C. TYSON.
Water Tube Boiler.

No. 196,844. Patented Nov. 6, 1877.

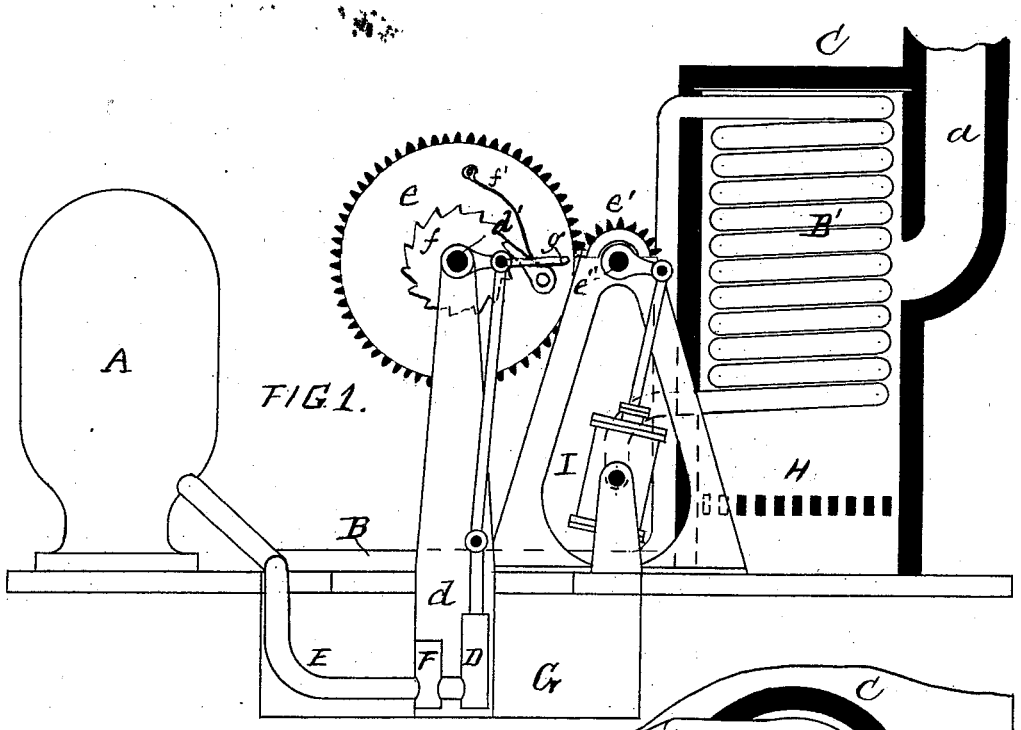

FIG. 1.

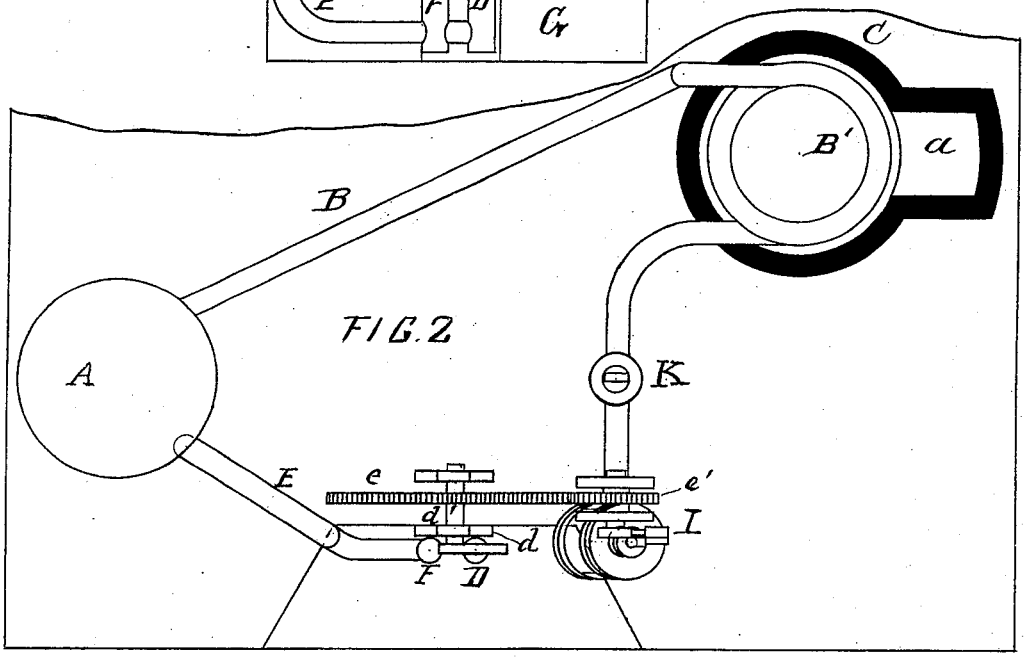

FIG. 2.

WITNESSES:
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CHARLES TYSON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WATER-TUBE BOILERS.

Specification forming part of Letters Patent No. **196,844**, dated November 6, 1877; application filed September 17, 1877.

To all whom it may concern:

Be it known that I, CHARLES TYSON, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Steam-Generators, which improvement is fully set forth in the following specification, in which—

Figure 1 is a vertical longitudinal view, and Fig. 2 a plan view of the same.

The invention consists in the combination of parts hereinafter described, in which is employed a supplemental pressure-supply for a steam-generator by means of an air-chamber, hydrant, or other convenient appliance, conducting water to an evaporating-coil, in which it is vaporized, and from and through which it is conveyed to the steam-chest of the engine for useful work. The supply to the engine is controlled by means of a cock. A submerged pump, operated by the engine, supplies water to the air-chamber, from which it is forced to the coil, a spring-valve in the pipe, between the pump and air-chamber, regulating the supply.

A is the air-pressure chamber, connecting with the pipe B, the coiled portion B′ of which is inclosed in the furnace or case C, having the flue *a* and grate H. The heating medium may be petroleum or other gas-generating fluid, or other suitable combustible material, and the chamber of the grate or burner will depend upon the nature of the fuel employed. E is the pipe leading from the chamber A to the check or spring valve F, and thence to the pump D, which is submerged in the tank G. On water being fed to the chamber A, it compresses its contained air to a suitable degree, and flows into the coil B of the furnace C. Immediately on its entrance it is evaporated by heat, and passes to the engine (represented by I) in the condition of steam. K is a cock, by means of which the steam can be regulated in its flow to the engine. Thus, when the flow is too rapid, the cock can be gradually closed, and water be prevented from working into the coil, which, as far as possible, is intended for steam alone. The elasticity of the air causes steadiness and regularity in the flow of water to the coil.

In case the supply of water should exceed the amount required, the spring-valve F will open outwardly and discharge the surplus into the tank G. A coil-wire is used in the coil-pipe, for the purpose of aiding in the heating of the water.

The pump is provided with mechanism whereby it may be operated independently of the engine. The pump D is supported on a standard, *d*, its shaft *d′* having a bearing therein and in the supplemental standard D′.

The spur-wheel *e*, driven by the pinion *e′* on the engine-shaft *e″*, is loose upon the pump-shaft, but connected therewith, when desired, by means of the ratchet-wheel *f*, which is tight on the pump-shaft, and the spring-pawl *f′*, pivoted to an arm of the spur-wheel *e*.

The crank of the pump is extended, so as to form a crank-handle, *g*, by means of which, when the pawl and ratchet are freed, the pump may be worked by hand, independently of the engine.

I claim as my invention—

The air-chamber A, pipes B B′, and furnace C, having the flue *a* and grate H, combined with the pipe E, valve F, and pump D, submerged in the tank G, the whole operating as a means of generating steam for, and supplying it to, the engine I, substantially as specified.

In testimony whereof I hereunto sign my name in presence of two subscribing witnesses.

CHARLES TYSON.

Witnesses:

FRANCIS D. PASTORIUS,

W. W. DOUGHERTY.