

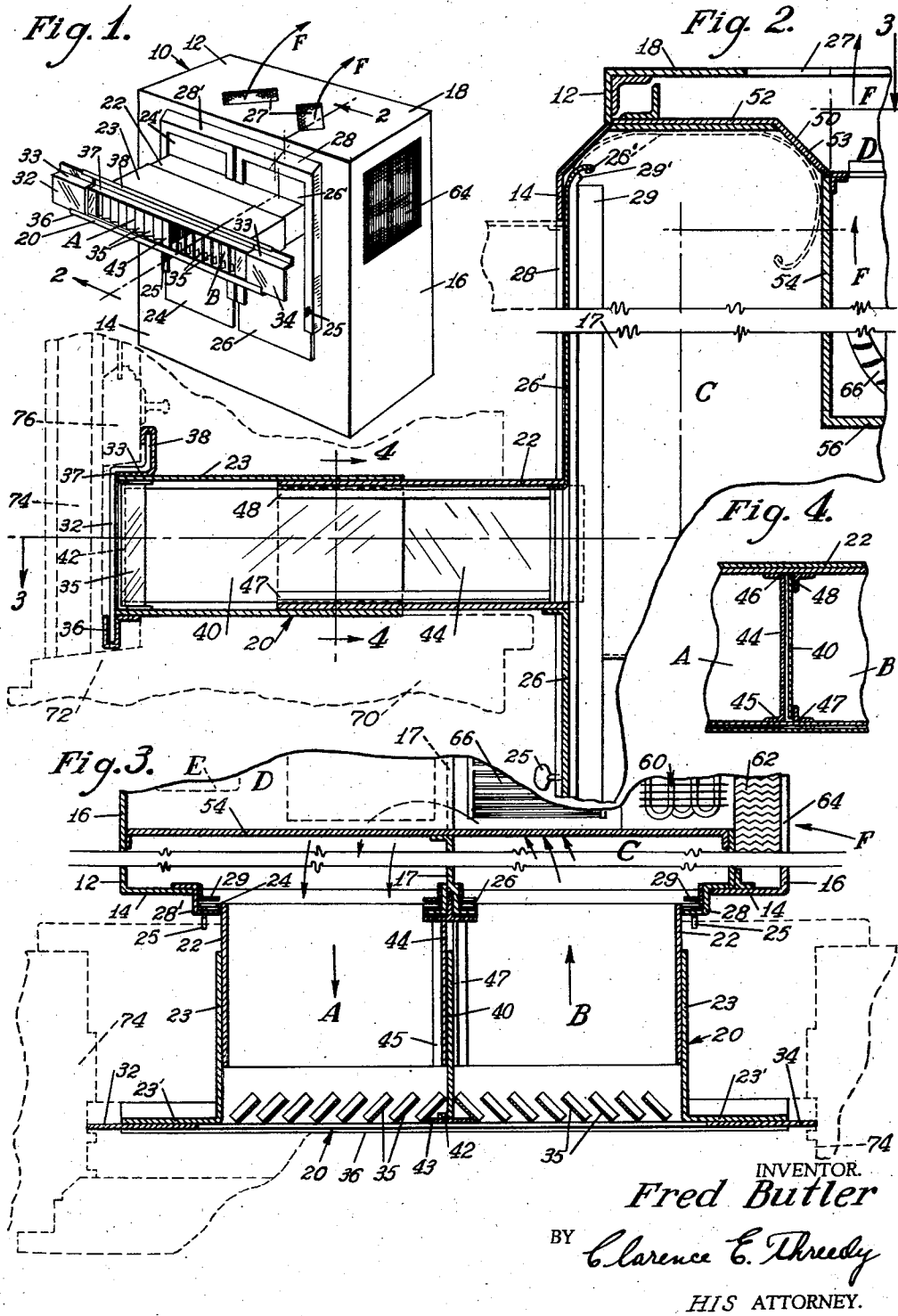
June 11, 1940.

F. BUTLER

2,204,401

AIR CONDITIONING APPARATUS

Filed June 18, 1936



UNITED STATES PATENT OFFICE

2,204,401

AIR CONDITIONING APPARATUS

Fred Butler, Chicago, Ill., assignor to Fred C. McClellan, Chicago, Ill.

Application June 18, 1936, Serial No. 86,020

1 Claim. (Cl. 98—94)

This invention relates to air conditioning apparatus, and particularly to a novel three-way duct and housing structure for such apparatus.

An object of the invention is the provision of a housing for a conditioning unit of the type especially suited to installation in apartments or the like, and positionable relative to a window to handle air in a manner to circulate outside air separately from the conditioned inside or apartment air, and the invention further provides means in such a device for adjustably positioning air circulating ducts relative to windows of varying dimensions and sill height, the said adjustable duct means being separate from other duct means for handling conditioned air.

Other objects and novel features of the invention will appear as the following particular description develops in view of the annexed drawing, in which:

Fig. 1 is a perspective of a complete conditioning unit;

Fig. 2 is a vertical section along the lines 2—2 of Fig. 1;

Fig. 3 is a horizontal section along the lines 3—3 of Fig. 2; and

Fig. 4 is a fragmentary detail in section taken along the lines 4—4 of Fig. 2.

My improved conditioning unit is of a type particularly adapted for use with air conditioning mechanism of the type including refrigerating mechanism having a motor driven compressor, the usual condensing and cooling coils, and means for circulating conditioned air relative to the cooling coils.

The heat developed by the mechanism and heat exchanging elements of the latter type of mechanism is quite considerable, and where the conditioned air is cooled as part of the conditioning process it is of course desirable to keep the conditioned air separate from the air normally in contact with the refrigerating mechanism, and for the purpose of convenience in this description the conditioned air will be referred to as such, while the other air circulated relative to the refrigerating and conditioning mechanism will be referred to as secondary or unconditioned air.

My improved conditioning apparatus 10 as shown in Fig. 1, comprises an upstanding housing member 12 having a vertical front wall 14 and side and top wall portions 16 and 18, respectively. In the front wall 14 of the housing is an adjustable secondary air duct structure 20, comprising a body portion 22 of substantially rectangular

shape and supported at its inner extremities by a pair of sliding panels 24, 26, slidable in open-ended frames 28 and 28' secured to the wall 14 at margins of substantially rectangular shaped openings in the wall 14 behind the panels 24 and 26. The said panels 24 and 26 have their upper portions 24' and 26' constructed of a light and relatively flexible metal which extends over a lip portion 29' (Fig. 2) formed in the upper lateral edge of guide frame 29, just behind and inwardly of the upper horizontal portions 28, 28' of the adjustable frame structure.

Locking means to secure the slidable panels 24, 26 in frames 28, 28' are provided in the form of set-screws 25 suitably threaded into the lower end portions of the outermost vertical members of the frame structure 28, 28'.

The adjustable duct structure 20 further comprises a second rectangular duct or sleeve portion 23 having diverged side or wing parts 23' adjacent its outer or intake end, and adjustable window-frame engaging means slidable against said wing parts 23'.

The adjustable window engaging structure comprises a pair of extensible blocking wings 32, 34, slidable in a bottom channel portion 36 which is extended along the bottom horizontal edge of the sleeve member 23, and in an upper channel 38 in the upper horizontal edge of the member 23 extending parallel to the lower channel. The upper channel 38, however, is stepped back from the outermost edge 37 of the said upper horizontal edge of the member 23. The wing portions 32, 34 are substantially elongated plates having their lower longitudinal edges slidable in the lower channel 36 and their corresponding upper longitudinal edges offset to form the angled portions 33 which are confrontable on their under surfaces with the correspondingly angled surfaces between the upper channel 38 and the horizontal edge 37 on the top, outermost edge of the movable sleeve 23. The purpose of the angled formation in the wings 32, 34 between the edge 37, and upper channel 38, will be particularly pointed out hereafter, when the operation of the device is explained.

The adjustable duct structure 22, 23 is divided into two compartments A and B (see also Fig. 3) by means of an adjustable partition 40 in the form of an elongated plate having an outermost lateral edge portion 42 suitably angled and secured to a spacer 43 extended between the top and bottom portions of the sleeve 23, and being slidable against a corresponding fixed wall portion

44 (Figs. 3 and 4) secured at its opposite longitudinal edges 45 and 46 to the top and bottom wall portions of the stationary duct portion 22, the sliding wall 40 being held in sliding engagement relative to the corresponding partition 44 by means of a pair of angle brackets 47, 48, extended laterally across the top and bottom walls of the stationary duct 22 on the side of plate 40 opposite to the companion plate 44.

10 The adjustable window engaging structure 20, as shown in Figs. 1 and 3, is further provided with baffles 35 extended between the upper and lower wall portions of the sleeve 23 at the outermost extremity thereof and between the channels 36 and 38, the individual baffle plates in compartment A being set to deflect air issuing therefrom toward the left in Fig. 3, and to take air into the compartment B from the region to the right thereof so as to keep the two streams of air circulated in the compartments A and B separate.

20 Interiorly of the housing 12, as shown in Fig. 2, are two general compartments C and D formed by an angularly extending inner wall structure 50 adapted to have a horizontally extending portion 52 underlying a part of the top horizontal wall 18 of the housing 12 and a vertical wall portion 54 with an angularly disposed part 53 between the horizontal portion 52 and the latter wall 54 which extends toward the rear wall of the housing in its second horizontal part 56 to completely close off the compartment D from compartment C.

The cooling or refrigerating mechanism with which my improved duct and housing structure 35 is adapted to be used is of any well known type, the detailed structure of which need not be recited herein, but as already pointed out, such a mechanism would include a motor-driven compressor and condensing coils, all of which would be a source of heat which must be kept separate from the cool, conditioned air. Such elements of the refrigerating mechanism are preferably disposed in the compartment C of the structure, as shown in Fig. 2, while the expansion or cooling coils partially, indicated at 60 in Fig. 3, are positioned behind a filter 62 which in turn is positioned behind an intake aperture or opening 64 (Fig. 1).

Motor means for driving an impeller 66 which 50 is positioned behind the cooling coils 60 (Fig. 3), may be positioned in still another compartment E, separated from the compartments C and D by a wall 17 (Figs. 2 and 3). The impeller 66 is of the type adapted to draw air in from the direction of the tracer arrow F in Figs. 1 and 3, through the filter 62, the cooling coil 60, and thereafter angularly upward in the direction of the outlets 27 in the upper wall 18 of the housing 12.

Operation

My improved conditioning structure with the usual form of conditioning and cooling mechanism positioned in the lower compartment C in the housing 12, may be positioned relative to a window, as in Fig. 2, and a secondary or supply source established by extending the movable sleeve portion 23 upon the fixed sleeve portion 22 relative to sill 70 of the window, such that the lowermost edge of the lower channel 36 rests upon the outermost portions 72 of the usual window structure, and preferably so that the under surfaces of the members 22 and 23 rest upon the upper surface of the sill, the latter depending upon the

dimensions and angular disposition of the outer sill 72 relative to the main sill 70.

Thereafter, as shown in Fig. 3, the wing portions 32, 34 in the adjustable structure 20 may be slid inwardly or outwardly to engage the vertical portion 74 of the window frame, and the lower window sash 76 as shown in Fig. 2, may be lowered upon the upper angularly disposed surfaces 33 of the wings 32, 34 and also upon the corresponding angular surface between the edge 37 and channel 38. In this way the duct structure 22, 23 is in communication with a secondary source of air through the window, and at the same time such air is prevented from circulating within the apartment in which the structure is being used. The blower mechanisms associated with the conditioning apparatus and disposed within the housing 12, are situated and constructed so as to draw air into the compartment B and circulate such air in the compartment C and the general regions lying below the conditioned air compartment D, and discharge such air through compartment A to the outside source beyond the window.

The air conditioning apparatus which is adapted to be housed within the compartment C, may include a fan for cooling the conditioning mechanism itself, and such fan may be positioned relative to either of the ducts A or B so as to drive air toward the other and draw air directly through the first duct, or the fan may be so positioned within the compartment C as to drive air directly out the duct A for example, and thus cause a reduced pressure within the compartment which will result in an influx of air through duct B. In any event, the circulation of air within compartment C is to be effected, for purposes of greatest efficiency, by a power-driven impelling means associated with the conditioning apparatus.

Also, with the air conditioning mechanism in operation, air will be drawn from the apartment or chamber being treated or conditioned, into the opening 64 in the direction of the tracer arrow F in Fig. 1, through the filter 62, cooling coil 60, and impelling mechanism 66 as shown in Fig. 3, and thereafter discharged through the aperture 27 in the top wall 18 of the housing. In this manner air may be circulated from an outside source through the mechanical and heat generating parts of the conditioning apparatus, and can be entirely separate from the conditioned air thereof by the particular duct structure I have disclosed.

Should it be necessary to change the vertical level of the secondary air duct structure 20, it is merely necessary to loosen the set screws 25 (Fig. 1) and raise or lower the duct structure 22, 23 to the desired height relative to a sill 70 and reset the screws 25.

During such lowering and raising operation, 60 the uppermost portions 24', 26' of the slidable panels 24, 26, being flexible, will be advanced or retracted within the structure and housing 12, as shown in dotted lines in Fig. 2, the lip portion 29' of the upper lateral edge of the frame 29 being adapted to direct the inward movement of such flexible upper portions to the region beneath the horizontal upper wall portion 52 and against the angular wall portion 50, so that such flexible panel portions will tend to curve back upon itself in the manner shown in dotted lines.

In adjusting the duct structure 20 and particularly the movable sleeve portion 23 thereof inwardly and outwardly upon the stationary duct 75

portion 22, the partition wall 40 sliding against the stationary wall 44 in duct 22, telescopes in and out between the said wall 44 and the angle brackets 47, 48 and at all times keeps compartments A and B entirely separate.

It will thus be seen that I have provided a novel duct and housing structure for air conditioning apparatus, which is particularly adapted for use with window structures of varying sill height and frame dimensions, and which is relatively simple and inexpensive in construction, and while I have described my improved conditioning structure or apparatus in considerable detail, I do not wish to be restricted to the precise recitations herein but desire to avail myself of all the modifications and variations coming within the scope of the appended claim.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

An air conditioning structure comprising: a substantially upstanding housing having an apertured wall portion and a frame substantially bordering the apertured portion thereof; an adjustable, multi-channelled duct member for said hous-

ing including a pair of telescoping duct members of rectangular shape having wide horizontally extensive top and bottom walls and relatively narrow side walls; means for adjustably supporting said duct member on said housing comprising a panel member vertically slidable in said frame on the apertured portion of the wall in said housing and having a relatively flexible portion extensible into and out of said housing, one of said duct members being attached at one end to said panel member and extended horizontally therefrom; and adjustable means carried on the movable one of said telescoping duct members for engagement with a window frame and sash structure, said means including a wing panel slidable transversely of the duct opening, spaced channel portions in the free horizontally-extensive and outermost edge parts of the said top and bottom walls of said movable duct member, said wing panel being disposed for sliding movement in said channel portions; and expansible partition means in said telescoping duct member for the provision of a plurality of channels therein.

FRED BUTLER.