(No Model.) 4 Sheets—Sheet 1.

A. SEIGLE.

STEAM BOILER.

No. 580,009. Patented Apr. 6, 1897.

Fig 2.

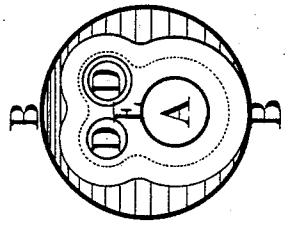


Fig. 4.

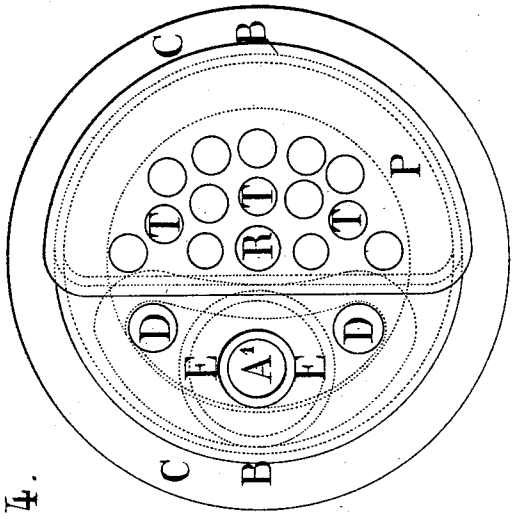
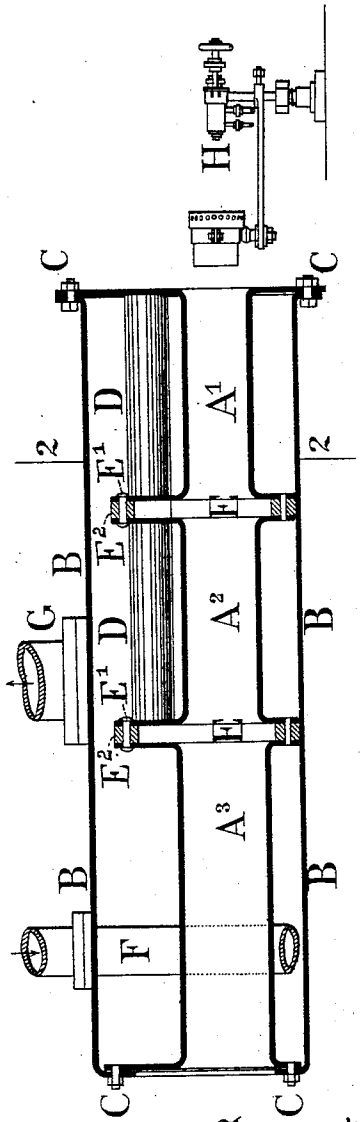


Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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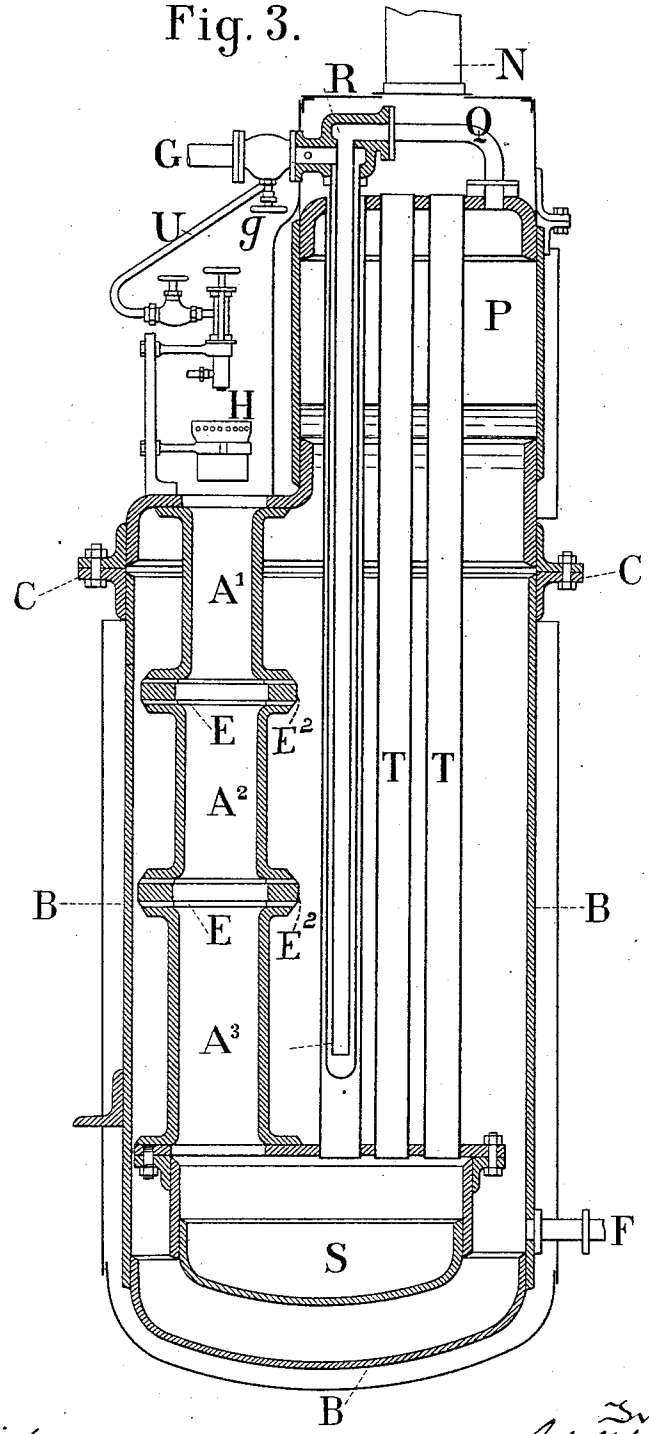
Fig. 3.



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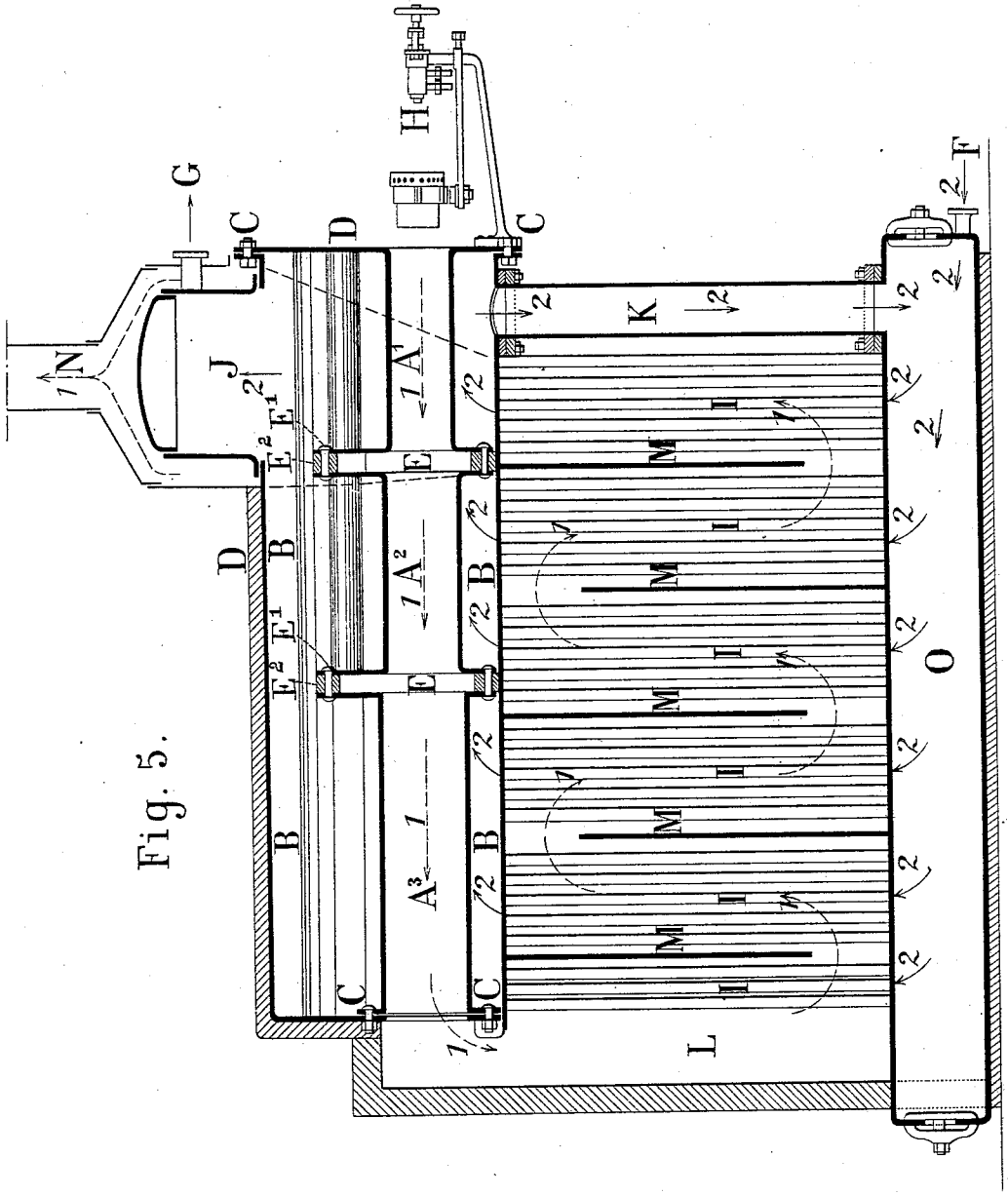

Fig. 5.

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(No Model.) 4 Sheets—Sheet 4.

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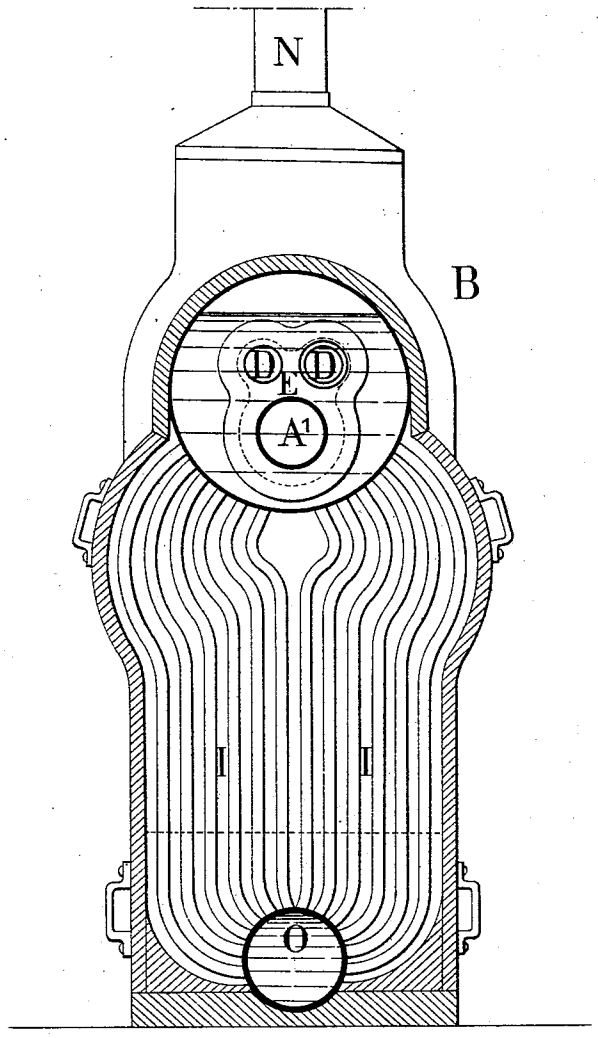
Fig. 6



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UNITED STATES PATENT OFFICE.

ADOLPHE SEIGLE, OF PARIS, FRANCE, ASSIGNOR TO THE COMPAGNIE INTERNATIONALE DES PROCÉDÉS ADOLPHE SEIGLE, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 580,009, dated April 6, 1897.

Application filed May 11, 1896. Renewed February 2, 1897. Serial No. 621,715. (No model.)

To all whom it may concern:

Be it known that I, ADOLPHE SEIGLE, a citizen of France, residing at 147 Rue de Courcelles, Paris, in the Republic of France, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention has relation to a steam-boiler, particularly of the class wherein steam is generated by the action of hot gases upon a surrounding body of water when said gases arise from the combustion of hydrocarbons, and in such connection it relates particularly to the construction and arrangement of the hot gas or air flues of such a boiler.

The principal objects of my invention are, first, to provide in a steam-boiler a sectional combustion-flue adapted to be quickly and easily removed from and replaced in the boiler; second, to provide a combustion-flue consisting of a series of sections of increasing diameter, the outlet of one of the sections being adjacent to and smaller than the inlet of the succeeding section throughout the series and with elastic joints interposed between adjacent sections, and, third, to provide in such a flue a series of air-boxes interposed between the sections and air-pipes adapted to conduct fresh air to said boxes from the exterior of the boiler.

My invention, stated in general terms, consists of a sectional combustion-flue for steam-boilers constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a longitudinal central section of a boiler of simplified form, illustrating the sectional combustion-flue embodying main features of my invention. Fig. 2 is a transverse section on the line 2 2 of Fig. 1. Figs. 3 and 4 are respectively a vertical section and top or plan view of an upright boiler, illustrating the construction and arrangement of the sectional combustion-flue adapted for use in said boiler; and Figs. 5 and 6 are respectively a longitudinal central section and a transverse section of a multitubular boiler of the torpedo class provided with a sectional combustion-flue embodying features of my invention.

Referring to the drawings, the combustion-flue consists of two or more sections A′, A^2, and A^3, of preferably cylindric form and of increasing diameters. These sections are arranged in line with each other, the outlet end of the section A′ being adjacent to and smaller in diameter than the inlet to the following section A^2, and the outlet of A^2 and inlet to A^3 occupying a similar relationship with regard to their proximity and diameter.

B represents the outer casing of the water and steam reservoir, which is preferably cylindrical. The front end of the front section A′ and rear end of the rear section A^3 are united to the casing B by means of bolts C C or similar separable joints.

Outside the flue-sections and within the casing B are arranged one or more air flues or pipes D, leading from the exterior of the boiler to a series of air boxes or spaces E, formed between the adjacent ends of the flue-sections. The adjacent ends of the sections A′, A^2, and A^3 are secured together by means of bolts E′ or similar fastenings, and between these ends are interposed packing-rings E^2, of suitable flexible material.

F represents the water-inlet or feed pipe entering the casing B and through which the water to be vaporized is conducted to the boiler.

G represents the outlet-pipe through which the steam generated in the boiler is conducted to the part in which it is to be used.

H represents a sprayer or burner fed with heavy hydrocarbons from a suitable source, and which in burning furnish the necessary gases to be passed through the flue to heat the water in the boiler.

In Figs. 3 and 4 the improved flue is illustrated as used in connection with an upright or vertical boiler. This boiler has in con-

nection with the parts heretofore described the following additional parts, to wit: a chimney N, serving as an outlet for the expended gases; a steam-chest P for the collection of the generated steam; a pipe Q, leading from the steam-chest P to two concentric nested tubes R, forming a superheating apparatus; a series of additional vertical combustion tubes or flues T in communication at one end with a fire-box S and discharging to the chimney N, and a pipe U, conducting superheated steam from the outlet G to the sprayer or burner H. The feed-water is led by the pipe F into the casing B and vaporized therein. It then collects in the steam-chest P and passes through the pipe Q into the superheater R, and thence by the pipe G to the place of utilization. Upon the pipe G may be placed an ordinary steam-cock *g*.

In Figs. 5 and 6 the flue is shown as used in connection with a horizontal multitubular boiler provided with the following additional parts: a series of steam-tubes I, leading from a lower collector O into the casing B; a steam-dome J, connected with the casing B; a tube or passage K, connecting the space in the casing B with the lower collector O and adapted to permit the passage of the water to said collector; a return-flue L for the passage of hot gases from the sections A', A^2, and A^3 to the tubes I and thence to the chimney N, and baffle-plates M, interposed in the path of the hot gases as they pass around the tubes I.

In Figs. 5 and 6 the direction of the passage of the hot gases is indicated by the arrows 1 and the circulation of the water or steam by the arrows 2.

It will be manifest to those skilled in the art that my improved flue may also be adapted for use in many compound boilers of suitable type, and that although three sections of the flue are shown and described more or less sections may be used, as requirements demand, without departing from the spirit of my said invention.

By reason of its peculiar construction and of the separable connections C the sectional flue may readily be removed from the casing B for cleansing or repairs and quickly replaced therein. The boxes E and elastic packing E^2 permit the sections to expand and contract without injury.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A combustion-flue for steam-boilers, consisting of a series of sections of increasing diameters, the outlet of one section being adjacent to and smaller than the inlet of the succeeding section, and elastic joints interposed between the ends of adjacent sections, substantially as and for the purposes described.

2. A combustion-flue for steam-boilers, consisting of a series of sections of increasing diameters, the outlet of one section being adjacent to and smaller than the inlet of the succeeding section, air-boxes interposed between the ends of adjacent sections and one or more pipes adapted to feed air to said boxes from the exterior of the boiler, substantially as and for the purposes described.

3. A combustion-flue for steam-boilers, consisting of a series of sections of increasing diameters, the outlet of one section being adjacent to and smaller than the inlet of the succeeding section, a casing inclosing the sections, means for removably securing the sections to the casing to permit of their withdrawal therefrom, air-boxes interposed between the ends of adjacent sections, one or more pipes adapted to feed air to said boxes, and an elastic packing interposed between the ends of adjacent sections, substantially as and for the purposes described.

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

ADOLPHE SEIGLE.

Witnesses:
C. DE MESTRAL,
CLYDE SHROPSHIRE.