No. 650,111. Patented May 22, 1900.

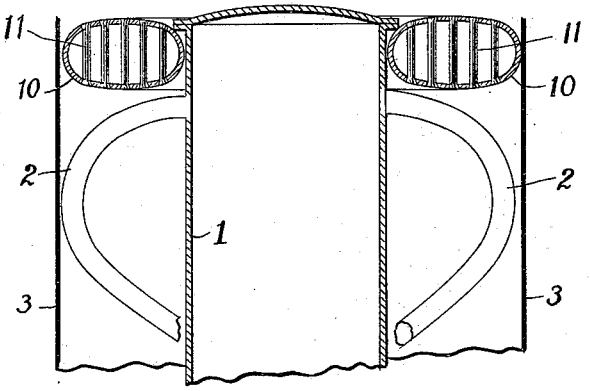
A. R. & W. T. MARSH.

STEAM REHEATER.

(Application filed Aug. 31, 1899.)

(No Model.)

Fig. 1



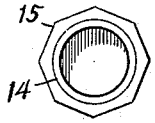


Fig. 3

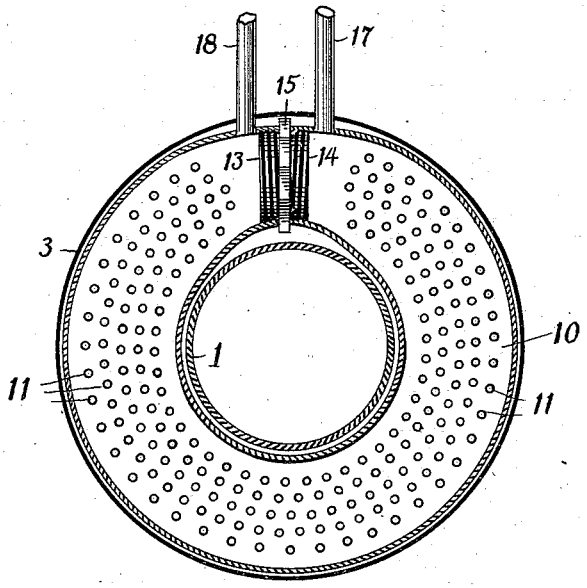


Fig. 2

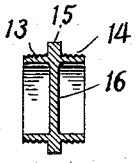


Fig. 4

Attest;

M. L. Upham.

Lowell M Maxham

Inventors,

Alonzo R. Marsh,

William T. Marsh;

By A. B. Upham,

Their Attorney.

UNITED STATES PATENT OFFICE.

ALONZO R. MARSH AND WILLIAM T. MARSH, OF BROCKTON, MASSACHUSETTS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE ECLIPSE AUTOMOBILE COMPANY, OF MAINE.

STEAM-REHEATER.

SPECIFICATION forming part of Letters Patent No. 650,111, dated May 22, 1900.

Application filed August 31, 1899. Serial No. 729,043. (No model.)

To all whom it may concern:

Be it known that we, ALONZO R. MARSH and WILLIAM T. MARSH, citizens of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented a new and useful Steam-Reheater, of which the following is a full, clear, and exact description.

In the motor-vehicle which we manufacture we employ a high-pressure steam-cylinder exhausting into a low-pressure cylinder and reheat such exhaust before it enters the second cylinder, thereby adding greatly to the efficiency of the engines and in addition prevent a saturated exhaust from being thrown into the atmosphere from the second cylinder. Without this reheating the exhaust issues from the engine as an objectionably-visible vapor.

The object of this invention is the construction of a device for economically reheating the exhaust from the first cylinder.

Referring to the drawings forming part of this specification, Figure 1 is a vertical central section of the upper part of our boiler and of our reheater applied thereto. Fig. 2 is a horizontal section of the reheater, and Figs. 3 and 4 are detail views of the means for closing and securing together the ends of the annular tube forming the body of our reheater.

The boiler, as shown, is of the porcupine type, with its central chamber 1 projecting a short distance above the tubes 2. About said chamber and immediately above said tubes we place our reheater, which is annular in form and with its inner diameter substantially corresponding with the outer diameter of said chamber and with its outer diameter substantially corresponding with the extreme dimensions of the tubular portion of the boiler, the same jacket which surrounds the boiler serving to protect the reheater. In this manner the surplus heat arising between the tubes 2 strikes the reheater and imparts thereto the heat necessary for suitably raising the temperature of the steam passing to the low-pressure cylinder.

As before stated, our reheater is annular in form and is made from a single length of rather large tubing 10, flattened in cross-section and having its ends brought together to complete the circle, as shown in Fig. 2. Vertically through this reheater-body are inserted a large number of short tubes 11, made steam-tight by being expanded in the holes drilled in the tubing 10, designed therefor.

The ends of the tube 10 are not flattened, but are left cylindrical and internally threaded, being tapped with right and left hand threads, respectively. These tube ends are brought together and at the same time made steam-tight by means of the double plug having its ends oppositely threaded to fit the said tube ends and formed with the central wrench-receiving shoulder 15. This plug is hollowed out for lightness, with the exception of a partition 16, designed for preventing the direct passage of steam from one end of the tube 10 to the other.

The pipe 17 introduces the exhaust-steam from the high-pressure cylinder to the annular reheater at one end of the tube 10, and the pipe 18 conducts the reheated steam therefrom to the low-pressure cylinder. In order for the steam to pass from the pipe 17 to the pipe 18, it must pass through the entire length of the tubing 10 and between the multitude of columnar tubes 11, and inasmuch as the heat from about the boiler is constantly rising through said tubes 11 the latter are very hot and raise the temperature accordingly of the passing steam.

By having the tube 10 flattened and the tubes 11 terminally expanded in the same the high steam-pressure within said tube 10 serves to more tightly press the flattened sides into contact with such expanded ends and so insure the tightness of all the joints.

What we claim as our invention, and for which we desire Letters Patent, is as follows, to wit:

1. In a steam-reheater, the combination of the flattened tube curved into the annular form, means for closing its ends, steam inlet and outlet pipes communicating with said tube at its respective ends, and the vertical tubes terminally secured in holes in the flat-

tened sides of said annular tube, substantially as set forth.

2. In a reheater, the combination of the tube flattened throughout all its length except its ends, and bent into an annular form, said ends being internally threaded with right and left hand screw-threads respectively; the plug having its ends oppositely threaded to correspond therewith, and having the wrench-receiving central shoulder; the vertical tubes opening through said annular tube; and the inlet and outlet pipes communicating with said annular tube at opposite sides of said screw-plug, substantially as set forth.

In testimony that we claim the foregoing invention we have hereunto set our hands this 26th day of August, 1899.

ALONZO R. MARSH.
WILLIAM T. MARSH.

Witnesses:
GUY H. HOLLIDAY,
A. B. UPHAM.