April 26, 1938. F. H. SCHLUNZ 2,115,541

ADJUSTABLE AIR FILTERING AND CIRCULATING DEVICE

Filed Oct. 28, 1936

Fig. 1

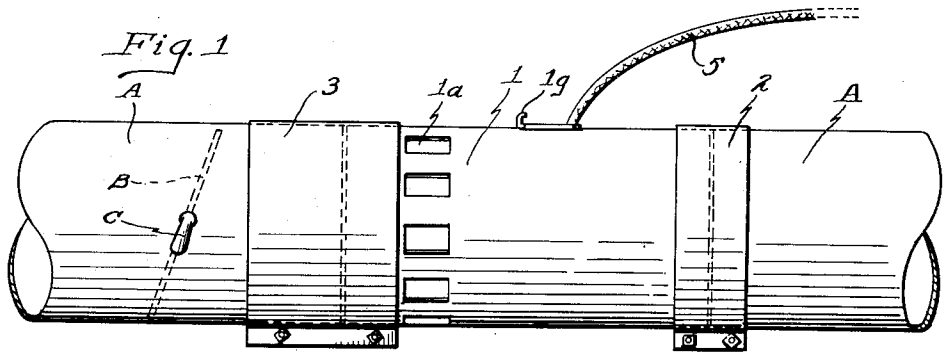


Fig. 2

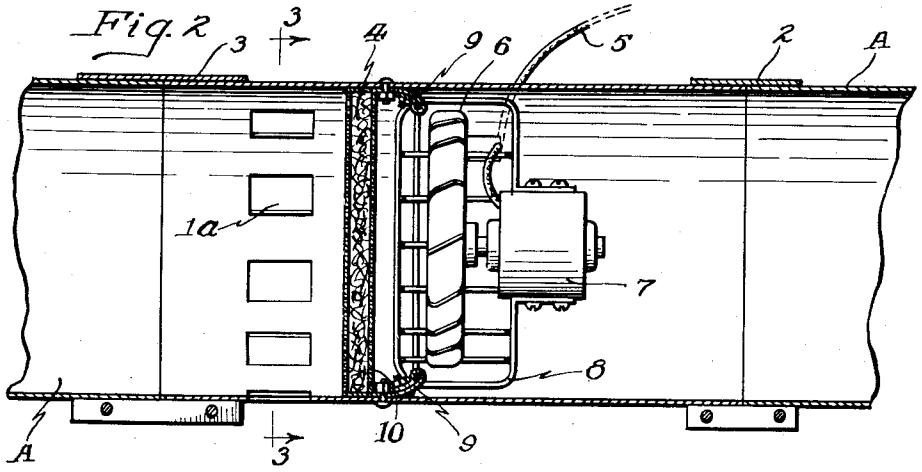


Fig. 3

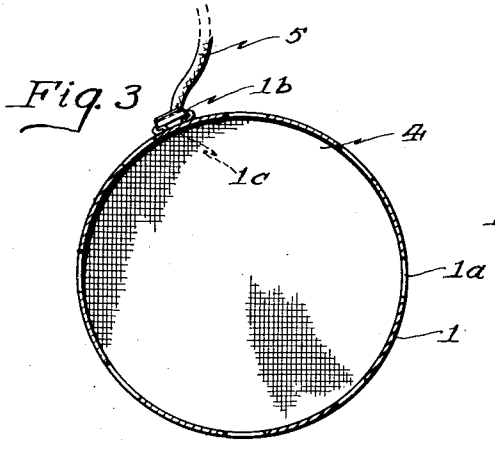
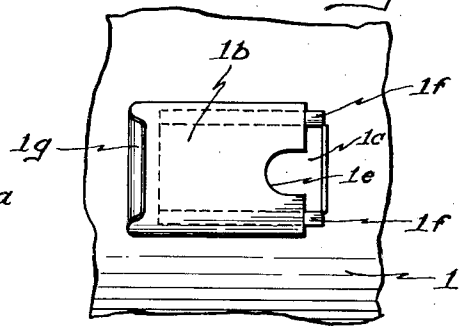


Fig. 4



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Patented Apr. 26, 1938 2,115,541

UNITED STATES PATENT OFFICE

2,115,541

ADJUSTABLE AIR FILTERING AND CIRCULATING DEVICE

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Application October 28, 1936, Serial No. 107,943

6 Claims. (Cl. 183—48)

This invention is an adjustable air filtering and circulating device adapted to form a portion of the cold air duct or pipe leading to a conventional hot air furnace to circulate and purify the air circulating therethrough.

An important object of this invention is the provision of a device which will accomplish the purposes for which it is designed and which may be easily made a part of the conventional air pipes without substantial changes in said pipes and with a minimum of labor for installation.

A further object of the invention is to provide a means to filter and circulate air in conjunction with the conventional air ducts in which a conventional household type electric fan may be used for propelling the air, without substantially changing the said fan.

A further important object of this device is to provide a housing in which a fan may be placed adapted to optionally draw air from the upper portions of a house or to draw air from the cellar or basement, for circulation through the regular discharge pipes or ducts.

In the past, it has been generally customary to install hot air furnaces in such a manner that the air circulated past the heated surfaces of the furnace only by convection. One or more cold air shafts are usually placed near the floor in the upper stories of the house, connecting to the lower part of the furnace casing by means of air shafts or ducts. The cold air drawn through the cold air shaft passes the heated furnace, is heated, is expanded by said heat, and passes through the hot air pipes to the rooms above. Experience has shown that unless the cold and hot air pipes are carefully placed and scientifically planned, the circulation of the air is often relatively small, and inadequate where convection alone is relied upon. Forced circulation such as that provided by my air circulating fan is necessary for best results, particularly when it is desired to heat the rooms quickly.

In summer, the cellar or basement is usually cooler than the rooms above. My invention also provides means whereby the cooler air in the basement may be drawn into the conventional air ducts and circulated through the rooms above, thereby cooling and air conditioning the rooms above.

Other and further objects of the invention will be apparent from the drawing and the specification.

On the drawing:—

Fig. 1 is a side elevational view of my invention attached to a conventional air duct, showing also the damper or valve which is conventionally placed in said air duct.

Fig. 2 is a central vertical cross sectional view of my invention, showing the internally contained air filtering pad and showing the electric motor driven fan in elevation.

Fig. 3 is a cross sectional view of the device taken on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged elevational view of the aperture and slidable cap at the top of the device, which provides a means of oiling and inspection of the same, and through which the electric cord extends for connection to a source of electric current.

As shown on the drawing:—

The letter "A" indicates the conventional tubular air ducts which lead to the usual casing of a hot air furnace. The letter "B" indicates a pivotally mounted circular damper which is usually placed in said air duct to control the volume of air passing therethrough, and having an externally extending lever C by means of which the relative position of said damper may be controlled.

The numeral 1 indicates the cylindrical casing which houses the internal parts and mechanism of my device, having formed therein the plurality of parallel holes or apertures indicated by the numeral 1*a*. The numeral 1*b* indicates the slidable top or cap which covers a further aperture 1*c*, in casing 1, indicated in Fig. 4, adapted to allow inspection of the internal parts and the oiling thereof and further, having formed therein as shown in Fig. 4, the aperture 1*e* adapted to allow the electric cord 5 to pass therethrough.

The numeral 2 indicates a relatively wide annular band adapted to connect one end of casing or housing 1 to the conventional air duct A. The numeral 3 indicates a further annular band, relatively wider than band 2, adapted also to connect one end of casing 1 to duct A, as shown on the drawing, and also, when placed in forwardmost position, to cover the holes or apertures 1*a* in casing 1, closing said apertures.

The numeral 4 indicates a circular pad of resilient material adapted to allow the passage of air therethrough, but of sufficiently fine mesh or consistency as to effectively catch and hold any dust or other foreign material which may be carried by the air drawn into said air ducts or pipes. Said pad 4 is removable and is frictionally retained within the casing 1, but rests rearwardly against the foraminated circular partition indicated by the numeral 10. The said filtering pad 4 may be chemically treated, if desirable, to further make the same impervious to dust and the like or may be scented or otherwise chemically treated to remove obnoxious odors or dangerous fumes from the air.

As shown in Fig. 2, the numeral 7 indicates a conventional electric motor, having affixed to the hub thereof an air propelling fan indicated by the numeral 6. The numeral 8 indicates the conventional guard which surrounds the blades

of said fan. The numeral 9 indicates the plurality of straps or connections which are adapted to be fastened to the fan guard 8, holding the fan in proper position.

As shown in Fig. 3 the pad or filtering medium 4, which is indicated heretofore is removable, may have a foraminated face and back turned annular sides as shown in Fig. 2, or may consist of a compressed integral pad adapted to fit snugly in and be retained in the central opening of tubular casing 1.

As indicated in Fig. 4 the aperture 1c has a pair of oppositely outwardly extending parallel lips 1f, forming grooves. The slidable cap 1b has a pair of inwardly extending parallel lips adapted to fit behind said lips 1f and longitudinally slidably retained thereby. The upwardly extending lip 1g formed integral with cap 1b allows said cover 1b to lie opened or closed, for the purposes hereinbefore set out. The aperture 1e in said top or cover 1b allows the electric cord 5 to be passed from the motor 7 to a source of electric current.

To attach the device, a suitable length of pipe must be removed from the conventional air duct leading to the furnace. For best results this device should be attached to the usual cold air pipe or duct. In original installations no pipe need be removed, the device being merely placed in the regular pipe as a part thereof. As hereinbefore indicated, the annular rings 2 and 3 hold the device in proper position.

In winter time, the annular ring 3 is shifted to a position covering the apertures 1a in casing or housing 1, and the damper B is positioned parallel with the pipe A, allowing maximum passage of air through said pipe. When the air suction fan or propeller is turned by the motor, the air will be drawn through the filter or pad 4 and its circulation past the heated surfaces of the furnace will be substantially increased thereby.

In summer time, the annular band 3 may be moved rearwardly, exposing the apertures 1a. When damper B is closed (as shown in Fig. 1) or partially closed, and the suction fan is operated, air from the basement or cellar will be drawn through said holes or apertures, pass through the said filtering pad and be circulated through the conventional air ducts, effectively cooling and air conditioning the house.

It will be obvious from the drawing and above detailed description that I have invented a device which will effectively function for the purposes set forth.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations on the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

I claim as my invention:

1. In an adjustable air filtering and circulating device the combination of, a tubular casing forming a part of an air circulating duct having an aperture therein, an annular ring at one end of said tubular casing adapted to removably connect said tubular casing to said air circulating duct, an annular ring at an end opposite said first annular ring adapted to connect said casing to said air duct and adapted to optionally slidably close said aperture in said tubular casing, an air filtering medium in said casing and a plurality of connections adapted to connect to an air fan mounted in said casing.

2. In an adjustable air filtering and circulating device a cylindrical casing adapted to form a part of an air circulating pipe, said cylindrical casing having a plurality of circumferentially formed apertures therein, connecting bands at both ends of said casing, one of said bands optionally slidable to cover said apertures in said casing, a resilient air filter transversely mounted in said casing, and a plurality of strap connections adapted to firmly position an air fan in said casing.

3. In an adjustable air filtering and circulating device, a cylindrical casing forming a part of an air circulating system, said cylindrical casing having a plurality of circumferentially placed apertures at one end thereof, annular connecting bands on opposite ends of said casing, one of said bands being optionally slidable to close said apertures, a pad, pervious to air, adapted to filter air passing through said casing and extending completely transversely across the internal portion of said casing, and means to mount an electrically motor driven fan in said casing.

4. In an adjustable air filtering and circulating device, a casing forming a part of an air circulating system, said casing having a plurality of apertures at one end thereof, a pair of annular bands at opposite ends of said casing adapted to fasten said casing to a pipe in said air circulating system, one of said bands being adjustably slidable to close said apertures, a removable air filtering medium extending entirely across the internal portions of said casing and mounting straps adapted to mount an air fan in said casing.

5. In an adjustable air filtering and circulating device the combination of a tubular casing adapted to form a part of a conventional air circulating pipe, said tubular casing having an aperture therein near one end thereof, a relatively wide annular band adapted to connect one end of said tubular casing to an air circulating pipe and being optionally slidable in rearwardmost position to cover the aperture in said casing, a relatively narrow annular band adapted to connect the tubular casing to said air circulating pipe, a filter pad in said casing adapted to filter air passing therethrough and straps extending radially in said casing and adapted to form a means of mounting a conventional electrically driven fan in said casing.

6. In an adjustable air filtering and circulating device the combination of a tubular casing having a plurality of circumferentially formed apertures therein, said casing being adapted to be removably connected to a conventional air circulating pipe by means of a pair of split annular connecting bands, one of said bands being relatively wider than the other and adapted to slidably close the apertures in said tubular casing when in rearwardmost position, a removable air filtering pad extending transversely across the hollow internal portion of said casing, a transversely extending mesh forming a base for said pad and flexible connecting straps adapted to fixedly yet removably mount an air propeller in said casing.

FREDERICK H. SCHLUNZ.