

UNITED STATES PATENT OFFICE.

FRANCOIS HAECK, OF BRUSSELS, BELGIUM.

REFRIGERATING-CONDENSER FOR DISTILLERS.

Specification forming part of Letters Patent No. 45,003, dated November 8, 1864.

To all whom it may concern:

Be it known that I, FRANÇOIS HAECK, a subject of the King of Belgium, residing at Brussels, Belgium, have invented an Improved Refrigerating-Condenser for Condensing the Vapors Produced in the Process of Distillation; and I do hereby declare that the following is a full, clear, and exact description of my invention.

Figure 1 is a vertical section of the refrigerating-condenser. It is composed of four vessels, *a b c d*, fitted to each other at a very slight distance apart.

Between the sides of the vessels *a b* and those of the vessels *c d* refrigerating-water circulates. It enters continuously through the funnels *e e'*, and issues continuously by pipes *j'' j'''*. The vapor to be condensed enters by a pipe, *T''*, into a large jacket, *b'*, from which it spreads into the thin space contained between the sides of the vessel *b c*, which give it the form of an extremely thin cylindrical film in contact on both sides with refrigerating-water, which is incessantly renewed, all in thin films. The liquid arising from the condensation of the vapor falls into the space contained between the bottoms of *b* and *c*, and rises therein up to the height of the exit-pipe *j'* in such manner that the liquid remains in the bottom of the apparatus sufficiently long to be reduced to the temperature of the adjoining water, the stream of which surrounds it on both sides.

In order to allow the air which the vapor may carry with it to escape from the space in which the condensation of the vapor takes place, there is immediately above the level of the condensed liquid a number of pipes, *o*, which terminate at top in a horizontal circular pipe, ending in a vertical pipe of sufficient size communicating at the top of the level of the water with the external air. By this method the air which the vapor carries with it passes off regularly from the space *b c* of the apparatus without carrying off with it either vapor or alcoholic liquid. The two vessels *b c* are joined at top by flanges *g*, which are fitted one on the other, and which are made to adhere hermetically by means of pressure-screws. By loosening these screws the vessels *b c* become independent, and the four vessels may be entirely separated, in or-

der that the sides thereof may be cleansed by hand. The interior surfaces of the two vessels *b c*, which are in contact with the alcohol, are tinned. The breadth of the narrow spaces for the water and the vapor is variable, according to the work to be performed, and the apparatus is constructed accordingly, retaining, however, the capability of unfastening the vessels *b c* for cleansing. The alcoholic liquid may also be allowed to flow out directly and immediately, without remaining in the reservoir, by the exit-pipe *j'*. In such case the air-pipes *o* are unnecessary, as the air escapes by the same pipe through which the alcoholic liquid arising from condensation flows.

The apparatus may be constructed of any dimensions as regards breadth and height, according to the amount of work to be performed.

R is a cock for drawing off the liquid from *b c* at the end of the operation.

Fig. 2 is a plan of the apparatus.

Instead of the cylindrical form of the refrigerating-condenser, Figs. 1 and 2, any other form may be employed, if the other conditions of the construction of the apparatus be preserved. Thus, for example, the development of a cylinder being rectangular or oblong, this refrigerating-condenser may be constructed in the form represented in elevation in Fig. 3, in vertical section in Fig. 4, in horizontal section in Fig. 5, and in plan in Fig. 6.

The outlets and inlets for the refrigerated element and the refrigerating element at top and bottom of the apparatus are formed according to the arrangement shown in Fig. 1.

It is evident that the aerating-pipes *o* and the exit-pipe *j'* for the liquid arising from the condensed vapor may be fitted to the apparatus, Figs. 3, 4, 5, 6, as easily as to the apparatus Figs. 1 and 2.

The construction of the refrigerating condensing apparatus of flat rectangular form may be such that the four parts—two together in juxtaposition—which form the apparatus may be entirely separated for cleansing.

The parts may be united by screwed bolts *p* or otherwise.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The refrigerating-condenser hereinbefore described, constructed of parts inclosing a thin

chamber for the reception of the vapor to be condensed, and exposing broad condensing-surfaces, in such manner that the parts may be separated to permit the condensing-surfaces to be readily cleansed, the said condenser being provided with pipes for the supply and removal of the refrigerating-fluid and for the supply and removal of the fluid to be condensed, all operating substantially as set forth.

2. The combination of the aforesaid condenser with pipes for the escape of air, substantially as set forth.

In witness whereof I have hereunto set my hand.

FRANCOIS HAECK.

Witnesses:

T. VIRNEBURG,

G. DAWES.