No. 671,965. Patented Apr. 16, 1901.

W. KENNEDY.

STEAM BOILER.

(Application filed Aug. 10, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

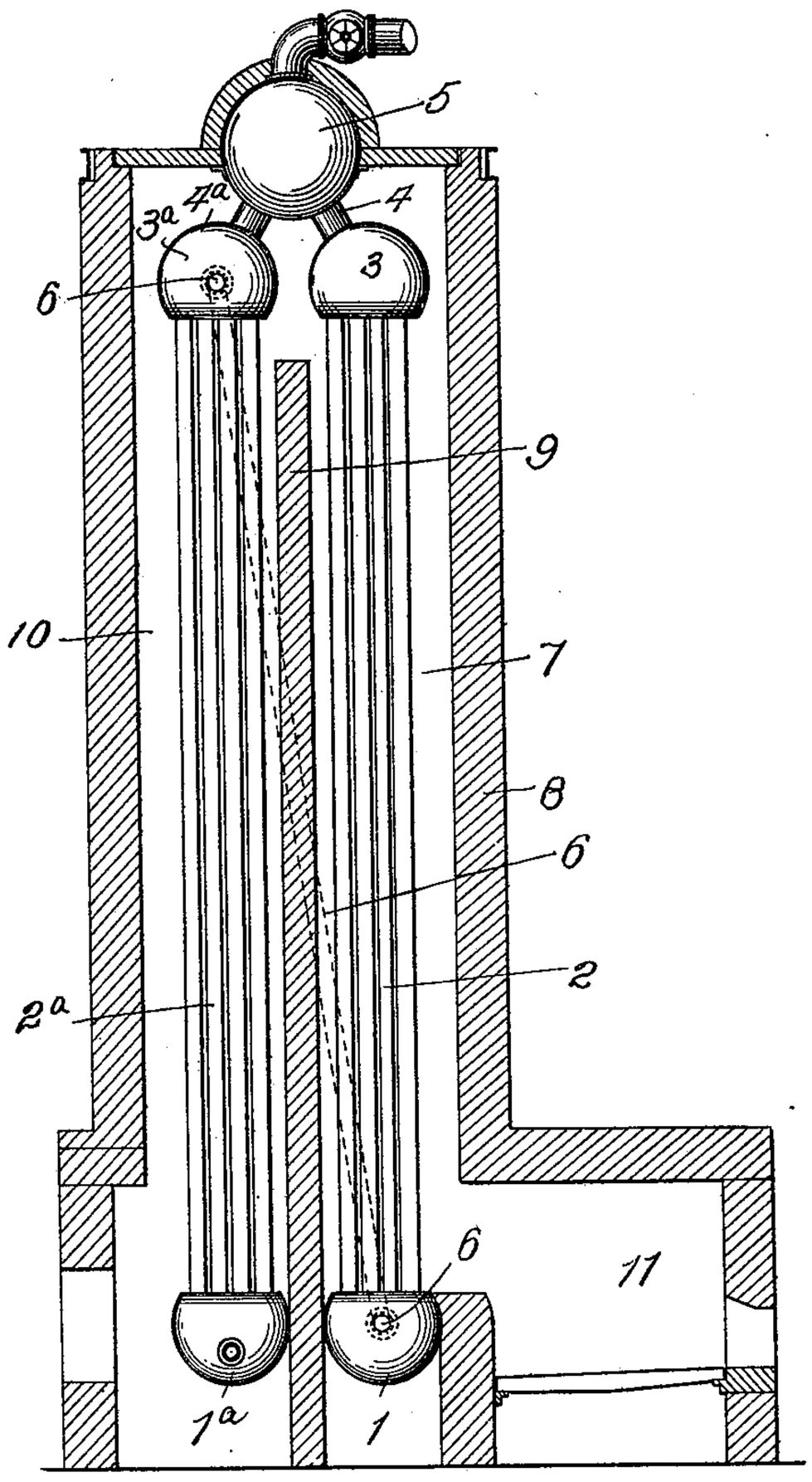

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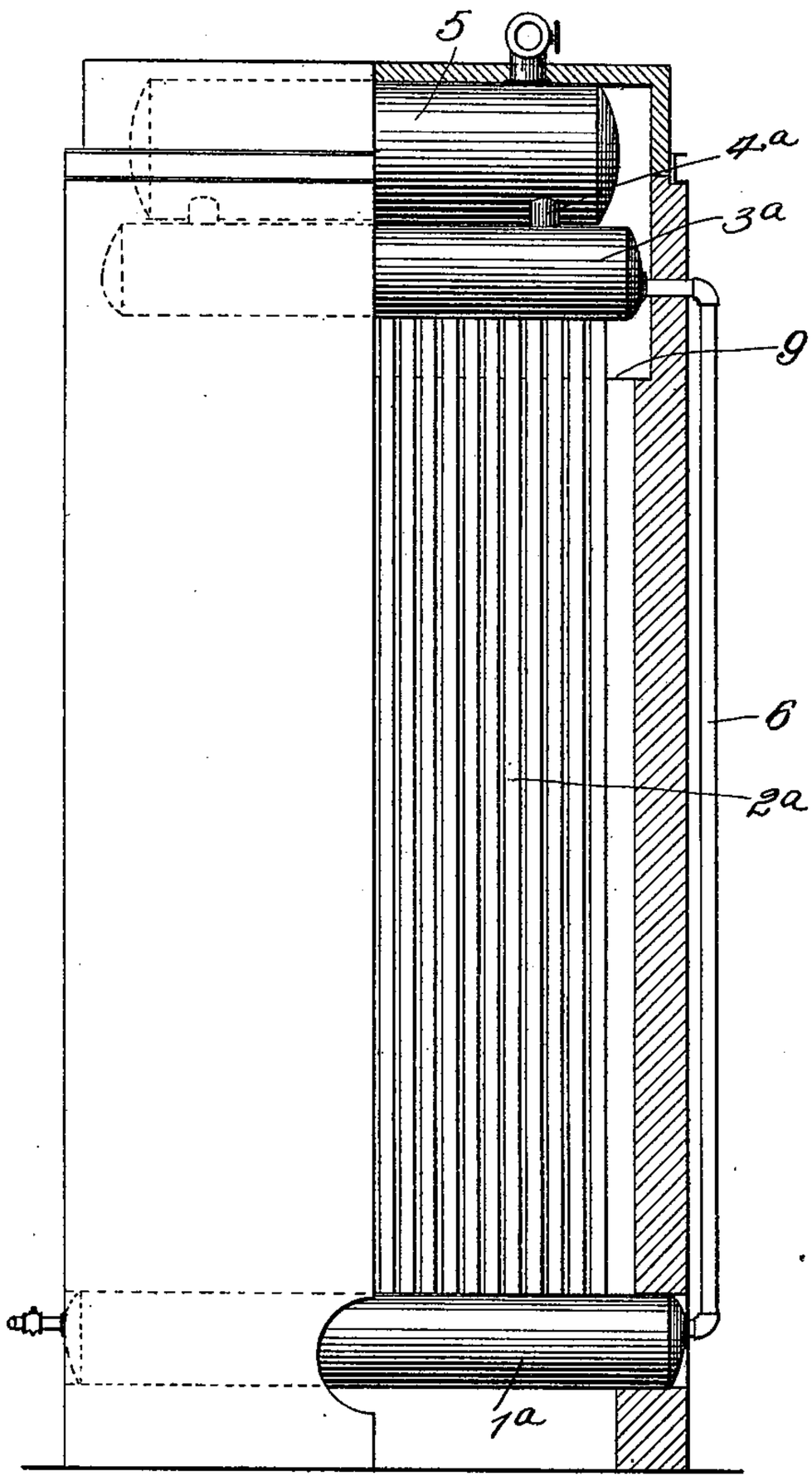
FIG. 2.



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UNITED STATES PATENT OFFICE.

WALTER KENNEDY, OF ALLEGHENY, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 671,965, dated April 16, 1901.

Application filed August 10, 1900. Serial No. 26,517. (No model.)

To all whom it may concern:

Be it known that I, WALTER KENNEDY, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

The invention described herein relates to certain improvements in water-tube boilers of the class or kind consisting of two or more lower drums and two or more upper drums connected to the lower drums by two or more vertical or approximately vertical banks of tubes. Difficulty is sometimes encountered in the use of this type of boiler by reason of the piling up of the water in the upper drum connected to the front or hottest bank of tubes and the consequent lowering of the level of the water in the upper drum connected to the cooler bank of tubes, the water by reason of the difference of specific gravity flowing down through the cooler bank of tubes into one of the lower drums, and thence into the other lower drum and up through the hottest bank of tubes. It sometimes happens that this piling up of the water in one drum is of such extent that the water-level in the cooler bank of tubes and drum falls below the point of junction of such bank of tubes with its drum. As the means employed for indicating the water-level in the boiler is generally connected to the hottest or front bank of tubes and drum the attendant is misled as to the true water-level in the other parts of the boiler, and it therefore results that the upper portion of the cooler banks of tubes and the drum connected thereto are burned.

The object of the present invention is to provide for the maintenance of a water-level in the cooler upper drum or drums at a safe point, regardless of the water-level in the hottest bank of tubes and drum.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view showing my improved boiler in elevation and its inclosed shell or casing and fire box or chamber in section. Fig. 2 is a view in side elevation, a portion of the boiler casing or shell being broken away.

My improved boiler consists of two or more lower drums 1 and 1^a, connected by two or more banks of vertical or approximately vertical tubes 2 and 2^a with two or more upper drums 3 and 3^a. The lower drums are disconnected except each to its respective upper drum, and the upper drums are disconnected, except by means of pipes 4 and 4^a, with the steam-drum 5, the pipes 4 and 4^a being connected to the drums 3 and 3^a at a point above the normal water-level. The two sections or members of the boiler are connected together by means of one or more pipes 6, which extend from a point lying in, but not materially below, the normal water-level of the upper rear drum 3^a down to the lower front drum 1. By means of this pipe the water which is fed into the lower rear drum 1^a will flow down into the lower front drum 1, but as the point of connection of the pipe or pipes 6 with the upper rear drum is so located that all the water cannot be drawn from this upper drum any piling up of the water in the upper front drum which, with its bank of tube, is, as shown, most nearly adjacent to the fire-chamber, and therefore the hottest, will not reduce the water-level to a dangerous extent in the rear bank of tubes or the upper drum connected thereto.

The fire-chamber 11 is so located that the products of combustion therefrom will impinge against the lower ends of the front bank of tubes 2 and pass upward along such tubes through a flue or chamber 7, formed between one wall of the shell-casing 8 and the partition 9, which extends from the foundation of the boiler to a point adjacent to the upper drums. The products of combustion pass from this front flue or chamber 7 up around the upper drums, down through chamber 10, in which is located the rear bank of tubes 2^a, to the stack.

It will be readily understood by those skilled in the art that the boiler may consist of two, three, or more members and that each member, consisting of an upper and lower drum and connecting banks of tubes, is connected by a tube or tubes extending from the upper portion of the cooler member of the boiler to

the lower portion of a hotter member. These connecting-tubes may be arranged outside the boiler-casing or inclosed within the casing-wall or entirely within the shell or casing.

The terms "hotter" and "colder" are herein used to designate the positions of the banks of tubes relative to the fire chamber or box, the term "hotter" being applied to the banks nearest the fire-box.

Water is introduced into the rear lower drum 1 and passes up through the bank of tubes 2^a to the upper rear drum 3^a, from which it passes by the pipe or pipes 6 to the lower front drum. As the water passes up along the bank of tubes 2^a it is heated sufficiently to cause a precipitation of foreign matter, which drops down into the drum 1^a.

I claim herein as my invention—

1. A boiler having in combination two or more members or sections, each consisting of an upper drum, a lower drum and a connecting bank of tubes, a casing or shell inclosing said members and provided with two or more connected flues or chambers, a member or section of the boiler being arranged in each of said flues or chambers, a fire-chamber connected to the front flue or chamber and a smoke-outlet connected to the rear flue or chamber, and a tube or tubes extending from at or near the normal water-level of the cooler section or sections to the lower portion of the hotter section or sections of the boiler, substantially as set forth.

2. A boiler having in combination two or more members or sections, each consisting of an upper drum, a lower drum and a connecting bank of tubes, and a tube or tubes extending from at or near the normal water-level of the cooler member or section to the lower portion of a hotter member or section, substantially as set forth.

3. A boiler having in combination two or more members or sections, each consisting of an upper drum, a lower drum, a connecting bank of tubes, and a tube or tubes extending from at or near the normal water-level of the cooler member or section to the hotter member or section, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WALTER KENNEDY.

Witnesses:

DARWIN S. WOLCOTT,

M. S. MURPHY.