

(No Model.)

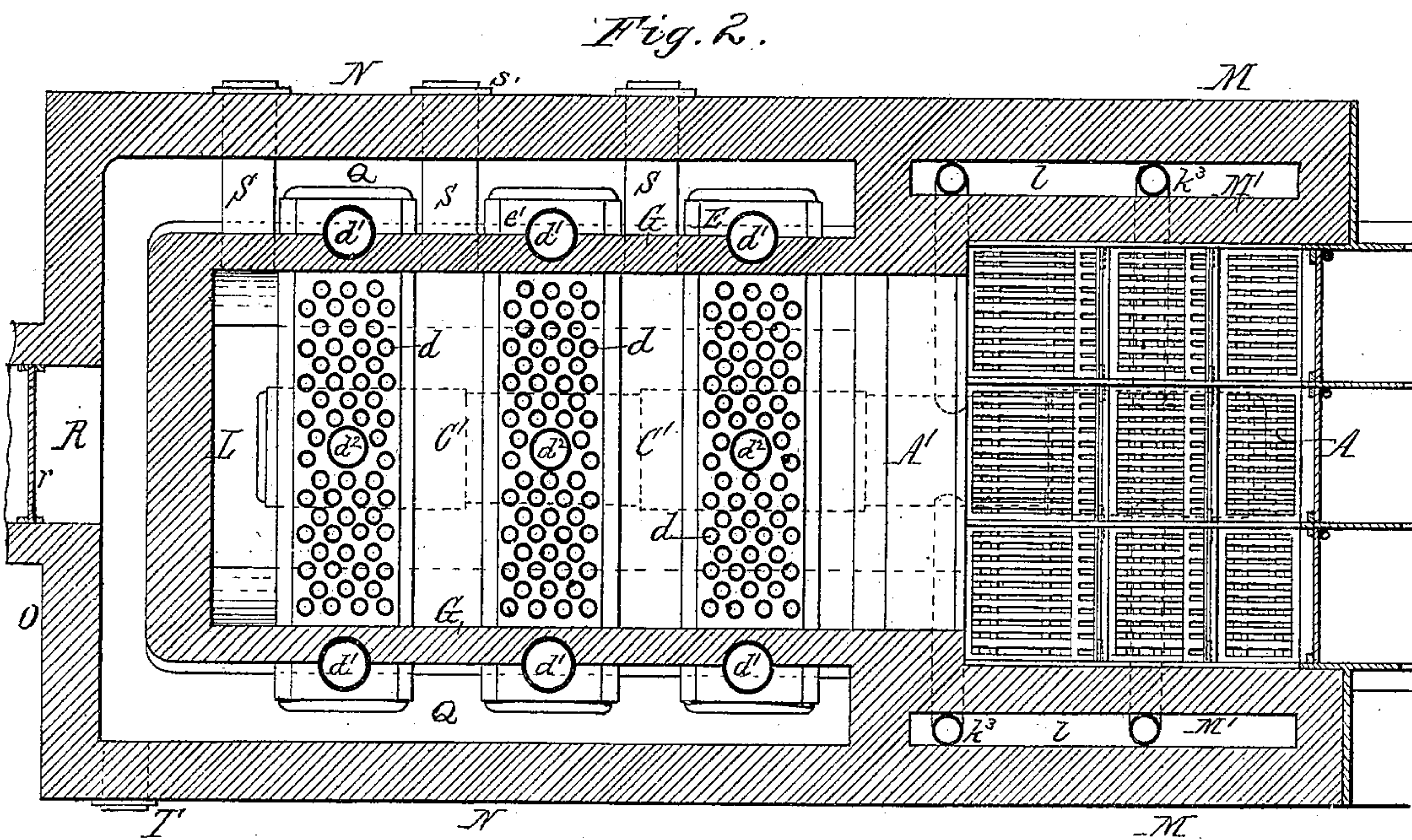
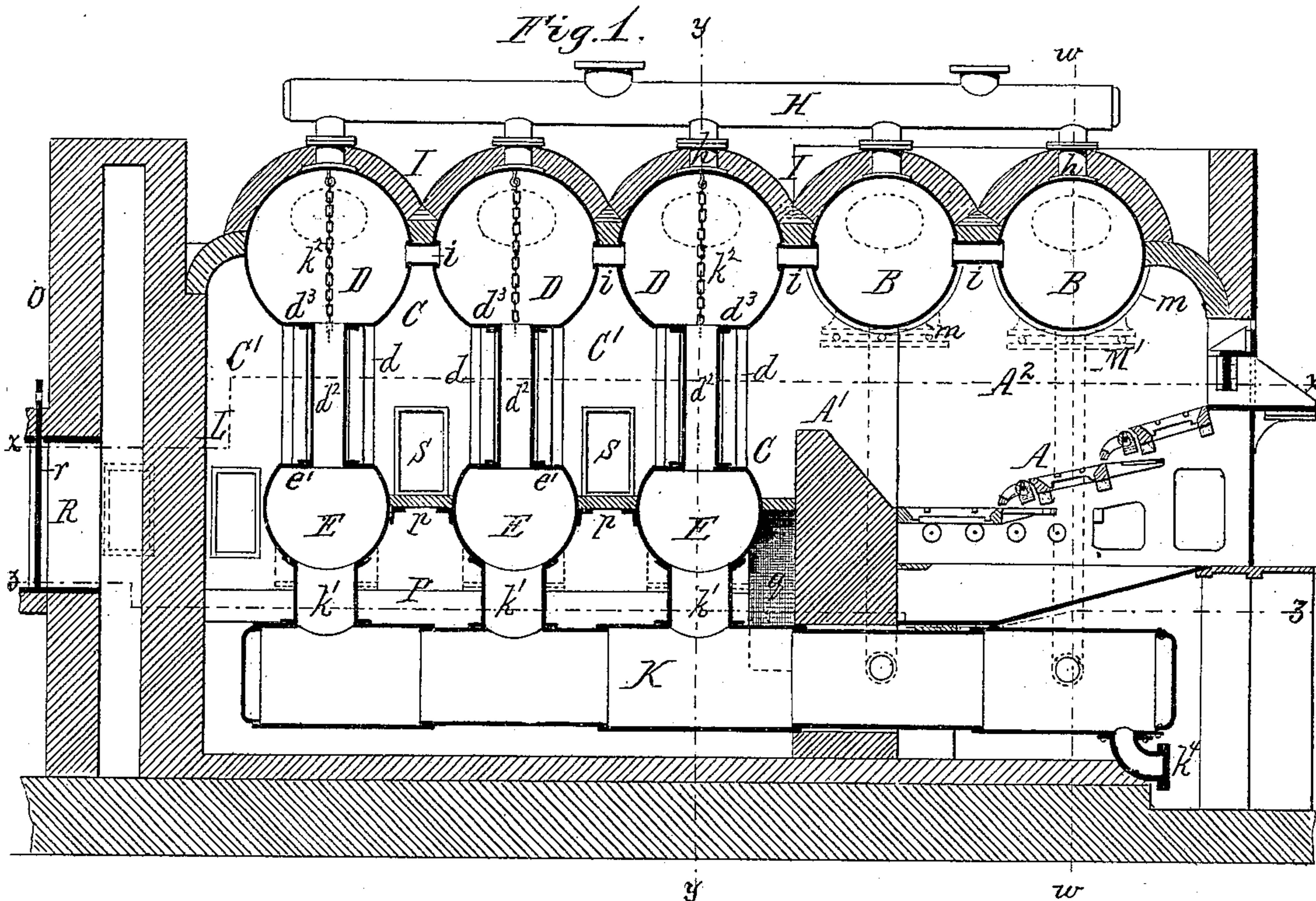
2 Sheets—Sheet 1.

J. H. MEISSNER.

STEAM BOILER.

No. 253,082.

Patented Jan. 31, 1882.



Aug. 6. 1882.
Edw. J. Brady
Witnesses.

J. H. Meissner Inventor.
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

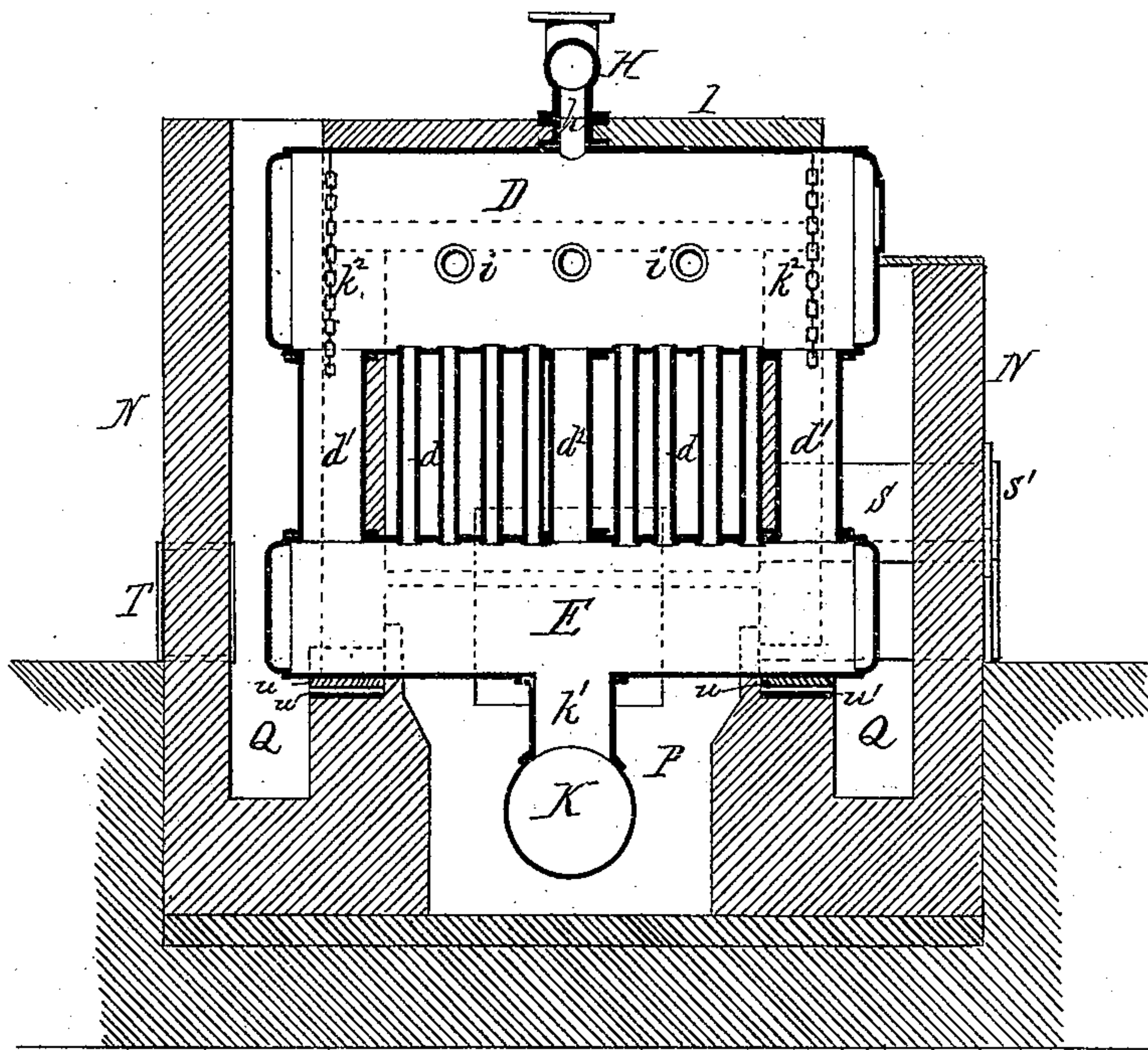
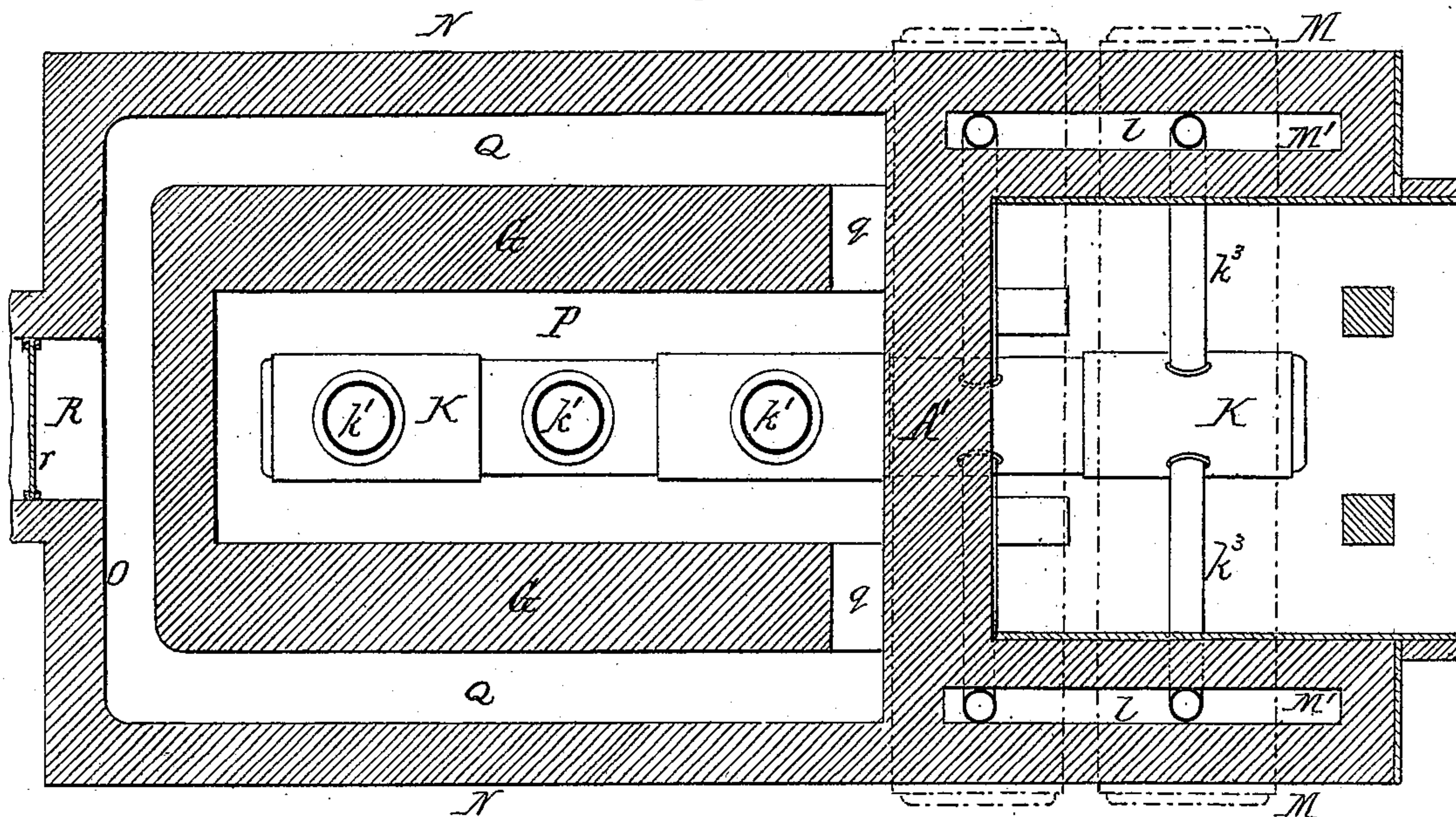


Fig. 4.



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UNITED STATES PATENT OFFICE.

JULIUS H. MEISSNER, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 253,082, dated January 31, 1882.

Application filed September 10, 1881. (No model.)

To all whom it may concern:

Be it known that I, JULIUS H. MEISSNER, of Philadelphia, in the State of Pennsylvania, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to an improvement in sectional steam-boilers, and has for its object the construction of a boiler having a large heating-surface, water-surface, and steam-space, an efficient circulation, and which can be easily kept clean and in repair.

My invention consists of the particular construction of the boiler, which will be herein-
after described.

In the accompanying drawings, consisting of two sheets, Figure 1 is a longitudinal section of my improved boiler. Fig. 2 is a horizontal section in line *x x*, Fig. 1. Fig. 3 is a vertical cross-section in line *y y*, Fig. 1. Fig. 4 is a horizontal section in line *z z*, Fig. 1.

Like letters of reference refer to like parts in the several figures.

A represents the grate, which may be of any ordinary and well-known construction; but I prefer a shelving grate, as shown.

A' represents the bridge-wall, and A² the combustion-chamber above the grate.

B represents one or more cylindrical boilers arranged transversely on the roof of the combustion-chamber A² over the grate.

C C C represent several boiler-sections arranged in the direct flue or flame-passage C' behind the bridge-wall A'. Each of the boiler-sections C is composed of an upper shell, D, and a lower shell, E, both arranged transversely or at right angles to the directions of the draft, and vertical water-tubes *d d' d²*, which connect the shells D E. The latter are made cylindrical in form, except the portions *d³ e'* thereof, to which the water-tubes are fastened, which portions are flattened, as clearly shown. One of the shells D E, preferably the upper shell, is made so large in diameter that the water-tubes *d*, upon being loosened in their sockets, can be drawn into the shell and removed through a man-hole, thus permitting each tube *d* to be readily removed from the boiler and replaced by a new tube without disturbing any other tube. The tubes *d* are made of the usual size of which water-tubes are ordinarily made, and secured in their sockets in the flat tube-sheets by expanding and calking in the well-known manner. The tubes *d'* at

both ends of each section are made round or oval in cross-section, and much larger than the tubes *d*, the proportion being preferably such that the aggregate area of the tubes *d'* is nearly as large as that of the tubes *d d²*. The tubes *d'* are provided at both ends with flanges, which are riveted or bolted to the shells D E, and the tubes *d²* are secured to the shells in the same manner, so that the tubes *d' d²* serve as stays whereby the shells D E are firmly connected, and which do away with the necessity of employing stay-rods for the purpose.

G G represent two fire-walls, which extend forward from the bridge-wall A', and which inclose the direct flue or flame-passage C'. The walls G G are arranged between the water-tubes *d* and the enlarged end tubes, *d'*, whereby the latter are shielded against the heat in the direct flue in which the tubes *d* are arranged. By this means the tubes *d* are exposed to a much greater degree of heat than the end tubes, *d'*, whereby a rapid circulation is established in each section, the current being upward in the hot tubes *d* and downward in the cooler tubes *d'*.

H represents a steam-drum arranged lengthwise over the shells B and D, and connected therewith by short pipes *h*.

I represents brick arches which cover the shells B and D, and which form the roofs of the flues or flame-passages.

i are short connecting-pipes whereby communication is established between the shells B D. As shown in the drawings, the pipes *i* are arranged within the direct flue C', underneath the roof thereof; but, if preferred, such connections may be arranged outside of the side walls, G.

K represents a mud-drum arranged lengthwise under the cylinders B and sections C. The sections C are connected with the drum K by pipes *k'*, which are large enough to permit a man to pass through them, so that upon removing a man-hole cover at one end of the drum K a man can enter the latter and pass from the same through the connecting-pipes *k'* into the lower shells, E, and thence through the pipes *d d'* into the upper shells, D. The latter are provided with chains *k²*, which are secured with their upper ends in the shells and depend into the tubes *d'*, so that a man upon taking hold of these chains can draw himself up through the tubes *d'*. The shells B are connected with the mud-drum K by pipes *k³*,

which establish a communication between the water-spaces of the shell B and the mud-drum.

k^4 represents a blow-off pipe connected with the mud-drum.

5 L represents the rear wall of the direct flue C'.

M represents the outer portion of the side walls of the combustion-chamber A², and M' the inner portion of these walls, which are separated from the outer portion by an air-space, l , to prevent radiation. The inner walls, M', do not quite reach up to the shells B, but leave narrow spaces m below the shells, through which the flame can enter and come in contact with the shells throughout their entire length inside of the outer portions of the walls M. The shells rest upon the outer portions of the walls M, whereby the inner walls, M', which are in direct contact with the heat, can be renewed, when required, without disturbing the shells B.

N N represent the outer side walls, and O the rear wall, of the brick casing of the boiler.

P represents a return-flue, which connects with the rear end of the direct flue C', and runs backward under the latter to the bridge-wall A', the two flues being separated by tiles or other fire-proof flooring, p , interposed between the lower shells, E, and resting on angle-irons secured to the same, as clearly shown in Fig. 1.

30 Q Q represent two side flues formed between the inner walls, G G, and the outer walls, N N. The side flues, Q, are connected with the return-flue P by openings q , extending through the inner walls, G, in rear of the bridge-wall A'. The lower portions of the lower shells, E, the mud-drum K, and the connecting-pipes k' , are arranged in the return-flue P. The ends of the shells D and E and the connecting-pipes d' are arranged in the side flues,

40 Q. The latter connect with the chimney by means of a passage, R, provided with a suitable damper, r . The flame and the heated gases in the combustion-chamber A² come first in contact with the cylinder-boilers B,

45 which are sufficiently raised above the grate to permit of a good combustion of the fuel before the flames come in contact with the cool surface of the boilers. After passing over the bridge-wall the flame and heated gases come in contact with the water-tubes of the first section C. These tubes are arranged to break joint, so that the flame and gases are compelled to pass between them in a sinuous course. After leaving the water-tubes of the first section C the flame and heated gases commingle freely in the open space between the sections and then pass on to the next section. After leaving the last section the gases descend into the return-flue P and pass through the latter

60 to the rear side of the bridge-wall A', heating in their course the lower portions of the shells E, the mud-drum K, and the pipes k' . From the return-flue P the gases pass by the openings q into the side flues, Q, through which they pass forward until they reach the passage R, which leads to the chimney. The gases entering the side flues, Q, have been deprived of

the greater portion of their heat, and the end pipes, d' , are therefore much less heated than the water-pipes d in the direct flue C'. The side walls, G, confine the heat and concentrate it upon the water-pipes d and those portions of the shells D E which are exposed in the direct flue C'. The side flues, Q, being arranged on the outer sides of the walls G prevent the radiation of heat outward from the direct flue C'.

S are hollow boxes or flues, open at both ends, which are arranged in the side walls, G N, and which open into the spaces between the sections C, above the floor p , and at the end of the direct flue C', for the purpose of permitting access to these spaces when necessary. The dust, ashes, and soot adhering to the water-tubes and shells are readily detached therefrom by introducing a steam-jet through the flues S, and the dust so accumulating on the flooring p is readily removed through these boxes, which are provided with suitable doors, s' , at their outer ends.

T represents a door in the outer walls, N, through which access is had to the side flues, Q.

The shells E and B rest, by means of brackets or saddles u , on bed-plates u' , arranged in the foundation-walls. Rollers are interposed between the brackets and the plates for the purpose of permitting the sections to move freely in expanding and contracting.

My improved boiler combines great strength with a large grate and heating-surface and water and steam capacity, it possesses a good circulation, and is readily built and kept in repair.

I am aware that short tubes capable of being removed upwardly have been used in marine boilers in connection with closed sides, and a water-space inclosing the tubes and connecting the upper and lower water-spaces, forming a continuous shell, and this I do not claim.

I am aware that it is not new broadly to arrange one shell over another, so that the tubes can be drawn from within the upper shell.

I claim as my invention—

1. A steam-boiler composed of a series of sections, having an upper and lower shell or drum and horizontal connections, substantially as shown, said shells or drums being connected by water-tubes d , of a length less than the space within the walls of the shells or drums, whereby the tubes may be put in place or withdrawn from the inside of the drum, as hereinbefore set forth.

2. The combination, in a steam-boiler composed of an upper and lower section or drum connected by water-tubes the length of which is less than the space within the walls of the drum, said tubes being thus adapted to be placed or withdrawn from within the drum, of outer circulating and connecting tubes for staying and supporting the drums, as hereinbefore set forth.

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