

April 17, 1934.

G. L. MATEER ET AL

1,955,006

LUBRICATED BAFFLE FOR HEAT EXCHANGERS

Filed Dec. 2, 1932

3 Sheets-Sheet 1

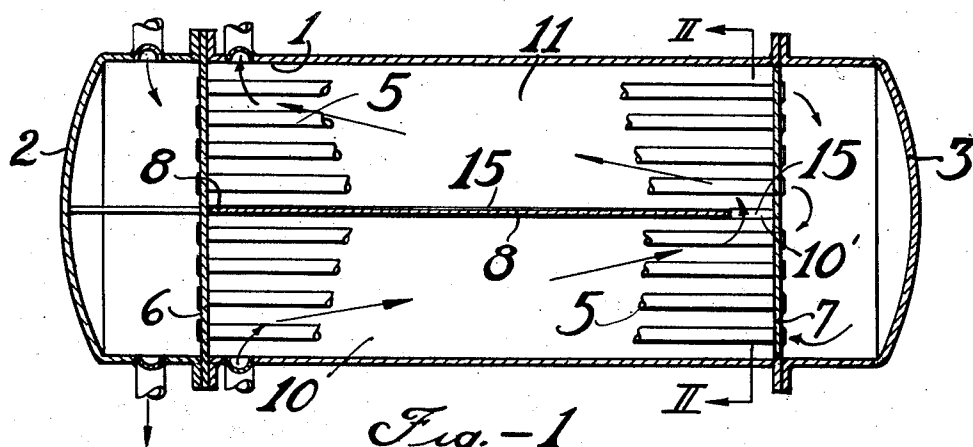


Fig. -1

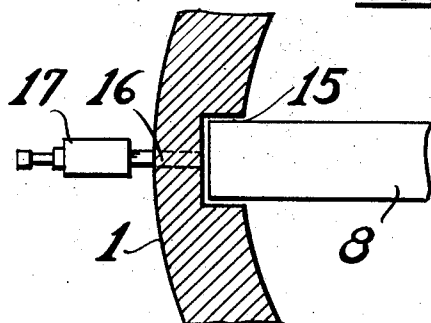


Fig. -2

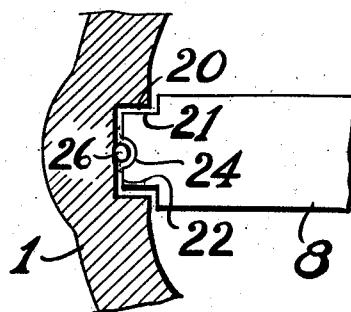


Fig. -3

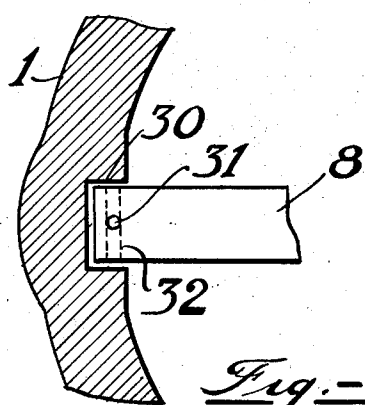


Fig. -4

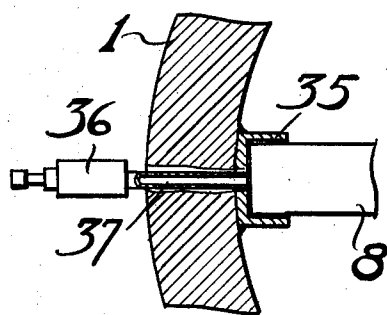


Fig. -5

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Fig.-7

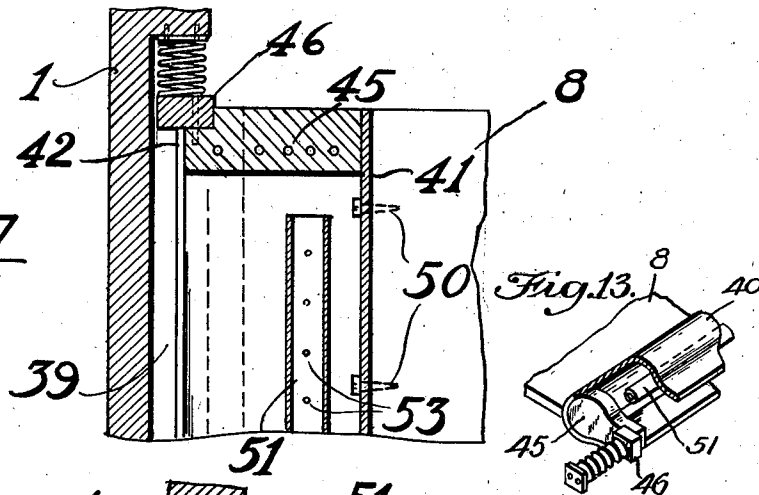


Fig.-6

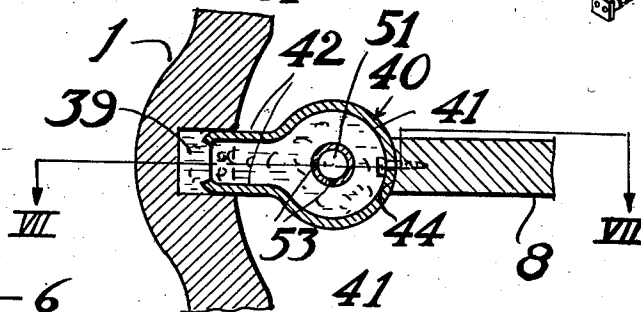
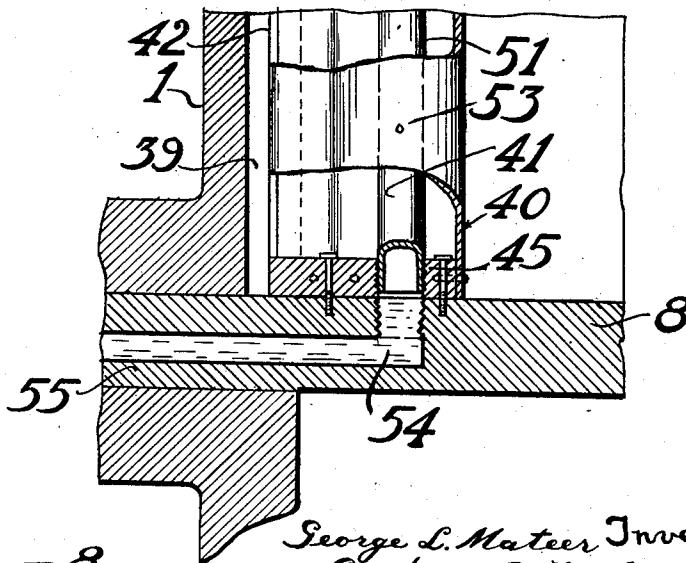


Fig.-8



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3 Sheets-Sheet 3

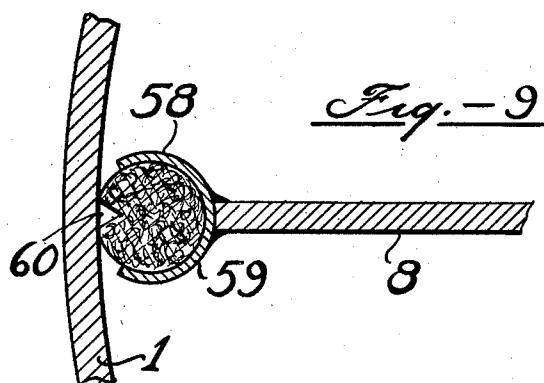


Fig. - 9

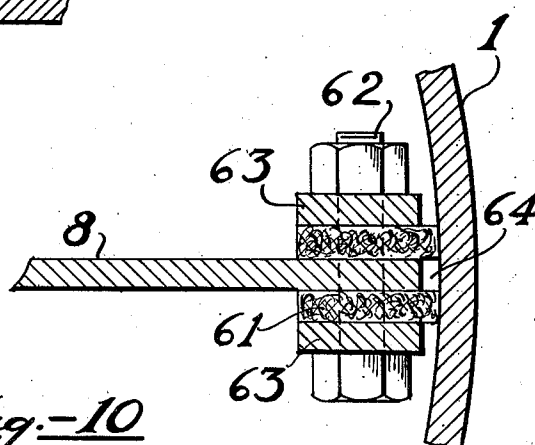


Fig. - 10

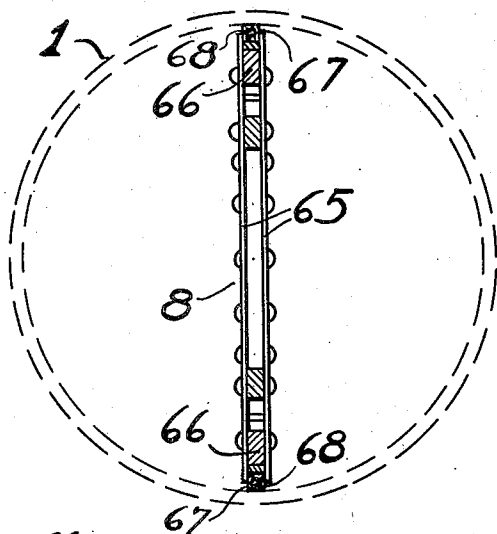


Fig. - 11

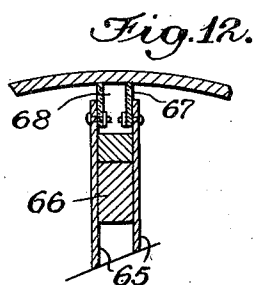


Fig. 12.

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UNITED STATES PATENT OFFICE

1,955,006

LUBRICATED BAFFLE FOR HEAT EXCHANGERS

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velopment Co.

Application December 2, 1932, Serial No. 645,330

8 Claims. (Cl. 257-236)

This invention relates to improvements in baffles for heat exchangers, and more particularly relates to lubricated baffles. The invention will be fully understood from the following description taken in connection with the accompanying drawings in which latter

Fig. 1 is a longitudinal sectional view of a heat exchanger showing a baffle to which the invention is applied.

Fig. 2 is a transverse sectional view taken along the line II-II of Fig. 1.

Figs. 3, 4, 5 and 6 are transverse sectional views through a heat exchanger and showing alternative forms of the gland between the baffle and the shell of the exchanger.

Fig. 7 is a sectional view taken along the line VII-VII of Fig. 6.

Fig. 8 is a transverse sectional view through the opposite end of the tube sheet and baffle illustrated in Figs. 6 and 7 showing the gland in side elevation and showing the passage for lubricant through the tube sheet.

Figs. 9, 10 and 11 are transverse sectional views through a heat exchanger showing further alternative forms of the gland between the baffle and the shell of the exchanger.

Fig. 12 is a detail view of the gland structure of Fig. 11 and Fig. 13 is a perspective view looking toward the end of the baffle and block in Fig. 7.

Referring particularly to Figs. 1 and 2, reference numeral 1 designates the shell of a heat exchanger. The shell 1 is provided with end closures 2 and 3. A tube bundle extends longitudinally of the shell 1. The tube bundle comprises a plurality of tubes 5 which are supported at their opposite ends in tube sheets 6 and 7. A horizontal plate or baffle 8 extends longitudinally through an intermediate portion of the heat exchanger. The horizontal baffle 8 is sealed against the tube sheet 6 and terminates in spaced relation to the tube sheet 7. The horizontal baffle 8 divides the shell 1 into passageways 10 and 11 which communicate through the space 10' between the end of the horizontal baffle and the tube sheet 7.

The horizontal baffle 8 is sealed against the walls of the shell 1 through the following arrangements of parts: The interior surface of the opposite walls of the shell 1 is provided with longitudinally extending recesses 15. The passageways 16 are formed through the wall of the shell 1 opening into the recesses 15 and communicate upon the exterior of the shell with lubricators 17. The lubricators are of any suitable construction for forcing lubricant under pressure

into the recesses 15. The recesses 15 when filled with the proper lubricant provide a positive seal which prevents by-passing of liquid or vapor and directs fluid vapor flow in the heat exchanger and also permits the removal of the tube bundle from the shell without binding. The joint between the baffle 8 and the shell is lubricated by using a lubricator upon the outside of the shell similar in design to those common in industrial use.

Referring particularly to Fig. 3, a modified form of joint between the shell 1 and the baffle 8 is shown. The shell 1 is provided with longitudinally extending recesses 20. The baffle 8 is provided with inset edge portions 21 adapted to fit within the recess 20. The outer face 22 of the inset portion 21 is provided with a longitudinally extending recess 24. The recess 24 provides room for a tube 26 which extends longitudinally of and is secured to the base wall of the recess 20. The tube 26 is adapted to receive lubricant under pressure from any suitable source, not shown, and is perforated at spaced intervals to permit the lubricant to be ejected into the joint between the baffle 8 and shell 1.

Referring particularly to Fig. 4, a modified form of joint between the shell 1 and the baffle 8 is shown in which recesses 30 extend longitudinally in the interior of the shell. A tube 31 extends longitudinally through the baffle 8 and opens laterally of the baffle through tubes 32 into the side walls of the recess 30. The lubricant is adapted to be forced from a suitable source of supply not shown.

Referring particularly to Fig. 5, U shaped members 35 are secured as by welding or brazing to the inner surface of opposite walls of the shell 1. The side edges of the solid baffle 8 project into the space between the arms of the U shaped member 35. The joint between the baffle 8 and the U shaped member 35 is lubricated and sealed by means of lubricant introduced from a plurality of suitable lubricators 36 through passageways 37.

Referring particularly to Figs. 6, 7, 8 and 13, the shell 1 is provided with longitudinally extending recesses 39 in the opposite inner faces of the shell. Longitudinally extending sleeve members 40 are sprung into and extend through the walls of the recesses 39. The tubular sleeve members 40 comprise a cylindrical portion 41 having outwardly extending arms 42 which project into and form a seal with the walls of the recesses 39. The side walls of the baffle 8 are concave at 44 to engage the convex faces of the sleeves 40. The sleeves 40 are closed at their

opposite ends by means of suitable blocks 45. Compressible thrust block 46 including a member which fits snugly in the floating end of slot 39 seals slot 39 against loss of lubricant and allows longitudinal expansion of sleeves 40 at end of slot 39 and allows for linear expansion of baffle 8. The baffle 8 is secured to the sleeves 40 by means of suitable screws 50.

The joint between shell 1 and the sleeves 40 is lubricated through the following arrangement of parts: Tubes 51 which may or may not be used extend longitudinally within the sleeves 40. Each tube 51 may be provided at spaced intervals with laterally opening apertures 53 adapted to deliver the lubricant into the interior of the sleeve 40. The lubricant is delivered from openings 53 in the sleeve 40 into the space between the slot 39 and the sleeve 40. The lubricant is delivered into the tube 51 through a passageway 54 in the tube sheet 55. The passageway 54 communicates with a suitable source of lubricant under pressure, not shown, upon the exterior of the heat exchanger.

Referring to Fig. 9, the joint between the shell 1 and the baffle 8 comprises a tubular sleeve 58 which is secured to the edge wall of the baffle 8. The sleeve 58 is provided with a longitudinally extending slot facing outwardly from the baffle 8. Round packing 59 is disposed in the sleeve and protrudes outwardly through the slot into position to engage the shell 1, forming a seal therewith. The packing is provided with a channel 60 for lubricant.

In Fig. 10, the joint between the baffle 8 and the shell 1 is formed by means of packing strips 61 which protrude beyond the baffle 8 on opposite sides of the baffle. The packing strips are secured to the baffle 8 by means of suitable bolts 62 and plates 63. The space between the protruding ends of the packing 61 forms a channel 64 for lubricant.

In the form of the invention shown in Figs. 11 and 12, the baffle 8 is formed of cover plates 65 which are secured to spacer blocks 66. Packing 67 protrudes from between the cover plates 65 into engagement with the shell 1. A lubricant channel 68 extends longitudinally in the packing 67.

While a preferred form of apparatus for lubricating and sealing a plate or baffle in a container has been shown and described, it will be understood that the structure can be modified as desired depending upon the style of baffle or plate used in the container.

Various changes may be made within the scope of the appended claims in which it is desired to claim all novelty inherent in the invention as broadly as the prior art permits.

We claim:

1. Heat exchange equipment, comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of and engaging the side walls of the shell, and means for forcing lubricant between the baffle and side walls whereby the space between the baffle and shell is sealed with lubricant.

2. Heat exchange equipment comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of and engaging the side walls of the shell, the shell having recesses in its side walls to receive the edges of the baffle, and means for forcing lubricant into the recesses.

3. Heat exchange equipment, comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of the shell, the shell having recesses in its side walls to receive the edges of the baffle, and a longitudinally extending tube in the recesses adapted to deliver lubricant into the recesses.

4. Heat exchange equipment, comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of the shell, the shell having longitudinally extending recesses in its opposite faces, the side walls of the baffle being reduced to project into the recesses, and means for forcing lubricant between the baffle and shell.

5. Heat exchange equipment, comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of the shell, the shell having recesses to receive the opposite edges of the baffle, tubes in the baffle adapted to deliver lubricant into the recesses.

6. Heat exchange equipment, comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of the shell, U shaped members projecting from opposite walls of the shell the arms of which receive the baffle, and means for forcing lubricant between the baffle and the U shaped members.

7. Heat exchange equipment, comprising a shell, a tube bundle in the shell, a baffle extending longitudinally of the shell, tubular sleeves expanded into slots in the opposite walls of the shell, the baffle associated with the sleeves, and means for forcing lubricant into the sleeves and through the walls of the sleeve against the shell.

8. Apparatus for the treatment of fluid comprising a shell, a plate extending longitudinally of and engaging the side walls of the shell, and means for forcing lubricant between the plate and side walls whereby the space between the plate and shell is sealed with lubricant.

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