

Dec. 30, 1930.

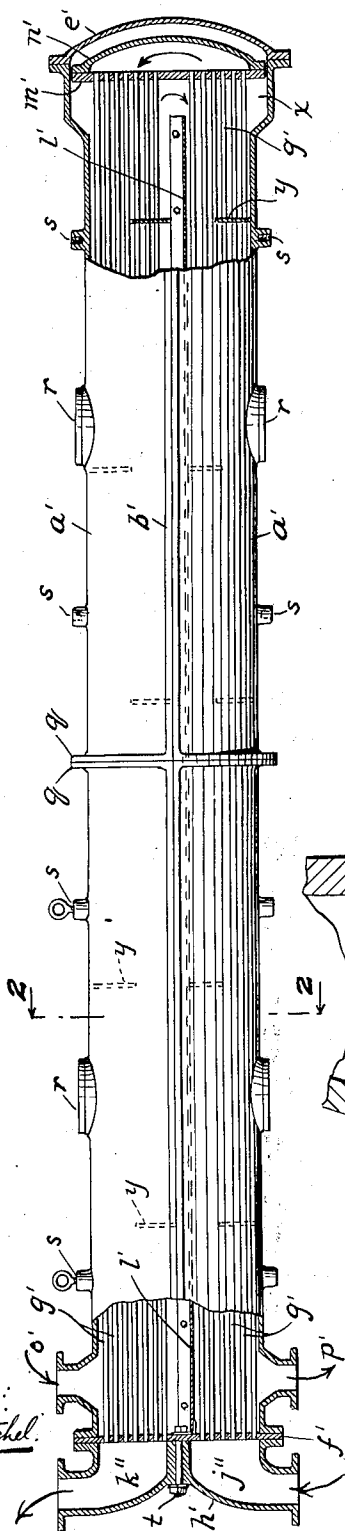
A. E. PEW, JR.

1,787,086

HEAT INTERCHANGER

Filed June 10, 1926

FIG. 1.



WITNESS:
Robert Mitchell

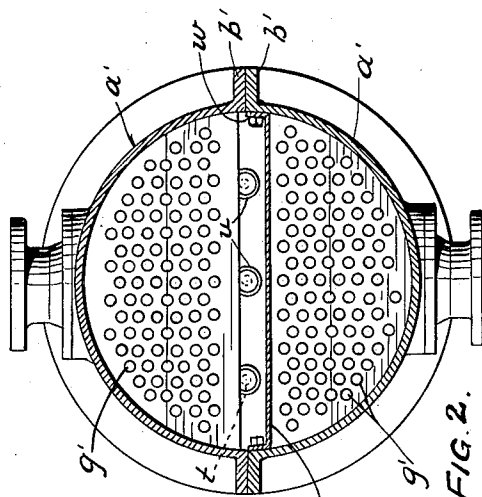


FIG. 2.

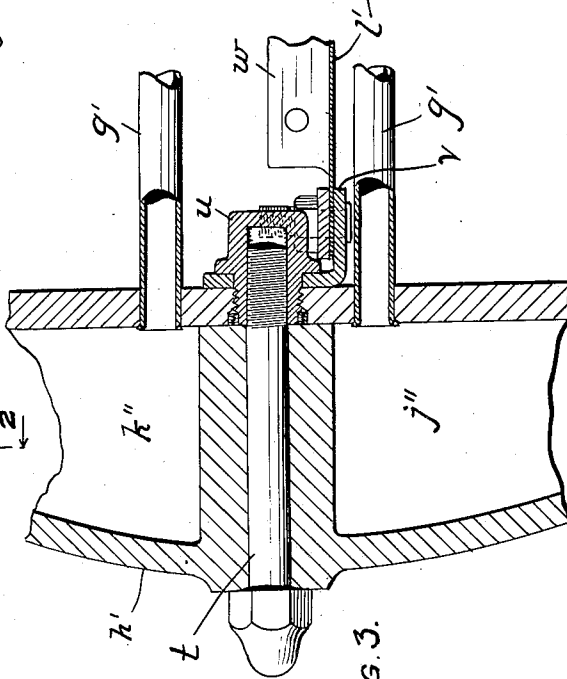


FIG. 3.

INVENTOR

Arthur E. Pew, Jr.

BY

Brown & Handing
ATTORNEYS.

UNITED STATES PATENT OFFICE

ARTHUR E. PEW, JR., OF BRYN MAWR, PENNSYLVANIA, ASSIGNOR TO SUN OIL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF NEW JERSEY

HEAT INTERCHANGER

Application filed June 10, 1926. Serial No. 114,910.

My invention relates to heat interchangers, of the type adapted for effecting heat interchange between fluids, as gases or liquids.

In the provision of an efficient heat interchange apparatus numerous problems arise which heretofore have not been solved with maximum satisfaction. For example, heat interchange apparatus must have the capacity for maximum heat interchange between two fluids, whether it is intended as a preheater or as a cooler and it must be so constructed as to have a capacity for different degrees of expansion in different parts.

Now it is the object of my invention to provide a heat interchange apparatus of a novel construction, which will have a maximum efficiency for the purpose intended and in which the problem of differential expansion will be taken care of in a novel and highly efficient manner.

Further objects of my invention are to provide an apparatus which will be relatively simple and inexpensive to construct and maintain and which, at the same time, will operate with a maximum of efficiency.

Having now indicated, in a general way, the nature and purpose of my invention, I will proceed to a detailed description thereof with reference to the accompanying drawings in which there has been illustrated a preferred embodiment and in which:

Fig. 1, is a side view of a heat interchanger embodying my invention, partly broken away and partly in section.

Fig. 2, is a cross sectional view on line 2—2, Fig. 1.

Fig. 3, is a view partly in section showing details of construction of the subject of Fig. 1.

The heat exchanger shown in the drawings comprises a cylindrical casing made in two pairs of semi-cylindrical sections a' , the two sections of each pair being secured together by bolts passing through abutting longitudinal flanges b' and the two pairs of sections being secured together by bolts passing through semi-circumferential flanges g . The casing is provided with man holes r and fitted with eyes s for engaging a hoist. To one end of the casing is secured a tube sheet f'

to which is secured the ends of a plurality of tubes g' extending longitudinally within the casing and supported intermediate their ends by supporting sheets y . The casing is provided adjacent the tube sheet f' with an inlet opening o' and an outlet p' . A head h' in which is formed chambers j'' and k'' is secured to the tube sheet f' by means of bolts t each of which, as shown in Figure 3, passes through the head and into the tube sheet and engages in a fitting u , threaded into the tube sheet and which serves to clamp thereto a support v to which is bolted the end of a partition l' , which extends longitudinally of the casing and is provided with flanges w at its edges for securing to the casing.

The opposite end of the casing is enlarged, as at x , for the reception of a second tube sheet m' , of less area than the enlargement of the casing, which is supported by the tubes at a point beyond the end of partition l' . A head n' forming a closure for the tubes, is secured to the tube sheet and the end of the casing is closed by a head e' .

A circulation of fluid in the tubes may be effected by the introduction of fluid through chamber j'' , thence through the tubes in communication with that chamber to chamber n' , thence back to chamber k'' through the tubes in communication with that chamber and thence out through chamber k'' . A circulation of fluid within the casing, preferably in a direction opposite to that through the tubes, may be effected by the introduction of fluid through inlet o' into the casing, through the casing on one side of partition l' , around the end of the partition l' and by tube sheet m' , to return on the other side of the partition and out through outlet p' . Thus it will be observed that if a heated fluid be circulated through the tubes and a cool fluid be circulated through the casing, an efficient heat interchange will be effected.

In the circulation of a heated fluid through the tubes and of a cool fluid through the casing, there is a substantial difference in the degree of expansion of the tubes and casing, and it will be observed that in the structure embodying my invention the tubes and cas-

ing are free to expand independently of each other since the tubes are supported from the casing only at one end, being entirely free from the casing at the other, since one of the tube sheets and the tube head supported thereby is free to move within the casing.

Access to the tubes may be readily obtained by the removal of bolt *t*.

The apparatus embodying my invention may be used for effecting heat interchange between either liquids or gases or between a liquid and a gas.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. A heat exchanger casing composed of a plurality of pairs of sections, each pair being composed of complementary semi-cylindrical sections, abutting longitudinally extending flanges along adjacent edges of the casing sections of each pair and abutting circumferential flanges on adjacent ends of adjacent pairs of casing sections, and means securing said abutting flanges.

2. A heat interchanger comprising a cylindrical casing, a head at one end of the casing, a tube sheet confined between the said casing and head, a partition between said head and tube sheet, tubes carried by said tube sheet and extending nearly throughout the length of the casing, a partition extending nearly throughout the length of the casing and having a wing along its longitudinal edge secured to the casing, a bolt extending through the partition in the head and the tube sheet, and partition supporting means including a supporting member on the last mentioned partition and a fitting internally threaded on the bolt and externally threaded on the tube sheet.

3. A heat interchanger comprising a cylindrical casing, a head at one end of the casing, a tube sheet confined between said casing and head, a partition between said head and tube sheet, tubes carried by said tube sheet and extending nearly throughout the length of the casing, a bolt extending through the partition in the head and the tube sheet, a fitting internally threaded on the bolt and externally threaded on the tube sheet, a support which is clamped by said fitting against the tube sheet, and a partition extending nearly throughout the length of the casing and secured to said support.

In testimony of which invention, I have hereunto set my hand at Philadelphia, Penna., on this 8th day of June, 1926.

ARTHUR E. PEW, JR.