Jan. 28, 1969 H. LAUX 3,424,237

HIGH PRESSURE INDUCTION APPARATUS

Filed Sept. 1, 1966

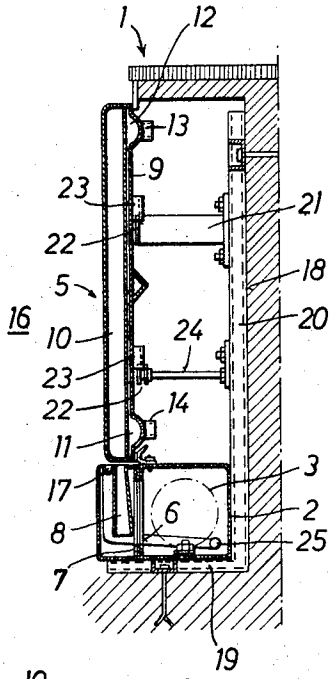
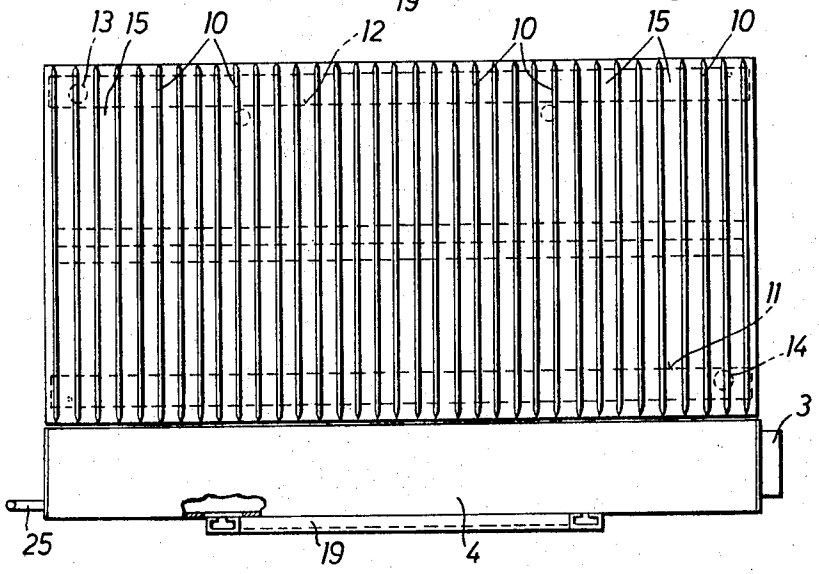


Fig.1

Fig.2



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United States Patent Office

3,424,237

Patented Jan. 28, 1969

3,423,237

HIGH PRESSURE INDUCTION APPARATUS

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Filed Sept. 1, 1966, Ser. No. 576,652

Claims priority, application Spain, Sept. 3, 1965, 317,090

U.S. Cl. 165—123 10 Claims

Int. Cl. F28f *13/12*; F24f *3/04*

ABSTRACT OF THE DISCLOSURE

This provides a high pressure induction mechanism for controlling the temperature in a room. This apparatus includes an expansion chamber for compressed air which is deflected upwardly by way of a distribution duct toward a heat exchanger through which expanded fluid medium flows toward the room side of the apparatus.

The conventional apparatus of the type to which this invention is directed is relatively well-known, and generally includes means for introducing compressed air through a heat exchanger which obtains or conducts a heating or cooling medium. The compressed air is generally allowed to expand an expansion chamber which is closed at all but the front or room side thereof, the latter being bounded by a heat exchanger. The fluid medium is forced by conventional deflection means to flow past an inner portion of the heat exchanger and outwardly thereof into a room which is to be heated or cooled.

SUMMARY OF THE INVENTION

A primary object of this invention is to provide a high pressure induction apparatus of the type referred to immediately above, which is particularly characterized by the provision of a distributor duct for deflecting compressed air from an expansion chamber toward and through a heat exchanger into the room which is to be heated or cooled. This latter arrangement provides simplicity of construction and operates at a high degree of efficiency, particularly because the compressed air or other fluid media supplied to the apparatus can spread out in the distributor duct to a maximum degree and, after expansion, issue in a calm state through appropriate perforations or similar means toward the heat exchanger.

The apparatus is also particularly characterized in the provision of a plurality of ribs which define vertically disposed channels or ducts opening toward the room. The compressed air conducted into each channel is thereby directed or guided by the ribs in an upward flow pattern. Since the channels open toward the room side of the apparatus circulation is unhindered and an effective temperature gradient is obtained relative to the liquid contained in foils or similar heat exchanging means of the heat exchanger.

While the apparatus of this invention functions in much the same manner of well-known air conditioning convectors, disadvantages of such convectors, such as clogging of heat exchanger grills, is avoided. Thus, the apparatus meets both hygienic and physiological requirements of, for example, hospitals and similar institutions.

In accordance with this invention, the distributor duct is advantageously provided with nozzles each of which opens into the heat exchanger which is of a U-shaped transverse cross-section defined by two ribs or flanges and a back plate. The nozzles and the distributor duct so constructed considerably improve the induction of room air i.e., the introduction of room air into the heat exchanger for subsequent circulation.

BRIEF DESCRIPTION OF DRAWINGS

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawing, and claimed.

In the drawing:

FIGURE 1 is a transverse cross-sectional view of the high pressure induction apparatus of this invention, and illustrates a chamber and a distributing duct located beneath a heat exchanger; and

FIGURE 2 is a front elevational view of the apparatus of FIGURE 1, and more clearly illustrates the particular construction of the heat exchanger.

DESCRIPTION OF SPECIFIC EMBODIMENT

The novel high pressure induction apparatus of this invention is generally designated by the reference character **1**, and is capable of either heating or cooling rooms by means of compressed air or similar media which is employed as the convection carrier. The apparatus **1** is substantially constructed of three components, namely, a supply duct **2** having an inlet **3**, a distributor duct **4** positioned forwardly of the duct **2**, and a heat exchanger **5** arranged above the distributor duct **4**. The inlet or supply duct **2** also functions to expand the compressed air and includes an aperture **6** in a forward wall (unnumbered) thereof which is of a size complementary to that of an aperture **7** formed in a rear wall (also unnumbered) of the distributor duct **4**. The distributor duct **4** is completely closed except for the aperture **7** and a plurality of upwardly directed nozzles **8**.

The heat exchanger **5** positioned above the duct **4** includes a closed back plate **9** from which project a plurality of hollow vertically extending ribs **10**. A heating or cooling medium flows through the ribs **10**, and for this reason the ribs are connected to each other by longitudinally disposed manifolds **11** and **12** formed in the plate **9**. The entrance port **13** is connected to the manifold **12** while an outlet port **14** is connected to the manifold **11**. In the disclosed embodiment of the invention the heat exchanger **5** also includes relatively narrow U-shaped channels **15** directed toward a room **16** between adjacent pairs of ribs **10**. If desired, the distributor duct **4** may also include at an upper portion a collecting tray **17** for condensation from the heat exchanger **5** and an outlet **25** for conducting condensation to a suitable reservoir (not shown).

The heat exchanger **5** is supported in part by the duct **2** resting upon a flange **19** of a frame **18** which includes an upstanding flange **20**. The holders or brackets **21** are fastened to the vertical flange **20** and include flanges **22** which are slidably received in straps **23** fixed to the plate **9** of the heat exchanger **5**. The heat exchanger **5** is additionally supported in spaced relationship to the vertical flange **20** by a bolt (or bolts) **24** screw threaded into apertures of the flange **20** and provided with similar flanges **22** received in straps **23** carried by the rear plate **9** of the heat exchanger **5**. This construction maintains the heat exchanger **5** in unsupported suspended relationship above both the distributor duct **4** and the supply duct **2**, and permits both the simplification of installation and removal of the apparatus.

The distributor duct **4** can also be easily removed from the supply duct **2** after the release of the threaded bolts **24** to facilitate the cleaning of the apparatus interior. While only a single bracket **21** and a single bolt **24** are illustrated in FIGURE 1 of the drawing, it is to be understood that more or less than this number may be provided as desired, but in any case the heat exchanger **5** is re-

moved from its mounting by merely lifting the same upwardly as viewed in FIGURES 1 and 2 until the straps **23** are free of the flanges **22**. The ease of so removing the heat exchanger **5** is particularly important in hospitals and similar institutions requiring high standards of sanitation.

While there is herein shown and described the preferred embodiment of the invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

What is claimed is:

1. An induction apparatus for controlling the temperature in a room comprising

(a) a heat exchanger means including a plurality of hollow, generally upright ribs forming a diffusing surface having open-sided channels which open outwardly to the room to provide both radiant and convection heat exchange effects to the room,

(b) means for circulating heat exchange media through the ribs,

(c) a distributor duct disposed below the heat exchanger means and including means for directing a flow of primary air upwardly along said open-sided channels to cause a secondary flow of air from the room and air turbulence along said open-sided channels, and

(d) means supplying compressed air to the distributor duct to provide air for the primary air flow.

2. The induction apparatus as defined in claim **1** wherein the directing means includes a plurality of individual means associated with each channel for directing the air upwardly in each channel.

3. The induction apparatus as defined in claim **1** wherein said heat exchanger includes spaced front and rear plates defining a chamber for the heat exchange media therebetween, said circulating means being in fluid communication with said chamber through said rear plate, and said front plate being of a generally corrugated configuration to define said ribs which are directed away from said rear plate.

4. The induction apparatus as defined in claim **1** wherein said heat exchanger means is a component separate from and unconnected to said distributor duct, and said heat exchanger includes means for supporting the same above said distributor duct.

5. The induction apparatus as defined in claim **1**

wherein said distributor duct is defined in part by an upper portion underlying said heat exchanger, and said upper portion includes reservoir means for collecting condensed liquid accumulated by the heat exchanger.

6. The induction apparatus as defined in claim **1** wherein said supplying means is an air duct positioned adjacent and rearwardly of said distributor duct, means is provided for supporting said air duct beneath said heat exchanger and rearwardly of said distributor duct, and said last mentioned supporting means is accessible only upon the removal of said heat exchanger from its normal position above said air and distributor ducts.

7. The induction apparatus as defined in claim **1** wherein said heat exchanger is a component separate from and unconnected to said distributor duct, said heat exchanger includes means for supporting the same above the distributor duct, said supporting means includes a bracket adapted to be secured to a supporting surface, and means forming a slidable connection between said heat exchanger and said bracket for securing and removing said heat exchanger from the bracket in the absence of conventional auxiliary fastening means.

8. The induction apparatus as defined in claim **2** wherein the directing means includes a plurality of nozzles for directing the air from the distributor duct upwardly in each channel.

9. The induction apparatus as defined in claim **8** wherein said distributor duct includes reservoir means for collecting condensed liquid accumulated by the heat exchanger.

10. The induction apparatus as defined in claim **8** wherein said heat exchanger includes a chamber defined in part by spaced front and rear wall portions, said circulating means being in fluid communication with said chamber through said rear wall portion, and said front wall portion being of a corrugated configuration thereby defining said ribs and channels.

References Cited

UNITED STATES PATENTS

1,875,639	9/1932	Modine	165—55
2,758,822	8/1956	Sauter	165—131
3,162,243	12/1964	Dziekonski	165—55

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