

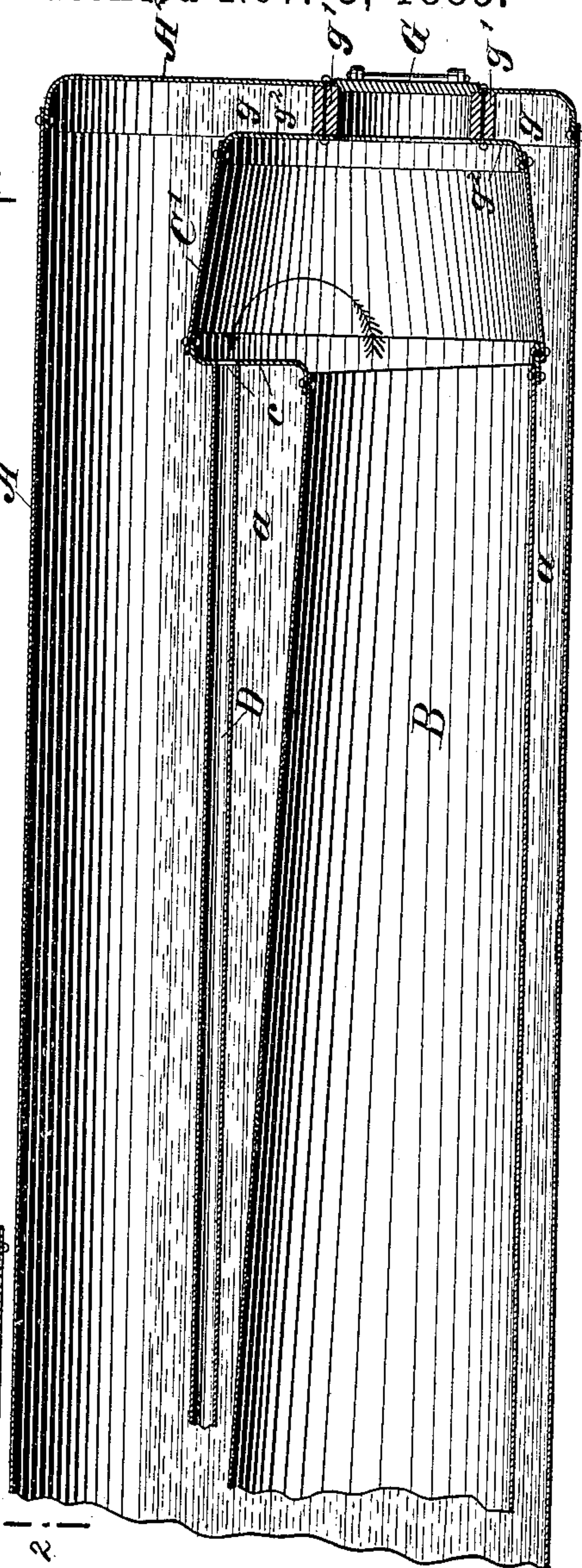
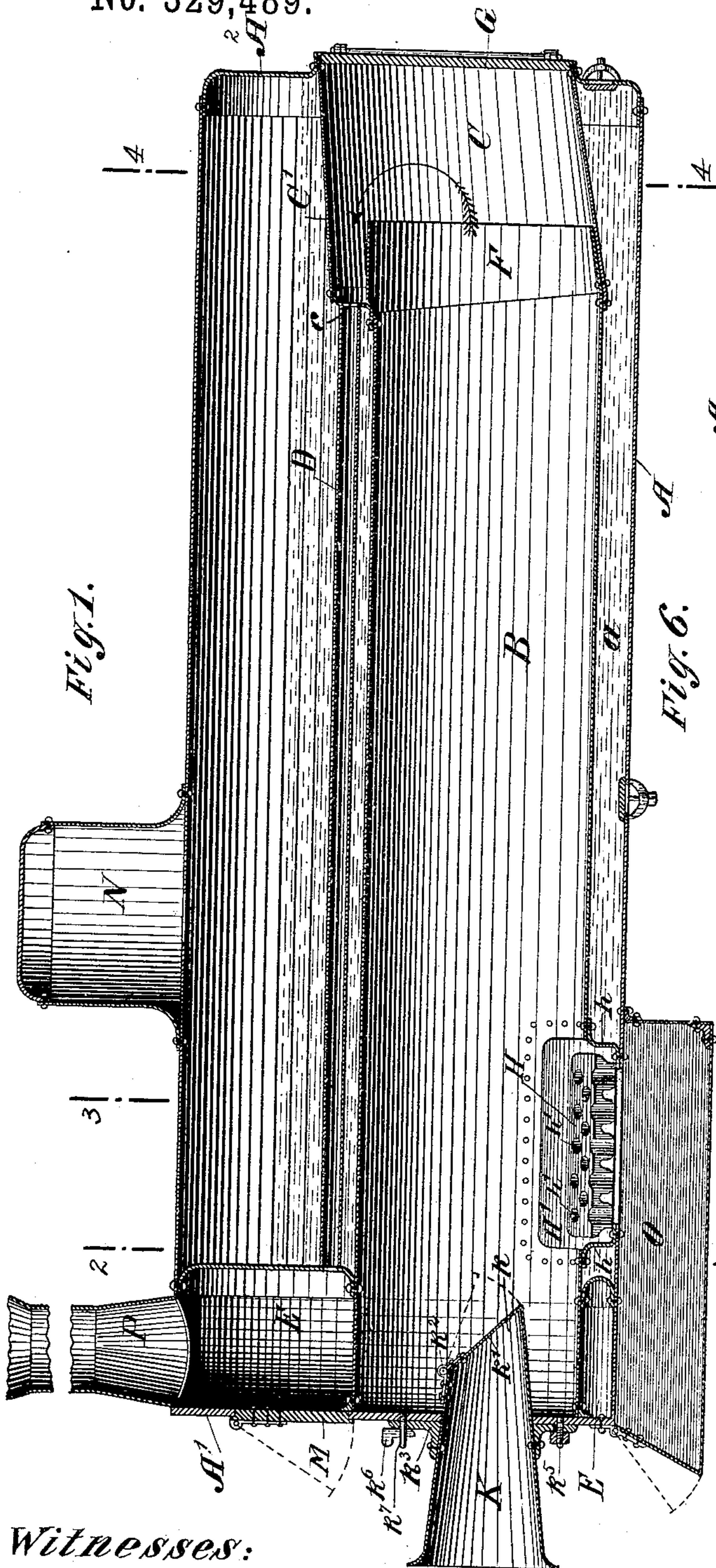
(No Model.)

M. & W. N. RUMELY.  
STEAM BOILER.

2 Sheets—Sheet 1.

No. 329,489.

Patented Nov. 3, 1885.



Witnesses:

Chas. Baur.

Jacob Hessler

Inventors:

Meinrad Rumely

William N. Rumely

by Munday, Everts and Adcock  
their Attys



(No Model.)

M. & W. N. RUMELY.  
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Fig. 3.

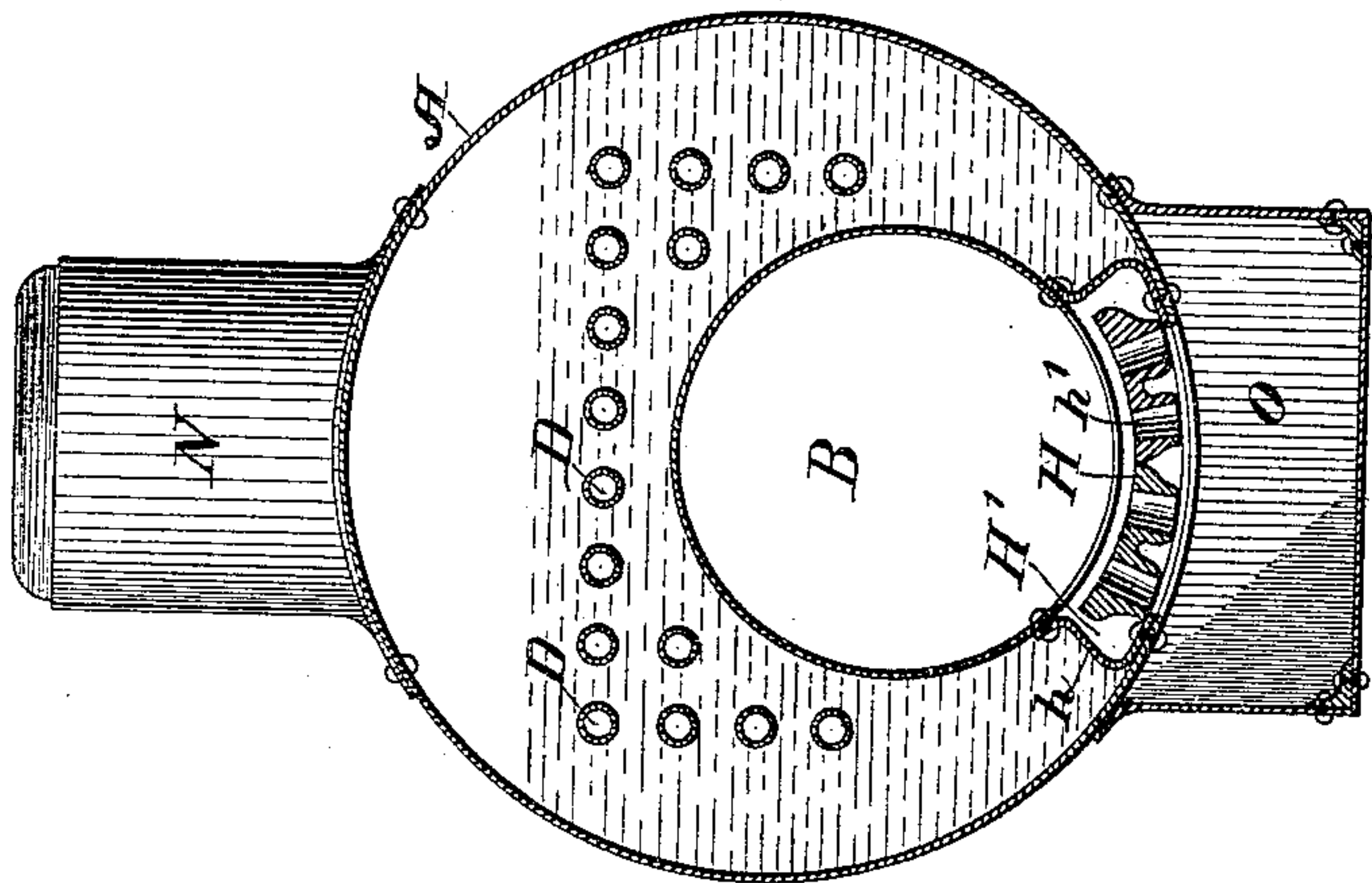


Fig. 5.

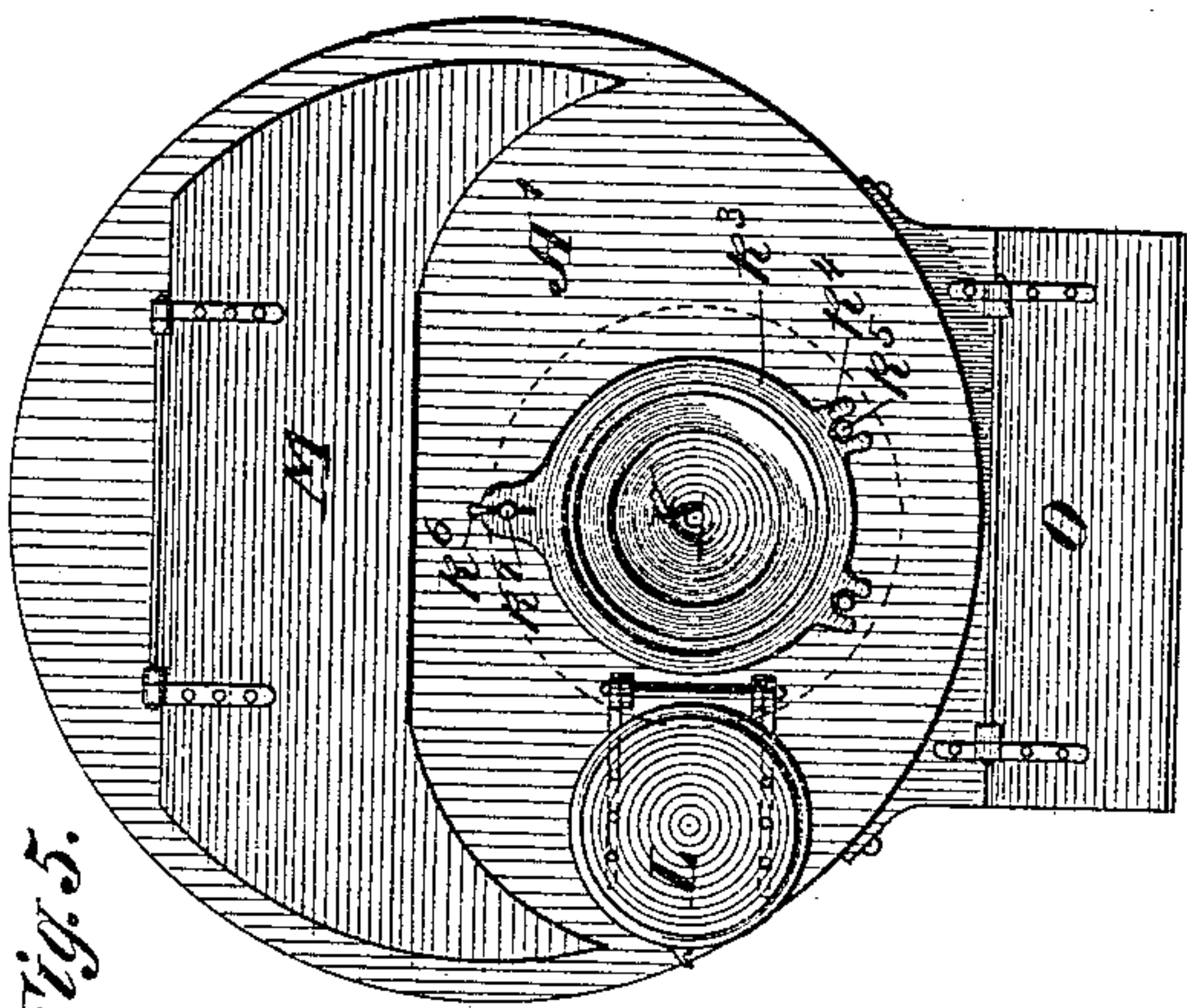


Fig. 4.

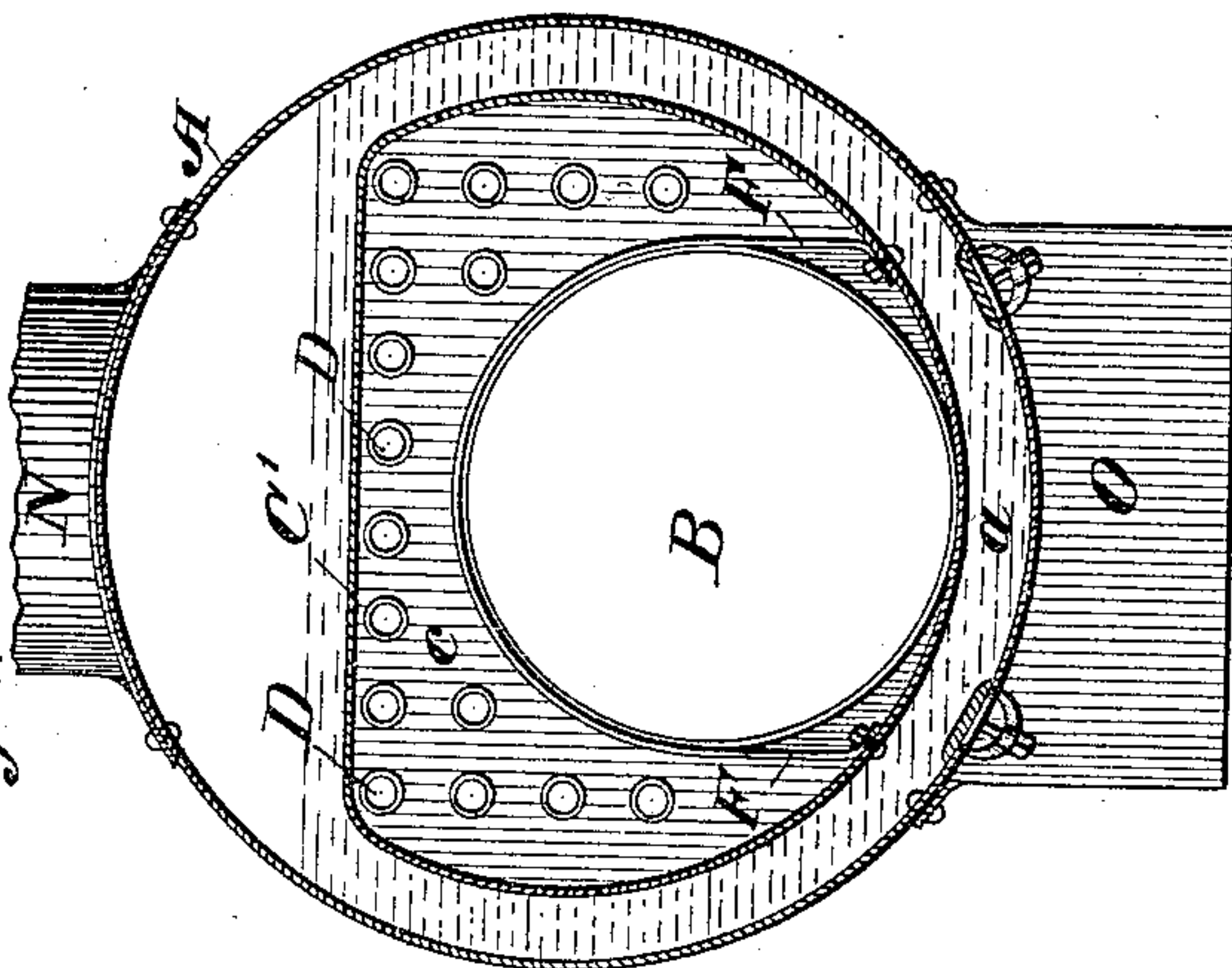
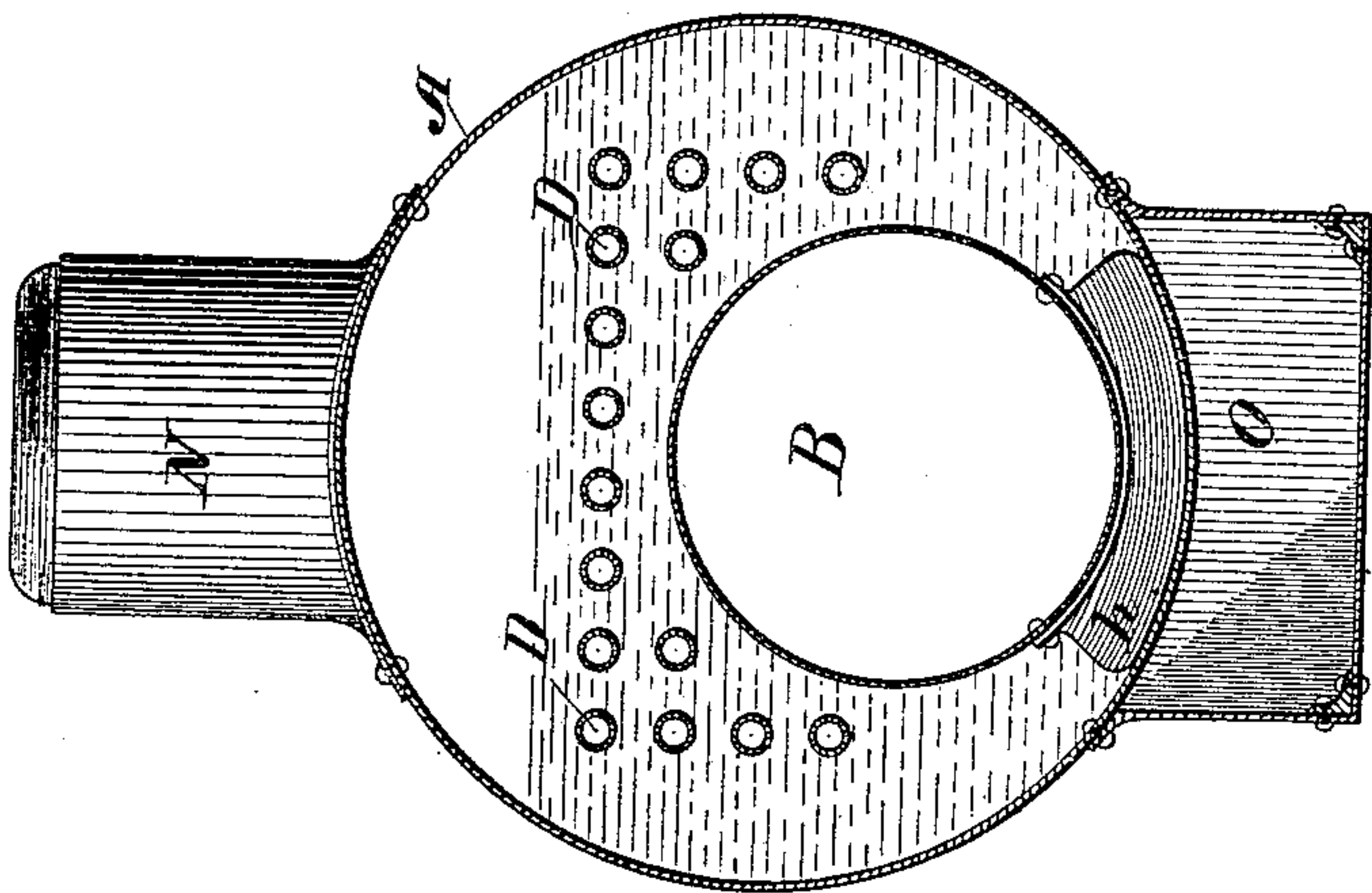


Fig. 2.



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# UNITED STATES PATENT OFFICE.

MEINRAD RUMELY AND WILLIAM N. RUMELY, OF LA PORTE, INDIANA.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 329,489, dated November 3, 1885.

Application filed May 22, 1885. Serial No. 166,363. (No model.)

*To all whom it may concern:*

Be it known that we, MEINRAD RUMELY and WILLIAM N. RUMELY, citizens of the United States, residing in La Porte, in the county of La Porte and State of Indiana, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

This invention relates more particularly to steam-boilers which are adapted or designed for burning either straw or coal as a fuel, and which are commonly used for driving thrashing-machines, and for other agricultural purposes.

The object of the invention is to adapt by simple, cheap, and practical means an ordinary Cornish or return-flue boiler, so that it will efficiently and economically burn either light fuels, like straw, or the denser fuels, like coal or wood, and also to increase both the durability and heating or steam-generating power of such boilers, as they have heretofore usually been constructed.

In our invention, in order to keep a bed of fire or coals over the grate in burning straw, so as to always quickly ignite the fresh fuel when it is fed in, and to prevent the fresh straw as it is pushed in along the main or fire flue from shoving these light coals ahead of it, as well as to prevent the draft along the main flue from carrying such coals away, and thus putting the fire practically out when it happens to get a little low, we depress the grate below the surface of the main flue, so that the fresh straw, as it is pushed in, may slide or rest on the walls of the main flue surrounding the grate, and thus pass over the bed of light coals on the grate into position to be ignited thereby without disturbing said coals. The bed of coals is also thus protected from the direct draft from the feed door or chute along the main or fire flue. To better accomplish these results, as well as to economize space and give a greater depth to the fire-flue above the center of the grate, we make the grate curved in cross-section, the curve being preferably concentric with the fire or main flue. The grate is made, preferably, in two pieces, and the openings through the same should be simply round holes, in order to properly support the coals of straw fuel.

To increase the heating and steam-generat-

ing power of the boiler, a flat crown-sheet is extended from the flue-sheet back to the rear end of the boiler above the combustion-chamber and below the water-line, so as to utilize in generating steam this hottest part of the boiler, where the ignited gases and products of combustion curve upward from the main or fire flue to enter the return-flues. In this way or by this means we also greatly increase the durability of the upper wall of the combustion-chamber, which in this class of boilers has heretofore usually burned out very quickly, owing to the great heat to which it is subjected. As this construction necessarily somewhat contracts the depth of the combustion-chamber, we compensate therefor by increasing its length slightly. A fire-arch projects from the end of the main or fire flue in the combustion-chamber to cause the ignited gases to be curved and deflected up against this crown-sheet, and to be carried back nearer the rear end of the combustion-chamber. This fire-arch is of especial service in connection or combination with the lengthened combustion-chamber.

A further or additional improvement consists, in connection with the features of our invention before mentioned, in providing a water leg or jacket at the end of the combustion-chamber, and also in making the main flue tapering toward the combustion-chamber, so as to give more room for the return-flues toward the rear end of the boiler, while the size of the main flue above the grate is preserved the same in order to properly utilize the flash-flame.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a central longitudinal section of a boiler embodying our invention. Figs. 2, 3, and 4 are cross-sections of Fig. 1 on lines 2 2, 3 3, and 4 4, respectively. Fig. 5 is a front end view, and Fig. 6 is a partial longitudinal section showing certain additional or further improvements not shown in Fig. 1.

In said drawings, A is the shell of the boiler; A', its front head, and A<sup>2</sup> its rear head.

B is the main or fire flue extending from the front head to the combustion-chamber C at the rear end of the boiler. The return-flues



D lead from the combustion-chamber to the smoke-box E at the front end of the boiler.

C' is a flat crown-sheet over the combustion-chamber, and extending from the flue-sheet c to the rear head of the boiler below the water-level.

F is a fire-arch projecting from the rear end of the main or fire flue into the combustion-chamber, so that the ignited gases from the fire-flue must curve around this arch before entering the return-flues, and thus be deflected nearer the rear end of the combustion-chamber, which is made somewhat longer than is usual, and up against the crown-sheet C'.

G is a door or opening at the rear end of the combustion-chamber, through which access may be had for cleaning out the flues, making repairs, &c. In Fig. 6 this opening is shown of smaller size, and a water leg or space, g, is formed at the end of the combustion-chamber by inserting a ring or frame, g', to which the head A' and the end sheet, g', of the combustion-chamber are secured or riveted. This water-space g at the end of the combustion-chamber gives additional heating-surface. In Fig. 6 also we have shown the main flue B as made tapering from the front end of the boiler toward the combustion-chamber, so as to give increased space for the return-flues D at that end of the boiler.

H is the grate. It is preferably made in two pieces, divided longitudinally, and curved in cross-section concentrically with the fire-flue B. The grate rests in a recess or opening, H', through the fire-flue shell B and boiler-shell A, and it is supported upon the sheet or wall h, which unites the boiler-shell and main-flue shell. The depth of this recess H' is considerably greater than the vertical thickness of the grate, so that the upper surface of the grate is depressed below the inner wall or shell of the main flue in order to form a protected space over the grate for the light straw coals, out of the line of the direct draft along the main flue from the feed-door. The walls of the main flue around the depressed grate also serve to prevent the fresh straw as it is pushed into the furnace from disturbing the light coals upon the grate. It will be observed that the water-space a between the main flue and boiler extends in front of the grate, and that the smoke box E also entirely surrounds the main flue B. The grate H is provided with holes h'.

K is a chute or funnel through which the straw is fed into the boiler or furnace. The inner end, k, of this funnel is cut off diagonally and provided with a hinged door, k', which closes by its own gravity, but readily opens when fuel is being pushed through the funnel. The hinge k' of this door, it will be seen, is at the upper side of the funnel. The funnel is secured to the head A', so that it can be readily and quickly removed by means of a collar, k', rigidly secured to the funnel, and provided with forked lugs k', which fit over the bolt-heads k' on the head A', and by a key, k', which passes through a staple or slot-

ted bolt, k', on the head A', that projects through a slot or hole in the collar k'.

L is the door, which closes the opening in the head A' when the funnel is removed. It is hinged to the head A', and when not in use is simply swung back out of the way, as shown in Fig. 5.

M is a door opening into the smoke-box to give access to the return-flues D for cleaning, repairing, &c.

N represents the steam-dome; P, the smoke-stack, and O the ash pan. The bottom wall of the combustion-chamber C is slightly elevated at its rear end or inclined upward, as shown in Figs. 1 and 6, to give room for a hand-hole at the end of the boiler into the annular space between the shell and the combustion-chamber. This upward inclination of the bottom sheet or wall of the combustion-chamber also increases the heating-power of the boiler, as the flame will by this means be projected more effectually against said bottom wall.

We claim—

1. The combination, in a Cornish or return-flue boiler, of shell A with main flue B, extending from the front head of the boiler to the combustion-chamber, and having a straw-feed chute and door or opening at its front end, and a grate, H, the upper surface of which is depressed below the interior wall of said main flue, substantially as specified.

2. The combination, in a return-flue boiler, with shell A, of main flue B, provided with a recess or opening, H', between said main flue and shell, and a grate, H, supported on a projecting edge of said shell A, surrounding said opening H', and said grate having its upper surface depressed below the interior wall of said main flue, substantially as specified.

3. The combination of shell A, fire-flue B, grate H, depressed below the surface of said fire-flue, and straw-feed chute K at the front end of said flue B, substantially as specified.

4. The combination of shell A with fire or main flue B, combustion-chamber C, return-flues D, and curved grate H, depressed below the surface of said fire-flue, substantially as specified.

5. The combination, in a return-flue boiler, of the fire-flue B with a curved grate, H, divided longitudinally into two parts, substantially as specified.

6. The combination, in a return-flue boiler, of shell A, fire-flue B, straw-feed chute K, and a grate, H, depressed below the surface of said fire-flue, and provided with holes h, substantially as specified.

7. The combination of shell A, fire-flue B, return-flues D, combustion-chamber C, having crown-sheet C' over the same extending below the water-line of the boiler, and fire-arch F, projecting from the rear end of said main flue into said combustion-chamber, substantially as specified.

8. The combination of shell A with fire-flue B, combustion-chamber C, having crown-sheet



C', and an annular or continuous water-space surrounding said chamber between the same and said shell A, return-flues D, and grate H, depressed below the interior surface of said  
5 main flue B, substantially as specified.

9. The combination of shell A with fire-flue B, return-flues D, and combustion-chamber C, having an annular or continuous water-space surrounding it between it and said shell A, and  
10 having its bottom wall or sheet inclined upward toward its rear end, substantially as specified.

10. The combination, with the main or fire flue of a boiler and a grate therein, of the  
15 straw-feed chute K, having inclined inner end,  $k$ , and door  $k'$ , hinged thereto at its upper side, the inner end of said feed-chute project-

ing into said main flue near and above said grate, substantially as specified.

11. The combination of main flue A, combustion-chamber C, having an annular or continuous water-space surrounding the same, return-flues D, water leg or space  $g$  at the end of the combustion-chamber, rings  $g'$ , having boiler  $A^2$  and end sheets,  $g^2$ , of the combustion-chamber secured thereto, and door G, closing the opening in said ring, substantially  
25 as specified.

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