

No. 756,073.

PATENTED MAR. 29, 1904.

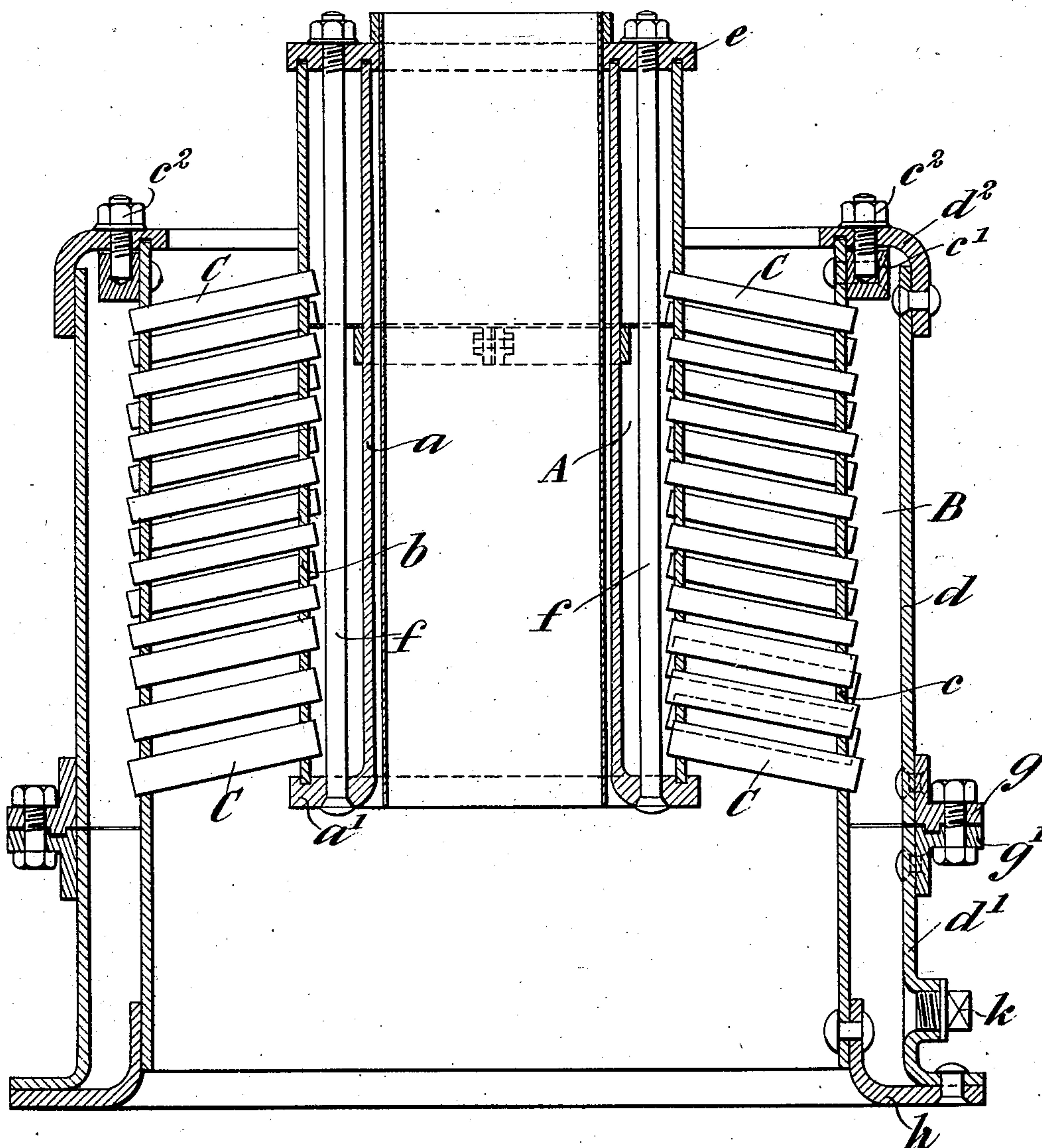
S. STRAKER.  
STEAM GENERATOR.

APPLICATION FILED AUG. 3, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

*Fig. 1.*



WITNESSES

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INVENTOR

*Sidney Straker*  
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*his Attorneys.*

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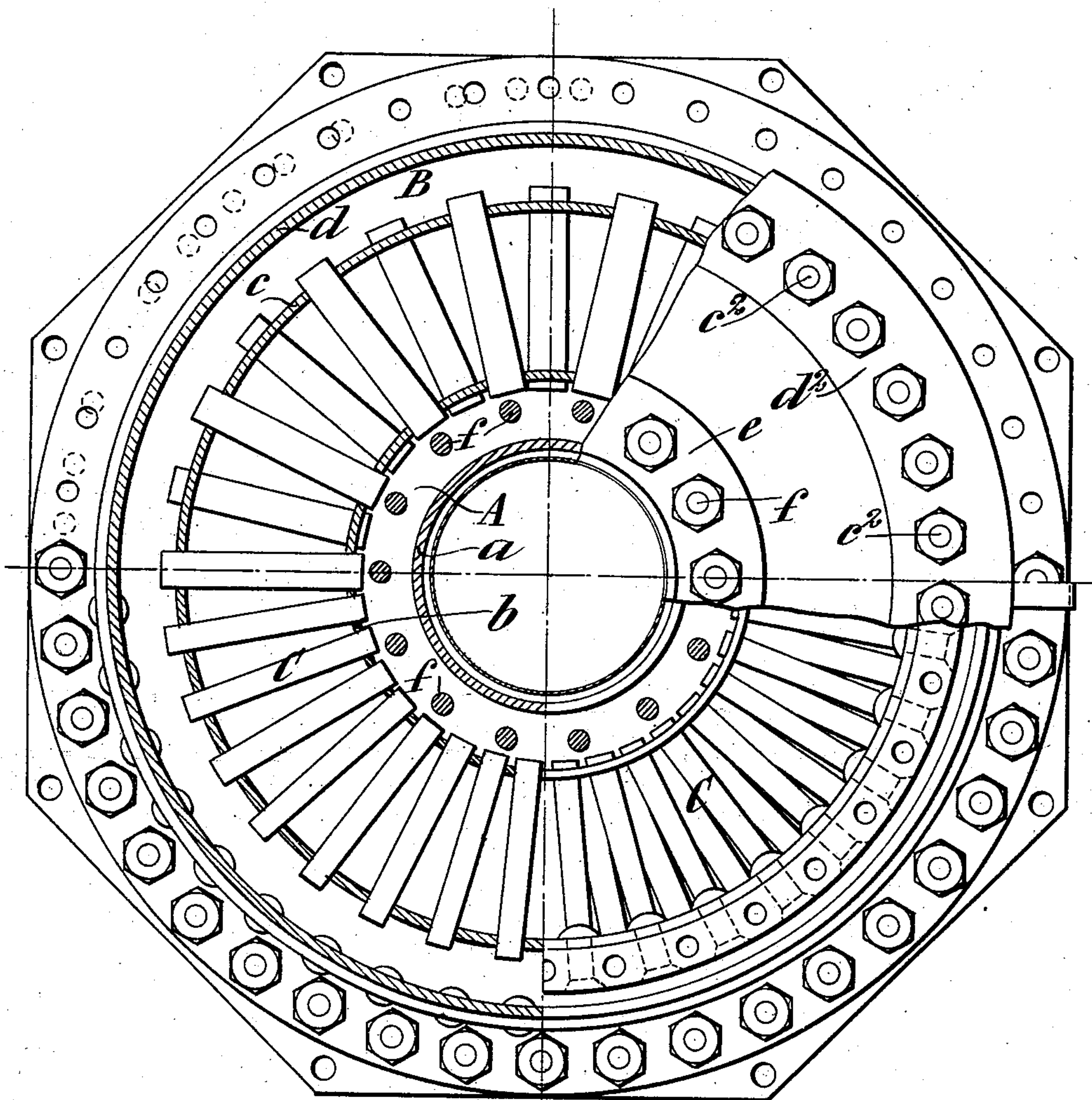
S. STRAKER.  
STEAM GENERATOR.

APPLICATION FILED AUG. 3, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 2.*



WITNESSES

*A. P. Barnes*  
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INVENTOR

*Sidney Straker*  
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# UNITED STATES PATENT OFFICE.

SIDNEY STRAKER, OF LONDON, ENGLAND.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 756,073, dated March 29, 1904.

Application filed August 3, 1903. Serial No. 167,954. (No model.)

*To all whom it may concern:*

Be it known that I, SIDNEY STRAKER, a subject of the King of Great Britain and Ireland, residing at 9 Bush Lane, Cannon street, London, England, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification, for which I have applied for a patent in Great Britain, dated January 23, 1903, No. 1,684.

This invention relates to improvements in the construction of water-tube boilers of the type consisting of two annular concentric water-spaces connected by radial tubes. In boilers of this type as at present constructed no provision can be made for effectively cleaning out the mud deposited in the annular water-spaces or the scale or deposit formed in the tubes without practically taking the boiler to pieces.

The present invention consists in improvements in the construction of such boilers whereby it is possible, first, to dispense with longstay-rods in the water-spaces of the boiler, and thereby render it possible by the provision of mud or wash-out plugs to readily remove accumulations of mud from the water-spaces, and, second, to inspect and clean the tubes by merely slacking two joints and removing part of the outer shell. Another advantage of the construction which secures these objects is that at the same time it reduces the number of packed joints, and therefore the chance of leakage.

In the accompanying drawings, Figure 1 is a sectional elevation, and Fig. 2 a part-sectional plan, of a steam-generator constructed according to this invention.

The boiler consists of two concentric annular water-spaces A B, connected by radial tubes C. The inner water-space is formed between an inner cylindrical shell *a* and the inner tube-plate *b* and the outer water-space between the outer tube-plate *c* and an outer cylindrical shell, which is made in two sections or rings *d d'*, connected to each other, as will be hereinafter described. The upper edges of the inner shell and inner tube-plate are turned to form a plain surface and are fitted into annular grooves on the under side of a heavy ring *e*, which forms the top of the

inner water-chamber, copper gaskets or asbestos or other suitable packing being interposed to form water and steam tight joints. The lower edge of the inner tube-plate is similarly fitted into a corresponding groove in a heavy flange *a'*, formed on the inner shell. The joints are made tight and the parts held together by a number of longstays *f*, screwed into the flange and secured by nuts over the ring *e*.

The upper section *d* of the outer shell is provided with an inwardly-projecting flange *d'*, which may be formed with the shell or riveted thereto, on the under side of which is a circular groove containing packing, which fits over the upper edge of the outer tube-plate *c*. Round the outer tube-plate, near its upper edge, is riveted a heavy ring *c'*, which is drilled and tapped for a number of studs *c''*, passing through the flange *d'*, the joint between the flange and the outer tube-plate being made tight by screwing the stud-nuts home.

The lower edge of the upper ring *d* and the upper edge of the lower ring *d'* terminate in heavy outwardly-projecting flanges *g g'*, respectively, which may be separately formed and then riveted to the outer shell or flanged from the plate. These flanges, which are formed with a circular projection and a corresponding groove on their adjacent faces, are bolted together to form a tight joint. The lower edges of the outer tube-plate *c* and the ring *d'* are closed by a ring *h* of angle section, the vertical limb being riveted to the tube-plate and the other limb to an outwardly-projecting flange, in which the ring *d'* terminates. The flanged ring *h* may be dispensed with by forming the outer tube-plate *c* with a diminished diameter and riveting the two together. A number of screw-plugs *k* are provided near the base of the outer shell, so that the deposit in the water-spaces may be conveniently washed out or otherwise removed.

The upper section *d* of the outer shell is arranged to be of sufficient depth to enable, when it is removed, all the tubes to be cleaned out with a scraper or the like.

The long stay-bolts in the inner water-space may also be dispensed with by riveting rings inside the upper and lower ends of the inner



tube-plate and closing the joints in the same manner as the upper joint of the outer water-space by short studs fixed in the rings.

By dispensing with long stay-bolts in the outer water-space it becomes possible to thoroughly wash out through the mud-holes any loose deposit in the water-spaces of the boiler which could otherwise be only imperfectly cleaned and that with difficulty, owing to the interference of the long stay-bolts.

The tubes and tube-plates can be exposed for inspection by removing the upper section of the outer shell and unscrewing the nuts of the stay-bolts *f* and lowering the inner shell until clear of the tubes.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—

1. A steam-generator having an inner annular water-chamber and a surrounding outer water-chamber, tubes connecting said chambers, the outer chamber being formed by a tube-plate and an outer shell, said outer shell having a detachable ring-section; substantially as described.

2. A steam-generator comprising an outer and an inner water-chamber each constituted by a tube-plate and a shell, the inner shell being detachably connected with the inner tube-plate and a ring-section of the outer shell being detachably connected with the other part thereof and with the outer tube-plate; substantially as described.

3. A steam-generator comprising an outer and an inner water-chamber connected by tubes in which the outer chamber is constituted by a tube-plate and an outer shell in

two ring-sections detachably connected with each other, the lower section being also riveted to the tube-plate, and the upper section provided with a flanged portion detachably connected with the tube-plate; substantially as described.

4. In steam-generators of the kind herein described, an outer water-chamber formed between an outer tube-plate and an outer shell constructed in two ring-sections bolted together to form a water-tight joint, the water-chamber being closed at the bottom by riveted joints and at the top by a packed joint formed between the edge of the tube-plate and an annular groove on an inwardly-projecting flange of the outer shell and held together by studs screwed into a ring riveted round the tube-plate; substantially as described.

5. A steam-generator comprising an outer and an inner water-chamber each constituted by a tube-plate and a shell, the inner shell being detachably connected with the inner tube-plate, and a ring-section of the outer shell being detachably connected with the other part thereof and with the outer tube-plate without the use of bolts extending longitudinally through the outer water-chamber; substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIDNEY STRAKER.

Witnesses:

W. J. NORWOOD,  
T. J. OSMAN.