

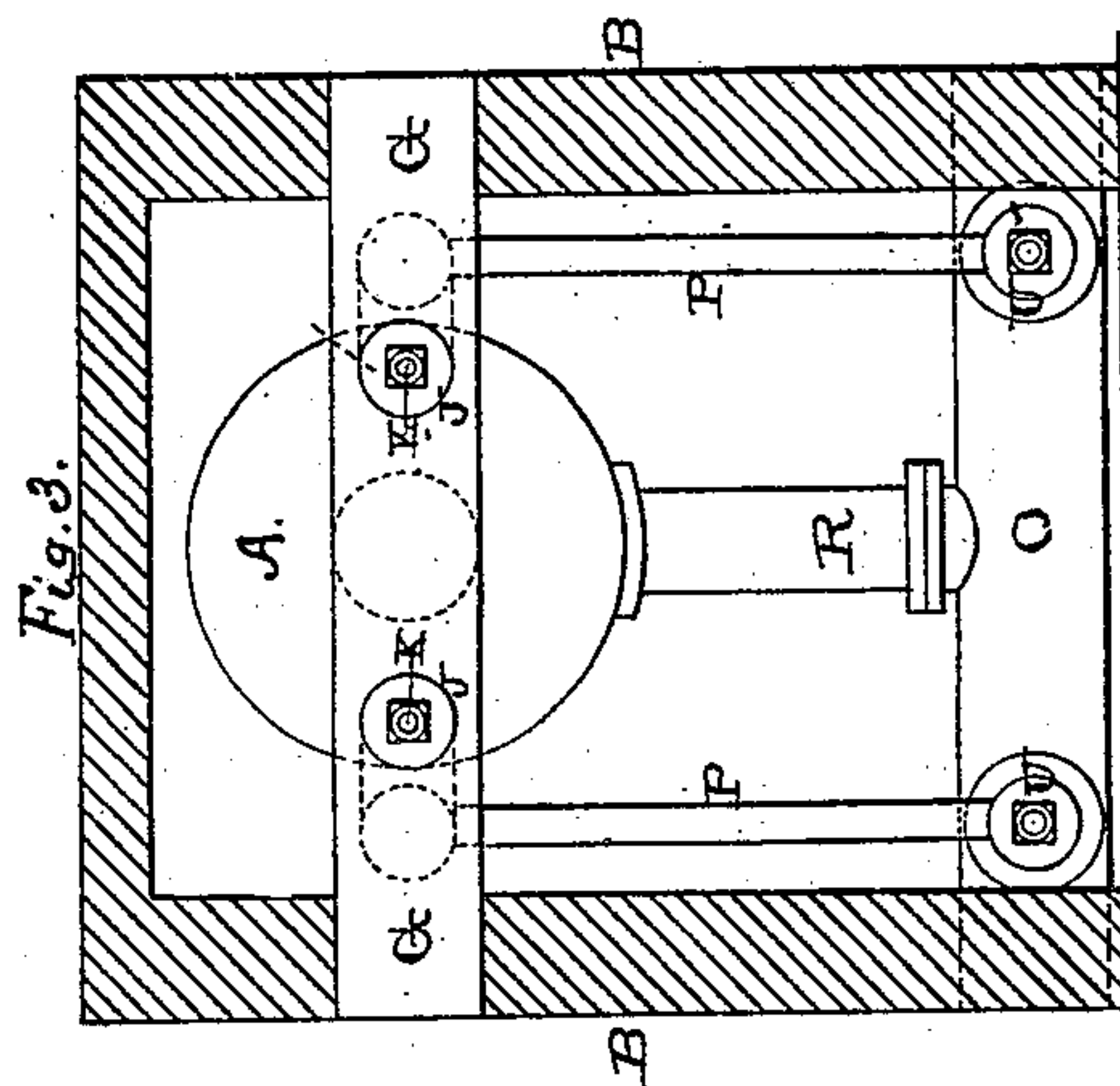
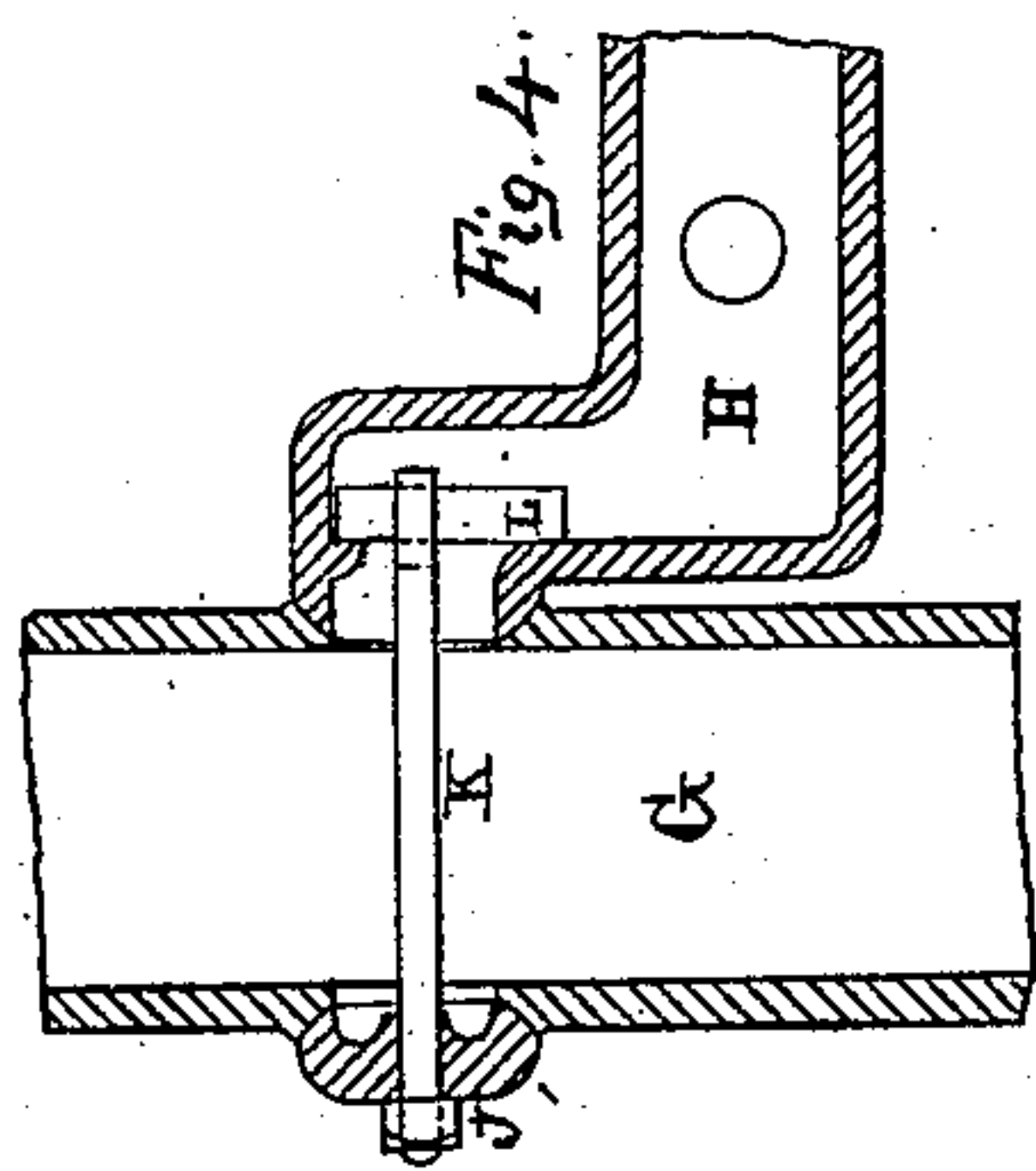
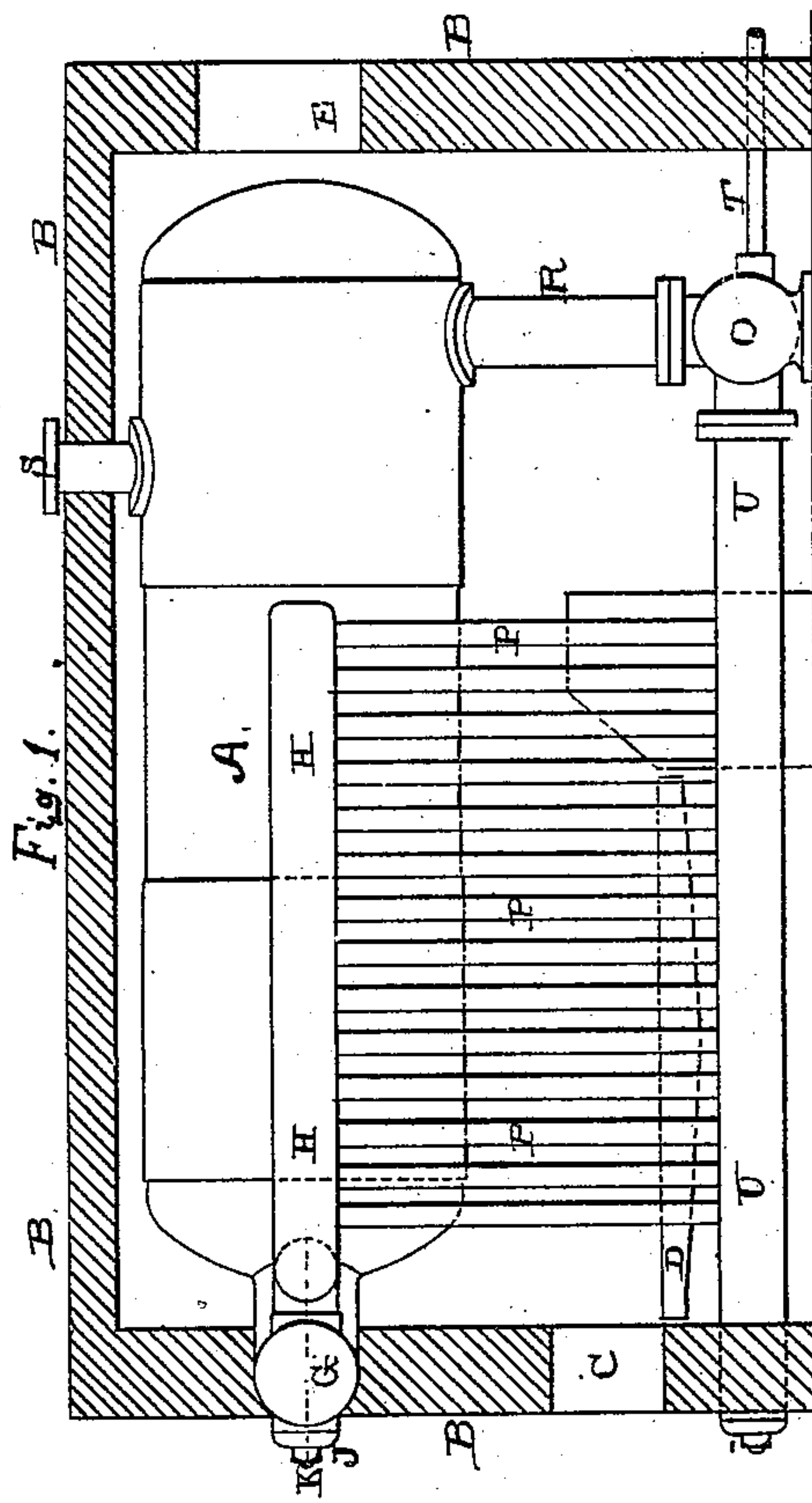
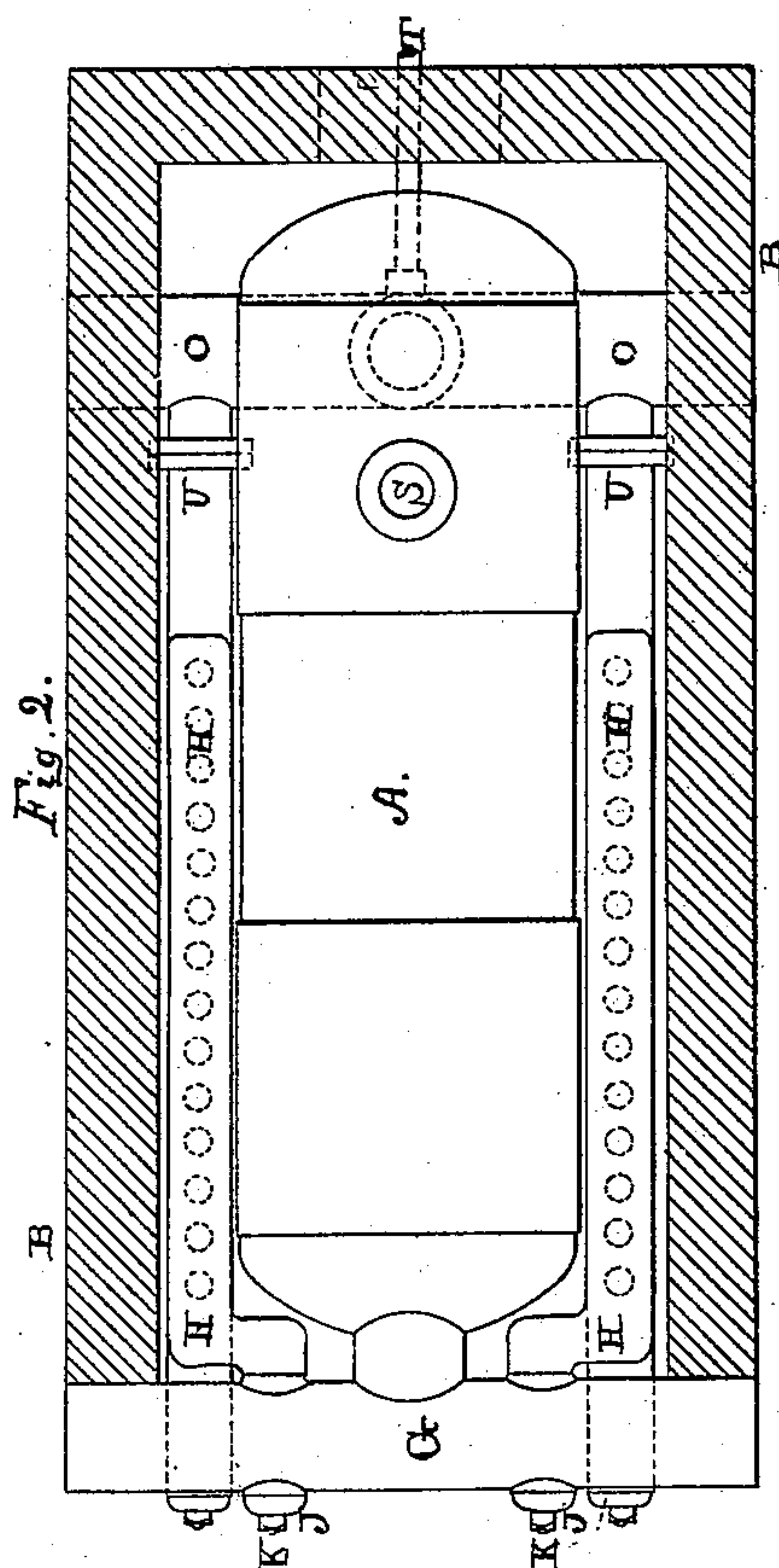
(No Model.)

H. H. SUPLEE.

STEAM BOILER.

No. 271,541.

Patented Jan. 30, 1883.



Witnesses:

James F. Gardner
E. D. York

Inventor:

Henry H. Suplee
per
R. B. Chamberlin, atty.

UNITED STATES PATENT OFFICE.

HENRY H. SUPLEE, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 271,541, dated January 30, 1883.

Application filed November 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. SUPLEE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an improvement in steam-boilers; and it consists in the combination of the boiler with the upper pipes, which extend along opposite sides of the boiler, corresponding lower pipes, and suitable water tubes or pipes which connect these upper and lower pipes together, and a return-pipe which extends from the bottom of the boiler and connects with the mud-drum.

It still further consists in the combination of the upper pipes, which extend along upon opposite sides of the boiler, corresponding lower pipes, and the intermediate connecting-tubes, the upper pipes being connected with the front of the boiler and the lower pipes being connected with the rear end of the boiler, as will be more fully described hereinafter.

The object of my invention is to increase the efficiency and economy of steam-boilers by providing an additional heating-surface so connected to the main boiler as to improve the circulation, and at the same time provide additional capacity for the generation of steam.

Figure 1 is the side elevation of a boiler embodying my improvement, with the side of the casing removed. Fig. 2 is a plan view of the same with the top of the casing removed. Fig. 3 is a front view of the boiler with the casing removed. Fig. 4 is a detailed view.

A represents the boiler, which may be of any desired shape, size, length, or construction which may be preferred, and which is inclosed in a suitable casing, B, which has an opening, C, through its front end, through which to feed the fire upon the grate-bars D, and an opening, E, through its rear end for the escape of the products of combustion.

Connected to the front end of the boiler is the cross pipe or main G, which is here shown as being made the same length as the width of the inclosing-case of the boiler, but this main can be made of any length or size that may be preferred.

Placed upon opposite sides of the boiler are horizontal pipes H, which have their front ends turned at an angle, as shown, and which are then connected to the main by means of a clamping-rod or any other similar devices that may be preferred. As here shown, inside of the end of each horizontal pipe is placed a cross-bar, L, to which the clamping rod or bar K is connected in any suitable manner. This rod extends through the cap or cover J, which closes the opening made in the front part of the main and has a nut applied to its outer end, as shown. When this nut is turned tightly into place the front end of the horizontal pipe and the cap or cover are drawn rigidly against the main. Any suitable means may be resorted to for fastening these parts together, and I do not therefore limit my invention to the precise construction that is here shown.

Extending parallel with the boiler or below the level of the grate-bars are two horizontal pipes, U, which have their front ends supported in the casing and have their rear ends connected with the mud-drum O. These lower pipes need not necessarily be placed so near the bottom of the inclosing frame or casing, and need not have their front ends supported by the casing itself. As is here shown, the ends are made to project through the casing and are supplied with suitable caps or covers, so that they can be cleaned out at any time. Connecting these lower horizontal pipes and the upper horizontal pipes are a series of smaller pipes or water-tubes, P, which are kept filled with water, and which pipes, being in direct contact with the fire upon each side of the furnace, adds very greatly to the steam-producing capacity of the boiler. The rear end of the boiler has the return-pipe R connected to it, and the lower end of this pipe is connected with the mud-drum, as shown in Figs. 1 and 3. The steam passes out through the steam-pipe S, while the feed-water passes through the pipe T into the mud-drum. The intense heat applied to the vertical water-tubes causes them to expand, and as they expand they force the upper horizontal pipes upward. If these upper horizontal pipes were connected rigidly to the main, the expansion and contraction would soon either break the horizontal pipes or tear them loose from their fastening with the main. In order to prevent this the front end of the horizontal

pipes are bent, as shown in Figs. 2 and 4, and united to the main by joints of such a construction as to allow the horizontal pipes to move as upon a pivot. The bends of the front ends of the horizontal pipes act as crank or lever arms, and convert the vertical motion given the pipes into an axial motion around the center of the clamping-bolt K. These upper horizontal pipes, being connected to the main at their front ends only, are free to expand in the direction of their length. The lower horizontal pipes, being fastened at their rear ends only, are also free to expand in the direction of their length. When the boiler is in operation the downward current passes through the return-pipe, forward through the lower horizontal pipes, up through the water-tubes into the upper horizontal pipes, and from these pipes into the main, and then back into the boiler again.

Having thus described my invention, I claim—

1. The combination of the boiler having the

main attached to one end, the upper and lower horizontal pipes, and the connecting water-tubes, the front end of the upper pipes being bent and connected to the main in such a manner that these upper pipes can be moved vertically by the water-tubes as they expand and contract, substantially as described.

2. The combination of the boiler, the main connected thereto, the upper and lower horizontal pipes, connecting-tubes, and mud-drum, the upper horizontal pipes being connected by means of oscillating joints with the boiler at one end only, whereby they are allowed to expand in the direction of their length, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY H. SUPLEE.

Witnesses:

FRANK M. WIRGMAN,
WALTER T. CALMORE.