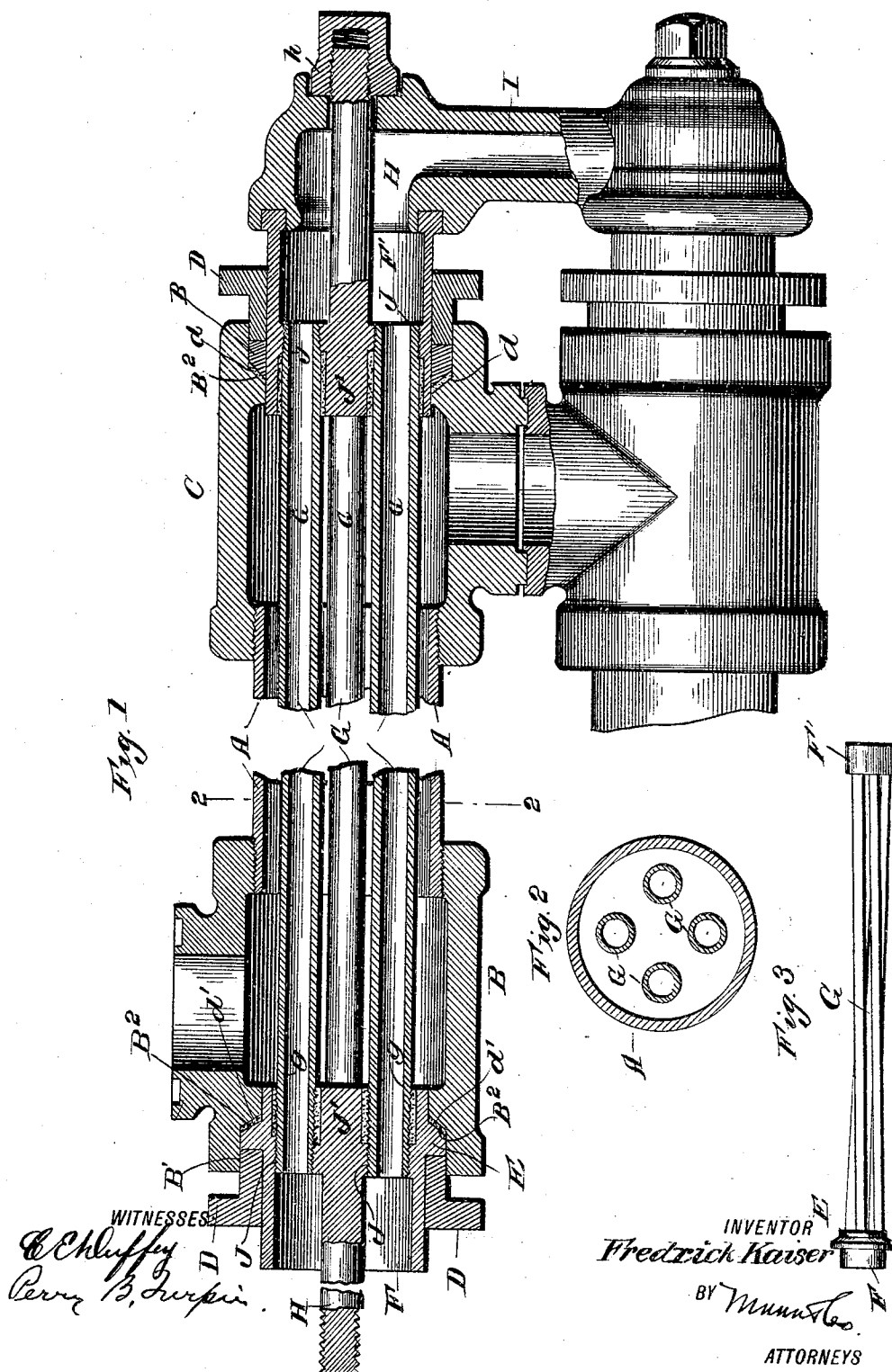


No. 807,278.

PATENTED DEC. 12, 1905.

F. KAISER.
CONDENSER.

APPLICATION FILED FEB. 10, 1905.



UNITED STATES PATENT OFFICE.

FREDRICK KAISER, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-HALF TO GEORGE SHARP, OF NEW ORLEANS, LOUISIANA.

CONDENSER.

No. 807,278.

Specification of Letters Patent.

Patented Dec. 12, 1905.

Application filed February 10, 1905. Serial No. 245,189.

To all whom it may concern:

Be it known that I, FREDRICK KAISER, a citizen of Switzerland, residing at New Orleans, in the parish of Orleans and State of Louisiana, have made certain new and useful Improvements in Condensers, of which the following is a specification.

My invention is an improvement in surface condensers intended especially for condensing and cooling ammonia-gas, but which may be used for condensing steam or for use in any other suitable heat-exchanging apparatus; and the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation of a portion of an apparatus embodying my invention. Fig. 2 is a cross-section on about line 2 2 of Fig. 1, and Fig. 3 is a detail side elevation of one of the sets of condensing-tubes.

In practice my condenser is built up in sections one above another, forming a stand, as is usual in the art, the ammonia-gas and the cooling-water being circulated through the condenser in the usual way.

My invention relates particularly to the sets of condensing-tubes and the construction whereby they are secured within the shell or casing, so the tubes can be readily assembled, can be conveniently inserted in and removed from the shell or casing, and can be securely packed when inserted in such shell or casing to prevent any leakage, and will compensate, in a measure, for variation in expansion and contraction between such tubes and the shell of the condenser.

The shell A has at its opposite ends the couplings B for connection with the adjacent shell-sections, and these couplings B are provided in their outer ends with rabbets B' and shoulders B², said rabbets receiving the glands D, and the coupling B at one end of the shell A receiving in its rabbet B' the shoulder E on the head F at the outer end of the set of condenser-tubes G, the head F' at the inner end of such set of condensing-tubes being similar to the head F, except that the head F' is formed without any flange or shoulder E, so such head F' can be inserted through the coupling B at the left in Fig. 1 in inserting the set of condenser-tubes in and removing the same from the shell A whenever desired.

As before suggested, the heads F and F' are alike, except that the head F is provided with the flange or shoulder E, which part is omitted from the head F'. The heads F are generally cylindrical in form, are provided with the outwardly-projecting pins H, which cooperate with nuts h in securing the couplings I in connection with the outer ends of said cylindrical heads F F', and these heads F and F' are also provided with threaded openings J for the tubes G, such openings being provided in numbers corresponding to the number of tubes G, four tubes being shown in Fig. 2. As shown, the threaded openings J are counterbored at J' at the inner ends of the caps F and F', and these counterbored portions J' are filled with solder to secure a tight union between the parts in the use of the invention. The tubes G do not extend on straight lines, but are twisted spirally, as best shown in Fig. 3, in order to compensate for variations in expansion and contraction between such tubes and the shell of the condenser. This is an important feature of my invention, as it avoids the racking and consequent leakage resulting from variation in expansion and contraction and enables me to avoid this objection in a simple, inexpensive, and effective manner. It will be noticed that the tubes G are threaded at one end—the end g, for instance—much longer than their threaded sockets J, so that the tubes in assembling the same may be turned to project at the left through the cylindrical head F sufficiently far to enable them to be returned in the opposite direction to properly thread into the head F' at the right in Fig. 1. When the tubes have been secured to the opposite heads F and F', one of said heads may be clamped firmly in a vise and the other head be turned in one direction or the other in order to give the desired spiral twist to the tubes G. Manifestly this spiral twist may be at a greater or less angle, as desired, and in addition to compensating for the variations in expansion and contraction this spiral twist of the tubes is advantageous in that it increases the condensing-surface in a given length of shell or casing.

In the construction shown in Fig. 1 the gland D, operating against the flange or shoulder E, presses the same firmly against the packing d' at B², which packing may be any suitable form of metal packing. At the right

in Fig. 2 the gland D operates against a suitable metal packing at *d*.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is--

1. The improved condenser herein described, comprising the shell, the couplings at the opposite ends of the shell and rabbeted in their outer ends, the glands fitting in said
10 rabbeted ends of the couplings, the heads within said glands and provided with threaded openings for the tubes, and tubes threaded at their ends in said openings and having the threads at one end made longer than their
15 threaded sockets, whereby the tubes may be turned to project at such ends sufficiently far to enable them to be returned in the opposite direction to properly thread into the opposite head, and said heads being adjusted relatively,
20 whereby to give the tubes a spiral twist, substantially as and for the purposes set forth.

2. A condenser having a set of condensing-tubes twisted spirally, heads to which the opposite ends of the tubes are connected, pins
25 projecting outwardly from said heads, the couplings and nuts on the pins for securing the couplings substantially as described.

3. A condenser having a set of condensing-tubes and heads at the ends thereof, provided
30 with threaded sockets for the tubes and with outwardly-projecting pins, the couplings and

means coöperating with the pins for securing the couplings substantially as set forth.

4. A condenser having a set of condensing-tubes, heads at the ends thereof, one of said
35 heads having an outwardly-projecting flange or shoulder, shells having sockets in their ends for the glands, and the glands and packing, substantially as set forth.

5. The combination of the shell, the couplings at the ends thereof and having sockets
40 in their outer ends, the condenser-tubes, the heads at the ends of the condenser-tubes, one of said heads being flanged to fit in the socket of its coupling-section, and the other head
45 being free from such obstructing flange whereby it may be inserted through the couplings to its position, and glands around the opposite heads and within the sockets in the outer ends of the opposite couplings, substantially
50 as set forth.

6. The combination with the condenser-tube and the head at the ends thereof and having a projecting pin, of the coupling receiving said
55 head, and the gland coöperating with said head and coupling, and means coöperating with the pin for securing the coupling substantially as set forth.

FREDRICK KAISER.

Witnesses:

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