

May 21, 1929.

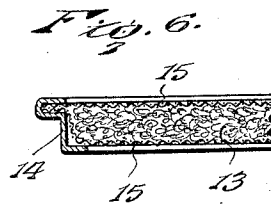
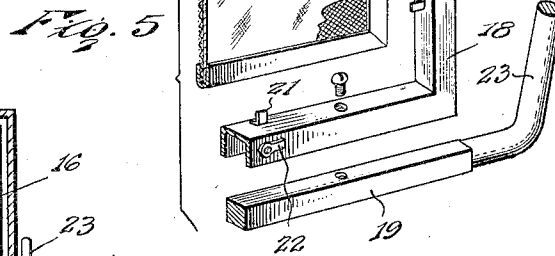
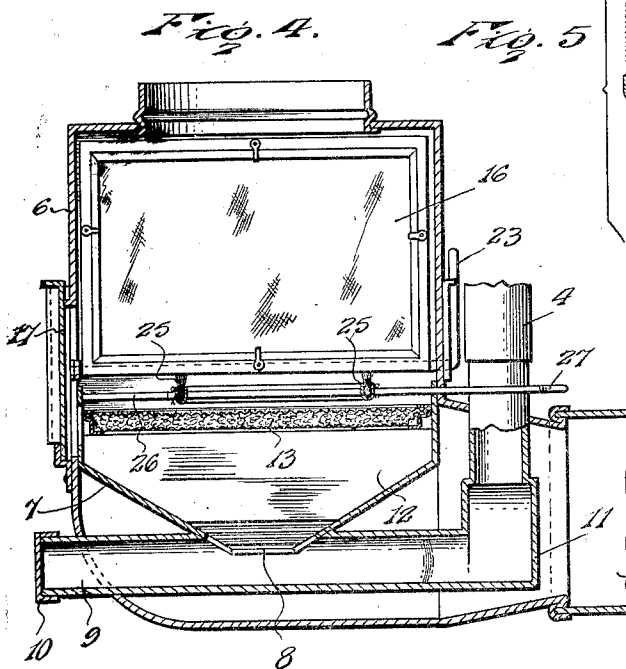
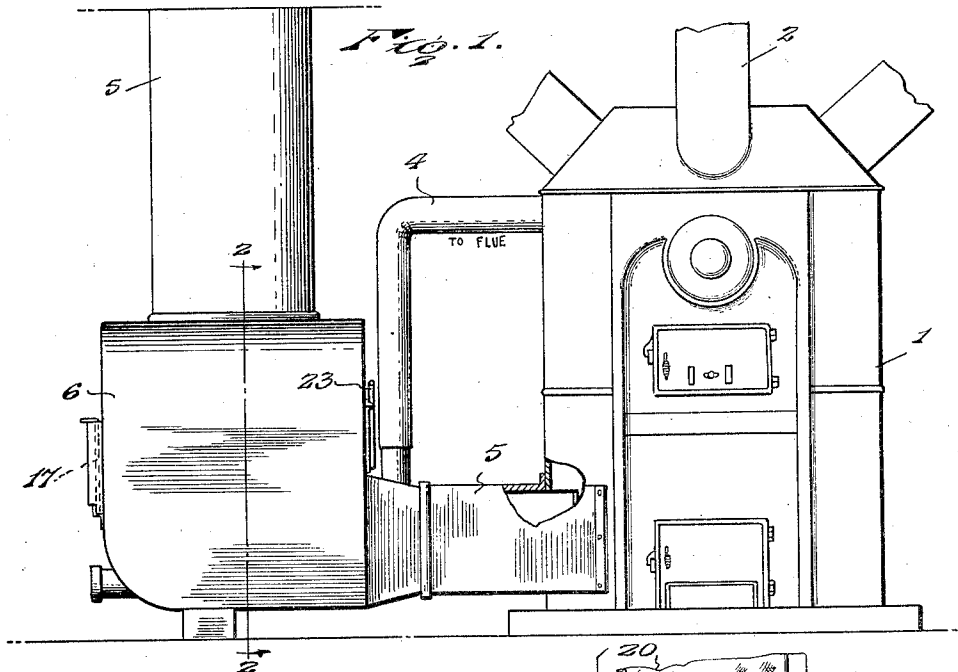
A. L. McLEAN

1,713,880

AIR CLEANER

Filed Aug. 17, 1927

2 Sheets-Sheet 1



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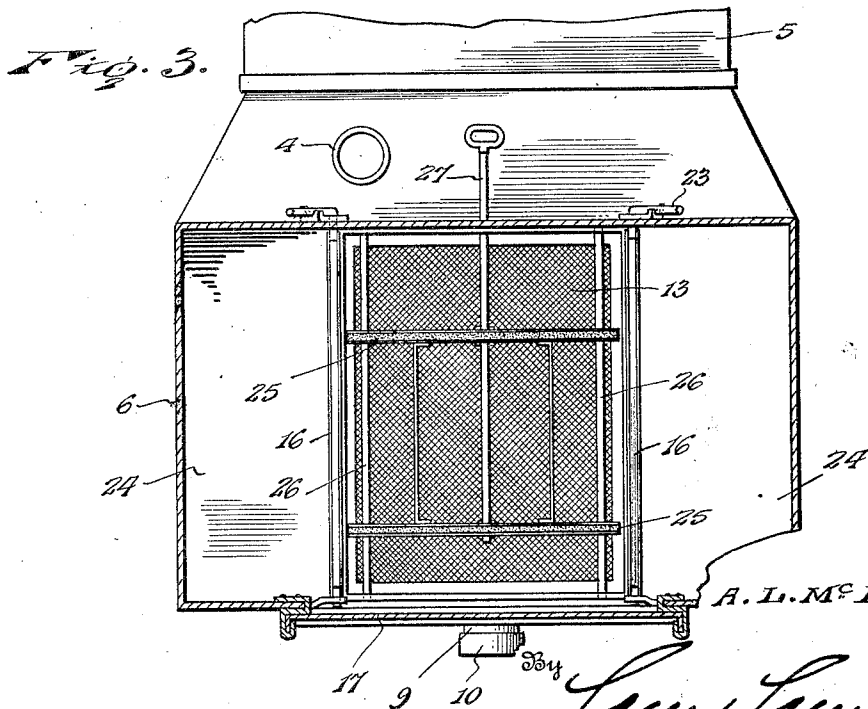
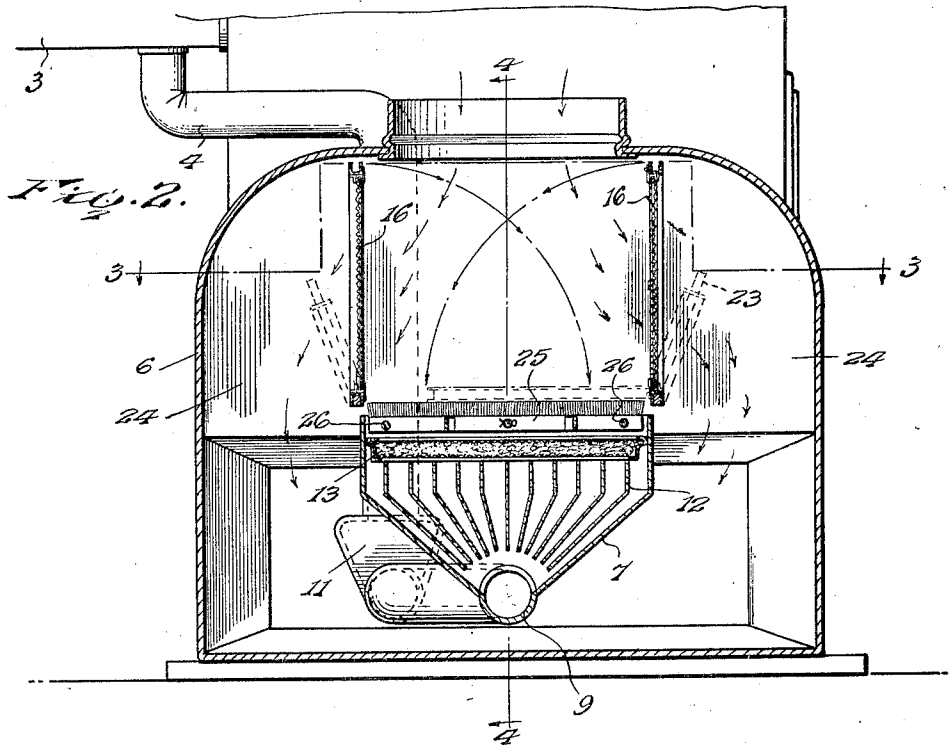
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UNITED STATES PATENT OFFICE.

AUGUSTUS L. McLEAN, OF ASHEVILLE, NORTH CAROLINA.

AIR CLEANER.

Application filed August 17, 1927. Serial No. 213,681.

This invention provides means for the removal of dust, lint and other impurities from air supplied to air heating furnaces for warming dwellings, buildings and structures of abode and assemblage, thereby insuring pure air for respiration and obviating the depositing of dust on walls, hangings, interior finishings and furniture as commonly experienced in hot air heating where no provision is made for eliminating the impurities from the air admitted to the furnace to be heated and distributed to the rooms and other places to be made comfortable in cold weather.

The invention contemplates an air cleaner interposed in the length of the cold air supplying pipe, which separates the impurities from the air, the bulk of the impurities passing off through the smoke flue and the remaining impurities collecting and being removable as occasion may require.

The invention provides a cleaner which may be installed in a limited space and which insures a positive draft for carrying off the impurities separated from the air.

The invention furthermore provides a device of the character aforesaid which is readily accessible and provided with means for dislodgment of the impurities tending to collect on the separating means.

While the drawings illustrate a preferred embodiment of the invention, it is to be understood that in adapting the means to meet specific needs and requirements the design may be varied and such other changes in the minor details of construction may be resorted to within the scope of the invention as claimed, without departing from the spirit thereof.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and the drawings hereto attached, in which,

Figure 1 is an elevational view of a hot air furnace provided with an air cleaner, embodying the invention.

Figure 2 is an enlarged sectional view of the cleaner on the line 2-2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a plan sectional view on the line 3-3 of Figure 2.

Figure 4 is a detail sectional view on the line 4-4 of Figure 2, looking in the direction indicated by the arrows.

Figure 5 is a fragmentary perspective

view of a portion of a filtering damper, the parts being separated.

Figure 6 is a fragmentary sectional view of the dust collecting mat.

Corresponding and like parts are referred to in the following description and designated in the several views of the drawings by like reference characters.

The numeral 1 designates a hot air furnace such as commonly provided for heating air and distributing the same. The numeral 2 designates the pipes for distributing the hot air. The smoke flue is designated by the numeral 3, and 4 designates the dust pipe which connects the cleaner with the smoke flue. The pipe 5 supplying air to the jacket of the furnace 1 is designated by the numeral 5, and the cleaner is interposed in the length of this pipe and comprises a body 6 which is provided at its top and sides with collars to which parts of the pipe 5 are coupled in a manner common in connecting pipe joints. The body 6 consists of a casing and is usually formed of sheet metal, and is of a size and shape best adapted for the particular installation. A trap 7 is disposed within the lower portion of the body or casing 6. The lower portion of the trap 7 tapers towards an outlet 8 which is in communication with a pipe 9 which in effect forms an extension of the dust pipe 4. The pipe 9 is disposed horizontally and projects beyond opposite sides of the body or casing 6 and is closed at one end by means of a cap 10 and its opposite end connects with a box 11. A plurality of baffles 12 are disposed within the trap 7 and the lower portions converge to direct the dust and other impurities separated from the air towards the outlet 8. A mat 13 is removably fitted within the upper portion of the trap 7 and is usually supported upon the upper ends of the baffles 12. The mat 13 is of a nature to check the too free passage of air there-through without preventing the passage of dust. The mat usually consists of a metal frame 14 and spaced coverings 15 of wire gauze between which a filling of metal filings or steel wool is provided.

Two filtering dampers 16 are located within the upper portion of the body 6 above the trap and upon opposite sides of the opening in the top to which the air supplying pipe 5 is coupled. These dampers 16 are pivoted at their lower ends so as to swing

inward and downward, whereby provision is had for ready removal and cleaning of the dampers as required. The dampers 16, as well as the dust collecting mat 13, are removable through an opening in a side of the body or casing 6 and which opening is normally closed by means of a cover or door 17 slidable in ways provided upon the casing at each side of the opening. As indicated most clearly in Figure 5 of the drawings, each of the dampers includes a metal frame 18, a pivot bar 19 secured to the lower member of the frame 18 and a screen 20 which is removably fitted to the frame 18, and comprises a metal fabric and a textile covering fitted to a frame which is retained in place by means of stops 21 and turn buttons 22 applied to the frame 18. Each of the pivot bars 19 is provided at one end with a handle 23 which provides convenient means for moving the filtering dampers into upright or horizontal position as required. The filtering dampers as well as the trap and dust collecting mat 13, fit between opposite sides of the body or casing 6, as shown most clearly in Figures 3 and 4 of the drawings. Spaces 24 are provided at opposite sides of the separating mechanism, and these spaces connect with the side opening to which the horizontal portion of the air pipe 5 is coupled, as indicated most clearly in Figures 2 and 4 of the drawings.

A brush 25 is located above the mat 13 and below the filtering dampers 16 and is slidable, being supported and directed in its movement by guides 26 which are supported at their ends in opposite sides of the body or casing 6. A handle 27 connected to the brush 25 projects through a side of the body or casing 6 and provides convenient means for reciprocating the brush. To remove dust or other matter adhering to the filtering dampers they are swung from a vertical to a horizontal position, thereby bringing the dust collecting side of the damper in contact with the brush 25 which is reciprocated, thereby dislodging and removing the foreign matter from the damper. Each of the dampers is cleaned separately. The textile element of the filtering damper is disposed inwardly, hence arrests the dust and other matter which may be removed in the manner indicated. The down draft through the cleaner assists materially in holding the textile filtering or separating element in contact with the brush, thereby assuring thorough removal of the matter tending to adhere to the damper. The matter thus removed from the filtering dampers, may be, if desired, removed from the mat through the opening closed by means of the cover or door 17. The separating screen of the filtering dampers may also be removed through the opening closed by means of the cover or

damper 17. This may be readily effected by detaching the screen from its frame 18. This also provides for replacement of any of the parts should occasion arise.

It is preferred to dispose the dust box 11 so that it will be heated from the furnace and thereby accelerate the draft through the dust pipe 4. That portion of the dust box nearest the furnace is preferably made of copper or other metal which will readily absorb heat so as to warm the air circulating through the box 11.

In practice the cleaner is interposed in the length of the air supplying pipe 5 and the air entering the upper portion of the pipe 5 passes into the cleaner between the filtering dampers 16, thence laterally through said dampers into the spaces 24 and laterally through the side opening and horizontal portion of the pipe 5 into the jacket of the furnace to be heated and distributed in a manner well understood. The air entering that portion of the cleaner comprised between the trap and the filtering dampers 16 is purified by having any dust or other foreign matter removed therefrom. A small proportion of the air entering and flowing through the casing 6 passes downwardly through the mat 13 and into the pipe 9 and carries along therewith the dust separated from the air.

Having thus described the invention, I claim:

1. An air cleaner of the character specified comprising a casing having an inlet and an outlet, a filtering damper pivotally mounted within the casing, a trap, a dust collecting mat disposed over the trap, and a brush movable over the said mat and adapted to remove foreign matter from the filtering damper when the latter is turned to make contact with the brush.

2. An air cleaner of the character specified comprising a casing having an inlet, and an outlet, a trap within the casing adjacent the outlet, a filtering damper pivotally mounted within the casing adjacent the inlet, a dust collecting mat disposed over the receiving end of the trap, and a brush disposed to operate between the said mat and the filtering damper.

3. An air cleaner for hot air furnaces, the same comprising a casing having an inlet and an outlet, and provided in a side with an opening which is normally closed by means of a door, a trap within the lower portion of the casing, a dust collecting mat extending over the trap, a reciprocating brush arranged above the said mat, filtering dampers pivotally mounted within the upper portion of the casing upon opposite sides of the inlet, and mat, each including a screen, which with the mat, is removable through the side opening, a dust pipe extending through the lower portion of the casing, a

dust box connected with the dust pipe, and a pipe connecting the box with the smoke flue.

4. An air cleaner for hot air furnaces comprising a casing having an inlet and an outlet, a dust trap within the casing adjacent the outlet, a brush operable across the trap, and a filtering damper at one side of the trap and between the inlet and the outlet of the casing and movable to overlie the brush and trap to discharge the dust detached therefrom by the brush directly into the trap.

5. An air cleaner for hot air furnaces comprising a casing having an inlet and an outlet, a dust trap within the casing adjacent the outlet, a brush operable across the trap, and filtering dampers at the sides of the trap and brush and pivoted to overlie the brush and trap to admit of the dust removed therefrom by the brush discharging directly into the trap.

In testimony whereof I affix my signature.

AUGUSTUS L. McLEAN. [L. s.]