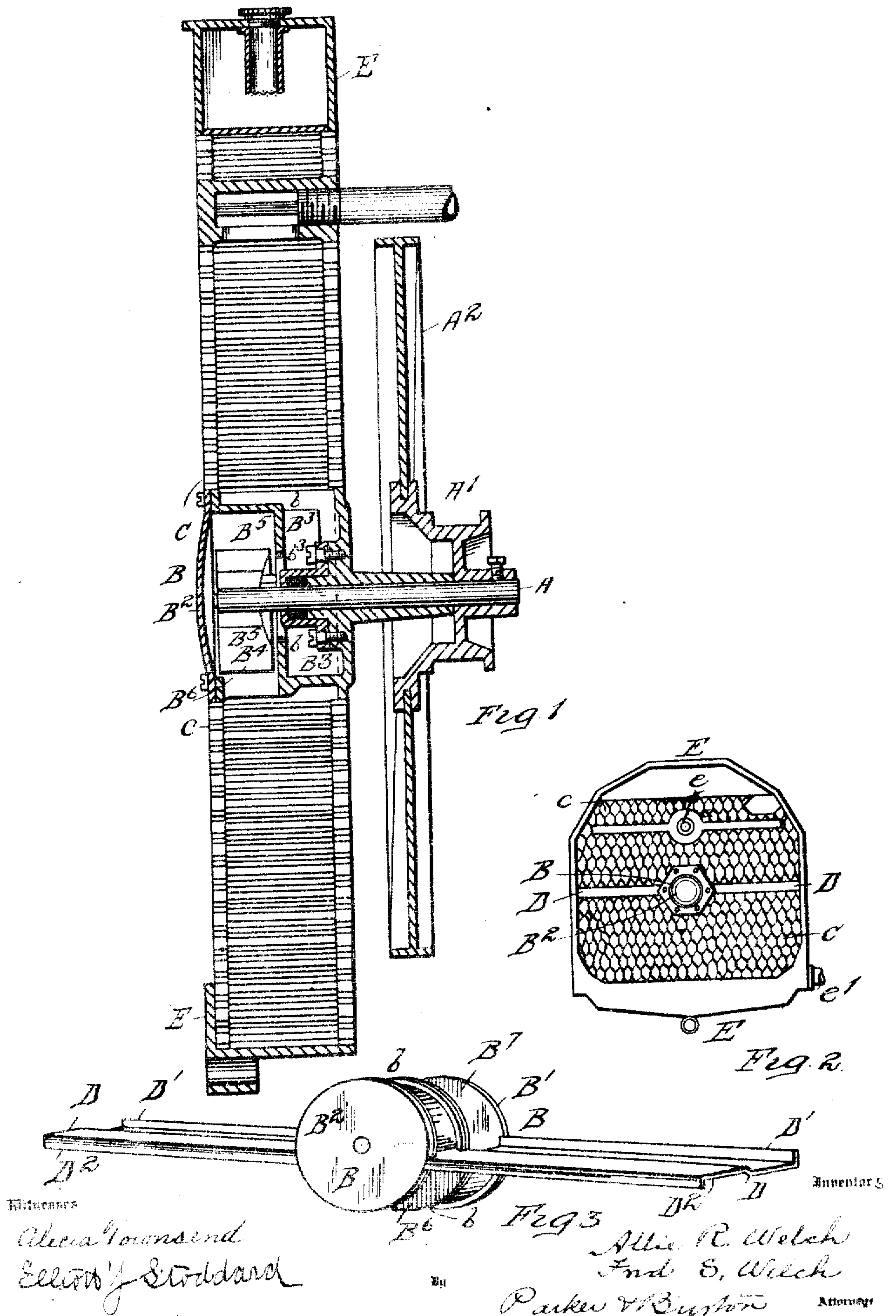


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 APPARATUS FOR CIRCULATING AND COOLING FLUID.  
 APPLICATION FILED MAR. 23, 1907.

914,686.

Patented Mar. 9, 1909.





# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR CIRCULATING AND COOLING FLUID.

No. 914,686.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed March 23, 1907. Serial No. 364,170.

*To all whom it may concern:*

Be it known that we, ALLIE R. WELCH and FRED STIMSON WELCH, citizens of the United States, residing at Pontiac, county of Oakland, State of Michigan, have invented a certain new and useful Improvement in Apparatus for Circulating and Cooling Fluid, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to apparatus for circulating and cooling the cooling fluid for gas engines.

In the drawing:—Figure 1, is a vertical central section of an apparatus embodying our invention showing a section of the pump and a few tubes adjacent thereto, forming a part of the cooling surface of the radiator. It will be understood that there are other tubes occupying the space indicated by the dotted lines as shown in Fig. 2. Fig. 2, is a front view of a cooler showing an apparatus embodying our invention combined therewith. Fig. 3, is a perspective view of the pump and attached partition separate, from the cooler.

We have shown our invention embodied in an apparatus combined with a cooler of the cellular type, such as is shown in our application for Letters Patent, Serial Number 263,724, now pending in the United States Patent Office.

A, is the fan shaft. A<sup>1</sup>, is a pulley on said shaft, and A<sup>2</sup> is the fan for actuating a current of air through and past the cooler.

E, E, is the cooler, and C, C, are the cells or tubes of which the cooling surface is made up.

B, is a centrifugal pump built into the cooler in the center thereof, and having its center axially in line with that of the fan A<sup>2</sup>. Tubes are removed from the cooler to form a central opening to receive the pump and the pump is put into this opening to fill the same and soldered in place to form an integral part of the cooler.

B<sup>2</sup>, is the forward plate, and B<sup>1</sup>, is the rear plate of the pump B; these plates form part of the corresponding surfaces of the cooler.

b, is a partition extending transversely across the pump B at the center thereof, and dividing said pump into two chambers B<sup>3</sup>, B<sup>4</sup>.

b<sup>3</sup>, is a circular aperture through the partition b at the center thereof and concentric with the shaft A. The chamber B<sup>3</sup>, is open at its top for about one hundred and eighty degrees. B<sup>7</sup>, in the drawing denotes this opening. The chamber B<sup>4</sup> is open at the bottom for about one hundred and eighty degrees as indicated at B<sup>6</sup>. The shaft A of the fan A<sup>2</sup> extends forward through a stuffing box or gland through the chamber B<sup>3</sup> and into the chamber B<sup>4</sup>, and has attached to it at this place a fan B<sup>5</sup>.

D, is a partition extending in each direction from the pump B, and dividing the cooler into an upper and lower portion communicating with each other only through the pump. The partition is of S form in cross section, the two parts being indicated by D<sup>1</sup> and D<sup>2</sup> in Fig. 3. Thus a trough D<sup>1</sup> is formed which receives the fluid descending from between the cooling tubes above said partition, and leads it into the chamber B<sup>3</sup> of the pump B, from which it passes through the aperture b<sup>3</sup> into the chamber B<sup>4</sup>, and is discharged from the open lower portion of said chamber into the lower portion of the cooler E.

e<sup>1</sup>, is the outlet from the cooler to the circulating system, and e is the inlet from said system to the cooler.

The operation of the above described device is as follows:—The fan and fan shaft is operated by a belt in the usual manner. The rotation of the shaft A with the fan A<sup>2</sup> carries with it the pump blades B<sup>5</sup>, which acts to force outward by centrifugal force the fluid in the chamber B<sup>4</sup>, and sucks the fluid through the aperture b<sup>3</sup> from the chamber B<sup>3</sup>; thus the fluid returned to the top of the cooler is drawn downward past the cooling surfaces of the upper portion of the cooler, and discharged downward past said surfaces in the lower portion of the cooler and forced outward through the outlet passage into the circulating system, which system is of the ordinary construction, except that it is not necessary to have any flexible connections. The circulating system beyond the cooler is well known and therefore is not specially shown or described. It will be noticed that by this arrangement, space may be considerably economized and fewer moving parts are necessary, while a simple and efficient circulating and cooling system is provided, in which the fluid is properly distributed through the various passages of the cooler.



What we claim is:—

1. The combination of a cooler divided into two compartments and provided with an inlet communicating with one of said compartments and an outlet communicating with the other of said compartments, with a pump united with said cooler so as to form an integral part of the body portion thereof, said pump being provided with an inlet communicating with the first of said compartments and an outlet communicating with the other of said compartments.

2. The combination of a cooler divided into two compartments and provided with an inlet communicating with one of said compartments, and an outlet communicating with the other of said compartments, with a pump united with said cooler so as to form an integral part thereof, said pump being provided with an inlet communicating with the first of said compartments and an outlet communicating with the other of said compartments, and a cooling fan, a shaft common to said cooling fan and pump, said fan being adapted to actuate a current of air against said cooler and pump.

3. The combination of a cooler, a casing of a pump, the interior of said casing being divided into two chambers by a partition in the plane of the rotation of the blades of said pump, said pump being provided with an opening through said partition, pump blades in one of said chambers, one of said chambers opening to one portion of said cooler, and the

other of said chambers opening to another portion of said cooler, and a partition separating said portions of the cooler and said openings.

4. The combination of a cooler, a casing of a pump, the interior of said casing being divided into two chambers by a partition in the plane of the rotation of the blades of said pump, said pump being provided with an opening through said partition, pump blades in one of said chambers, one of said chambers opening to one portion of said cooler, and the other of said chambers opening to another portion of said cooler, and a partition separating said portions of the cooler and said openings, said openings extending for approximately one hundred and eighty degrees.

5. In a cooler, the combination of a plurality of cells forming the circulating system of said cooler, a partition having a trough formed therein dividing said system into upper and lower parts, the trough being in the upper part, a pump having its inlet communicating with said trough, and its outlet communicating with the lower part of said circulating system.

In testimony whereof, we sign this specification in the presence of two witnesses

ALLIE R. WELCH.

FRED STIMSON WELCH.

Witnesses:

C. E. JENNINGS,

ELLIOTT J. STODDARD.