J. Firmenich,

Flue and Tubular Boiler.

No. 53,284. Patented Mar. 20, 1866.

Fig. 1

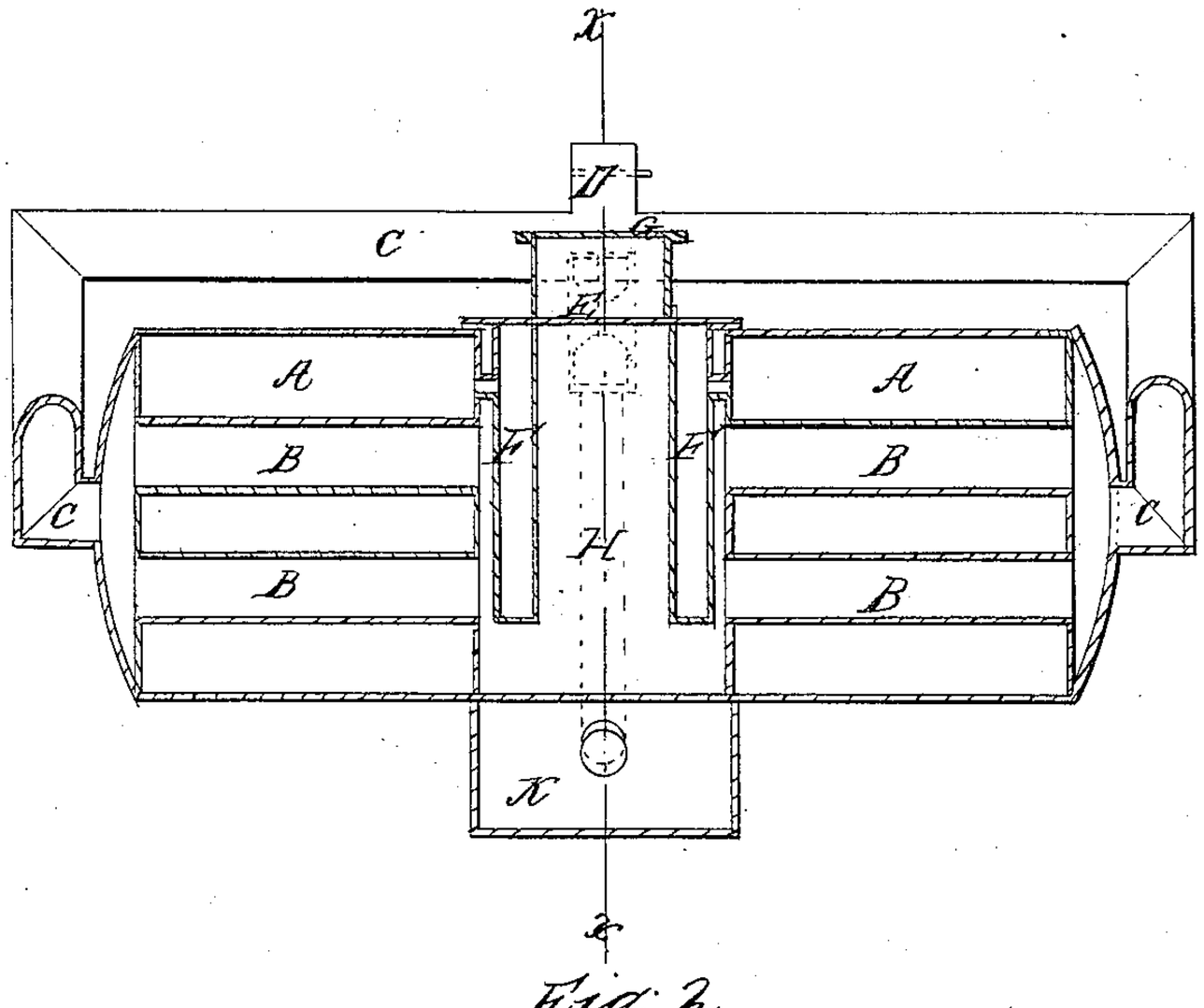
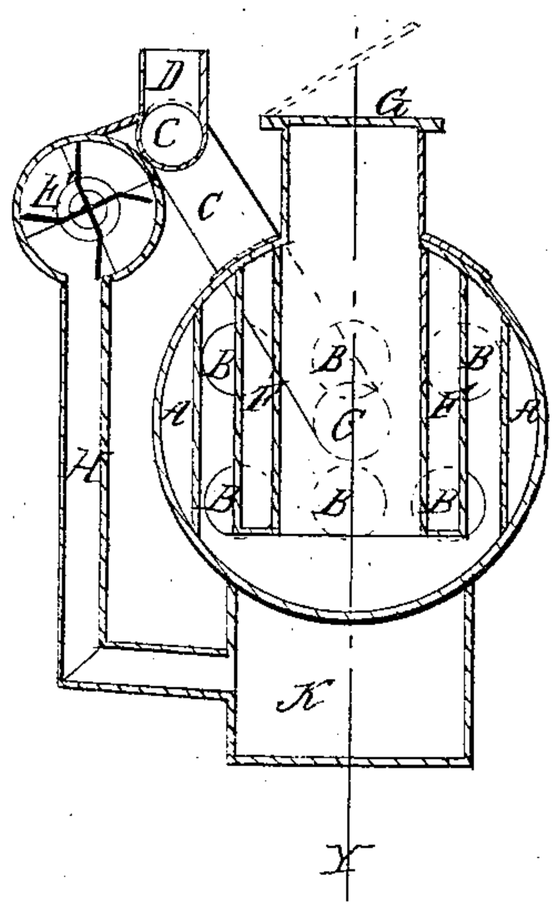


Fig. 2



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JOSEPH FIRMENICH, OF BUFFALO, NEW YORK.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **53,284**, dated March 20, 1866.

To all whom it may concern:

Be it known that I, JOSEPH FIRMENICH, of the city of Buffalo, county of Erie and State of New York, have invented a new and Improved Steam-Boiler; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and the letters of reference marked thereon, in which—

Figure I is a longitudinal sectional elevation taken from the line Y Y. Fig. II is a transverse sectional elevation taken from the line X X.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The nature of my invention consists in constructing a steam-boiler in two or more sections, each section being united or connected together with sheet metal, with a coal or fuel chamber arranged between each of said sections, the said boilers being provided with any desired number of flues running longitudinally through each section of the boiler and terminating in one flue of sufficient capacity to admit the smoke and gas to pass through the said flue, which is located at the outer end of the respective sections of the boiler, the said flue passing around longitudinally upon the outside of each boiler, terminating in another flue located outside and between the sections of the boiler, and, passing around, terminating under the fire-grates, the whole being so arranged that the entire products of combustion, after having once passed through the flues, are caused to pass in a continuous current through pipes to the ash-chamber, and thence up through the fuel to the flues again.

It further consists in providing a fan arrangement at the terminus of said flues, which, by rapid motion, forces the gas and smoke through said flues to the fire-grates, up through to the flues in the respective sections, and so on in a continuous current.

The great objection which has always been raised against steam as an economical agent for producing motive power to be used in the various departments of manufacture has been the expense for fuel or in generating it. It has long been the great desideratum of inventors and others engaged in manufacturing steam-boilers, and those using them, to devise some means by which fuel can be saved and by which the objection might be defeated that has so long been urged against it, and by which it might be made a cheap and desirable agent for the propulsion of machinery. By my invention I am enabled to save a large amount of fuel, which makes steam-power economical and desirable.

Letters of like name and kind refer to like parts in each of the figures.

A A represent the body or shell of my improved steam-boiler, which is made in two sections, divided by the coal or fuel chamber, said sections being connected by heavy sheet metal. It also contains flues B B, or any desired number of flues, which extend longitudinally through said sections in the shell or body A A.

C C are flues located at the outer ends of the respective sections of the boiler, said flues C C passing round in a longitudinal direction upon the outside of each boiler, and terminating in the flue H. Said flue H is located outside and between the sections of the boiler A A, extending to the ash-chamber K, up under the fire-grates above. By the construction of these flues C C and H the smoke and gas which is produced by the combustion of the coal is forced around by the fan E, said fan E being located at the terminus of the flues C and H. Thus the smoke and gas, as it generates from the coal or fuel, passes up around the chambers F F to the flues B B, that are located in the sections of the boilers A A, passing then to the flues C C, through the fan E, to the flue H and ash-chamber K, up through the fire-grates, and so on in a continuous current. By the action of this fan E a continued draft is kept in motion, and forcing it around through the different flues.

D is a damper located at the top of the flues C C, and serves the purpose of regulating the heat. When closed the heat is concentrated in the different flues of the boiler, but when opened the heat passes off; but by turning the damper D to any desired position the heat may be regulated.

It will be observed that the coal or fuel is fed from the top of the coal-chamber G. By raising the lid or cover of the fuel-chamber G the coal or fuel is placed into said chamber G, by which means the fire which is upon the grates is replenished as the fuel becomes consumed. It will here be observed, also, that the bulk of coal or fuel deposited in the coal-

chamber G cannot ignite above the lower end or base of the said chamber G, as there is no draft in that direction; but as the coal on the grates is consumed the coal from the chamber G settles or falls down upon the grate, where it comes in contact with the hot blast produced by the fan E, and is ignited, so that by this means the labor of a fireman is in a great measure dispensed with.

What I claim is—

1. A steam-boiler provided with one or more flues in such a manner that the current or draft is continuous, and all, or nearly all, the products of combustion are returned through the boiler and fire-grates, for the purposes and substantially as herein described.

2. The fan E, or its equivalent, in combination with the flues C C and H, for the purposes and substantially as herein set forth.

3. The arrangement of the self-feeding fuel-chamber G between the sections of the boiler, substantially and for the purposes described.

4. The arrangement of the self-feeder having a double chamber around which water circulates, in connection with the boiler, and to prevent the burning out of the fire-chamber, at the same time facilitating the generation of steam, for the purposes and substantially as herein described.

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