

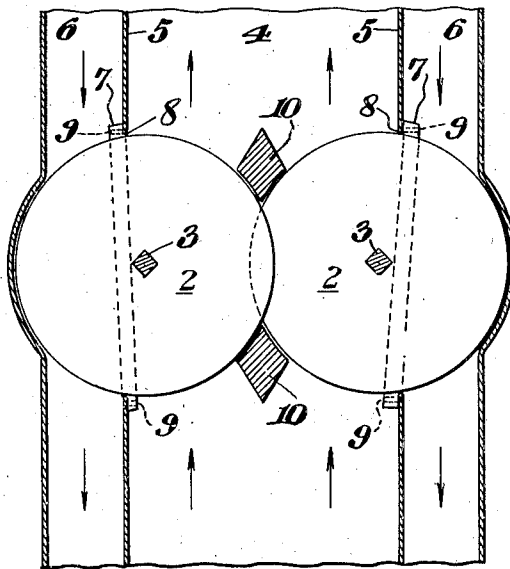
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HEAT EXCHANGER

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INVENTOR

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UNITED STATES PATENT OFFICE

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HEAT EXCHANGER

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My invention relates to heat exchangers, and particularly to rotary heat exchangers for extracting heat from a heated fluid column and transferring it to a cooler fluid column. One application of the invention is in extracting heat from hot waste gases, and transferring it to a column of air, although it is to be understood that it is applicable to numerous other uses.

I provide a rotary heat exchanger which divides the columns of fluid travelling it into thin streams. Each stream passes through the heat exchanger without distortion, in a direction substantially parallel to the axis of its conduit. By this construction, the pressure drop across the heat exchanger does not differ materially from that in adjacent sections of the fluid conduit.

The heat exchanger is constituted by a plurality of continuously rotating spaced disks or plates that project into the fluid conduits, between which the heat exchange takes place. All portions of the plates are simultaneously undergoing a change in thermal condition. By utilizing simple disks mounted on a common shaft, I eliminate the necessity for a large number of differently shaped parts and the resulting expense and difficulty in making and assembling them.

The single figure of the accompanying drawing is a longitudinal sectional view through the casing of heating ducts with a heat exchanger embodying my invention disposed therein.

Referring to the drawing, a plurality of heat exchangers 2 each comprising a plurality of spaced disks mounted on a shaft 3 are disposed in a central heating duct 4 for transmitting fluid such as hot air. The heat exchangers 2 project through partition walls 5 defining the inner conduit, and into outer ducts 6 in which a fluid is moving in opposite directions to that in the duct 4. As the heat exchangers 2 are rotated they become heated in the duct 4 and as they move into the ducts 6 they transfer the stored thermal energy to the fluid in the ducts 6. In order to impart the greatest temperature to the fluid in the conduits 6, the heat exchangers 2 are preferably rotated so that the hottest sections of

the heat exchanger are brought into the conduits 6 on the lee side of the heat exchangers.

For preventing the transfer of heating fluid between the ducts 4 and 6 between the disks of the heat exchangers, baffle bars 7 are mounted on the walls 5 and span the openings 8 through which the disks of the heat exchangers 2 extend. The bars 7 are secured by pins or bolts 9 on opposite sides of the partitions 5 so that the friction of the rotating disks tends to press the bars into engagement with the partitions 5. For preventing the by-passing of fluid in the conduit 4 at the edges of the disks, baffles 10 are mounted near the overlapping sections of the heat exchangers. The presence of the baffles 10 insures that fluid traversing the heat exchangers must follow a path having a sufficient length to insure an efficient heat transfer.

By having the heat exchangers in overlapping relation at their edges, a material reduction in the overall dimensions of the ducts 4 and 6 is obtained. This is of considerable importance as it results in a considerable reduction in the amount of material required for the casings and connections of the heat exchangers. As the disks of one heat exchanger overlap those of the other, the disks or plates of one heat exchanger serve as spacers for the plates or disks of the adjacent heat exchanger.

The invention is particularly applicable to fire boxes, chimneys, the exhaust from heat treating devices and the like, where it is desired to utilize the escaping heat for heating another fluid such as air.

The speed of rotation of the disks and the disks constituting the heat exchangers 2 and their thickness is dependent upon the amount of heat being exchanged between the ducts 4 and 6.

While I have illustrated and described the preferred form of my invention and certain modifications thereof, it will be understood that it may be otherwise embodied without departing from the spirit of the invention or the scope of the following claim.

I claim:

In a heat exchanger, an inner fluid conduit,

outer fluid conduits disposed along the edges
of the inner conduit, and heat exchanging
mechanism operative between the inner and
outer conduits comprising a plurality of
disks arranged in groups and rotating in the
5 inner and outer conduits, the individual disks
of the different groups being in overlapping
relation, whereby the disks of one group
space the disks of another group.

10 In testimony whereof I have hereunto set
my hand.

WALDEMAR DYRSSEN.

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