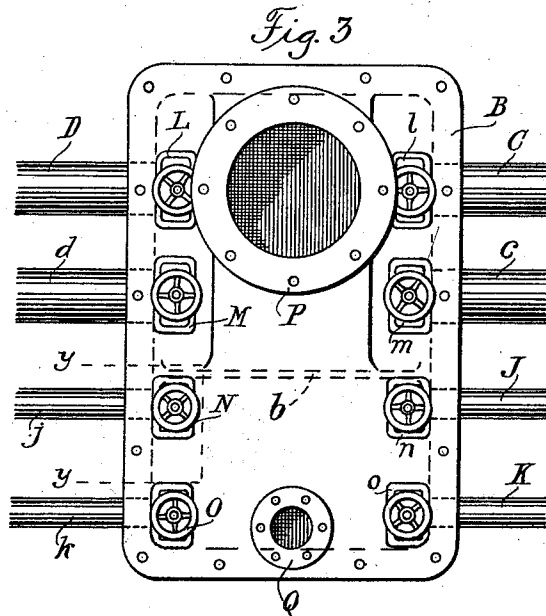
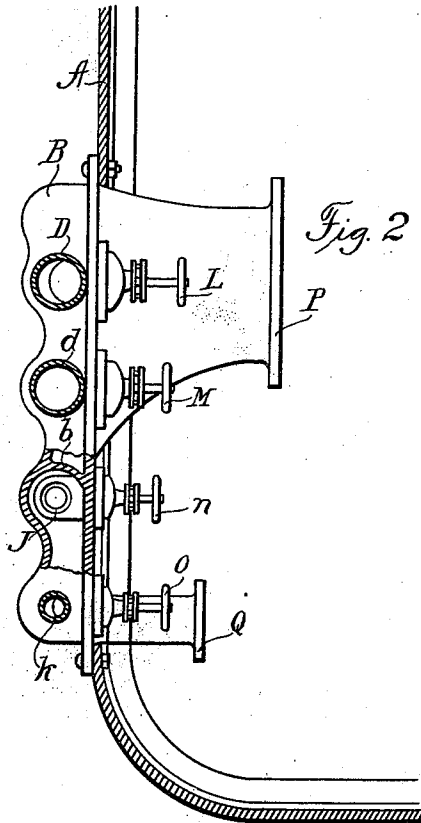
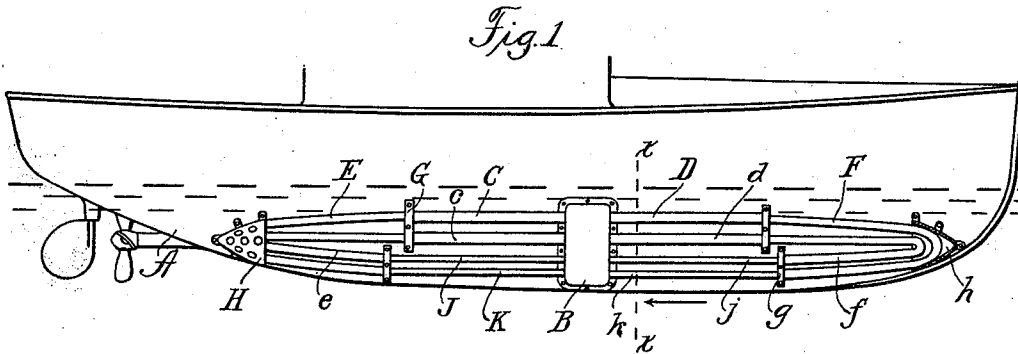


C. & C. E. WARD.
OUTBOARD CONDENSER.
APPLICATION FILED MAR. 5, 1910.

1,000,310.

Patented Aug. 8, 1911.



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UNITED STATES PATENT OFFICE.

CHARLES WARD AND CHARLES E. WARD, OF CHARLESTON, WEST VIRGINIA.

OUTBOARD CONDENSER.

1,000,310.

Specification of Letters Patent.

Patented Aug. 8, 1911.

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To all whom it may concern:

Be it known that we, CHARLES WARD and CHARLES E. WARD, citizens of the United States, residing at Charleston, in the county of Kanawha and State of West Virginia, have invented certain new and useful Improvements in Outboard Condensers, of which the following is a specification.

This invention relates to outboard condensers, that is to say, to apparatus for condensing the exhaust steam from the engines of a boat, by exposing suitable piping arranged upon the outside of the boat to the cooling effect of the water in which the boat floats, and passing the exhaust steam through such piping.

It has been found in practice that, in winter, when the outside water is very cold, a less number and extent of piping is required than in summer, to reduce the steam and water of condensation to the temperature most economical for return to the boiler.

It is an object of this invention, in addition to the special construction and particular arrangement of the various parts, to produce a condenser of the character stated, provided with valves for cutting out one or more of the complement of pipes exposed on the exterior of the vessel.

The construction and arrangement constituting this invention are illustrated in the accompanying drawings, of which—

Figure 1 represents a side view of a boat to which this invention has been applied, showing all parts assembled. Fig. 2 is a cross-section of part of the boat, upon the broken line $x-x$ of Fig. 1, showing the outside and inside of the boat, and the relative positions of the divided header, piping and valves. Fig. 3 is an elevation or face view of the header, representing that face or surface of it which would be applied directly to the outside of the boat, and shows all the pipes, and valves governing them. In the two Figs. 2 and 3, the scale of drawing has been increased to render the illustration clearer.

The same letter is employed to refer to the same part throughout the description and drawings.

In the drawings, the letter A marks the side of a boat to which is suitably secured a header or hollow body B, divided by a partition b into two compartments. From the upper compartment of the header, the pipes C, c , and D, d , extend in both direc-

tions along the side of the boat. To those pipes other pipes E, e , and F, f , are connected, and the piping may be secured to the side of the boat by straps G, g , or in any convenient and effective manner. It will be noted in Fig. 1, that the pipes E, e , and F, f , are somewhat less in size than pipes C, c , and D, d , of which they form continuations, and that they are bent in the middle and have portions at and near the bends housed in the shields H, h . As illustrated in Fig. 1, the shields H and h , have converging sides, and perforated tops through which the water may pass to the pipes as the boat progresses. The bent pipes E, e , and F, f , are continued to the header B by the pipes J, K, and j , k , and these last-mentioned pipes are ordinarily smallest in size, as the steam has been about all condensed when they are reached. The pipes J, j , and K, k , communicate with the lower compartment of the header.

The upper compartment of the header is provided with an exhaust-receiving connection P, and the lower compartment is furnished with an air pump connection Q by way of which the water of condensation leaves the header B. Each pipe is connected to a valve within the header. The pipes D, d , j , k , are provided, respectively, with the valves L, M, N, and O. The pipes C, c , J, K, are controlled by valves l , m , n , and o . The valves and their arrangement are best shown in Fig. 3.

In Fig. 2, the section of the header introduced for the purpose of illustrating and showing the position of the partition b in the header, is taken on the indirect broken line $y-y$ of Fig. 3.

While but one side of a boat is shown in the drawings forming part of this application, it will be understood that this invention may be applied to both sides, and, in practice, all exposed surfaces are rounded in order to offer as little resistance as practicable to the passage of the boat through the water.

In Fig. 1, the size of the invention shown, in proportion to the size of the boat, is somewhat exaggerated for purposes of illustration.

Having now described this invention, and explained the mode of its operation, what we claim is:—

1. In an outboard condenser, the combination with a header adapted to be secured

upon the side of a boat, the said header being divided into compartments, of pipes connected with one compartment of the header and extending toward the bow and stern of the boat and returning to another compartment of the header, and valves arranged to close each pipe near the header independently of the others, the stems of the said valves projecting inwardly from the face of the header.

2. In an outboard condenser, the combination with a header adapted to be secured upon the side of a boat, the said header being divided into compartments, of pipes connected with one compartment of the header and extending toward the bow and stern of the boat and returning to another compartment of the header, and valves arranged within the header and adapted to close each pipe independently of the others, the stems of the said valves projecting inwardly from the face of the header.

3. In an outboard condenser, the combination with a header adapted to be secured upon the side of a boat, the said header being divided into compartments, of relatively larger pipes connected with one compartment of the header and extending toward the bow and stern of the boat, the said larger pipes having relatively smaller pipes connected to them and forming continuations of them, the said smaller pipes returning to another compartment of the header,

and means for closing each pipe near the header independently of the others.

4. In an outboard condenser, the combination with a boat, of a header secured to the side of the boat, the said header being divided into compartments, pipes extending a distance from one compartment of the header and returning to another compartment of the header, and means constructed and arranged to be operated from the interior of the boat for closing any number of the said pipes.

5. In an outboard condenser, the combination with a boat, of a header secured upon the outside of the boat, the said header being divided into two compartments one of which is larger than the other, pipes connected with one compartment of the header and extending a distance from the header and returning to the other compartment of the header, and valves provided with operating means extending into the boat whereby any number of the said pipes may be opened to one compartment of said header and closed to the other compartment.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES WARD.
CHARLES E. WARD.

Witnesses:

THOS. LIVERSEDGE,
J. E. DAVIES.