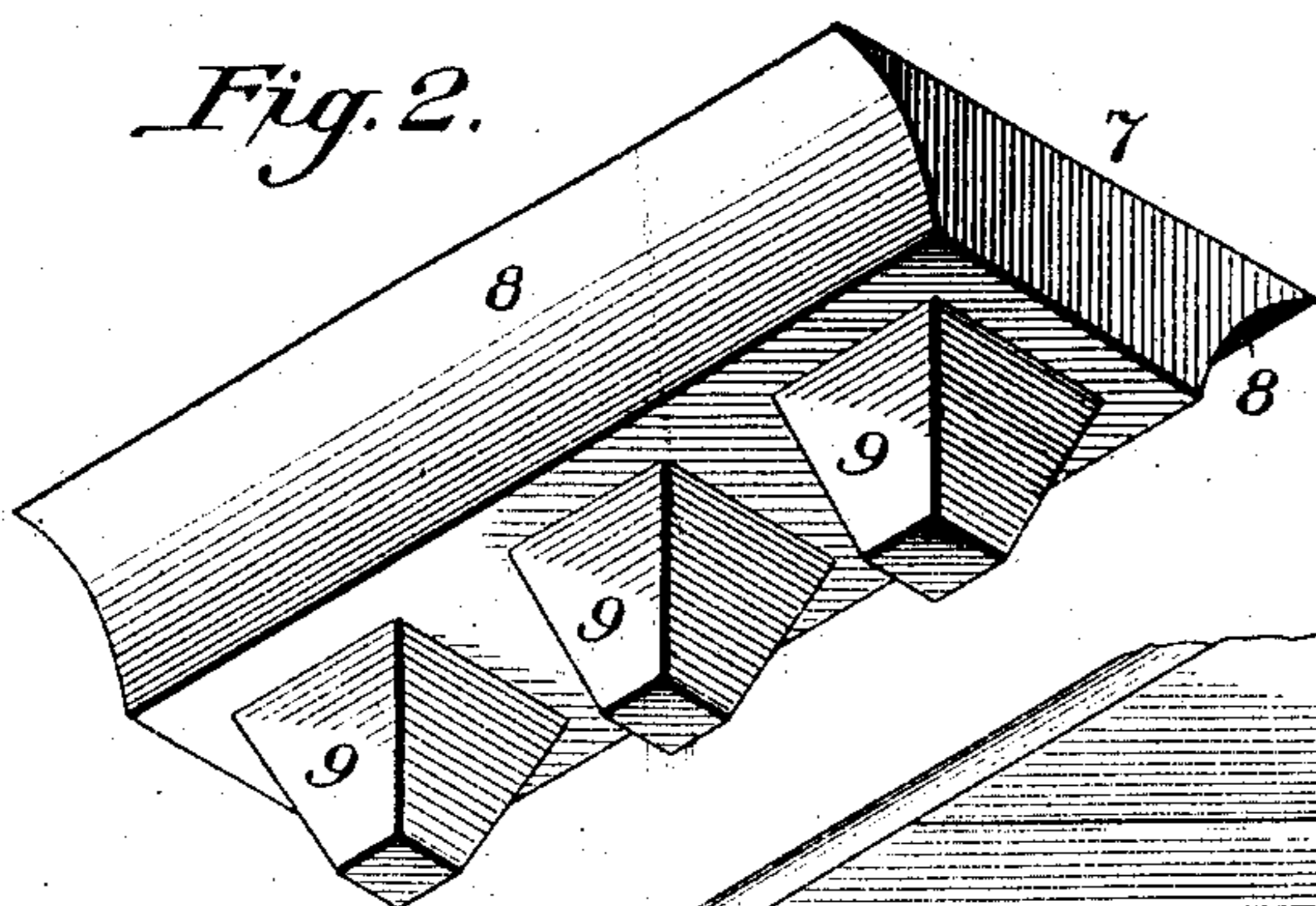
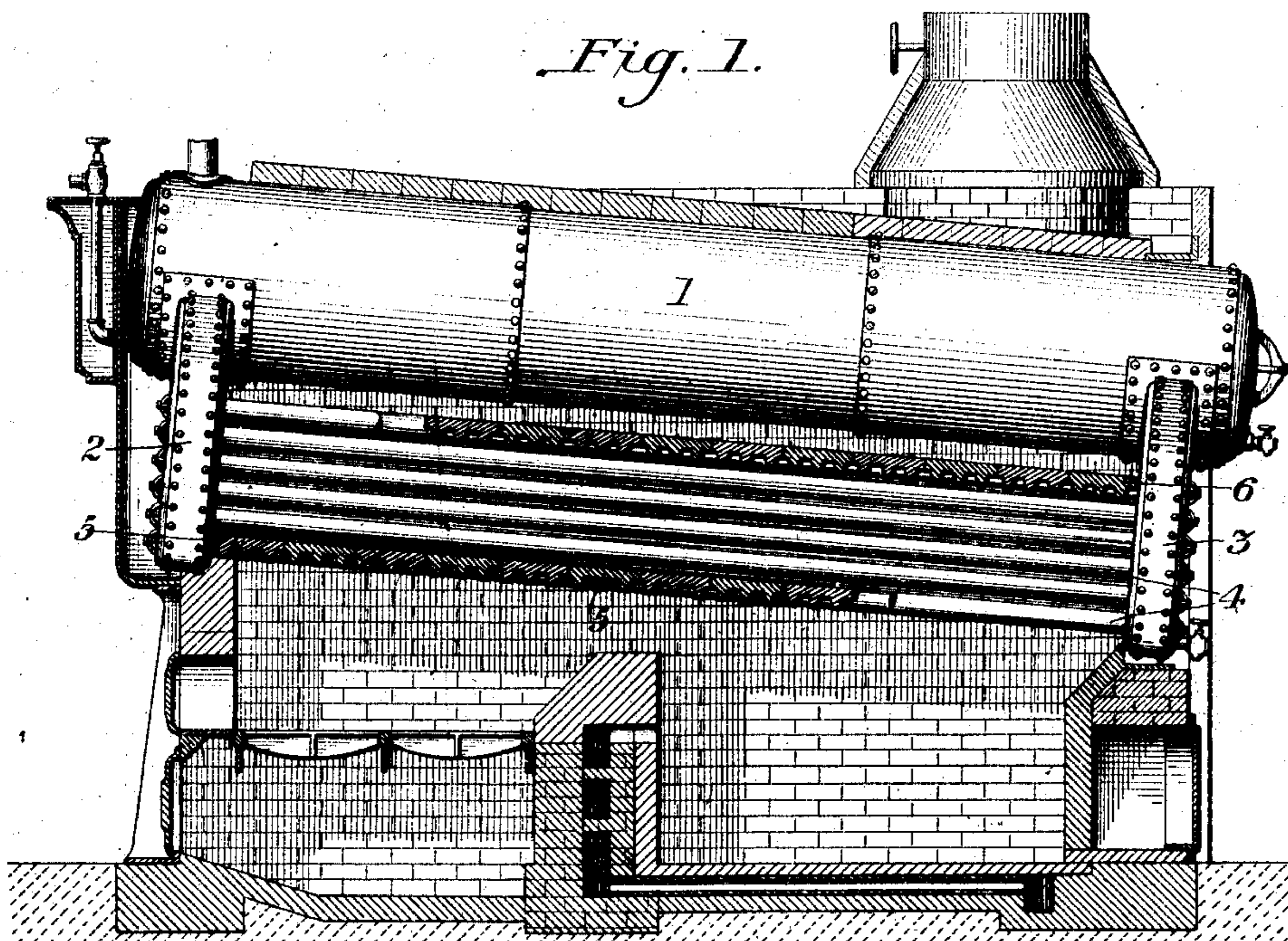


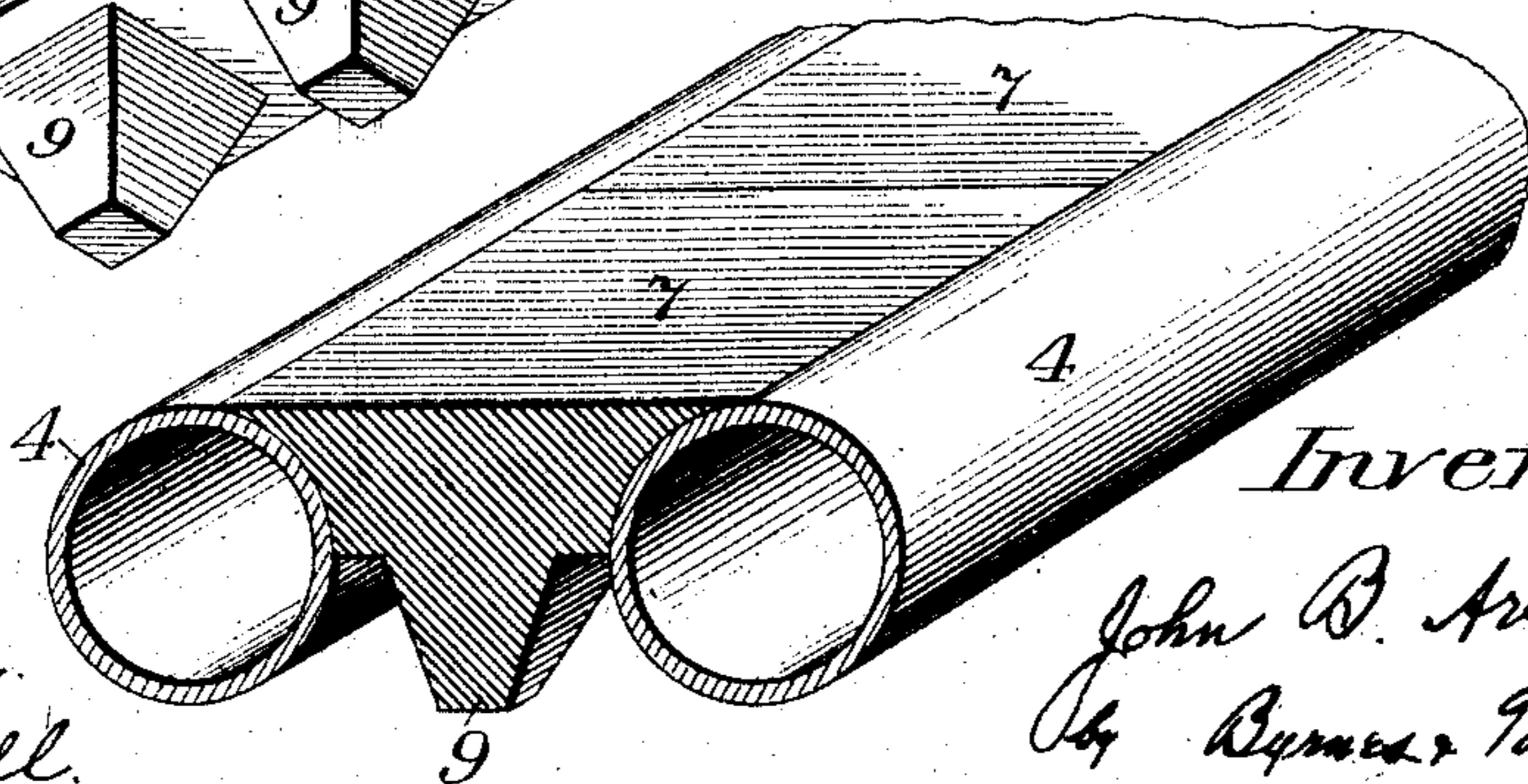
J. B. ARCHER.  
 BAFFLE PLATE FOR WATER TUBE BOILERS.  
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Patented Dec. 15, 1908



*Fig. 3.*



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN B. ARCHER, OF KENSINGTON, MARYLAND.

## BAFFLE-PLATE FOR WATER-TUBE BOILERS.

No. 906,988.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed February 5, 1908. Serial No. 414,431.

*To all whom it may concern:*

Be it known that I, JOHN B. ARCHER, a citizen of the United States, residing at Kensington, in the county of Montgomery and State of Maryland, have invented certain new and useful Improvements in Baffle-Plates for Water-Tube Boilers, of which the following is a specification.

In steam boilers of the type in which the heating surface consists of a number of parallel water tubes, it is customary to interpose one or more baffles between certain tubes or layers of tubes to cause the outgoing gases to take a tortuous course through the tubes, thereby delaying their escape to the stack until their temperature has been reduced to the desired minimum.

The ordinary baffle consists of a number of fire-clay tiles, resting upon or fitted between the water tubes. I have found that these baffles may be converted into a means for effecting complete combustion of the fuel gases and preventing the deposit of soot upon the water tubes, by providing the tiles with projections which extend outward into the path of the outgoing gases. These projections, which are preferably frusto-pyramidal in shape, soon become heated to incandescence by the outgoing products and not only act mechanically to thoroughly mix any unburned fuel gases with the air, thereby completing their combustion, but also facilitate the combustion and prevent the deposit of soot upon the water tubes by equalizing the temperature of all portions of the products of combustion.

These improved baffle plates can be employed to advantage with any water tube boiler. For the sake of illustration, they are shown applied to a well-known type of boiler comprising a cylindrical steam drum, from the front and rear ends of which depend water legs or headers which are connected by the water tubes.

Referring to the accompanying drawings; Figure 1 is a longitudinal vertical section through the boiler and its furnace, showing parts in elevation. Fig. 2 is a perspective view of one of the improved tiles, viewed from beneath; and Fig. 3 is a perspective view of a portion of two water tubes with tiles between them, viewed from above.

The boiler shown comprises a cylindrical steam drum 1, from the front and rear por-

tions of which depend water legs or headers 2, 3, between which extend the water tubes 4. A horizontal baffle 5, extending from the front water-leg 2 toward the rear water leg 3, closes the spaces between the lower water tubes, except at the rear. A similar baffle 6 extends forward from the rear water leg 3 and closes the spaces between the upper water legs except at the front. The products of combustion rising from the fire box impinge against the lower faces of the tiles of the baffle 5, pass rearwardly over the bridge wall, thence rise, impinge against the lower face of the tiles of the baffle 6, move forward, escape from the water tubes at the front and pass to the stack. Each baffle consists of a number of rows of tiles 7, the tiles of each row abutting at their ends and closing the space between adjacent water tubes.

The construction and arrangement of the tiles is clearly shown in Figs. 2 and 3. Each tile consists of a body portion the lateral edges of which have curved recesses to fit between the upper portions of the water tubes. From the lower face of the tile depend projections 9, here shown as three in number and each having the shape of a frustum of a pyramid with a square base. These projections, which may be of any number and shape, are preferably integral with the tile. The tile may consist of any refractory material but is preferably composed of a mixture of fire clay, 75 parts, and some refractory form of carbon such as plumbago or retort carbon, 25 parts.

It will be seen that each baffle presents a large number of projections which depend into the path of the outgoing gases. These projections, being comparatively narrow, are soon heated to incandescence and thoroughly mix the fuel gases and air, preventing any portion of them from being chilled by the cold water tubes to a point where soot is deposited. The products of combustion which finally escape to the stack pass off as a light gray vapor containing substantially no smoke, soot or unburned fuel gases.

I claim:—

1. A tile consisting of a slab of refractory material adapted to rest upon parallel tubes of a boiler and provided with a plurality of spaced depending projections.

2. A tile consisting of a slab of refractory

material adapted to rest upon parallel tubes of a boiler and provided with a plurality of spaced depending pyramoidal projections.

3. A tile consisting of a slab of mixed fire-  
5 clay and carbon, adapted to rest upon parallel tubes of a boiler and provided with a plurality of spaced depending pyramoidal projections.

4. A tile consisting of a slab of refractory  
10 material having recessed edges adapted to rest upon parallel tubes of a boiler and provided with a plurality of spaced depending projections.

5. A tile consisting of a slab of refractory  
15 material having recessed edges adapted to

rest upon parallel tubes of a boiler and provided with a plurality of spaced depending pyramoidal projections.

6. A tile consisting of a slab of mixed fire-  
clay and carbon, having recessed edges 20  
adapted to rest upon parallel tubes of a boiler and provided with a plurality of spaced depending pyramoidal projections.

In testimony whereof, I affix my signature in presence of two witnesses.

JOHN B. ARCHER.

Witnesses:

JAMES B. COOK,  
GRETCHEN H. COOK.