removing cap 22.

I claim:

1. In a device of the class described including in combination, a casing, having a chamber in each end thereof; a fresh air intake conduit connected to said casing; a pipe connected to said housing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remainder with said chambers, and a foul air conduit in open communication with said casing; for the purposes set forth.

2. In a device of the class described, including in combination, a casing, having a chamber in each end thereof; a fresh air intake conduit connected to said casing; a plurality of rectangular channels disposed within said casing, each alternate channel in open communication with said fresh air

intake conduit and said pipe, and the remaining channels in open communication with said chambers; a foul air conduit in open communication with one of said chambers, and a draft conduit in open communication with said foul air conduit and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

3. In a device of the class described, including in combination, a casing, having a chamber in each end thereof; a movable partition, dividing one of said chambers into two compartments; a fresh air intake conduit connected to said casing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe and the remaining channels in open communication with said chambers; a foul air conduit in open communication with said casing, and a draft conduit in open communication with said foul air conduit and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

4. In a device of the class described, including in combination, a casing, having a chamber at each end thereof; a movable partition in one of said chambers, dividing it into two compartments; a fresh air intake conduit connected to said casing; a pipe connected to said casing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers; a foul air conduit in open communication with one compartment of said divided chamber, and a draft conduit in communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

5. In a device of the class described, including in combination, a casing, having a chamber at each end thereof; a foul air conduit in open communication with one of said chambers; an exhaust conduit in open communication with the other chamber; a fresh air intake conduit connected to said casing; a pipe connected to said housing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers, and a draft conduit in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

6. In a device of the class described, including in combination, a casing, having a chamber at each end thereof, one of which is divided; a foul air conduit in open communication with one compartment of said divided chamber; an exhaust conduit in open communication with the other chamber; a fresh air intake conduit connected to said casing; a pipe connected to said casing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers, and a draft conduit in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

7. In a device of the class described, including in combination, a casing, having a chamber in each end thereof, one of which is divided; a fresh air intake conduit connected to said casing; a pipe connected to said casing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers; a foul air conduit in open communication with one compartment of said divided chamber, and a draft conduit in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

8. In a device of the class described, including in combination, a casing, having a chamber in each end thereof; a fresh air intake conduit connected to said casing; a pipe connected to said casing; a plurality of channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers; and an exhaust conduit in communication with one of said chambers; a foul air conduit in communication with the other chamber, and a draft conduit in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

9. In a device of the class described, including in combination; a casing, having a chamber at each end thereof; a movable partition, dividing one of said chambers into two compartments; a fresh air intake conduit connected to said housing; a pipe connected to said housing; a plurality of rectangular channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers; a foul air conduit, having a damper therein, in open communication with one

compartment of said divided chamber, and a draft conduit, having a damper therein, in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

10. In a device of the class described, including in combination, a casing, having a chamber at each end thereof; a fresh air intake conduit connected to said casing; a pipe connected to said casing; a plurality of rectangular channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers; a foul air conduit, having a damper therein, in open communication with one of said chambers; and a draft conduit, having a damper therein, in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; for the purposes set forth.

11. In a device of the class described, including in combination, a casing, having a chamber in each end thereof; a movable partition within one of said chambers dividing it into two compartments; a foul air conduit, having a damper therein, in open communication with one compartment of said divided chamber; a draft circuit, having a damper therein, in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; an exhaust conduit, having a fan therein, in open communication with the other chamber in said housing; a fresh air conduit connected to said casing; a pipe connected to said casing; a plurality of rectangular channels disposed within said housing, each alternate channel in open communication with said fresh air conduit and said pipe, and the remaining channels in open communication with said chambers; for the purposes set forth.

12. In a device of the class described, including in combination, a casing having a chamber in each end thereof; a foul air conduit, having a damper therein, in open communication with one of said chambers; a draft conduit, having a damper therein, in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; an exhaust conduit, having a fan therein, in open communication with the other chamber in said casing; a fresh air intake conduit connected to said casing; a pipe connected to said casing, and a plurality of rectangular channels disposed within said housing, each alternate channel in open communication with said fresh air conduit and said pipe, and the remaining channels in open communication with said chambers; for the purposes set forth.

13. In a device of the class described, including in combination, a casing, having a chamber in each end thereof, one of which is divided; a foul air conduit, having a damper therein, in open communication with one compartment of said divided chamber; a draft conduit, having a damper therein, in open communication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; a fresh air intake conduit connected to said casing; a pipe connected to said casing; and a plurality of rectangular channels disposed within said casing, each alternate channel in open communication with said fresh air intake conduit and said pipe, and the remaining channels in open communication with said chambers; for the purposes set forth.

14. In a device of the class described, including in combination, a casing having a removable cap on one end thereof and a chamber in each end thereof, one of which is divided; a foul air conduit, having a damper therein, in open communication with one compartment of said divided chamber; a draft conduit, having a damper therein, in open comunication with said foul air conduit, and adapted to communicate with the combustion chamber of a furnace; an exhaust conduit, having a fan therein, in open communication with the other chamber in said casing; a fresh air conduit connected to said housing; a pipe connected to said casing, and a plurality of rectangular channels disposed within said casing, each alternate channel in open communication with said fresh air conduit and said pipe, and the remaining channels in open communication with said chambers; for the purposes set forth.

OLIVER S. BOWMAN.