

G. I. MUNSON.  
 SMOKE FLUE DAMPER FOR FEEDING AIR TO COMBUSTION CHAMBERS.  
 APPLICATION FILED JUNE 30, 1908.

920,369.

Patented May 4, 1909.

2 SHEETS—SHEET 1.

Fig. 2.

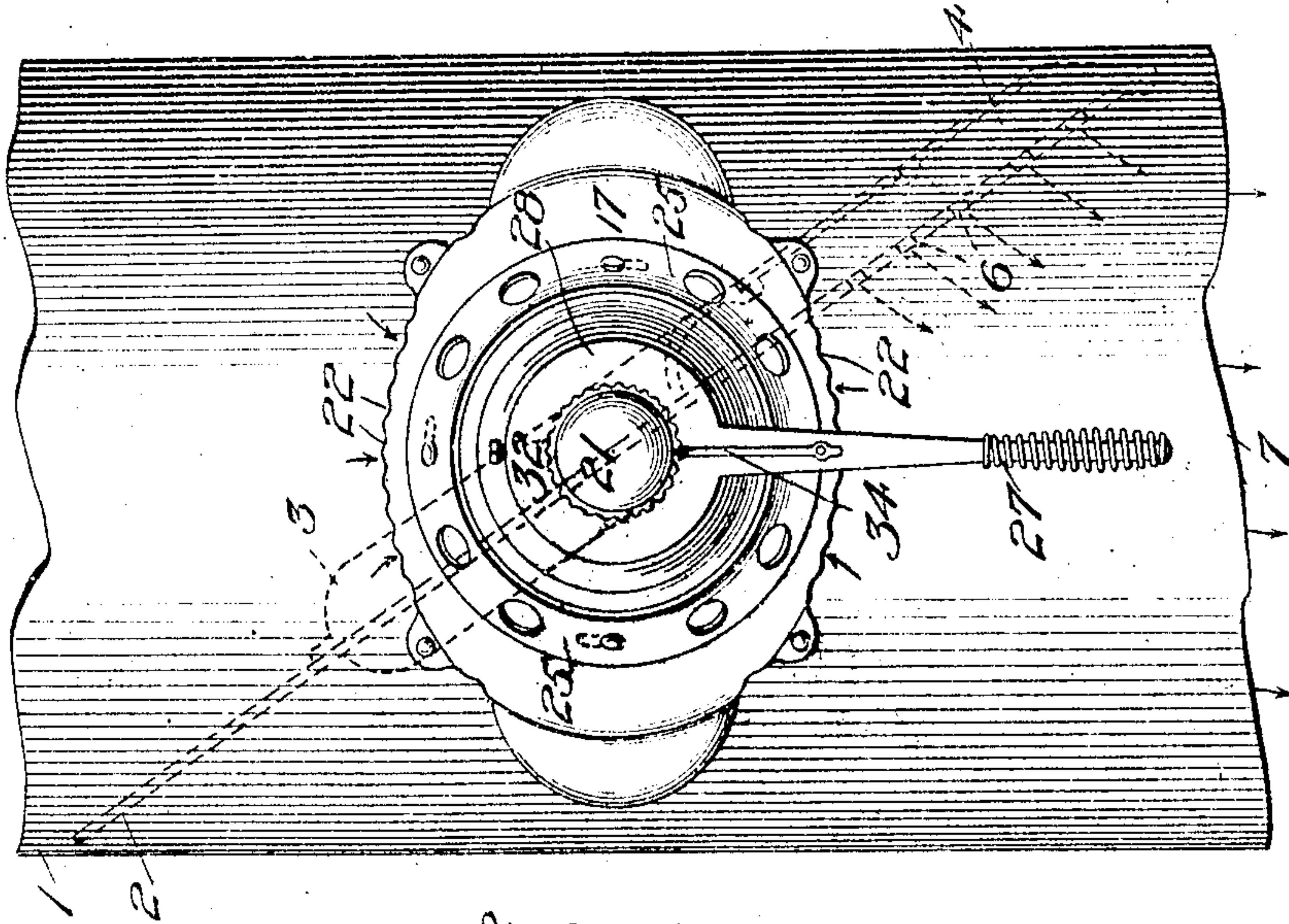
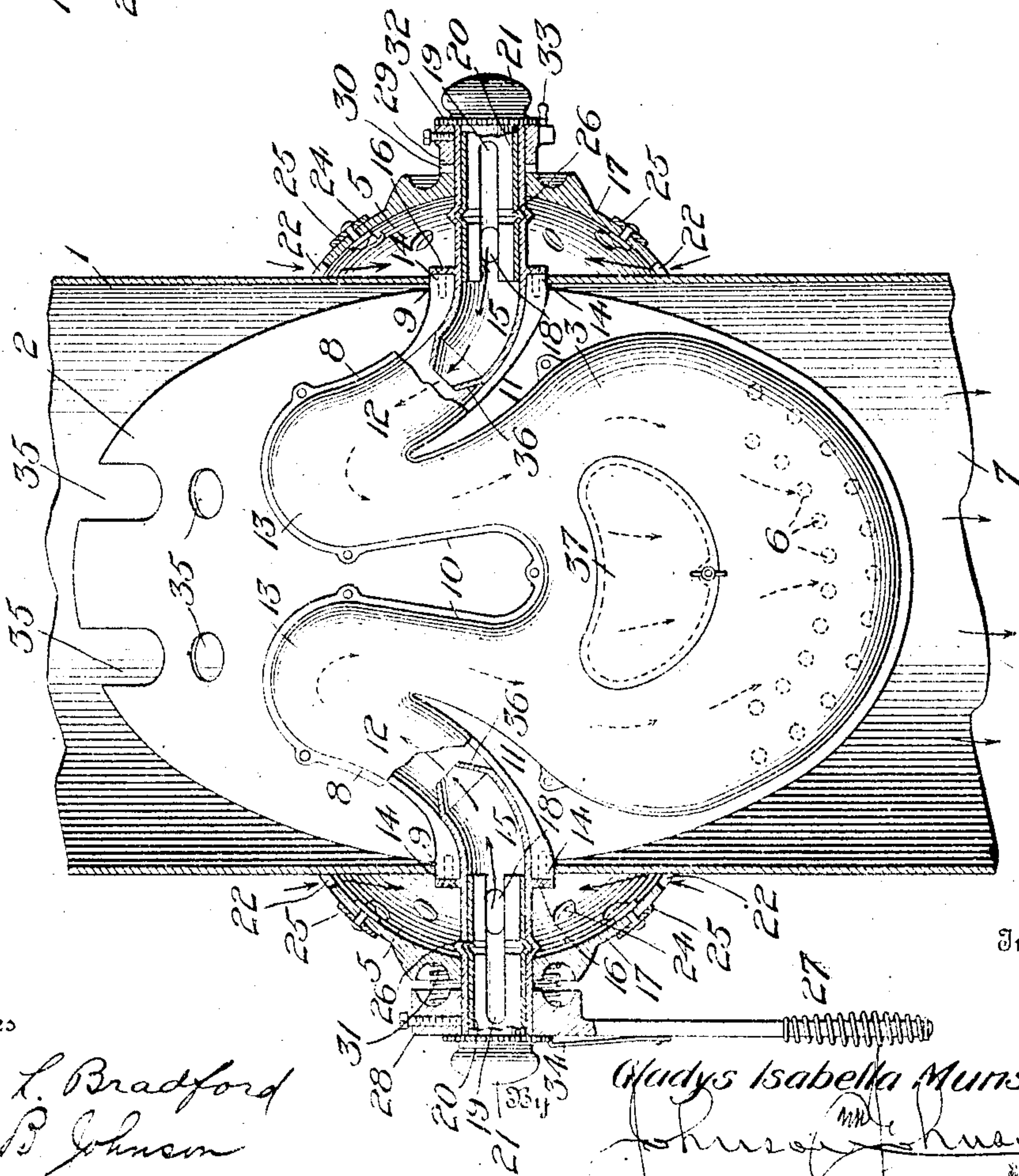


Fig. 1.



Witnesses

Edwin L. Bradford  
 Anne B. Johnson

Inventor

Gladys Isabella Munson

John S. Johnson  
 Attorney



G. I. MUNSON.

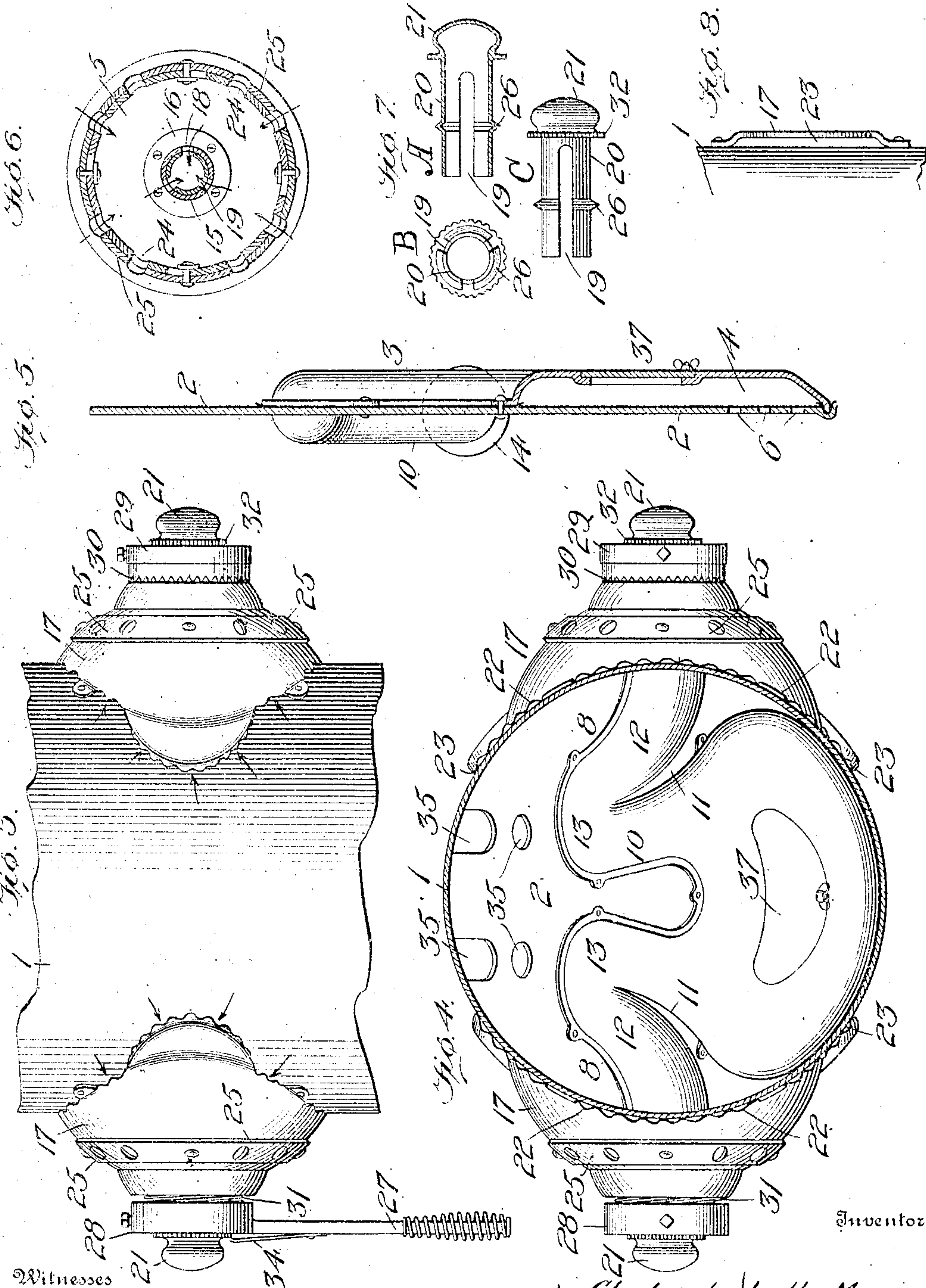
SMOKE FLUE DAMPER FOR FEEDING AIR TO COMBUSTION CHAMBERS.

APPLICATION FILED JUNE 30, 1903.

920,369.

Patented May 4, 1909.

2 SHEETS—SHEET 2.



Witnesses  
Edwin L. Bradford  
Anne B. Johnson

By

Gladys Isabella Munson

John G. Johnson  
Attorneys



# UNITED STATES PATENT OFFICE.

GLADYS ISABELLA MUNSON, OF INDIANAPOLIS, INDIANA.

## SMOKE-FLUE DAMPER FOR FEEDING AIR TO COMBUSTION-CHAMBERS.

No. 920,369.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed June 30, 1908. Serial No. 441,181.

*To all whom it may concern:*

Be it known that I, GLADYS ISABELLA MUNSON, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Smoke-Flue Dampers for Feeding Air to Combustion-Chambers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

For introducing heated air as a combustion effecting medium to the combustion-chamber of a stove, or furnace through the dampered smoke-flue whereby the mingling of the air with the gases in combustion is effected with increased and more efficient combustion and the consequent saving in the consumption of fuel, and to the prevention of smoke, and in regulating and maintaining a uniform temperature of apartments, is the object of my invention. For this purpose I have produced an improved air-heating and feeding damper in the smoke-flue, and in the claims appended hereto I will set out the parts and combinations of parts wherein my improvements reside in connection with the accompanying drawings, in which,—

Figure 1 shows in vertical section a portion of a smoke-pipe having mounted therein my improved air-heating and feeding chambered-damper, and showing in section external supplemental air-heating chambers and the damper mounting journals passing through them, whereby the air is heated and expanded before it enters the damper-chamber. Fig. 2 is a side elevation of the same the damper being shown in dotted lines. Fig. 3 is a similar view taken at right angles to Fig. 2. Fig. 4 is a horizontal section of the smoke-pipe taken above the chambered-damper. Fig. 5 is a vertical section of the chambered-damper. Fig. 6 shows in cross section the air heating chamber which supplements the damper-journal, the section being taken through the air register ring of said chamber and showing the tubular journal-extension, the air regulating tube therein and the registering air inlets of said chamber and of the journal tubes. Fig. 7 shows the tubular valve member of the damper-journal in longitudinal section A, end B and side view C. Fig. 8 shows in edge view one of the air inlet flanges of the air heating cups which supplement the damper-

journals and which are secured to the outer wall of the smoke-pipe.

It will be understood that my chambered air-feeding damper is mounted in the smoke-pipe of a boiler furnace, heating stove, or cook-stove, and the air fed into the flue by the chambered-damper, being of greater specific gravity than the smoke and gases which are passing off from the fuel, descends into the combustion-chamber and being ignited produces a more efficient combustion of fuel. In its function the air feeding damper is economical for causing as much heat as possible to pass from the combustion-chamber and in effecting the conversion of the products of combustion no perceptible quantity of smoke is left to pass out.

While the damper is designed when in a closed position for feeding air into the smoke-flue through its side walls it has the usual function when in open position of leaving a free and unobstructed passage through the flue when it is desired to have the full chimney or stack draft from the combustion chamber.

The damper preferably of elliptical form is mounted by tubular journals which project through the walls of the smoke-flue or stack 1 and is formed of a plate 2, adapted to fit the inner walls of the flue and in its normal position when closed is oblique as in Fig. 2. A plate 3 fastened to one side of the damper forms an air receiving chamber 4 extending from the lower edge toward and beyond its center and into which the journals open and through which the chamber is supplied with air heated in an external chamber 5 supplementing the projecting end of each journal. Within the damper-chamber the plate has a plurality of openings 6 contiguous to its lower edge and through which the heated air passes from the chamber down into the smoke-flue 7 as in Figs. 1 and 2. The damper-chamber is preferably formed by a cover plate 3 and a rim around the lower edge of and extending across the upper portion of the damper-plate, the joint of said rim with the latter being made tight by asbestos packing. That raised portion of the cover which crosses the damper forms an upward oblique extension 8 from the upper side of each journal 9 and has a sort of downward return loop formation 10 around the center of the damper. On each side of this loop-forming rim the edge rim extends from the lower side of each journal as an arm 11, upward about



parallel with the upward oblique rim part 8 and these two oblique rim-parts form an oblique tubular extension 12 within the chamber, of each tubular journal 9, which latter projects through the flue-wall and forms the air inlets into the damper-chamber. The arms 11 and the upward curved rim forming-loop parts 8 and 10 form pockets 13 the walls of which give an upward and downward curved direction to the air entering the chamber through the hollow journals. These oblique damper rim parts 9 and 11 form a hub-bearing 14 at each edge of the damper—a part of said hub being formed in the damper-plate 2 and a corresponding part in the chamber cover 3, so that when the two parts are secured together they form the tubular hub-bearing 14 which projects a short distance through openings in the flue-wall. This construction allows the damper to be mounted within the flue by inserting one of the damper-hubs into the wall opening from the inner side of the flue and then pressing the other hub against the inner wall of the flue thereby causing it to expand and receive the hub into its opening and the damper thereby mounted so as to swing upon its journals in the walls of the flue in opening and closing the damper.

It is important that the air entering the damper-chamber through the tubular-journals be first heated and its volume controlled. For this purpose a tubular extension 15 open at both ends is inserted into the projecting end of each hub-journal, the inner end of such tubular extension being curved or deflected to fit the upward oblique or curved tubular hub-formation 9 and 11, and from which said extension 15 projects about two inches and is secured to the outer end of said hub 14 by a circumferential flange 16, such tubular extension being made after the damper has been mounted. A cup 17 fastened by flanges to the outer smoke-flue wall supplements the projecting end of the hub extension, forms a chamber 5 around it and supports it. The hub extension is provided with slots 18, Fig. 6, which open into the cup-chamber and are controlled by registering slots 19 in the tubular valve 20, Fig. 7, which is open at its inner end and closes the outer end of the tubular-extension by a knobbed-head 21, the turning of which, in either direction, causes the valve to control the slots in the hub extension; the valve for this purpose being free to be rotated within the tubular-extension and independent of the rotation of the damper-journals. The inlets for the air into these cup-chambers is provided by scalloping the edges so as to form openings 22, Fig. 1, while the ends of the cups may be arched so as to leave openings 23 as in Fig. 8, so that the air passing into the cup-chambers is heated by contact with the walls of the flue, and the hub extension, and passes into and through the

tubular-valves, into and through the tubular-journals and into the damper-chamber, which, by its peculiar interior formation, causes the air to be distributed in contact with the hot walls of the damper and to become highly heated before passing into the smoke-flue. As a further provision for admitting air into the cup-chambers the arched portion of each cup may have a row of openings 24, Fig. 6, controlled by a perforated registering ring 25 on the outer side of the cup. The air regulating valves 20, are each retained in the tubular hub extension against being withdrawn by a circumferential crimp or bead 26 adapted to engage a corresponding groove formed on the inner wall of said hub-extension Fig. 1, and thus allow the valve to be partially rotated by its knob to bring its slots 19 in register relation to the slots of the hub-extension to regulate the inflow of the air into the damper-chamber, or to close the slots to cut off the inflow of the air into the chamber. When the damper is in position to allow full and free flue-draft the air regulating valves are closed to prevent air entering the damper-chamber and passing into the flue which, in such event, would cause the checking of the draft and allow the escape of the smoke and gas through the damper into the room.

For adjusting the damper to open it more or less or to close it the outer end of one of its tubular journal extensions is provided with a handle 27 having a ring-end 28 fixed thereon by a set screw so that the movement of the handle will cause the damper to be swung on its journals and to hold it in its adjusted position the following means are provided: On the outer end of one of the tubular journal extensions is fixed by a set screw, a collar 29 which is yieldingly held in engagement with the crown of one of the cup-air chambers, such engagement being effected by intermatching annular toothed edges 30 one on the collar 29 and the other on the crown of said cup-chamber and a spring 31 at the other cup-chamber yieldingly maintaining such engagement by exerting a force in alignment with the damper-journals. For this purpose the damper is caused to have a slight movement in the line of and upon its journals, carrying with it the tubular extensions of its journals, whereby the toothed collar 29, is caused to be pushed away from and out of engagement with the teeth of the cup-air-chamber and the damper thereby left free to be swung on its journals. This lateral movement of the damper is caused by the attendant pressing the knob of the other tubular-journal-extension which causes the damper to be moved bodily against the inner wall at the opposite side of the smoke-flue sufficient to separate the toothed collar 29, from the crown of the toothed-cup. This side movement of the



damper is made against the tension of a coil-spring 31 at the handled journal, and which, for this purpose is housed in grooves in the meeting faces of the handle-ring 28 and of the crown of the cup air-chamber as in Fig. 1, so that on releasing the pressure from the journal-knob the expansion force of the spring against the handle-ring 28 will pull the damper toward its handled side and thereby cause the automatic engagement of the toothed collar 29 with the teeth of the cup-chamber to hold the damper in its adjusted position. The tubular valve of one of the damper-journals is held when adjusted by a toothed rim 32, at its knob end and a pin 33, Fig. 1, fastening said toothed-rim of the valve to the toothed collar 29 of the tubular hub-extension. The other tubular valve is fastened when adjusted by a spring-pin 34, on the handle. The tubular valves are sprung into their seats in the tubular extensions by being compressed to allow their circumferential crimps 26 to be engaged with the grooves of the journal tubular extensions, and for this purpose, the slots in the valve are open at its inner end. This construction allows the tubular-valves to be withdrawn for cleaning out the tubular journals. For allowing the necessary draft to maintain combustion and the escape of gases which may collect in that part of the pipe above the journals the damper is provided with openings 35 above its chambered part.

To prevent back-pressure from the damper-chamber into the journal bearings, the inner telescoping ends of the tubular journal extensions 15 may each be provided with a cone nozzle 36, standing inward so as to allow the free inflow of the air into the chamber. The damper-chamber is provided with a man-hole closed by a removable air-tight cover 37 for cleaning out the chamber.

It is important to note that the damper hubs are formed of thickened parts of each of the chamber forming-plates and that part 14 which projects from the edge of the plates forms a cylindrical journal bearing with which the tubular extensions 15 thereof telescope to deliver the air into the chamber; that said tubular extension is by a flange screwed to the vertical face 14 of the journal bearing; that the handle is fixed upon the outer end of the tubular journal extension; and that the latter forms a sleeve within which the tubular-valve 20 is fitted and held so as to be rotated to admit more or less air from the cup-chamber within the damper-chamber; and that the tubular-valve for this purpose, can be adjusted by its knobbed-head independently of the adjustment of the damper.

While I have described the disengagement of the interlocking teeth, which holds the damper when adjusted, as being effected by pushing the handled-journal endwise, ob-

viously the pulling swing of the handle will cause the separation of the interlocking teeth, which will, by the yielding of the spring, be caused to separate and ride over each other in adjusting the damper.

I do not desire to confine myself to the specific construction and arrangement of the parts herein described and shown, and I reserve the right to make all such changes in and to the same as fairly come within the scope and spirit of my invention as set out in the claims.

I claim:

1. In combination with a smoke-flue, a damper mounted therein and having tubular journals provided with wall openings and an air receiving and heating chamber communicating with said journals and provided with exit openings, air receiving and heating chambers upon the outer walls of the smoke-flue supplementing and inclosing the damper-journals, registering means within the tubular journals for controlling their wall-openings to regulate the feed of the air from the chambers into the damper-chamber, and means for adjusting the damper, for the purpose stated.

2. The combination with a smoke-flue, a damper mounted therein and having tubular journals provided with wall openings and an air receiving and heating chamber communicating with said journals and provided with exit openings, air receiving and heating chambers upon the outer walls of the smoke-flue supplementing and inclosing the damper-journals, a tubular-valve within each tubular-journal and having openings registering with the openings in the tubular journals, means for adjusting the tubes rotatively for regulating the air supply to the damper-chamber, and means for adjusting the damper, for the purpose stated.

3. A smoke-flue, a damper mounted therein and having tubular journals provided with wall openings and an air receiving and heating chamber in communication with said journals and provided with exit openings below its journals, chambers upon the outer walls of the smoke-flue supplementing and inclosing said journals and having air inlet openings, a tube within each journal having openings registering with the openings in the journals and closing the outer end of each, means for holding each tube within its journal, means for adjusting each tube rotatively for regulating the air supply to the damper-chamber means for holding each tube in its adjusted position and means for adjusting the damper, for the purpose stated.

4. In a device of the character described, a smoke-flue, a damper mounted therein having tubular journals and provided with wall openings and an air-chamber having openings below the damper-journals, a cup fixed



on the outer wall of the smoke-flue having air inlet openings and supplementing each journal, forming a chamber surrounding it and communicating with its wall openings, a tube telescoping with and forming an extension of the journal and having wall openings, and a tubular valve within and having openings in registering relation to those in the journal telescoping tube, means for holding the valve tubes within the journals, means for rotatively adjusting the valve tubes, means for adjusting the damper, and means for retaining it at such adjustment.

5. In a device of the character described, a smoke-flue, a damper mounted therein having tubular journals and an air receiving and discharging chamber having openings below the damper journals, a cup fixed on the outer wall of the smoke-flue having air inlet openings and supplementing each journal, forming a chamber surrounding it, a perforated tube within and forming an extension of the journal, a tubular valve within and closing the outer end of the journal extension and having openings in registering relation to those in the journal extension, means for holding the valve tubes within the journals, knobs for rotating the valve tubes, means for adjusting the damper and for holding it in such adjustment consisting of a collar on the outer end of one of the journals having a toothed edge adapted to engage a toothed edge on the cup, a handle fixed on the outer end of the other journal, and a spring between the handle and the cup to draw the damper journals toward it to maintain the toothed engagement and to allow the separation of such engagement.

6. In a device of the character described, a smoke-flue, a damper mounted therein and having tubular-journals provided with openings and an air receiving and heating chamber provided with exit openings, the said tubular-journals having each an upward oblique extension into and opening into a downward deflecting pocket-space on each side of the center of the damper, cup-chambers upon the outer walls of the smoke-flue supplementing and inclosing the damper journals, registering means within the tubular journals for controlling its openings to regulate the feed of the air from the cup-chambers, and means for adjusting the damper for the purpose stated.

7. In a device of the character described, a smoke-flue, a damper mounted therein and having tubular-journals provided with openings and an air receiving and heating chamber provided with exit openings, the said tubular journals opening into said chamber on each side of the center of the damper, a cone in each upward journal extension having its nozzle standing inward, cup-chambers upon the outer walls of the smoke-flue supplementing and inclosing the damper

journals, registering means within the tubular journals for controlling its openings to regulate the feed of air from the cup-chambers, and means for adjusting the damper for the purpose stated.

8. In an air-feeding damper, a smoke-flue, a damper mounted therein having an air receiving and discharging chamber and tubular journals opening into said chamber, an air receiving and heating chamber fixed upon the outer walls of the smoke-flue supplementing and inclosing each journal, a perforated tubular extension for each journal telescoping with and projecting from its outer end and having a circumferential flange for attachment to the end of said journal, a tubular valve within the journal extension having slots opening at its inner end, a circumferential crimp adapted to engage a groove in said journal extension, a knob and a toothed rim on the outer end of the tubular-valve for closing the outer end of the journal and for rotatively adjusting the tubular-valve to regulate the feeding of air to the journal.

9. In an air-feeding-damper, a smoke-flue a damper mounted therein and having tubular journals and tubular extensions thereof provided with wall openings and having also an air-receiving, heating, and discharging chamber into which the journals open, air receiving and heating chambers upon the outer walls of the smoke-flue supplementing and inclosing the damper-journals and their tubular extensions, a tubular-valve within each tubular journal extension and having openings registering with the openings in the latter, and means for adjusting said tubes rotatively for regulating the air supply to the damper-chamber consisting of a knob closing the outer end of said tubular-valve, a toothed-rim on said knob and a pin adapted to engage said toothed rim with a part fixed to the tubular extension, and means for adjusting the damper.

10. In an air feeding damper, a smoke-flue, a damper mounted therein and having tubular-journals and tubular extensions thereof provided with wall openings and having also an air receiving, heating, and discharging chamber into which the journals open, air receiving and heating chambers upon the outer walls of the smoke-flue supplementing and inclosing the damper-journals and their tubular extensions, a tubular-valve within each tubular-journal extension and having openings registering with the openings in the latter, means for adjusting said tubes rotatively for regulating the supply of air to the damper-chamber, and means for holding each tube within the journal consisting of a circumferential crimp on said tube engaging a corresponding groove in the tubular-journal extension, means for holding said tubular-valves when adjusted, and means for adjusting the damper.



11. In combination with a smoke-flue, a damper mounted therein and having tubular journals provided with wall openings and an air receiving and heating chamber communicating with said journals and provided with exit openings into the flue, that part of the tubular journals having openings projecting beyond the flue-walls, a tubular valve within each tubular-journal and having openings  
5 registering with the openings therein, and  
10

means for adjusting said tubular valves rotatively for regulating the air supply to the damper-chamber.

In testimony whereof I have signed my name to this specification in the presence of 15 two subscribing witnesses.

GLADYS ISABELLA MUNSON.

Witnesses:

CECILIA A. BEACH,  
W. G. MUNSON.