Geo. A. Barnard. Steam Generator.

PATENTED JUL 11 1871

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Fig. 1.

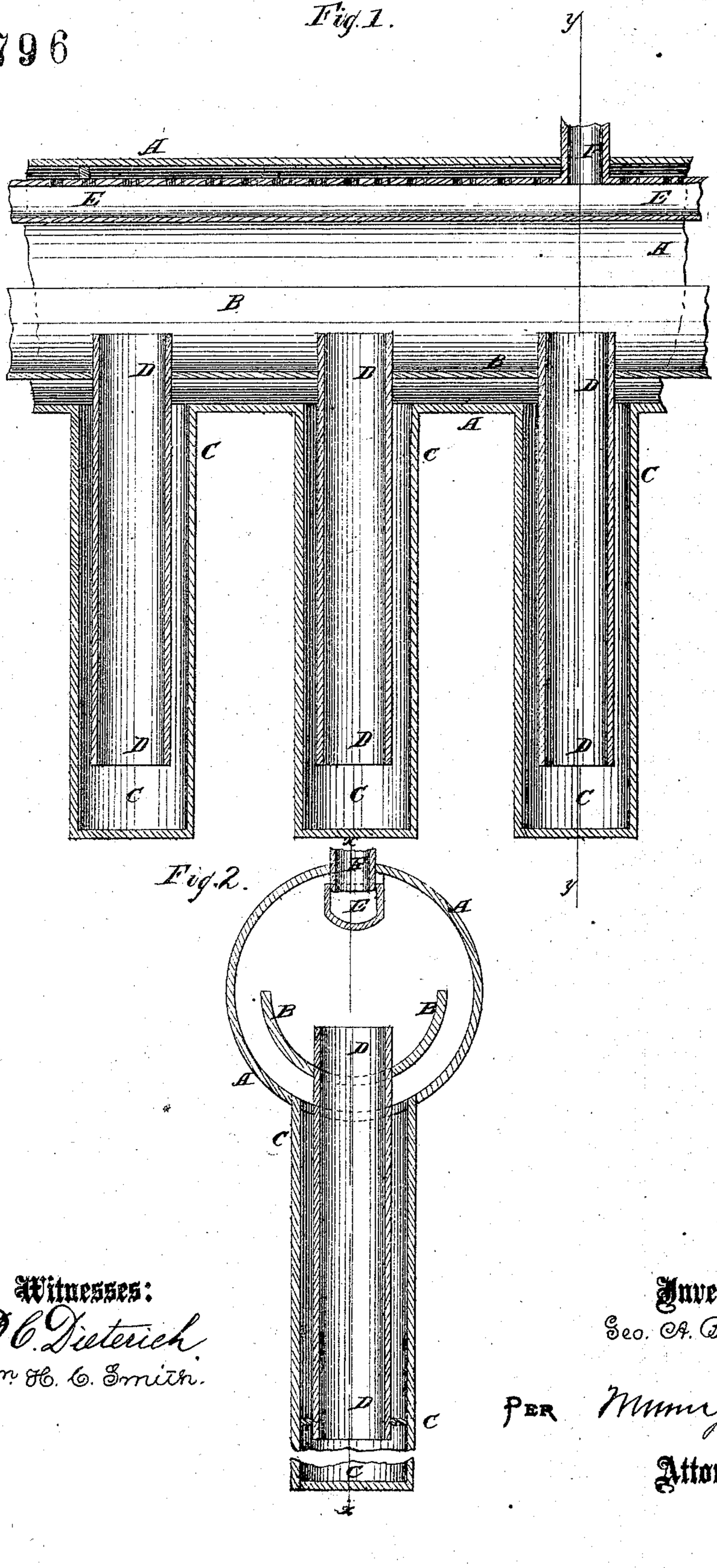

Fig. 2.

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GEORGE A. BARNARD, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 116,796, dated July 11, 1871.

To all whom it may concern:

Be it known that I, GEORGE A. BARNARD, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Generator; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of a portion of my improved generator taken through the line *x x*, Fig. 2. Fig. 2 is a vertical cross-section of a portion of the same taken through the line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention consists in improving the construction of steam-generators, as hereinafter fully described and subsequently pointed out in the claim.

A is the cylindrical shell, which may be made of cast or boiler-iron. B is an inner lining made of sheet-iron—say about ten-gauge—placed within the cylinder A and encircling its lower half. The lining B should be supported at the distance of about an inch from the shell A, thus forming a water-space between said lining and shell. To the under side of the shell A, and communicating with the interior of said shell, are attached the upper ends of vertical pipes C, made of cast-iron. The pipes C should be made corrugated and should be closed at their lower ends with screw-plugs for convenience in cleaning them, &c. D are vertical pipes placed within the vertical pipes C. The pipes D are made open at both ends, and pass through and are secured to the lining B, their upper ends projecting about one-third the diameter of the cylinder A, thus communicating with the interior of said shell above the lining B. The lower ends of the pipes D terminate about three inches from the bottom of the pipes C. The pipes D should be made of such a size as to have a space of about one inch between them and the pipes C. E is the dry-pipe, which extends the whole length of the cylinder A, is placed close to the top of the said cylinder, is made U-shaped, and with a series of holes in its upper or flat part, extending its whole length and about two inches apart. The pipe E thus receives steam throughout its entire length and delivers it to the steam-drum through the pipe F.

By this construction a thorough and rapid circulation is obtained, and the generator may contain a liberal supply of water, while only a small part of said water is exposed to the heating-surface. The transmission of the steam is easy from all parts of the generator to the dry-pipe E and thence to the drum through the pipe F. The sediment will all collect upon the inner lining B below the upper ends of the pipes D, from the fact that that is the coolest part of the generator and the water there has but little agitation. The sediment thus collected cannot scale, and may be readily removed through blow-off pipes. The steam, being taken from all parts of the boiler through the dry-pipe E, is removed without any undue rising of the water-level and with but little saturation. The heat and gases from the furnace are designed to pass around and among the pipes C and to come in contact with the lower half of the shell A, being more generally distributed by a diaphragm placed in the rear of the bridge-wall, and beneath the lower edge of which the said products of combustion must pass. At the rear end of the generator the products of combustion pass up into a flue around the upper part of the cylinder A, and thence back to and around the steam-drum, and thence into the chimney, the upper part of the cylinder A and the steam-drum thus becoming partially superheating surfaces.

The feed-water is designed to be introduced into the interior of the lining B, and at whatever temperature it may be when introduced it will be heated nearly to, or above, the boiling point before it comes in contact with the heating-surface, the first place of contact being the bottom of the pipes C. The result is that no part of the generator will be subjected to any great changes of temperatures.

The vaporizing capacity of this generator is very great from the fact that only a thin stratum of water is in contact at any time with the heating-surface, and that the whole exterior of the generator is heating-surface.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of the cylinder A, semi-cylindrical lining B, exterior vertical pipes C, and interior vertical pipes D, substantially in the manner herein shown and described.

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