

May 4, 1937.

C. A. OLSON ET AL

2,079,562

AIR CONDITIONING UNIT

Filed March 26, 1934

2 Sheets-Sheet 1

Fig. 4.

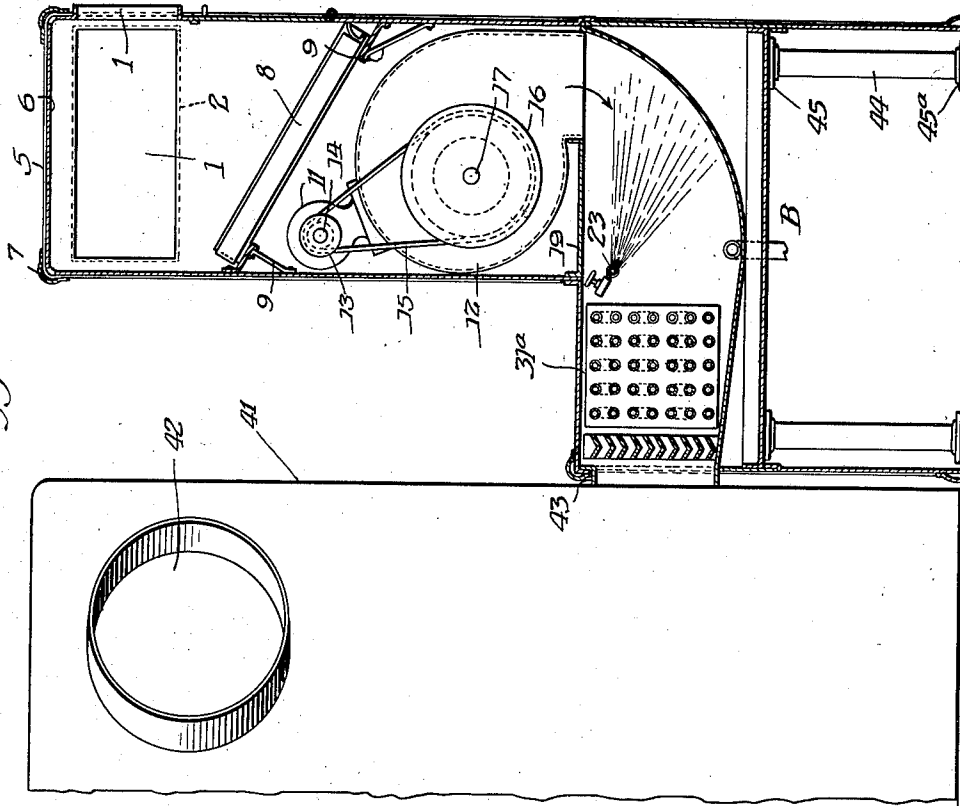
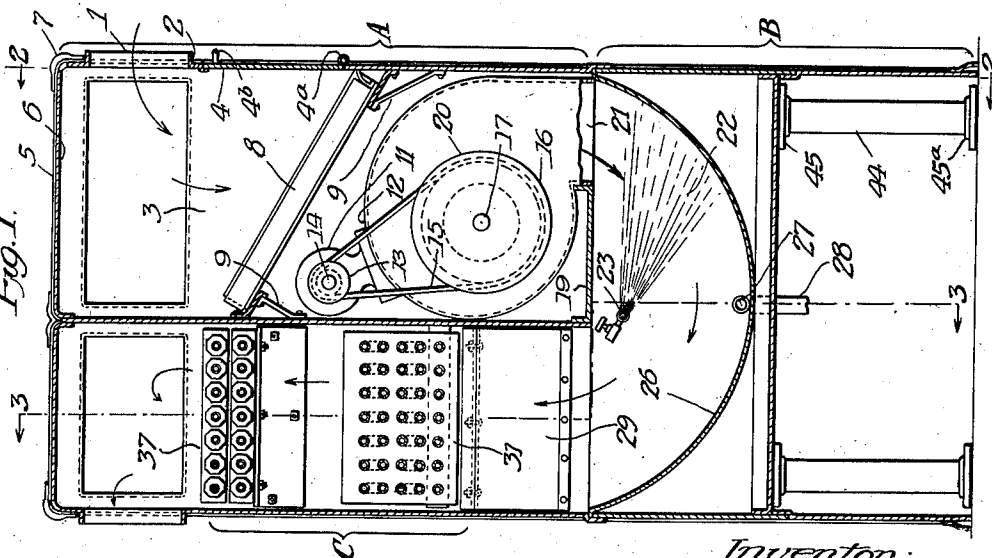


Fig. 1.



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Fig. 3.

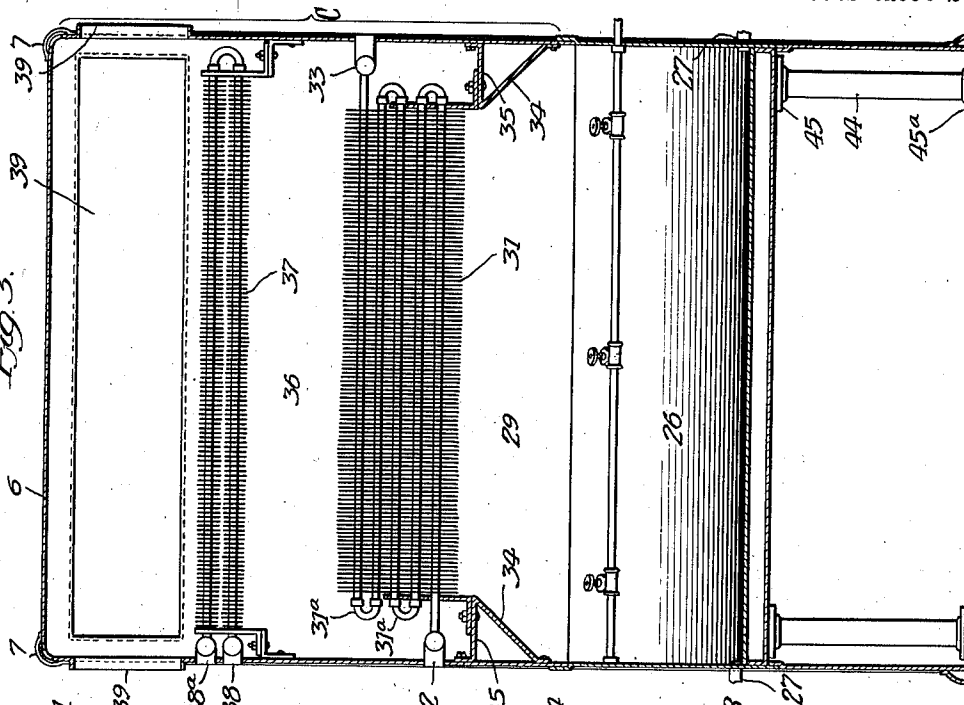
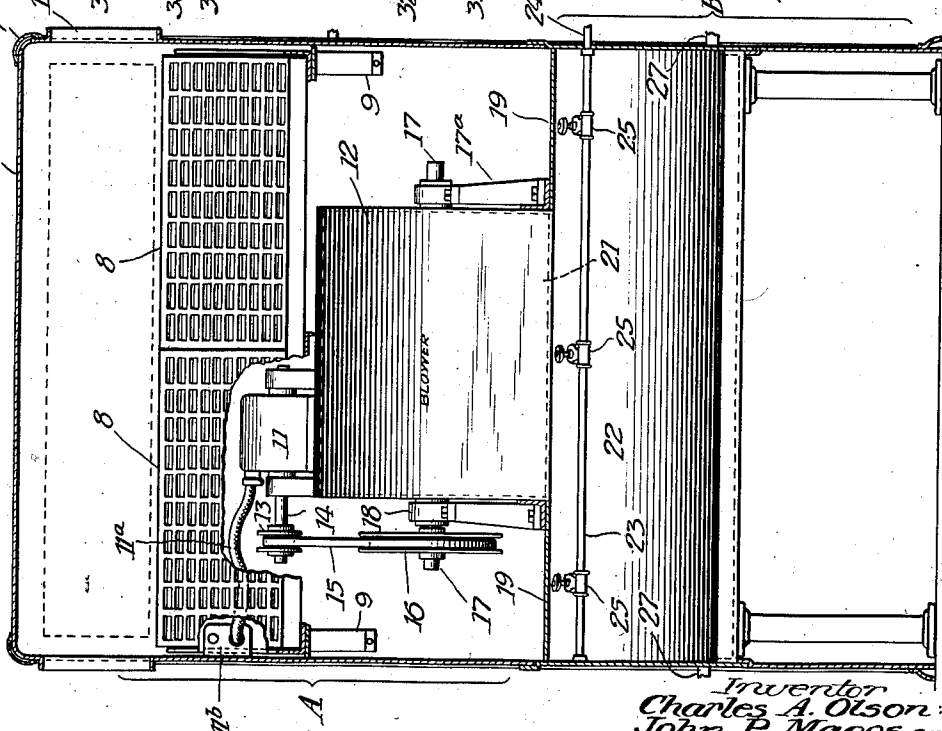


Fig. 2.



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UNITED STATES PATENT OFFICE

2,079,562

AIR CONDITIONING UNIT

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Application March 26, 1934, Serial No. 717,342

2 Claims. (Cl. 257-9)

This invention pertains to an air conditioning unit, and more particularly, it relates to a compact device adaptable for use in dwelling houses and the like.

5 The primary object of the present invention is to provide a compact unit in which a certain order or sequence is observed in the conditioning operations on the air to be treated.

10 Another important object of this invention is to provide an apparatus in which proper air conditioning is accomplished with a minimum amount of alteration to the present heating means.

15 A further object is to provide a unit which is capable of being employed in the summer months as a means for cooling, and in the winter months shutting off the cooling unit and using only the heating and humidifying media.

20 More particularly, we are concerned with providing a device of this character in which three separate units preferably comprise the complete assembly, namely,

(a) The inlet unit containing the filter, the motor, and the centrifugal fan. (Designated as 25 A.)

(b) The base unit, containing the humidifying sprays and the drain tank. (Designated as B.)

30 (c) The outlet unit containing the heating coil, cooling coil, and the discharge ducts. (Designated as C.)

It is thus evident from the foregoing, that the three units can be shipped separately, facilitating handling and installation, and also since the device has been designed on the add-a-unit principle, the owner can start with any particular 35 section, adding units as desired without altering the original installation.

The unit also possesses the desirable feature of being provided with adjustable supports or legs, 40 so that the duct inlets and outlets may be placed at any level to facilitate duct arrangements, thus being readily adaptable for installation under conditions in a basement having a high ceiling or in one where the ceilings are relatively low, and where the installation is necessarily cramped as 45 a consequence. No difficult sheet metal transformations are needed. For example, when the unit is used with all three sections a fin type heating coil may be employed beneath which is installed a cooling coil. If so desired by the users, 50 the latter coil could be put in at the time of installation or it may be added later without necessity for disturbing the balance of the unit.

55 If the apparatus is to be used in conjunction with a heating furnace, for example, then the unit C is dispensed with and a special base (see Fig. 4) is furnished with a horizontal outlet for connection to the furnace casing, in which the lower unit or in the base adequate provision may 60 be made for the installation of a cooling coil.

Another advantage in connection with a unit of this character is the U-shaped air travel with the horizontal inlet and outlet duct connections. This latter feature is important because it simplifies installation and maintenance by confining such ducts to the top of the unit, which necessarily means that separate horizontal duct connections may be made from the unit without the addition of any complicated or unsightly flues or bends. All of this tends to make the complete installation more compact, which is an important consideration when installed as ordinarily, in basements, in which space restrictions are an important item.

As further brought out in the drawings, an important advantage gained is the provision for three-way connections for both supply and return ducts, as in many cases it permits the direct connection to the unit without requiring any turns of the ducts.

Other objects and advantages of this construction will be apparent upon referring to the drawings and description, in which

Fig. 1 shows a side sectional view in which the general relation of important parts of each unit is shown.

Fig. 2 is a view taken on the line 2-2 of Fig. 1.

Fig. 3 is a view taken on the line 3-3 of Fig. 1.

Fig. 4 is a view of a modified assembly showing an adaptation of this unit to a hot air furnace or similar device.

Referring to Fig. 1, there are shown for purpose of illustrating our invention three units respectively designated as A, B, and C, and consisting of the filtering and circulating section, the base and humidifying section, and the heating and cooling section, respectively.

Directing attention to that portion of the unit designated as A, the latter is provided at its upper portion with the inlet ducts 1 having peripheral flanges 2, which connect with the interior inlet passage 3, and which are of the conventional rectangular form, as shown, although it is obvious that the shape is immaterial. These inlet ducts are formed from the jacket or casing 47 5, which is similar to that used, for example, in enclosing a boiler and properly insulated with a suitable material as indicated at 6, joined by means of the corner connections 7 to form a container.

The front surface of the jacket of the unit A is generally provided with an outwardly swinging hinged door 4, provided with hinges 4a and a handle 4b, for the purpose of installing the filter 8 within the enclosure, and placed upon the supporting brackets 9, preferably in a sloping position in order to permit of greater area of filtering material, with the obvious advantage of less frequent renewals. As shown more clearly in Fig. 2, the filters 8 extend for the full length of 60

the device thus providing an unbroken, continuous filtering surface, through which the air drawn through the inlet ducts 1 must necessarily pass in order to reach the fan blower chamber below.

It is obvious that the construction of the filter may be of any of the numerous types or shapes available on the market, as for example, grease impregnated spun glass or wire wool, and the like.

Within the same unit A and located immediately below the superposed filters, a small electric motor 11 is preferably mounted upon a blower housing 12 as shown, suitably connected electrically by the conduit 11a and the switch 11b. Extending from the motor 11 is a pulley 13 fixedly connected to the revolving motor shaft 14 and suspended therefrom is a fan belt 15 connected to a larger pulley 16. Both ends of the housing 12 are preferably open and the pulley shaft 17 supported by the frame 17a and the trunnions 18, is provided interiorly with a centrifugal fan diagrammatically referred to as 20, preferably drawing in the air at both open ends of the housing 12. Thus, the path of the air after passing through the superposed filters is solely through the end openings of the housing 12 at the ends, since the base 19 of the housing beyond said open ends forms a complete closure, except for the opening 21 through which the air is driven into the lower chamber 22 of unit B, which is provided with suitable humidifying means 23. The latter is controlled by a supply valve (not shown) from an inlet pipe 24, the tubing being preferably perforated or provided with separate valves 25 for the adjustment of the spray of water supplied to the chamber 22.

Referring to the unit B, the air duct 26 of the humidifier unit provides for a 180 deg. turn, the construction providing for a free and unobstructed flow of air and at the same time to place the drain 27, the lowermost portion of the chamber 22, and connecting with the drain pipe 28 leading to a discharge (not shown). In order to make proper adjustment for the variable duct connections with which the device may be used, it may be desirable to support the unit B by a conveniently installed means. This we accomplish by the supporting legs 44, preferably made of pipe cut to length and being connected to the floor and unit by the respective flanges 45a and 45.

After the moistened and filtered air has been driven by the fan around the turn 26, it passes upwardly through the passage 29 past the cooling coil designated as 31, composed of return bends 31a, supplied by the inlet 32 and the outlet 33, and attached to a suitable refrigerating medium (not shown). The chamber 29 is self-enclosed by means of the sloping supporting walls 34, upon which is attached supporting bracket 35 for the coil 31, making it necessary that all air in order to pass into the chamber 36 must pass between the coils 31. During the winter months the lower coil 31 may be disconnected and the upper coil 37 which is preferably connected to a heating means (not shown) by the inlets and outlets 38 and 39 respectively, is turned on, and conversely during the summer months the heating coil 37 will likewise be disconnected, the obvious advantage of both units being thus installed facilitates a convenient shut-off when necessary. After the treated air has passed through the coil 37 it passes into the upper chamber 38 and then upwardly through the outlet ducts 39 to such

flues or ducts as may be necessary (not shown) to distribute the conditioned air throughout the dwelling house.

A further modification of our invention, illustrative of its flexibility in use, is shown in Fig. 4, in which the unit is arranged for connection to a hot air furnace designated as 41 supplied with the conventional outlet duct 42. In this installation, the heating means within the unit is obviously dispensed with since the furnace itself or similar device supplies that medium. The cooling coil 31a may be located directly beyond the humidifying means 23. In this assembly, it will be noted that the entire unit C has been removed and connection is made directly to the air intake of the furnace by means of the connection 43, in which case the ducts 42 leading from the furnace are used as the distributing means for supplying the conditioned air to the building.

It is thus evident that in the preferred embodiment of our invention, air drawn from the recirculating (return) ducts 1 is mixed with a measured amount of outside air and introduced to the conditioner inlet 3. The fresh and revitalized air then passes through the replaceable filters 8, where dust and dirt are removed. After this cleaning process the air enters the fan blower housing and is discharged through the port 21 into the humidifying chamber formed by the enclosure 26 where the sprays 23 add the proper amount of humidity. The air then passes up through the cooling coil 31 and over the heating element 37 out into the distributing ducts 39.

It is obvious that several changes may be made in the construction and arrangement of the parts of our invention without departing from its real spirit and purpose, and it is our intention to cover by our claims any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

We claim as our invention:

1. In an air conditioning apparatus provided with inlets leading to a substantially vertical downwardly extending passage, air propulsion and filter means within said passage, the latter passage being superposed above and leading into a humidifying chamber, the latter being adapted for connection with a normally independent heating medium provided with circulatory ducts for the distribution of the conditioned air, and provided with cooling means adjacent to said connection.

2. In an air conditioning apparatus provided with inlets leading to a substantially vertical downwardly extending passage, the combination of propulsion means, filter means and humidifying means said means being in respective vertical alignment within the said passage, the said passage being superposed above and leading into a humidifying chamber, the latter being adapted for connection with a normally independent heating medium provided with circulatory ducts for the distribution of the conditioned air and provided with cooling means, the said cooling means being positioned, between the said connection and the said humidifying means.

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