

## [54] ROTATING HEAT EXCHANGER

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abandoned.

[30] **Foreign Application Priority Data**

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[51] Int. Cl. .... **F28d 11/04**

[58] Field of Search ..... 165/86, 92, 122, 142

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[57]

**ABSTRACT**

In a rotating heat exchanger with parallel annular fins and with pipes running parallel to the axis of rotation traversing these annular fins and conveying a heat carrier, each of these pipes is divided by a separating wall into two compartments which communicate with each other at the closed end of each pipe and, at the other end, communicate with separate chambers in the hollow front of the rotor.

**2 Claims, 3 Drawing Figures**

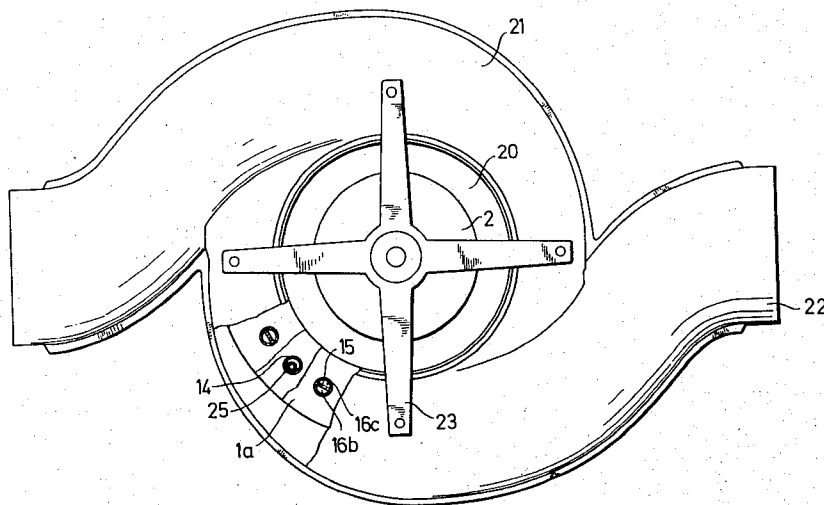
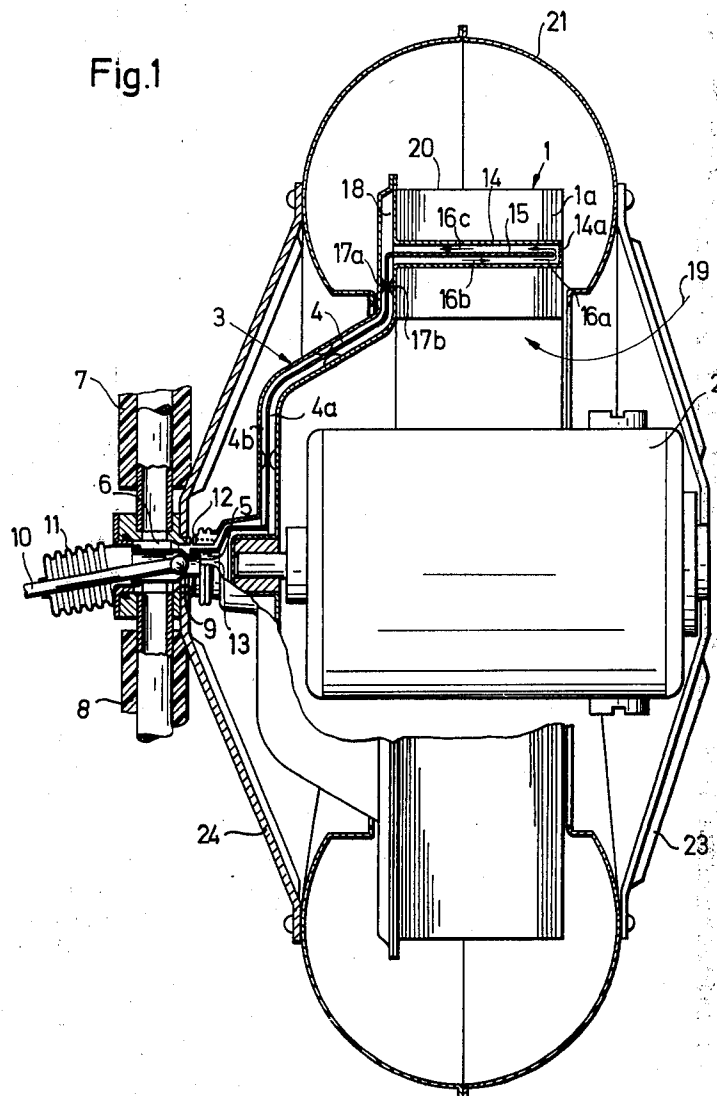


Fig.1



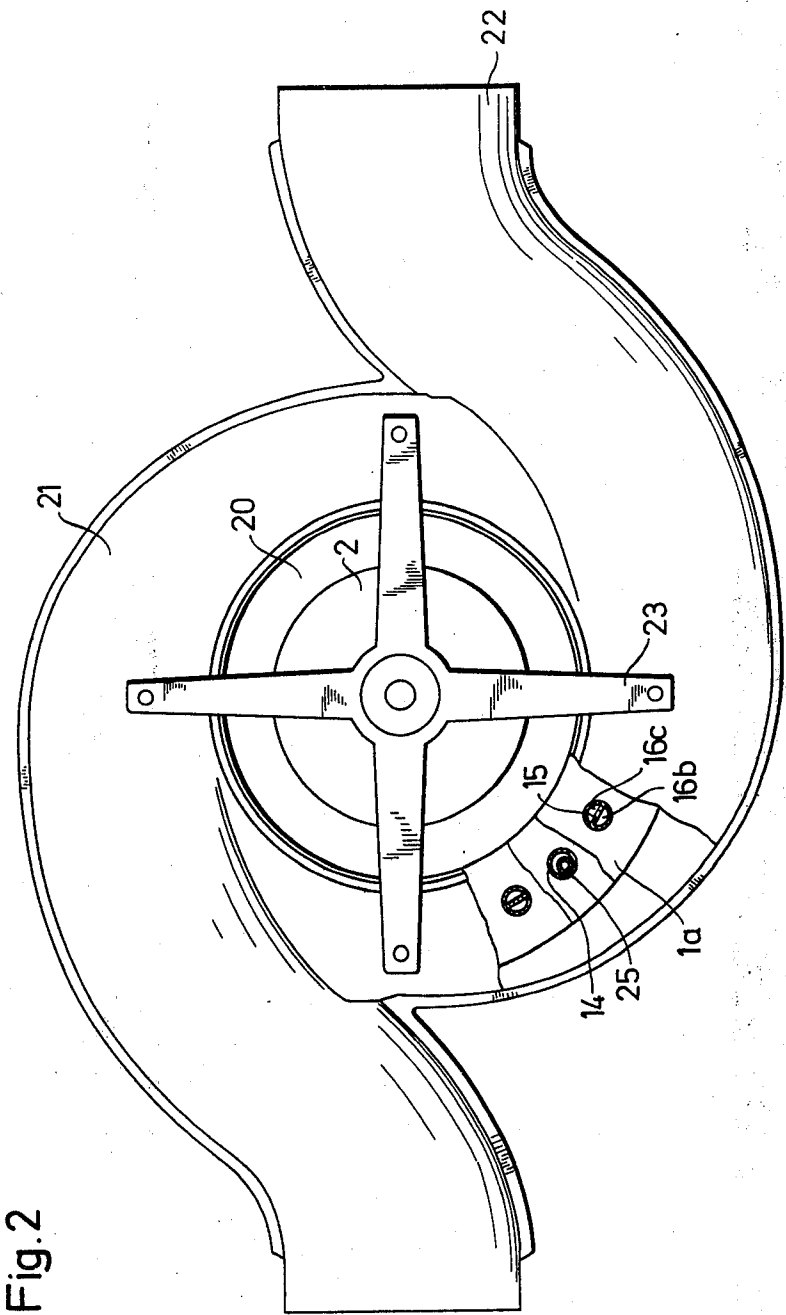
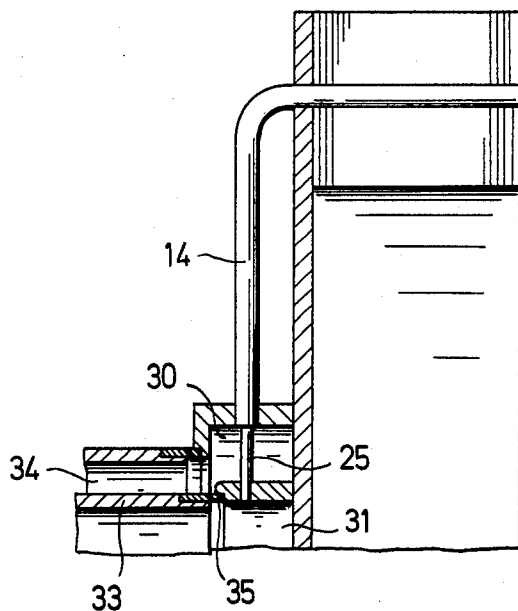


Fig. 3



## ROTATING HEAT EXCHANGER

This is a division, of application Ser. No. 293,100, filed Sept. 28, 1972, now abandoned.

## THE PRIOR ART

As in non-rotating tube-and-shell type heat exchangers, rotating heat exchangers have hitherto been provided with pipes running to and fro in which the liquid carrier thus traverses the heat exchanger in the axial direction and through which, or through adjacent pipes, the liquid carrier flows back in the opposite direction. It has been found that, in rotating heat exchangers, it is detrimental to connect pipes with soldered bends.

## THE OBJECT OF THE INVENTION

The invention has the aim of so designing the pipes that soldered bends are not required.

## DESCRIPTION OF THE INVENTION

In a rotating heat exchanger with annular fins lying in planes of rotation and with axially running pipes, a forward and a reverse flow are arranged in each pipe by sealing off one axial end of each pipe and subdividing the pipe by a separating wall into an inflow and a discharge channel in such a way that the separating wall does not quite reach the closed end of each pipe so that a communicating channel remains. In other example of an embodiment, two concentric pipes are provided of which one is inserted into the other. In this arrangement, a diameter ratio of 1.5 : 1 has been found to be an optimum.

The invention will be described, by way of example, with the help of the accompanying drawings in which:

FIG. 1 shows a cross-section through a rotating heat exchanger.

FIG. 2 shows an elevation viewed along the axis of the illustration of FIG. 1, however, to a smaller scale.

FIG. 3 illustrates a variant.

Referring to FIG. 1, the rotating heat exchanger 1 consists of a large number of annular flat rings 1a of thin aluminum sheet, and is driven by the motor 2 via a saucer-shaped wheel 3. A separating wall 4 is situated in the thickness of the hollow wheel and divides the interior of the thickness of the wheel into an inner and an outer hollow space, respectively 4a and 4b. The space 4a communicates with the inlet duct 5 for hot water, whilst the outer hollow space 4b communicates with the annular space 6 and thereby to the water discharging hose 7. Water enters through the hose 8. A valve ball 9 which is actuated by a control rod 10, controls the mass flow of the water. Bellows 11 provides hermetic sealing of the control rod 10. A shaft seal 12 prevents escape of water from the water circuit. The separating wall 4 blends into a socket 13, the inside diameter of which is slightly larger than the outside diameter of the inlet duct 5. Hot water flows through the space 4a to the pipes 14 and is then guided as shown by the arrows 16a, 16b and 16c through the annular passages defined by the cylindrical separating walls 15, the axial length of which approximates to the length of the pipes not quite reaching their ends at 14a. The water then enters the collector space 18 which communicates with the outer hollow space 4b and the outlet hose 7. The

separating wall 4 is held spaced from the two walls of the hollow wheel 3 by excrescences such as 17a and 17b. When the valve ball 9 is closed water is prevented from entering the inside of the rotating heat exchanger

1. The heat exchanger then draws in air along the path indicated by the arrow 19, which flows from the periphery 20 into the 180° volute ducts 21 whence the air is discharged from outlets 22. Such air is, therefore, either heated or cold. The stator part of the motor 2 is attached by the spokes 23 to the structure of the volutes 21, whilst the spokes or the plate 24 provide the centering of the ducting and valve elements.

FIG. 2 shows a view of the motor side, partly cut away. In this can be seen the separating walls 15, dividing the pipes 14 in the illustrated manner into the in and out flows shown by the arrows 16b and 16c. Instead of the wall 15, the axial flows in the pipes 14 may be conducted by pipes 25 within the pipes 14: FIG. 2 illustrates both schemes. The pipes 25 in such variant communicate with one of the spaces 4a or 4b and, like the separating walls 15, the pipes 25 do not quite reach the closed ends at 14a of the pipes 14.

At very high rotational speeds, substantial hydrostatic pressure is generated in the space 18. This is a reason for the use of the pipes 25 which can be led inwardly to the hub along with the pipes 14. FIG. 3 shows such an embodiment in which all the pipes 14 are L-shaped and reach a first fluid collector space 30, whilst all the pipes 25 are L-shaped and reach a coaxial second fluid collector space 31. It is advantageous if the diameter ratio of the pipes is chosen to be 1 : 1.5, whereby the velocity inside both channels is approximately the same. The pressure inflow is applied within the inside pipe 33, whilst the return flow proceeds through the annular space 34. A seal 35 is necessary only when the design pressure difference is very high.

I claim:

1. A rotary heat exchanger comprising a rotatable matrix of axially spaced sheet metal elements of good thermal conductivity arranged to afford radial passage of air between said elements, at least one L-shaped outer pipe having an axially extending portion closed at one axial end thereof and transversing said sheet metal elements in good thermal contact therewith, a radially extending portion connected at its radial outer end to the end of the axially extending portion opposite said closed end, a first fluid collector space connecting with the radial inner end of the outer pipe, an inner L-shaped pipe having a smaller outer diameter than the inner diameter of the outer pipe positioned within the outer pipe wherein the inner pipe forms one flow channel and the space between the inner pipe and the outer pipe forms another flow channel and wherein the outer pipe extends at its closed end axially beyond the inner pipe to form an axially extending space between the closed end and the end of said inner pipe to provide a fluid connection between the flow channels, and a second fluid collector space connecting with the radial inner end of the inner pipe.

2. A rotary heat exchanger according to claim 1 having in addition connecting means providing a rotational fluid connection between said inner and outer pipes and said collector spaces.

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