

Oct. 21, 1958

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REFRIGERATION APPARATUS FOR AIR
COOLING SYSTEMS AND THE LIKE
Filed Nov. 7, 1955

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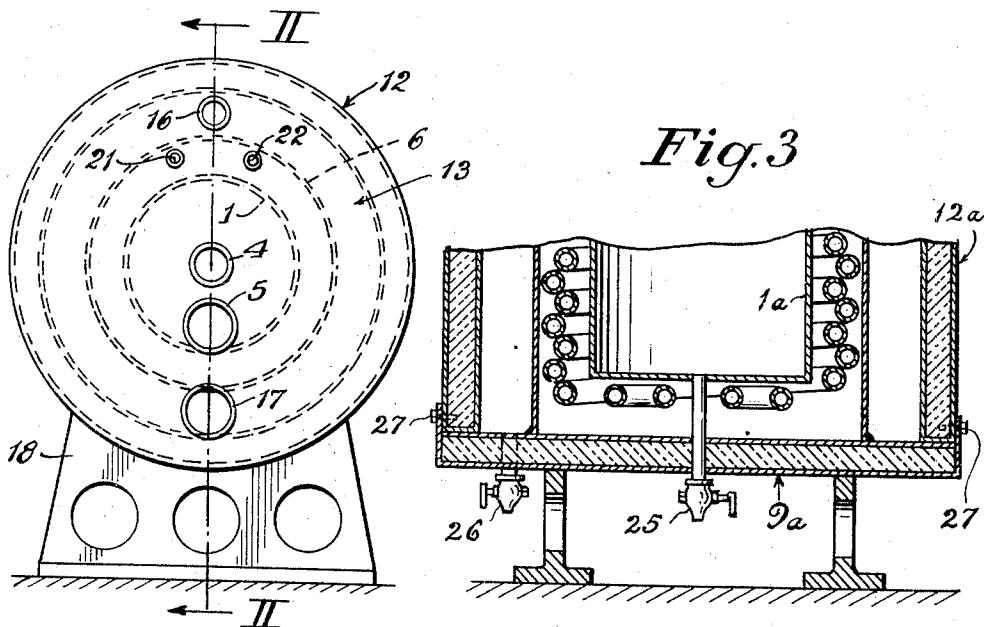
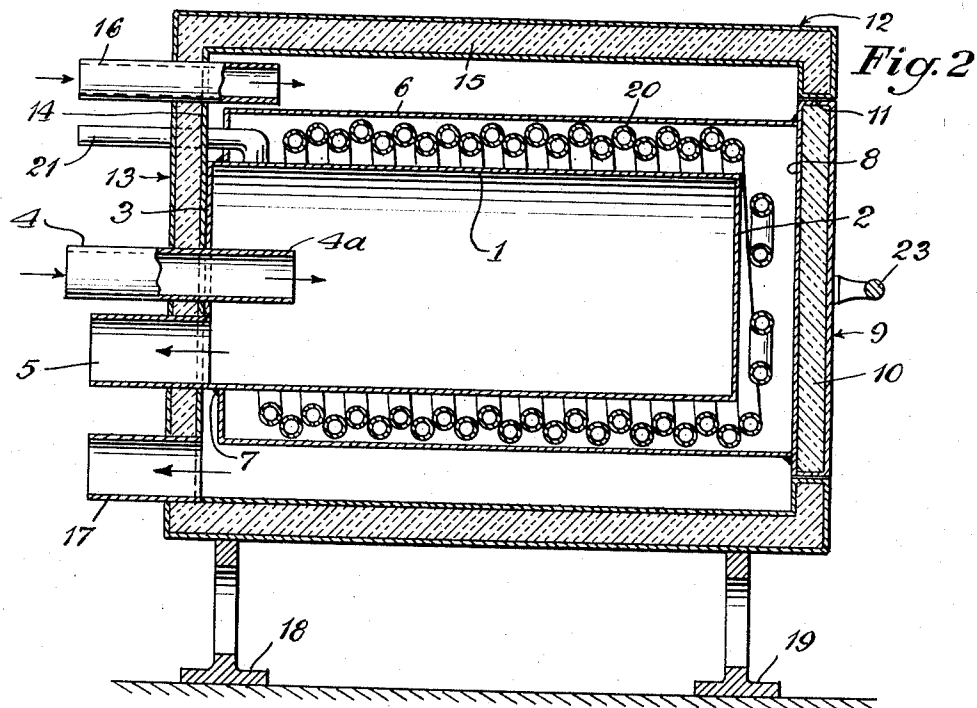


Fig. 1

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REFRIGERATION APPARATUS FOR AIR COOLING SYSTEMS AND THE LIKE

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Application November 7, 1955, Serial No. 545,264

3 Claims. (Cl. 62—285)

This invention relates to a refrigeration apparatus for air cooling systems and the like.

An object of the invention is to provide a refrigeration apparatus which is particularly suited for connection with the air ducts in a forced air heating system in a building so that the same duct system can be employed for cooling purposes as well as for heating the building.

Another object of the invention is to provide a refrigeration apparatus of the type indicated which is extremely efficient and dependable, yet inexpensive to manufacture and simple to install and operate.

Other objects and advantages of the invention will be obvious from the following description.

The invention is illustrated in the accompanying drawing in which

Fig. 1 shows an end elevation of an embodiment,

Fig. 2 shows a section along line II—II of Fig. 1, and

Fig. 3 shows a similar partial section of a modified embodiment.

In the embodiment shown in Figs. 1 and 2, an inner cylinder 1 provided with end covers 2, 3 is provided with an inlet pipe 4 and an outlet pipe 5 both disposed in the end cover 3. The inlet pipe 4 extends a distance into the cylinder 1, as shown at 4a.

An intermediary cylinder 6 is coaxial with the inner cylinder 1 and welded thereto as at 7. Said intermediary cylinder 6 extends beyond the end cover 2 of the inner cylinder and is closed at the end as by a cover plate 8 welded or otherwise secured to the cylinder 6. Said cover plate 8 forms the inner wall of a hollow end unit 9 which is filled with a suitable heat insulating material 10 and said end unit 9 covers an opening 11 in a hollow shell 12 surrounding the intermediary cylinder 6 and having a larger inner diameter than said intermediary cylinder 6.

Said shell 12 is provided with an end member 13 the inner wall 14 of which is in engagement with the end wall 3 of the inner cylinder 1. The shell 12 is filled with insulating material 15 similarly to the end unit 9 and when said end unit 9 is in its place in the opening 11 the members 9, 12, 13 form a housing which surrounds the inner and intermediary cylinders 1, 6 on all sides. The end member 13 of said housing is pierced by an inlet pipe 16 and an outlet pipe 17, and the inlet pipe 16 extends into the housing as at 16a. The shell 12 is supported on feet 18, 19 of any suitable kind.

In the space between the inner cylinder 1 and the intermediary cylinder 6 a coil 20 of tubing is disposed and the end portions 21, 22 of said coil 20 extend through the end member 13 of the insulating housing, as shown. The inlet pipe 4, the outlet pipe 5, and the end portions 21, 22 of the tubing 20 are merely passed through openings in the end member 13 so that they can be readily withdrawn and reinserted together with the assembly 1—8. It should be noted also that the outlet pipes 5 and 17 are disposed so that their bottom is flush with the bottom of the inner cylinder 1 and the housing,

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respectively. The end unit 9 is provided with a handle 23 of any suitable kind.

In operation, the inlet pipes 4, 16 are connected to a blower (not shown) or some similar source of compressed air, while the outlet pipes 5, 17 are connected to the air duct system ordinarily employed for conducting heating air to the rooms of a building. The return ducts of said duct system may be connected to the inlet side of the blower to form a closed circulation system. The end portions 21, 22 of the tubing coil 20 are connected to the inlet and outlet of a cooling apparatus (not shown) of any suitable kind so that a cooling fluid may be circulated through the coil 20. The ducts connected to the outlet pipes 5, 17 may, at their lowest point, each have a drain valve for discharge of condensate.

It is obvious that with cooling fluid continuously flowing through the coil 20 and with air continuously forcibly supplied through the inlet pipes 4, 16, said air will be efficiently cooled before it is discharged to the duct system of the building through the outlet pipes 5, 17. Tests have shown that said cooling is, in fact, extremely and surprisingly efficient. Any condensate formed in the inner cylinder 1 or in the housing is discharged with the air and can be drained out through the aforementioned valves, if necessary.

By disconnecting the pipes 4, 5 and the end portions 21, 22 from the duct system and the cooling system, respectively, the entire assembly 1—10, 20—23 can be pulled out from the housing for cleaning, repair, or replacement purposes.

In the embodiment of Fig. 3 the axis of the apparatus is vertical, and the inner cylinder 1a and the shell 12a are provided with discharge valves 25 and 26, respectively, for removal of condensate. The end unit 9a covers the entire lower end of the shell 12a and is attached thereto by screws 27. Upon removal of said screws 27 and disconnection of the pipe connections at the opposite end of the apparatus (compare Fig. 2), the shell 12a can be removed upwards.

The apparatus according to the invention is extremely simple and inexpensive to manufacture and use, yet dependable and surprisingly efficient. It should be understood, of course, that the embodiments described and shown are only examples of preferred embodiments of the invention, numerous modifications and changes being feasible within the scope of the appended claims. For instance, the apparatus may in lieu of feet be provided with means for supporting it on a wall or from a ceiling. Further, the end wall 8 of the inner cylinder 1 may be separate and spaced inwardly from the end unit 9 of the housing to permit air flow between said end wall 8 and the end unit 9.

Although the word "cylinder" has been used above for some members, this has been done for the sake of simplicity and convenience only and not in order to limit the shape of said members which may vary considerably.

What I claim is:

1. In a refrigeration apparatus for air cooling systems and the like, an inner hollow member, a housing of heat insulating material substantially surrounding said inner hollow member, an intermediary hollow member substantially surrounding said inner hollow member and being surrounded by said housing, first forced air inlet means secured to said inner member and slidably mounted in the wall of said housing, second forced air inlet means communicating with the space between said housing and said intermediary hollow member, outlet means secured to said inner hollow member and slidably mounted in the wall of said housing for connecting the interior of said inner hollow member with an air duct system for a building, outlet means from said housing to

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the air duct system, refrigeration means in the space between said inner and said intermediate hollow members; and means slidably mounted in the wall of said housing for connecting said refrigeration means with the inlet and outlet of a cooling apparatus, whereby said inner and intermediate hollow members together with said refrigeration means and said slidable connections may be separated as a unit from said housing.

2. The refrigeration apparatus as set forth in claim 1, wherein said inner and intermediate hollow members and said housing comprise substantially horizontally disposed substantially concentric cylinders, said outlet means from the inner hollow member and from the housing having their bottom part substantially flush with the bottom part of said inner hollow member and said housing, respectively, whereby condensate can readily escape through said outlets.

3. The refrigeration apparatus as set forth in claim 1, wherein said inner and intermediate hollow members and said housing comprise substantially vertically disposed substantially concentric cylinders having said connec-

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tions at the top end thereof, a valve controlled outlet for condensate at the bottom end of said inner hollow member with the valve outside said housing, and a valve controlled condensate outlet from the space between said housing and said intermediate hollow member at the bottom end of said housing.

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