

(No Model.)

2 Sheets—Sheet 1.

J. C. H. STUT.
BOILER.

No. 538,000.

Patented Apr. 23, 1895.

Fig. 1.

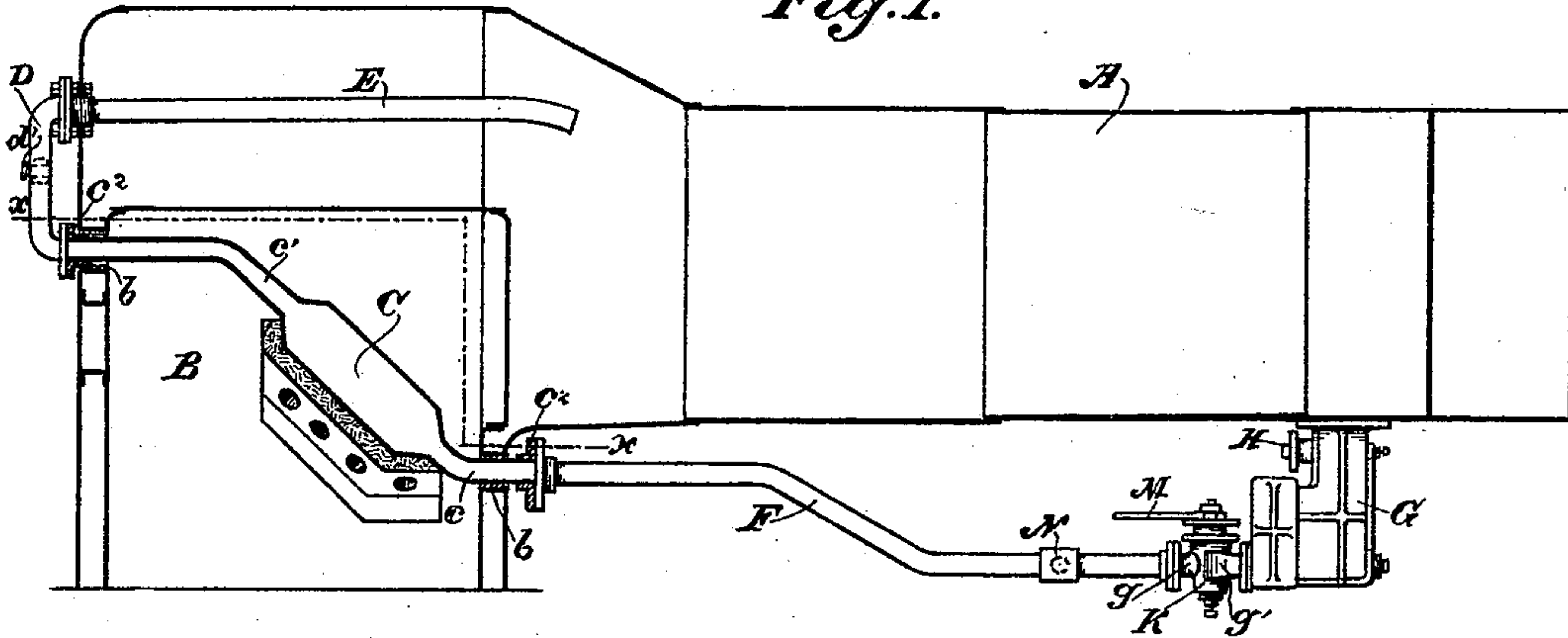


Fig. 2.

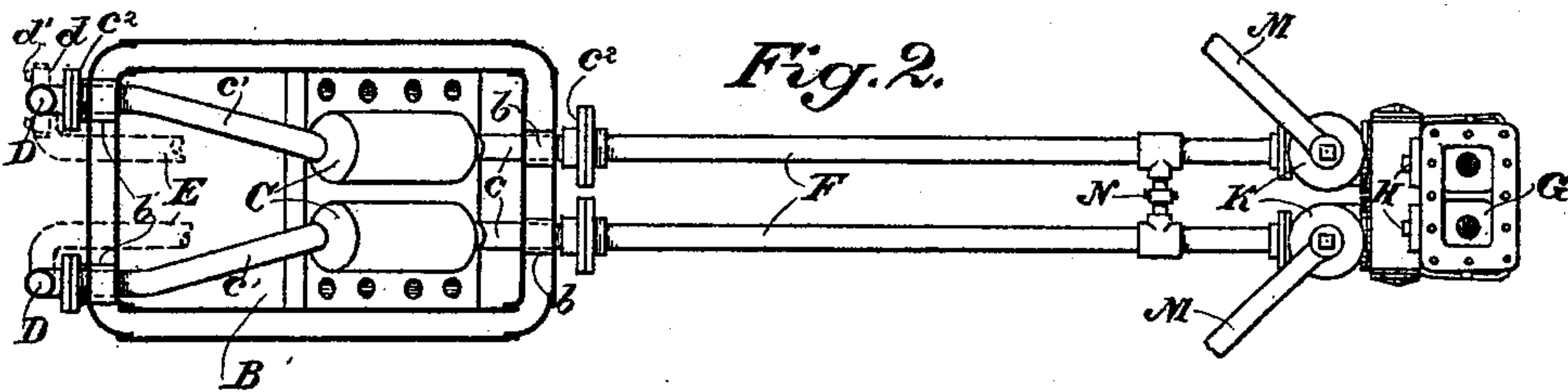


Fig. 4.

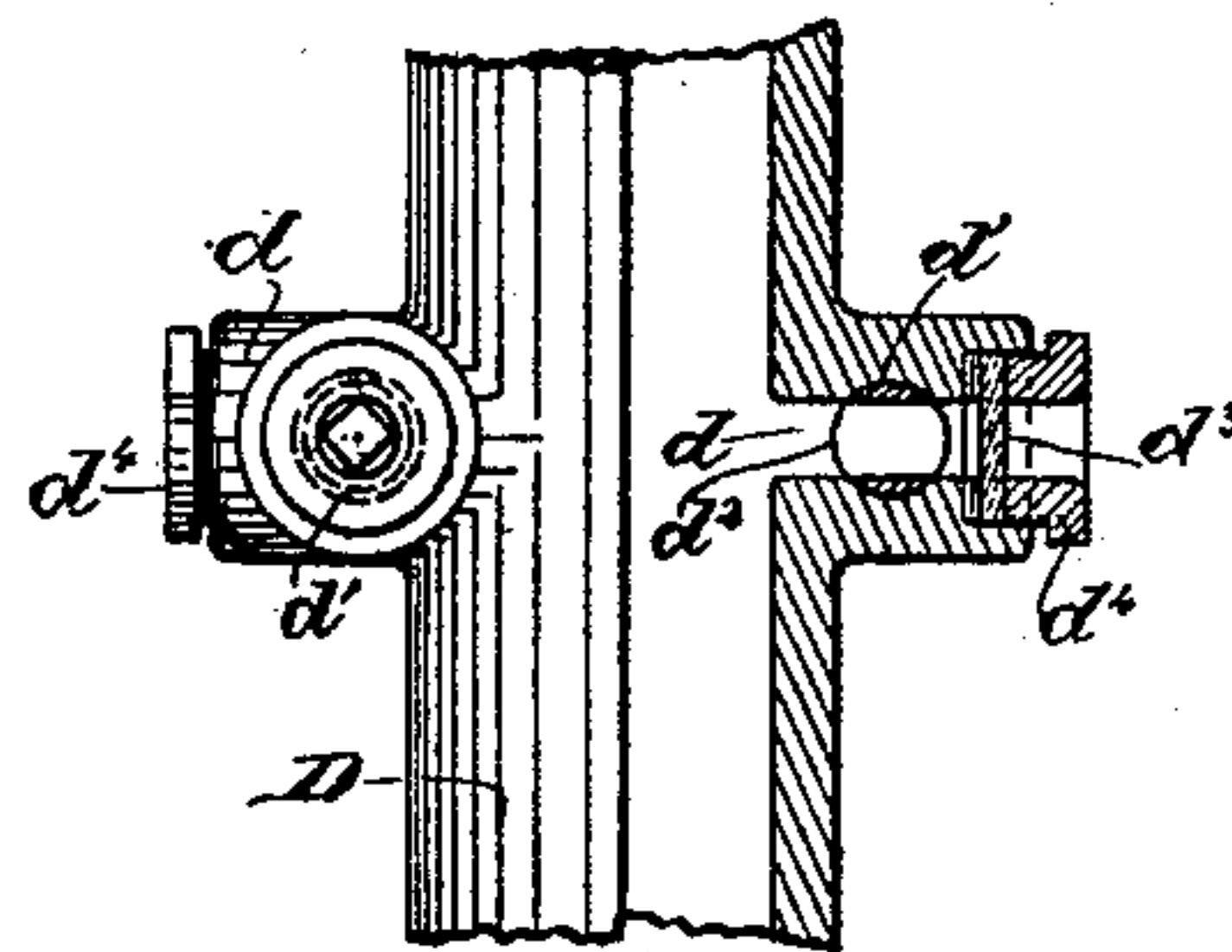
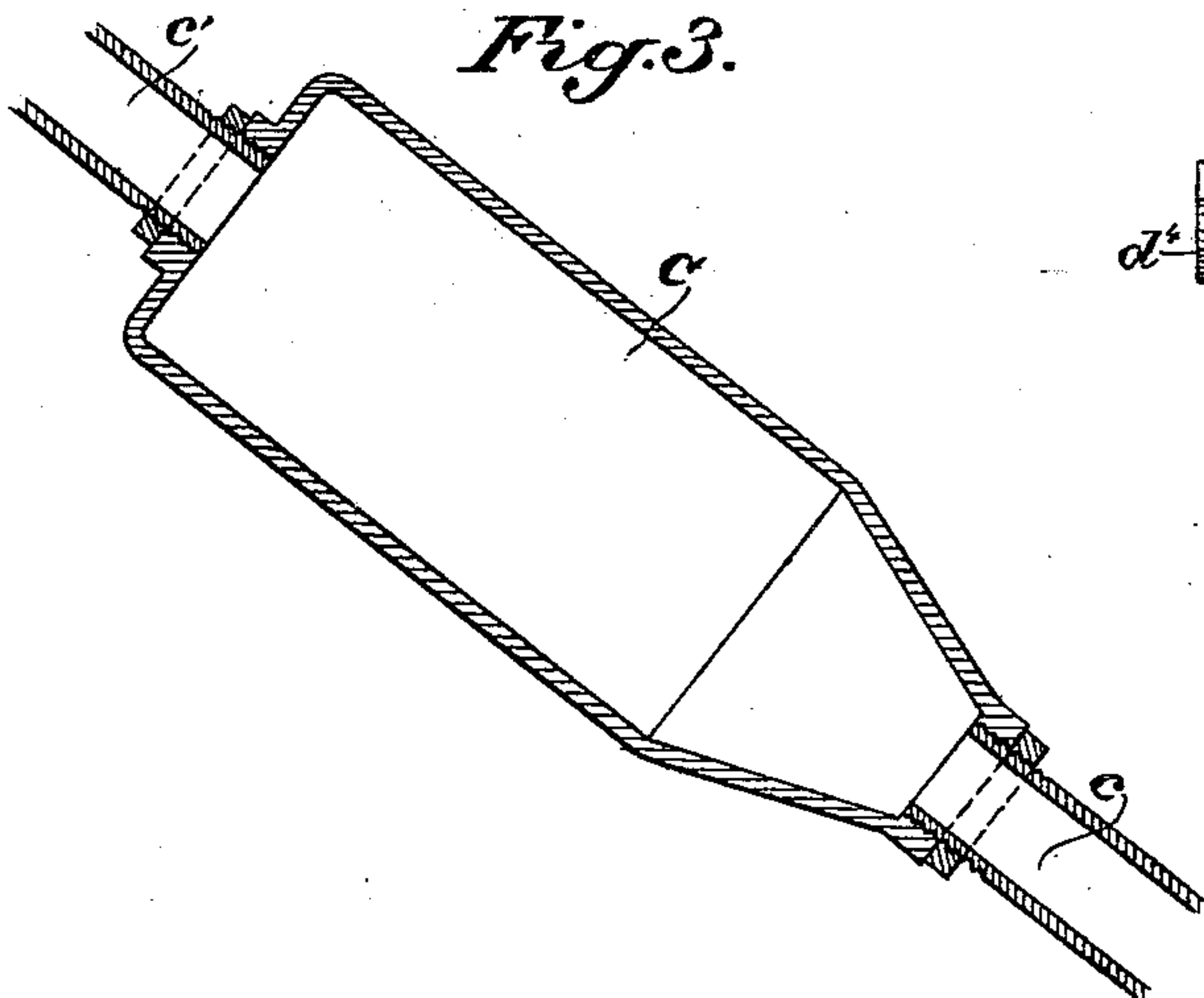


Fig. 3.



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2 Sheets—Sheet 2.

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Fig. 5.

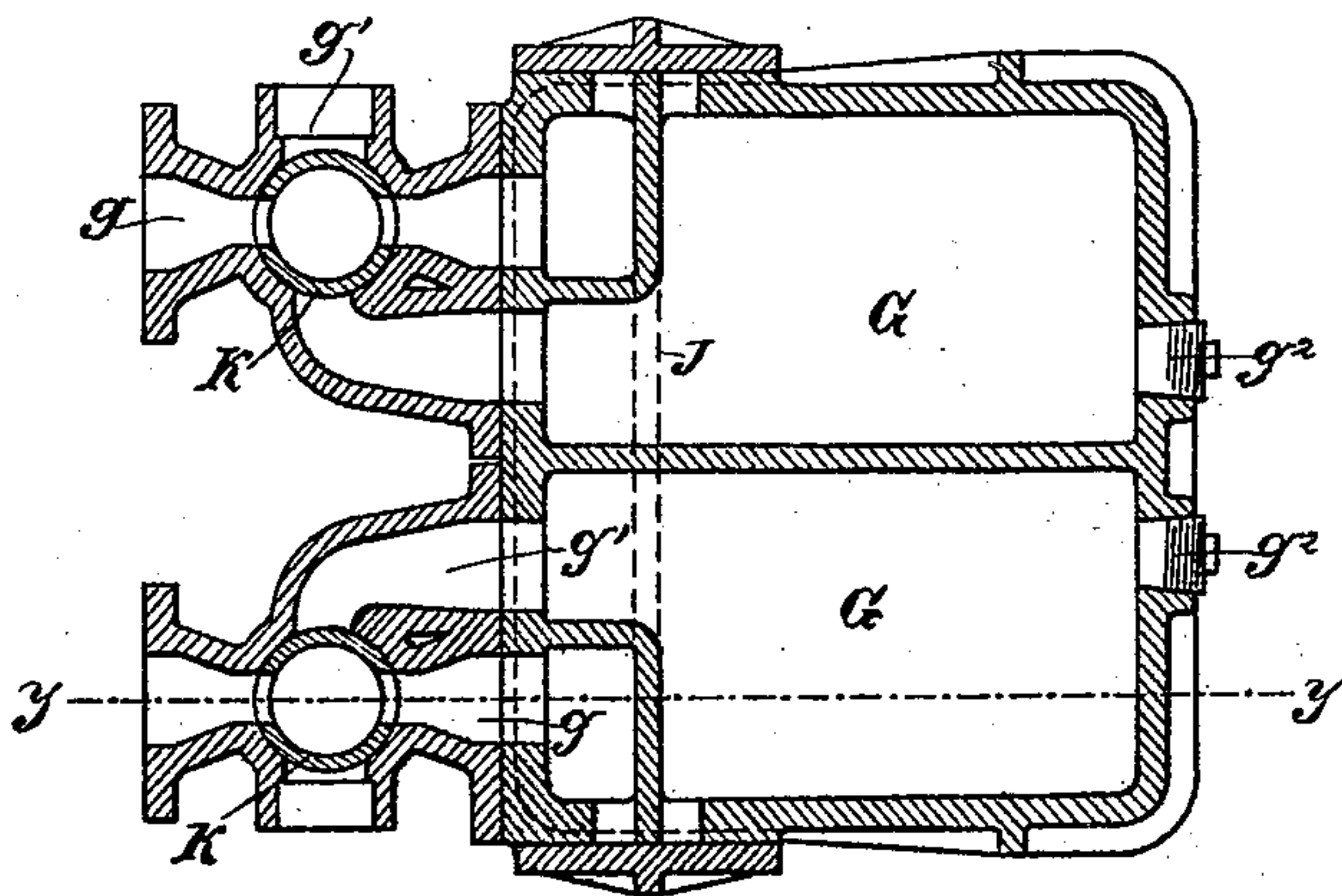
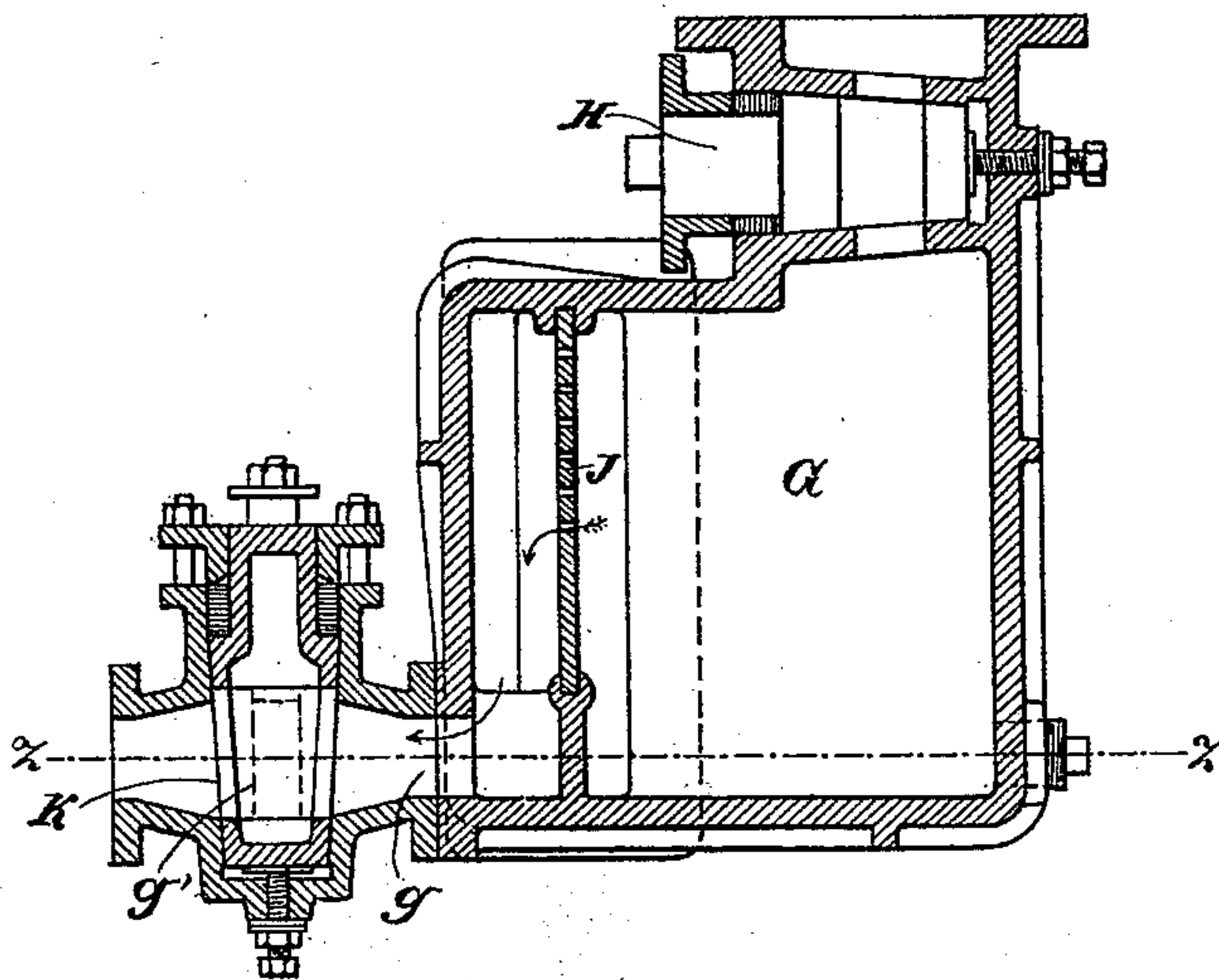


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN C. H. STUT, OF OAKLAND, ASSIGNOR TO THE LOCOMOTIVE FEED
WATER HEATER COMPANY, OF BAKERSFIELD, CALIFORNIA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 538,000, dated April 23, 1895.

Application filed January 18, 1895. Serial No. 535,381. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. H. STUT, a citizen of the United States, residing in Oakland, county of Alameda, State of California, have
5 invented an Improvement in Boilers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of boilers in which a supplemental heater, located
10 within the fire-box, is connected at its lower portion by a suitable pipe with the lower portion of the boiler, and at its upper portion is connected with and is adapted to conduct the
15 hot water or steam into the upper portion of the boiler, whereby a complete circulation is maintained.

My invention consists in an improvement in the form and construction of the supplemental heater within the fire-box whereby it
20 can withstand the heat to better effect, in that it is not likely to leak, and will not disturb joints by its expansion and contraction.

It also consists in the novel construction whereby the circulation of the water may be
25 observed, and it finally consists in the novel filtering and blowing off device in the pipe which connects the lower portion of the boiler with the supplemental heater; the object of this last construction being to effect a perfect
30 filtering of the water, and deposit of the sediment, and to control its blowing off readily.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical, longitudinal section.
35 Fig. 2 is a horizontal section on line $x-x$ of Fig. 1. Fig. 3 is a section of a modification of the supplemental heater. Fig. 4 is a detail of pipe D, one half in section. Fig 5 is a horizontal section of the filter-box on the line
40 $z-z$ of Fig. 6. Fig. 6 is a vertical section on line $y-y$ of Fig. 5.

The boiler A, which is here shown, in outline, as a type of the locomotive boiler, has a fire-box B. In this fire-box are supported in
45 suitable manner, one or more supplemental heaters C, here shown as two in number and set at an inclination. These supplemental heaters have heretofore usually been made rectangular in cross section and provided with
50 transverse flues through them. It has been

found, in practice, that this construction is liable to burn out, and the tubes or flues to leak, and I have, therefore, constructed the supplemental heater curved in cross section, preferably circular, and without any trans-
55 verse tubes or flues; and further, to better withstand the heat and absolutely prevent any leaking, I make the heater of a single piece of metal, preferably copper, without joint or rivet, as I have shown.

In one form, and that which I prefer, the supplemental heater is provided with an inlet pipe or neck c at its lower end, and an outlet pipe or neck c' from its upper end, both of which are made integral with the
65 body of the supplemental heater, so that in this form there is no joint or seam whatever throughout the entire vessel or heater, exposed within the fire-box. I do not, however, confine myself to thus making the inlet and
70 outlet necks integral with the body of the heater, for, as shown in Fig. 3 I may make them separate, and screw them into the heater. These necks are bent as shown, whereby they
75 may be successively fitted through the sleeves b formed in the walls of the fire-box whereby the heater is readily adjusted. It may also be as readily taken out, when necessary, by taking off the flanges c^2 on the ends of the
80 necks and uncoupling them from the adjacent connections. This bending of the necks and the general inclination of the supplemental heater is such that its expansion and contraction do not strain any of the connected
85 parts, so that no joints can be loosened. The upper neck c' of each heater joins a pipe D which extends upwardly, and is connected with a pipe E entering the upper portion of the boiler.

In one of the pipes D, I make on each side
90 holes d which open into seats d' containing cocks d^2 , and having sight apertures d^3 opposite the holes d in the pipe D. When the sight apertures and the ports in the cocks and the holes in pipe D are all in line, inspection
95 may be had of the circulation.

The sight apertures are formed in insertible nuts d^4 , and are covered with glass, and in case this glass should break, one of the
100 cocks d^2 is turned to prevent the water or

steam from coming out through the sight aperture, until it can be repaired.

F are pipes which communicate with the lower necks of the supplemental heaters.

5 These extend under the boiler and communicate with the lower portion of the filter box G. This box is a casing secured under the boiler and having direct communication therewith through a controlling cock H seated
10 in the upper portion.

The box G has communication with the pipe F, through a passage *g* which is intersected by a passage *g'* from the box to the exterior air, and at the place of intersection is formed
15 a seat in which is fitted a cock K, which is thus adapted to alternately control the passages *g* and *g'* closing one and opening the other and vice versa. Within the box G, at the entrance to passage *g*, is a perforated plate J or other
20 filtering diaphragm through which the water must pass and be thereby filtered before it can flow into the pipe F.

There are, of course, within the filter-box G, two sets of filtering communications, one
25 for each pipe F, and said box may be divided, as here shown, and there are two controlling cocks K, as will be seen. When these cocks are turned to open passages *g*, the water flows through the filters and directly into the pipes
30 F; but when turned at right angles, the ports in these cocks open up the passages *g'* from the filter-box to the outside, and when thus opened all the sediment may be blown out through passages *g'* which thus form special
35 passages under the filtering diaphragm. Opposite these passages *g'* are plugs *g²* to permit the insertion of a scraper into box G for cleaning out any sediment.

The cocks K have levers M and are adapted
40 to be readily controlled from any point, as, for instance, from the stand of the engineer.

In order to provide against accident due to either of the pipes F or its connections clogging up, I may join the pipes by a cross pipe
45 N, so that the flow of water may continue in both to the supplemental heaters, at all times.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

50 1. In a boiler, a supplemental jointless and tubeless heater of circular cross-section, made of a single piece of metal, and having inlet and outlet pipes extending from its opposite ends to points exterior of the fire box, and
55 coupled at said points with pipes leading from the bottom of the boiler and into the upper portion thereof.

2. In a boiler, a supplemental heater in the fire box thereof, composed of an imperforate
60 tubeless body of curved form in cross-section, having an inlet and an outlet neck at opposite ends, said body and necks being formed in-

tegral and of metal without joints or rivets, and said necks being fitted in sleeves formed in the walls of the fire box, and extending to
65 the outside of the fire box and connected with pipes leading from the bottom of the boiler into the upper portion thereof.

3. In a boiler, the combination, with the fire box having sleeves mounted in its walls, of
70 pipes leading from the bottom and into the upper portion of the boiler respectively, and a supplemental tubeless heater mounted in the fire box and having a circular form in cross-section, and having integral bent necks
75 passing through said sleeves whereby the heater is adjustably mounted.

4. In a boiler, the combination of a supplemental heater in the fire-box, a pipe connecting the lower portion of the boiler with the
80 lower portion of said heater and a pipe connecting the upper portion of the heater with the upper portion of the boiler, holes made in said last named pipe outside the boiler, cocks controlling said holes and sight apertures be-
85 yond the cocks, substantially as and for the purpose described.

5. In a boiler, the combined filter and blow off therefor, consisting of the filter casing communicating with the boiler and having
90 intersecting outlet passages from its lower portion, one of said passages communicating with the circulating channel, and the other opening exteriorly, a filter in the box controlling the former passage, and a cock at the in-
95 tersection of said passages adapted to alternately control them, substantially as and for the purpose herein described.

6. In a boiler, the combined filter and blow off consisting of the filter casing in the circu-
100 lating channel of the boiler, communicating with the lower portion of the boiler and having a cock controlling said communication, said filter casing having intersecting outlet
105 passages from its lower portion, one of said passages communicating with the circulating channel, and the other opening exteriorly, a filter in the box controlling the former passage, and a cock at the intersection of said
110 passages adapted to alternately control them, substantially as and for the purpose herein described.

7. In a boiler, duplicate supplemental tubeless heaters of circular cross-section, placed side by side within the fire box, and each
115 having a pipe connecting it with the upper and lower portion of the boiler, and a cross pipe connecting the inlet pipes of each heater.

In witness whereof I have hereunto set my hand.

JOHN C. H. STUT.

Witnesses:

CHAS. E. KELLY,
G. E. KELLY.