

No. 628,817.

Patented July 11, 1899.

W. KNEEN.

AIR FEEDING APPARATUS FOR BOILER FURNACES.

(Application filed Feb. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

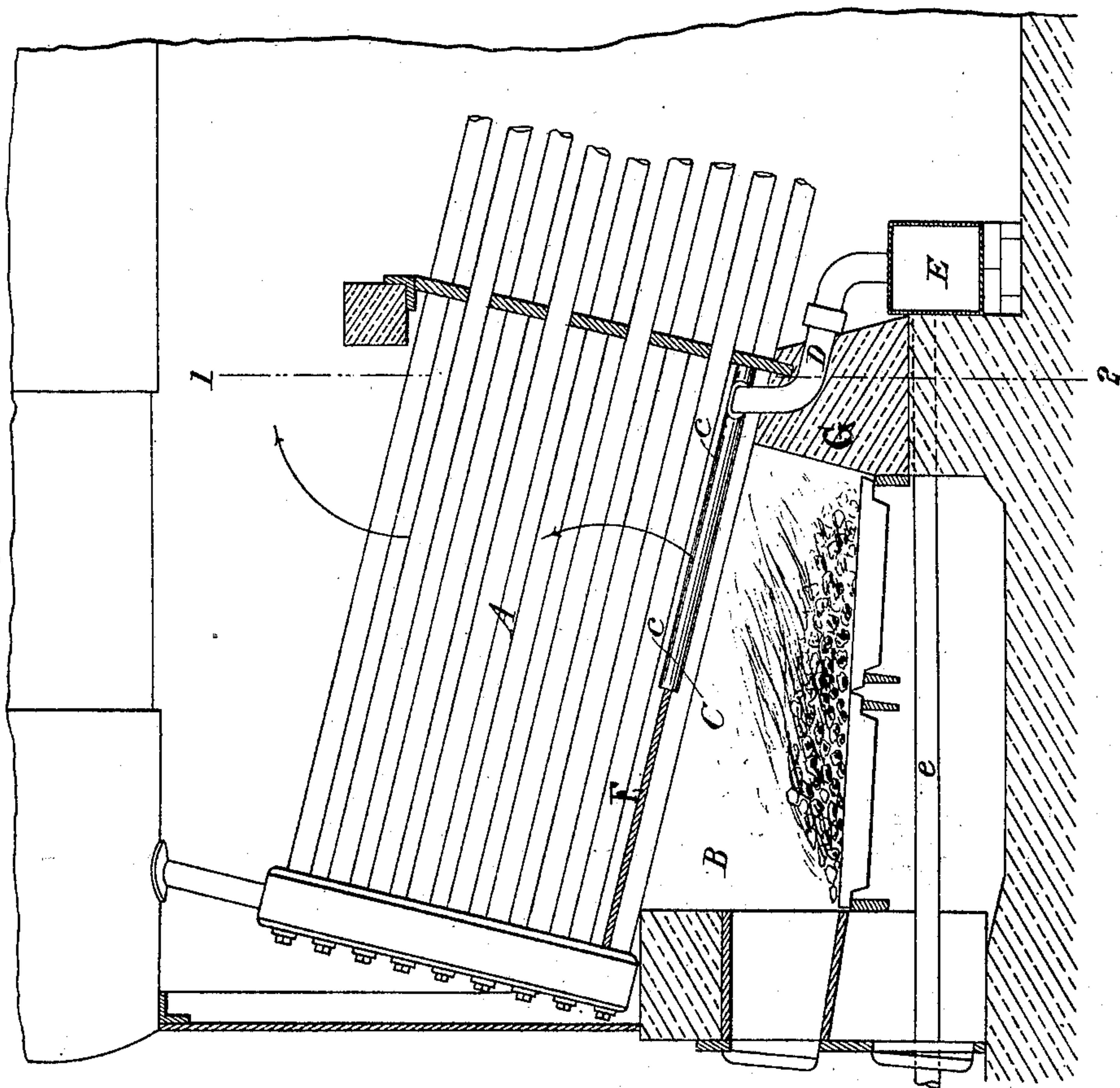
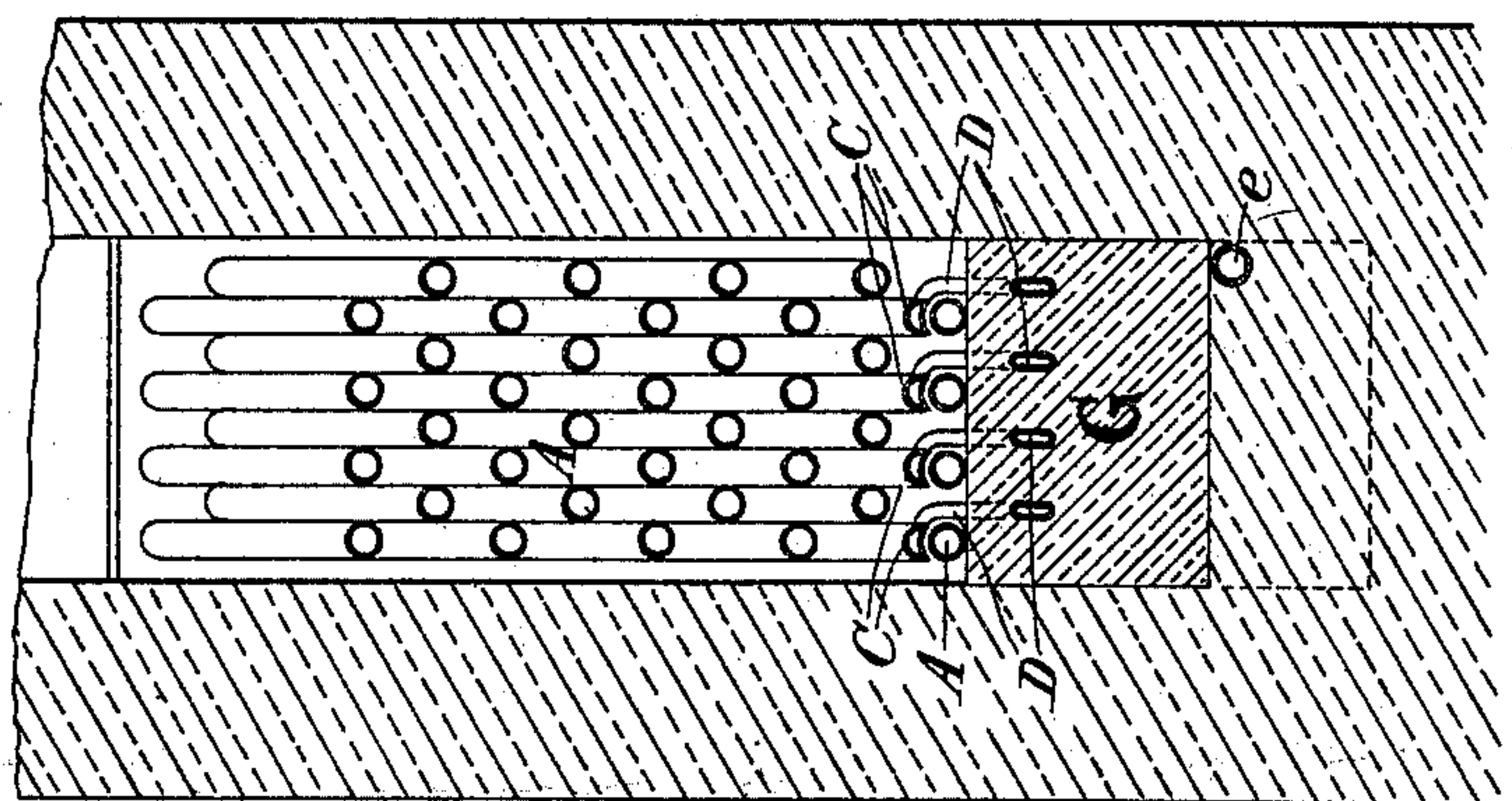


Fig. 1.



WITNESSES:

*P. W. Wright*  
*S. C. Connor*

INVENTOR

WILLIAM KNEEN

BY

*Horton and Horton*  
HIS ATTORNEYS.

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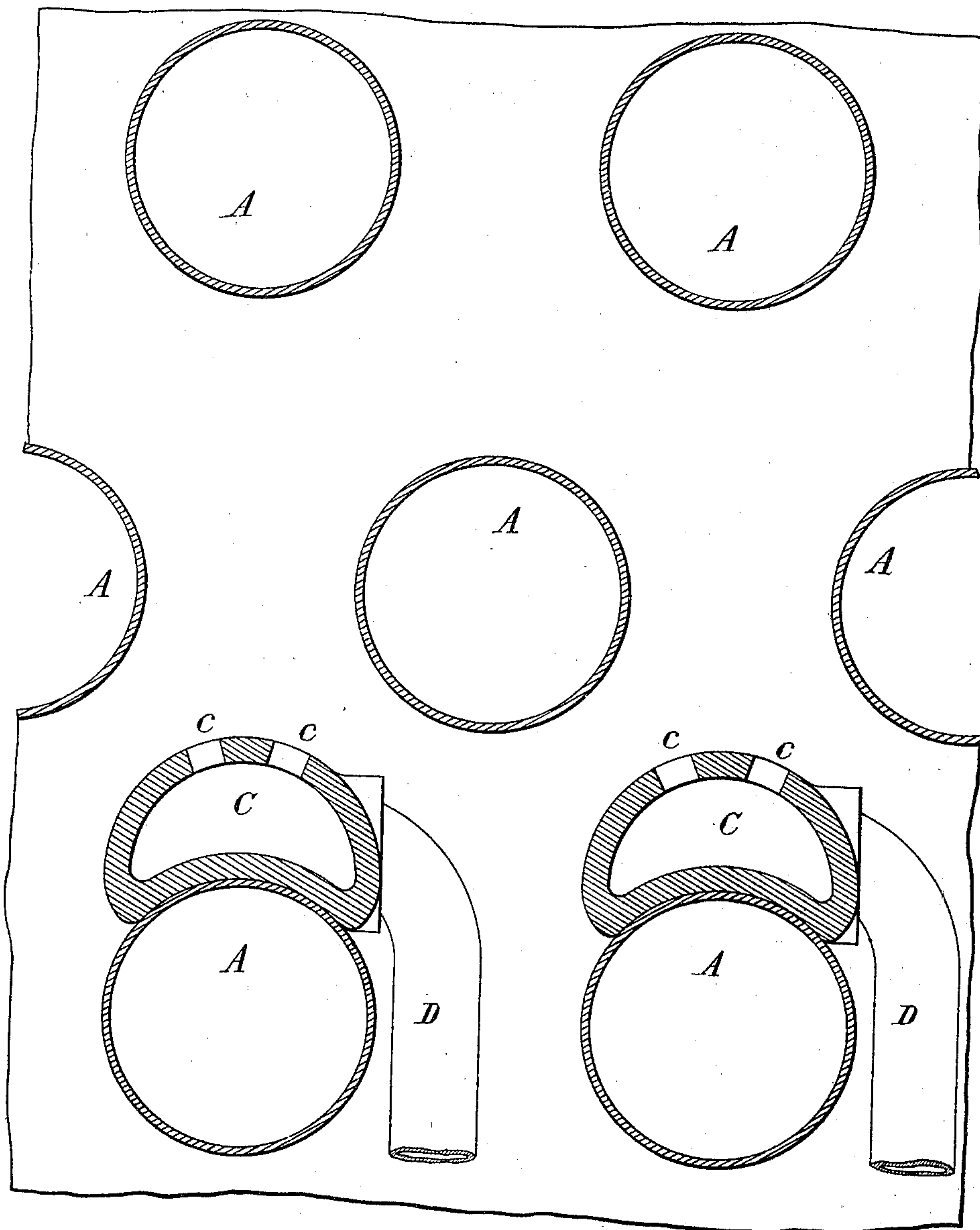
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Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM KNEEN, OF LONDON, ENGLAND.

## AIR-FEEDING APPARATUS FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 628,817, dated July 11, 1899.

Application filed February 16, 1899. Serial No. 705,679. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM KNEEN, a subject of the Queen of Great Britain and Ireland, and a resident of 17 Coleman street, in the city of London, England, have invented certain new and useful Improvements in Air-Feeding Apparatus for Boiler-Furnaces, (for which I have applied for a patent in Great Britain, No. 16,127, dated July 23, 1898,) which improvements are fully set forth in the following specification.

My invention relates to boilers of the water-tube class, such as those known as "Babcock" boilers, for example, wherein water-tubes are disposed over or around the fire; and it has for its object to provide means whereby a thorough combustion of the fuel is effected by the admixture of atmospheric air with the products of combustion either immediately before or after they have passed between the tubes or as they pass between them. For this purpose to each of the said tubes forming the lower or innermost row of tubes, and, if desired, also to those of a row or rows above them or outward of them, I apply air-pipes with apertures therein, through which air can be forced by any suitable device—such, for example, as a fan, blower, or steam-jet. The said pipes are preferably made "saddle-shaped," so as to seat snugly against the water-tubes, and the apertures in the said pipes may be in one row or in two or more rows or be otherwise disposed in the said pipes.

I will describe, with reference to the accompanying drawings, an arrangement according to my invention, premising, however, that I do not limit myself to the precise arrangement of details shown.

Figures 1 and 2 are vertical sections, at right angles to each other, of part of a Babcock boiler and furnace to which my invention is applied. The section Fig. 1 is taken on the line 1 2, Fig. 2. Fig. 3 is a transverse section of some of the water-tubes, showing (to a larger scale) the air-pipes applied thereto.

A are the water-tubes, and B the furnace. To each of the water-tubes of the lower row is applied an air-pipe, C-shaped at bottom, to seat upon the water-tube and lie thereon parallel therewith and extending the length of the passages through which the products of

combustion pass from the furnace. These passages are limited at the front by the baffle plate or plates F over the fire-box and at the back by the bridge-wall G. The said air-pipes are perforated at c. They may be attached below the water-tubes or at the side or sides thereof; but I prefer to arrange them as shown in the drawings. The air is supplied to the pipes by any suitable air-forcing device. In the arrangement shown in the drawings the lower ends of the air-pipes are connected by the pipes D, passing through the bridge or wall, with an air-chamber E immediately behind the bridge or wall, a main air-pipe e being attached to the said chamber E, by which air is conveyed from the air-forcing device. By these means air is conveyed to the products of combustion in finely-divided jets and thoroughly mixed with them throughout their whole extent immediately after they leave the fuel in the furnace and on their way between the water-tubes.

The invention may be applied to boilers in which the water-tubes are in a horizontal or a vertical position or at some intermediate angle.

Creosote, tar, petroleum, or other hydrocarbon liquids may be mixed with cheap solid fuel and be effectually consumed in a furnace provided with my invention by increasing the pressure of air ordinarily supplied by the air-forcing device, so as to meet the chemical requirements for the consumption of the extra gas arising from the combined liquid and solid fuel.

The pipes C and the pipes D (or so much of them as is exposed to great heat) are preferably made of plumbago after the manner in which plumbago crucibles are made.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In water-tube boilers, the combination of the lower or inner tubes thereof with a baffle plate or plates over the front of the fire-box, a bridge-wall at the back, perforated air-pipes and an air-forcing device, the said air-pipes being arranged in the passage between the said bridge and baffle plate or plates, substantially as described.

2. In water-tube boilers, the combination

of the lower or inner tubes thereof, with a  
bridge-wall at the back of the fire-box, per-  
forated air-pipes made to fit against the said  
lower tubes, an air-box at the back of the  
5 bridge-wall, into which air is forced, and pipes  
in the bridge-wall, connecting the box with  
the perforated pipes, substantially as de-  
scribed.

In testimony whereof I have signed this  
specification in the presence of two subscrib- 10  
ing witnesses.

WILLIAM KNEEN.

Witnesses:

WILLIAM FREDERICK UPTON,  
WILLIAM JOHN WEEKS.