

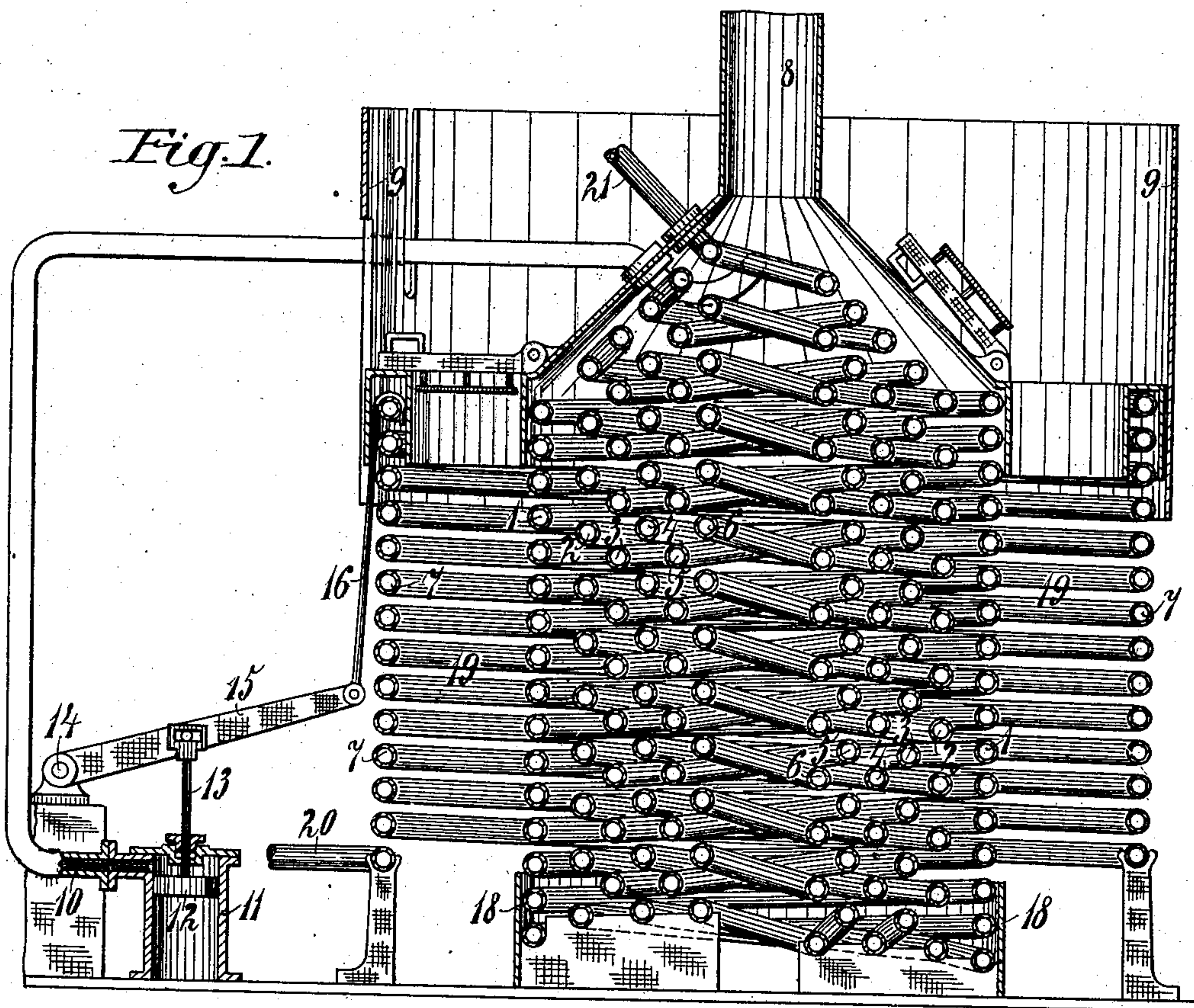
No. 742,359.

PATENTED OCT. 27, 1903.

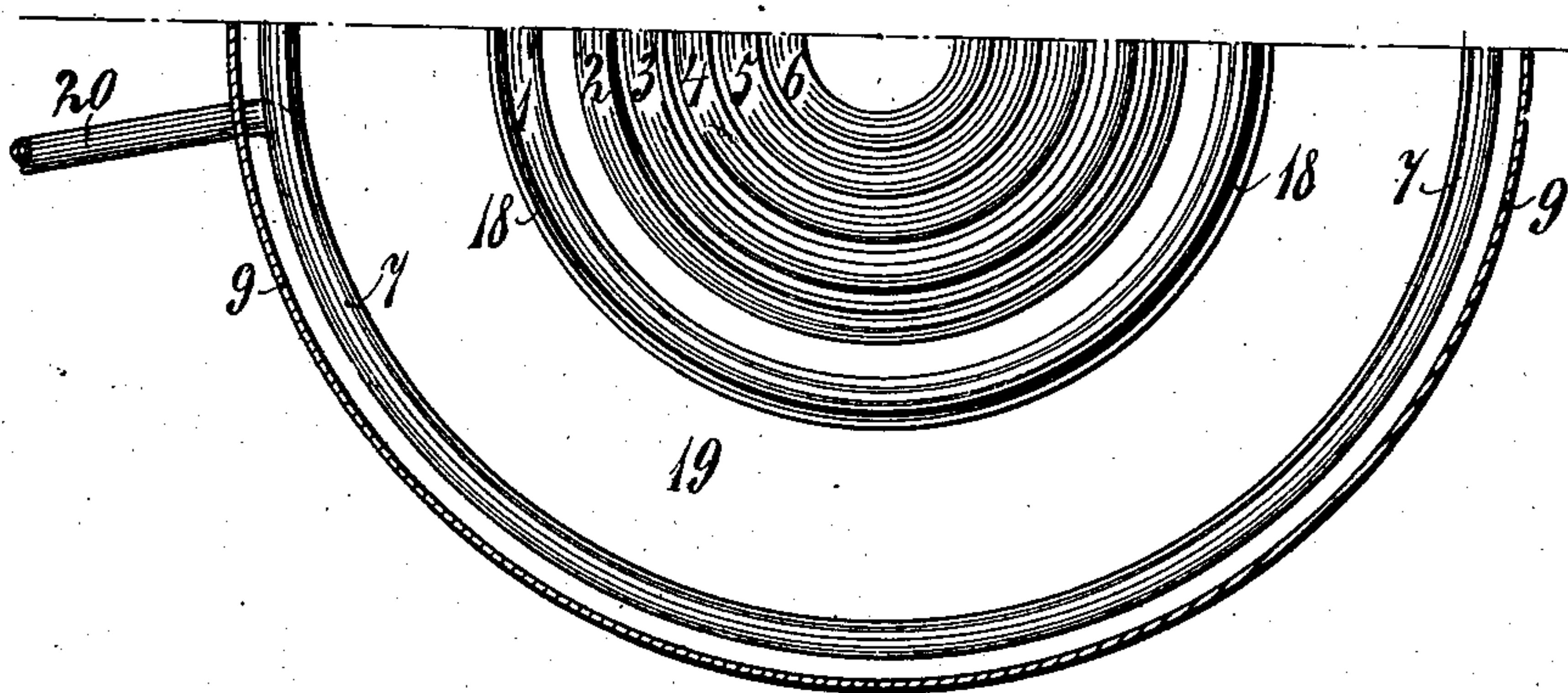
A. SCHOLL.  
HEATING BOILER.

APPLICATION FILED AUG. 4, 1902.

NO MODEL.



*Fig. 2.*



Witnesses

*E. M. Moore*  
E. M. Moore

Inventor

Albert Scholl  
by his Attorney. *H. H. H. H.*



## UNITED STATES PATENT OFFICE.

ALBERT SCHOLL, OF MANNHEIM, GERMANY.

## HEATING-BOILER.

SPECIFICATION forming part of Letters Patent No. 742,359, dated October 27, 1903.

Application filed August 4, 1902. Serial No. 118,237. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT SCHOLL, a subject of the German Emperor, residing at Mannheim, Germany, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to a steam-boiler comprising a central tubular helical system consisting of a tubular helix or tubular helices, wherein an instantaneous evaporation of the water is attained by exposing all the parts of the helix to the full effect of the flue or fire. For this purpose the helix constituting the boiler proper is surrounded on the outside by 15 grates of shaft form—that is to say, forming a cylinder or shaft surrounding the exterior of the central helical system. By this construction the flames move radially toward the axis of the boiler, where the space inclosed 20 by the helix or helices forms a flue leading to the chimney. This form of boiler having large and powerful heating-surface in proportion to its size can be worked with forced water-feed, and the water carried through the 25 helical system with great speed is in consequence of centrifugal force always toward the outwardly-lying faces of the pipes, and therefore in the direction whence the fire is coming. Thus the heating-surfaces which are 30 heated more intensely are subjected also to a correspondingly greater cooling, thereby adding to the transmission of heat and avoiding a deleterious high temperature of the heating-surface.

35 In referring to a helix I do not confine myself to a cylindrical helix or one that is circular in plan.

In the annexed drawings, Figure 1 represents a section, and Fig. 2 a plan view, of a 40 boiler constructed according to this invention.

The boiler here consists of a continuous tube wound in the form of six concentric cylindrical helices 1 2 3 4 5 6. These tubes 1 2 45 3 4 5 6 are so surrounded by the coil 7, also wound like a helix, that an annular fire-box 19 is formed between the latter and the exterior of the tubes 1 2 3 4 5 6. The grate of the fire-box is formed by the coil 7 just mentioned, the single windings of which are placed 50 at such a distance from each other that air may pass from the exterior through the spaces

between said single windings into the fire-box, entering the latter in a nearly-horizontal direction, (the coils being placed with 55 their common axes vertical,) passing in a similar direction between the windings of the coils 1 2 3 4 5 6, and finally escaping through the chimney 8. It is evident that this arrangement possesses all the advantages of 60 internal flues, principally consisting in the avoidance of any loss of heat arising from radiation and conduction, and also the firing-places are visible and easily accessible. The employment of the helical tube 7 as a grate 6 renders it further possible to regulate the effective area of grate-surface as desired. This regulation may, for instance, be accomplished by raising and lowering by hand or 70 otherwise an annular slide 9, surrounding the tube 7, so as to cut off the access of air to so much of the area of the grate from the top downward.

Another method is to regulate the admission of air by compressing the coil 7 more or 75 less. In the latter case it would be better to compress the windings of the coil 7 in such a manner that the upper windings are approached to or separated from each other, consequently not only diminishing the access 80 of air to the fire, but also reducing the grate-surface. If the compression of the coil 7 is to be done automatically by means of the steam-pressure produced in the boiler, the steam-pressure is caused to work on the coil 85 by means of pistons, membranes, and the like, and suitable gear attached to the coil, as, for instance, shown in Fig. 1. Here the steam passes from the system 1 2 3 4 5 6 90 through the pipe 10 into a cylinder 11 and presses the piston 12 and its piston-rod 13 downward. The lever 15, fulcrumed at 14, is drawn downward and the connecting-rod 16 pulled by means of the piston-rod 13, causing several of the uppermost windings of the 95 coil 7 to be compressed, according to the height of the steam-pressure, whereby the necessary reduction of the effective area of the grate-surface is effected. In place of one steam-cylinder 11 several cylinders may obviously 100 be employed for attaining a very uniform compression of the windings, according to the size of the steam-generator. These steam-cylinders are preferably placed in front of



the boiler. It may also be mentioned that the annular guard-plate 18 may be dispensed with when the windings of the coil 1 are capable of being so compressed as to rest upon each other. The feed-water is continuously fed at 20 by means of a feed-pump or other suitable device for preliminary heating by passing through the outer coil 7, while the steam may be drawn off through the pipe 21. A part of the water may, however, be introduced at the point where the heating-gases leave the coils, and the steam may be drawn off between the feeding-points, thus giving a preliminary heating by the departing smoke-gas. The whole quantity of water may also, of course, be pumped into the end of the heating-surface and then conducted to the outer grate, or any other combinations may be made.

I claim—

1. In a steam-boiler for continuously producing steam, the combination of a helical tubular central system, a fire-box of shaft form surrounding said system externally for combustion of the heating material, and means for outlet of the gaseous products of combustion from the axis of said helical system, substantially as described.

2. In a steam-boiler the combination of a helical tubular central system, an exterior helical tube communicating therewith, said exterior tube surrounding the central system and constituting of the space between it and the central system, a fire-box of shaft form for combustion of the heating material, said exterior tube being adapted for admitting air between its coils, and means for outlet of the gaseous products of combustion from the axis of said helical system substantially as described.

3. In a steam-boiler, the combination of a helical tubular central system, an exterior helical tube, surrounding the central system and constituting between itself and the central system a fire-box of shaft form for com-

bustion of the heating material, means for controlling the admission of air between the windings of said exterior helical tube, and means for outlet of the gaseous products of combustion from the axis of said helical system, substantially as described.

4. In a boiler for continuously producing steam, the combination of a helical tubular central system, an exterior elastic helical tube, said elastic helical tube surrounding said central system and constituting between itself and said central system, an annular fire-box for combustion of the heating material, said elastic helical tube being adapted for the passage of air between its windings, means for compressing said elastic helical tube so as to vary the space between the windings thereof, and means for outlet of the gaseous products of combustion from the axis of said helical system substantially as described.

5. In a boiler for continuously producing steam, the combination of a helical tubular central system terminating in an exterior helical tube with spaced windings for admission of air said helical tube surrounding said central system and constituting therewith an annular fire-box of shaft form for combustion of the heating material, an annular slide surrounding said exterior helical tube, means for raising and lowering said slide, a pipe for continuously admitting the water to be evaporated at one end of said boiler and a pipe for continuously leading away the live steam produced in said boiler, from the other end thereof, and means for outlet of the gaseous products of combustion from the axis of said helical system, substantially as described.

In witness whereof I have signed this specification in the presence of two witnesses.

ALBERT SCHOLL.

Witnesses:

JACOB ADRIAN,  
H. W. HARRIS.