Aug. 12, 1958 A. J. STILL 2,846,935

FLUE BREATHER

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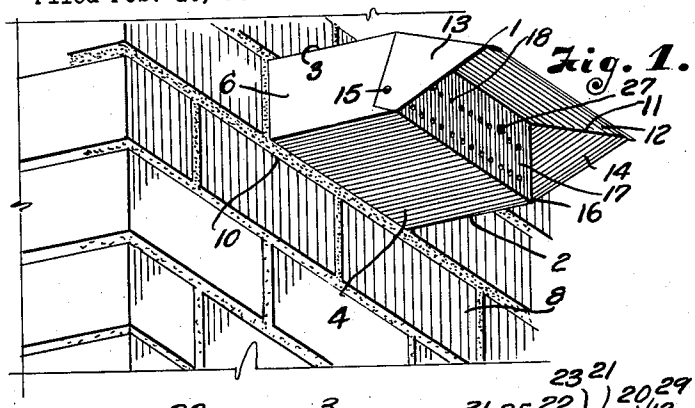


Fig. 1.

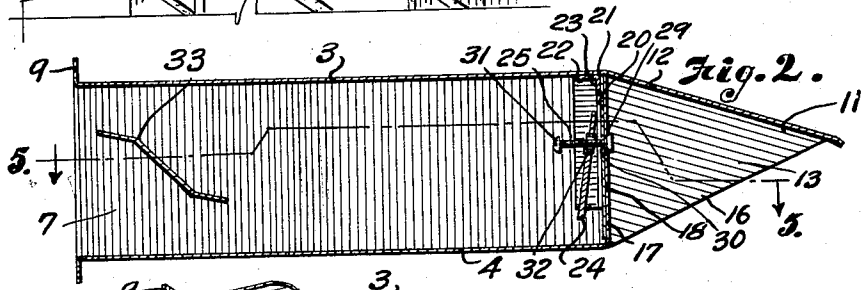


Fig. 2.

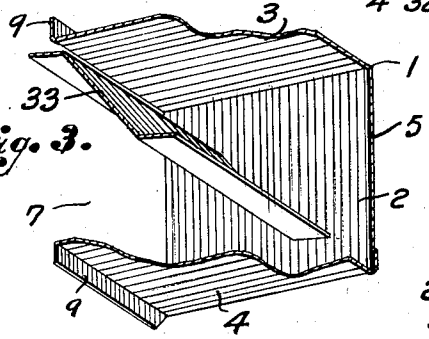


Fig. 3.

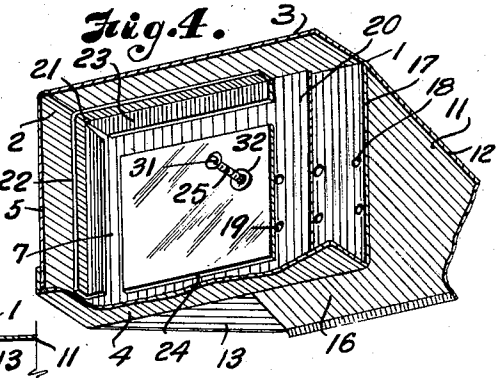


Fig. 4.

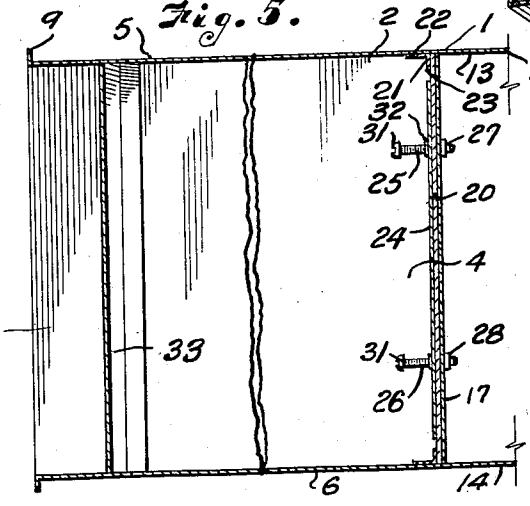


Fig. 5.

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Fig. 6.

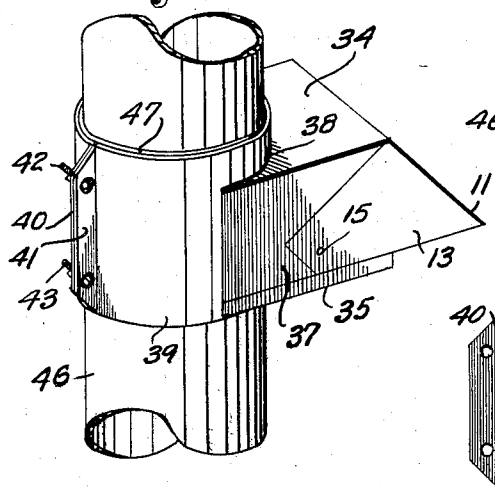


Fig. 7.

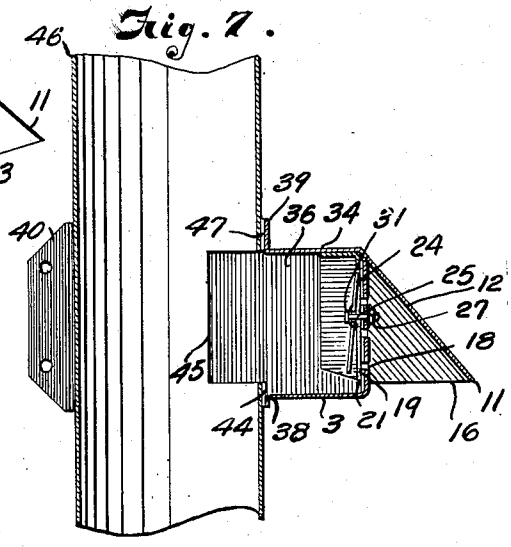


Fig. 8.

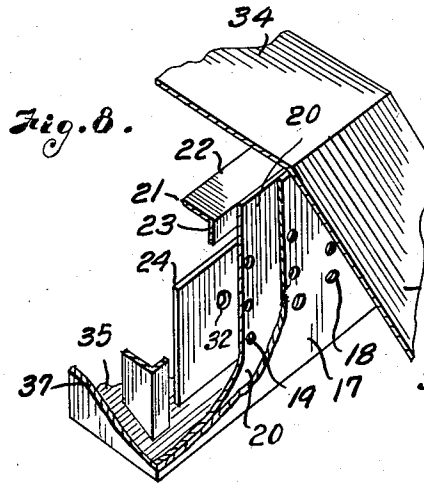
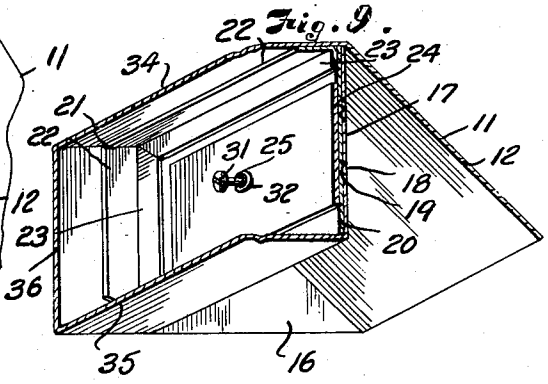


Fig. 9.



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FLUE BREATHER

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3 Claims. (Cl. 98—48)

This invention relates to a breather adapted to be connected with an upper portion of a flue or vent stack and has for its object to facilitate discharge of flue gases that tend to collect in the upper end of flues or stacks having poor draft conditions. Other objects of the invention are to provide a flue breather which is constructed for facilitating application thereof to a flue or vent at any desired location, for example, in the attic or near the ceiling of a space which is to be heated and/or ventilated; to provide a breather having inlets and a damper adapted to close the inlets automatically in case of downdrafts; and to provide a simple lightweight damper which opens and closes responsive to relatively slight pressure differentials on the respective sides thereof.

In accomplishing these and other objects of the invention hereinafter pointed out, I have provided improved structure the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of a portion of a conventional brick type of chimney equipped with a breather constructed in accordance with the present invention and which is adapted to be inserted in place of one of the bricks of the chimney.

Fig. 2 is a longitudinal sectional view through the breather.

Fig. 3 is a fragmentary perspective view particularly illustrating the deflector or baffle which retards entrance of flue gases from the flue into the breather.

Fig. 4 is a fragmentary perspective view particularly illustrating the breather inlets, gasket and damper.

Fig. 5 is a horizontal section through the breather on the line 5—5 of Fig. 2.

Fig. 6 is a perspective view of a modified form of invention and which is particularly adapted to cylindrical vent stacks or flues.

Fig. 7 is a vertical section through the breather and vent to which it is attached.

Fig. 8 is a fragmentary perspective view of the inlet end of the breather particularly illustrating the inlet openings, gasket, and control damper.

Fig. 9 is a similar perspective view but showing the parts as viewed from within the breather.

Referring more in detail to the drawings and first to the form of invention illustrated in Figs. 1 to 5, inclusive:

1 designates a breather constructed in accordance with the present invention and which is particularly adapted for use in connection with chimneys or flues of brick construction. The breather 1 includes a tubular body or casing 2 having a top and bottom 3 and 4 and side walls 5 and 6 to provide a horizontal duct or passageway 7 open at one end for connection to a flue or chimney. The casing has a cross sectional size and shape conforming to one of the bricks 8 of a chimney in which the device is to be inserted, as later described. The flue end of the top, bottom and sidewalls is preferably provided with laterally turned flanges 9 having a depth substantially conforming to the depth of the mortar joints 10 between the bricks whereby when the breather is inserted

within a lateral opening of the chimney that has been provided upon removal of one of the bricks, the flanges, preferably, lie flush with the inner face of the chimney and close the mortar spaces that surround the respective sides of the breather. The casing or body portion of the breather is of sufficient length to project from the outer face of the chimney and terminates in a hood 11. In the illustrated instances, the hood 11 is shown as comprising a downwardly and outwardly directed top portion 12 formed as an extension of the top 3 and which has downwardly directed side wings 13 and 14 that overlap the side walls 5 and 6, as best shown in Fig. 1. The wings are preferably secured to the side walls by suitable fastening devices such as rivets or spot welds 15. The wings 13 and 14 thus form the sides of the hood and also braces for supporting the top of the hood at the desired slant to protect the downwardly facing entrance 16 to the hood. Extending transversely between the walls 3—4 and 5—6 is a partition 17 having air inlet openings or apertures 18 therethrough and which are preferably arranged in transverse rows to register with corresponding apertures 19 in a gasket 20 that seats against the inner face of the partition. The partition and gasket are held in position within the breather by a frame 21 having an outer marginal flange 22 secured to the respective walls of the breather, as, for example, by spot welding, to support an inwardly extending marginal flange 23 in position to seat the marginal portions of the gasket and partition members, as best shown in Figs. 2 and 4.

In order to control inlet through the apertures 18 and 19 into the flue and to close the apertures in case of downdrafts through the chimney, the breather includes a damper plate 24 that is preferably formed of a fire resistant light weight material such as sheet mica and which is of a size to cover all of the apertures. The damper is slidably supported on studs or pins 25 and 26 which are spaced apart and adjustably retained in nuts 27 and 28 that are welded to the outer face of the partition in registry with openings 29 and 30 in the partition and gasket through which the studs are projected and threaded into the nuts to adjust heads 31 thereof to and from the gasket to provide the desired opening of the damper. The damper is slidably mounted on the studs between the gasket and heads 31 and to facilitate movement thereof the damper is preferably provided with grommets 32 through the studs extend and which grommets are sufficiently wide to prevent catching on the threads of the studs or pins 25 and 26. It is thus obvious that the studs project in the direction of the open end and support the damper for movement to and from the apertures responsive to pressure differential acting on the inner and outer sides of the partition.

The outlet end of the breather may be provided with a tranverse baffle 33 to aid in excluding flue gases from entering the breather.

A breather constructed as illustrated and described in Figs. 3 to 5 is installed at the desired position within the chimney by removing one of the bricks 8 and cleaning out the mortar from the opening thus provided. The studs are adjusted to allow the proper movement of the damper, after which the flanged ends of the breather are inserted into the opening thus provided until the flanges 9 preferably are flush with the inner face of the chimney. The mortar space then surrounding the breather is filled in with fresh mortar. The flanges 9 form the inner stop for the mortar so that the mortar may be pressed tightly around the breather to securely retain the breather when the mortar is set. As above stated, low draft conditions in the chimney cause the flue gases to collect in the upper end of the flue passageway, particularly when cold heavy air and/or windy conditions exist exteriorly of the building served by the chimney. However, the

breather being mounted within the attic of the building provides for inlet of air to displace the flue gases. The air in the attic being warmer than the exterior air passes through the openings **18** and **19** with sufficient velocity to keep the damper **24** unseated and maintain flow into the chimney to displace the stagnant flue gases. In case of back draft as during excessively windy conditions, the back draft produces sufficient pressure in the chimney to cause the relatively light weight damper **24** to move on the pins and to make contact with the gasket which forms a part of the partition to close and prevent flow through the apertures **18** and **19**.

The form of invention shown in Figs. 6 to 9, inclusive, is particularly adapted for cylindrical flues or vents. In this form of the invention the breather has top and bottom walls **34** and **35** and sides **36** and **37** corresponding with the walls in the first described form of the invention. However, in this instance the top and bottom walls **34** and **35** are provided with semicircular notches **38** to fit a cylindrical collar **39** to which the top, bottom and side walls are suitably connected as by welding or the like. The collar **39** is of the split type and the ends thereof terminate in outwardly extending flanges **40** and **41** that are adapted to be drawn together by fastening devices such as bolts **42** and **43**. The collar **39** has an opening **44** in registry with the breather duct and which also is adapted to register with a similarly shaped opening **45** in the vent or flue **46** to which the breather is to be connected. Otherwise the structure corresponds with that previously described and like designations are used on the corresponding parts.

In applying the form of invention shown in Figs. 6 to 9, an opening **45** is made in the vent and the flanged ends of the collar are spread apart to pass over the flue **46**, after which the flanges **40** and **41** are brought together and secured by the fastening devices **42** and **43**. In order to prevent leakage between the collar and the wall of the vent, the collar is preferably lined with a suitable gasket material **47**.

This form of the invention is particularly adapted for use on the vent outlets of trailers to effect removal of the warm air that collects under the ceiling and to improve circulation of the air within the trailer when the trailer is being heated.

From the foregoing it is obvious that I have provided a flue breather that is readily adapted for installation on existing flues or vents and that the damper or valve mechanism is of simple construction and adapted to operate automatically responsive to pressure differentials on the respective sides of the perforated inlet to the breather ducts.

What I claim and desire to secure by Letters Patent is:

1. A breather adapted for connection with a lateral opening in a flue for effecting a substantially continuously open inlet for flow of air through said lateral opening and into the upper part of the flue to displace flue gases tending to collect in the upper portion of the flue, said breather including a substantially horizontal tubular casing having an open end adapted to be connected with the lateral opening in said flue, a transverse partition at the opposite end of the casing and provided with an air inlet, guide pins projecting substantially horizontally from the partition on the side facing the flue, and a damper having free sliding support on said guide pins and to depend from said guide pins in spaced relation with the partition to uncover the air inlet and provide for free flow of air through said air inlet of the partition and into the flue for keeping flue gases from collecting in the upper portion of the flue, said damper being movable on said guide pins from said spaced position into contact with the partition for closing said air inlet opening responsive to a downdraft in said flue and said damper being retractable on said guide pins to said open position responsive to pressure of external air acting on the damper after suspension of said downdraft to re-establish said air flow into the flue.

2. A breather adapted for connection with a lateral opening in a flue for effecting a substantially continuously open inlet for flow of air through said lateral opening and into the upper part of the flue to displace flue gases tending to collect in the upper portion of the flue, said breather including a substantially horizontal tubular casing having an open end adapted to be connected with the lateral opening in said flue, a transverse partition at the opposite end of the casing and provided with an air inlet, a baffle extending transversely within said open end of the casing to assist in excluding flue gases from entering the casing, guide pins projecting substantially horizontally from the partition on the side facing the flue, and a damper having free sliding support on said guide pins and to depend from said guide pins in spaced relation with the partition to uncover the air inlet and provide for free flow of air through said air inlet of the partition and into the flue for keeping the flue gases from collecting in the upper portion of the flue, said damper being movable on said guide pins from said spaced position into contact with the partition for closing said air inlet opening responsive to a downdraft in said flue and said damper being retractable on said guide pins to said open position responsive to pressure of external air acting on the damper upon suspension of said downdraft to reestablish said air flow into the flue.

3. A breather adapted for connection with a lateral opening in a flue for effecting a substantially continuously open inlet for flow of air through said lateral opening and into the upper part of the flue to displace flue gases tending to collect in the upper portion of the flue, said breather including a substantially horizontal tubular casing of rectangular cross section and having an open end adapted to be connected with the lateral opening in said flue, a transverse partition at the opposite end of the casing and provided with air inlet openings, a hood extending outwardly from the casing in protecting relation with said air inlet openings of the partition, spaced apart guide pins projecting substantially horizontally from the partition on the side facing the flue, a substantially rectangular damper having spaced apertures passing the pins for free sliding support of the damper on said guide pins and to normally depend from said guide pins in spaced relation with the partition to uncover the air inlet openings and provide for free flow of air from the hood side of the partition through said air inlet openings and into the flue for keeping flue gases from collecting in the upper portion of the flue, said damper being movable on said guide pins from said spaced position into contact with the partition for closing said air inlet openings responsive to a downdraft in said flue and said damper being retractable on said guide pins to said open position responsive to pressure of external air acting on the damper after suspension of said downdraft to reestablish said air flow into the flue, and a baffle inset within the open end of the casing to exclude flue gases normally from the casing.

References Cited in the file of this patent

UNITED STATES PATENTS

218,596	Taber	Aug. 12, 1879
501,253	Netzer	July 11, 1893
773,723	Farrington et al.	Nov. 1, 1904
1,186,303	Frost	June 6, 1916
1,470,930	McConnell	Oct. 16, 1923
2,052,315	Riesner	Aug. 25, 1936
2,297,892	Jacobs	Oct. 6, 1942
2,347,895	Evans	May 2, 1944
2,350,771	Klunder	June 2, 1944
2,473,804	Ledoux	June 21, 1949
2,565,122	Cowan	Aug. 21, 1951