

(No Model.)

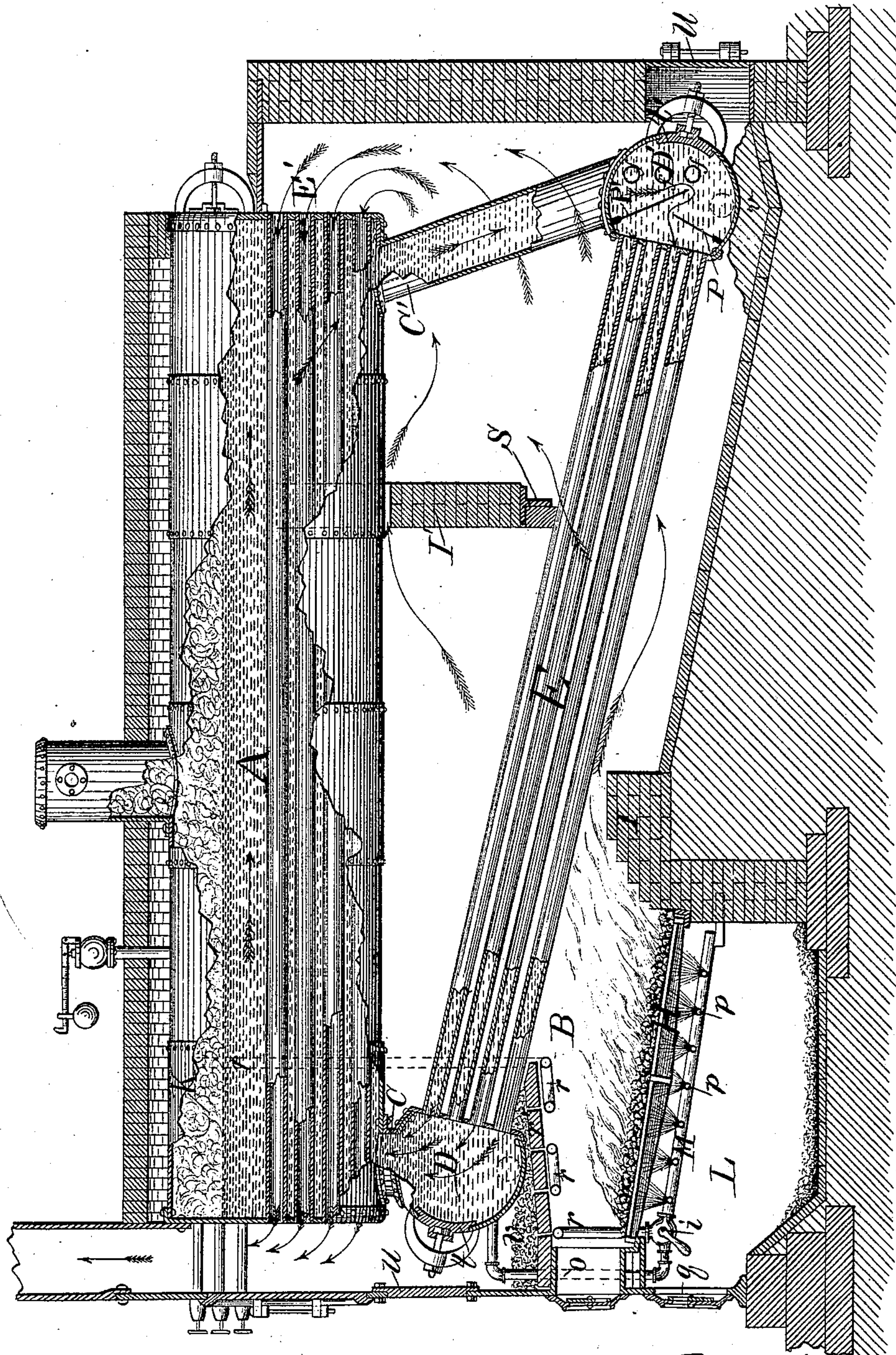
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T. E. THOMPSON.
STEAM GENERATOR.

No. 291,959.

Patented Jan. 15, 1884.

Fig. 1.



Witnesses:

Chas. C. Gaylord.
Edu. M. Caffrey.

Inventor:

Thos. E. Thompson
By R. C. Dyrenforth,
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(No Model.)

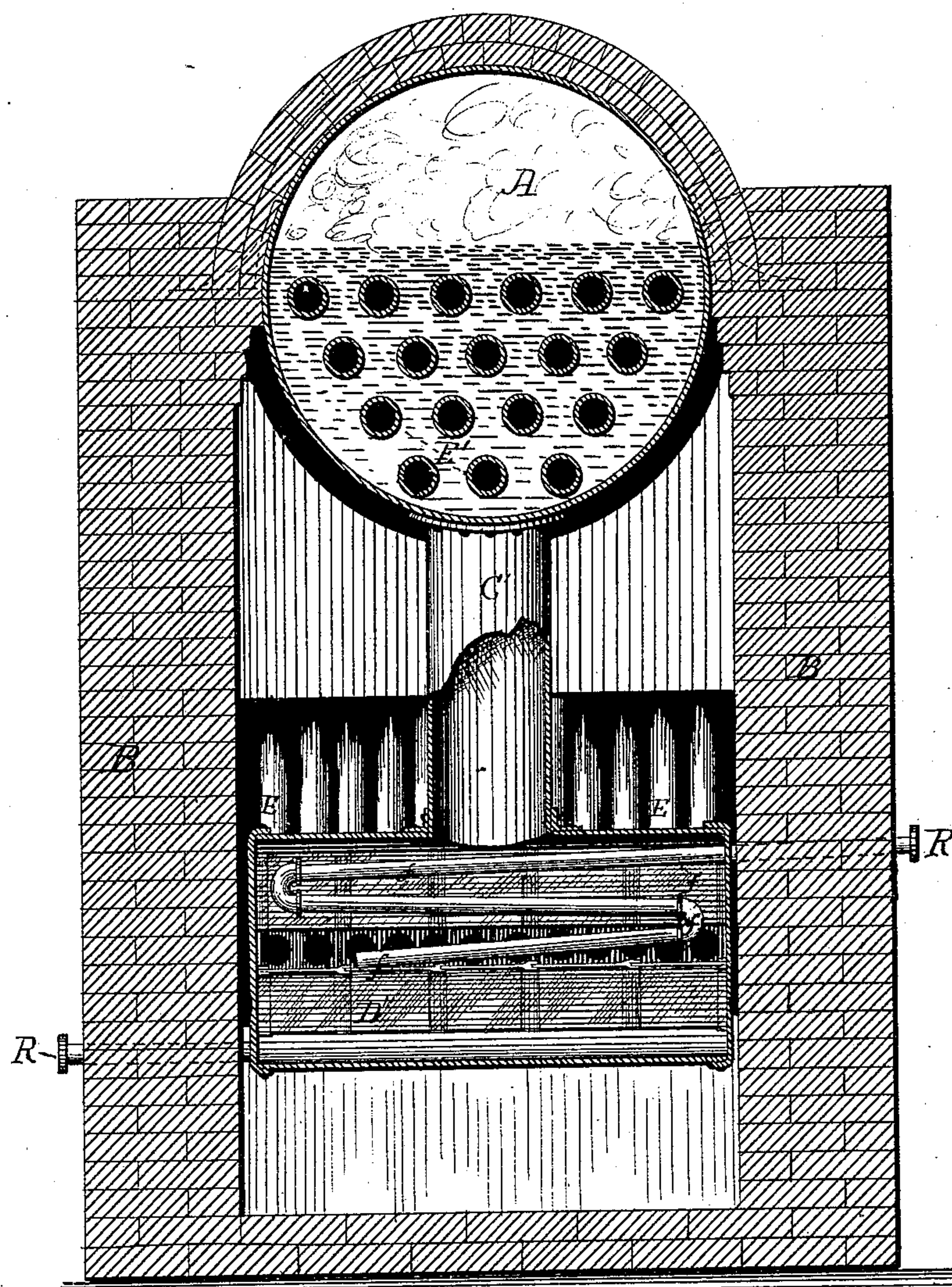
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STEAM GENERATOR.

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Fig. 2.



Witnesses:

Chas. C. Gaylord.

Edward W. Caffrey.

Inventor:

Thomas E. Thompson
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UNITED STATES PATENT OFFICE.

THOMAS E. THOMPSON, OF CHICAGO, ILLINOIS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 291,959, dated January 15, 1884.

Application filed March 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. THOMPSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Generators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain novel combinations and arrangements of devices, whereby the steam-generating power of a boiler is enhanced and incrustation prevented by a circulation of the water through heated tubes and by passing the feed-water through pipes inside the boiler, so that the temperature may be raised to the same degree as that of the water in the boiler before it is discharged, when almost all the solids contained in water will be precipitated by gravity to the bottom of the mud-drum, and by means of partitions in the mud-drum the sediment is prevented from being drawn by the circulation of the water into the water-tubes. I seek to accomplish these ends without any radical departure from established principles and methods of boiler construction.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of a furnace and tubular boiler provided with my improvements, certain portion of the boiler and other parts being broken away to show the internal construction; and Fig. 2, a vertical section taken through the lower mud-drum and the adjacent end of the boiler.

A is a tubular boiler of ordinary form, mounted in a furnace, B. At the front and rear ends of the boiler are short and long stand-pipes C and C', connected to mud-drums D and D', having flat sides facing each other. Into the flat sides of these mud-drums are expanded the diagonal inclined water-tubes E, which extend across the furnace B, and which connect the water-spaces of the mud-drums D and D', and likewise the water-space of the front and rear ends of the boiler A. The mud-drums D and D' are suspended from the boiler A, and underneath each of them is placed a filling, *v*, of earth, sand, or other loose substance, in order to prevent the draft from passing around them, but so that they are free to vibrate when affected by expansion or con-

traction. The mud-drums D and D' are provided with man-holes *t t'*, *t* being in one mud-drum and opposite certain of the interior water-tubes E, and the other man-hole, *t'*, being in the mud-drum D' and opposite the remaining portion of the interior water-tubes E, so that in case of repairs, if it should become necessary to remove one of the water-tubes E, the interior tubes can be removed through the man-holes *t t'*. The exterior tubes E can be drawn out outside of the mud-drums D and D'. Opposite the man-holes *t* and *t'* are doors, so as to permit access to them. In the mud-drum D', I place the inclined pipes *f f f*, which form a continuation of the feed-water pipe R through the mud-drum, the object of these pipes being to pass the feed-water through them, causing it to be raised in temperature to as nearly as possible the same temperature as the water in the boiler before it is allowed to mingle with the latter, when the temperature will be sufficient in most cases to precipitate all solids contained in water, which solids, being of a greater specific gravity than water, will settle to the bottom. The feed-water pipes form one continuous downward passage for the water and sediment to the end, and are formed in sections, so that they can easily be removed to be cleansed of the scale that may form in them. If desired, a pipe, *f*, may pass through the boiler and down the stand-pipe C.

In order that none of the sediment can be drawn up the water-tubes E, I put in partitions P P', and in order that we may be enabled at any time to get at the water-tubes E for any purpose, the partitions P P' should be put in in section, so that they can readily be removed.

At the rear of the grate-bars H is the bridge-wall I, below the tubes E, and still farther back is a second bridge-wall, I', mounted upon a T-beam, S, (or it may be arched over the tubes E,) the bridge-wall I extending across the furnace and nearly to the bottom surface of the boiler, in order to deflect most of the draft down upon the tubes E on its way to the fire-tubes E' in the boiler A. As a result of the above construction, as the steam is generated it ascends the inclined tubes E, and consequently forms a continuous motion and circuit of the water through the water-tubes E, mud-drums D and D', stand-pipes C and C',

and boiler A. In connection with the foregoing I use a device for superheating and injecting steam, for the purpose of accelerating combustion, a description of which is as follows:

From the steam-space K a pipe, *r*, leads into the fire-chamber immediately under the arch *r'*, and is thence continued back and forth, as shown, and then passed down below the grate-bars to a three-way cock, *i*, at the side of the ash-pit L, accessible through the ash-pit door *q*. From another opening in the three-way cock a pipe, M, extends across the ash-pit from front to rear, and from this pipe extend numerous small pipes, *p*, perforated in their upper surfaces. From another opening in the three-way cock a pipe, O, leads to the water-space of the mud-drum D, the openings in the three-way cock being such that when the handle is turned in one way a connection is made between the superheating-pipes *r* and the perforated pipes *p*, and when the handle is turned another way, so as to shut off the connection between the pipes *r* and *p*, a connection is made between the water-pipe O and the superheating-pipe *r*, so that the pipe *r* will fill with water and be prevented from burning out.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the furnace B and tubular boiler A, the stand-pipes C and C', mud-drums D and D', water-tubes E, feed-water pipes R *ff*, and partitions P P', the whole being constructed and arranged to operate substantially as described.

2. In combination with the tubular boiler A and furnace B, provided with the bridge-walls I and I' and doors *u u'*, the stand-pipes C and C', mud-drums D and D', having man-holes *t t'*, and tubes E, the whole being constructed and arranged to operate substantially as described.

3. The combination of the tubular boiler A, furnace B, stand-pipes C and C', mud-drums D and D', tubes E, pipes *r*, O, and M, three-way cock *i*, and perforated branch pipes *p*, the whole being constructed and arranged to operate substantially as described.

THOMAS E. THOMPSON.

In presence of—

WM. H. DYRENFORTH,
EDWARD McCaffrey.