Nov. 10, 1936. C. F. ROSENBLAD 2,060,440

HEAT EXCHANGE APPARATUS

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Fig. 1

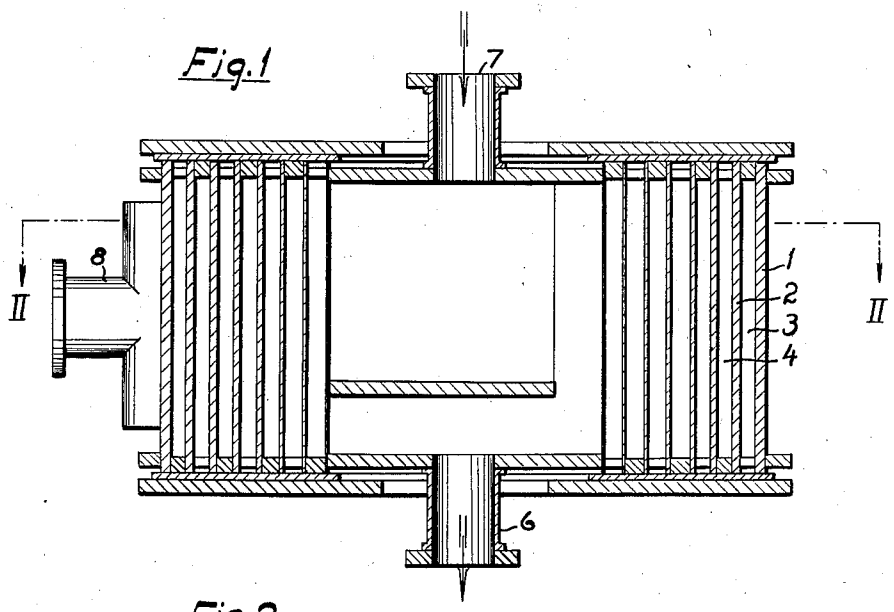
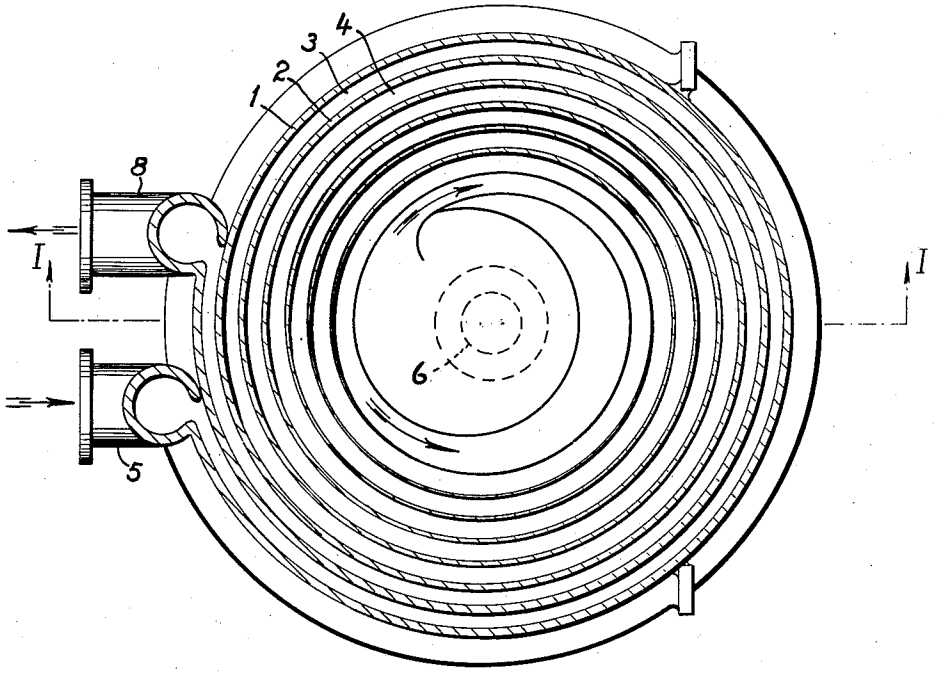


Fig. 2



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Fig. 3

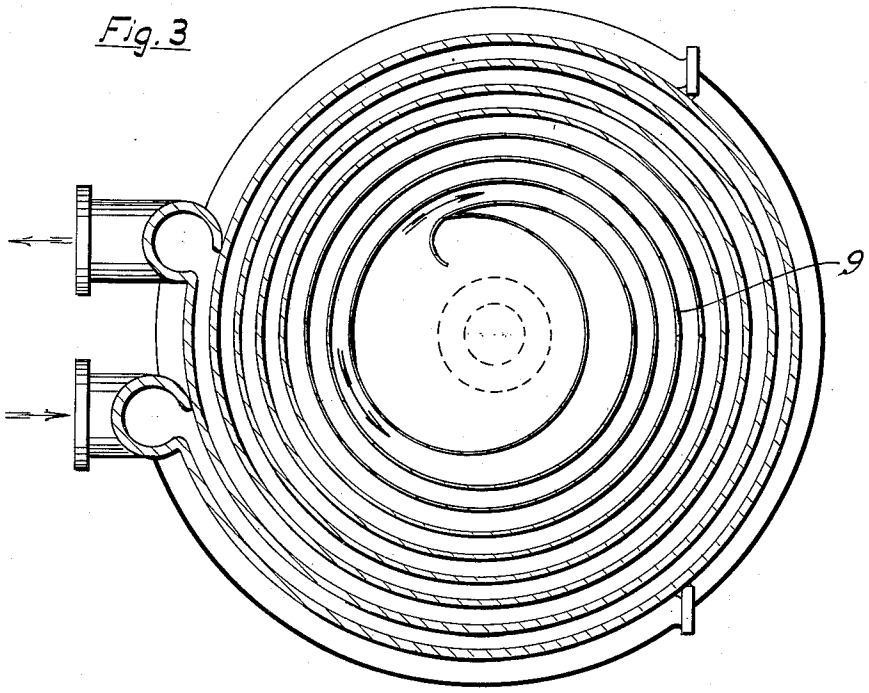
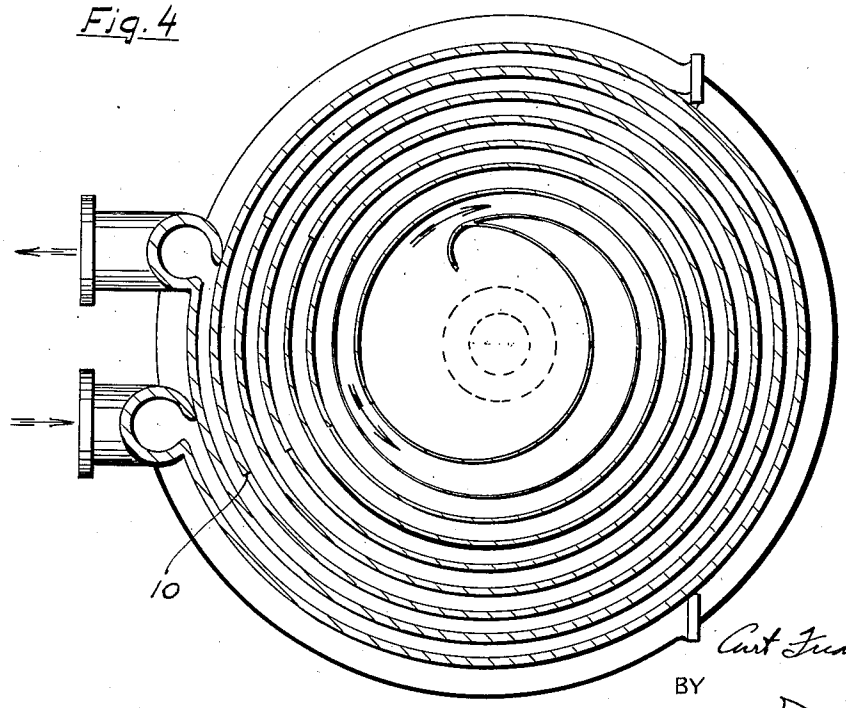


Fig. 4



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UNITED STATES PATENT OFFICE

2,060,440

HEAT EXCHANGE APPARATUS

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Application March 27, 1936, Serial No. 71,090
In Sweden March 28, 1935

4 Claims. (Cl. 257—245)

This invention relates to improvements in heat exchange apparatus, and it is an object of the invention to reduce the costs of manufacture by saving expensive material and nevertheless obtain an apparatus being equally resistant to stresses and shocks as hitherto known apparatus of the kind referred to.

Another object of my invention is to provide apparatus of the kind referred to having an improved heat exchange efficiency.

Still another object of my invention is to decrease the weight and size of such apparatus and nevertheless maintain their full capacity.

Some embodiments of the invention are shown in the annexed drawings.

Fig. 1 is a sectional view taken on the line I—I of Fig. 2;

Fig. 2 is a sectional view taken on the line II—II of Fig. 1;

Fig. 3 is a view similar to Fig. 2 but showing another embodiment of the invention; and

Fig. 4 is a view similar to Fig. 2 but showing still another embodiment of the invention.

Referring now to the drawings, the apparatus comprises two parallel channels 3 and 4 for heat exchanging fluids. The channels are formed by plates bent to form convolute heat transmission walls 1 and 2. The channel 3 has an outer inlet connection 5 and an inner outlet connection 6 and the channel 4 has an inner inlet connection 7 and an outer outlet connection 8. Hot liquid may, for instance, be supplied to the channel 4 through the inlet connection 7 and liquid to be heated may be supplied to the channel 3 through the inlet connection 5.

Fig. 2 shows exaggeratedly the thickness of both the walls 1 and 2 decreasing continuously from their outermost ends to their innermost ends. By conveniently accommodating the thickness of the different sections of each wall relative to their distance from the centre of the apparatus a construction of uniform strength can be obtained and as this is effected by reducing the thickness of the walls a considerable saving of material will be obtained. In apparatus of the kind referred to the convolute walls are often made of valuable and expensive material and then the saving of material will considerably reduce the entire costs of manufacture.

In apparatus operating at relatively small fluid pressures walls of uniform strength throughout would have very little thickness at the innermost convolutions and this would cause difficulties in manufacture. In such case it might be suitable to use walls having a certain minimum thickness at the inner convolutions as shown in Fig. 3. Thus it is assumed that the walls have a uniform thickness from their inner ends to a section at 9.

Instead of continuously varying the thickness of the convolute walls said thickness may vary stepwise as shown in Fig. 4. In such case each section may have a uniform thickness or a continuously varying thickness, and the sections may be secured to one another at 10, or they may be integrally formed with one another.

Also in case there are used convolute walls having a continuously varying thickness said walls may be formed by sections secured to one another. Possibly, one of the channel walls might be developed with varying thickness and the other wall or walls may have a uniform thickness throughout as in hitherto used apparatus of the kind referred to.

I claim:—

1. A heat exchange apparatus having convolute heat transmission walls forming channels for heat exchanging fluids, the thickness of said walls decreasing in a direction towards the centre of the apparatus.

2. A heat exchange apparatus having convolute heat transmission walls forming channels for heat exchanging fluids, the thickness of said walls decreasing continuously in a direction towards the centre of the apparatus.

3. A heat exchange apparatus having convolute heat transmission walls forming channels for heat exchanging fluids, the thickness of said walls decreasing stepwise in a direction towards the centre of the apparatus.

4. A heat exchange apparatus having convolute heat transmission walls forming channels for heat exchanging fluids, the thickness of said walls decreasing in a direction towards the centre of the apparatus, and the innermost part of said walls having a uniform thickness.

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