

No. 766,873.

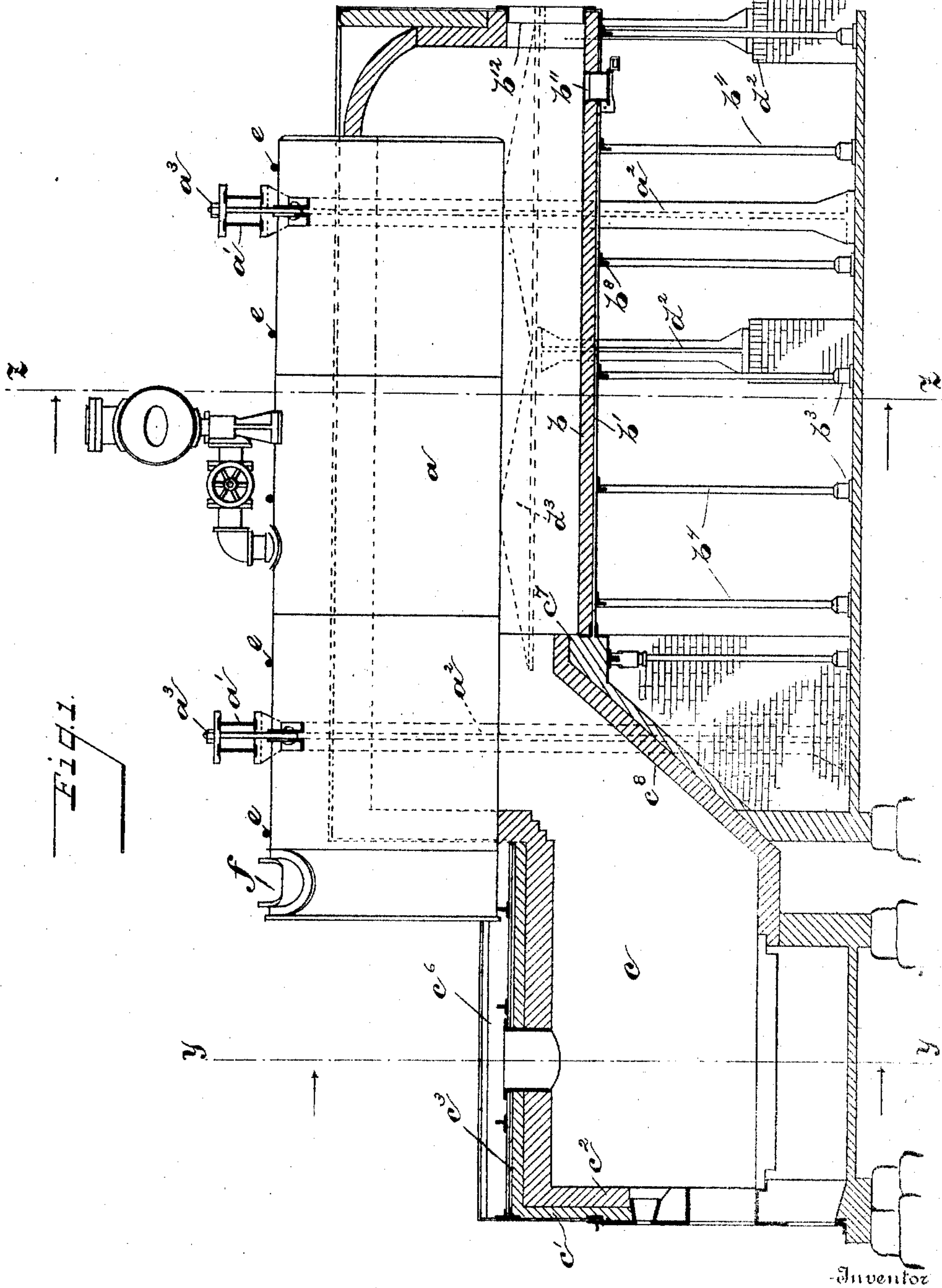
PATENTED AUG. 9, 1904.

J. F. CASEY.
STEAM BOILER.

APPLICATION FILED MAR. 28, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
J. Newell Walker
Chas. J. Welch

James F. Casey
Staley & Bowman
Attorneys

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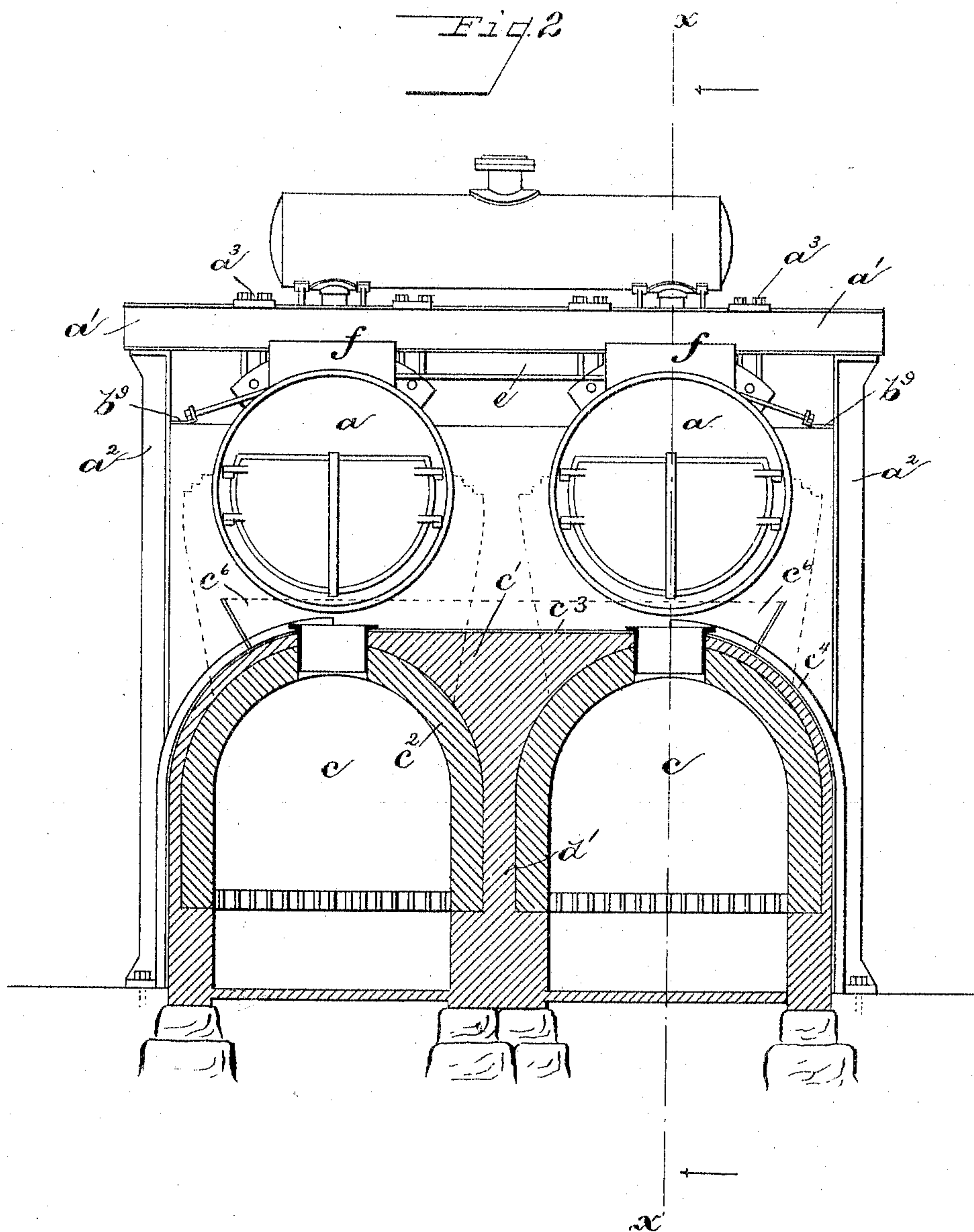
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J. F. CASEY.
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NO MODEL.

3 SHEETS—SHEET 2.



Inventor

Witnesses
J. D. Dwyer & Walker
Chas. J. Welch

By James F. Casey
Staley & Bowman
Attorneys

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3 SHEETS—SHEET 3.

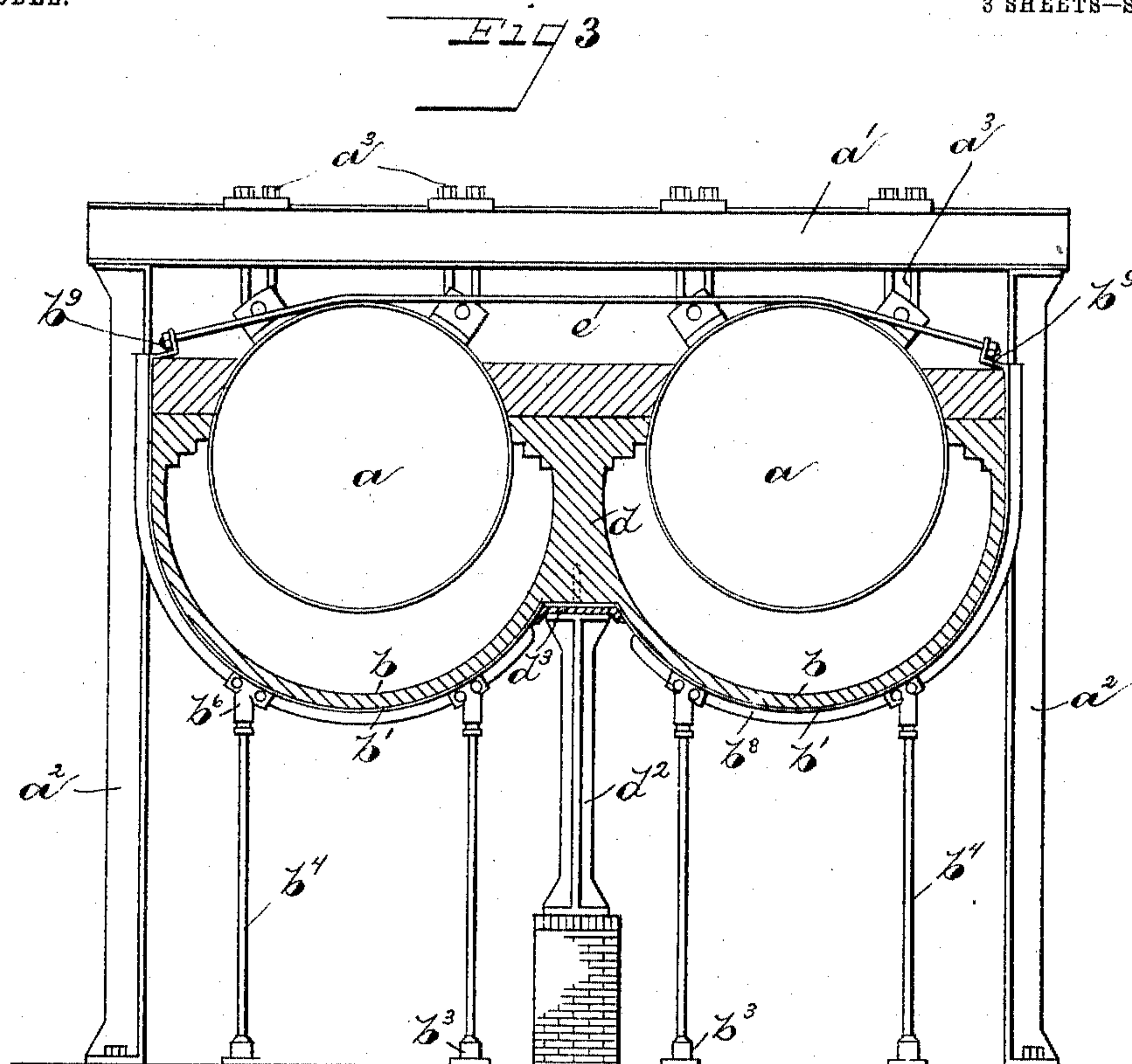


Fig. 4.

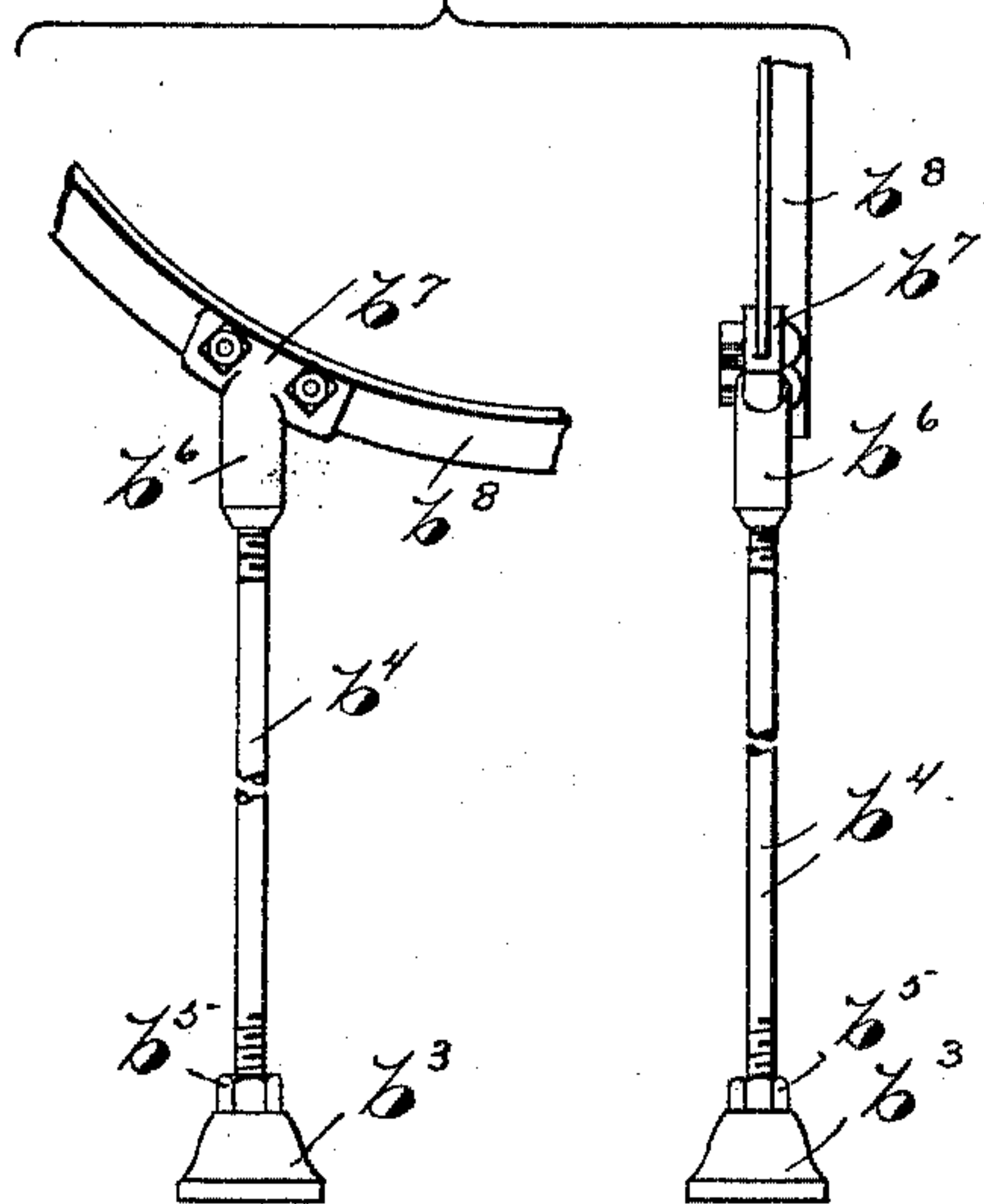


Fig. 5.

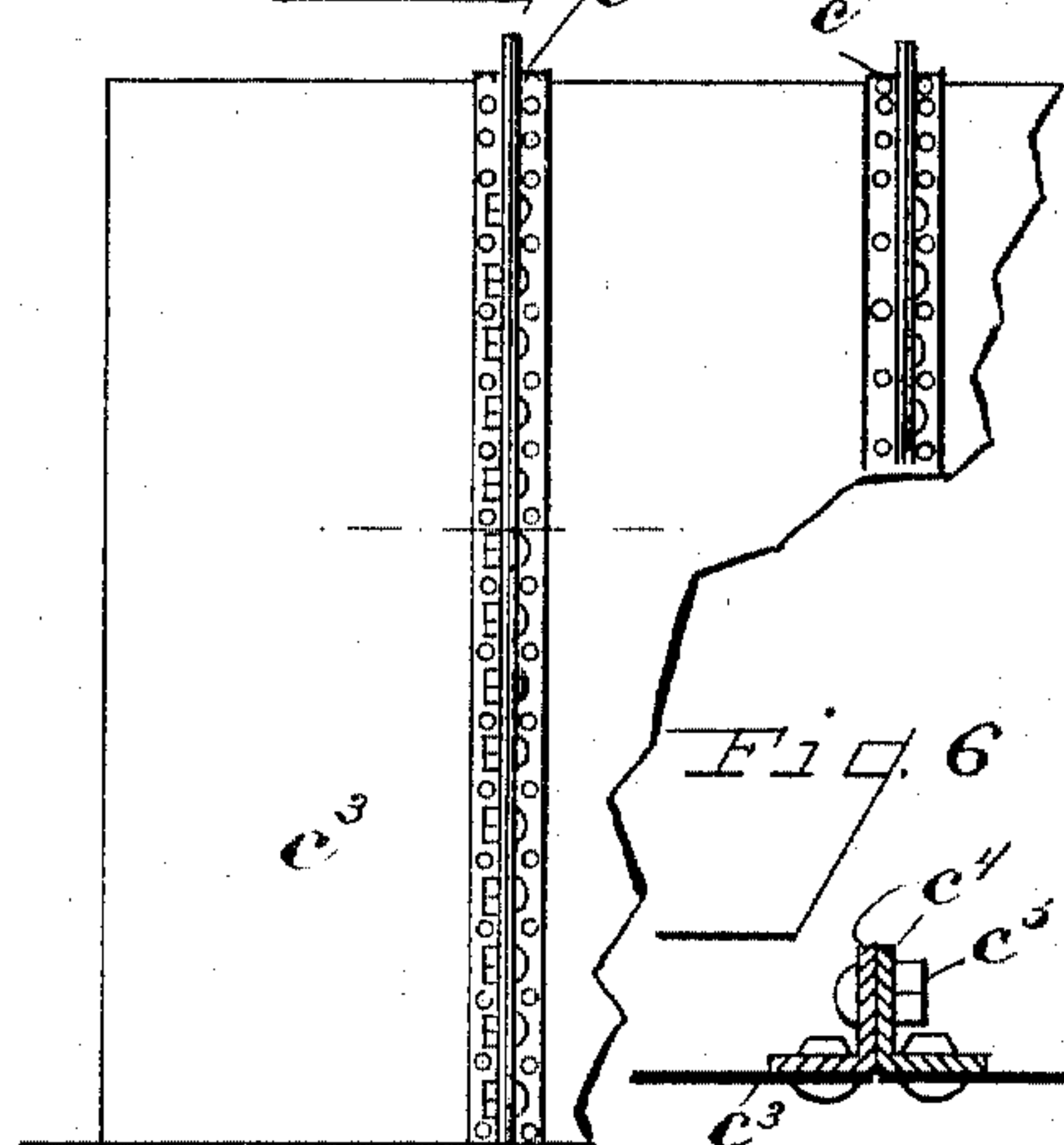


Fig. 6.

Inventor

Witnesses

J. Lowell Walker
Chas. J. Welch

By

James F. Casey
Staley & Bowman
Attorneys

UNITED STATES PATENT OFFICE.

JAMES F. CASEY, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO THE
CASEY & HEDGES MANUFACTURING COMPANY, OF CHATTANOOGA,
TENNESSEE, A CORPORATION OF TENNESSEE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 766,873, dated August 9, 1904.

Application filed March 28, 1904. Serial No. 200,263. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. CASEY, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to steam-boilers, and especially to the boiler-setting and furnace, including the construction and arrangement of same.

The object of the invention is to greatly simplify the construction, increase the efficiency, provide a construction which will easily permit repairs to the boiler or furnace, and to provide external means for adjusting either the boiler or setting when out of alignment.

A further object is to provide a structure in which either a single or several boilers may be independently employed and to provide a structure suitable for any stationary setting.

A further object is to provide a furnace suitable for using to advantage such fuel as sawdust, bagasse, &c., and one in which all the gases will be consumed at the most advantageous point and the furnace thus rendered practically smokeless.

With the above primary and other incidental objects in view the invention consists of the devices, constructions, and parts or their equivalents hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a longitudinal sectional view on the line xx of Fig. 2. Fig. 2 is a transverse sectional view on the line yy of Fig. 1. Fig. 3 is a transverse sectional view on the line zz of Fig. 1. Fig. 4 shows details of adjustable casing support or jack. Fig. 5 is a side view of a portion of the furnace-jacket. Fig. 6 is a detail of construction of said jacket.

Like parts are represented by similar reference characters in the several views.

In the drawings, a represent the boilers, which are of the ordinary tubular type. b is the casing surrounding the lower portion of

said boilers, and c is the furnace, which is of a Dutch-oven style. The furnace c is located forward of and entirely below the boiler a . In cross-section the upper half of the oven is 50
semicircular, the interior forming the arc of a true circle, and the throat c^8 is inclined upwardly to the bridge-wall c^7 . The furnace is constructed of brick or masonry c' , having a 55
lining c^2 of fire-brick and a jacket c^3 of steel. This steel jacket, as illustrated in Figs. 5 and 6, is constructed in sections by riveting along either edge of a sheet of steel an angle-iron 60
 c^4 , and when placed in position over the masonry the adjacent angle-irons are connected by bolts c^5 , as shown. By this construction any particular section may be removed for the purpose of making repairs to the masonry 65
without disturbing other sections or the necessity of tearing down the entire structure. In addition to the regular furnace-doors there is in the top of the furnace a stoke-hole, which is especially serviceable when using sawdust or bagasse as fuel. On the top of the furnace 70
at c^6 , Fig. 1, and in solid and dotted lines, Fig. 2, is shown a pan on which the supply of damp sawdust or bagasse may be partially dried before its introduction to the furnace.

The boilers a are suspended from the trans- 75
verse beams a' , which in turn are supported on the upright columns a^2 . The proper alignment of the boilers is secured through the suspension-bolts a^3 . Arranged about the lower portion of said boilers and eccentric 80
therewith is a fire-brick casing b , forming a combustion-chamber for the gases, inclosed in a steel jacket b' . The casing b extends from a point in the rear of the boilers a to the bridge-wall c^7 of the furnace. It will be noted that 85
the intersection of said casing b with the bridge-wall c^7 is somewhat below the top of the latter. The object of thus depressing the casing is to allow sufficient space within said casing and below the boilers to permit 90
the entrance, in case of necessity, of a boiler-maker to make repairs.

The steel jacket b' of the casing is secured to the upright columns a^2 , thus forming a

rigid structure and preventing any tendency to weave backward or forward, and the casing b is further supported by a series of adjustable standards in the nature of jacks.

5 These standards, as shown in Fig. 4, consist of a base b^3 having a screw-threaded opening therein to receive the end of a rod b^4 , which is screw-threaded at either end with a right and left thread, respectively, said rod being
10 provided with a lock-nut b^5 and at the upper end engages a head b^6 , provided with inclined jaws b^7 , which rigidly engage an angle-iron b^8 , riveted to the steel jacket b' . By the adjustment of these standards the alinement of the
15 casing b is readily secured.

To prevent any bulging of the casing and to correct any "bagging" the cross-tie rods e are provided. These cross-ties are provided with adjusting-nuts and engage at either end
20 with angle-clips b^9 , which are connected to the steel casing b' , thus connecting at the top the two sides of the casing b .

In the bottom of the casing b near the rear end is an opening b^{11} , covered by a door, the
25 purpose of this being to facilitate the removal of the ashes which may accumulate in the combustion-chamber behind the bridge-wall and between the casing and boiler. By dropping this door the operator working through
30 the opening b^{12} in the back of the casing with a scraper can thoroughly clean the combustion-chamber.

It will be noted that thus far the description has related to one boiler and one furnace;
35 but it is to be understood that this construction can be used singly or in a battery of any desired number.

When used in series, there is constructed between each of the boilers and furnaces a
40 dividing-wall, (indicated by d and d' , respectively.) The object of this construction is to permit the use of any one of a series of boilers independent of all the others. As will be noted especially in Fig. 3, the dividing-wall
45 d is constructed entirely within the steel jacket b' and is supported by a lintel-plate d^3 , resting on columns d^2 . The lintel-plate d^3 is preferably channel-shaped, as shown in Fig. 3, and extends the length of the boilers, (see
50 Fig. 2,) and to it is riveted the jacket b' of the casing b .

The arched top of the furnace-oven causes the rays of intense heat to converge toward the center of the oven, where they dry and to
55 a certain extent coke the fresh fuel, hasten combustion, and set free the gases. The heat-rays are directed upward through the throat and striking the round bottom of the boiler diverge to either side. The free gases are
60 also carried upward and, being entirely consumed in their passage through the throat and casing b , thus add greatly to the heating efficiency and render the furnace practically smokeless.

It will be further noted that the superheated
65 products of combustion are conducted through the combustion-chamber in contact with the outside of the boiler-shell to the rear end thereof, from which place they return through the boiler-tubes to the front end of the boiler,
70 the attachment to the stack being made at the point f .

Having thus described my invention, I claim—

1. In a construction as described, the combination with a boiler and a furnace, of a casing
75 arranged eccentric with said boiler, a steel jacket for said casing, and adjustable means connected with said jacket for securing the alinement of said casing. 80

2. The combination with a boiler, of a furnace located below and in front of said boiler, said furnace having a steel sectional jacket, an arched oven, an inclined throat terminating at a point in proximity to the front end
85 of said boiler, and a combustion-chamber extending throughout the length and partly around said boiler, the bottom of said chamber being in a lower plane than the termination of said inclined throat, substantially as
90 specified.

3. In a construction as described, the combination with a furnace and a boiler having a surrounding casing, of adjustable supports for said casing consisting of a foot-block, a
95 head-piece connected with said supported member, and a screw-threaded connection between said foot-block and said head-piece, substantially as specified.

4. In a construction as described, the combination with the furnace and boiler, of a casing
100 for said boiler, supports for said casing, a jacket surrounding said casing, and adjustable tie-rods for alining said casing.

5. In a construction as described, the combination with a furnace and boiler, of a casing
105 for said boiler, supports for said casing, a jacket for said casing extending to the top thereof, and horizontal tie-rods for surrounding said casing, substantially as specified. 110

6. In a construction as described, a plurality of boilers, a casing for each of said boilers forming an independent combustion-chamber, a plurality of furnaces, an arched oven and an inclined throat in each of said furnaces,
115 each of said inclined throats connecting with one of said combustion-chambers, a single jacket formed of a plurality of detachable sections for said furnaces, a single jacket for all of said boiler-casings, adjustable tie-rods
120 passing over said boilers and engaging the sides of said jacket, and a plurality of adjustable vertical supports for said casing-jacket, substantially as specified.

7. In a construction as described, the combination of a plurality of boilers, a casing
125 partially surrounding each of said boilers, dividing-walls between each of said boilers, a sin-

gle jacket inclosing all of said casings and dividing-walls, a lintel-plate immediately under and supporting each of said dividing-walls, and one or more columns supporting each of said lintel-plates, substantially as specified.

8. The combination with a plurality of boilers having interposed dividing-walls, of a lintel-plate supporting each of said dividing-walls, and a plurality of columns supporting each of said lintel-plates, substantially as specified.

9. In a construction as described, a plurality of furnaces, a plurality of boilers, and a dividing-wall between each of said furnaces and each of said boilers, a casing for each of said boilers and a single jacket surrounding said casings, upright columns supporting said casings and boilers, a series of tie-rods connecting the sides of said jacket, and means for

adjusting said tie-rods, for the purpose specified.

10. In a construction as described, a plurality of furnaces and a plurality of boilers, a casing surrounding each of said boilers, dividing-walls between each of said casings and said boilers, a single jacket of an inverted-arch-shaped form encircling said casings, columns for supporting it at its center, supporting-columns for supporting said casing at the sides thereof, and a series of adjustable tie-rods extending from the sides of said jacket, for the purpose specified.

In testimony whereof I have hereunto set my hand this 22d day of March, A. D. 1904.

JAMES F. CASEY.

Witnesses:

H. GRANGE,

NORRIS HEADRICK.