

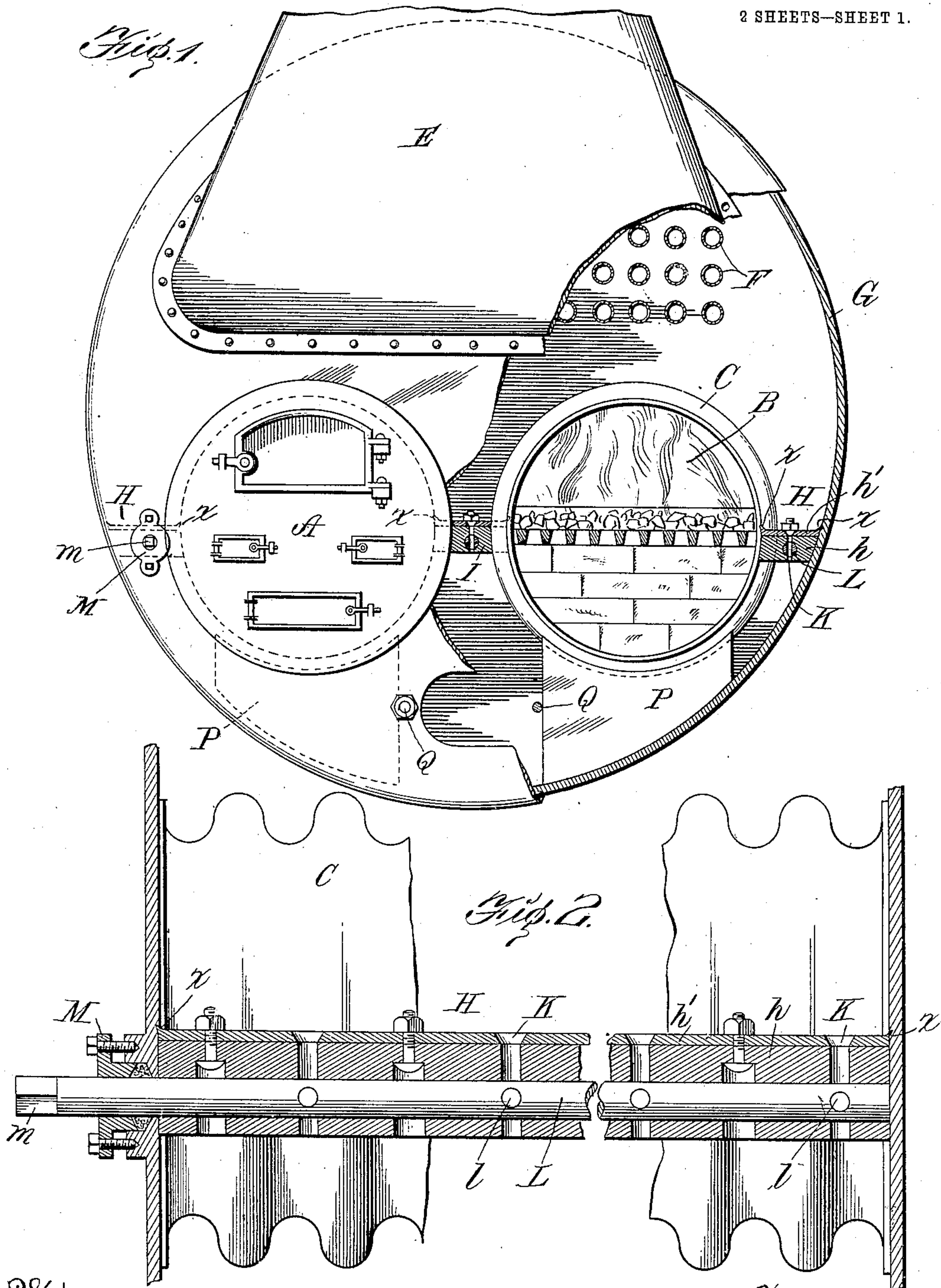
No. 829,722.

PATENTED AUG. 28, 1906.

G. MARSHALL.
MARINE BOILER.

APPLICATION FILED MAR. 26, 1906.

2 SHEETS—SHEET 1.



Witnesses
Paul J. Gathmann
C. F. Early.

Inventor
George Marshall
By his Attorneys
Baldwin & Wright.

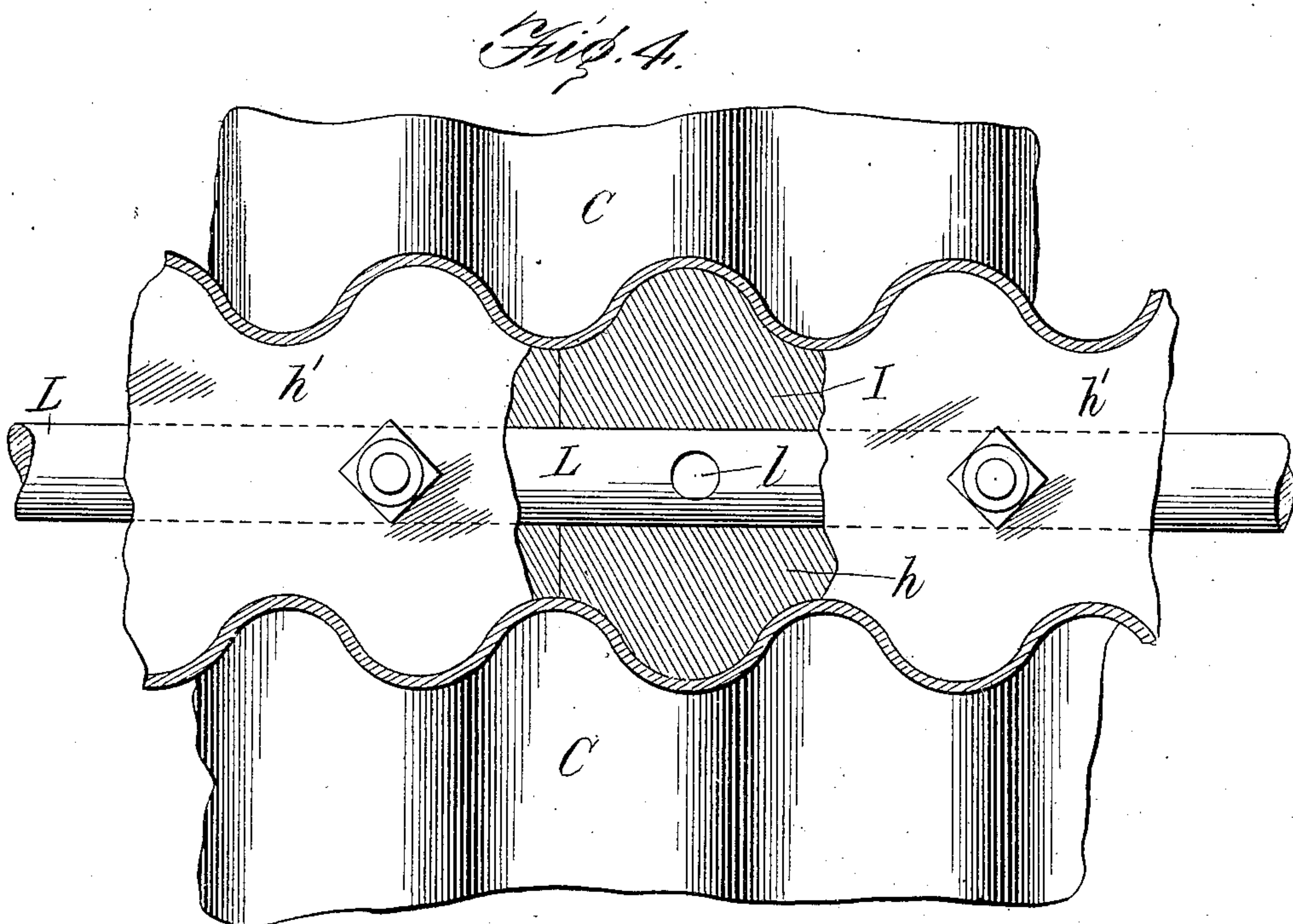
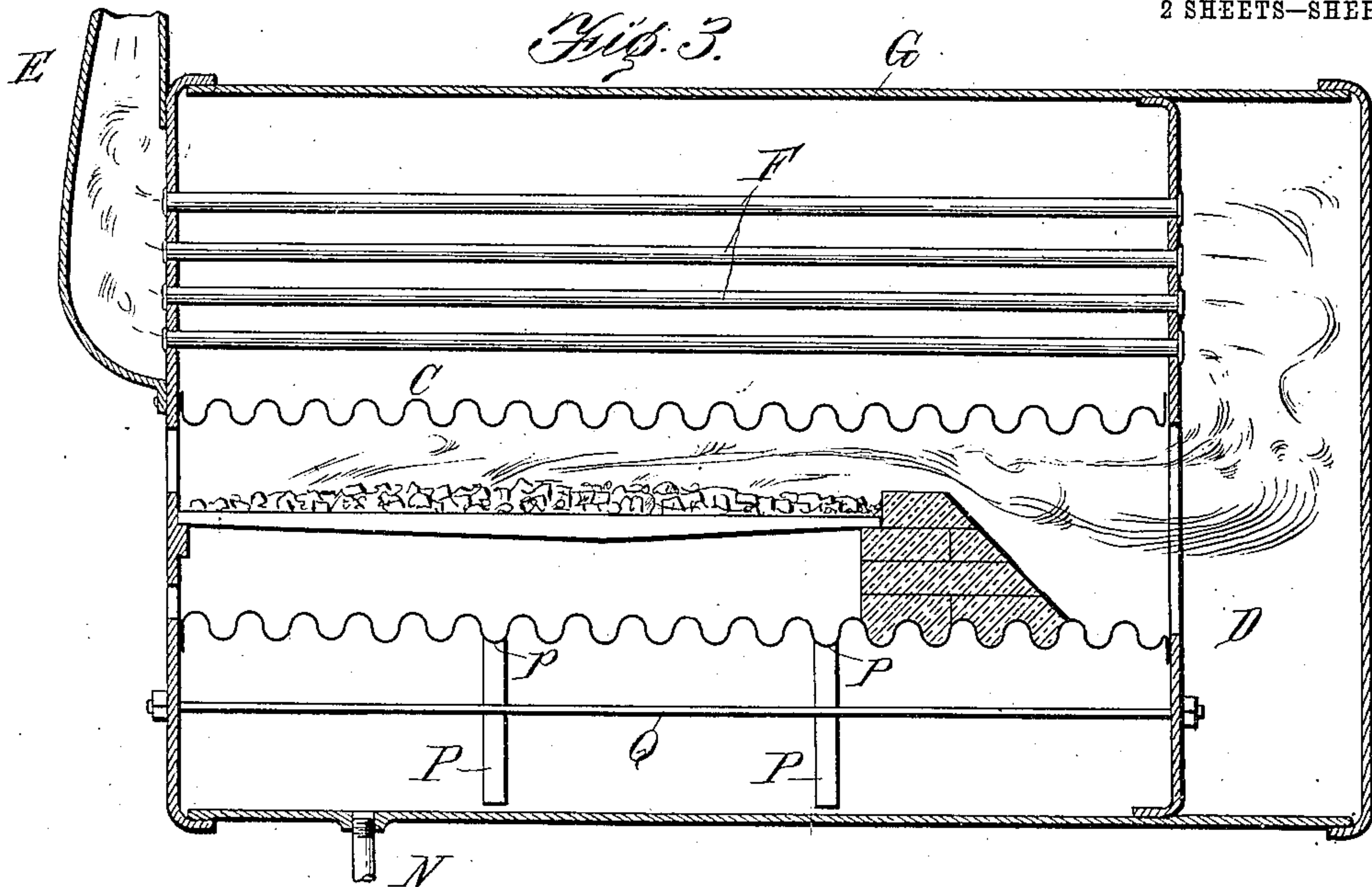
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UNITED STATES PATENT OFFICE.

GEORGE MARSHALL, OF FREMONT, NEBRASKA.

MARINE BOILER.

No. 829,722.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed March 26, 1906. Serial No. 307,997.

To all whom it may concern:

Be it known that I, GEORGE MARSHALL, a citizen of the United States, residing in Fremont, in the county of Dodge and State of Nebraska, have invented certain new and useful Improvements in Marine Boilers, of which the following is a specification.

In marine boilers of the type in which the furnace-flues and return-tubes are surrounded by water within the boiler-shell the water below the fires is colder than that above them and often the presence of this cold water interferes with obtaining the required temperature to produce steam at the desired pressure.

In my United States Patent No. 809,518, of January 9, 1906, I disclosed means for separating the water below the fires from that above them, so that the presence of the cold water need not affect the water in the upper portion of the boiler.

For the purpose specified I provided separator-bars or partitions located between the furnace-flues and the boiler-shell and between adjacent furnace-flues, which closely fit the shell and flues by water-tight joints. Each separator-bar or partition was composed of a solid casting and boiler-steel, the steel being calked at its edges to the boiler shell and flues.

No provision was suggested in my prior patent for withdrawing mud or sediment collecting on the partitions and flues in the upper part of the boiler.

According to my present invention I employ separator-bars or partitions arranged as in my prior patent, but provide each of said separator-bars or partitions with means for establishing a communication between the upper and lower parts of the boiler, whereby the lower portion of the boiler may be entirely separated from the upper portion, or a communication can be established so that mud or sediment may pass from the upper portion to the lower portion of the boiler.

In the accompanying drawings, illustrating my invention, Figure 1 shows a front elevation of a marine boiler embodying my improvements with parts broken away in order to more clearly show other parts, some of which are in section. Fig. 2 is a detail view, on an enlarged scale, showing more clearly the construction of one of the separator-bars or partitions with my improvements applied. Fig. 3 shows a longitudinal section through a marine boiler embodying my improvements. Fig. 4 is a view, on an enlarged scale, showing

how one of the separator-bars fits the flues and how such a bar is provided with means for opening and closing communication between the upper and lower portions of the boiler.

In the drawings I have shown a marine boiler comprising two furnaces A B. These furnaces are surrounded by flues C, which extend from the front of the boiler to the combustion-chamber D, and products of combustion pass therefrom to the chamber D and thence back to the stack E through fire-tubes F. The tubes and flues are inclosed in a shell G, as usual. This general type of boiler is of well-known construction and need not be further described.

In the particular boiler shown the furnace-flues C are corrugated—that is, they are provided with a series of parallel concentric rings formed of the sheet metal of which the flues are made in the manner illustrated in Figs. 3 and 4. In this type of boiler the water fills the shell G from the bottom thereof below the flues to a level somewhere above them. The water below the flues is somewhat colder than that above them and interferes with obtaining the proper temperature of water to produce steam at the desired pressure. As specified in my patent above mentioned, I overcame this difficulty by separating the water in the lower portion of the boiler from that in the upper portion by means of separator-bars or partitions H I.

Each of the bars H is preferably made of a cast-metal body *h*, to which is bolted a plate *h'*, of boiler-steel. Each of these bars may extend the entire length of the furnace-flue, or it may be made in sections. One side of the separator-bar, or each section thereof, is corrugated, as shown, to fit the corrugations in the flue C, and it is correspondingly curved to fit the curvature of the shell. It may be held in place in any suitable way. The separator or partition I is similar to those marked H', except that the two opposite sides of the bar or sections thereof are corrugated and curved to correspond with and fit the sides of the flues C. When the bars are made in sections, the joints are overlapped by the plate *h'*, which latter may be made in one piece, or it may be made in sections, but should overlap the sections of the bars *h*. The separator-bar I is used between adjacent flues and the bars H between flues and the boiler-shell. By the use of these bars the water below the flues is separated from that above them or

from the water in the upper portion of the boiler; but in order to insure water-tight joints the plates *h'* are preferably calked to the shell *G* and the flues *C* in the manner indicated at *x*.

In the drawings I have shown the separator-bars as being located on a level with the grate-bars; but the exact location is not essential, it being important only that the water in the lower portion of the boiler, particularly that below the grate-bars, shall be separated from the water above the fires.

As thus far described the construction is similar to that shown in my patent before mentioned; but it will be observed that no provision was made in the prior construction for removing mud or sediment which would sometimes accumulate on the separator-bars and also on the flues, which is objectionable. I have therefore by my present improvements provided means for establishing through the separator-bars communications between the upper and lower portions of the boiler, so that when communication is established in this way the mud or sediment may be allowed to pass from the upper portion to the lower portion of the boiler and thence blown off through a suitable opening. This communication is preferably established by forming vertical openings *K* through the separator-bars and opening and closing these openings by means of rods *L*, having transverse openings *l*, adapted to register with the openings *K*. Preferably a number of openings *K* are made through each separator-bar, and there are a corresponding number of openings *l* in the rod *L*. Each rod *L* extends from one end of each separator to the other end thereof, and one end of the rod preferably projects through packing *M* in the boiler-head and is provided with a squared portion *m* to receive a wrench or other suitable tool for turning it. By this arrangement when the bar *L* is turned to the position shown in Fig. 2 the holes *l* are out of register with the holes *K*, and hence communication between the upper and lower portions of the boiler is closed; but when the rod *L* is given a quarter-turn the holes *l* register with the holes *K* and communication between the two portions of the boiler is established.

A blow-off cock or pipe may be located at any suitable point in the lower portion of the boiler. I have indicated a blow-off opening at *N* in Fig. 3.

In order to get rid of the mud and sediment, I first open the blow-off cock, so as to diminish the pressure in the lower portion of the boiler as much as possible. The rods *L* are then given a quarter-turn and the mud and sediment are allowed to escape into the lower portion of the boiler. It is best to turn one rod at a time. After the blowing off is completed the blow-off opening in the lower space is closed and the rods *L* are turned back

to cut off communication between the two parts of the boiler and the pressure above and below is equalized. This operation can be performed every day, if necessary, with great facility.

When the pressure in the lower portion of the boiler is relieved, the steam-pressure in the upper portion of the boiler acts forcibly on the flues and subjects them to considerable strain. I therefore preferably employ braces *P* beneath the flues to support them at proper intervals. These braces are shaped on their lower edges to fit the boiler-shell, and they are made circular or curved on their upper edges to fit the flues, as indicated in Fig. 1, and they are also preferably concaved at *p*, as indicated in Fig. 3, to fit the corrugations of the flues, although they might be made to fit between the corrugations thereof. In this way the braces are held in such manner as to not be liable to fall over sidewise, and in order to securely hold the braces in place I employ stay-rods *Q*, which extend from the front to the rear end of the boiler, as shown in Fig. 3, and bear against the inner ends of the braces, as indicated in Fig. 1. This arrangement holds the braces against movement in any direction, as their shape enables them to be wedged in between the shell and the flues. Any suitable number of braces may be employed. They should be arranged equal distances apart and suitable distances from the ends of the boiler, as indicated in Fig. 3.

While I have shown the separator bars or partitions as being provided with rods which are turned within them to open and close communication between the two parts of the boiler, it is obvious that the same result may be accomplished in other ways, and I do not wish to be limited to the precise arrangement shown.

I claim as my invention—

1. In a marine boiler, the combination of a horizontal furnace flue or casing, a boiler-shell surrounding it, partitions fitting the boiler-shell and the furnace flue or casing which separate the water in the lower portion of the boiler from that in the upper portion, and means in said partitions for opening and closing communication between the upper and lower portions of the boiler.

2. In a marine boiler, the combination of a flue or casing, a boiler-shell surrounding it, a partition fitting the boiler-shell and the furnace flue or casing which separates the water in the lower portion of the boiler from that in the upper portion thereof, and which is provided with openings adapted to establish communication between the two parts of the boiler, and a rod mounted to turn in the partition and having openings adapted to register with the openings in the partition for the purpose specified.

3. In a marine boiler, the combination of a

horizontal furnace flue or casing, a boiler-shell surrounding it, a partition fitting the boiler-shell and the furnace flue or casing which separates the water in the lower portion of the boiler from that in the upper portion, means for establishing communication through the partition between the two portions of the boiler and braces below the flue resting on the boiler-shell for supporting the flue and sustaining it when pressure is relieved below the partition.

4. In a marine boiler, the combination of a horizontal flue or casing, a boiler-shell surrounding it, partitions fitting the boiler-shell and the furnace flue or casing which sep-

arate the water in the lower portion of the boiler from that in the upper portion, means in the partitions for establishing communication between the upper and lower portions of the boiler, wedge-shaped braces interposed between the shell and the flue or casing and a rod extending from one end of the boiler to the other to hold the braces in place.

In testimony whereof I have hereunto subscribed my name.

GEORGE MARSHALL.

Witnesses:

S. S. SIDNER,
V. P. KURTZ.