

(No Model.)

2 Sheets—Sheet 1.

A. M. DIMMICK & E. Z. SMITH.
STEAM BOILER.

No. 403,878.

Patented May 21 1889.

FIG. 1.

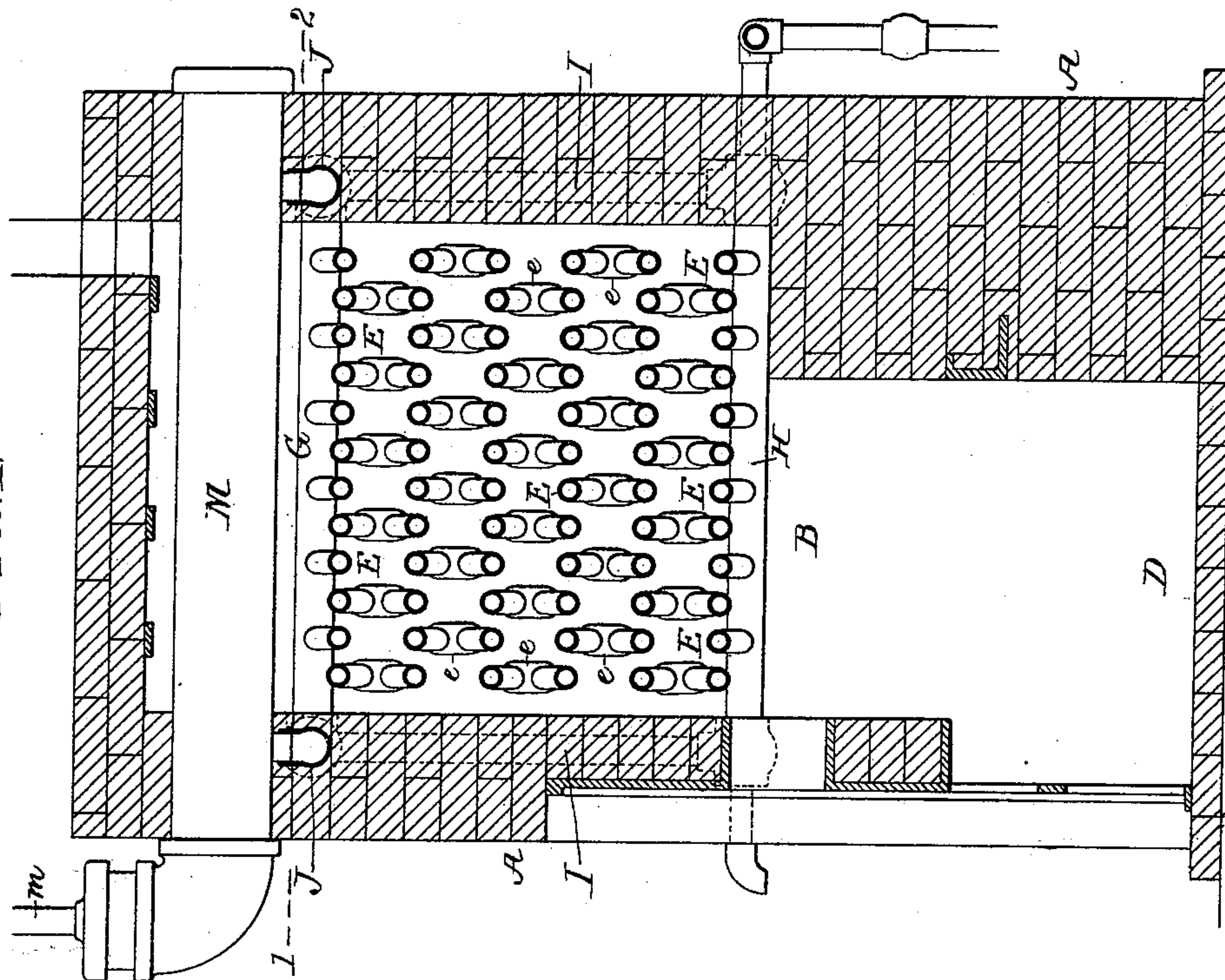
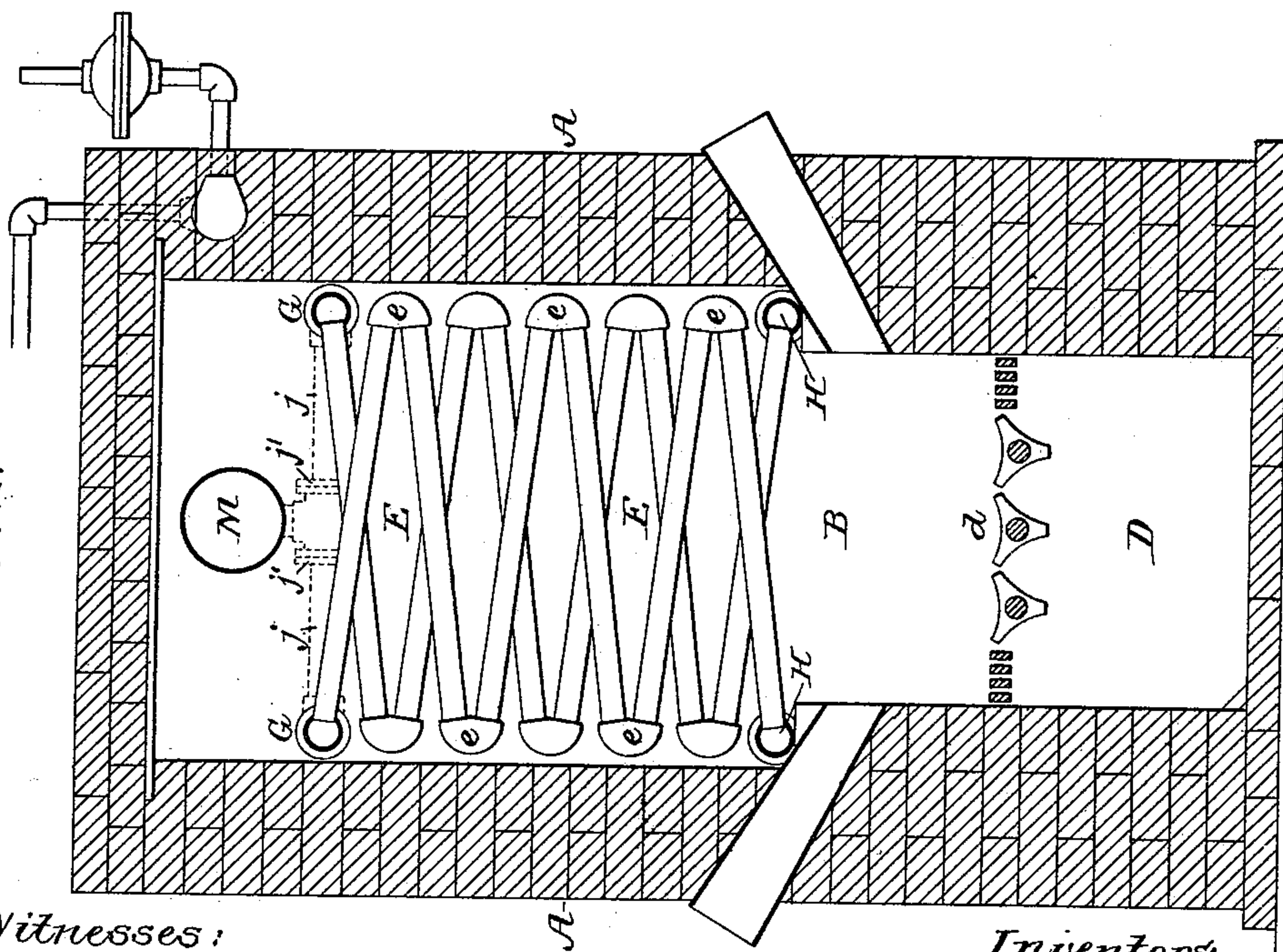


FIG. 2.



Witnesses:
Hamilton D. Turner.
William D. Corner.

Inventors:
Albert M. Dimmick & E. Z. Smith
by their Attorneys
Howson & Howson

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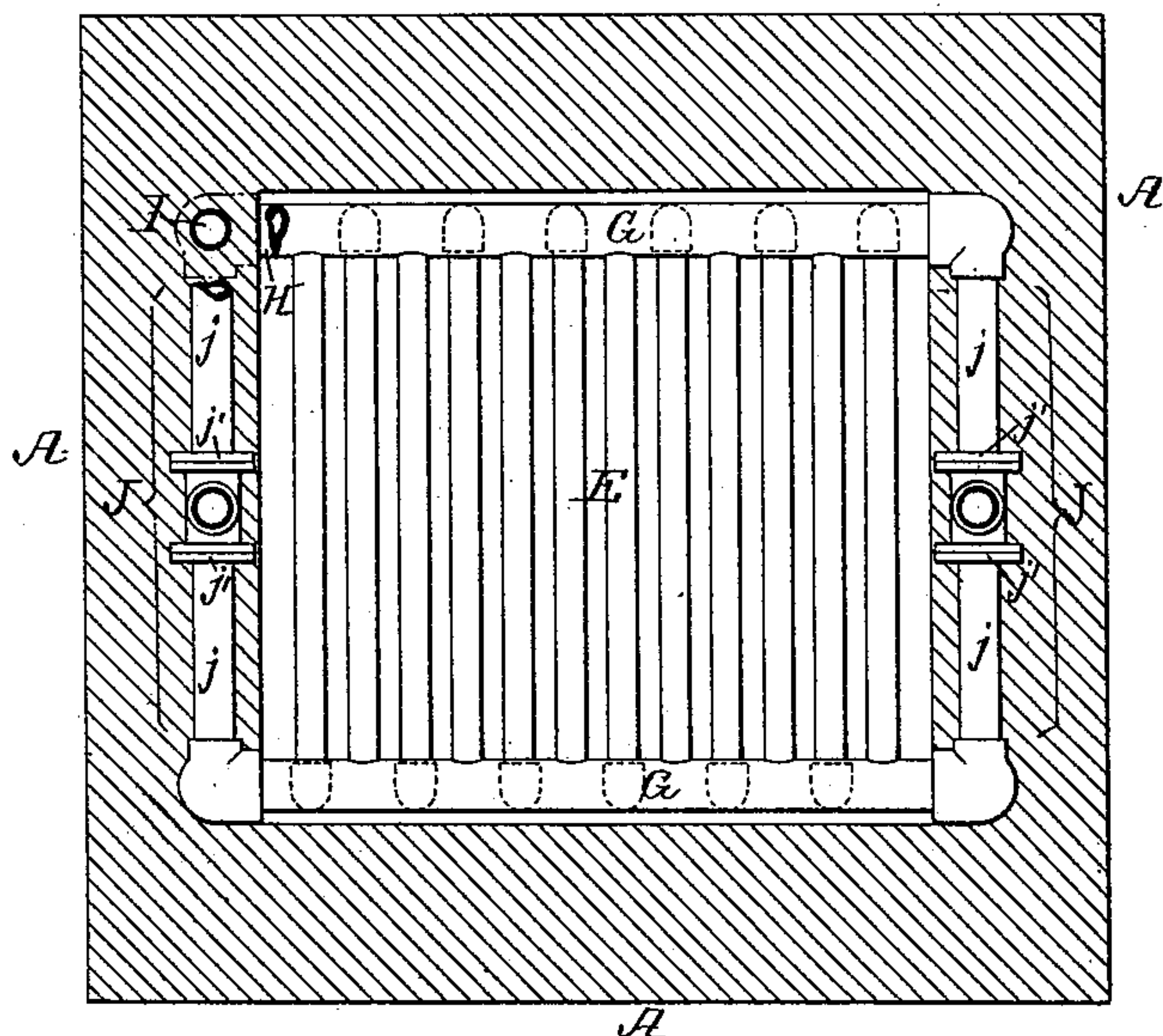


FIG. 3

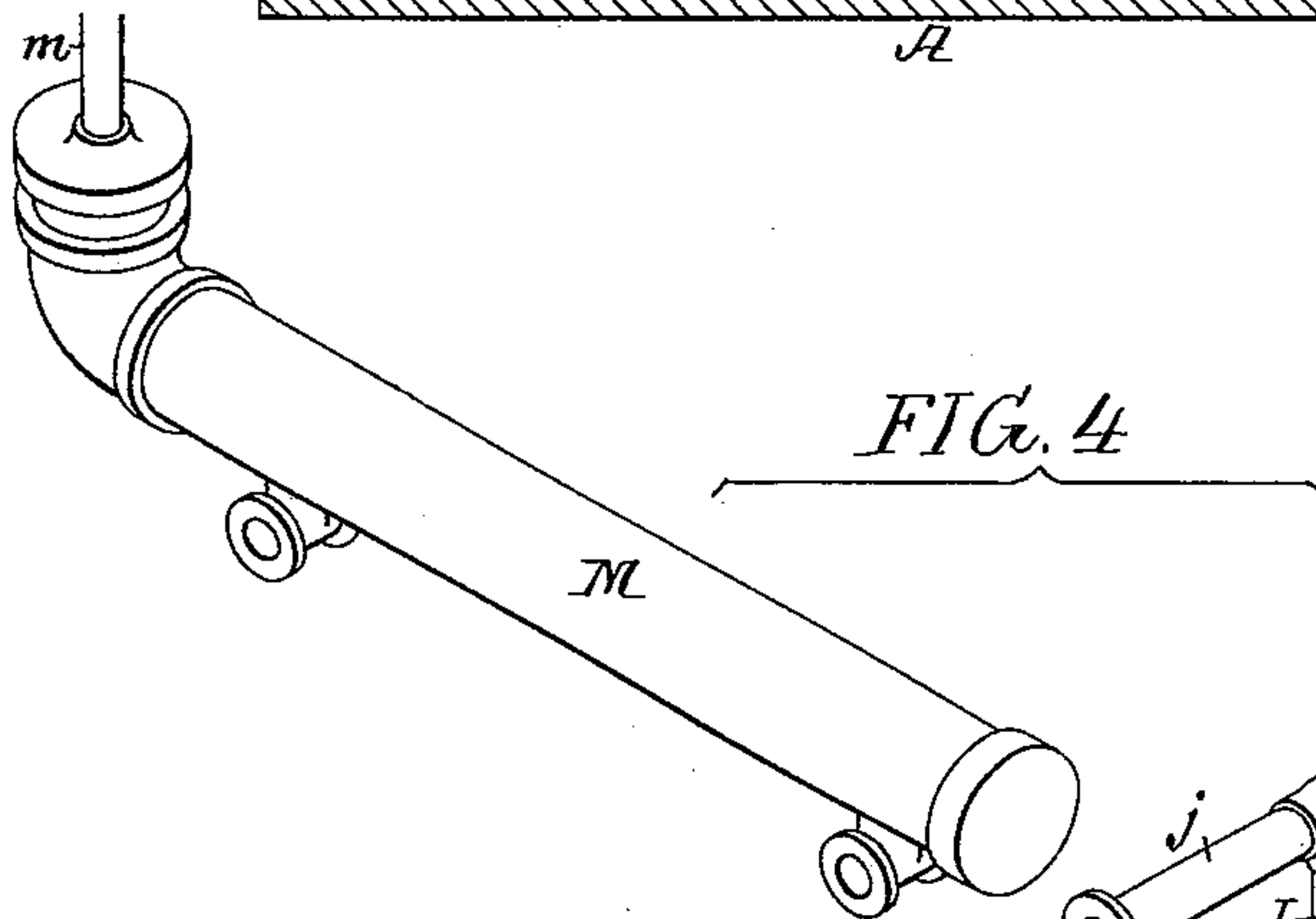
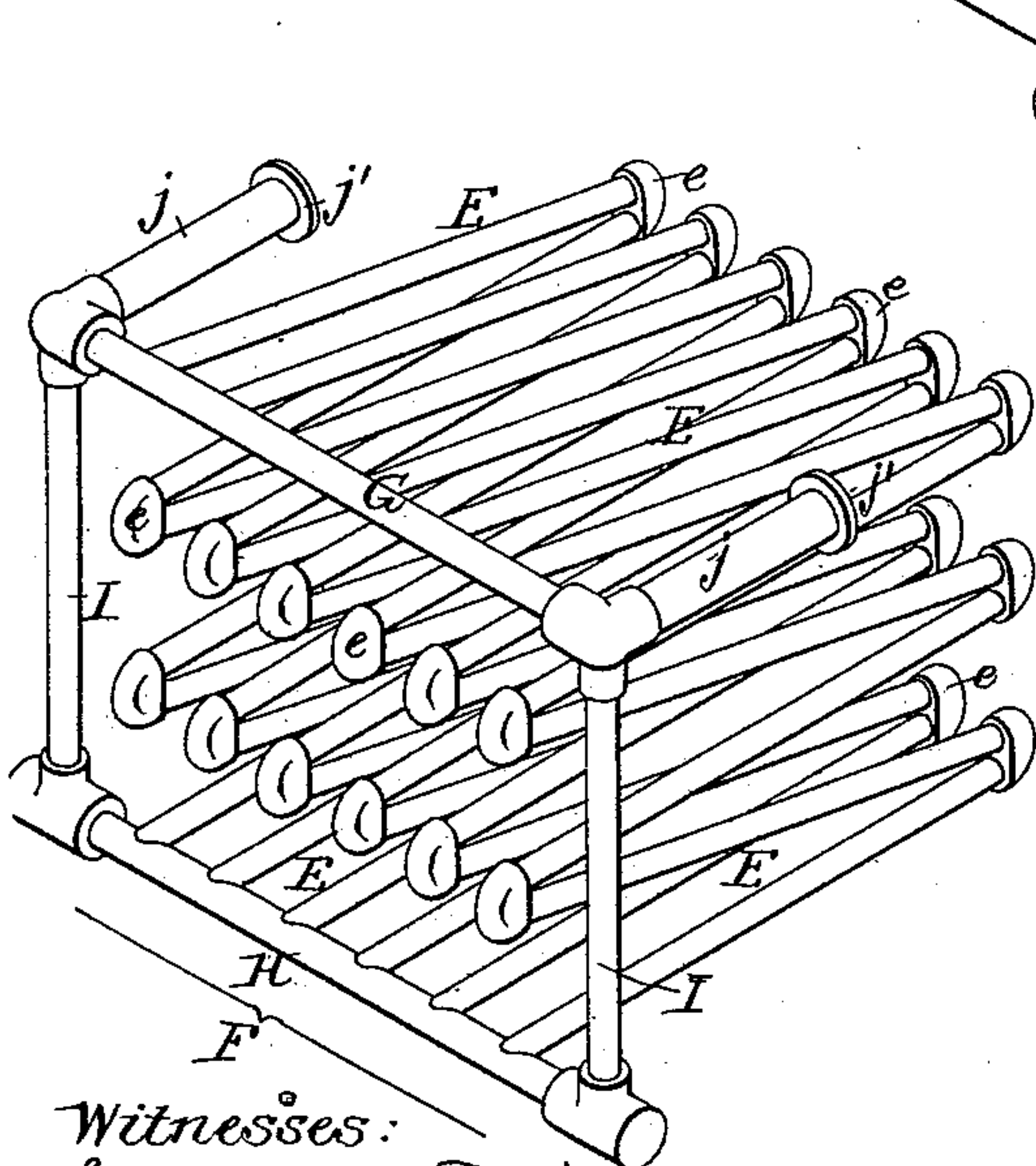
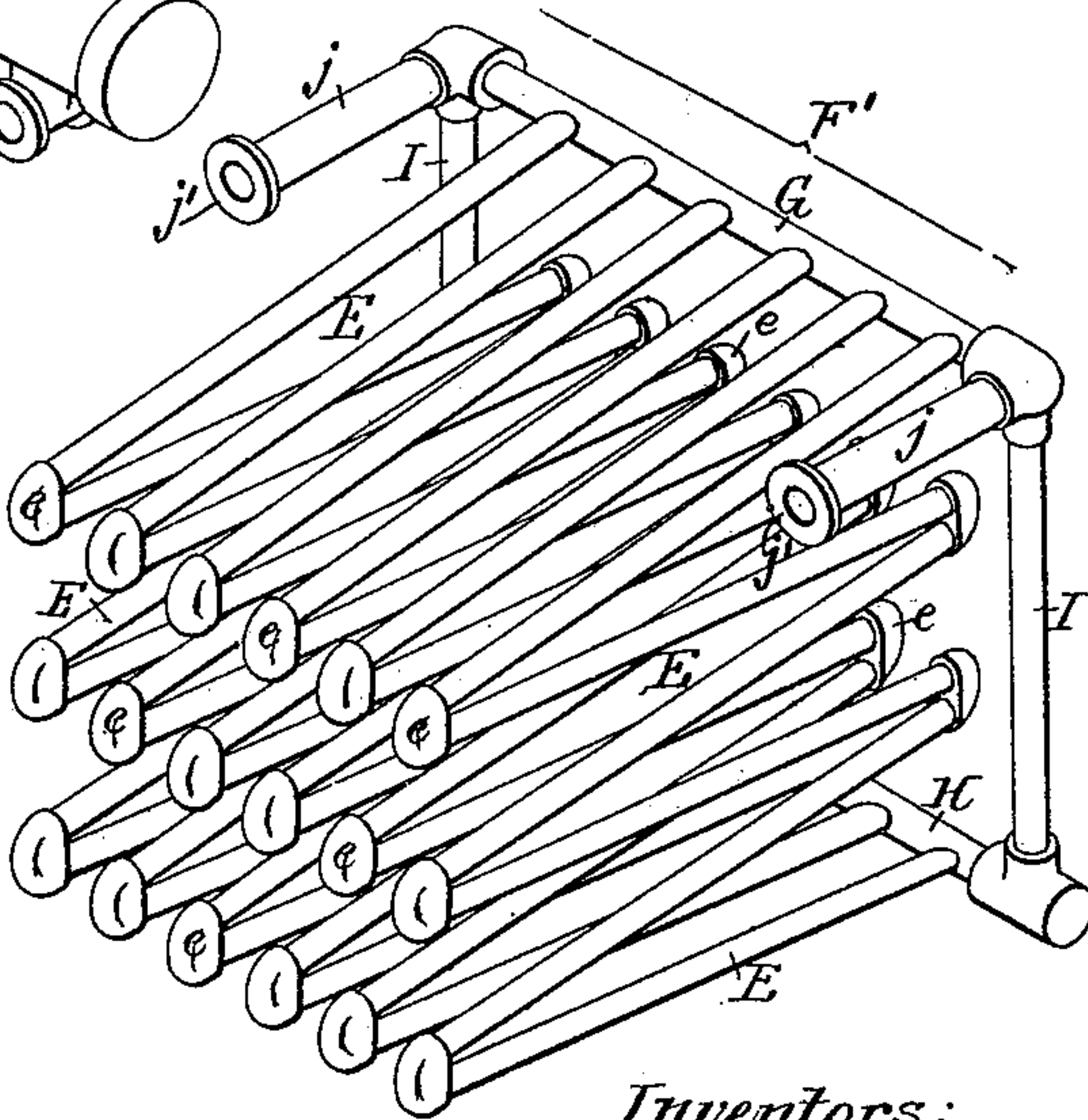


FIG. 4



Witnesses:
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UNITED STATES PATENT OFFICE.

ALBERT MELLVILLE DIMMICK AND ELMER Z. SMITH, OF WILKES-BARRÉ,
PENNSYLVANIA, ASSIGNORS TO F. C. STURGES, TRUSTEE, OF SAME
PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 403,878, dated May 21, 1889.

Application filed November 12, 1888. Serial No. 290,566. (No model.)

To all whom it may concern:

Be it known that we, ALBERT MELLVILLE DIMMICK and ELMER Z. SMITH, both citizens of the United States, and residents of Wilkes-Barré, Luzerne county, Pennsylvania, have invented certain Improvements in Steam-Boilers, of which the following is a specification.

Our invention relates to improvements in the construction of the steam-boiler for which we obtained Letters Patent of the United States No. 389,642, dated September 18, 1888.

One object of our invention is to so construct the parts of the boiler that the shipment and setting up of the same can be accomplished in an economical manner; and a further object is to so form and locate the circulating-tubes that any water that may be forced up in the same by the generation of steam in the lower coils will drop to the bottom again, as fully described hereinafter, reference being had to the accompanying drawings, in which.

Figure 1 is a longitudinal section of our improved steam-boiler set in brick-work, the grate and feed chutes being omitted. Fig. 2 is a transverse section of the same. Fig. 3 is a sectional plan view on the line 1 2, Fig. 1; and Fig. 4 is a detached perspective view of the parts composing the boiler.

A is the usual brick-work of the furnace; B, the combustion-chamber; D, the ash-pit; *d*, the grate, and *d'* feed-chutes passing through the opposite side walls of the fire-place.

The boiler is composed of a series of zigzag tubes E, connected together by return-bends *e*, these tubes being in series, extending the full depth of the furnace. In the present instance there are two sets of these zigzag tubes—one set attached to the quadrangular frame F, and the other set to a quadrangular frame F'. Each quadrangular frame is composed of parallel pipes G and H—one at the top and the other at the bottom—and vertical pipes I I—one at each side—and the upper ends of the zigzag pipes E are attached to the horizontal pipe G, while the lower ends of the zigzag pipes are attached to the pipe H. At the junction of the pipes G and I are short sec-

tions of pipe *j*, having at their ends flanges, *j'*, which are bolted to the flanged T-couplings depending from the large steam-drum M, which has an upturned end, from which extends a steam-pipe, *m*, provided with a suitable cut-off valve. It will thus be seen that while the pipes H act as mud-drums the pipes G and *j* act as steam-supply pipes for the steam-drum M, and the vertical pipes I I connect these steam-pipes G with the mud-drum H, so that any water that may be forced into the pipes G, owing to generation of steam in the lower pipes of the zigzag sections, will naturally descend the side pipes, I I, and enter the mud-drum, the pipes I I, as shown in Figs. 1 and 3, being built into the wall, and consequently protected from exposure to the heat of the furnace, so that no steam is generated therein. The circulation of the water is thus insured, and water that would otherwise be forced up into the steam-drum will be carried off before it reaches the drum, and consequently nothing but steam can enter said drum, and the steam produced is comparatively dry.

It will be noticed on referring to Figs. 1 and 4 that the zigzag pipes of one series alternate with those of the other series, and the zigzag pipes are attached to their frames F F' prior to shipment, so that practically all the work of constructing the boiler is finished before it leaves the shop, all that has to be done at the place of erection being the setting-up of the boiler in proper position, the securing of the flanges of the sections *j* to the flanges of the T-branches of the steam-drum, and the connection of the water-inlet pipe to one of the mud-drums H, and the usual cocks to each of said mud-drums. The other attachments—such as the steam-gages and damper-regulators—are secured to the boiler in the usual manner.

We claim as our invention—

1. The combination, in a steam-boiler, of the two quadrangular frames, each having a series of zigzag steam-generating tubes, and flanged connecting-pipes with a steam-drum having flanged T-branches secured to the flanges of the said connecting-pipes, the whole

forming a steam-generating structure, substantially as described.

2. The combination, in a steam-boiler, of the quadrangular frames, each having a series of zigzag pipes connected thereto, the lower longitudinal pipe forming a mud-drum, the upper longitudinal pipe forming a steam communication with the steam-drum, and the vertical pipes built in the walls of the furnace and acting as return-tubes for water that may gain access to the steam-pipes, substantially as described.

3. The combination, in a steam-boiler, of the quadrangular frame composed of the mud-drum, upper steam-pipes, and return-tubes, with a series of zigzag pipes, each set communicating at the bottom with the mud-drum and at the top with the steam-pipe, and a

steam-drum connected to said pipe, substantially as described.

4. The combination, in a boiler, of the two quadrangular frames, each composed of horizontal and vertical pipes, with a series of zigzag pipes, each set communicating at the bottom with one of said horizontal pipes and at the top with the other horizontal pipe, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ALBERT MELVILLE DIMMICK.
ELMER Z. SMITH.

Witnesses:

GEO. A. WELLS,
D. A. FEE, Jr.