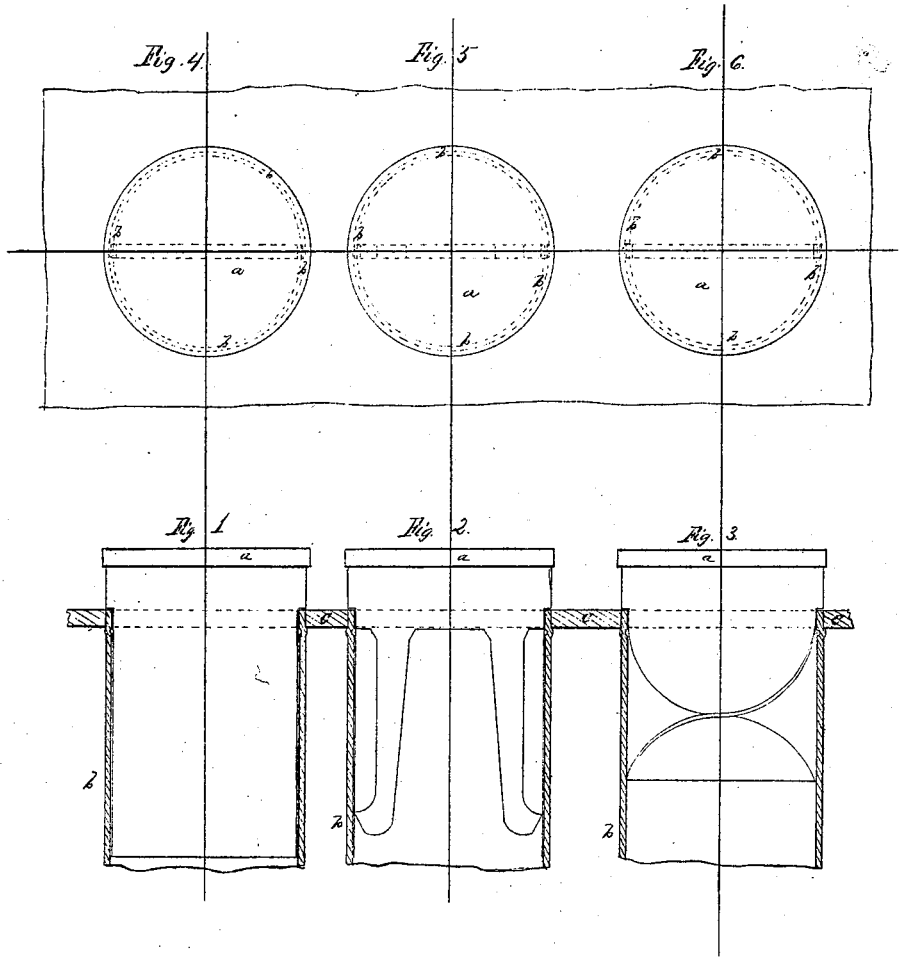
2 Sheets. Sheet 1.

J. M. Hicks.

Boiler Furnace.

No. 113,052. Patented. Mar. 28. 1871.



Witnesses
Treadwell Cleveland
Walter John Cleveland

Inventor:
J. M. Hicks

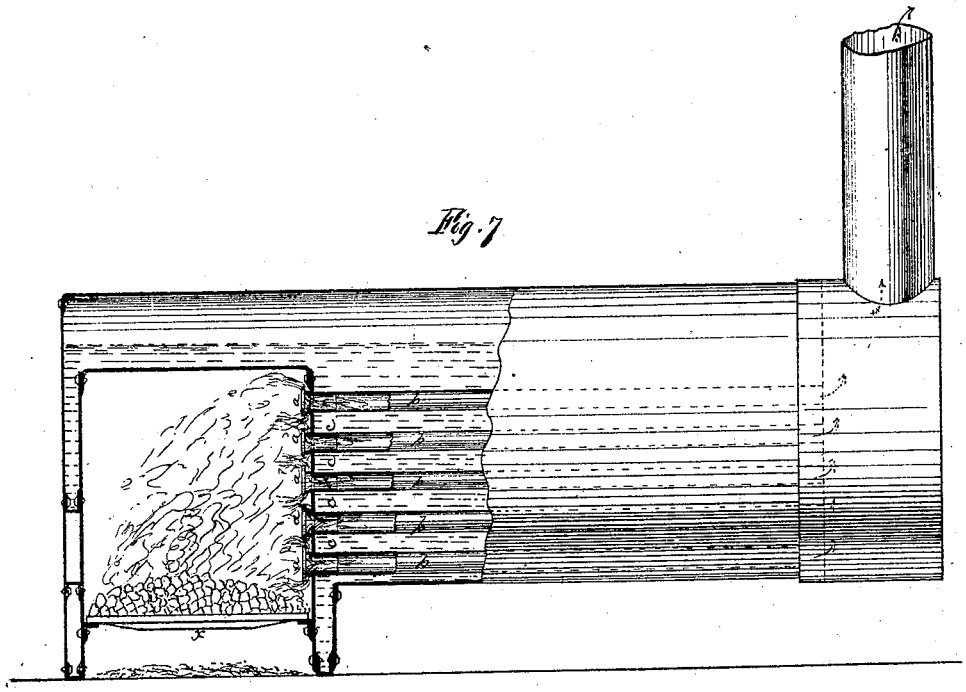
2 Sheets, Sheet 2.

J. M. Hicks,

Boiler Furnace.

No. 113,052. Patented Mar. 28. 1871.

Fig. 7



Witnesses.

Treadwell Cleveland

Walter John Cuddle

Inventor.

J. M. Hicks

UNITED STATES PATENT OFFICE.

JAMES M. HICKS, OF NEW YORK, N. Y.

IMPROVEMENT IN TUBULAR STEAM-GENERATORS.

Specification forming part of Letters Patent No. 113,052, dated March 28, 1871; antedated March 11, 1871.

To all whom it may concern:

Be it known that I, JAMES M. HICKS, of New York city, in the county and State of New York, have invented a new Device for more thoroughly Utilizing the Currents of Heat in Steam-Boilers or in Heaters, of which the following is a full description, reference being had to the accompanying drawings forming part of this specification.

In these drawings, Figures 1, 2, and 3 are views of tubes or flues in the tube-sheet of a steam-boiler, provided with different patterns of my device. Figs. 4, 5, and 6 are, respectively, end views of Figs. 1, 2, and 3.

Although the several drawings are in part different, they represent only different modes of construction.

Fig. 7 represents a sectional view of a fire-box on a locomotive-boiler, showing a tube-sheet and tubes or flues *b b b* in their relation to the rest of the boiler, and the position and operation of my device *a a a* at the front end of each tube or flue.

My device consists of any suitable material or substance fashioned into a shape as or similar to those shown in drawings, Figs. 1, 2, 3, 4, 5, 6, and serves, when placed at the end of a tube or flue, to deflect the current of heated gases from the mouth of the tube and cause it to strike against the tube-sheet. I usually make this deflector to consist of a round (or nearly so) disk of moderate thickness, provided with a tongue or tongues standing about at right angles thereto, which tongues are inserted in the tube, and when in position therein hold the disk opposite the opening of the tube, nearly parallel to the tube-sheet and about at right angles to the axial line of the tube. The distance between the outside edges of the tongues is equal (or nearly so) to the inside diameter of the tubes, the object of the tongue or tongues being to hold the deflecting piece in position, and to conduct into the tube the heat, which might otherwise overheat the deflecting piece.

By increasing the width of the tongue between the end of the tube and the disk a shoulder is formed, which also serves to keep the device in place at the end of the tube. The length of this shoulder and the consequent size of the opening between the end of the tube and the disk can be varied to suit the case, care being taken to have this deflecting piece at a sufficient distance from the end of the tube to allow free passage to the currents, and so as not to obstruct the draft.

This device serves as a deflector to the currents of heated gases seeking an outlet, and causes them to operate as follows: In ordinary boilers or heaters not provided with my deflectors the currents of heated gases pass directly into the openings formed by the tubes, tending strongly to the center of these openings, for the reason that in the centers there is the least resistance offered by friction to the passage of the currents. The tendency of the currents to flow not only directly into the openings, but also into the centers thereof, leaves proportionately unaffected by the direct currents both the spaces of the tube-sheet between the openings made by the tubes and also the circumference of the tubes themselves. These interspaces of the tube-sheet constitute the most available steam-making surfaces, and my deflector brings them into increased and positive action. The currents of heated gases cannot rush into the openings made by the tubes, but are made to pass directly against the spaces of the tube-sheet between the openings formed by the tubes. They then, having impinged against the tube-sheet between the tubes, pass into the tubes.

This deflecting piece can be constructed of any suitable material, and of any shape and convenient size. It need not necessarily be made with a tongue to fit into the tube or flue, as shown in the drawings. It can be constructed so as to be held in place over the mouth of the tube by any suitable fastening, either to the tube itself or to the tube-sheet or fire-sheet. Nor need these deflectors be, of necessity, made separately; without departure from the principle of my invention two or more can be constructed together. These deflecting pieces, however constructed, fastened, or held together, can be used with profit at both ends of the tubes or flues, the deflecting pieces at the ends of the tubes nearer the chimney causing the currents of heated gases in their passage through the tubes to more closely follow

the circumference of the tubes. By the use of these deflectors I save greatly in fuel. Therefore,

What I claim as new and useful, and what I desire to secure by Letters Patent of the United States, is—

The combination, substantially as set forth, of a tube-sheet and a tube of a steam-generator or heater with a deflector arranged in such manner before the tube as to prevent the currents of heat from concentrating toward the center of the tube directly, and to compel them to strike toward the tube-sheet before entering the tube.

JAS. M. HICKS.

Witnesses:
TREADWELL CLEVELAND,
WALTER JOHN CADDLE.