Sept. 26, 1944. G. T. JACOCKS ET AL 2,359,268

HEAT EXCHANGER

Filed Feb. 4, 1942 2 Sheets-Sheet 1

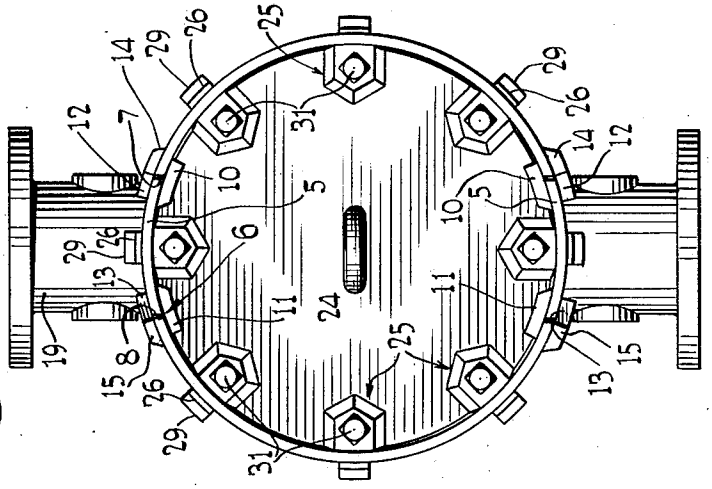


Fig. 2.

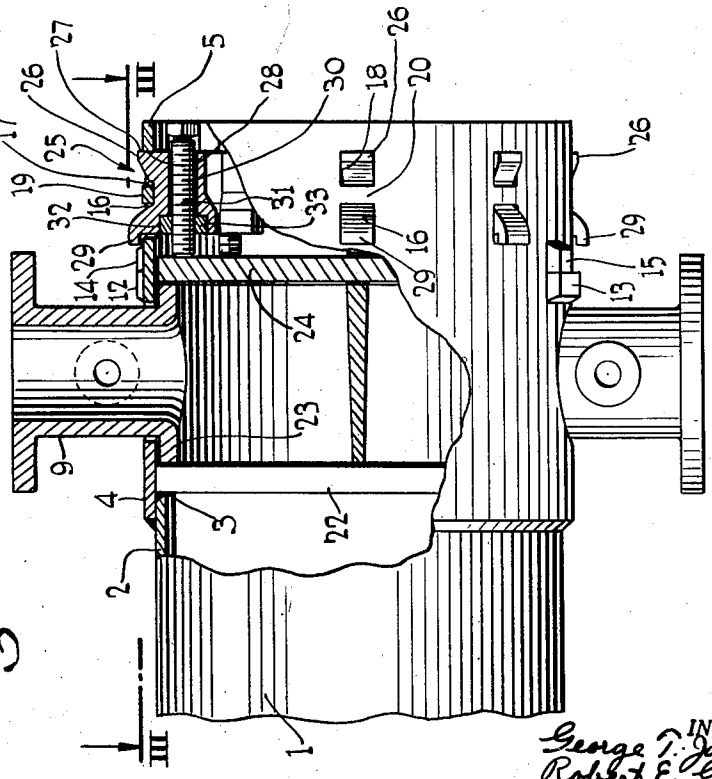


Fig. 1.

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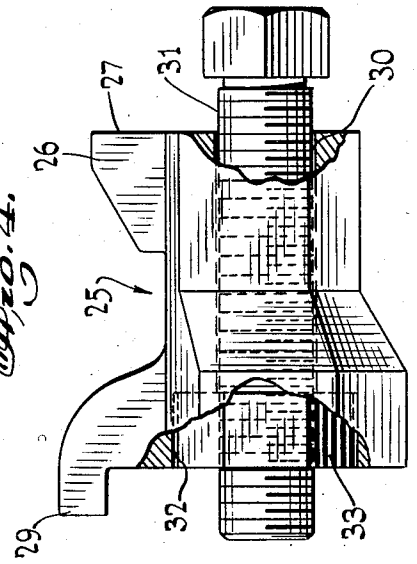


Fig. 4.

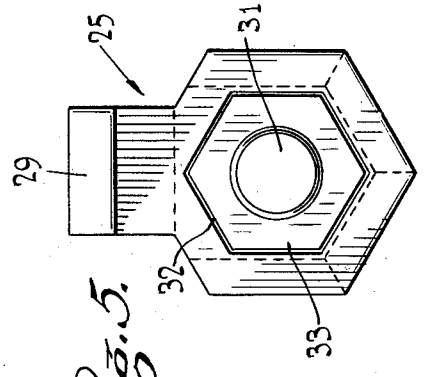


Fig. 5.

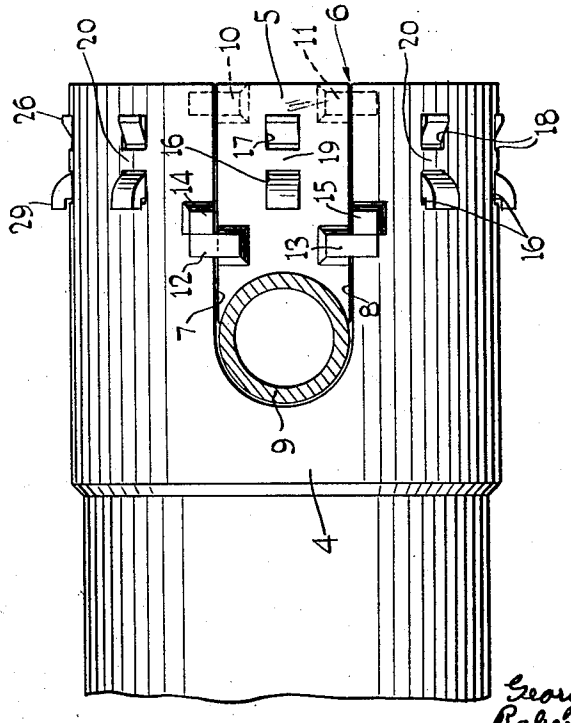


Fig. 3.

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2,359,268

UNITED STATES PATENT OFFICE

2,359,268

HEAT EXCHANGER

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Application February 4, 1942, Serial No. 429,474

1 Claim. (Cl. 220—55)

This invention relates to heat exchangers.

A principal object of this invention is the production of a device of the type specified which will be simple and inexpensive to construct, efficient in operation, and afford unusual facilities for disassembling.

Other objects and advantages will appear as the description of the particular physical embodiments selected to illustrate the invention progresses and the novel features will be particularly pointed out in the appended claim.

In describing the invention is detail and the particular physical embodiments selected to illustrate the invention, reference will be had to the accompanying drawings and the several views thereon, in which like characters of reference designate like parts throughout the several views, and in which:

Figure 1 is a fragmentary side elevational view of a heat exchanger equipped with the invention, with parts broken away to more clearly show the internal construction; Fig. 2, is an end view of the device as shown by Fig. 1; Fig. 3 is a cross-sectional view on the plane indicated by the line III—III of Fig. 1, viewed in the direction of the arrows at the ends of the line; Fig. 4 is a side elevational view of a key and jack screw forming one part of the invention; Fig. 5 is an end view of the key and jack screw as shown in Fig. 4, viewed from the left hand side of Fig. 4.

The invention, in general, is a means for firmly fastening down the head or closure of a hollow heat exchange device by means of keys and jack screws wherein the keys are positioned in a plurality of circumferentially disposed orifices formed in the material of the shell or wall of the heat exchanger vessel.

In Fig. 1 numeral 1 designates a shell. This shell is generally cylindrical and open at each end. The shell is formed, as usual, of boiler plate by any of the usual and well known methods. The shell or wall thereof as shown at 2, is of a thickness sufficient for the purpose for which the device is intended.

In the particular form shown the wall 2 terminates at the point 3 and is continued by a similar shell but of slightly larger diameter bearing on its inside on the outside of the shell 1. This continuation 4 is carried to the end 5, and it is affixed by any usual or ordinary method, as by welding.

In the particular form shown, the continuation wall 4 has a cut away portion 6, as best shown in Fig. 3. This cut away portion after being cut out along the lines 7 and 8 and taken out allows the inlet 9 to be pushed into place by a movement longitudinally of the shell. After this inlet 9 is put in place, the cut away portion 6 is returned to place and is held therein by clips as 10, 11, 12 and 13. Clips 10 and 11 bear against the inside surface of the shell 4 and clips 12 and 13 bear against the outside surface thereof. In addition, the clips 12 and 13 bear against abutments 14 and 15 on the outside of the shell. All of the members 10 to 15 inclusive may be attached in any suitable manner either to the cut away portion 6 or the shell 4 but it is preferred to weld the several pieces to each of the parts 4 and 6.

Adjacent the end 5 of the shell 4 and circumferentially around the shell a plurality of orifices as 16, 17 and 18 are formed. Each of these orifices, as shown, consists of two parts being separated by medial ribs as 19, 20 and 21.

The end of the shell 1 forms an abutment at 3 against which a tube head 22 bears. The outlet 9 has a ring or annulus 23 which bears against the head 22 and also against the closing head 24, gaskets being usually interposed, so that the annulus ring forms an internal abutment for the head 24.

In each of the orifices, as 16, a key 25 is positioned. This key 25 has at one end a projection 26 forming a shoulder 27 which is positioned to bear against the inside surface 28 of an orifice, as 16. On the opposite end of the key 25 is a lip 29 which is positioned to bear against the outside surface of the shell.

The key 25 is provided with a through bore 30 through which a threaded jack screw 31 may extend. At one end of the key 25 a recess 32 is formed within which may be positioned, nonrotatively, an internally threaded nut 33 which is adapted to cooperate with the threads of the jack screw 31.

After head 24 is positioned as shown in Fig. 1, keys, as 25, are positioned one at a time in each of the orifices as 16 and the jack screws as 31 are screwed inwardly so as to bear against the head 24. The screwing up of the jack screws 31 forces the head 24 firmly against the internal abutment and so makes a fluid and gas tight joint at 22 and 23 and 23 and 24.

The lip 29 cooperating with the medial rib 19 so positions each of the keys that the jack screws each bear substantially the same distance from the edge of the head 24.

Although we have particularly described only one particular physical embodiment of my idea of means, nevertheless, we desire to have it un-

derstood that the form selected is merely illustrative and does not exhaust the possible physical embodiments of the idea of means underlying our invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

In a heat exchanger, in combination: a circumferential wall forming a hollow body; an abutment within the body; a head for the end of the body; means for forcing the head toward the abutment including a plurality of jack screws, and a plurality of keys, the main portion of each key being positioned within the hollow vessel, each key formed with a through orifice and a recess in which is an internally-threaded nut, one of the jack screws passing through each orifice and each nut and bearing against the head, the hollow body formed with a plurality of through orifices longitudinally aligned in pairs spaced circumferentially of the wall adjacent the abutment, each of the keys having a pair of projections extending through a pair of orifices, the projection extending through the orifice nearest the abutment being hook-shaped and contacting the outer face of the wall, the other projection of the key merely extending through the other orifice of the pair and abutting the edge thereof farthest from the abutment, the intermediate portion of each key bearing against a portion of the inner face of the wall between the orifices of each pair.

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