

No. 774,312.

PATENTED NOV. 8, 1904.

A. P. DODGE.
STEAM GENERATOR.

APPLICATION FILED FEB. 5, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

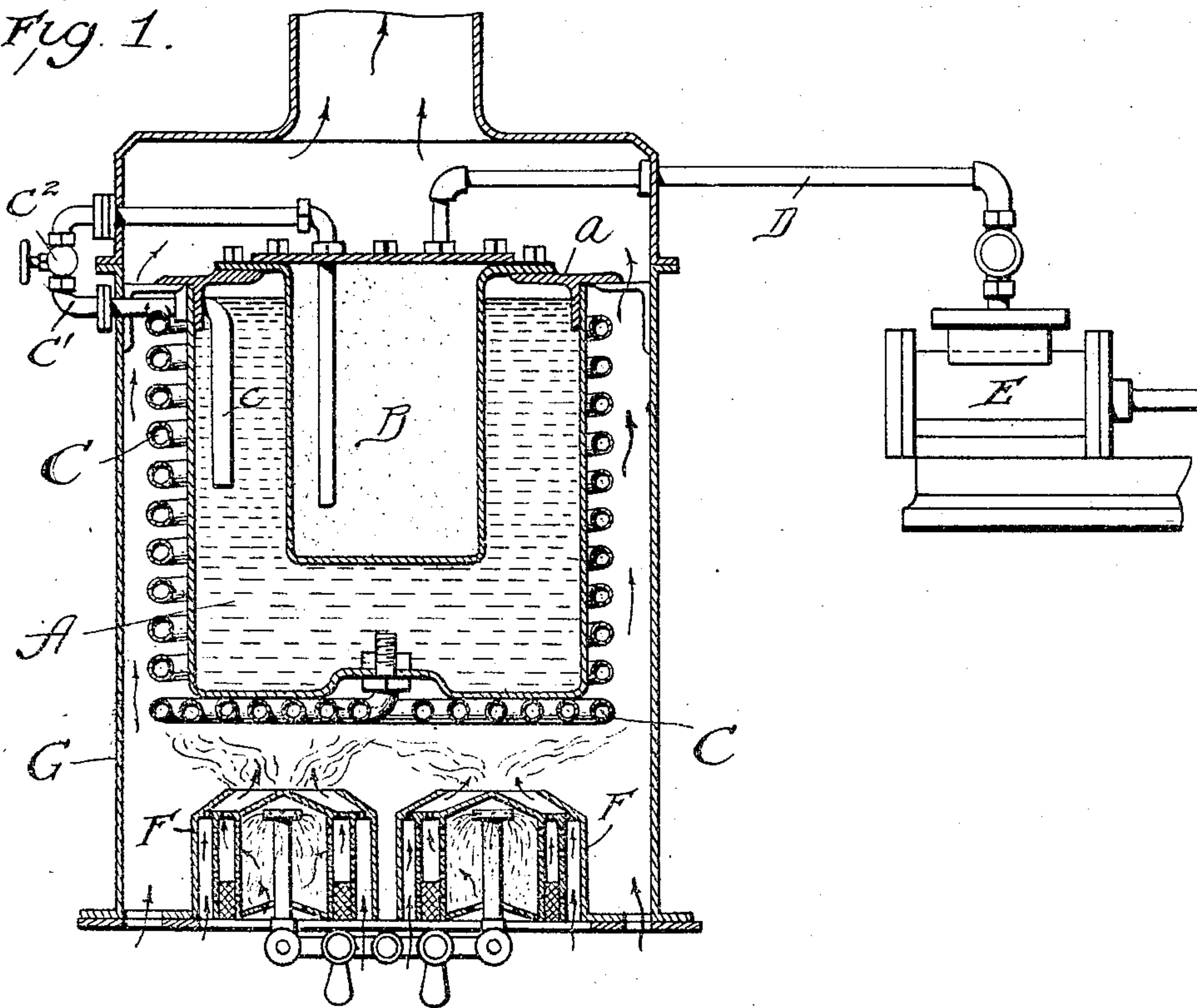
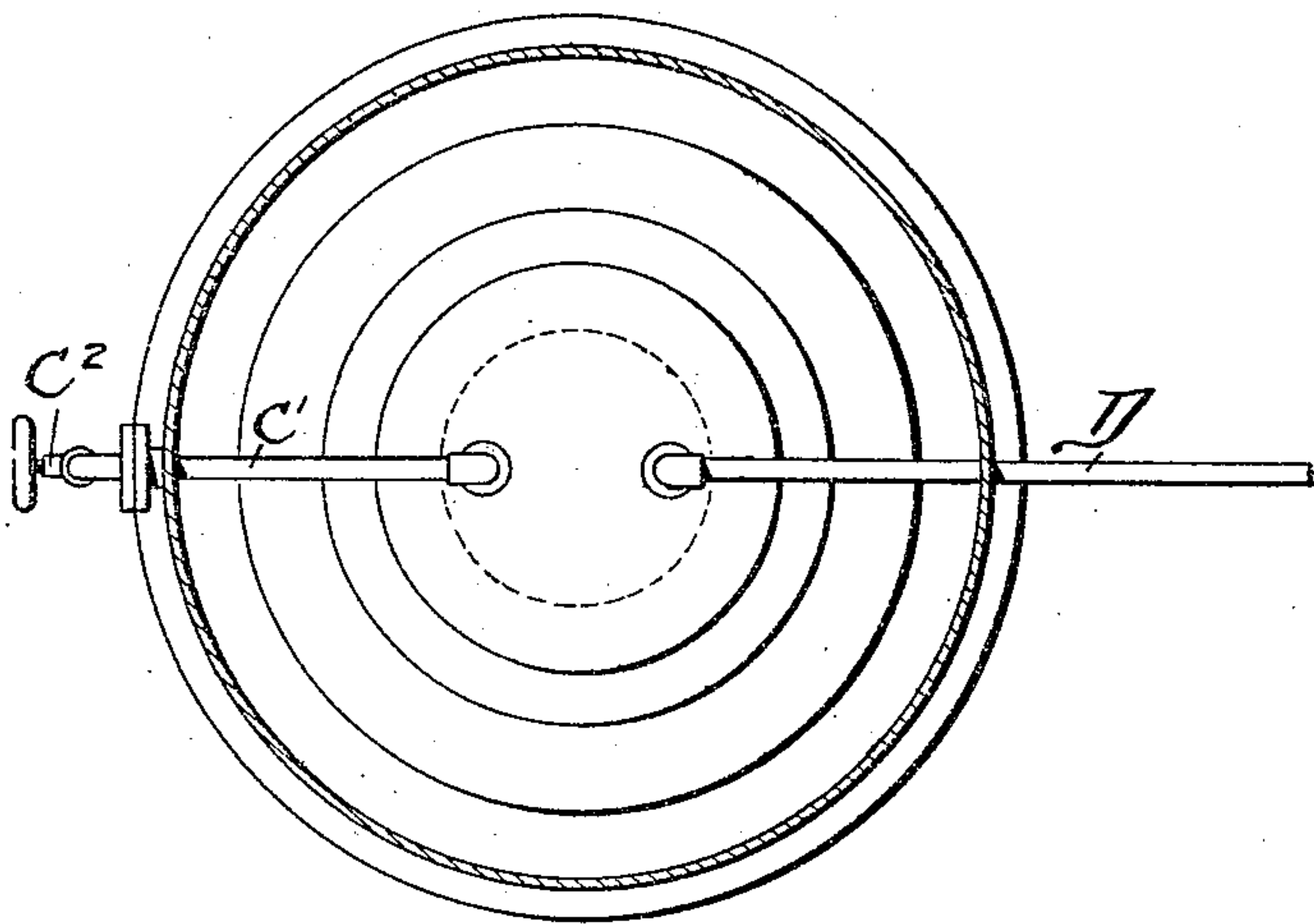


Fig. 1a



ATTEST.

Edmund Sarton

INVENTOR.

ARTHUR P. DODGE.

By *Ellis Spear Company*
ATTY

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2 SHEETS—SHEET 2.

Fig. 2.

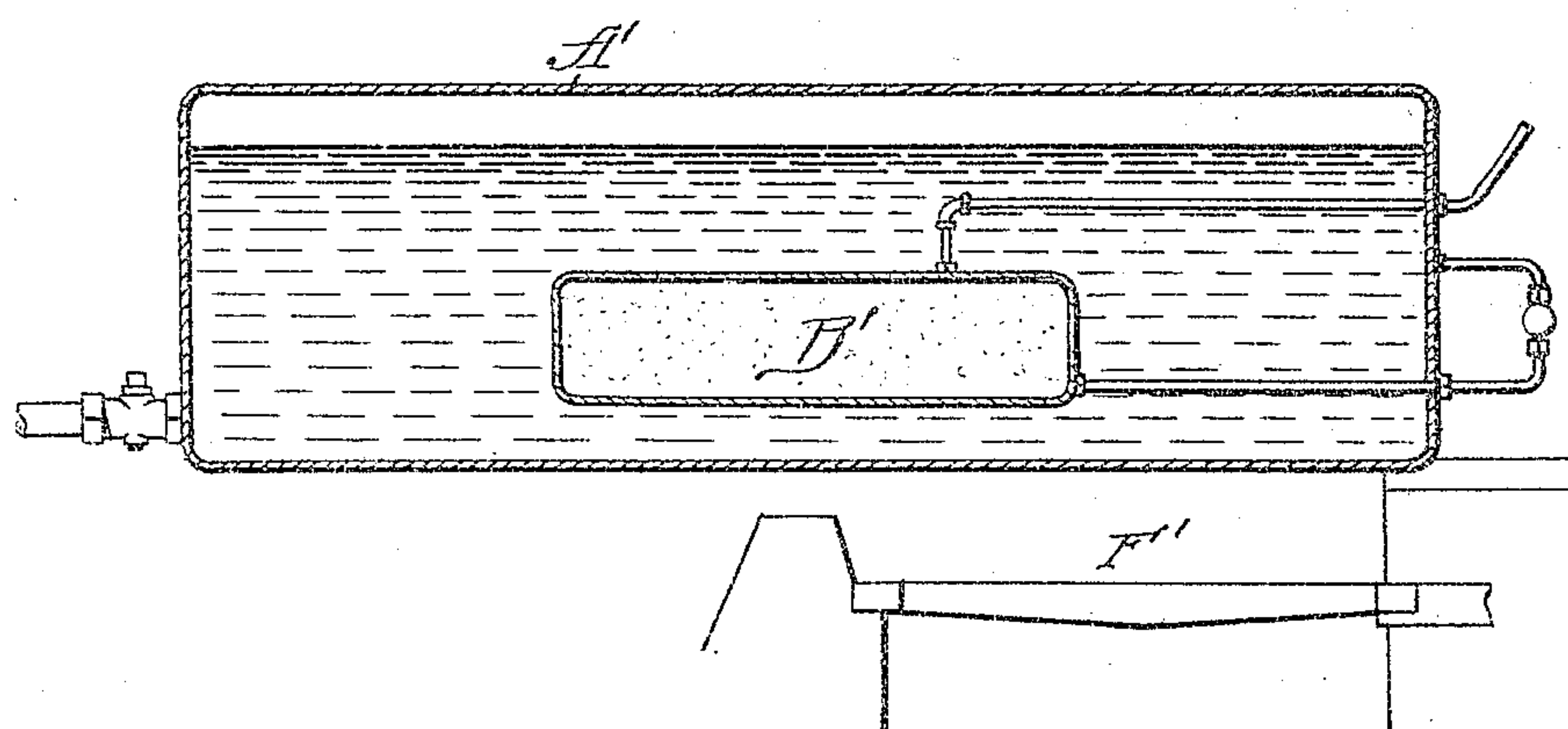
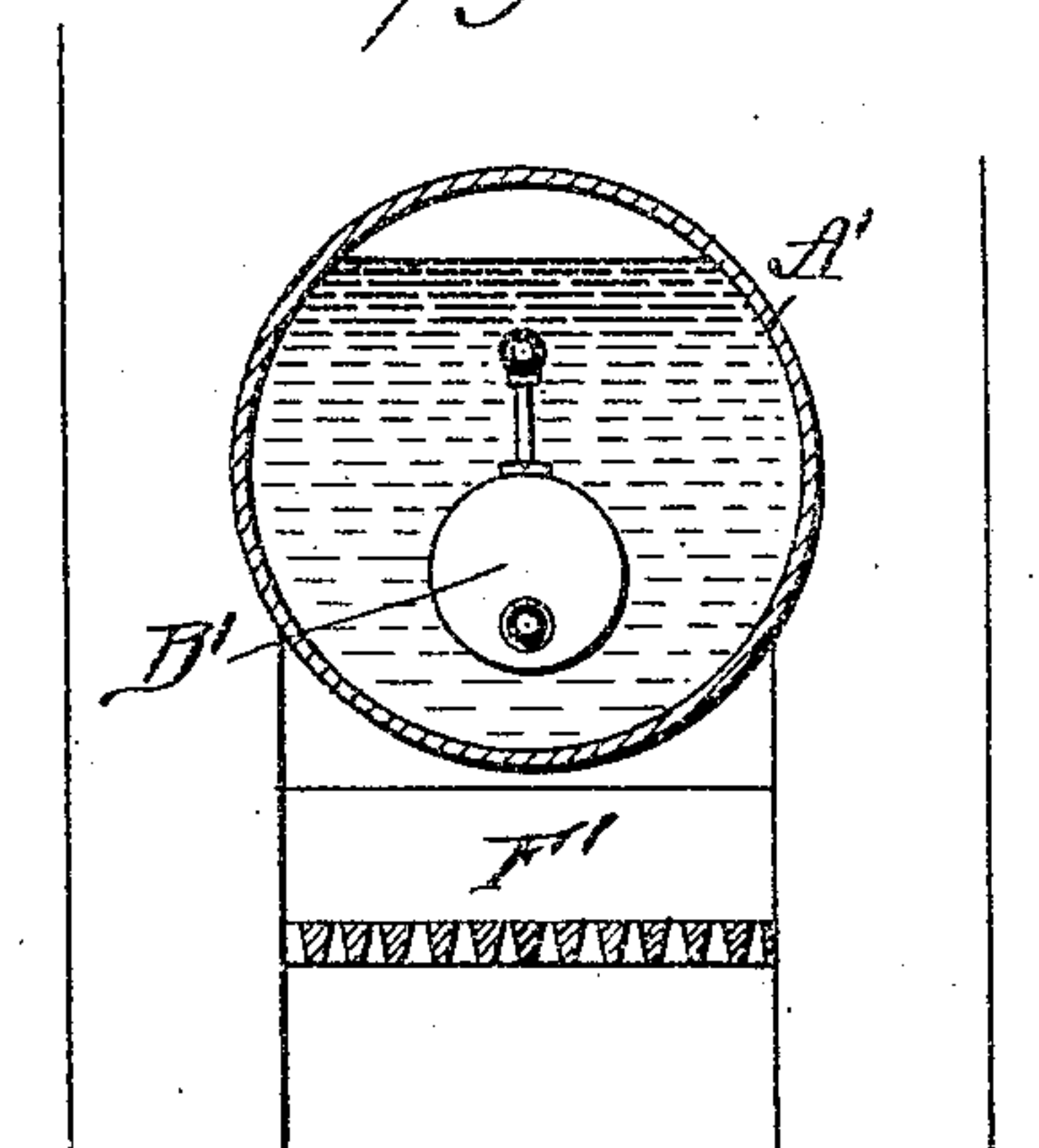


Fig. 3.



ATTEST:

Edmund Sartm

INVENTOR.

ARTHUR P. DODGE.

BY *Ellis Spear & Company*
ATTY'S.

UNITED STATES PATENT OFFICE.

ARTHUR PILLSBURY DODGE, OF NEW YORK, N. Y.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 774,312, dated November 8, 1904.

Application filed February 5, 1904. Serial No. 192,155. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR PILLSBURY DODGE, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates to improvements in steam boilers or generators, and while intended mainly for embodiment in that class of tanks or generators designed to be primarily charged with water heated to a high degree and under great pressure is not necessarily limited to such, but is equally applicable to the boiler and furnace in common use.

The object of the invention is to thoroughly evaporate the water in the tank or generator and to secure a perfectly dry steam at an even pressure for admission to the engine-cylinder.

With these objects in view the invention comprises a main tank or generator adapted to receive water raised to a high degree of heat and under great pressure and an evaporation or expansion chamber submerged either partly or wholly in the water of said tank, into which chamber the water is admitted and expanded at once into steam and from which it is conveyed to the engine-cylinder.

It further includes, in connection with the tank or generator and evaporation or expansion chamber, an interposed reducing-valve adapted to maintain a desired but reduced pressure in said evaporating-chamber, and finally the invention includes other features of construction and arrangements of parts hereinafter described, and particularly set forth in the claims.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section through a generator or boiler constructed in accordance with my invention in which the expansion-chamber is only partially submerged. Fig. 1^a is a plan view of parts in Fig. 1. Fig. 2 is a similar view of a form in which the expansion-chamber is wholly submerged, and Fig. 3 is a transverse section of the form shown in Fig. 2.

In the drawings, A indicates the boiler or generating-tank of suitable size and shape, which may be supplied with water under high heat and pressure by any suitable means. (Not shown.)

From the upper or crown sheet *a* of the boiler depends an internal expansion or evaporation chamber B, which extends downward to such a distance as to be mainly surrounded by the water within the generator or tank A.

A coiled pipe C, communicating with the bottom of the generator A, is coiled spirally beneath the bottom of said generator, and thence is coiled helically around the outside of the said generator to a point at or near the upper edge, where it communicates by a branch *c* with the interior of the generator, thereby insuring a complete circulation of the water; but I do not confine myself to this exact shape of coil-pipe. From this pipe *c* another branch, *c'*, communicates with the vaporization or expansion chamber, and in this pipe *c'* is located a reducing-valve (indicated at *c''*) of any suitable construction, whereby pressure within the chamber B may be controlled by limiting the amount of water admitted to it. From the expansion-chamber B the steam is conveyed by a pipe D to the engine, as illustrated at E.

The necessary heat to provide for radiation and evaporation losses may be supplied in any desired manner. As shown in Fig. 1, I may supply this by means of oil-burners F F, located beneath the generator, the heat and products of combustion being confined in proximity to the generator by an annular jacket G, terminating at the top in a suitable uptake or stack.

In Figs. 2 and 3 I have shown the invention as applied to a longitudinal boiler A', heated by a furnace of usual construction, as indicated at F, and in which form the expansion-chamber B' is located entirely within or submerged in the water of the generator or boiler. In this form the heating and circulating coil is dispensed with.

It will thus be seen that in either of the forms above described the water from the boiler under high heat and pressure and further heated by the fire below passes from the

bottom to the top of the boiler, equalizing its temperature, and also by way of the branch and pressure reduced to the internal chamber, where it immediately evaporates by reason of
 5 its reduced pressure and boiling-point and the highly-heated water surrounding it. As soon, however, as the pressure in the internal evaporating-chamber equals the pressure at which the pressure-reducing valve is adjusted to
 10 close, the entrance of water to it is shut off by the valve and the pressure remains steadily at that point. As steam is drawn from this chamber for use water is admitted afresh until it is exhausted from the boiler. It will thus
 15 be seen that the steam thus formed is maintained at the same temperature as the water in the surrounding boiler, though at a reduced pressure, thus practically superheating the steam.

20 It will be understood that while I have shown the expansion or evaporation chamber as embodied in a boiler provided with heating means, it may be applied equally as well where the generator is intended to generate steam
 25 solely by being charged with highly-heated water under great pressure, and subsequent heating means are omitted.

Having thus described my invention, what I claim is—

30 1. In combination, the generator, the evaporation-chamber located therein in contact with the water of the generator, means whereby water may be conveyed from the interior of said generator into said evaporation-cham-

ber, and means for conveying steam from said 35 evaporation-chamber to the point where it is used substantially as described.

2. In combination, the boiler or generator, an evaporation-chamber located therein in contact with the water, a water-pipe connect- 40 ing the interior of said generator with the evaporation-chamber, and a reduction-valve in said pipe, substantially as described.

3. In combination, the boiler or generator, and an evaporation-chamber within the gen- 45 erator below the water-level thereof, a water-circulation pipe extending between the upper and lower portion of the generator upon the exterior thereof, heating means beneath the same, a pipe for conveying the water of the 50 generator into the evaporation-chamber, and the reducing-valve in said pipe, substantially as described.

4. In combination, the generator, an evaporation-chamber therein below the water- 55 level, a coiled pipe having one end communicating with the bottom of the generator and its opposite end communicating with the upper portion of the generator, a branch pipe extending from said upper end to the evapora- 60 tion-chamber, and a reducing-valve in said branch pipe, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR PILLSBURY DODGE.

Witnesses:

P. F. W. RUTHER,
 WILLIAM C. DODGE.