May 14, 1940. J. A. COY 2,200,787

HEAT EXCHANGER BAFFLE SEAL

Filed Jan. 27, 1939 3 Sheets-Sheet 1

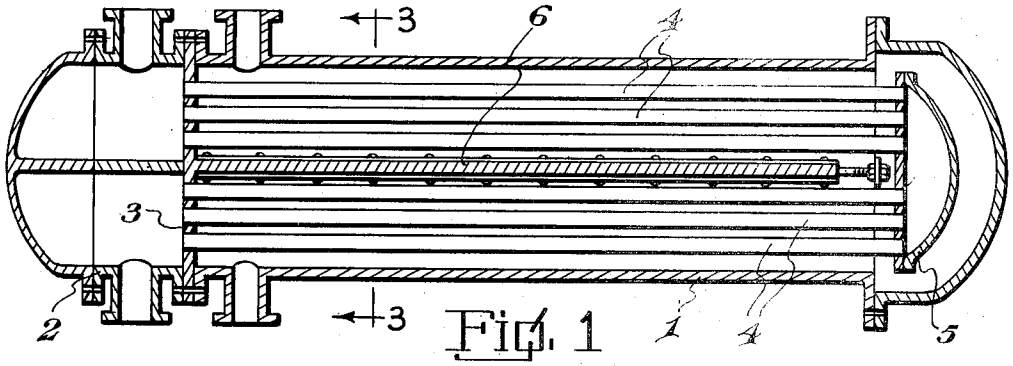


Fig. 1

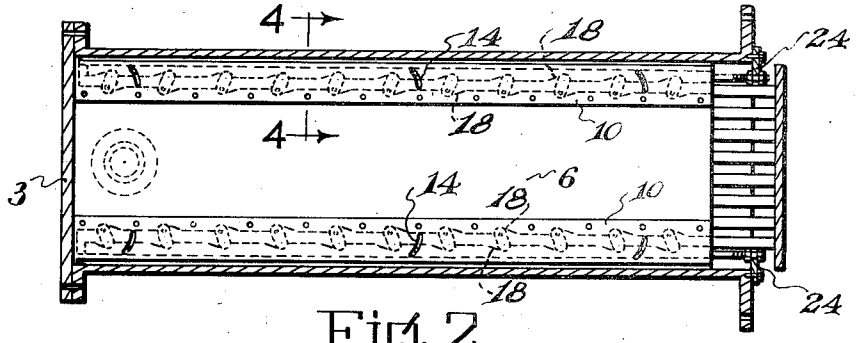


Fig. 2

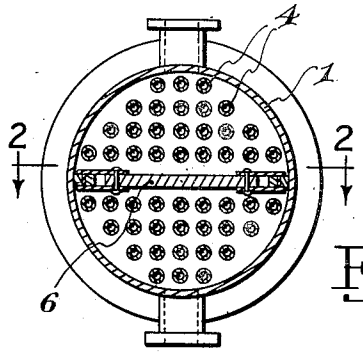


Fig. 3

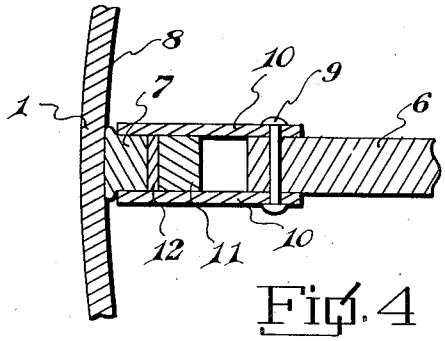


Fig. 4

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HEAT EXCHANGER BAFFLE SEAL

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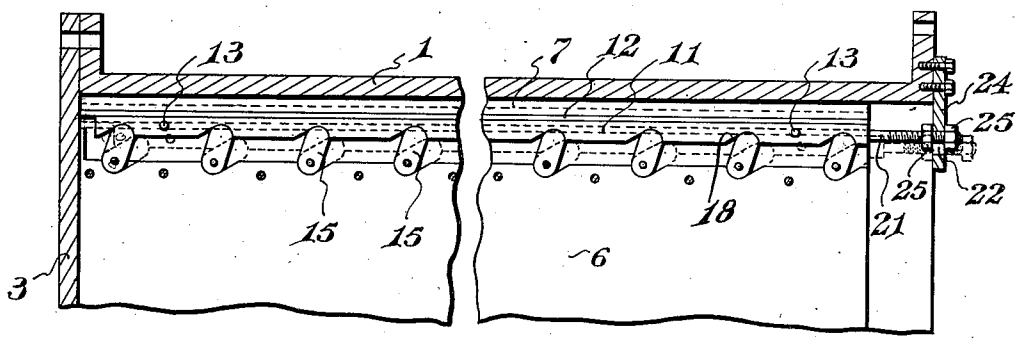


Fig. 5

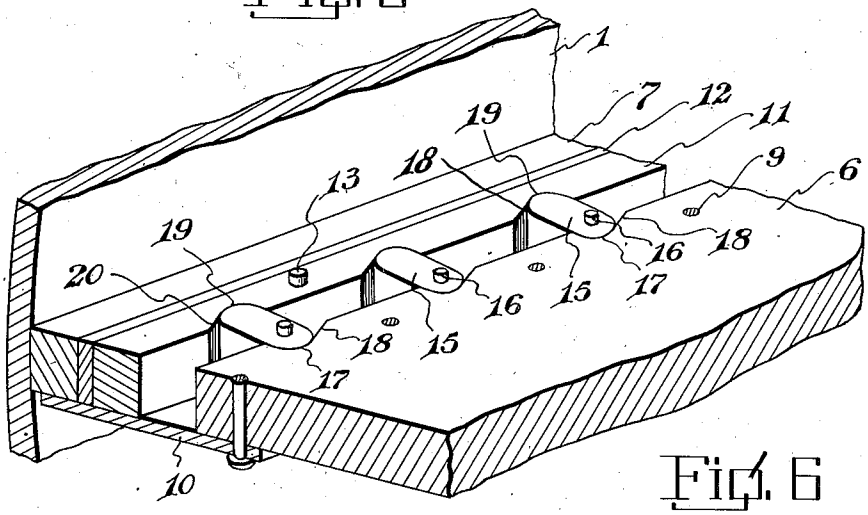


Fig. 6

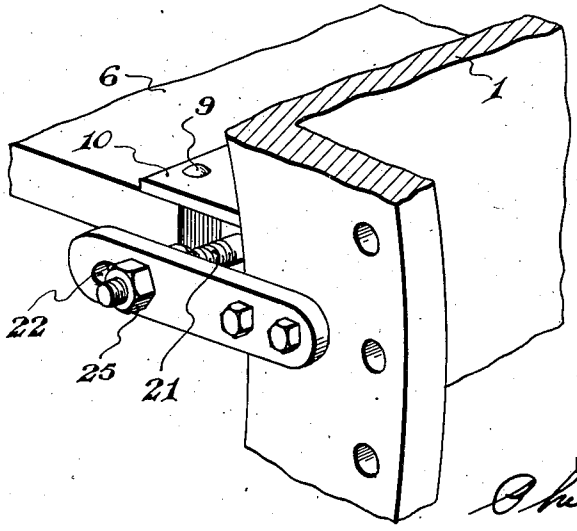


Fig. 7

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HEAT EXCHANGER BAFFLE SEAL

Filed Jan. 27, 1939 3 Sheets-Sheet 3

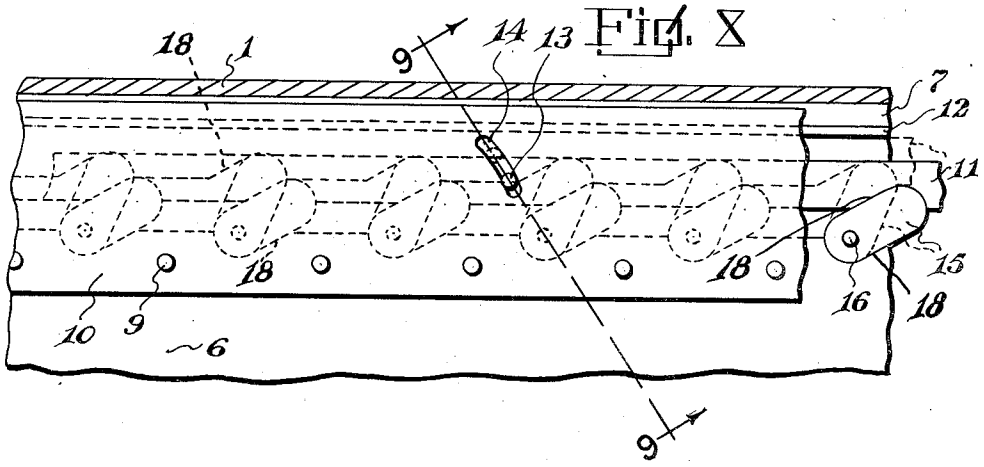


Fig. X

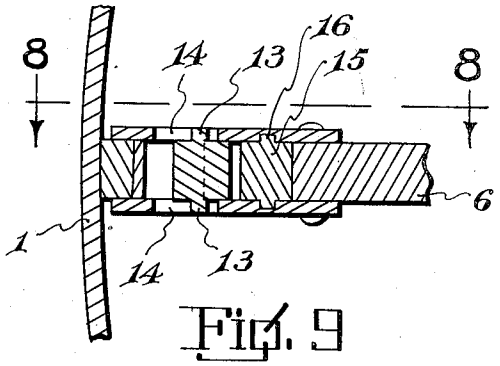


Fig. 9

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UNITED STATES PATENT OFFICE

2,200,787

HEAT EXCHANGER BAFFLE SEAL

Joseph A. Coy, Tulsa, Okla.

Application January 27, 1939, Serial No. 253,198

1 Claim. (Cl. 257—239)

The invention relates to baffle seals for heat exchangers or boilers, and has for its object to provide a device of this character whereby the opposite sides of the baffle plate are provided with laterally movable packing members for engaging the inner periphery of the shell of the heat exchanger for forming a seal between the edges of the baffle plate and the shell. Also to provide means in connection with the laterally movable packing means for extending or retracting the same when it is desired to seal the plate or to remove the plate with the tube bundle for cleaning or repair purposes.

A further object is to provide a baffle plate sealing means formed from a resilient material, as distinguished from a metallic one, thereby preventing the adherence of the seal to the boiler shell incident to corrosion.

A further object is to provide longitudinally movable tensioning bars in channels in opposite sides of the baffle plate for forcing packing strips outwardly and means for moving the tensioning bars in parallel relation to the wall of the shell during their longitudinal movement.

A further object is to provide pivoted dogs within the channel having their free ends disposed in recesses in the tensioning bar for imparting a parallel outward movement to the tensioning bars as they are forced inwardly or outwardly. Also to provide the tensioning bars with lugs extending through slots arcuate in relation to the pivotal point of the pivoted members for additionally guiding the tensioning bars and maintaining the bars assembled in the channels.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawings, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:

Figure 1 is a vertical longitudinal sectional view through the heat exchanger and baffle plate.

Figure 2 is a horizontal sectional view through a part of the heat exchanger taken on line 2—2 of Figure 3.

Figure 3 is a vertical transverse sectional view through the heat exchanger.

Figure 4 is an enlarged detail sectional view, vertically, through one side of the baffle plate and a portion of the exchanger shell, showing the packing strip compressed.

Figure 5 is a horizontal sectional view through one side of the exchanger shell, showing the packing means in operative position.

Figure 6 is a detail perspective view of a portion of the packing means, parts being broken away to better show the structure.

Figure 7 is a detail perspective view of one corner of the baffle plate, showing the operating means for one of the tensioning bars.

Figure 8 is a horizontal sectional view on line 8—8 of Figure 9, showing the tensioning bar retracted.

Figure 9 is a detail sectional view taken on line 9—9 of Figure 8.

Referring to the drawings, the numeral 1 designates the shell of a conventional form of heat exchanger, 2 the head thereof and 3 the tube sheet in which are anchored the ends of tubes 4 of conventional construction. The other ends of the tubes are connected to a header 5.

Extending into the shell 1 from the tube sheet 3 is a horizontally disposed baffle plate 6 of less width than the diameter of the chamber of the shell 1, and adapted to be removed from the shell, or placed therein along with the tube sheet 3.

Heretofore baffle sealing means has included the engagement of metal with metal, and it has been found, incident to corrosion, that the baffle plates can not be easily removed, and it often becomes necessary for workmen to go into the shell to break this adhesion so the baffle can be removed. To obviate this difficulty applicant provides resilient packing strips 7 for engaging the inner periphery 8 of the shell, hence said strips do not corrode to the shell, and if there is any sticking or cohesion of the strips to the shell, the strips can be easily removed after the baffle plate and tubing bundle have been removed from the shell.

Secured to opposite sides of the baffle plate 6, by means of rivets 9, are outwardly extending plates 10 and in the channels formed by the plates, the movable parts are disposed. Longitudinally and laterally slidable between the plates 10 are tensioning bars 11, which when forced outwardly engage metallic strips 12 forming a backer for each of the packing strips 7. By providing the strips 12, it will be seen that when the tensioning bars are longitudinally and laterally moved the resilient packing strip will not be buckled or distorted, as there is a sliding engagement of the tensioning bars with the strips 12. The tensioning bars 11 are provided with oppositely disposed guide lugs 13, which are guidably mounted in arcuate slots 14 in the strips 10, clearly shown in Figures 2, 8, and 9. By providing the arcuate slots, it is obvious, when

the hinged cam members 15 are rotated outwardly on their hinging points 16 to the positions shown in Figures 2 and 6, that the strips 11 will be longitudinally and laterally moved in parallel relation to the boiler shell wall. It will be noted that the arcuate slots 14 are concentric with the pivotal points 16, hence will not interfere with the movement of the bars 11, inwardly or outwardly. It will be noted however that the lugs 13, within the slots 14, will maintain the parts assembled during the handling of the device, for instance when renewing a tube bundle or removing the bundle from the boiler shell.

The cams 15 are disposed within recesses 17 in the edge of the baffle plate and are limited in their movement towards open position by the shoulders 18 of said recesses. The other ends of the cams 15 extend into recesses 19 in the tensioning bars, and it will be seen that when the tensioning bars are longitudinally moved to the position shown in Figure 6, the bars will be forced outwardly in sliding engagement with the strips 12 and the resilient packing strip 7 will be compressed against the wall of the boiler shell.

The recesses 19 are also provided with shoulders 20, substantially parallel to the shoulders 18 for limiting the extreme movement of the cams, however it will be noted that the recesses 17 are rounded at one side and the cams prevented from passing beyond a right angle position.

One end of each of the tensioning bars 11 is provided with a threaded extension 21, which threaded extensions extend through elongated apertures 22 in a bracket 24 carried by one end of the exchanger shell as clearly shown in Figures 5 and 7. Threaded on the extensions 21 and on opposite sides of the brackets 24 are adjusting nuts 25. It will be seen that when the inner adjusting nut 25 is threaded outwardly on the extension 21, the tensioning strip 11 in Figure 5 will be moved from the dotted line position shown to the full line position, and after a tight connection has been made between the inner periphery of the shell and the baffle plate the outer nuts 25 are tightened for preventing retrograde movement.

From the above it will be seen that a baffle plate packing device is provided which may be easily assembled within the boiler along with the tube bundle, and after the tube sheet 3 is in position the packing strips can be manipulated outwardly from the other end of the shell. It will also be seen that when it is desired to repair a tube or remove the tube bundle, it will only be necessary to move the tensioning bars 11 to inoperative positions, as shown in Figure 8 and then the baffle plate can be removed from the shell along with the tube bundle. It is obvious that by assembling the parts between the plates 10, the working parts are positively held against disassembling when the device is placed in or removed from the shell. If the resilient packing strip 7 should adhere to the wall of the shell, it can be easily pulled or scraped therefrom, which is not true where a metallic strip has corroded to the shell.

The invention having been set forth what is claimed as new and useful is:

The combination with a heat exchanger baffle plate carried by a tube sheet and disposed between tubes carried by the tube sheet, of packing members disposed in channels in the edges of the baffle plate, tensioning bars longitudinally and laterally movable within the channels, hinged cam arms within the channels and cooperating with the tensioning bars for forcing them outwardly upon longitudinal movement thereof in one direction, the inner ends of said arms being rockably mounted in semicircular recesses in the edges of the plate, the outer ends of said arms being rockably mounted in semicircular shaped recesses in the bars and tangentially disposed shoulders carried by the recesses of the plate and bars on opposite sides of the arms and forming means for limiting the pivotal action of the arms upon movement of the bars in one direction.

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