

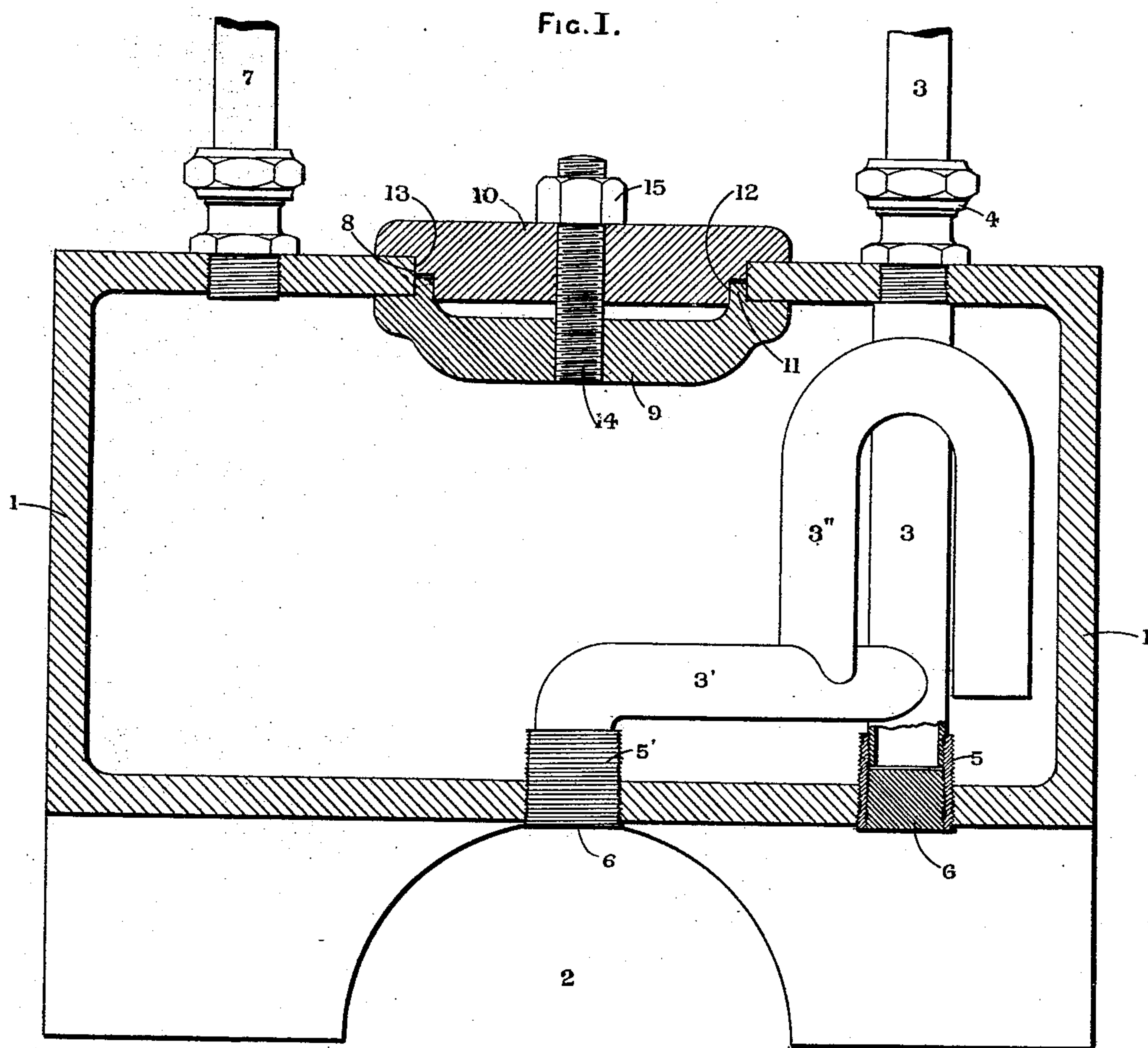
(No Model.)

R. DAVIES.  
BOILER.

3 Sheets—Sheet 1.

No. 486,700.

Patented Nov. 22, 1892.



Attest  
Walter M. Alden  
J. L. Middleton

Inventor  
Robert Davies  
by Ellis Spear  
Atty.

(No Model.)

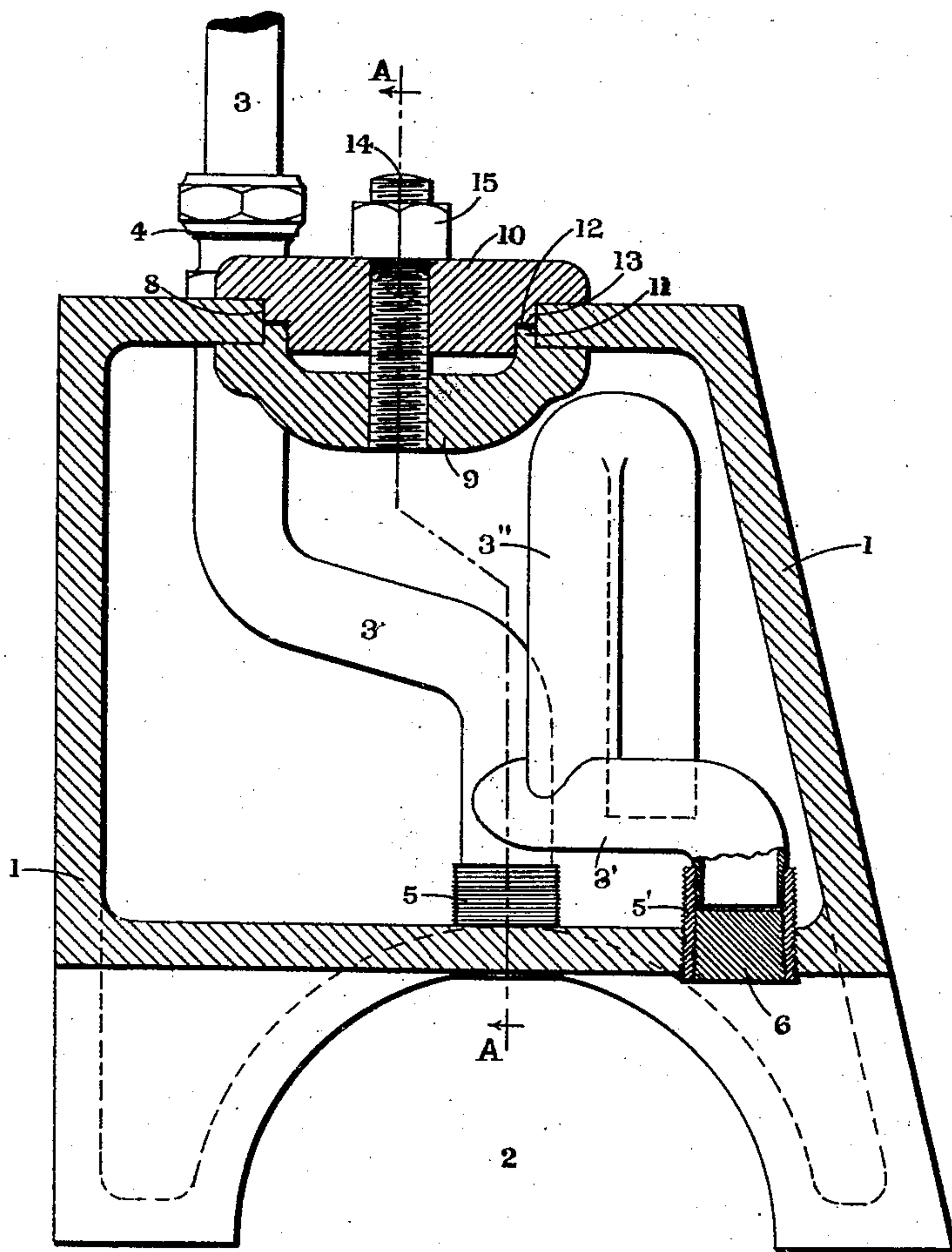
3 Sheets—Sheet 2.

R. DAVIES.  
BOILER.

No. 486,700.

Patented Nov. 22, 1892.

FIG. II.



Attest  
Walter M. Alden  
J. L. Middleton

Inventor  
Robert Davies  
by Ellis Spear  
Atty.

(No Model.)

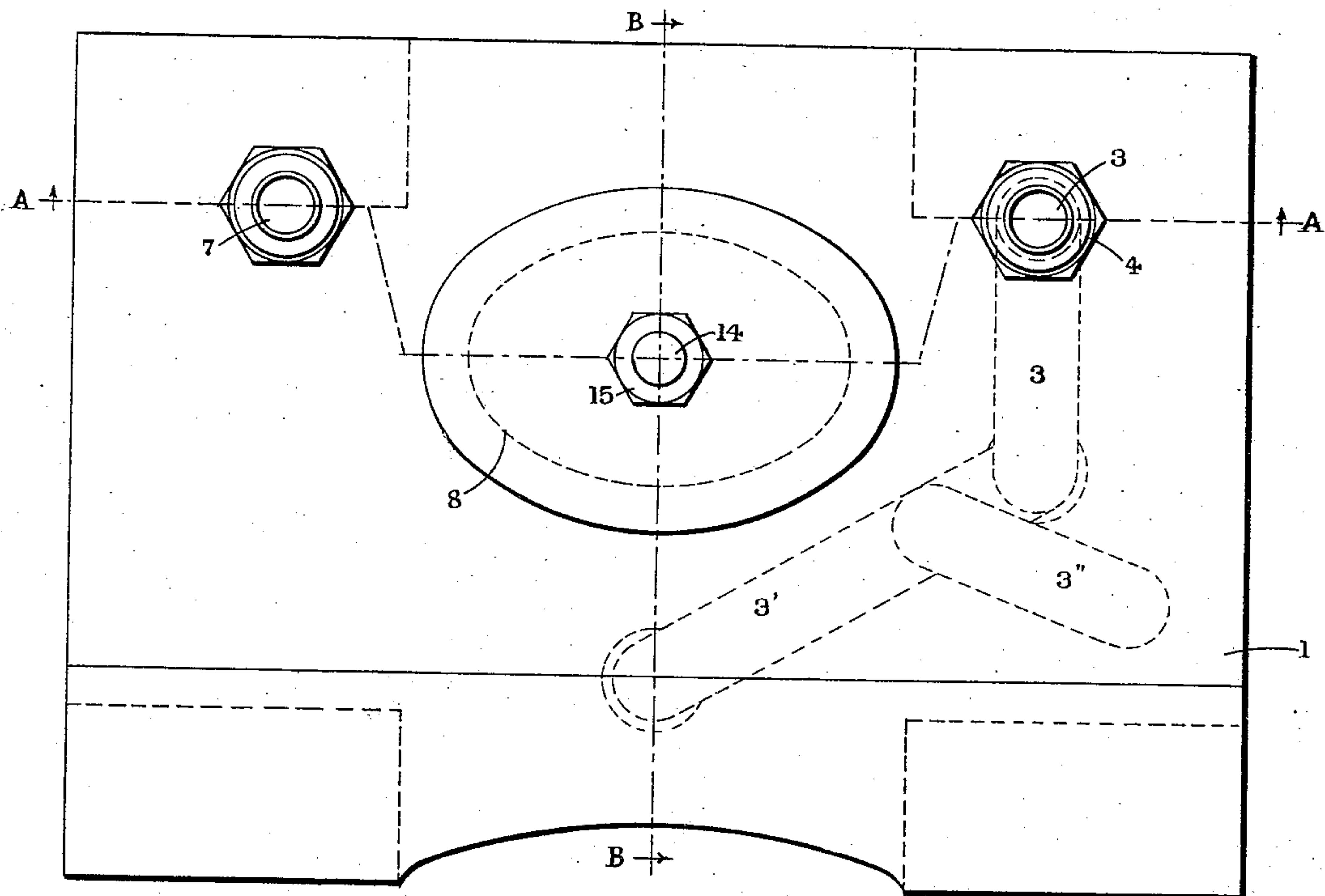
3 Sheets—Sheet 3.

R. DAVIES.  
BOILER.

No. 486,700.

Patented Nov. 22, 1892.

FIG. III.



Attest  
Matters Donaldson  
F. L. Middleton

Inventor  
Robert Davies  
by Ellis Spear  
Att'y.



# UNITED STATES PATENT OFFICE.

ROBERT DAVIES, OF BIRKENHEAD, ENGLAND.

## BOILER.

SPECIFICATION forming part of Letters Patent No. 486,700, dated November 22, 1892.

Application filed March 30, 1892. Serial No. 427,062. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT DAVIES, a subject of the Queen of Great Britain, and residing in Birkenhead, in the county of Chester, England, have invented certain new and useful Improvements in Boilers, in part especially applicable to domestic hot-water-supply boilers, of which the following is a specification.

This invention relates to boilers, and is in part especially applicable to domestic hot-water-supply boilers. It is found in such boilers that when the water-supply is cut off by frost or other causes the water in the boiler soon vaporizes, and as a result the metal of the boiler is raised to a very high temperature. On the resumption of the water-supply the water on entering the boiler and coming into contact with the heated metal immediately flashes off into steam, and a very considerable pressure is at once produced, which, taken in conjunction with the unequal contraction of the metal, is sufficient in most cases to burst the boiler even when there is an opening for the steam to escape, and the object of my invention is to prevent such explosions.

According to my present invention I construct such boilers as follows: I lead the water-supply or feed-pipe through the top of the boiler, through the interior, and out through the bottom of the boiler into the flue or fireplace thereof, so that if the end of the pipe be not plugged up the water passes directly into the fire. I plug the said end up with a fusible plug, which is composed of a metal or alloy which fuses at a temperature just exceeding the maximum temperature to which it is thought desirable to raise the metal of the boiler. From the lower portion of this supply-pipe, within the boiler, I lead a branch pipe up to the top of the boiler, then down to the lower portion, where I form the outlet of the pipe. It will be seen that so long as the fusible plug closes the end of the supply-pipe leading to the fire the water will be forced into the boiler through the branch pipe, but that should the supply be cut off from any cause and the said plug fuse on the resumption of the water-supply the water will pass straight through into the fire instead of coming into contact with the heated boiler and thereby causing an explosion.

The accompanying drawings show the application of my invention to a domestic hot-water-supply boiler.

Figure I is a vertical section on the line A A of Figs. II and III, the internal pipes being shown in part in front of the line of section. Fig. II is a section on the line B B of Fig. III, and Fig. III is a plan.

Throughout the drawings similar parts are indicated by the same reference-figures, and in the case of sections the direction in which they are viewed is indicated by the small arrows placed adjacent to the letters denoting the plane of section.

1 is the boiler, formed with the flues 2, which is built into the back of the fireplace in the usual way.

3 is the water-supply pipe, which enters the boiler by means of the screwed union 4. The supply-pipe 3 is carried through the boiler to the screwed ferrule 5, placed on the crown of one of the flues, and a branch 3' is carried to a similar ferrule 5', placed, also, at the crown of one of the flues and as close as possible to the front of the boiler, where the heat is most intense. The ferrules 5 and 5' are screwed internally and externally. They are screwed into place from without and at the same time screwed over the ends of the pipes 3 3'.

6 6' are the fusible plugs, which are threaded and screwed from without into the ferrules, the portions of the ferrules fitting against the boiler-shell and the fusible plugs are preferably made with a slight taper, so as to facilitate a fluid-tight connection. The plugs are made of any of the well-known compositions used for the purpose which melt at the desired temperature.

3'' is a branch from the supply-pipe by which the water-supply enters the boiler so long as the ends of the pipes 3 3' remain plugged. It is made of siphon form, as shown, and the bend carried well up within the boiler in order to minimize as far as possible the possibility of water passing through it when the plugs are melted. For the same reason it is preferably taken from the branch 3' rather than the direct pipe 3, and the branch 3' is carried away from 3 abruptly at a right angle. The pipe 3 is bent, as shown, within the boiler simply to keep the union 4 well back clear of the brickwork-setting.



7 is the delivery-pipe by which the hot water leaves the boiler.

It will be seen that in the event of the boiler becoming unduly heated and the fusible plugs melting not only is the water prevented from entering the boiler and the fire probably extinguished on the resumption of the water-supply, but the hot-water reservoir or cylinder is put in free communication with the atmosphere, and therefore relieved of all pressure, either from without or within.

The branch 3' and second fusible plug 6' are not essential features of my invention. They might be dispensed with and the branch 3'' taken directly from the pipe 3. The arrangement shown is, however, preferable for the reason already stated and for the further reason that either of the plugs might fail to melt.

The arrangement of supply-pipes and fusible plugs, illustrated in connection with domestic hot-water-supply boilers, is obviously applicable, with slight modification, to most, if not all, forms of steam boilers.

In the capping or means of closing the boiler I make the opening 8 in the top of the boiler oval, and I fit thereto two caps—an inner and an outer cap 9 and 10, respectively. The inner cap has a projecting ridge 11 on its upper surface, which determines its proper position in the oval hole. The under portion of the periphery of the outer cap is indented at 12 to fit loosely over this projecting ridge, the adjacent portion of the said periphery at 13 fitting loosely into the oval hole. The outer dimensions of the caps or covers are greater

than those of the hole, and the joint is made between the overlapping surfaces. A screw or bolt 14 is cast or otherwise secured to the inner cap and passes through the outer cap, the pressure necessary to make this joint being obtained by tightening a nut 15, which bears on the outer cap. It will be seen that by this construction it is impossible to make the joint with the inner cap out of position—a mistake frequently made by careless workmen with the usual construction.

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

1. The improvement in boilers which consists in leading the water-supply pipe through the boiler to the flue or fireplace and plugging the end or ends thereof with one or more fusible plugs and providing within the boiler a branch from the said supply-pipe, through which the boiler receives its supply, substantially as described and illustrated.

2. In domestic hot-water-supply apparatus, the combination of the water-supply pipe 3 3', fusible plugs 6 6', and supply branch 3'', substantially as and for the purpose described and illustrated.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ROBERT DAVIES.

Witnesses:

ROBERT A. SLOAN,  
26 Castle Street, Liverpool, Patent Agent.  
J. E. LLOYD BARNES,  
26 Castle Street, Liverpool.