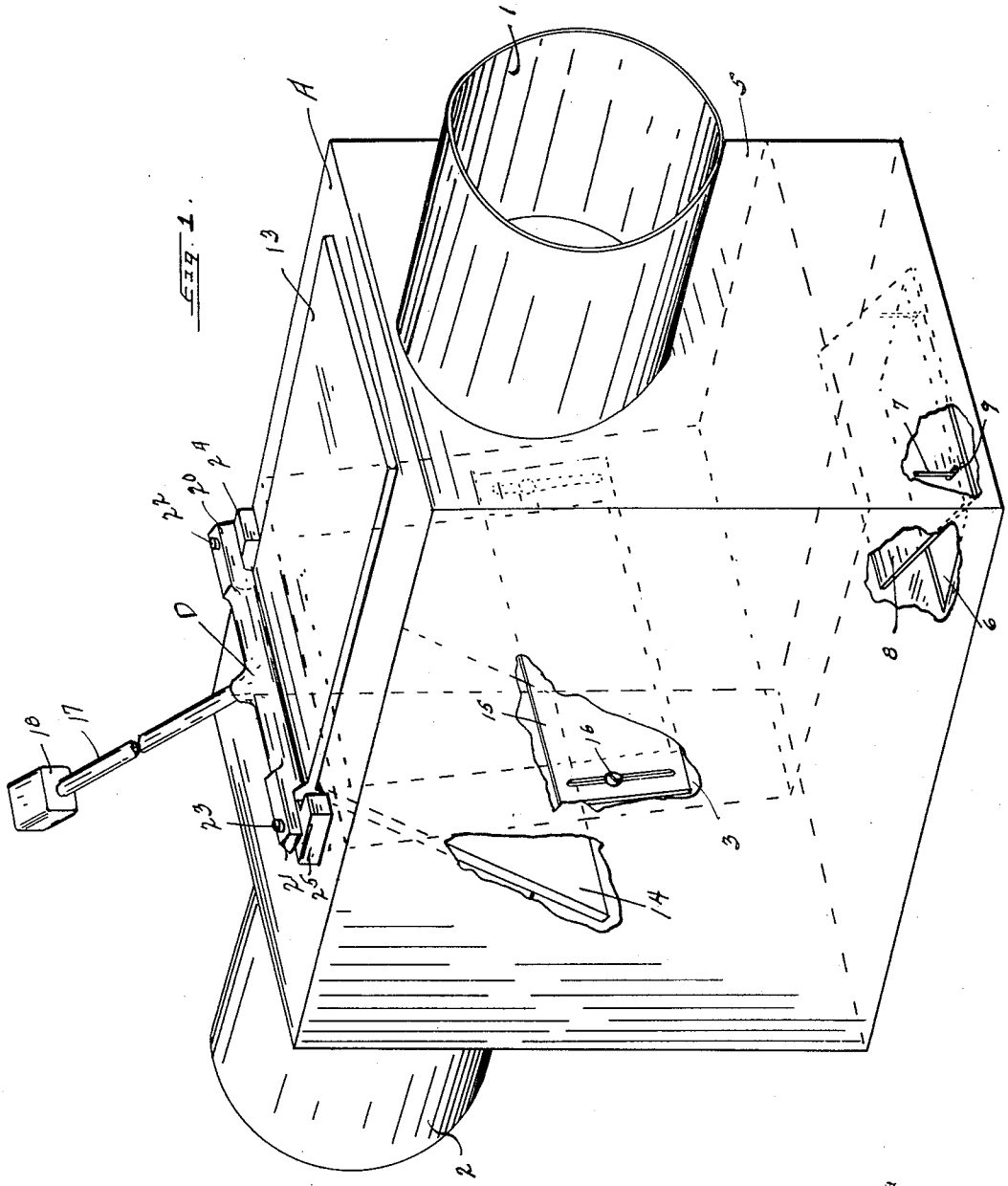
Feb. 13, 1934. W. L. BUTLER ET AL 1,946,568

DRAFT CONTROL DEVICE

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Fig. 1.




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DRAFT CONTROL DEVICE

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Fig. 2.

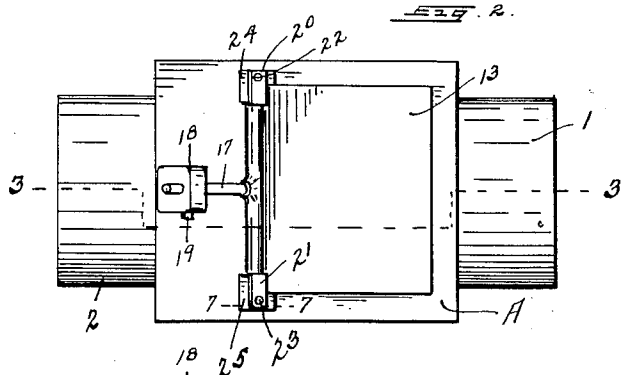



Fig. 7.

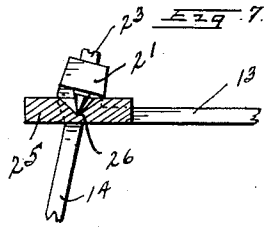



Fig. 3.

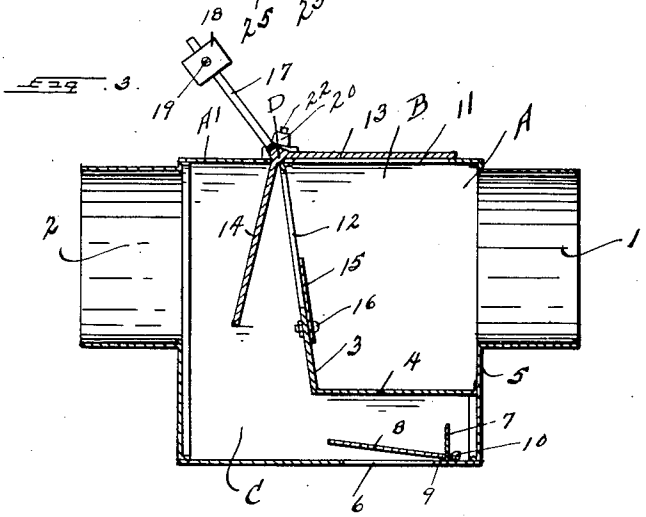



Fig. 4.

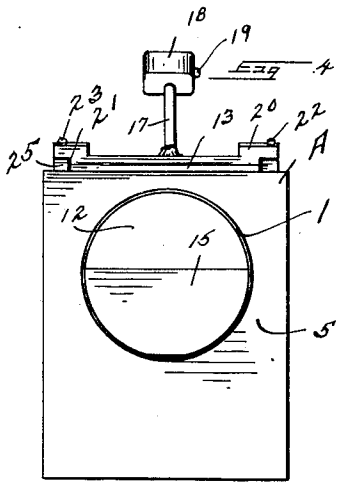



Fig. 5.

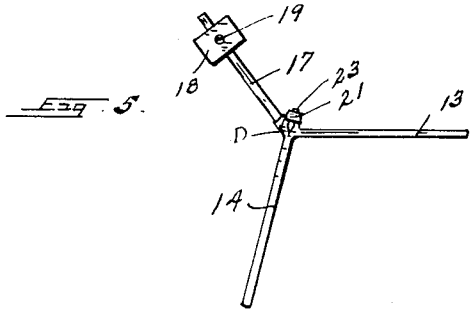
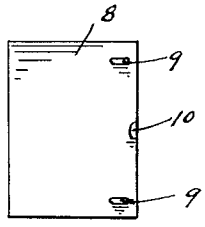



Fig. 6.




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Patented Feb. 13, 1934

1,946,568

# UNITED STATES PATENT OFFICE

1,946,568

## DRAFT CONTROL DEVICE

William L. Butler and Henry F. Hillard, Salt Lake City, Utah; said Hillard assignor to said Butler

Application December 7, 1931. Serial No. 579,484

1 Claim. (Cl. 236—45)

Our invention relates to draft control devices and has for its object to provide a new and efficient control for controlling the draft in a furnace pipe, preventing back draft, and keeping the pull from the combustion chamber constant.

A further object is to provide a device for regulating the draft in furnaces which by automatic action prevents reverse or back draft, opening the draft from the furnace into the surrounding atmosphere when there is a back draft in the flue.

A still further object is to provide a draft control which will save fuel for the user and which eliminates the danger of asphyxiation due to blowing out of the flame and allowing the gas to escape unburned.

A still further object is to provide a constant draft in the combustion chamber to furnish oxygen for combustion in a constant quantity resulting in the fuel being completely burned, effecting savings over other methods now used.

A still further object is to provide a flue draft control which will draw relief air from the furnace room into the stack only when the fire is burning, and then only in the exact amount necessary to maintain the minimum required draft pull on the orifice.

A still further object is to provide a balanced control for controlling the flow of draft from the furnace through the flue, preventing back draft by opening the flue into the furnace room when back draft occurs and providing a practically frictionless control eliminating the necessity of undue suction or back draft being necessary to operate the device.

These objects we accomplish with the device illustrated in the accompanying drawings in which similar numerals and letters of reference indicate like parts throughout the several views and as described in the specification forming a part of this application and pointed out in the appended claims. In the drawings in which we have shown the best and most preferred manner of building our invention.

Figure 1 is a perspective view of the device, parts shown by dotted lines and parts shown cut away.

Figure 2 is a plan view of the device.

Figure 3 is a vertical section on line 3—3 of Figure 2.

Figure 4 is an end view of Figure 3.

Figure 5 is a side elevation of the pivoted control plates.

Figure 6 is a plan view of the plate for covering the draft regulation opening in the bottom of the device.

Figure 7 is a section of the support block on line 7—7 of Figure 2.

In the drawings we have shown our device as made of a rectangular casing A, having an inlet pipe 1 in one end thereof and an outlet pipe 2 in the opposite end thereof and with a partition 3 dividing the interior into two chambers B and C. The partition 3 is secured to the top of the casing box A and extends down to near the bottom of the box where it is bent at an angle with the bent side 4 parallel to the base of the box and the bent side is then secured to the inlet end 5 of the box A below the level of the inlet pipe 1. In the bottom of the box A under the partition 4 we provide an air vent 6 and adjacent to the vent we provide two spaced apart vertical rods 7 which rods carry a closure plate 8 with the plate 8 over the vent 6 and with elongated slots 9 in the plate 8 around the rods 7 so that when the plate is raised by suction in the box the plate will raise without friction as the slots 9 will allow the plate to raise on the rods 7 without touching them in any way and in order to be sure that the plate 8 raises with the back side higher than the front side we provide a small weight 10 on the side of the plate 8 in which the holes 9 are formed. Through the top A1 of the casing A we then provide an outlet opening or port 11 and through the upright side of the partition 3 we provide an opening or port 12 with a pivotally supported closure device D mounted through the top of the box with spaced apart closure valve plates 13 and 14 so formed that one port will be closed while the other port is open. An adjustable plate 15 is provided in the chamber B to provide adjustable means to control the size of the draft port 12 from the chamber B into the chamber C. This is set when the device is installed by making the draft the correct pull for the fire being used and the plate 15 is then locked in place by the bolts 16.

The plates 13 and 14 of the closure D are made as shown, at an obtuse angle to each other, but they do not necessarily have to be made at such an angle. Dividing the space between the two plates into two equal angles and extending outwardly therefrom we provide a counter balance rod 17 carrying an adjustable weight 18 with a set screw 19 provided for setting the weight at the proper position for balance of the two plates. On the back side of the two plates at their juncture we provide spaced apart support blocks 20 and 21, one at each edge thereof, said blocks being provided with threaded holes therethrough, through which holes we provide adjustable externally

threaded pivot points 22 and 23, which points are carried in blocks 24 and 25. The said blocks 24 and 25 are mounted on the top side of the box A adjacent to the opening in the top thereof and said blocks are provided with tapered indentations 26 in the top side thereof in which the pivot points rest to support the two plates pivotally in the openings. The weight and rod extend upwardly and toward the outlet end of the box A. The plates are set in the device and the weight adjusted to close the port 11 and at such a balanced position that draft through the device will not affect the port but so that back draft will instantly close the port 12 and open the port 11 allowing the consumed gases to escape from the box A through the port 11 into the room around the furnace.

The operation of the device will be as follows:

When the draft in the stack is equal to or lower than a predetermined required amount which is fixed by the weight of the vent plate 8, exhaust gases from the combustion chamber of the furnace will pass through the inlet pipe 1 into the chamber B, through the port 12 into the mixing chamber C and out to the stack through the outlet pipe 2.

When the draft of the stack is greater than a predetermined required amount which is fixed by the weight of the plate 8, exhaust gases will pass through the chamber B through the port 12 into the mixing chamber C where it is mixed with air admitted from the atmosphere through the vent 6 by the suction opening the plate 8 thereover and the mixture will pass out through the outlet pipe 2.

When the draft of the stack is neutral or equal to atmospheric pressure or greater than atmospheric pressure either of which conditions are known as back draft, then the gases will enter the chamber B and out through the port 11 into the surrounding atmosphere. The back draft will close the port 12 by pressing the plate 14 thereagainst, or if the draft condition is neutral the buoyancy of the gases from the furnace will lift the plate 13 closing the port 12 and opening port 11. To normally adjust the proper amount of gases from the combustion chamber of the furnace and carry them out the stack a certain definite draft must be maintained in the chamber B and this is controlled by the side of the port 12 by the plate 15. The intensity of draft in the chamber C is maintained by the opening of the vent 6 by raising the plate 8 by the suction in the chamber. Any increased velocity or suction through the stack will open the plate 8 more from the vent 6 admitting relief air into the chamber C.

With this device connected between a stack and outlet of any combustion chamber the air and fuel supply to the combustion chamber may have their respective controls so set that proper combustion is effected when exhausting all of the products of combustion through the opening 11. At this condition there will be uniform absolute pressure in the chamber B. To normally discharge the products of combustion to the stack the port through the partition 3 and the weight of the vent plate 8 are so adjusted that the controlled degree of draft in the chamber C will be that degree necessary to permit just the proper flow of gases through the port 12 to maintain the same absolute pressure in the receiving chamber B as when the products of combustion all passed through the vent or opening 11. With such a setting the products of combustion may freely exhaust into the furnace room through the port 11 discharging only harmless carbon dioxide and water vapors therethrough.

A rotating balance is maintained in the plates 13 and 14 and the weight 18 by proper adjustment of the said weight on the rod 17.

When installing the device the plates are adjusted to a rotating balance and the pins are then slightly withdrawn so that the weight will normally close the port 11 and leave the port 12 free.

Having thus described our invention we desire to secure by Letters Patent and claim:

A draft control for furnaces comprising a casing divided into inlet and outlet chambers with a port therebetween and with a port from the inlet chamber into the atmosphere; pivotally supported integral counter-balanced plates carried on said casing adapted to close the atmospheric port and open the port between the chambers or open the atmospheric port and close the port between the chambers as the draft through the furnace flue fluctuates; and a draft responsive plate controlling a vent in the outlet chamber to draw extra air into the outlet chamber when the draft through the flue is increased above that predetermined amount required for complete combustion in the furnace.

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HENRY F. HILLARD.