

No. 672,211.

Patented Apr. 16, 1901.

S. E. FREEMAN.
STEAM CONDENSER.

(Application filed June 8, 1900.)

(No Model.)

Fig. I.

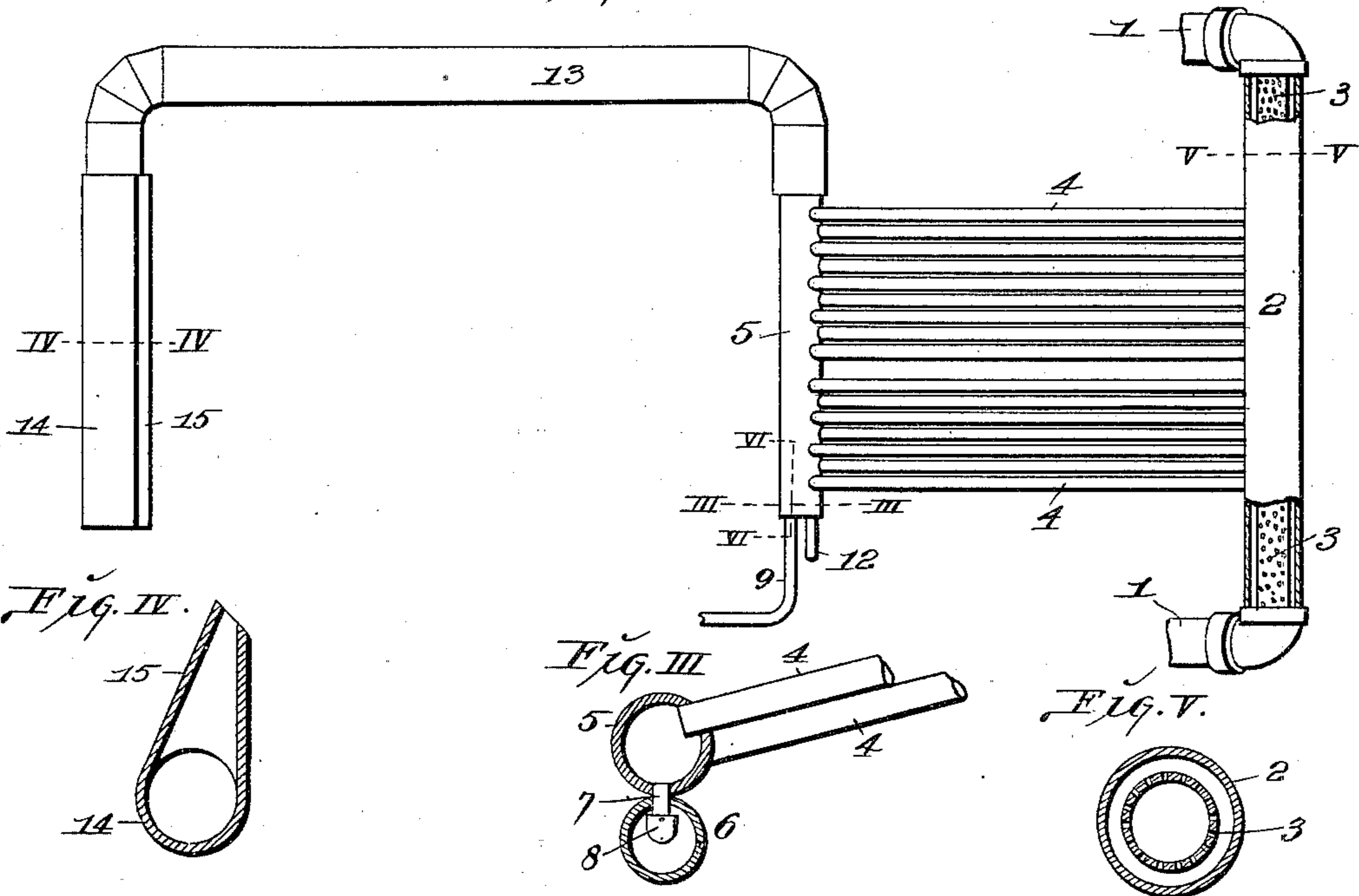


Fig. II.

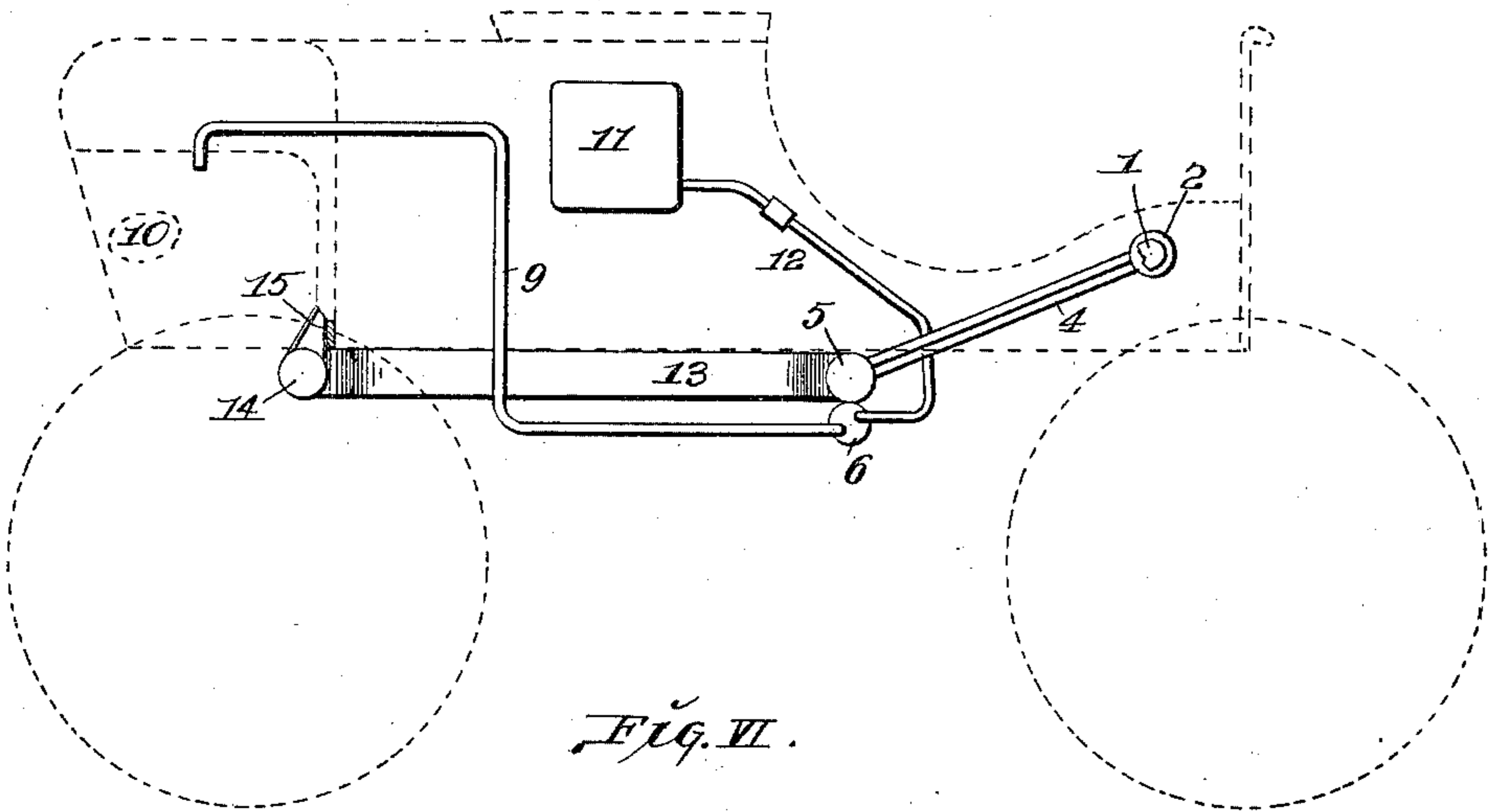
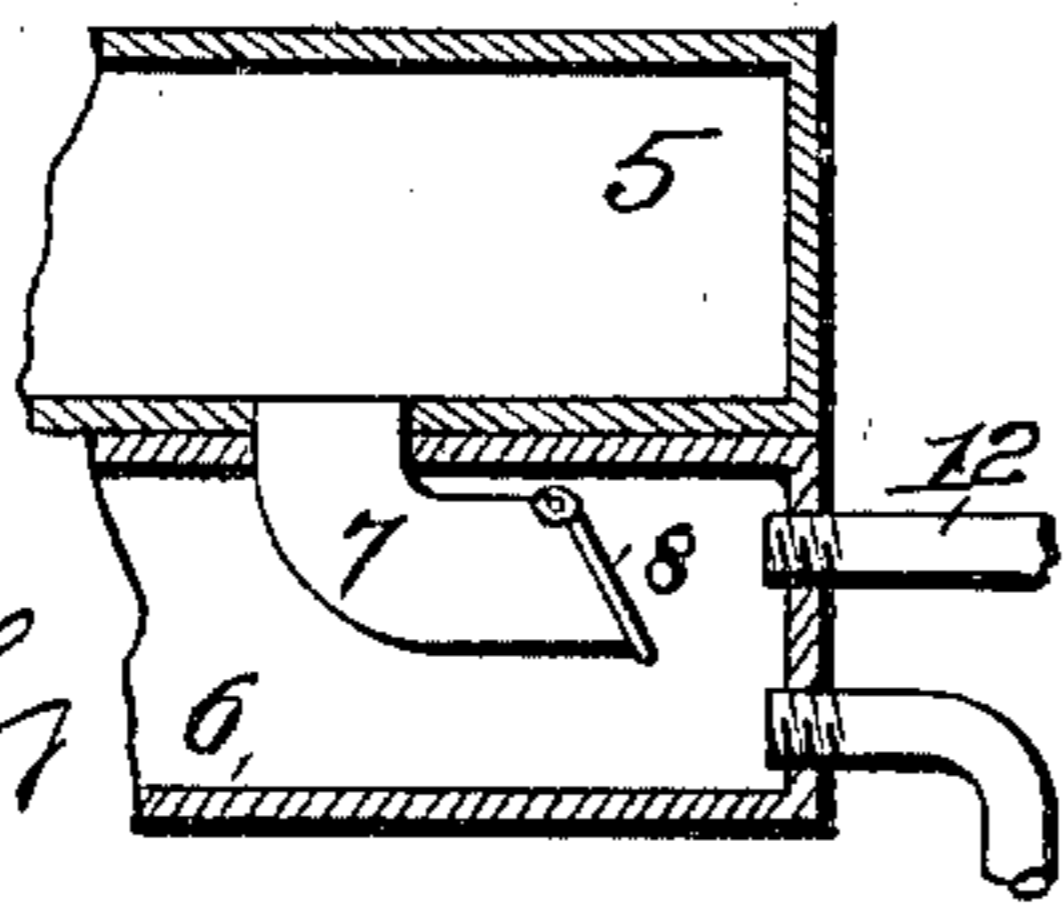


Fig. III.



Attest:

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STUART E. FREEMAN, OF ST. LOUIS, MISSOURI.

STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 672,211, dated April 16, 1901.

Application filed June 8, 1900. Serial No. 19,493. (No model.)

To all whom it may concern:

Be it known that I, STUART E. FREEMAN, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Steam-Condensers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a condenser particularly designed for use in condensing steam produced in the operation of motor-vehicles propelled by steam-power.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a top or plan view of my improved condenser. Fig. II is a side elevation of the condenser shown applied to a vehicle illustrated in dotted lines. Fig. III is a cross-sectional view taken on the line III III, Fig. I, through the water-receiving pipes. Fig. IV is a cross-sectional view taken on the line IV IV, Fig. I, through the exhaust-steam-discharge tube. Fig. V is a cross-sectional view taken on the line V V, Fig. I, through the steam-receiving pipe and muffler-tube therein. Fig. VI is an enlarged view, partly in section, taken on the line VI VI, Fig. I.

The steam to be condensed enters the condenser through the steam-conveying pipes 1, (see Figs. I and II,) said pipes being connected to a steam-receiving pipe 2, that contains a perforated muffler-tube 3, (see Figs. I and V,) the ends of which are seated in the pipes 1 or the unions connecting the pipes 1 and 2. The steam passing to the receiving-pipe 2 first enters the muffler-tube 3 at the ends thereof and passes through the perforations contained by said muffler-tube into the space surrounding said tube within the steam-receiving pipe. Connected to the steam-receiving pipe 2 are a series of cooling-tubes 4, that have communication with the interior of the pipe 2 and lead to a condensed-water-receiving pipe 5, into which they enter, as seen in Fig. III. The pipe 2 is preferably located above the level of the pipe 5, so that the cooling-tubes 4 extend on an incline between said pipes, as illustrated in Fig. II, in order to permit the air to strike

said cooling-tubes in such manner as to efficiently cool them and the steam passing therethrough. The steam passing into said cooling-tubes is therefore cooled and condensed before it reaches the water-receiving pipe 5. From the water-receiving pipe 5 the water passes into the auxiliary water-receiving pipe 6, located immediately beneath the pipe 5, through a water-discharge pipe 7, provided with a gravity check-valve 8. For the purpose of removing the water from the auxiliary pipe 6 and discharging it into the steam-boiler water-supply tank carried by the vehicle I provide a conveying-pipe 9, that leads from the auxiliary pipe 6 to the tank 10, (shown in dotted lines in Fig. II,) and a suitably-operated air-pump 11, that is connected by an air-pipe 12 to the pipe 6. When water has collected in the auxiliary water-pipe 6 from the condensation of steam, the air-pump 11 is operated, forcing air through the air-pipe 12 into the pipe 6, and the pressure of the air against the gravity check-valve 8 causes said valve to be closed, thereby closing communication between the pipes 5 and 6 through the water-discharge pipe 7, and the air-pressure forces the water from the pipe 6 through the conveying-pipe 9 to the tank 10 for reuse in the steam-boiler.

A small percentage of the steam may not be condensed in passing through the cooling-tubes 4 into the water-receiving pipes 5, and for the purpose of disposing of such uncondensed steam I provide an exhaust-pipe 13, connected to the water-receiving pipe 5 at the end thereof opposite the connection of the pipes 9 and 12, said exhaust-steam pipe being joined to a discharge steam-pipe 14, provided with a nozzle 15, through which the uncondensed steam escapes to the outside air.

No particular means for supporting the condenser upon the vehicle are herein shown or described, but the parts may be upheld in any suitable manner.

I claim as my invention—

1. In a steam-condenser, the combination of a steam-receiving pipe, a main water-receiving pipe, a series of straight cooling-tubes providing communication between said pipes, an auxiliary water-receiving pipe located beneath and parallel with said main water-pipe and having communication with said main

water-receiving pipe, and means for discharging the water of condensation from said auxiliary pipe, substantially as described.

2. In a steam-condenser, the combination
5 of a steam-receiving pipe, a muffler-tube therein, a main water-receiving pipe, a series of straight cooling-tubes providing communication between said pipes, an auxiliary water-receiving pipe located beneath and parallel with said main water-pipe and having
10 communication with said main water-receiving pipe, and means for discharging the water of condensation from said auxiliary pipe, substantially as described.

15 3. In a steam-condenser, the combination of a steam-receiving pipe, a main water-receiving pipe, cooling-tubes providing communication between said steam and water pipes, an auxiliary water-receiving pipe, a
20 discharge-pipe leading from said main pipe into said auxiliary pipe, a valve carried by said discharge-pipe, and means for discharging the water from said auxiliary pipe, substantially as described.

4. In a steam-condenser, the combination
25 of a steam-receiving pipe, a main water-receiving pipe, a series of straight cooling-tubes providing communication between said steam and water pipes, an auxiliary water-receiving pipe located beneath said main wa-
30 ter-pipe and extending parallel therewith, means of communication between said main and auxiliary pipes, a water-conveying pipe leading from said auxiliary pipe, and an air-pump having communication with said aux-
35 iliary pipe, substantially as described.

5. In a steam-condenser, the combination of a steam-conveying pipe, a water-receiving pipe, cooling-tubes providing communication
between said pipes, an exhaust-steam pipe
40 connected to said water-receiving pipe, and a steam-discharge pipe having a nozzle and connected to said exhaust-steam pipe, substantially as described.

STUART E. FREEMAN.

In presence of—

E. S. KNIGHT,

N. V. ALEXANDER.