No. 614,332. Patented Nov. 15, 1898.

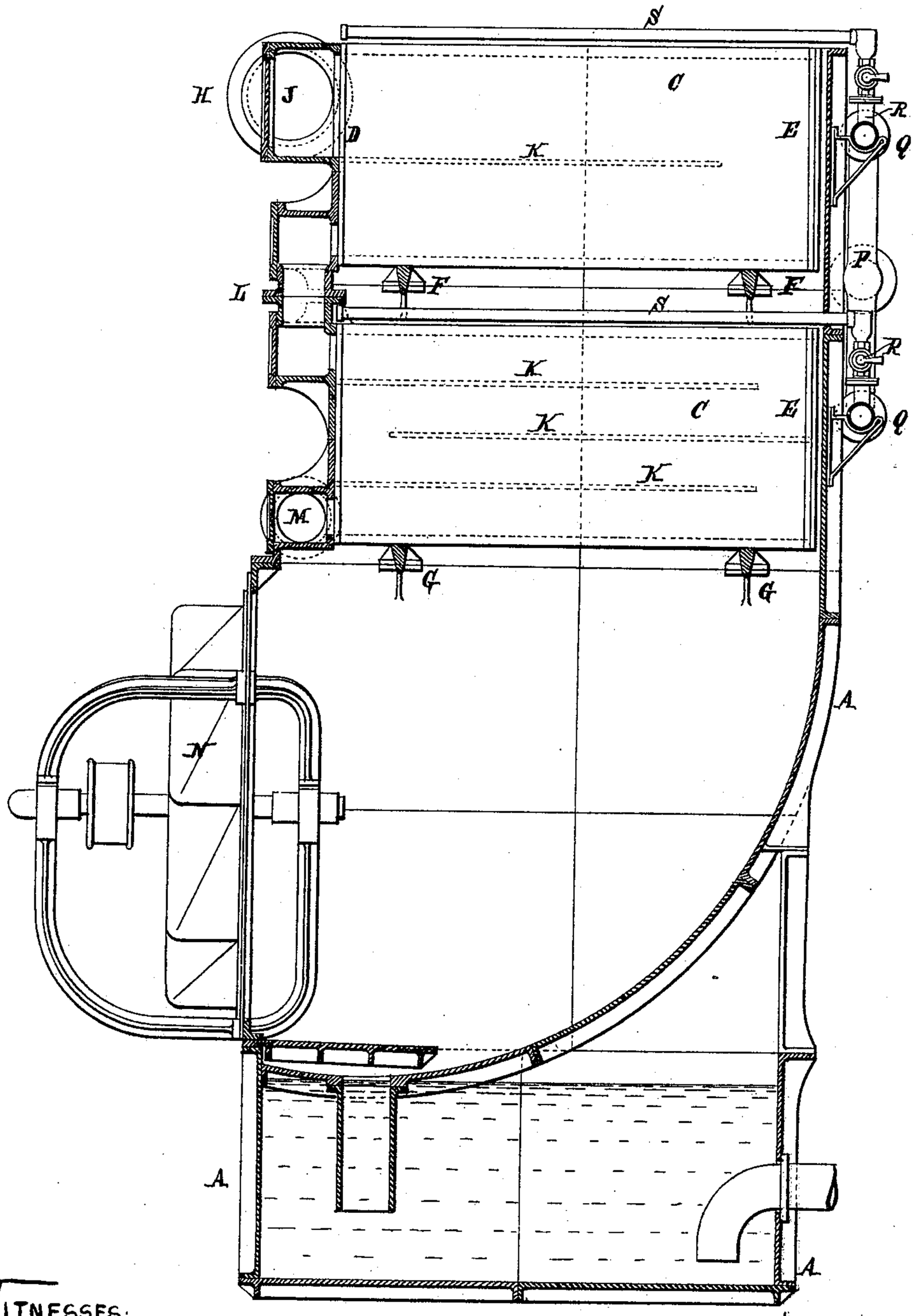
T. R. MURRAY.

APPARATUS FOR CONDENSING STEAM.

(Application filed Mar. 31, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.



WITNESSES:
F. W. Wright
L. C. Connor

INVENTOR
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HIS ATTORNEYS.

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(No Model.) 2 Sheets—Sheet 2.

FIG. 2.

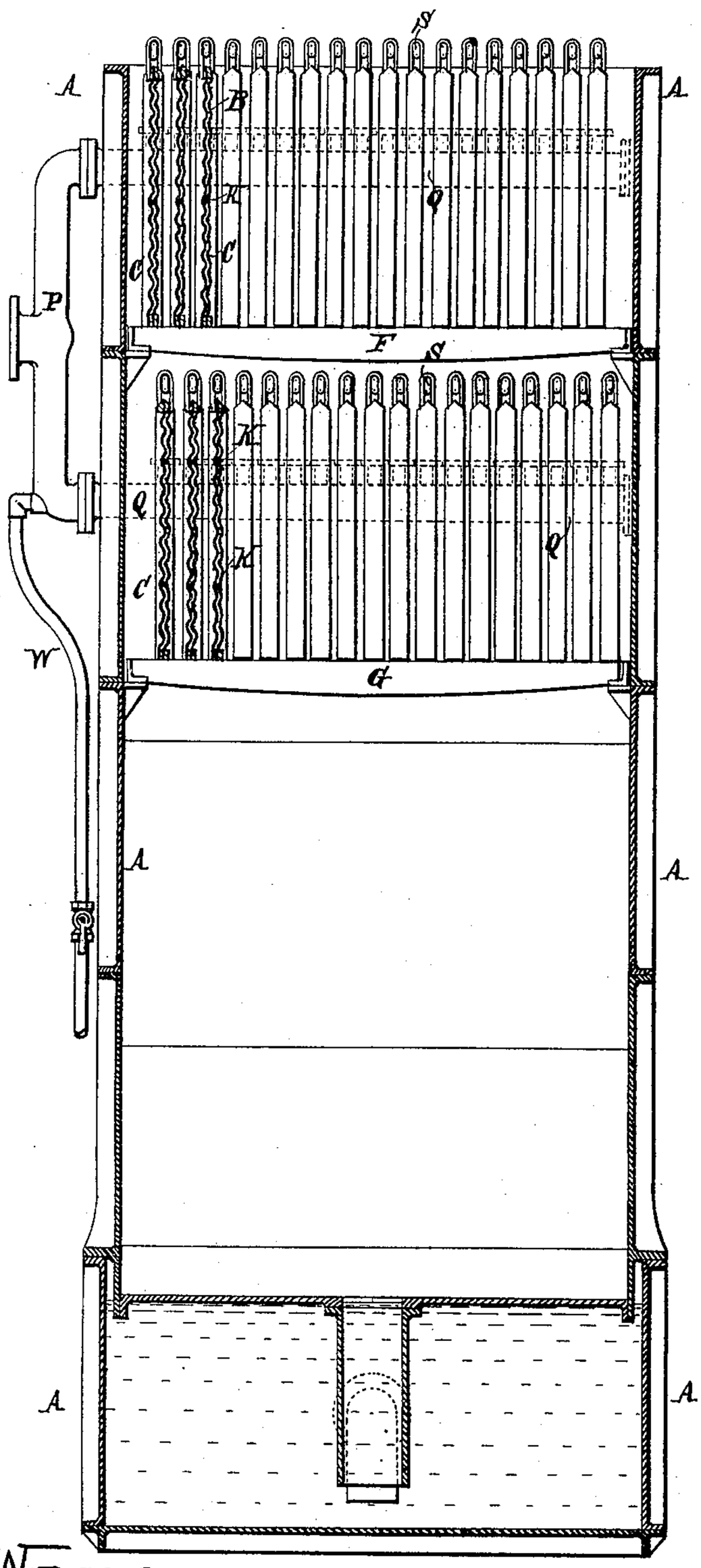


FIG. 3.

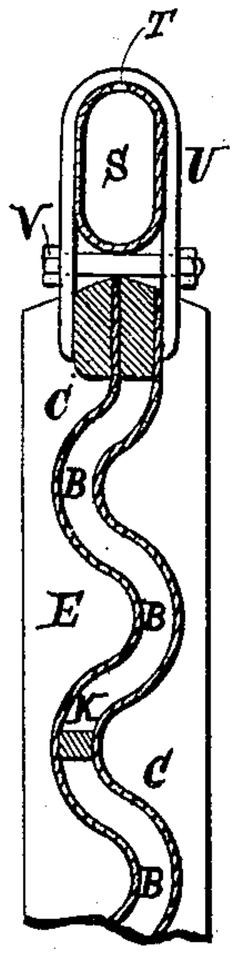
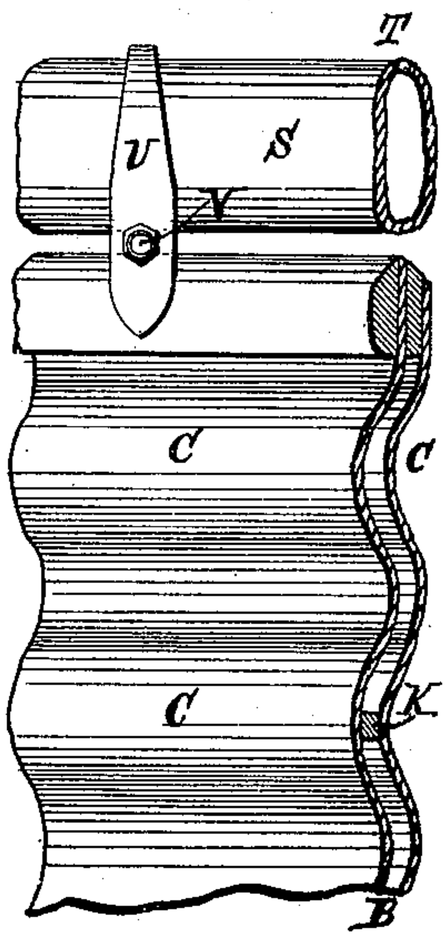


FIG. 4.



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UNITED STATES PATENT OFFICE.

THOMAS ROBERTS MURRAY, OF GLASGOW, SCOTLAND.

APPARATUS FOR CONDENSING STEAM.

SPECIFICATION forming part of Letters Patent No. 614,332, dated November 15, 1898.

Application filed March 31, 1898. Serial No. 675,939. (No model.)

To all whom it may concern:

Be it known that I, THOMAS ROBERTS MURRAY, a subject of the Queen of Great Britain and Ireland, and a resident of Glasgow, Scotland, have invented certain Improvements in Apparatus for Condensing Steam or other Vapors, (for which I have applied for a British patent, application No. 20,719, dated September 9, 1897,) of which the following is a specification.

My said invention has for its object the condensing of steam or other vapors by means of improved apparatus which is advantageously applicable in many cases, and especially in cases in which the economizing of water is a matter of importance.

My improved apparatus is shown on two accompanying sheets of explanatory drawings.

Figure 1 on Sheet 1 is a longitudinal vertical section, and Fig. 2 on Sheet 2 a transverse vertical section, of the apparatus. Fig. 3 is a transverse vertical section; and Fig. 4, a side elevation of details, to be hereinafter referred to.

In carrying out my invention I provide an external casing A of an approximate rectangular or other convenient simple form. Within the casing A, I arrange two series of steam-spaces B, each steam-space being inclosed by a pair of sheets C, of thin copper or other thin metal, which is by preference corrugated. For the sake of clearness three only of these steam-spaces B in each series are shown in Fig. 2. The upper part of one is shown to a larger scale in Figs. 3 and 4. There may be only one of these series of steam-spaces or more than two, if desired. The top and bottom of each pair of sheets C, inclosing a steam-space B, is closed, the ends also being closed by vertical bars D E, except at parts hereinafter described, and each series is supported on transverse horizontal girders F G, carried in the casing A. The steam-inlet pipe H is connected to a steam-chest J, extending across at the top of the casing A, and openings are formed through the vertical bars D, opposite this box J, to permit the steam to enter the steam-spaces B. Within the steam-spaces any desired number of bars or blocks K are fixed and placed, so as to cause the steam to take a tortuous course in its passage through the steam-spaces. Openings in the bottom of the vertical bars D of the upper series of steam-spaces B communicate through a second chest L with similar openings in the top of the vertical bars D of the second series of steam-spaces B, and an outlet-pipe M is connected to the bottom of this series of steam-spaces for the water due to condensation, the outlet-pipe being connected to a pump (not shown) for withdrawing water and air. An upward current of air is by a fan N or otherwise made to pass over the outer surfaces of the metal sheets C, forming the steam-spaces, the back of the casing A near the lower part being curved to make the air-current take an upward direction, and at the same time water is made to drip down over the same surfaces, such water collecting in the lower part of the casing A, from which it is pumped up to an elevated tank, (not shown,) descending from this tank to an inlet-pipe P, or the water may be pumped direct to the inlet-pipe. The cooling-water can thus be used over and over again, which is of considerable importance, especially where economizing water is a consideration. The cooling-water passes from the inlet-pipe to horizontal pipes Q, one extending along behind each series of steam-spaces B, from which pipes it rises through a number of short pipes R, fitted with stop-cocks to a corresponding number of pipes S, one extending longitudinally over each pair of metal sheets C, inclosing a steam-space B. The water passes from each of these long pipes S through an opening T, Figs. 3 and 4, extending along its upper surface, and drips down over the outer surfaces of the metal sheets C, as described. These pipes S are each held in position by metal straps U and bolts V, as shown in Figs. 3 and 4.

To make up for any loss in the cooling-water caused by evaporation, a supplementary supply of water from any source may be admitted through a pipe W to the horizontal pipe Q, extending behind the lower series of steam-spaces, or, if preferred, this supplementary supply may be led into the pipe supplying the upper series of steam-spaces or directly into the water collected in the lower part of casing A.

What I claim as my invention is—

In apparatus for condensing steam or other

vapors the combination of one or more series of steam or vapor spaces within an outer casing, each space being formed by a pair of metal sheets divided by a number of bars or blocks, means for causing an upward current of air to pass over the outer surfaces of these metal sheets, a series of water-supply pipes connecting the bottom of the casing with pipes having openings along their upper surfaces and extending along one above each steam-space; also a supplementary water-supply connection, substantially as and for the purposes herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS ROBERTS MURRAY.

Witnesses:

DAVID FERGUSON,

GEORGE PATTERSON.