July 28, 1942. F. BACHMANN 2,291,018

DRAFT REGULATOR

Filed May 16, 1939 2 Sheets-Sheet 1

Fig. 1.

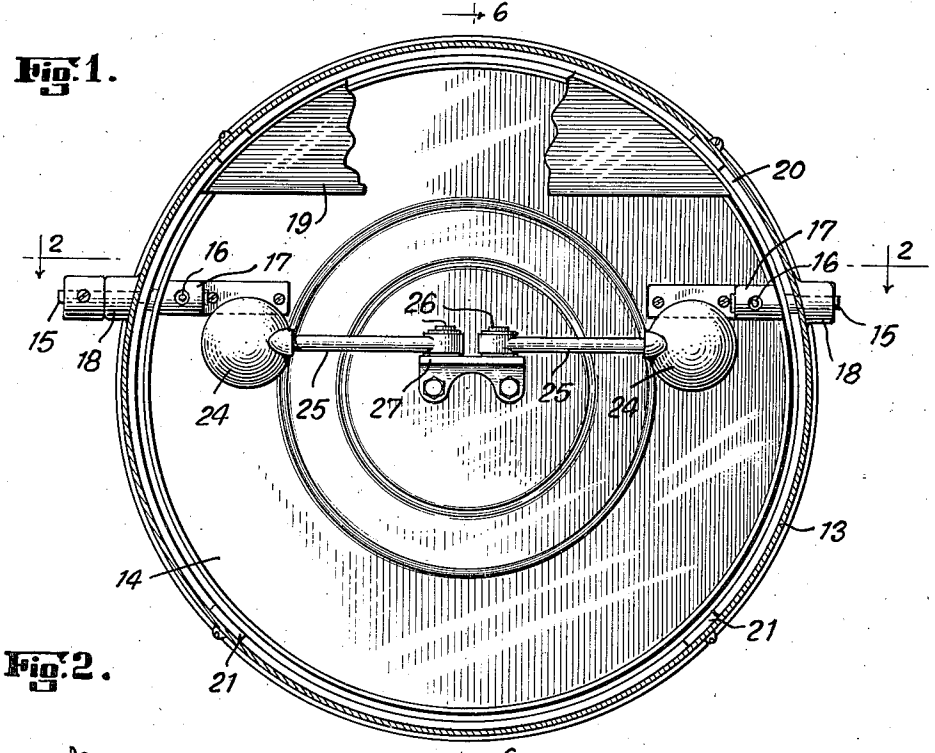


Fig. 2.

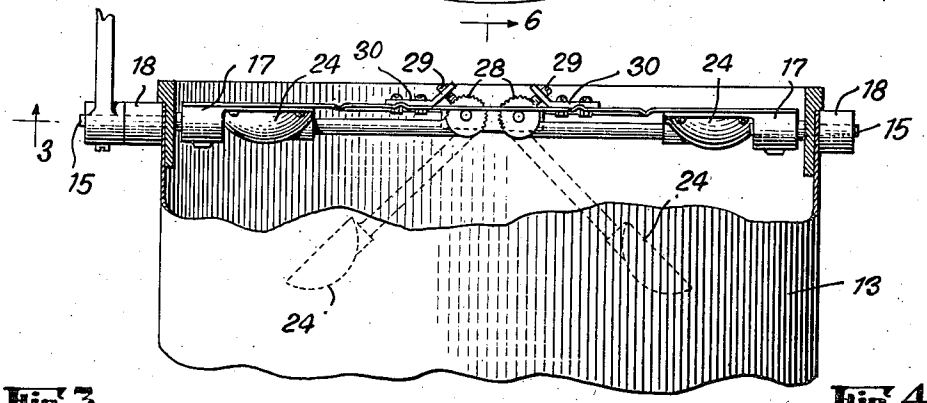


Fig. 3.

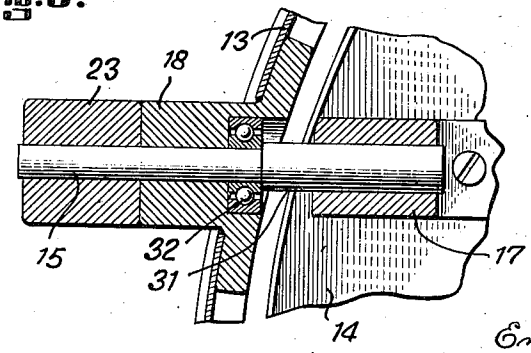
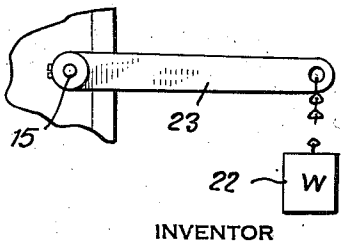


Fig. 4.



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Filed May 16, 1939 2 Sheets-Sheet 2

Fig. 5.

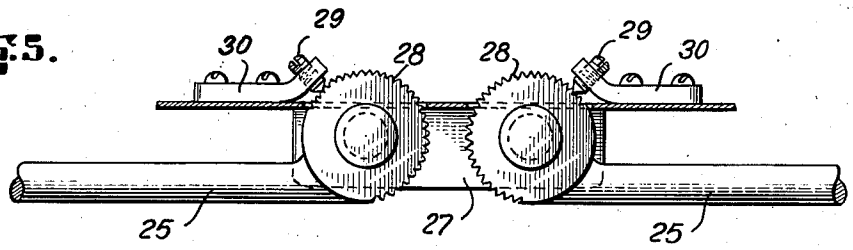


Fig. 6.

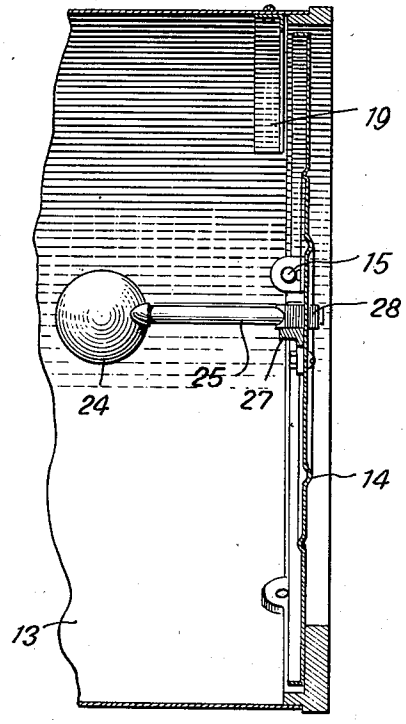


Fig. 7.

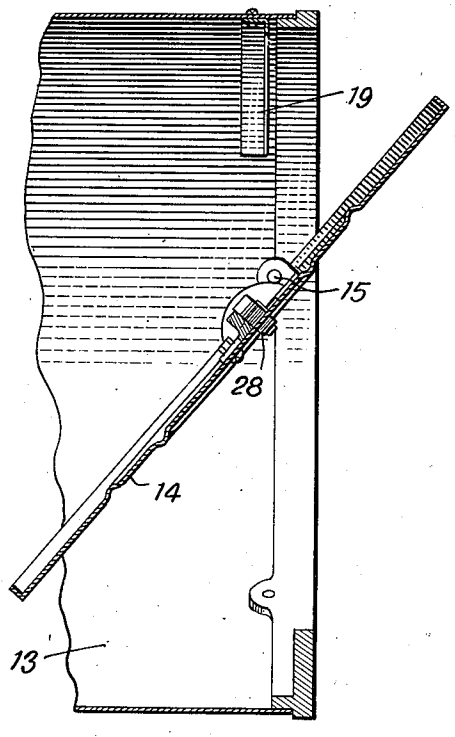


Fig. 8.

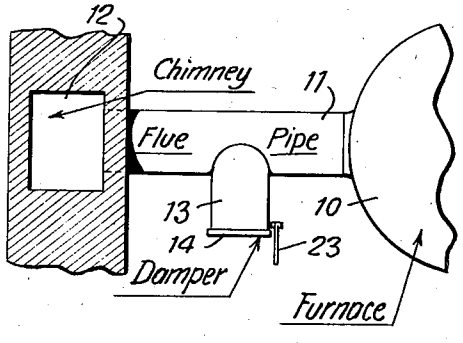
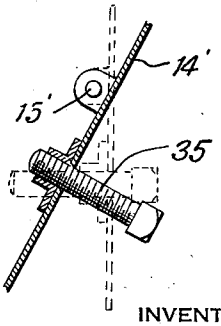


Fig. 9.



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Patented July 28, 1942 2,291,018

UNITED STATES PATENT OFFICE

2,291,018

DRAFT REGULATOR

Frank Bachmann, New York, N. Y.

Application May 16, 1939, Serial No. 273,834

2 Claims. (Cl. 236—45)

This invention relates to draft regulators, particularly to draft regulators for the pipes or stacks taking the exhaust gases of combustion furnaces, and has for an object the provision of improvements in this art.

Often a stack, chimney or pipe for the exhaust gases of combustion furnaces may have a draft which is too strong for immediate conditions, though needed for forced fire conditions. Under such conditions it is common to introduce additional make-up air into the stack beyond the combustion chamber of the furnace to reduce the draft through the furnace. Many furnaces are provided with auxiliary inlets and dampers to control the draft in this way.

Herein an auxiliary inlet for make-up air is provided but in the present case the inlet control mechanism is of a novel type adapted to operate automatically in accordance with intake demands or fluctuating conditions of induced draft rather than in accordance with temperature conditions as is now common. It is also adjustable for different demands and this adjustment may be made in a simple and easy manner. It has been found that the use of this inlet control mechanism gives a very noticeable economy in fuel because of its more ready response to the needs of the system. While the invention will be described herein with particular reference to use for make-up air inlets for furnaces, it will be obvious that it may be used to advantage for many other purposes.

An exemplary embodiment of the invention will now be described for purposes of illustration, reference being made to the accompanying drawings thereof, wherein:

Fig. 1 is a side elevation of the device installed in an auxiliary air inlet pipe such as that shown in Fig. 8;

Fig. 2 is a horizontal section partly in elevation, taken on the line 2—2 of Fig. 1;

Fig. 3 is a partial enlarged section taken on the line 3—3 of Fig. 2;

Fig. 4 is a partial side elevation looking at the left side of Figs. 1 and 2;

Fig. 5 is an enlarged view of the central portion of Fig. 2;

Fig. 6 is a vertical section taken on the line 6—6 of Fig. 1 showing the counterweights in outer adjusted position and the damper in closed position;

Fig. 7 is a view similar to Fig. 6 but showing the counterweights in inner adjusted position and the damper in open position;

Fig. 8 is a plan view of a furnace and stack installation embodying the device shown in Figs. 1 to 7; and

Fig. 9 is a partial vertical section of a modification.

Referring to Fig. 8, an installation adapted to use this invention is shown. It comprises a furnace 10, a flue pipe 11, a chimney 12, and an auxiliary inlet pipe 13 for make-up air. A damper is provided for the inlet 13. This is indicated in Fig. 8 and shown in detail in Figs. 1 to 7. The damper plate is referred to by the numeral 14.

The damper plate 14 is mounted on journals 15 to turn about a horizontal axis. The journals may be secured by set screws 16 to brackets 17 carried by the plate 14. The journals rotate in bearings 18 secured to the inlet pipe 13.

The axis of the journals 15 is located above the center of the plate to provide a greater area on one side than the other whereby suction on the greater area may open the damper as desired. Further to assist this action, a baffle plate 19 is secured in the pipe in front of the upper or smaller area of the plate 14. The baffle 19 reduces the effective suction area on the upper portion of the plate 14, especially when the plate is closed, and this produces easier opening, particularly in pipes where there is a greater natural draft at the top than at the bottom. The area of the baffle plate is large relative to the area of the damper plate above the hinge line.

The damper plate 14 is made smaller than the inside of the inlet pipe 13 to permit easy operation and provide an annular space 20 for a steady inflow of air. This predetermined inflow may be of any desired amount. One benefit derived from such a steady inflow is the avoidance of jerky operation of the plate. In a round pipe the hinge axis of the plate cannot be too high above the geometric center or the plate will bind when it swings up, even when the clearance space 20 is of considerable size. If the hinge axis is not too high a quicker action of the plate is permitted than would otherwise be the case.

One or more circumferentially spaced stops 21 serve to limit the outward movement of the lower portion of the plate 14.

Means are provided for varying the action and changing the initial position of the damper 14. Part of these means comprises a weight 22 attached to an arm 23 carried by one of the journals 15. The value of the weight and its position along the arm may be adjusted as desired. The arm 23 may also be operated by pressure regulating devices or in connection with other

draft regulators, particularly for coal burning installations. The other part of such means may comprise balance weights **24** carried by arms **25** mounted on pivot pins **26** secured in a bracket **27** attached near the center of the plate. The hubs of the arms **25** may be provided with notches **28** adapted to cooperate with set screws **29** carried by anchors **30** to hold the arms in various adjusted positions. When the weights **24** and arms **25** are swung inward, as shown in full lines in Fig. 2, the center of gravity lies substantially in a vertical plane passing through the axis of the journals **15** and the weights have practically no effect on the plate. But when the weights **24** are moved outward, as shown in dotted lines in Fig. 2, the plate is urged counterclockwise toward closed position, as viewed in Figs. 6 and 7. The weights **24** are spherical on one side but flat on the other so as to fit flat against the plate. Either one or both weights may be swung out at a time, thus giving a very wide range of adjustment values.

When the weights are symmetrically hinged and swung in a plane or planes perpendicular to the damper plate the weight on the bearings may be kept reasonably well balanced and this makes for very easy operation of the plate. It will be noted that applicant has mounted the plate so that it is held equally at all times between its bearings and has provided roller bearings so that it will move with the greatest ease. With this mounting in which the weights are nicely balanced symmetrically with respect to the bearings, the plate may be moved at the lightest touch and never tends to become stuck in any position. This is a matter of importance in avoiding jerky and inaccurate action of the damper.

Means are provided for maintaining the baffle plate in central position, the means shown in Fig. 3, comprising an enlarged portion **31** on the journals **15** to form shoulders cooperating with the ends of bearings **32**.

In Fig. 9 there is shown a modified form in which one or a plurality of threaded bolts **35** are provided for shifting the balance of weight from one side of the damper plate to the other. This may be used in place of or in addition to the weights **22** and **24**. The device otherwise may be the same as the previous form. In Fig. 9 the plate **14'** and its journals **15'** are shown.

When the adjustable weights **24** are used on the damper plate it is not always necessary to use the weight **22** and the arm **23**, the weights on their arms providing adjustable balance for the draft exerted on the lower edge of the damper plate. Also while two weights **24** are shown and provide better distribution of weight on the bearings, it may sometimes be preferable to have only one weight. In any event the two weights are independent and may be separately adjusted.

The operation of the device will be apparent from the foregoing description. It is to be understood that the invention may have various embodiments within the limits of the prior art and the scope of the subjoined claims.

I claim:

1. A draft regulator for auxiliary make-up air inlet pipes, comprising in combination, an inlet pipe, a damper plate therein hinged between its upper and lower edges above and parallel to its horizontal center line to permit its larger side at the bottom to swing inward under suction, and a baffle plate in the upper part of said pipe fitting against the upper side of the damper plate when closed, said baffle plate being of considerable size relative to the area of the upper part of the damper plate to effectively reduce the suction thereon, particularly when closed.

2. Apparatus as set forth in claim 1 in which the lower edge of said baffle plate is defined by a chord parallel to the axis of said damper plate and the horizontal center line of said pipe.

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