

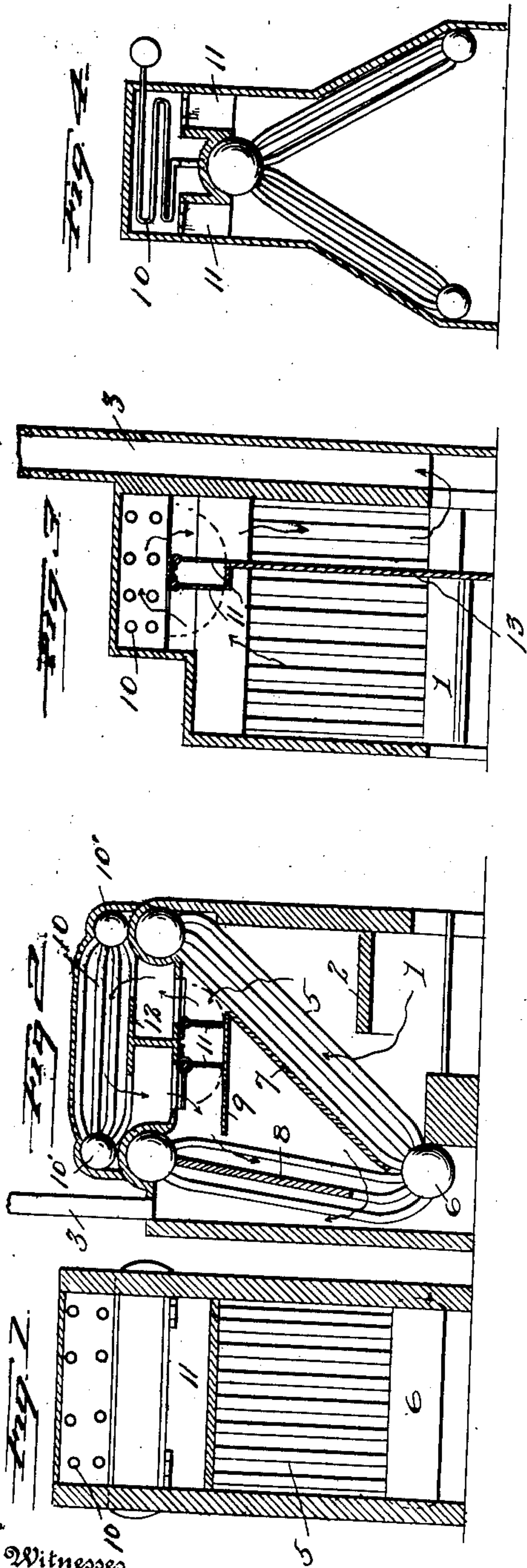
No. 837,844.

PATENTED DEC. 4, 1906.

H. O. KEFERSTEIN.
SUPERHEATER.

APPLICATION FILED APR. 12, 1906.

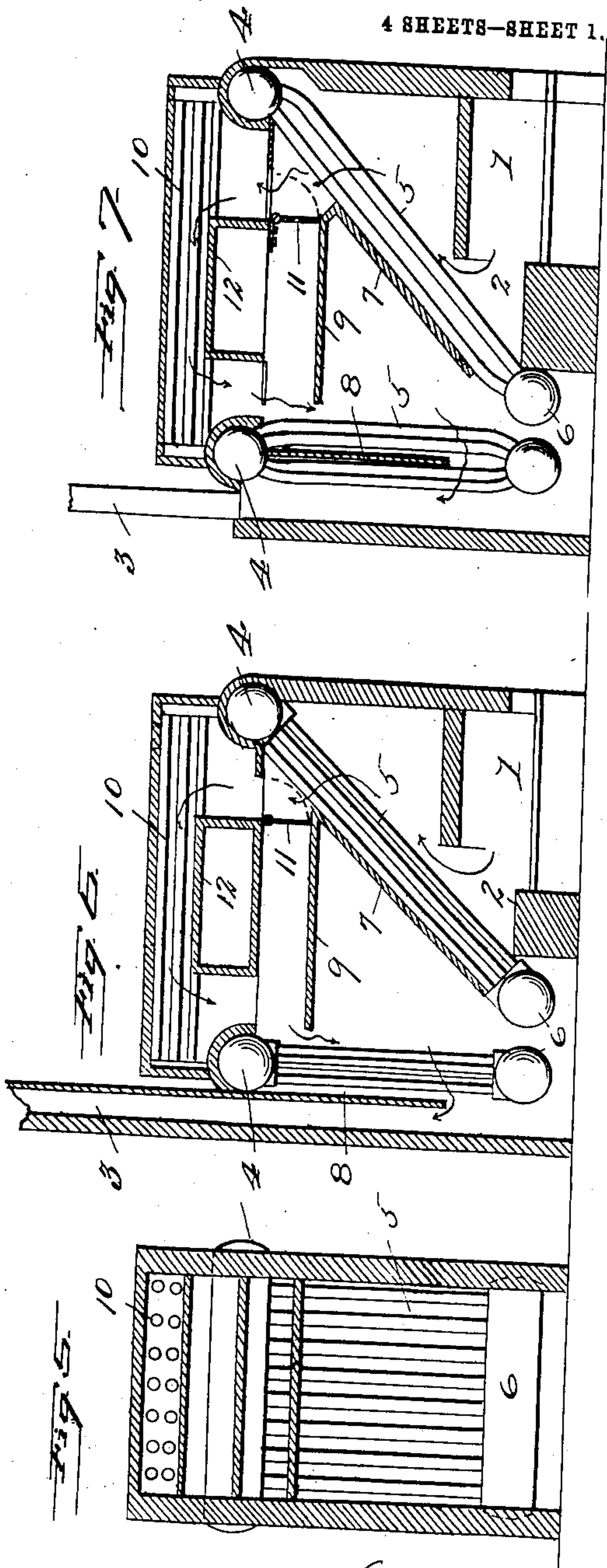
4 SHEETS—SHEET 1.



Witnesses

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M. E. Moore



Hans O. Keferstein Inventor
By *M. E. Moore* Attorney

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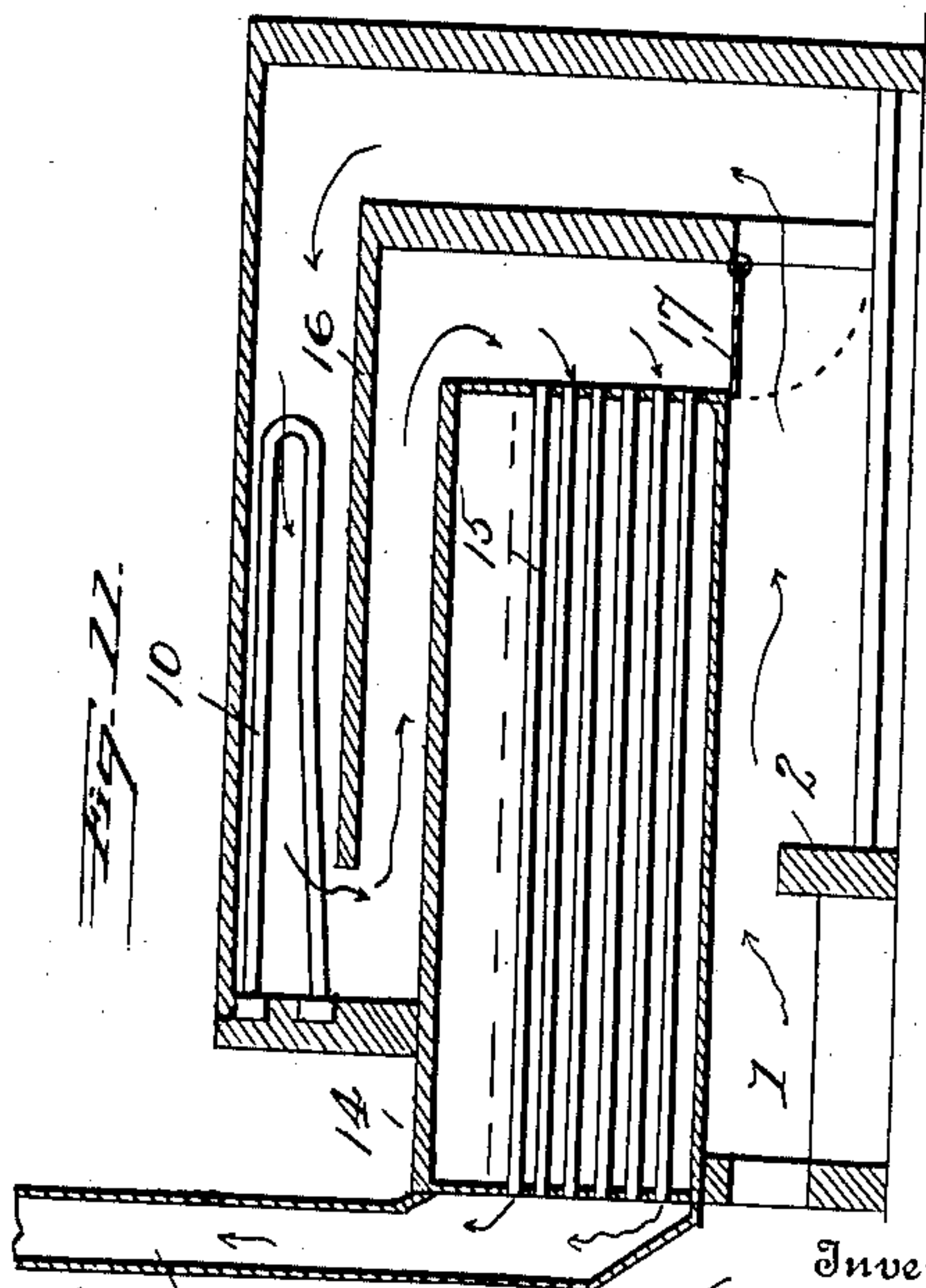
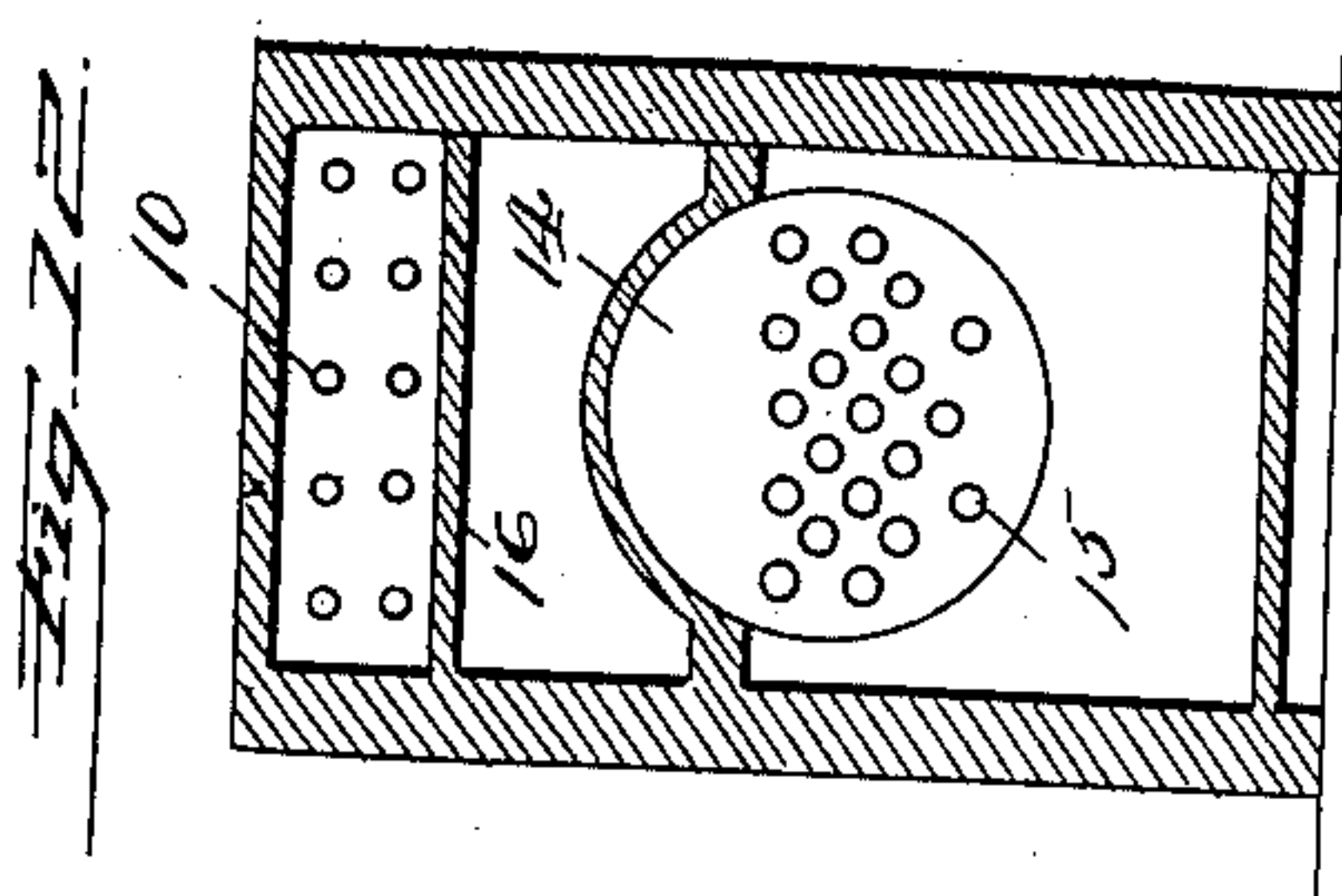
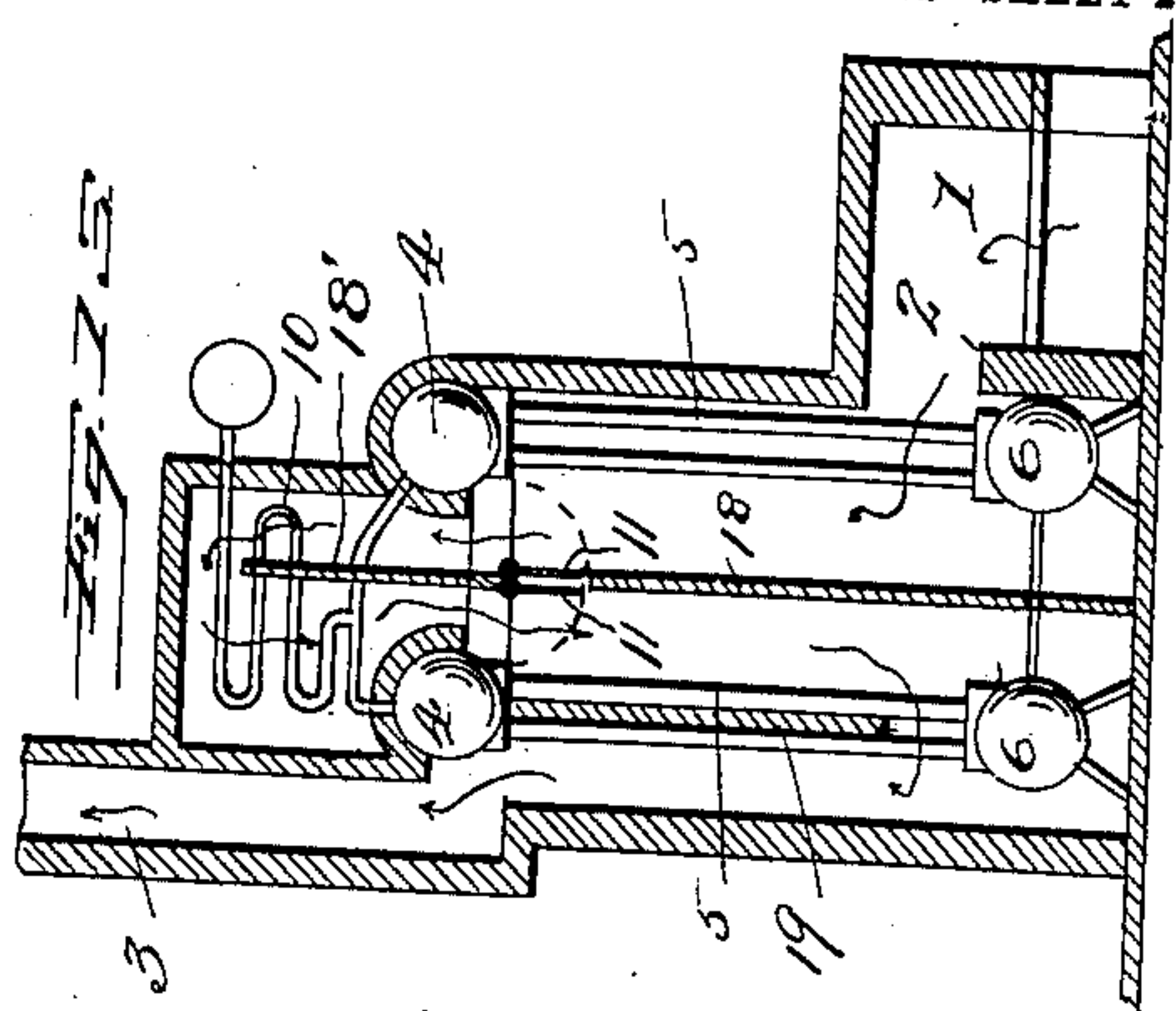
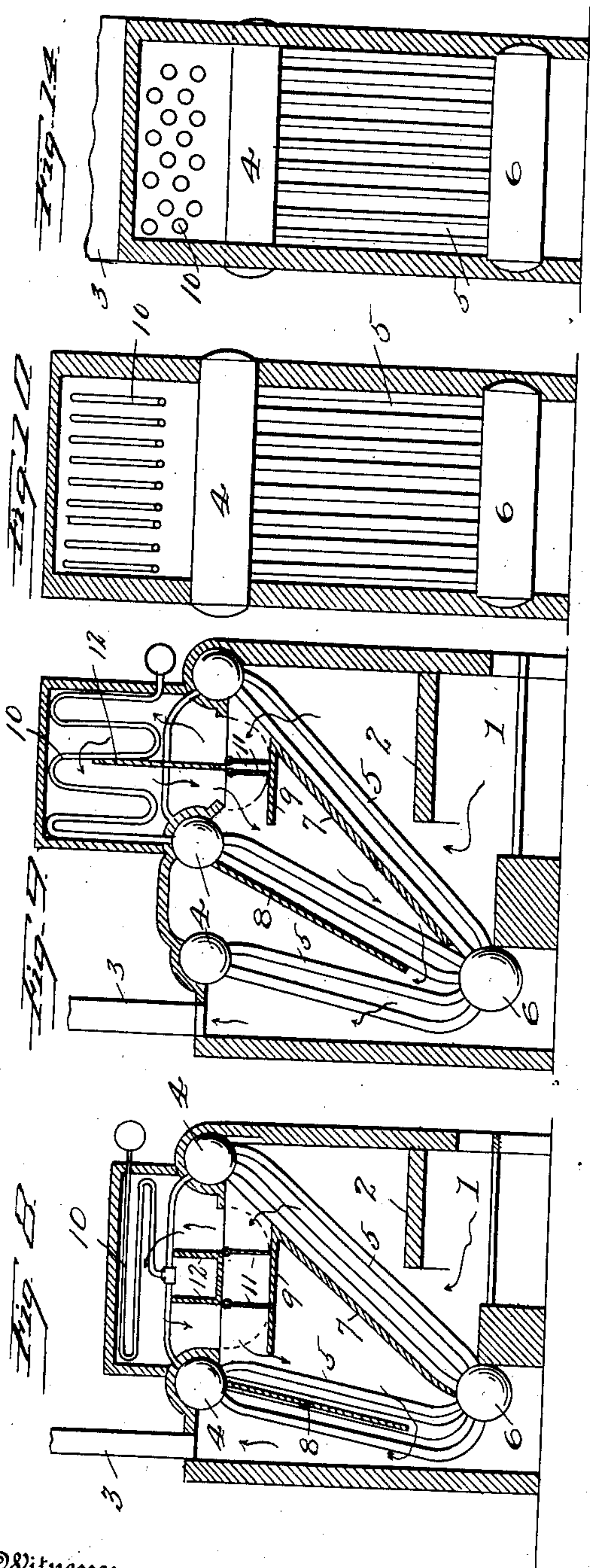
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4 SHEETS—SHEET 2.



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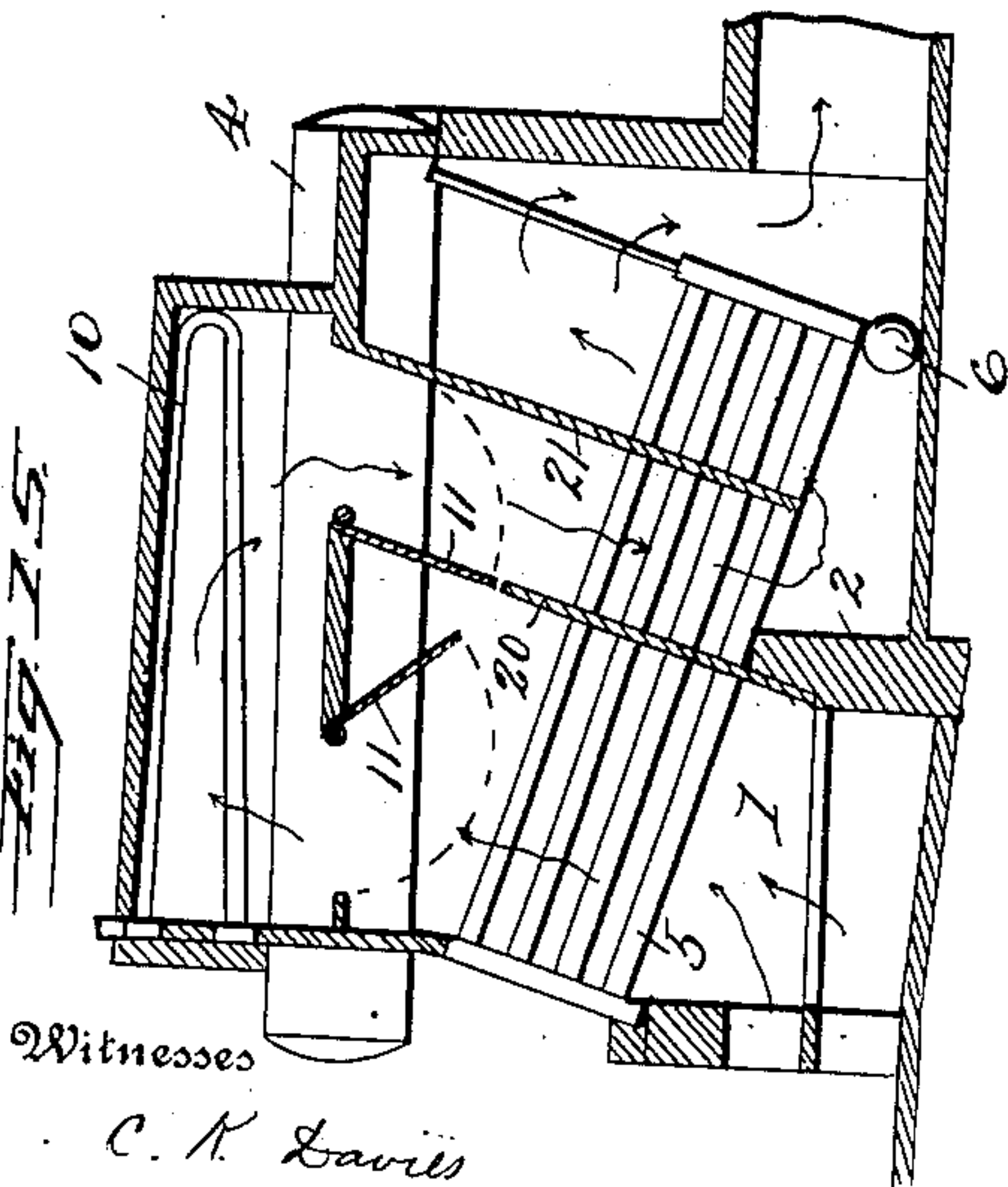
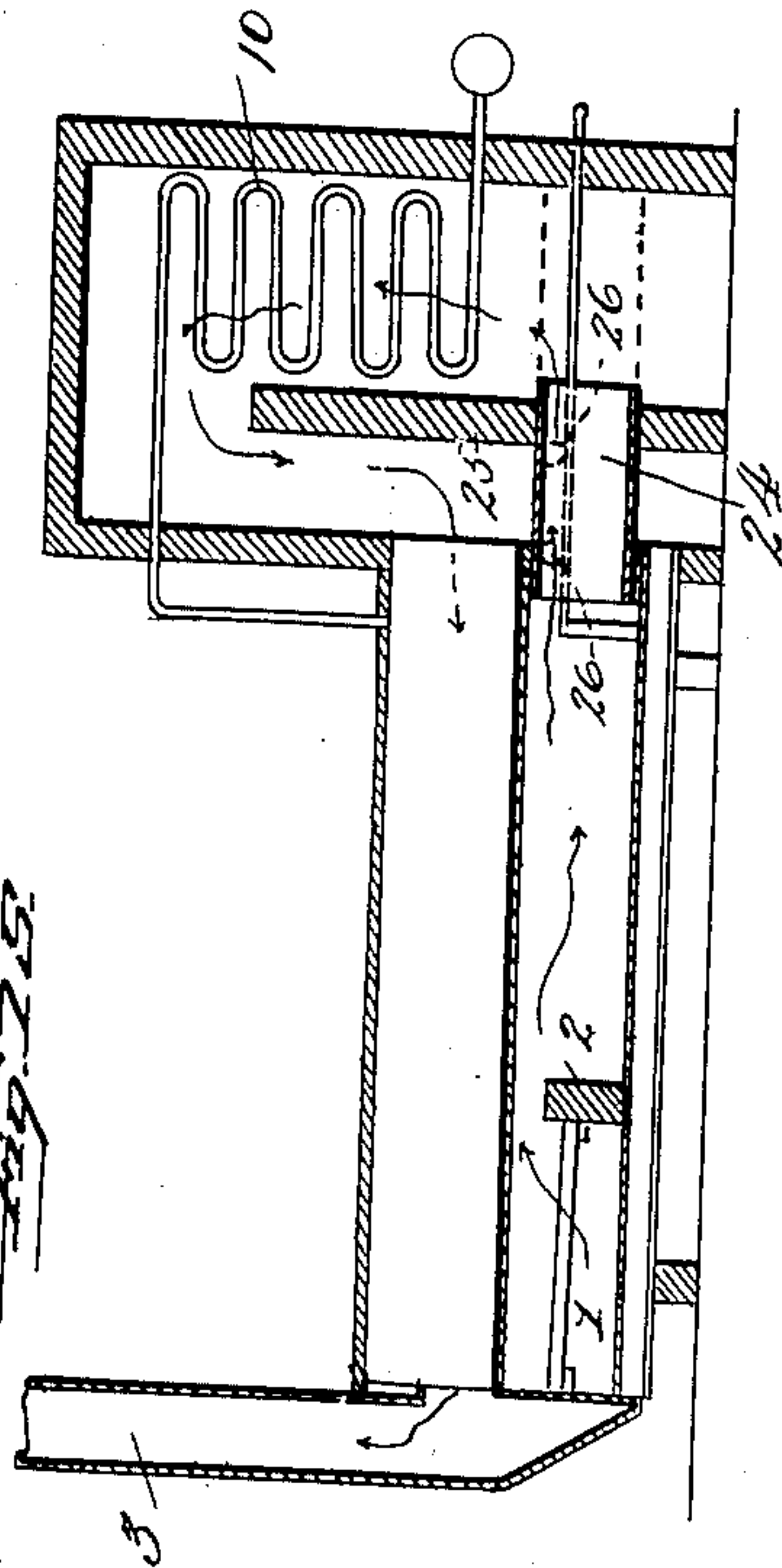
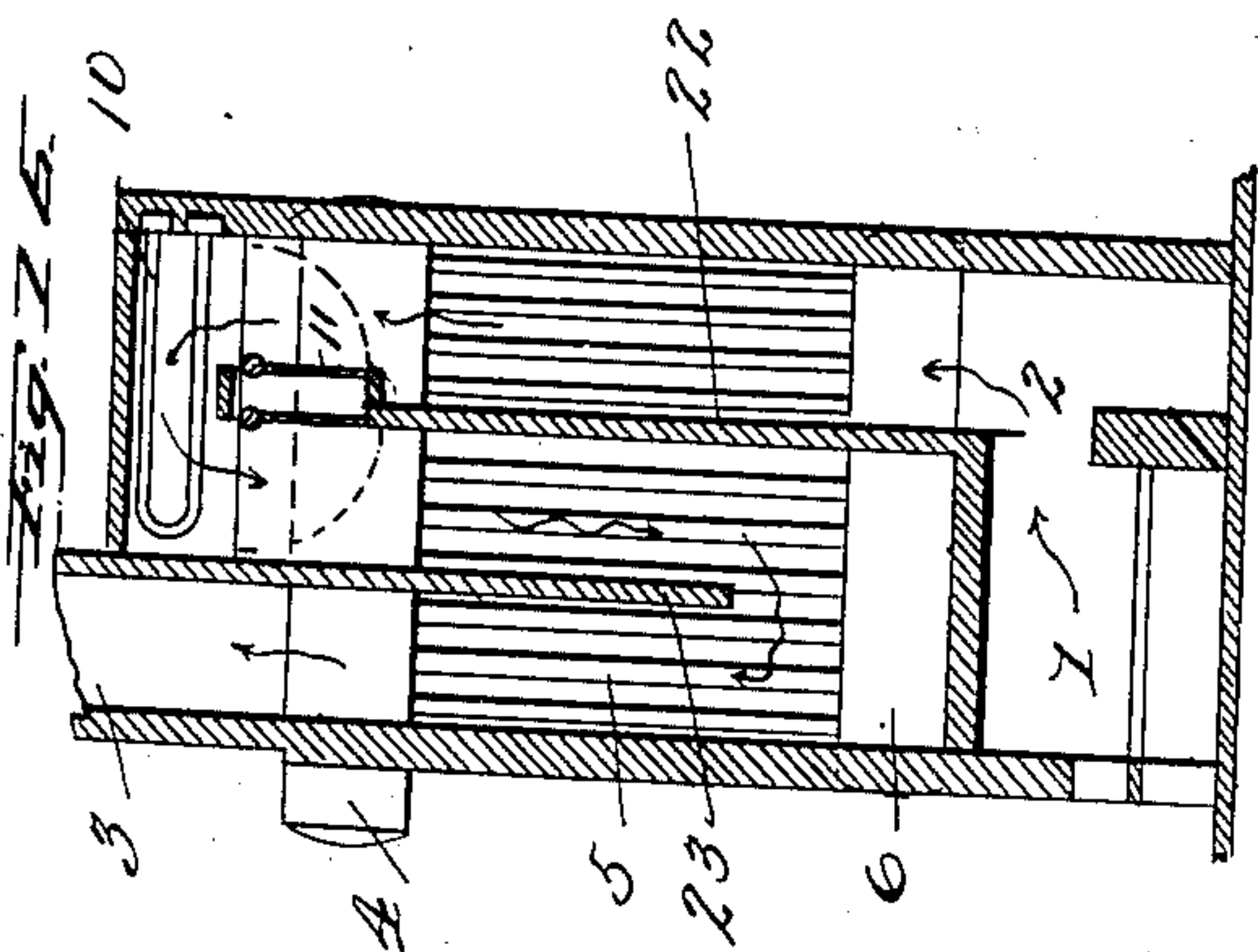
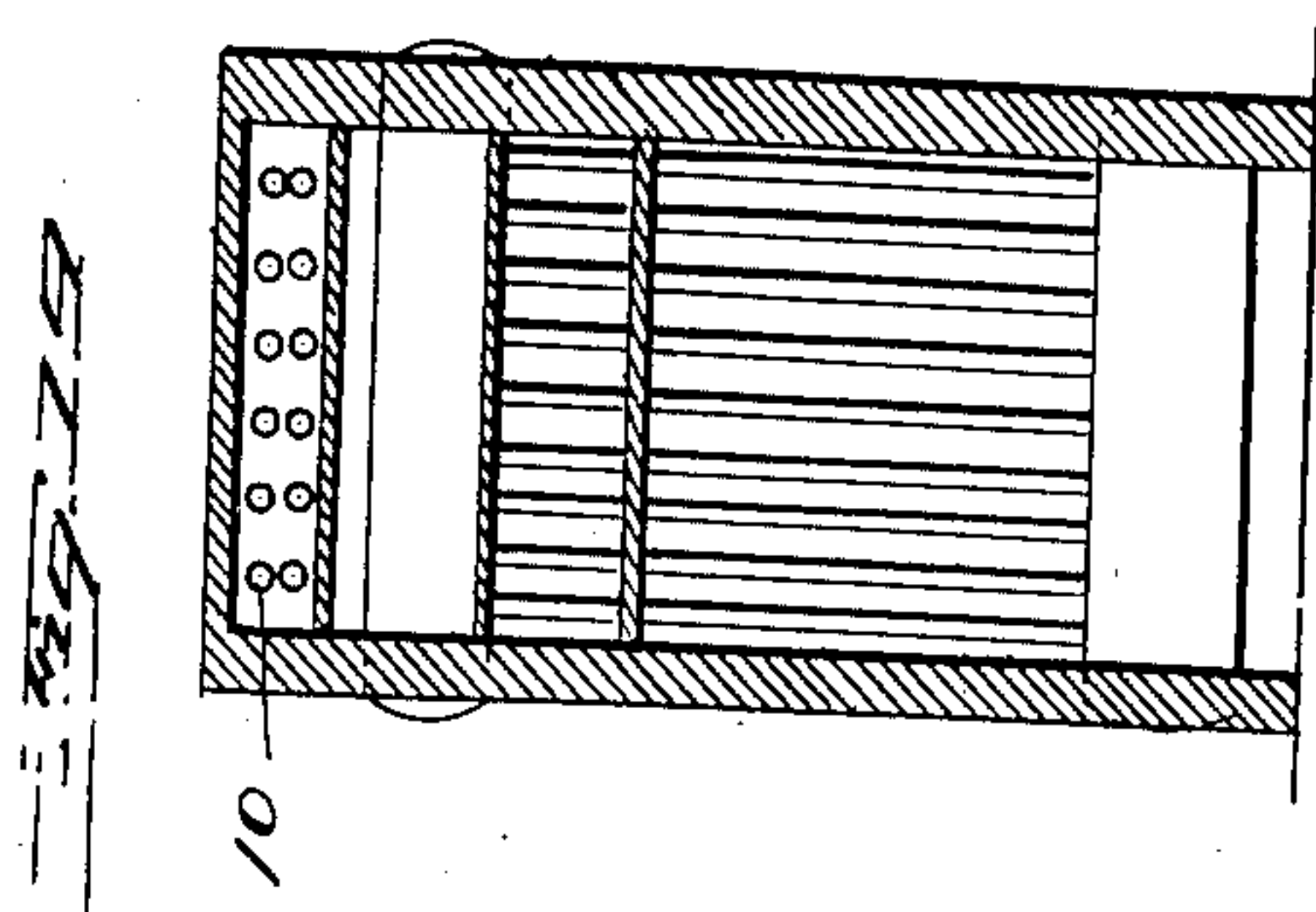
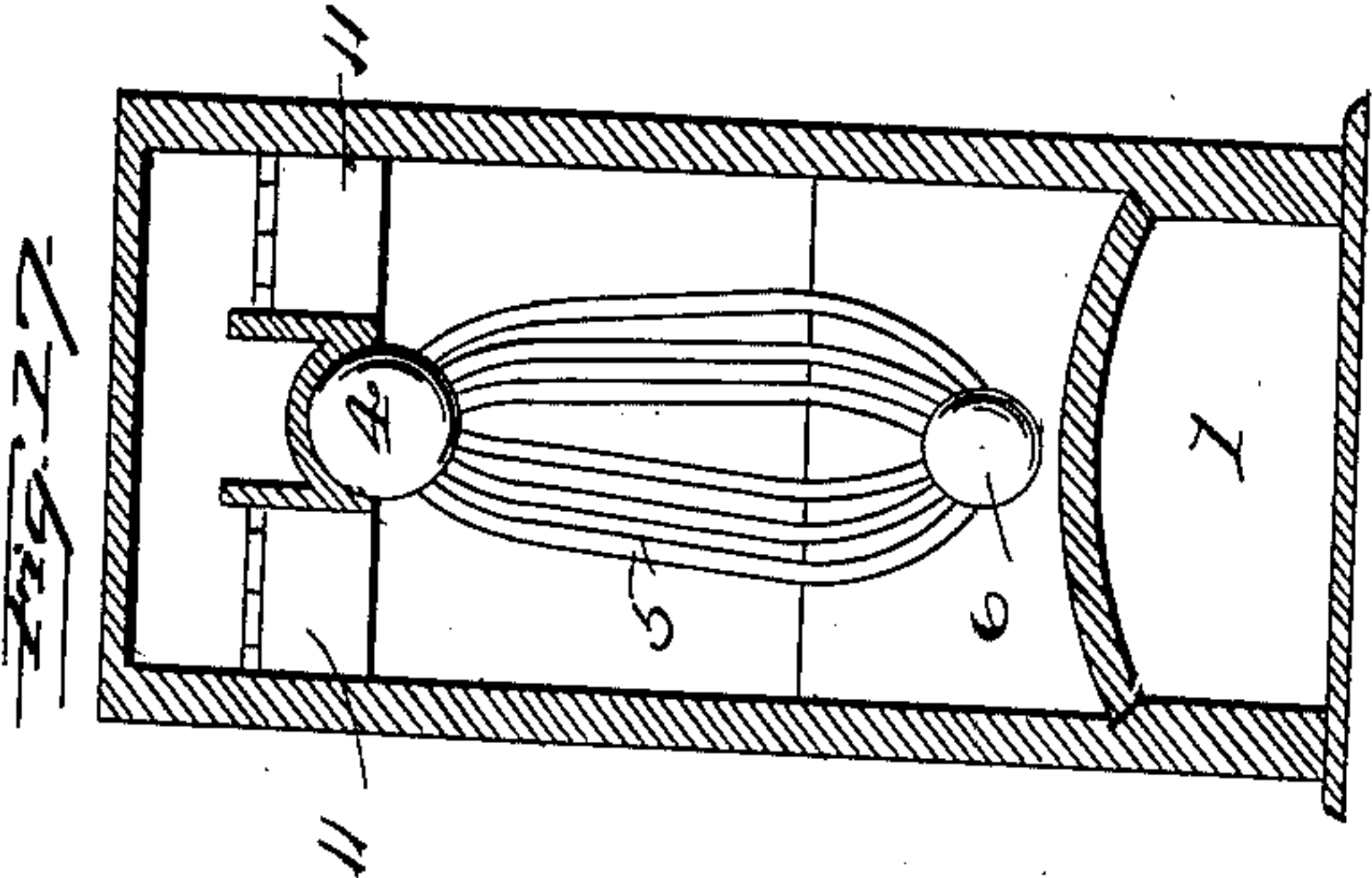
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4 SHEETS—SHEET 3.



Witnesses

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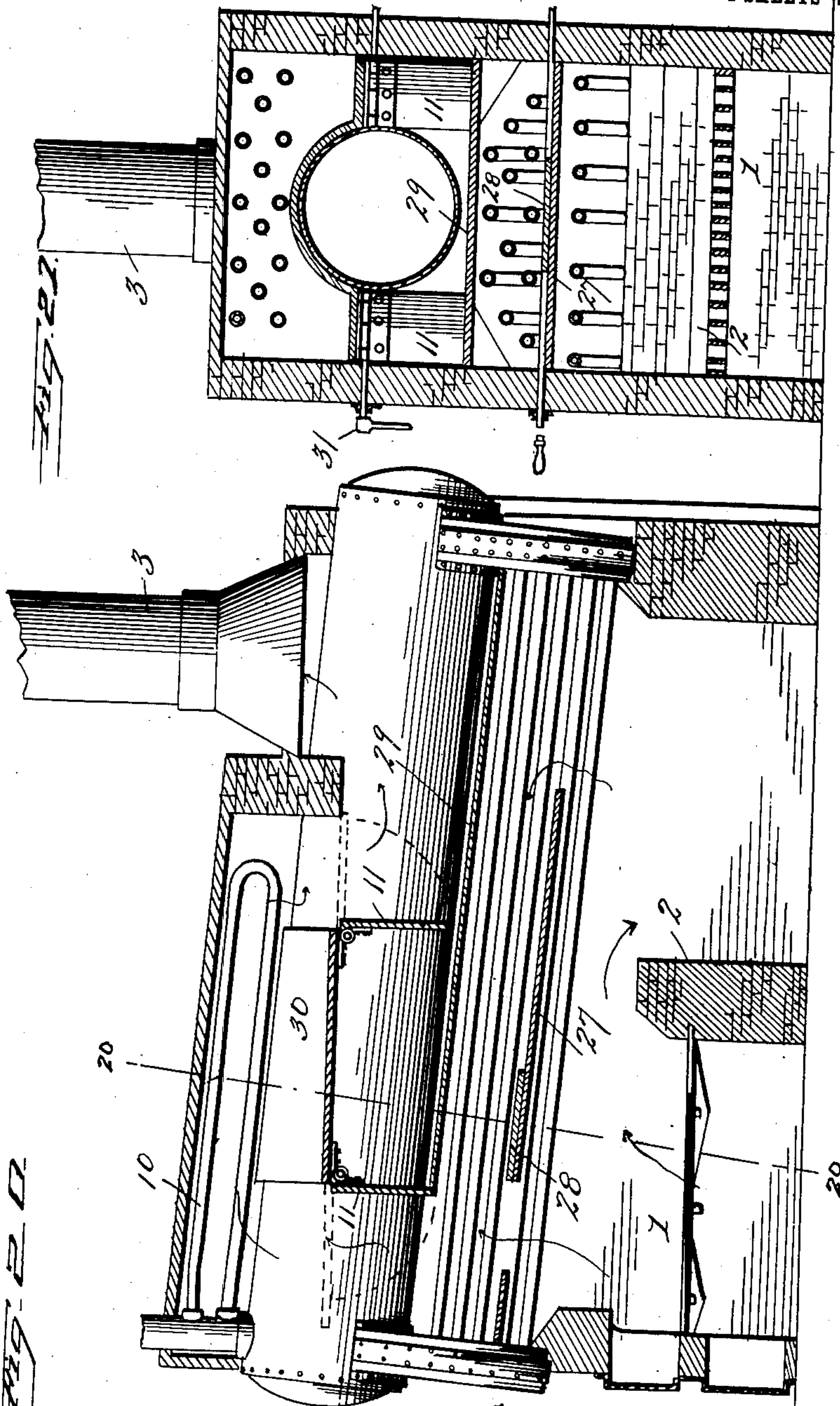
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4 SHEETS-SHEET 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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SUPERHEATER.

No. 837,844.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed April 12, 1906. Serial No. 311,272.

To all whom it may concern:

Be it known that I, HANS O. KEFERSTEIN, a subject of the German Emperor, residing at Barberton, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in a Combined Boiler and Superheater, of which the following is a specification.

My invention relates to combined boilers and superheaters, and has for its objects the provision of a superheater to be used in connection with a steam-boiler and furnace for the purpose of securing dry and superheated steam, to be located, preferably, in a space formed above the boiler-space of the furnace in order to regulate the temperature of the steam, with the highest efficiency of fuel.

A further object of the invention is to provide dampers located between the superheater and the boiler passes or flues, by means of which the gases and other products of combustion may be controlled and regulated. By means of the dampers the heat from the furnace may be permitted to pass through the boiler flues or passes directly to the stack without materially affecting the superheater, or the gases may be divided, a portion passing through the superheater pass or space, thence through a portion of the boiler-space to the stack, and another portion of the heat passing directly through the boiler-pass to the stack, or, finally, the entire products of combustion may be made to traverse the boiler space or passes, the superheater-space, and thence pass to the stack by way of the remaining portion of the boiler-passes.

The invention consists in certain novel features of construction of dampers, combinations, and arrangements of the boiler with the superheater, and other novel features of construction, as specified hereinafter, more clearly pointed out in the claims, and as illustrated in the accompanying drawings.

In the accompanying drawings I have illustrated several examples of the physical embodiment of my invention adapted for use with several different styles or types of boilers and constructed according to the best modes I have so far devised for the practical applications of the principles of the invention.

Referring to the figures of the drawings, Figure 1 is a central vertical section illustrat-

ing a type of water-tube boiler with my superheater applied; and Fig. 2 is a section of the same boiler, taken on a line at right angles to Fig. 1. Figs. 3 and 4 are sectional views taken at right angles to each other, illustrating a boiler with a vertical baffle-wall or partition therein and showing arrangement of superheater and dampers. Figs. 5 and 6 are similar sectional views showing a modified form of the invention as illustrated in Figs. 1 and 2, and Fig. 7 shows a slight departure from the construction of Fig. 6. Fig. 8 illustrates a further modification of Fig. 2, showing the superheater connected with two boiler drums or shells. Figs. 9 and 10 illustrate sections of a boiler with three steam drums or shells and the superheater arranged vertically. Figs. 11 and 12 illustrate sectional views of a tubular boiler with the superheater applied thereto. Figs. 13 and 14 show two sections of a water-tube boiler with the superheater in use. Fig. 15 is a sectional view of water-tube boiler with two controlling or regulating dampers. Figs. 16 and 17 illustrate another type of water-tube boiler with the superheater applied. Fig. 18 is a sectional view of a boiler with superheater applied and a modified form of damper employed. Fig. 19 is a sectional view at right angles to Fig. 7. Fig. 20 is an enlarged view in section of a boiler equipped with my superheater; and Fig. 21 is a section on line 20, Fig. 20.

The invention is illustrated as applied to water-tube, tubular, and the common cylinder type of boilers, and it will of course be understood that other types of boilers may be adapted for use with my invention.

In all the figures of drawings the numeral 1 indicates the furnace. 2 designates the bridge-wall, and 3 the stack.

Referring to Figs. 1, 2, 4, 6, 7, 8, 9, and 10, wherein different or slightly-modified forms of the water-tube type of boilers are illustrated, the steam drums or shells 4 are connected, as usual, by the tubes 5 to the mud-drum 6, and inclined baffle-walls or partitions 7 and 8 divide the combustion-chamber into sections and deflect the travel of the products of combustion from the furnace throughout the boiler-sections. In Figs. 2, 6, 7, 8, 9 a horizontal partition or wall is provided to further guide and divert the

travel of the gases of combustion. In all cases the superheater 10 is located in a space formed above the boiler space or passes in order to secure dry steam from the boiler for superheating, and, as illustrated in the figures of drawings, swinging dampers 11, pivoted to swing to open or closed position, are provided and located between the combustion-chamber of the furnace and the space in which the superheater is located. Within the superheater-space partitions 12 may be employed to insure proper traverse of the gases through the superheater-space and around the tubes of the same. In Fig. 2 a superheater having two heads or drums 10', with tubes connecting them, is illustrated, and of course in each instance the superheater is connected with the steam-drum or steam-pipe thereof at the highest point. The construction illustrated in Figs. 3 and 4 embodies a water-tube boiler provided with vertical partitions or walls 13, and above the wall the swinging dampers 11 are located to shut off or open communication between the superheater-space and the combustion-chamber of the furnace.

The ordinary type of fire-tube boiler is illustrated in Figs. 11 and 12, in which the numeral 14 indicates the boiler-shell, and 15 the flues of the same, and the superheater is located above the partition 16, which partition guides the travel of the gases from the combustion-chamber when the swinging damper 17 is in the position shown.

A modified form or type of water-tube boiler is illustrated in Figs. 13 and 14, wherein the drums and water-tubes are arranged vertically, and the two vertical partitions or baffle-walls 18 and 19 guide the gases, the wall 18 having an extension 18' located in the superheater-space and the swinging dampers 11 located between said wall and its extension.

In the water-tube boiler shown in Fig. 15 the gases of combustion are guided by the inclined partitions or walls 20 21, as illustrated by the arrows.

In some instances the boiler construction may be as shown in Figs. 16 and 17, which construction is substantially a modification of the type shown in Figs. 3 and 4; but in them the gases of combustion pass to the rear of the combustion-chamber from the furnace and traverse the space along the vertical wall 22 through the superheater-space and are deflected by the second baffle-wall 23 over the furnace and up through the stack.

A modified form of damper is illustrated in Fig. 18 in connection with a common type of boiler. The damper 24 is shown in a cylindrical shell located between the furnace and the combustion-chamber and movably supported by the baffle-wall 25. The damper is suspended and adapted to be moved on the

rollers 26. (Dotted lines.) In the position illustrated the gases are guided to the superheater-space for the purpose of heating the tubes of the superheater; but when moved to dotted position the shell or damper is out of line of the travel of gases, and they pass directly from the furnace or combustion-chamber through the flues of the boiler.

In the embodiment of the invention illustrated in Figs. 20 and 21 a horizontal baffle-wall or partition 27, with an opening therein adapted to be closed by the slide-plate 28, is located above the furnace and deflects the gases to the rear of the furnace. A second baffle plate or wall 29 is located above the wall 28, and the swinging dampers 11, which are located above the partition 29, form when closed a continuation of the upper wall 30 and an effectual barrier against the entrance of gases to the superheater-space, guiding them direct to the stack.

From the above description, taken in connection with the drawings, it will be understood that I arrange between the boiler and the superheater one or more dampers, which may be of any suitable design—such as shutters, leads, or single plates—and from any suitable material, which may be operated by suitable means—as, for instance, a handle 31, Fig. 21.

While the dampers are in the positions indicated, the gases of combustion will flow through the furnace and boiler passes or flues, thence through the superheater-space, among the tubes of the superheater, and thence through the boiler-flues to the stack. If the dampers are partly open, a part of the gas flows through the boiler-passes and superheater-space to the stack, and another part flows through the boiler-passes to the stack. If it is desired, by closing the dampers the entire supply of gases may be directed to pass through the boiler passes or flues only, leaving the superheater untouched.

From the above description, taken in connection with the drawings, it becomes obvious that I have provided a device which fulfills all the conditions set forth as the purpose and objects of my invention.

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

1. The combination with a steam-boiler and furnace of a superheater located above the boiler and inclosed by walls, the steam-drum of the boiler, a partition each side of said steam-drum partly closing the space between said superheater and the combustion-chamber, and swinging dampers adapted to entirely close, in connection with said partition, the communication between the superheater-space and the furnace.

2. The combination with a steam-boiler and furnace and the steam-drum thereof, of a

superheater located above said drum, a partition each side of said drum partly closing communication between the superheater and furnace, and a plurality of dampers adapted
5 when closed, to form a continuation of the partitions and close communication between the superheater and the furnace.

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

HANS O. KEFERSTEIN.

Witnesses:

J. M. ALEXANDER,
BERT RODENBAUGH.