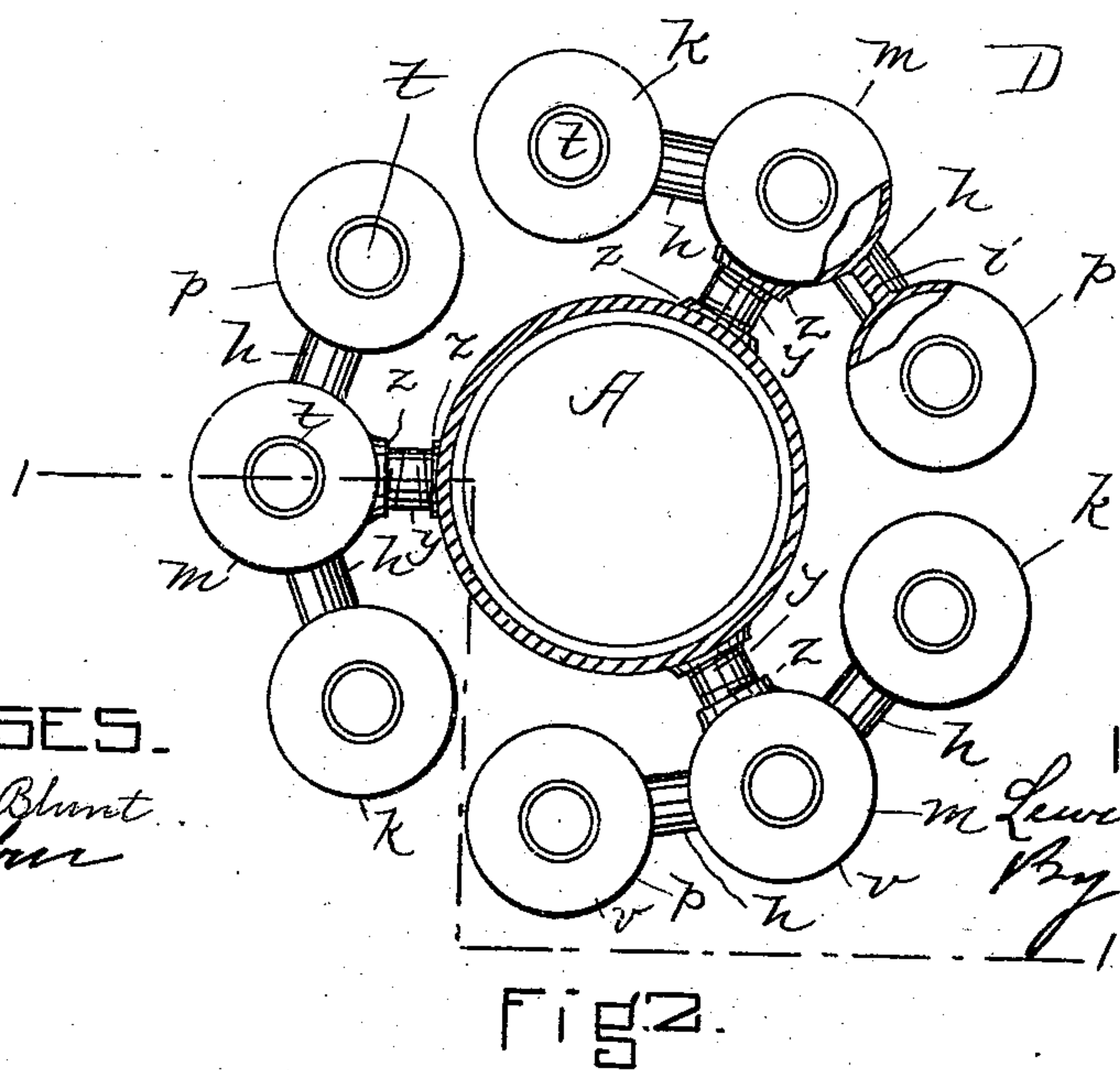
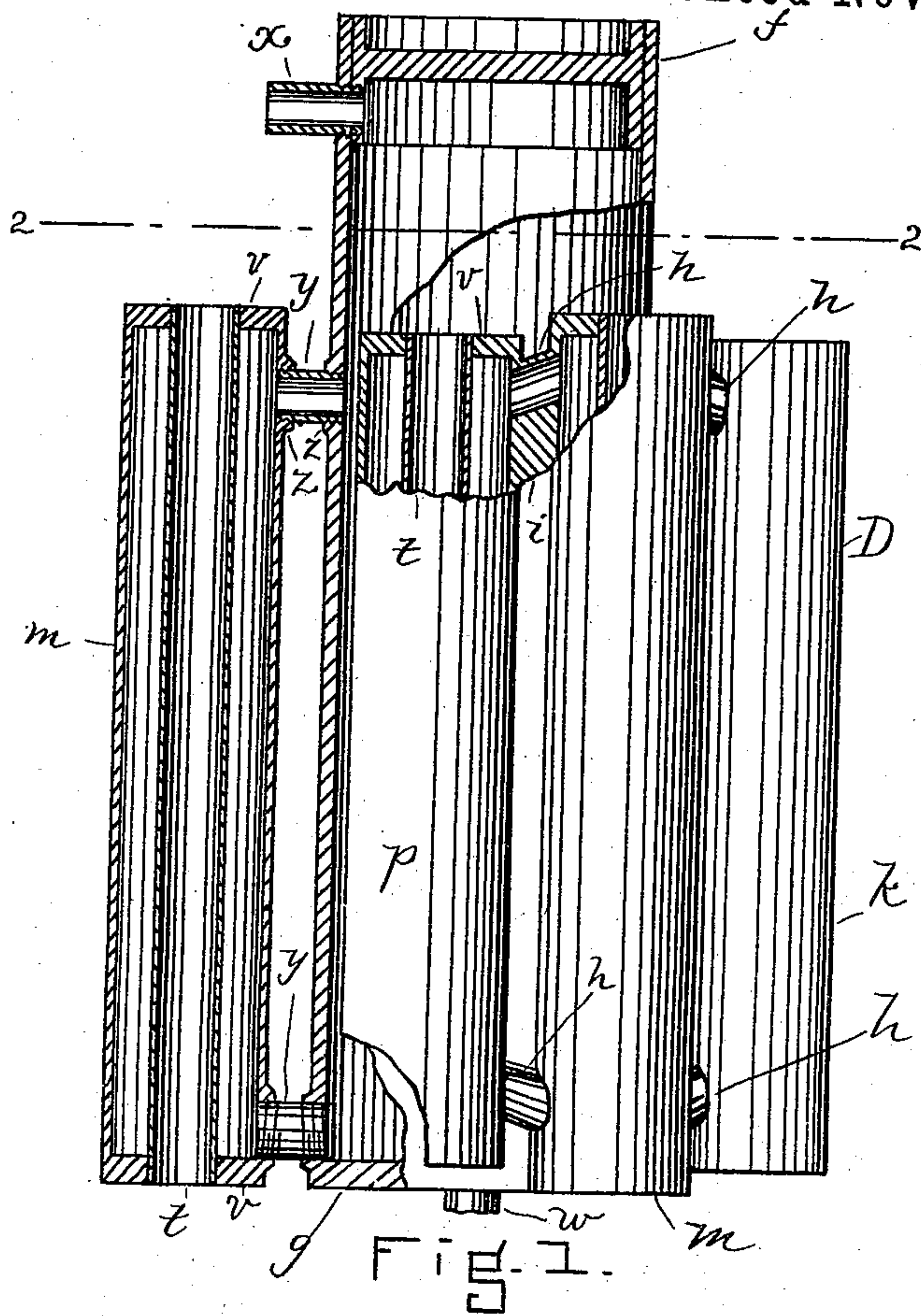


(No Model.)

L. SAUNDERS.
BOILER.

No. 549,689.

Patented Nov. 12, 1895.



WITNESSES.
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UNITED STATES PATENT OFFICE.

LEWIS SAUNDERS, OF LAWRENCE, MASSACHUSETTS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 549,689, dated November 12, 1895.

Application filed October 3, 1895. Serial No. 564,494. (No model.)

To all whom it may concern:

Be it known that I, LEWIS SAUNDERS, of Lawrence, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Boilers, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional elevation of my improved boiler, and Fig. 2 a horizontal section on line 2 2 in Fig. 1.

Like letters of reference indicate corresponding parts in both figures of the drawings.

My invention relates especially to vertical tubular boilers, and is designed as an improvement on the device shown in United States Letters Patent No. 483,000, dated September 20, 1892, and of which I am the assignee, the object being to reduce the cost of construction materially, whereby it may be adaptable for this reason for house-heating. A further purpose is to simplify such construction without reducing the water-space and to produce a device wherein the parts can be assembled with the expenditure of very little labor comparatively.

The nature and operation of the improvement will be readily understood by those conversant with such matters from the following explanation.

In the drawings, A represents the main or central cylinder, the upper end of which may be closed by a sunken head *f*, as in the Letters Patent referred to, the lower end being closed by a flush-head *g*, cast integral therewith. The upper end of this cylinder forms a steam-dome, and the discharge *x* opens under the head *f*. The inlet *w* enters the bottom of this cylinder.

A series of supplemental cylinders D are arranged around the central cylinder. These cylinders are arranged in groups of three cylinders *k m p*, which are cast together and connected by webs *i*. Circulation-ducts *h*, formed in the webs, connect these cylinders and open under their heads *v*, which are cast integral. The central cylinder of each group

is longer than the adjacent cylinders *k p* and the ducts *h* incline, in order to afford perfect circulation and open directly under and over the heads *v*.

The flues *t* are shrunk into the heads *v*. Each cylinder *m* is connected below its heads with the main cylinder A by ducts *y*. These ducts are exteriorly screw-threaded with right and left threads and the cylinders are thickened where the ports are to be tapped to receive these ducts, as shown at *z*.

The heated air and products of combustion pass around the cylinders and through the flues, a large heating-surface being presented. Constant circulation is maintained between the cylinders of each group and with the main cylinder; and the steam in the upper portion of the main cylinder is comparatively dry.

The boiler as thus constructed is exceedingly cheap for its capacity, there being very few parts and these all cast, and the labor of assembling the same being slight.

I do not confine myself to connecting the group of cylinders by a web, but prefer its use, as it strengthens the parts; neither do I confine myself to using three cylinders in each group as two may be employed, if preferred.

Having thus explained my invention, what I claim is—

1. In a tubular boiler a group of two or more cylinders connected by webs and ducts formed in said webs, and provided with heads all being cast integral.

2. In a tubular boiler a main cylinder in combination with a series of supplemental cylinders arranged in groups of two or more, the cylinders of each group being connected by ducts and cast integral and one of said cylinders of each group being connected by ducts with said main cylinder substantially as set forth.

3. In a tubular boiler the grouped cylinders, *k, m, p*, provided with heads, *v*, and connected by webs, *i*, and inclined ducts, *h*, all cast integral in combination with the flues, *t*, shrunk into the heads of said cylinders substantially as described.

LEWIS SAUNDERS.

Witnesses:

O. M. SHAW,
C. M. WILBUR.