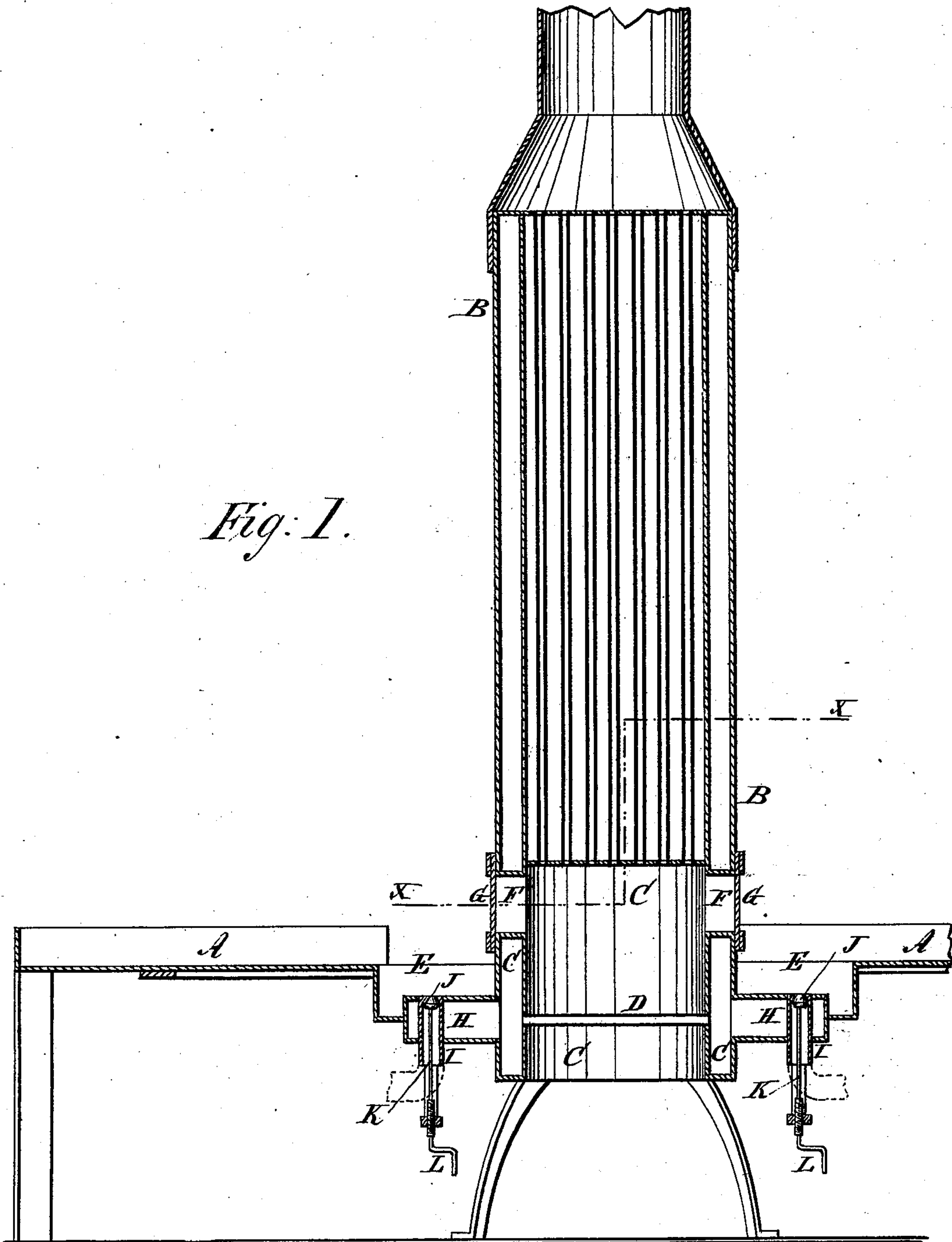


D. E. ENGLE.  
Combined Forge and Steam Boiler.

No. 227,744.

Patented May 18, 1880.

*Fig. 1.*



WITNESSES:

*A. Schehl.*  
*C. Sedgwick*

INVENTOR:

*D. E. Engle*

BY

*Mum Ho*

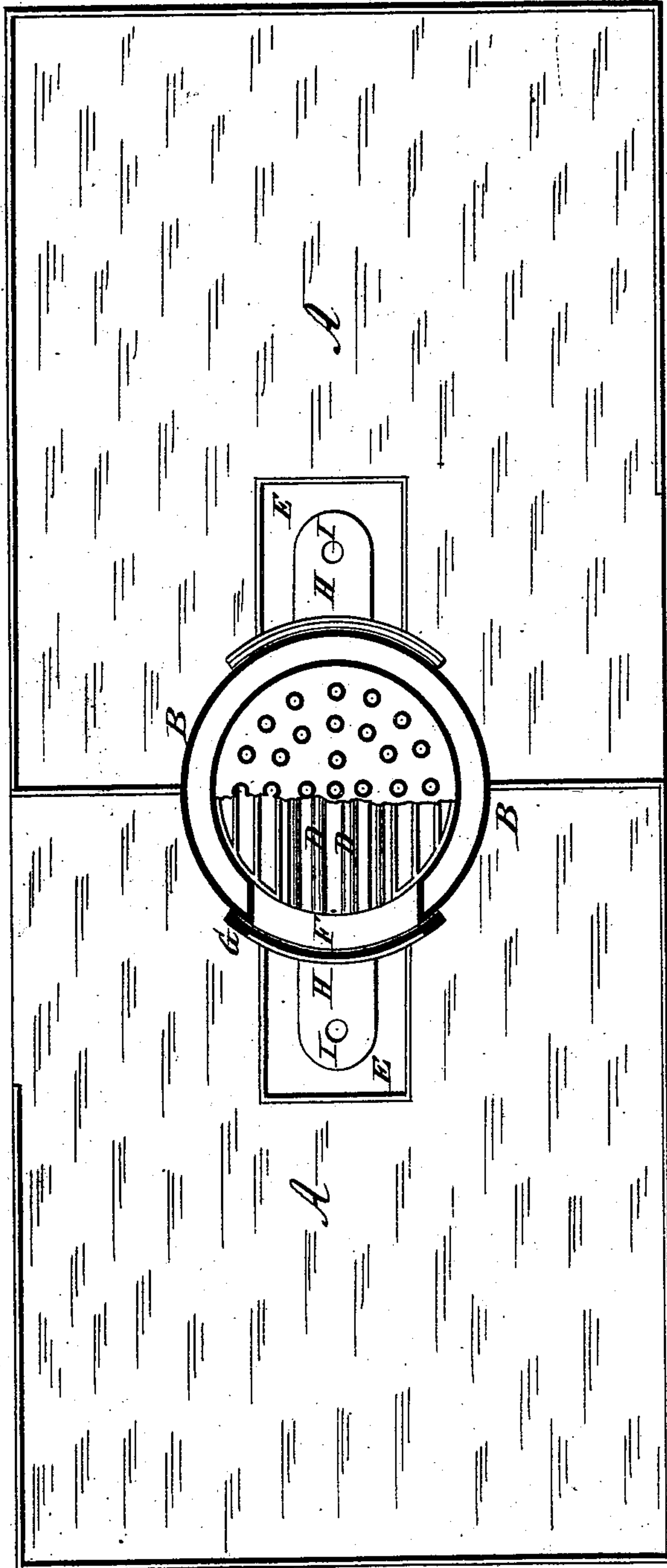
ATTORNEYS.

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*Fig. 2.*



WITNESSES:

*A. Seckel.*  
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INVENTOR:

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# UNITED STATES PATENT OFFICE.

DAVID E. ENGLE, OF JACKSONVILLE, (WIND RIDGE P. O.,) PENNSYLVANIA.

## COMBINED FORGE AND STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 227,744, dated May 18, 1880.

Application filed January 8, 1880.

*To all whom it may concern:*

Be it known that I, DAVID E. ENGLE, of Jacksonville, (Wind Ridge P. O.,) in the county of Greene and State of Pennsylvania, have invented a new and useful Improvement in Combined Forges and Steam-Boilers, of which the following is a specification.

Figure 1, Sheet 1, is a sectional elevation of the improvement. Fig. 2, Sheet 2, is a sectional plan view taken through the line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of this invention is to utilize the heat developed in forge-fires to generate steam for driving a fan-blower and other machinery.

A represents the forge, which may be constructed for one, two, three, or four fires, as may be required. The drawings show a forge constructed for two fires. B is an upright flue-boiler, which is placed in the forge A.

The fire-chamber C of the boiler is made with double walls, the space between the walls forming a water-space and being connected with the water-space of the boiler B.

The grate-bars D of the boiler B are made hollow, and their cavities are connected with the water-space of the fire-chamber C, so that the water will circulate through the said grate-bars. E are the places for the forge-fires, which are placed at the sides of the boiler B; and in the boiler B, directly opposite the fire-places E, are formed openings F, leading into the upper part of the fire-chamber C; so that the smoke and other heated products of combustion of the forge-fires may pass into the fire-

chamber C, and thence through the boiler B, to utilize the heat developed in the said fires for generating steam in the boiler B.

The openings F are provided with doors G, so that the opening F opposite any fire-place E that is not in use may be closed. In the bottom of each fire-place E is placed a tuyere, H, which is made hollow, and its cavity is connected with the water-space of the fire-chamber C, so that the tuyere may be kept cool by the circulation of the water in the boiler B.

I are the air-pipes leading to the tuyeres H from the fan-blower, and which are provided at their upper ends with ball-valves J. The stems K of the ball-valves J have screw-threads cut upon them, pass through screw-holes in the air-pipes I or other suitable supports, and have cranks L formed upon or attached to their lower ends, so that by turning the said cranks L the valves J can be adjusted to regulate the air-blast.

The boiler B is designed to be supplied with all the usual appliances of steam-boilers.

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

The above-described device, consisting of the steam-boiler B, the boiler fire-chamber C, the forge fire-places E, connected with said chamber by openings F, and the tuyeres H, connected by pipes I with said fire-places, as shown and described.

DAVID ELIS ENGLE.

Witnesses:

ISAAC C. BOOKER,  
JAMES F. GOODWIN.