

(No Model.)

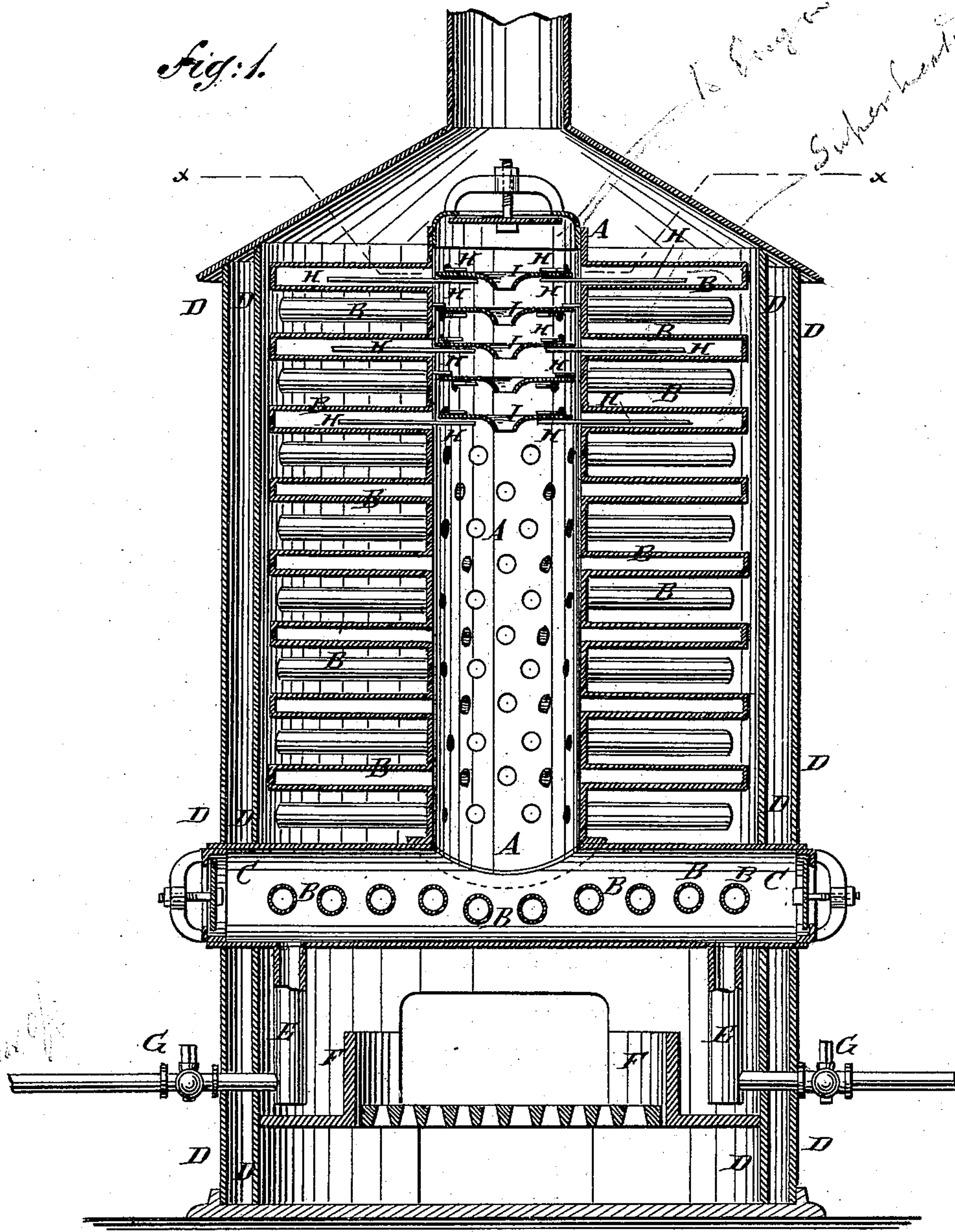
S. P. HEDGES.

STEAM BOILER.

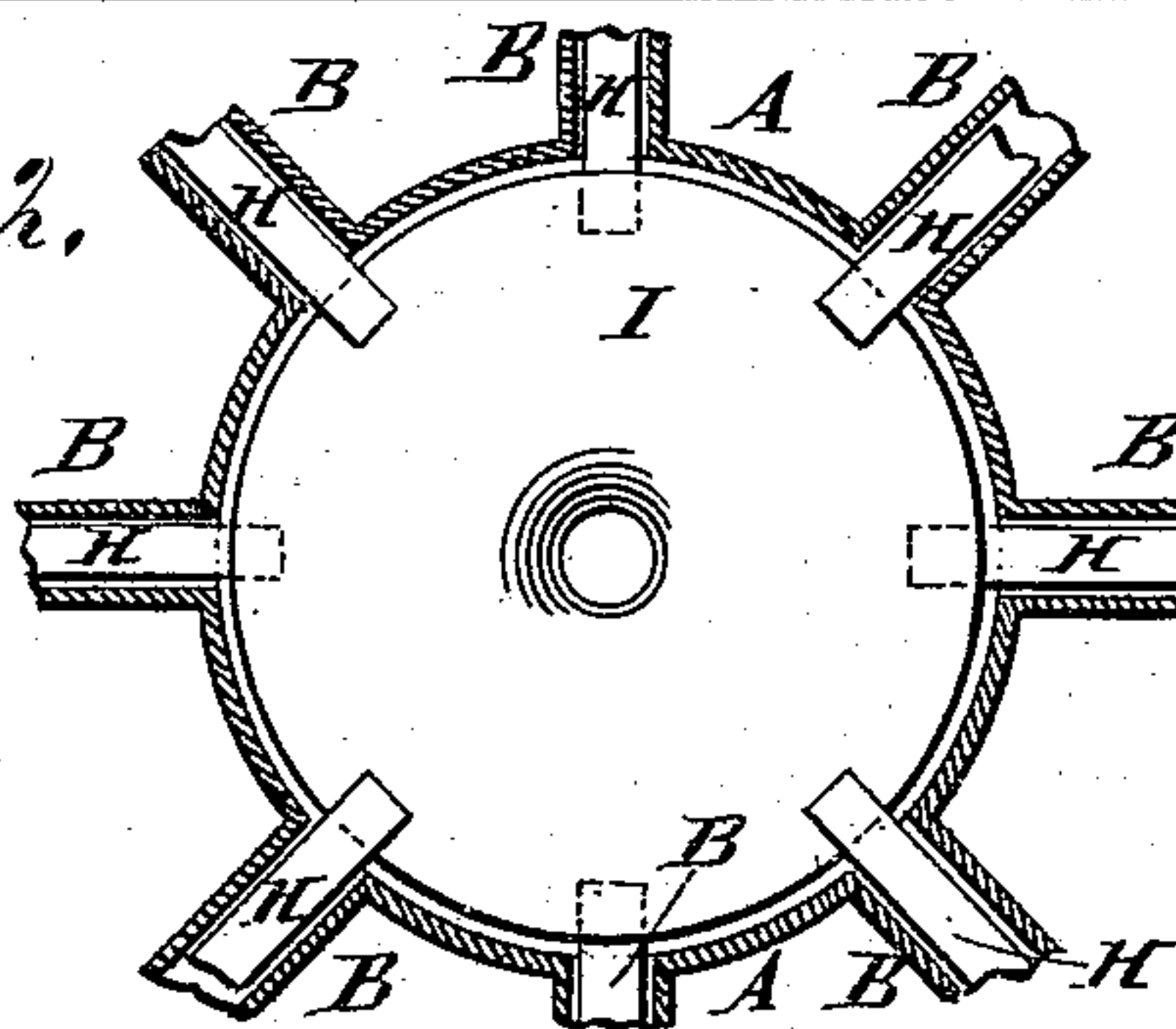
No. 316,144.

Patented Apr. 21, 1885.

*Fig: 1.*



*Fig: 2.*



WITNESSES:

*Chas. Nida.*  
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# UNITED STATES PATENT OFFICE.

SAMUEL P. HEDGES, OF GREENPORT, NEW YORK.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 316,144, dated April 21, 1885.

Application filed January 24, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL P. HEDGES, of Greenport, in the county of Suffolk and State of New York, have invented a new and useful

Improvement in Steam-Boilers, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional side elevation of one of my improved boilers. Fig. 2 is a sectional plan view of the upper middle part of the same, taken through the line *x x*, Fig. 1.

The object of this invention is to improve the construction of the steam-boilers for which Letters Patent No. 301,590 were issued to me July 8, 1884, in such a manner as to prevent the steam from carrying water with it into the steam-pipe, and thus make the said boilers more reliable in operation.

The invention consists in the combination, with the upright cylinder, its outwardly-projecting tubes, and the projecting ends of plates inserted in said tubes, of centrally-perforated and concaved plates whereby the ascending water and steam will be separated and dry superheated steam delivered to the steam-pipe, as will be hereinafter fully described, and then claimed.

A represents a hollow cylinder, provided with a number of projecting tubes, B, the outer ends of which are closed, and their inner ends are screwed or expanded into holes in the said cylinder A. With the lower end of the vertical cylinder A is connected a horizontal cylinder or pipe, C, the end parts of which extend out through the furnace wall or casing D, and rest upon the said wall or casing, or upon saddles connected therewith. From the lower sides of the end parts of the pipe or cylinder C pipes E extend down at the opposite sides of the fire-box F, and are provided with valve-couplings G, with one of which the feed-pipe is connected, and the other will serve as a blow-off for the removal of sediment.

The wall or casing D can be made of two iron shells placed at a little distance apart, as shown in Fig. 1, or of brick-work, as may be desired or convenient.

The tubes B of the vertical and horizontal cylinders A C are designed to be provided

with small interior tubes having projecting ends, as shown and described in Letters Patent No. 301,590, but which are not shown in the present drawings.

The upper part of the cylinder A and the upper tubes, B, serve as a steam-space or superheater, and with the said upper part of the cylinder is designed to be connected a steam-pipe, which is not shown in the drawings.

In the superheating-tubes B are placed plates H, which extend nearly to the closed ends of the said tubes, and the other ends of which project for a short distance into the cylinder A. Into the cylinder A, at each annular row or tier of the tubes B, is fitted a circular plate, I, which is supported upon the projecting ends of the plates H.

The plates I may be riveted or otherwise secured to the plates H to prevent them from being forced upward by the pressure of the steam or boiling water; but I prefer to place the plates I upon the projecting ends of the plates H of every other tube B, and then insert plates H in the remaining tubes B, above the said plates I, so that the projecting ends of the plates H of each tier will be alternately above and below the edge of a plate I, and will thus hold the said plate I securely in place. The plates I have central apertures, and are depressed or concaved upon their upper sides toward the said apertures, or are made cup-shaped, as shown in Fig. 1. With this construction the hot water and steam from the tubes B will rise along the inner surface of the cylinder A until they strike the first plate I, where a portion of the ascending water will be guided by the said plate I into the middle part of the cylinder A, and deflected downward by the shape of the said plate I, and the steam and a portion of the water will enter the lower parts of the tubes B, pass around the ends of the plates H within the said tubes, and will pass through the upper parts of the said tubes B into the cylinder A, where the water by its own gravity will flow over the upper surface of the plate I to its central aperture, and will pass downward through the middle part of the cylinder A. The steam and a small quantity of water will again rise along the inner surface of the cylinder A to the next plate I, where the same operation will be repeated, and so on, the water carried by the steam being separated

by the plates I, and the steam being superheated as it passes through the successive tubes B, so that no water can pass into the steam-pipe with the steam.

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

In a steam-boiler, the combination, with the upright cylinder A, the outwardly-projecting tubes B, and the projecting ends of the plates  
10 H, inserted in the said tubes B, of the centrally-

perforated and concaved plates I, substantially as herein shown and described, whereby the ascending water and steam will be separated and dry superheated steam delivered to the steam-pipe, as set forth.

SAMUEL P. HEDGES.

Witnesses:

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