April 10, 1928. 1,665,599

A. H. McCULLOCH

FURNACE REGULATOR UNIT

Filed March 16, 1927 2 Sheets-Sheet 1

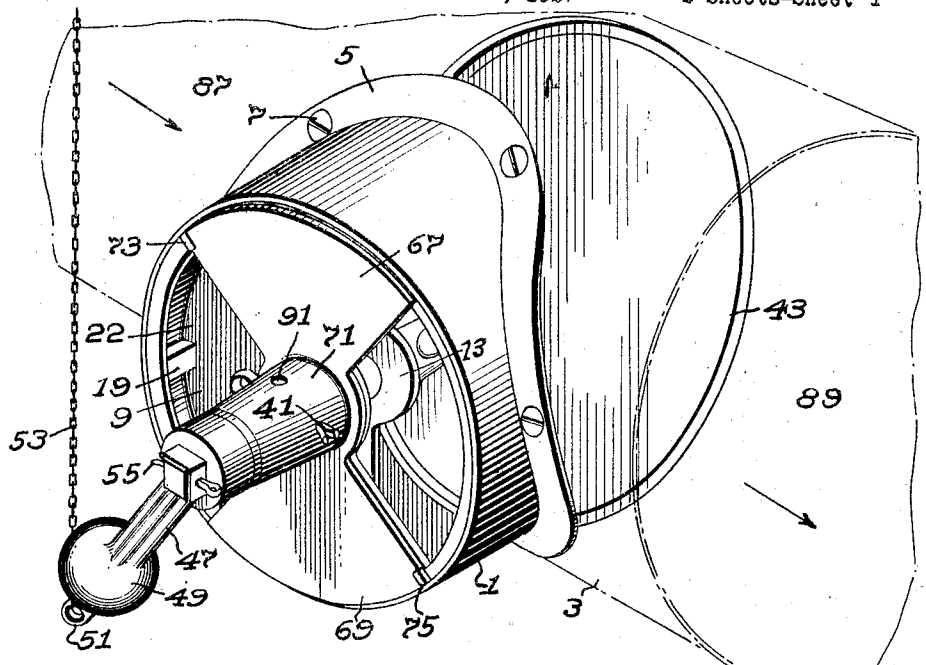


Fig. 1

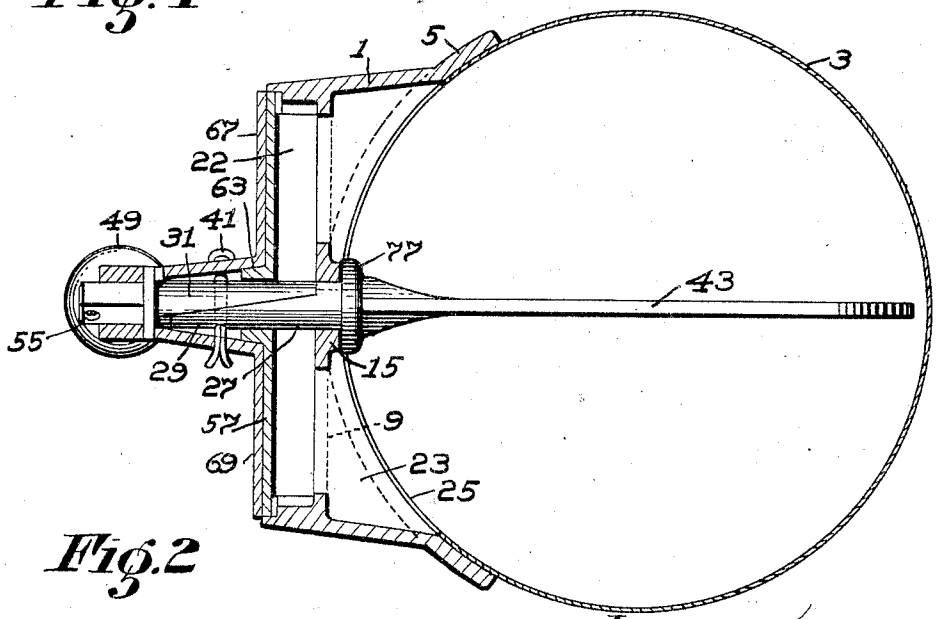


Fig. 2

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Fig. 3

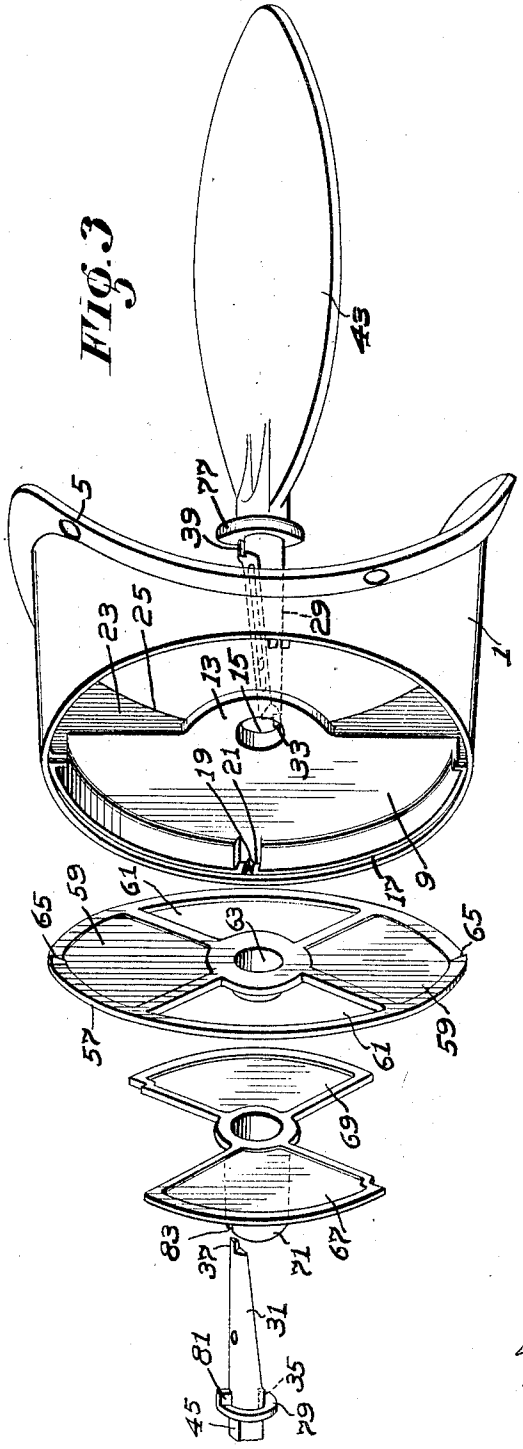


Fig. 5

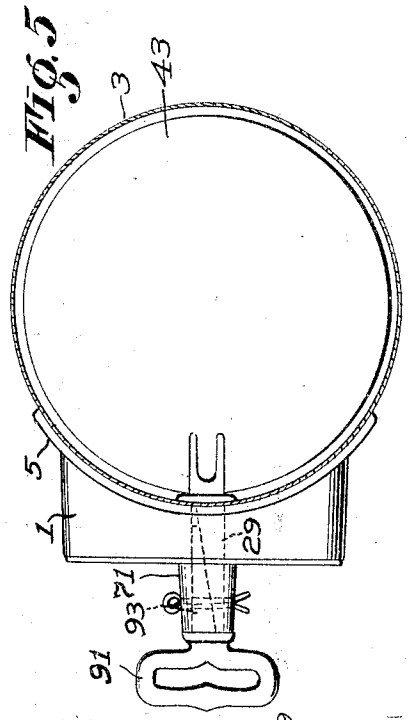
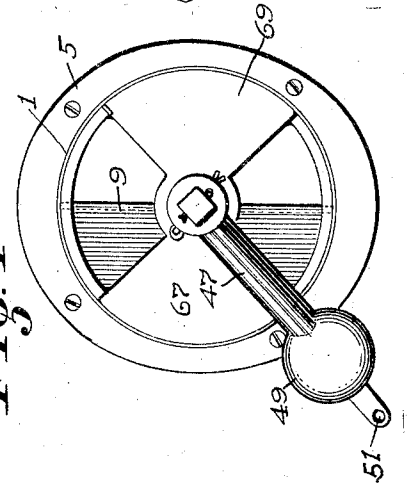


Fig. 4



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UNITED STATES PATENT OFFICE.

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FURNACE-REGULATOR UNIT.

Application filed March 16, 1927. Serial No. 175,723.

The invention to be hereinafter described relates to a damper and air-inlet regulator unit for application to the pipe for conducting the gases of combustion from a furnace to the chimney.

In Letters Patent of the United States No. 1,615,021, granted to me January 18, 1927, is disclosed a good form of damper and air-inlet regulator unit comprising a collar for application to the pipe, a disk-shaped damper for location in the pipe, a head on the collar having an opening, and diametrically opposed segmental shaped wings on the same shaft which carries the damper. The construction is such that when the damper is adjusted to open position for full draft from the furnace, one of the wings will cover the opening in the head, and when the damper is adjusted to closed position, said wing will uncover the opening in the head, thereby to allow air in the cellar in which the furnace is located, to enter the pipe through the opening. There is no opening in the head at the furnace side of the damper, so the noxious and injurious gases coming from the furnace can not escape into the cellar and rise up through the building to the discomfort of the occupants thereof.

Under certain conditions it may be desirable to provide a more ample air inlet opening for the unit when the damper is in closed position. A purpose of the present invention, therefore, is to provide the unit with a register and a chamber constructed to permit more air to pass through the unit, but without loss of substantial advantages of the unit set forth in said patent.

Another purpose of the invention is to provide the unit with a partition projecting from the head toward the damper and having an edge curved substantially to conform to the contour of the damper, the construction being such that when the damper is closed, its effectiveness in checking the fire is increased.

Still another purpose of the invention is to provide the unit with a register plate having air-inlet apertures therein adapted to be covered and uncovered by wings which are movable with the damper, the construction being such that the register plate may be adjusted to locate the apertures therein in different positions with relation to the head.

With the aforesaid and other purposes in view, the character of the invention may be best understood by reference to the following description of an embodiment thereof shown in the accompanying drawings, wherein:

Fig. 1 is a perspective view of the damper and air-inlet regulator unit applied to a pipe shown in dot-and-dash lines;

Fig. 2 is a transverse section through the unit and the pipe;

Fig. 3 is a perspective view of unassembled parts of the unit;

Fig. 4 is a front view of the unit showing the register plate in a position in which the apertures therein extend partly over the head and partly over the opening between the head and the collar; and

Fig. 5 is a side elevation of the unit and a transverse section through the pipe, and showing the unit provided with a handle for adjusting the damper and register.

Referring to the drawings, the damper and air-inlet regulator unit shown therein as one good form of the invention, comprises a collar 1 curved to conform to the contour of the pipe 3 and having a flange 5 connected by stove bolts 7 with the marginal portion of the pipe surrounding a hole cut in the pipe and of a size conforming to the collar.

The collar is provided with a head 9, in the present instance of an area substantially equal to half of the collar. This head is located in somewhat from the outer edge of the collar, and has a projection 13 provided with a short bearing 15. The collar is formed to provide a ledge 17 within and extending throughout the inner circumference of the collar. Lugs 19 project from the head to the ledge and have notches 21 at the ends thereof for a purpose to be described. Projecting rearwardly from the edge of the head is a partition 23 having a curved inner edge 25. The collar, flange, head and partition are preferably made in a single casting.

Mounted in the bearing 15 is a shaft 27 having mating spliced parts 29 and 31. The part 29 has a tongue 33 (Fig. 3) adapted to enter a notch 35 in the part 31, and the latter has a tongue 37 adapted to enter the notch 39 in the part 29. These tongues and notches serve to hold the parts in proper alinement. The parts are secured together by a cotter pin 41. Formed integral with the shaft part 29 is a disk-shaped damper

43 having a diameter somewhat less than the internal diameter of the pipe. The part 31 has a square end 45 adapted to receive an arm 47 having a ball-shaped weight 49 and an eye 51 adapted to be connected to a chain 53, said arm being held onto the square portion 45 by a cotter pin 55.

A circular register plate 57 has diametrically opposed solid portions 59 and wing-shaped aperatures 61. At the center of this plate is a short bearing 63. Projecting from the rear face of the plate are diametrically opposed lugs 65. The plate fits into the collar against the ledge 17, and the lugs 65 are adapted to enter either pair of opposed notches 21. An air-inlet chamber 22 is provided in the collar between the head and register plate.

Superposed on the register plate are segmental-shaped wings or plates 67 and 69 which project from a sleeve 71. The shaft extends through the register plate bearing 63 and through the sleeve 71, and the latter is secured to the shaft by the cotter pin 41, referred to, which projects through registering bores in the sleeve. The wings 67 and 69 are adapted respectively for engagement with stop lugs 73 and 75 projecting from the outer face of the register plate, said wings being notched where they engage the stops. A flange 77 on the shaft engages the bearing 15 and a flange 79 on the shaft engages the sleeve 71, thereby to confine the shaft against axial movement. The sleeve is caused to turn with the shaft by a key 81 which enters a notch 83 in the end of the sleeve.

The parts of this damper and air-inlet regulator unit may be quickly and easily assembled. To accomplish this, the register plate 57 is placed on the ledge 17 with its lugs 65 entering a pair of the notches 21. The wings are presented to the plate and the sleeve 71 is inserted over the bearing 63. The shaft part 29 is inserted through the bearings 15 and 63 and through the sleeve 71. The shaft part 31 is inserted in the sleeve and through the bearing 63 so that the tongues at the ends of the shaft parts will enter the notches therein. Then the cotter pin 41 is inserted through the bores in the sleeve and shaft parts. The arm 47 is mounted on the square end of the shaft and secured by the cotter pin 55. The relation of the parts is such that when the damper is in a position in which it extends transversely with respect to the length of the pipe, the wings uncover the register plate apertures, and on the other hand, when the damper is in open position parallel to the length of the pipe, the wings cover the register plate apertures.

When it is desired to apply the regulator unit to the pipe, the cotter pins are removed to allow separation of the parts. A hole is cut in the side of the pipe of a size corresponding to that of the collar, and the latter is secured by the stove bolts to the marginal portion of the pipe surrounding the hole. Then the damper is introduced into the pipe and the shaft part 29 is inserted through the bearings, the sleeve carrying the wings is presented to the plate, the shaft part 31 is inserted into the sleeve, the cotter pin 41 is inserted through the bores in the sleeve and shaft parts, the arm is applied to the square end of the shaft, and the cotter pin 55 is inserted in the shaft to secure the arm thereon.

In use, when a strong draft in a furnace is desired, the chain 53 is pulled upward, thereby turning the shaft to bring the damper to a position in which it is parallel to the length of the pipe, as indicated in Fig. 2. When the damper is adjusted to this position, the wings will cover the apertures in the register plate. When it is desired to check the fire and hold the heat in the furnace, the chain 53 is relaxed, thereby allowing the weight 49 to turn the shaft in a direction to bring the damper to a closed position in which it extends transversely to the length of the pipe, as indicated in Fig. 1. When the damper is in this position, the wings uncover the register plate apertures and engage the stop lugs 73 and 75. This will allow air in the cellar or other place in which the furnace is located, to enter the pipe through the register plate apertures. Some of the air will enter the pipe through the aperture which is opposite the opening between the edge of the head 9 and a part of the collar, and some of the air will pass through the other aperture and through the chamber 22 afforded by the space between the head and the register plate, and the air will pass thence through said chamber into the pipe.

It may be assumed that 87 (Fig. 1) is the side of the pipe between the furnace and the damper, and 89 is the side of the pipe between the chimney and the damper, and the draft is in the direction of the arrows. The air passing from the cellar through the register plate apertures will all be delivered into the pipe at the chimney side of the closed damper. Therefore, when the damper is closed, none of the gases of combustion at the furnace side of the damper can escape through the regulator unit into the cellar.

The damper may be set at any angle and the wings may partially cover the air-inlet apertures to any extent desired.

Under some conditions it may be desirable that the register plate apertures shall both be partially over the head and partially over the air-inlet opening between the head and the collar. To accomplish this, the cotter pins and the weighted arm are removed, and the wing sleeve 71 and the register plate are moved outward along the shaft to allow

the lugs 65 to escape from the notches 21 in which they were located. Then the register plate is turned through an arc of 90° to bring the lugs in registration with the other pair of notches 21. The wing sleeve is turned through an arc of 90°, and the cotter pin 41 is inserted through bores 91 in the sleeve which are set at right angles to the bores which formerly received the cotter pin. The weighted arm is replaced on the shaft in proper position to tend to turn the wings to positions for covering the register plate apertures, and the cotter pin 55 is inserted through the shaft to hold the arm thereon.

Under some conditions it may be desirable to employ a handle instead of a weighted arm for turning the shaft. To accomplish this, the weighted arm and the shaft part 31 may be removed, and a handle 91 (Fig. 5) having a shaft part 93 may be inserted into the wing sleeve to take the place of the shaft part 31.

When the damper is closed and the wings uncover the apertures in the register plate, air may freely pass through said apertures into the pipe at the chimney side of the damper. The chamber between the head and the register plate provides an ample passage for the air. The partition between the head and the damper prevents gases from the furnace from escaping through the register plate apertures into the cellar. A desirable feature of the construction is the provision of the two bearings in the head and plate a substantial distance apart, thereby serving reliably to maintain the damper in proper position in the pipe.

The parts of the unit are simple, cheap and strong in construction, and quickly and easily assembled. The unit may be applied to a horizontal or a vertical pipe or to one having any inclination.

It will be understood that the invention is not limited to the construction shown, and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, comprising a collar curved to conform to the contour of the pipe and adapted for attachment thereto, a head located in from the outer edge of the collar and formed to provide an air-inlet opening, a register plate on the outer edge of the collar, spaced from the head and having an aperture therein, said head and plate having bearings, a shaft projecting through said bearings, a damper on the shaft for regulating the draft through the pipe, a wing plate on the shaft adapted to be moved by the shaft to cover and uncover the plate aperture, and a member on the shaft for turning the same to adjust the damper and wing plates, said air inlet opening being wholly at one side of the axis of said shaft.

2. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from the furnace, comprising a collar curved to conform to the contour of the pipe and adapted for attachment thereto, a head in the collar located in from the outer edge of the collar and formed to provide an air-inlet opening, a bearing on said head, a shaft in said bearing, a damper on the shaft, a partition in the collar projecting from the head nearly to the damper and curved to conform to the latter, a register plate having air-inlet apertures therein, a sleeve on the shaft having wings for covering and uncovering said apertures, and means for rotatively adjusting the shaft.

3. A damper and air inlet regulator unit for application to the pipe for conducting gases of combustion from the furnace, comprising a collar adapted for attachment to the pipe, a head in the collar located in from the outer edge of the collar and formed to provide an air-inlet opening, a register plate on the outer edge of the collar and opposed to and spaced from the head, an air-inlet chamber between the head and plate, the latter having aperture to admit air to said opening and chamber, said head and plate having bearings, a shaft in said bearings, a damper on the shaft, a member on and moved by the shaft to cover and uncover the register plate aperture, and means for turning said shaft, said air inlet opening being wholly at one side of the axis of said shaft.

4. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, comprising a collar adapted for attachment to the pipe, a head in the collar formed to provide an air-inlet opening, a partition projecting rearward from the head, said collar, head and partition being in the form of a single casting, a register plate on the collar having apertures therein, a sleeve having wings for covering and uncovering said apertures, said head and plate having bearings, a shaft in said bearings connected to said sleeve, and a damper on the shaft.

5. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, comprising a collar adapted for attachment to the pipe, a head in the collar formed to provide an air-inlet opening, a bearing in the head, a shaft in the bearing having mating spliced parts, each having a tongue entering a notch in the other for alining said parts, a damper on one of said parts, and an operating member on the other of said parts.

6. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, com-

prising a collar adapted for attachment to the pipe, a head in the collar located in from the outer edge of the collar formed to provide an air-inlet opening, a register plate on the collar outward from said head and having apertures therein, one over the head and the other over the opening, said head and plate having bearings, a shaft in said bearings, a damper on the shaft, a sleeve on and moved by the shaft and having wings for covering and uncovering said apertures, and an operating member for the shaft, said inlet opening being wholly at one side of the axis of said shaft.

7. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, comprising a collar adapted for attachment to the pipe, a head in the collar formed to provide an air-inlet opening, a register plate having solid portions and a pair of apertures, said plate being adjustable to a position in which one of its apertures is wholly over the head and adjustable to a position in which both of said apertures are partly over the head, bearings on said head and plate, a shaft in said bearings, a damper on the shaft, and a sleeve connected to the shaft having wings for covering and uncovering said apertures.

8. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, comprising a collar adapted for attachment to the pipe, a ledge on the collar adjacent the outer edge thereof, a head in the collar formed to provide an air-inlet opening, a register plate seated on the ledge and having air-inlet apertures therein, bearings on the head and plate, a shaft in the bearings, wings connected to the shaft for covering and uncovering the apertures, a damper on one end of the shaft, and an operating member on the other end of the shaft.

9. A damper and air-inlet regulator unit for application to the pipe for conducting gases of combustion from a furnace, comprising a collar adapted for attachment to the pipe, a head in the collar formed to provide an air-inlet opening, an apertured register plate on the collar spaced outward from the head, a wing plate on the register plate, said head, register plate and wing plate having registering holes therein, a shaft projecting through said holes, and a damper on said shaft, the latter having means for holding the head, register plate and wing plate in assembled relation.

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