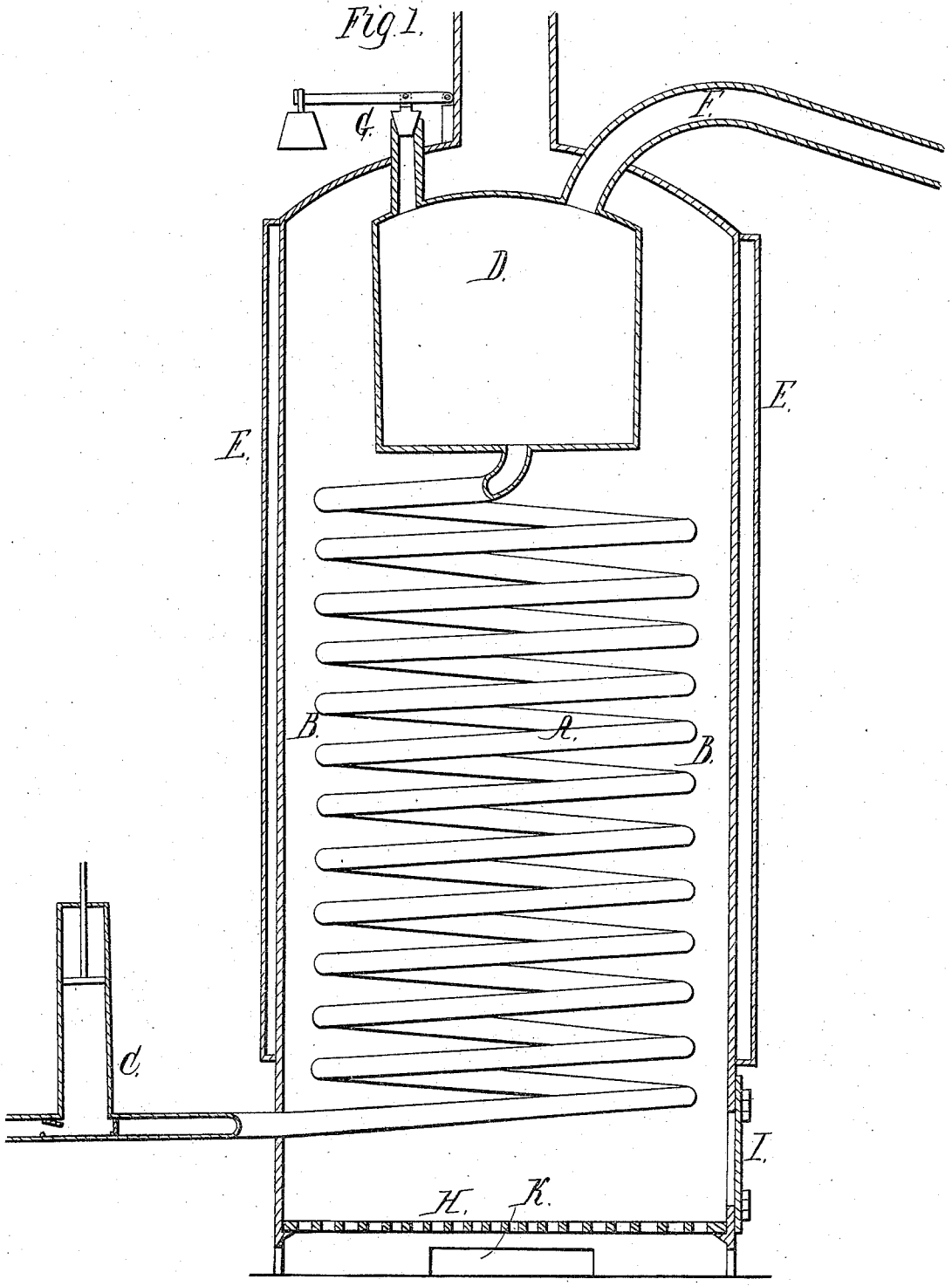
I. N. & S. W. Lesh, Deardorff & Beeson,

Steam-Boiler Water-Tube.

No. 2,693. Patented June 27, 1842.

Fig. 1.



UNITED STATES PATENT OFFICE.

ISAAC N. LESH, SILAS W. LESH, JACOB DEARDORFF, AND ZECHERIAH BEESON, OF HAGERSTOWN, INDIANA.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **2,693**, dated June 27, 1842.

To all whom it may concern:

Be it known that we, ISAAC N. LESH, SILAS W. LESH, JACOB DEARDORFF, and ZECHERIAH BEESON, of Hagerstown, Wayne county, State of Indiana, have invented a new and useful Improvement in the Construction of the Steam-Generator called the Spiral Tubular Immediate Steam-Generator, which is described as follows, reference being had to the annexed drawing of the same, making part of this specification, of which the figure is a vertical section.

This invention and improvement consists in constructing the boiler or generator A containing the water to be converted into steam in the form of a spiral tube and placing the same in a suitable furnace or fire-chamber B, in which the heat is generated, the lower end of said tube being passed through the furnace at a convenient place, at which end the water is forced in by a pump C or other means, and the upper end of said tube is conveyed into a receiver D for the steam, placed within the furnace, and provided with the necessary cocks, valves, and appendages of a steam-boiler. The furnace B is made of any suitable size and shape for the purpose intended and is surrounded by an outer case E for the purpose of preventing in part the escape of the heat, and should be made of a polished metal for the purpose of reflecting back the heat upon the furnace.

The receiver D, into which the steam is collected, is placed inside the fire-chamber, in order to keep it in a hot state. A tube F conveys the steam from the receiver D to the cylinder or wherever the steam is to be used. A safety-valve G is placed in the top of this receiver of the same diameter as the generator A for letting off all the steam at once.

The pump C for charging the tube with water is made in the usual manner.

H is the grate of furnace; I, furnace-door; K, air-hole.

A branch pipe of smaller diameter than the main pipe may extend from the lower coil, and after winding round spirally inside the main spiral tube enters the upper coil, where it may be increased in diameter. By means of this additional pipe a greater surface of boiler is exposed to the action of the fire and the effect of generating the steam almost instantaneous. The diameter of the tube should generally be the same as that of the column of water forced into it by the pump. The weight of the boiler and quantity of water used for producing a given quantity of steam is much reduced, and also the expense of the fuel is diminished.

Steam will be formed in the spiral tube in a regular ratio from the point of entrance at the lower end to the point of discharge at the upper end and will gradually increase in temperature and will be kept hot in the receiver in the furnace surrounded by fire. Air may also be rarefied in this generator for propelling machinery, the pump being increased in diameter for supplying the pipe with air.

Among the advantages to be derived from the foregoing construction of steam-generator are the following: first, reducing the weight of metal used in the construction of boilers and furnaces and the quantity of water and producing more steam and at a more rapid rate and of a higher degree of temperature with less fuel and without danger of explosion; second, producing a saving of thirty per cent. in fuel; third, in presenting more surface of boiler to the action of the fire; fourth, in preventing danger from explosion by having a valve the diameter of the pipe or tubular generator which will suffer all the steam to escape at once; fifth, causing the vessel to draw less water by reason of the decreased weight of boiler and water; sixth, rendering a vessel capable of carrying more fuel on account of the decreased weight of boiler, and thus rendered useful for ocean navigation; seventh, in dispensing with numerous joints in the construction of the boilers; eighth, in removing or diminishing the disagreeable effects produced by the es-

cape of the heat from the furnace into the hold of the vessel and the loss of heat in the furnace by means of the outer case; ninth, in raising the steam quicker with less fuel than with the common boiler; tenth, in its susceptibility of being used as an air-heater for various purposes.

What we claim as our invention, and which we desire to secure by Letters Patent, is—

The combination of the spiral tubular generator A and receiver D with the furnace B and reflector E, as described.

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SILAS W. LESH.
JACOB DEARDORFF.
ZECHERIAH BEESON.

Witnesses:
JOHN B. VANSANDT,
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