No. 772,279. PATENTED OCT. 11, 1904.

J. GROUVELLE & H. ARQUEMBOURG.

CONDENSER.

APPLICATION FILED AUG. 5, 1903.

NO MODEL.

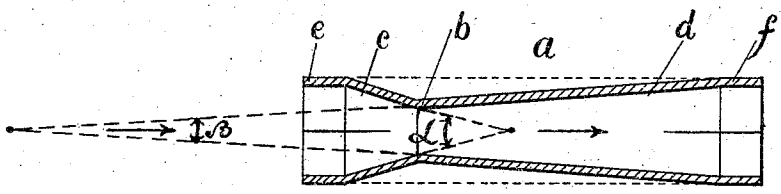


Fig. 1.

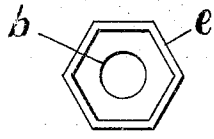


Fig. 2.

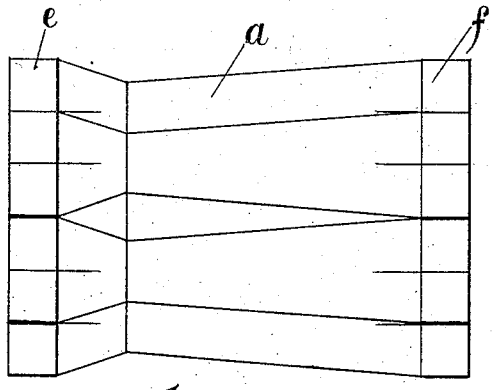


Fig. 3.

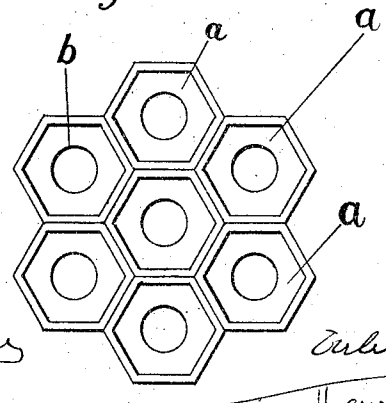


Fig. 4

WITNESSES.

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No. 772,279. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

JULES GROUVELLE AND HENRI ARQUEMBOURG, OF PARIS, FRANCE.

CONDENSER.

SPECIFICATION forming part of Letters Patent No. 772,279, dated October 11, 1904.

Application filed August 5, 1903. Serial No. 168,288. (No model.)

To all whom it may concern:

Be it known that we, JULES GROUVELLE and HENRI ARQUEMBOURG, manufacturers, trading as La Société Jules Grouvelle et H. Arquembourg, citizens of the French Republic, residing at 71 Rue du Moulin-Vert, Paris, France, have invented new and useful Improvements in Coolers or Condensers of the Honeycomb Type, of which the following is a specification.

The object of the present statement is to describe, with the aid of the annexed drawings and taking a particular arrangement as an example, and also to claim the improvements devised by us and applicable to the refrigerators or condensers known under the name of "Honeycomb," and principally, although not exclusively, intended for use with vehicles of the automobile type, the said improvements having more especially the object and the effect of reducing to a minimum the resistance to be overcome by the current of air which traverses at a greater or less speed the elements of which the apparatus in question consists.

Figure 1 is a longitudinal section in elevation of an element made in accordance with the data of our improvements. Fig. 2 is a corresponding end view, both right and left; and Figs. 3 and 4 are respectively general views in elevation and from the end, likewise both right and left, of a certain number of elements suitably grouped.

As seen in the figures, each element *a* is made in this example of a bit of tube of ductile metal, supposed to be at first cylindrical, and then beaten out so as to present at a given point a narrowed section *b* of available passage, joined on either side by truncated cone-shaped surfaces *c d* to two ends *e f*, made preferentially in the form of prisms with a hexagonal base. In the free spaces which surround the elements placed in juxtaposition and united together by solder, as usual, either the water which has become heated in the jacket of the cylinder or cylinders of the explosion-motor circulates for the purpose of cooling or the escape-steam from the steam-motor circulates for the purpose of condensing. This being understood and the current of air produced by the running of the automobile vehicle being supposed to follow across the elements of the apparatus the direction of the arrows of Fig. 1, the circulation of the said current of air will be effected with a minimum of resistance to be overcome if the angles α β of the tracing of the said Fig. 1 have been suitably determined by experience.

It is, in fact, easy to understand that we have here a case presenting the greatest analogy at the same time of those of the injectors and of the ejectors, and it is known that in the said injectors and ejectors the values of the angles at the top of the truncated cone-shaped surfaces must be very different, that value being about thirty degrees for the surfaces corresponding to the injection and about seven degrees for the surfaces corresponding to the ejection. Now our improved element takes the form of an injecto-ejector element—that is to say, an element in which the phenomena of injection and ejection are as closely as possible associated—and we may add that direct experiments have shown us that the analogy above referred to in the forms is no less clearly translated into the very conclusive results which we have obtained in practice.

In terminating the present statement we will point out that the form of the internal section of the bits of tubes of which the elements are made and the form of the ends of the said elements may be not only different to those indicated above, but may be any forms whatsoever upon the sole condition that they remain appropriate. On the other hand, we will point out that the very important industrial result due to the application of our improvements can be obtained by means very simple to carry out, it being understood, moreover, that without changing the nature of the invention one can vary at will the forms, dimensions, proportions, materials used, and accessory contrivances so long as these variations do not affect the really characteristic points of the said invention.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. An element for a cooler or condenser,

consisting of a tube formed of two truncated cones of different degrees of conicity united at their lesser ends, substantially as set forth.

2. An element for a cooler or condenser, consisting of a tube having prismatic end portions, the middle and major portion of said tube being formed of two truncated cones united at their lesser ends, which have the same diameter, substantially as set forth.

3. A honeycomb cooler or condenser, consisting of a plurality of tubes each with prismatic end portions, whereby they fit closely together at both ends, the middle and major portion of each tube being formed of two truncated cones of different length and conicity, united at their lesser ends, as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JULES GROUVELLE.
HENRI ARQUEMBOURG.

Witnesses:
EDOUARD CARÉNON,
CHARLES MARAIS.