

July 12, 1938.

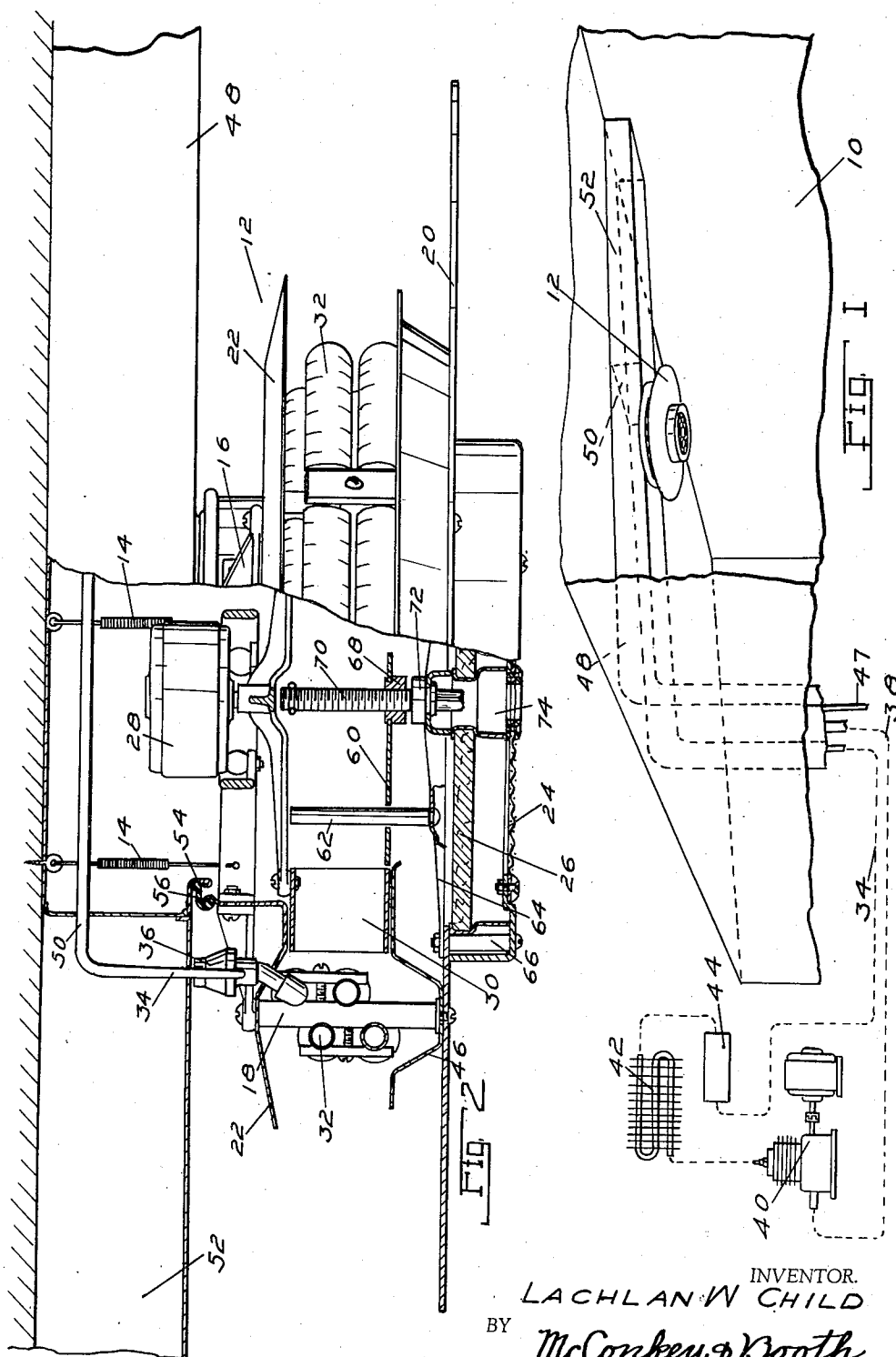
L. W. CHILD

2,123,693

AIR CONDITIONING SYSTEM

Filed June 4, 1936

2 Sheets-Sheet 1



July 12, 1938.

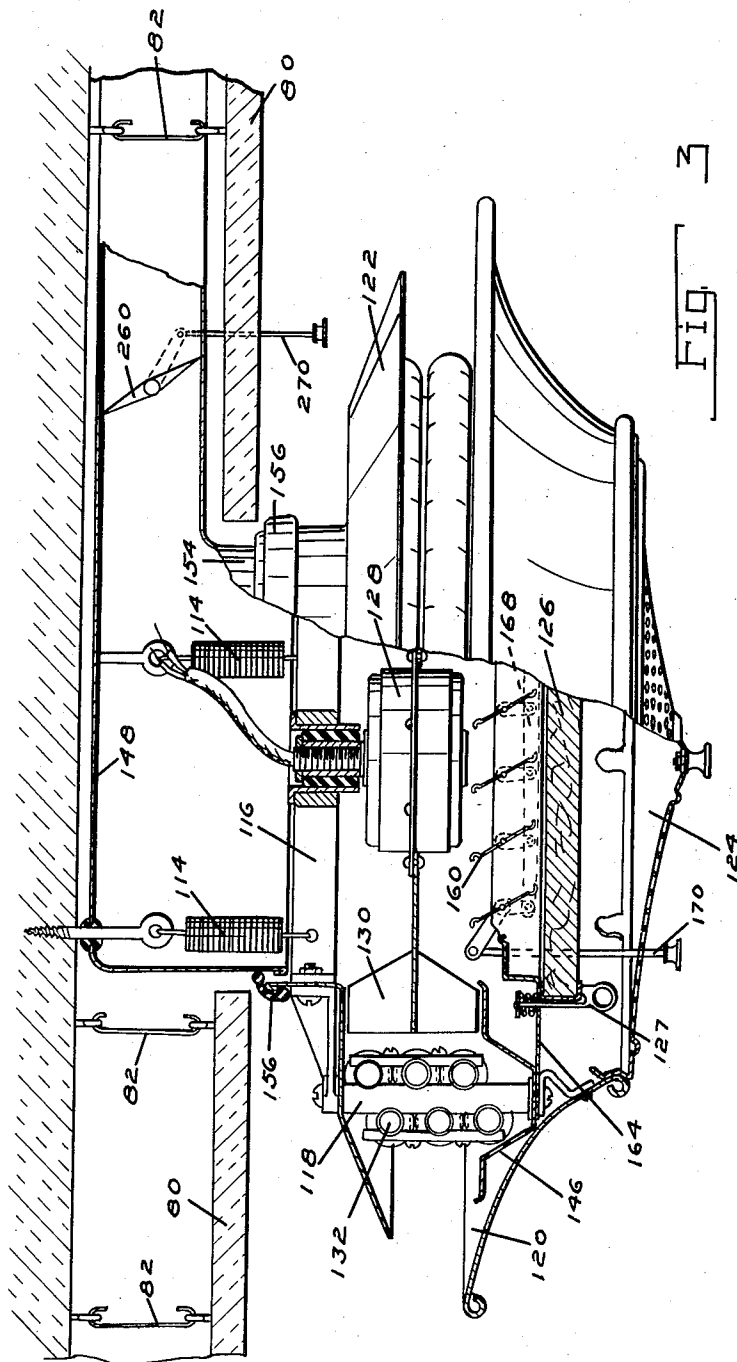
L. W. CHILD

2,123,693

AIR CONDITIONING SYSTEM

Filed June 4, 1936

2 Sheets-Sheet 2



INVENTOR.
LACHLAN W. CHILD
BY *McConkey & Booth*
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,123,693

AIR CONDITIONING SYSTEM

Lachlan W. Child, South Bend, Ind., assignor, by
mesne assignments, to Air Devices Corpora-
tion, Chicago, Ill., a corporation of Delaware

Application June 4, 1936, Serial No. 83,465

3 Claims. (Cl. 257—244)

This invention relates to air conditioning, and is illustrated as embodied in air-cooling means suspended from the ceiling of a room. An object of the invention is to supply fresh air from outside the room to a fixture of the ceiling-suspended type.

In one desirable arrangement, the fixture comprises upper and lower parts spaced apart to provide an annular outlet or mouth, with the fresh air supplied through the central portion of one part and room air (to be recirculated) through the central portion of the other part. After being conditioned, for example by a cooling coil in the path of the air, the mixed cooled air is blown horizontally outward in all directions, just below the ceiling by means such as a centrifugal fan.

Various features of novelty relate to the provision and arrangement of shutters or the like controlling the fresh air supply, to the use of a fresh-air conduit simulating one of the beams of a beamed ceiling, or to supplying the air through the space above a false ceiling suspended below the true ceiling of the room, and to other novel combinations and desirable particular arrangements shown in the accompanying drawings, in which:

Figure 1 is a perspective view of the upper part of the room, with the connections outside the room shown diagrammatically;

Figure 2 is a view, partly in elevation and partly in vertical section, showing the ceiling fixture and the hollow beam through which fresh air is supplied; and

Figure 3 is a similar view showing a fixture to which fresh air is supplied from the space above a false ceiling.

The invention is illustrated as embodied in means for cooling the air in a room 10, by the use of a fixture 12 suspended from the ceiling of the room, preferably by means of springs 14 which support it yieldingly.

The fixture indicated in Figures 1 and 2 comprises an upper part 16 carried by the springs 14, and which in turn carries on supporting posts 18 a bowl-shaped lower part 20. The outer portion of the upper part 16 may, as a matter of convenience of manufacture, be a separate annular stamping or the like 22. The part 22 and the part 20 are spaced apart to form an annular outlet or mouth, through which the conditioned air is forced substantially horizontally in all directions just below the ceiling.

The central portion of the lower part 20 is cut away to form an intake opening for room air to be recirculated; this opening is shown detachably

covered by a grille or the like 24 carrying a filter 26.

The upper part 16 supports a vertical electric motor 28 driving a centrifugal fan or blower 30 about the periphery of which is a cooling coil 32 mounted on the posts 18. Cooled liquid refrigerant is supplied, from any suitable remote location outside the room, through a conduit 34, to an expansion valve 36 which opens into the coil 32. The refrigerant, after taking up heat in the coil 32, passes as a gas through a conduit 38 to a motor-driven compressor 40, which delivers it through a water-cooled condenser coil 42 to an accumulator 44, from which it is again drawn off through the conduit 34.

Moisture condensed by the coil 32 drips into an annular drip pan or the like 46 supported by the lower part 20, from which it is forced through a drain tube 47 by any suitable means, for example as described in my application No. 729,544, filed June 8, 1934, which has become Patent No. 2,082,441, June 1, 1937 or my application No. 83,466, filed concurrently herewith.

Fresh air enters, from outside the room, through a hollow beam 48 on the ceiling. This beam is blocked off just beyond the fixture described above, by a partition 50, leaving a dead end or false duct 52. The true duct end of the beam is formed with an outlet flange 54 sealingly embraced by an annular rubber seal 56 carried by a cylindrical flange about the central opening of the stamping 22. Thus fresh air enters through the top of the fixture and room air enters through the bottom of the fixture.

The relative volumes of fresh air and room air is determined by means such as a vertically-shiftable horizontal shutter or gate 60, slidably guided by pins 62 carried by a spider 64 secured by the bolts 66 which hold the grille 24.

The shutter has at its center a nut 68 threaded on an operating bolt 70 rotatably mounted in a part 72 carried by the spider 64. The lower end of the bolt 70 is squared for engagement by a socket wrench, or is otherwise formed for engagement with an operating tool, and is accessible through a sleeve 74 at the center of the grille 24 and filter 26.

By turning the bolt 70, the shutter 60 is shifted vertically to vary the proportions of fresh and room air. In the lowermost position as shown, only fresh air is supplied; in the uppermost position of the shutter only room air is supplied; in intermediate positions various mixtures of fresh and room air are supplied.

Figure 3 shows a somewhat different fixture,

with fresh air supplied through the space above a false ceiling 80 supported below the true ceiling of the room by means such as hangers 82. Parts corresponding to parts in Figure 2 are indicated by the same reference characters increased by 100.

In this fixture, cold water or brine is circulated through a cooling coil 132, which is arranged in the annular mouth between upper and lower parts 122 and 120. The centrifugal fan 130 in this case is a double fan, the lower part acting on room air coming up through a grille 124 and a filter 126 held by spring latches 127. The room air is controlled by shutters 160 connected by a bar 168 for common actuation by a pull rod 170 extending down far enough for convenient operation.

The upper part of the fan 130 acts on fresh air brought in through a duct 148 arranged in the space above the false ceiling 80, under the control of a shutter shown as a butterfly valve 260 operated by a vertical operating rod 270.

Both fixtures may also, if desired, be used as lighting fixtures, as explained in my application No. 32,256, filed July 19, 1935 and which has become Patent No. 2,069,816, Feb. 9, 1937.

While two illustrative embodiments have been described in detail, it is not my intention to limit the scope of the invention to those particular embodiments, or otherwise than by the terms of the appended claims.

I claim:

1. An air-conditioning fixture comprising upper and lower parts connected in spaced relation to provide an annular mouth opening approximately horizontally outward in all directions,

a fresh air supply connected to the central portion of one of said parts, a room air intake provided at the central portion of the other of said parts, air-circulating means for taking air from said supply and from said intake and blowing it out in all directions through said annular mouth valve means between said parts for proportioning the relative amounts of fresh air and room air, and a cooling coil in the path of the air passing through said fixture.

2. An air conditioning fixture comprising a casing formed with a peripheral annular air outlet, air inlets in the top and bottom of said casing, one of said inlets being adapted to receive air from the space to be conditioned and the other to receive air from outside said space, means for circulating air through the casing, means in the casing for conditioning the circulated air, and a shutter shiftable between said inlets to control the proportions of air taken in through said inlets.

3. An air conditioning fixture comprising a casing formed with a peripheral annular air outlet, air inlets in the top and bottom of said casing, one of said inlets being adapted to receive air from the space to be conditioned and the other to receive air from outside said space, an annular centrifugal blower having an open center communicating on its opposite sides with said inlets respectively and discharging through said air outlet, and a disc shiftable axially through the center of said blower to control the proportions of air taken in through said inlets.

LACHLAN W. CHILD. 35