

W. D. IVES & J. NOVAK.  
FLUE SECTION.  
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Fig. 1.

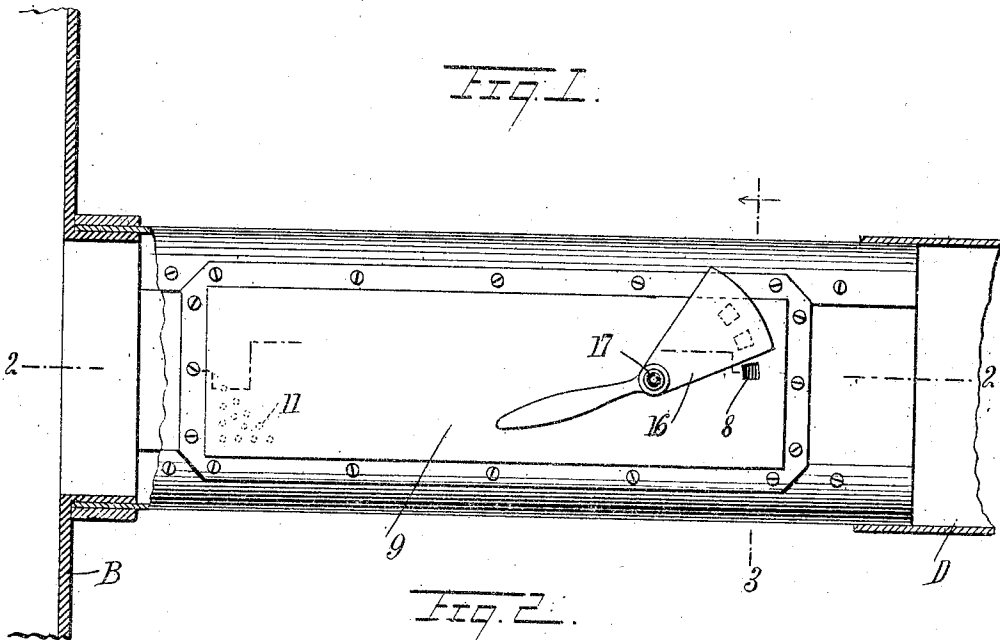


Fig. 2.

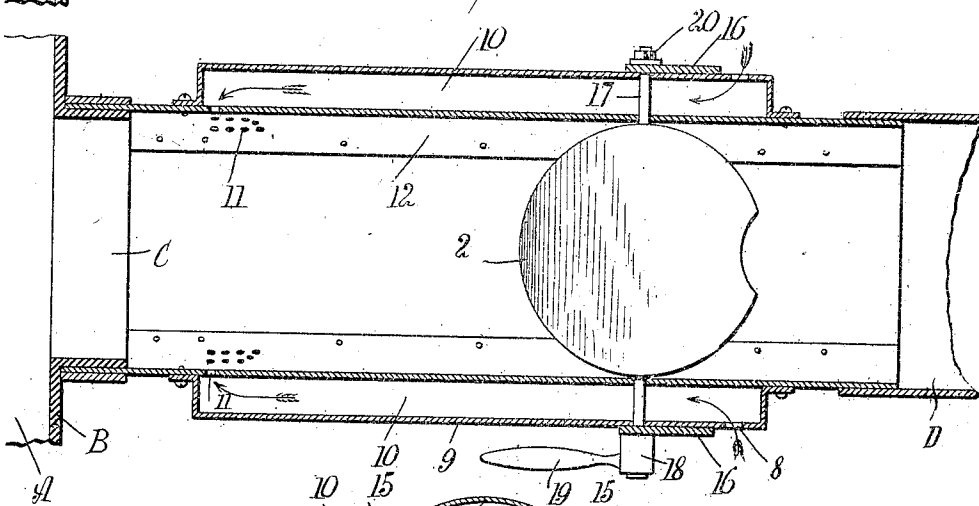
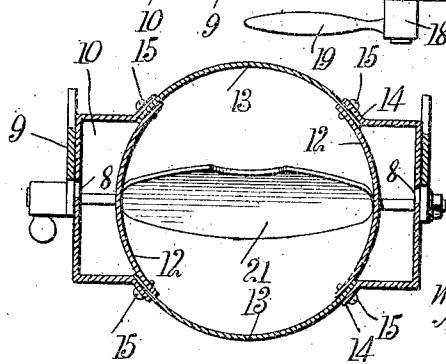


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## FLUE-SECTION.

1,056,549.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed April 1, 1912. Serial No. 687,641.

*To all whom it may concern:*

Be it known that we, WILLIAM D. IVES, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, and JOSEPH NOVAK, a citizen of the United States, and a resident of the city of New York, borough of the Bronx, in the county and State of New York, have invented a new and Improved Flue-Section, of which the following is a full, clear, and exact description.

Among the principal objects for which the present invention is designed are: to provide a section of the character mentioned, having heating pockets for the admission of air to the fire-pot of a furnace; to provide a section of the character designated, constructed and arranged in knock-down form, adapted to be varied in size to suit the exigencies of installation; to provide means adjustable in conjunction with a flue damper, for varying the proportion of fresh air admitted; and to provide air-ducts the length of which may be varied to suit the exigencies of the installation.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side view of a flue section constructed and arranged in accordance with the present invention; Fig. 2 is a longitudinal horizontal section taken on the line 2—2 in Fig. 1; and Fig. 3 is a vertical cross section taken on the line 3—3 in Fig. 1.

Heretofore fresh air has been introduced for consumption in the fire-pot of a furnace, where the air has been preheated by the heat of the smoke flue and where the air has been conducted to the fire-pot at the lowest level of said flue. In one form of the previously-used devices, the smoke flue damper has been made hollow, having receiving passages opening to the outside atmosphere through trunnions forming bearings for the said damper and having delivery openings at the lower edge of said damper for the introduction of air to the flue at the lowest level therein. The relatively cool air thus introduced into the flue, it is claimed, passes into the fire-pot of the furnace, forming within the flue a substratum of oxygen-containing or fresh air. In a second form, the air so introduced is confined to a delivery pipe disposed at the lower side of the smoke-flue

and extending from a casing to the fire-pot of the furnace.

In the present invention, the outside air is admitted through openings 8, provided in the outside plate of two boxes 9, forming air-flues, contracted, to form long, narrow ducts 10, as shown best in Fig. 2 of drawings. The ducts 10 are preferably extended to adjacent the fire-pot A of the furnace B. The ducts 10 are each provided at the lower corner nearest the furnace B, with perforations 11 provided in an inner plate 12.

The circle of the smoke-flue is completed by the filling plates 13, the edges whereof are introduced between the edges of the plates 12 and the flanges 14 of the boxes 9. In this position, the plates 13 are secured by screws 15 or other suitable fastening devices.

It will be understood that the rotundity of the flue section forming the subject of the present invention is regulated to suit the size of the collar C of the furnace B and the smoke-flue D. By varying the width of the filling plates 13 by alteration or substitution, as the case may be, the adjustment necessary for the installation of the present section may be effected on the job, avoiding thereby loss of time and inconvenience incident to the need for the mechanic returning to the shop for fittings or sections adapted to the size of the parts of the furnace upon which the improved section is being installed.

The openings 8 are disposed at the upper corner of the box 9. To close the openings 8, rotary shields 16 are provided. The shields 16 are adjustably mounted on a shaft 17, being held rigidly thereon by a hub 18 of a damper handle 19. The shields 16 are adjusted on the shaft 17 in positions relating to the positions of a damper valve 21.

The draft facilities of furnaces vary, and the delivery of air through the ducts 10 should vary with the intensity of the draft on the flue D. Where the draft on the flue D is deficient or slight, it is desirable that a smaller proportion of air should be introduced through the ducts 10, and when the damper valve 21 is in more opened position, than in installations where the draft of the flue D is intense. Under certain circumstances, the reverse of the statement above given prevails, and it becomes necessary to give the shields 16 a lead on the valve 21.

When the shields are adjusted and clamped rigidly in position, the operation is

as follows: By turning the shaft 17 with the handle 19, the valve 21 is disposed to restrict the draft of the flue D and to retard the passage of the heated gases and smoke from the furnace B. Under ordinary or usual conditions, the position of the valve 21 just above outlined would be accompanied by a movement of the shields 16, which would expose all of the openings 8 in the boxes 9. This position of the valve 21 and the shields 16 is obtained after the fire in the furnace B has gathered full headway and the draft in the flue D is at its strongest. The fresh air from the outside, being thus admitted through the openings 8, is passed between the walls of the boxes 9 to the perforations 11 at the lower corners of said boxes adjacent the furnace B. In passing lengthwise of said boxes, the air admitted through the openings 8 is heated by the inner walls of the boxes or plates 12. Though heated, this air is relatively cooler than the hot and burning gases escaping from the fire-pot A of the furnace B. The air thus introduced, having a heavier specific gravity than the heated gases, seeks the lower section of the flue, and is drawn into the fire-pot thereof in a direction opposite that pursued by the upper strata of hot escaping fumes and gases. It will be observed that the air thus introduced into the fire-pot of the furnace, by the time it is finally delivered into the fire-pot, is heated to a degree which avoids the cooling or dampening of the fire in the fire-pot. By thus introducing into the fire-pot of the furnace fresh or oxygen-containing air, preheated by the escaping smoke or gases, the heat units of the gases are conserved and utilized for radiation within the body of the furnace, or within the heating drum thereof. The practical result of the conservation thus obtained is that the draft on the flue D is diminished until only sufficient is retained to maintain the combustion within the fire-pot of the furnace. Thus, the gases of the coal or other combustible being more completely consumed within the fire-pot of the furnace, the quantity of combustible is relatively diminished.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:—

1. A flue section comprising a plurality of elongated box sections, having openings at both ends, said openings being disposed at opposite sides of said boxes to form air

intake and outlet passages said outlet passages leading to the interior of said flue section; a plurality of filling plates disposed between said box sections; fastening devices for removably securing the said plates and said boxes, said box sections and filling plates being shaped to form when combined a tubular flue section and a valve rotatably mounted in said flue section to control the flow therethrough.

2. A flue section comprising a plurality of elongated box sections, having openings at both ends, said openings being disposed at opposite sides of said boxes to form air intake and outlet passages said outlet passages leading to the interior of said flue section; a plurality of filling plates disposed between said box sections; fastening devices for removably securing the said plates and said boxes, said box sections and filling plates being shaped to form when combined a tubular flue section; a valve rotatably mounted in said flue section to control the flow therethrough; and a shield manually operated to limit the intake opening in said box sections.

3. A flue section comprising a plurality of elongated box sections, having at one end a series of intake openings and at the opposite end a delivery opening, said intake opening being through the outer wall of said box section and disposed above the median longitudinal line of said box section and said outlet opening being through the inner wall and below the said median line of said box section; a plurality of filling plates disposed between said box sections; means for removably connecting said filling plates and said box sections; a butterfly valve and shaft therefor rotatably mounted in bearings formed in said box sections; and a shield mounted on said shaft to close progressively the said intake openings, said shield and said valve operating in unison to expose said intake openings proportionate to the closure by said valve of said flue section.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM D. IVES.  
JOSEPH NOVAK.

Witnesses:

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PHILIP D. ROLLHAUS.