

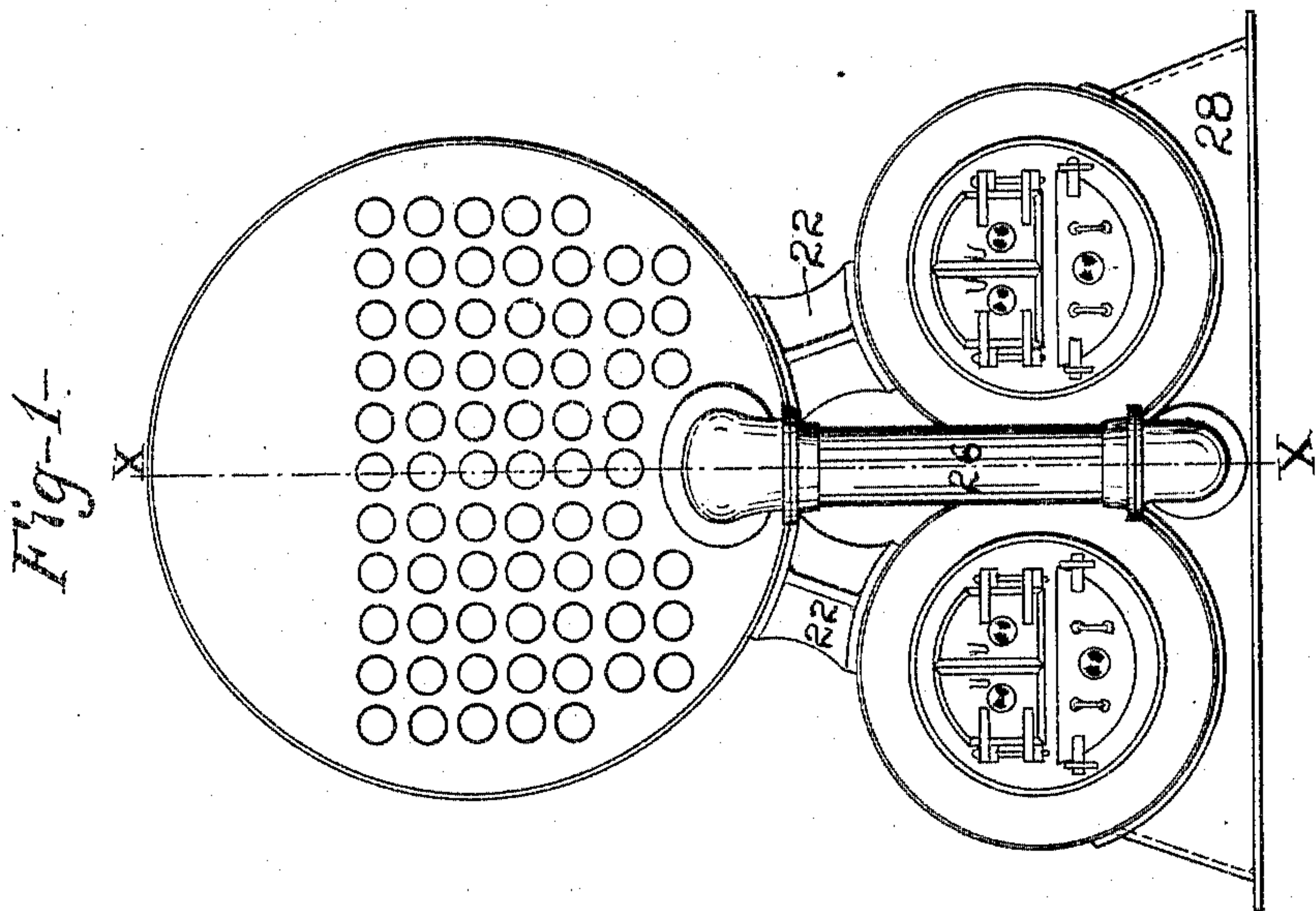
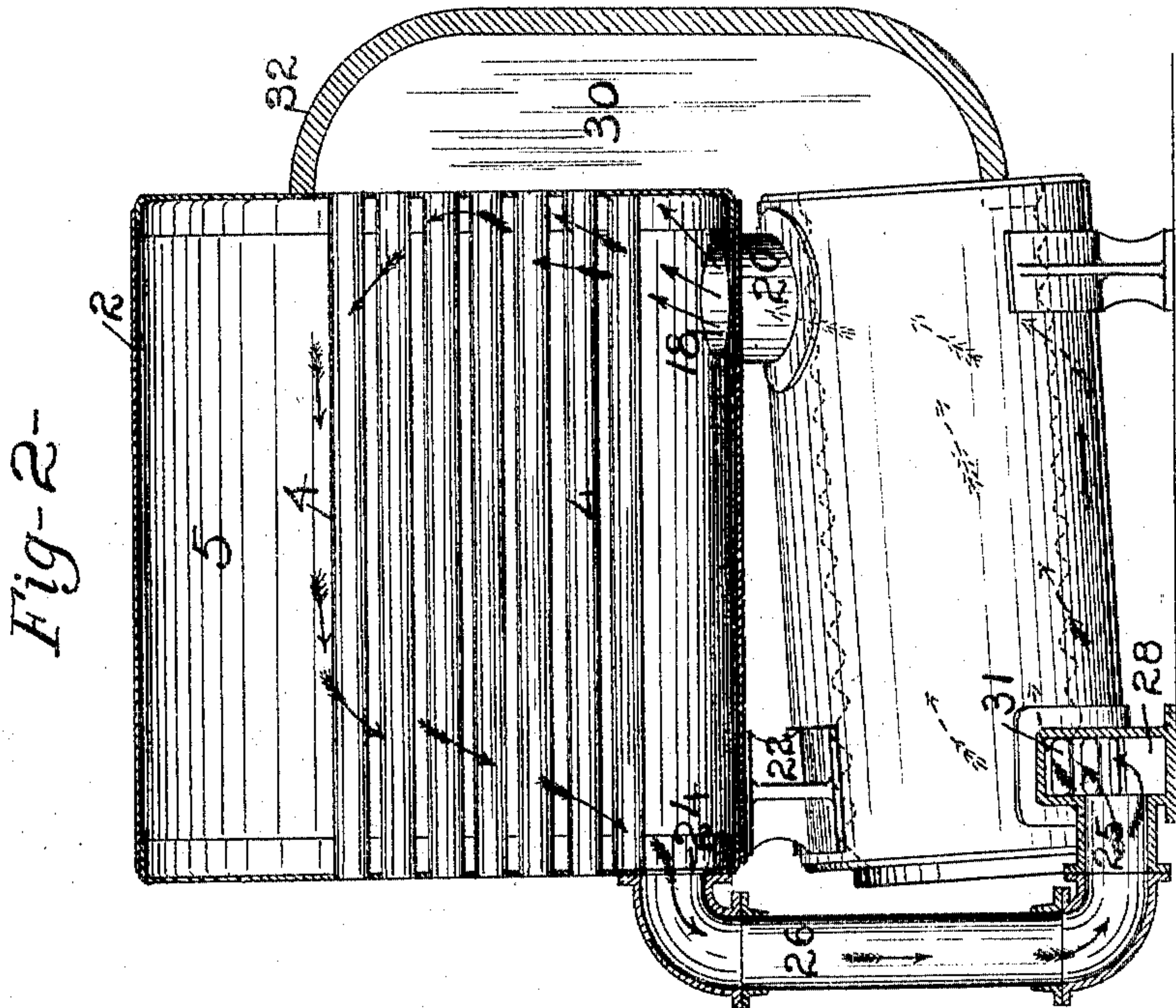
No. 780,263.

PATENTED JAN. 17, 1905.

R. BONSON.
COMBINED BOILER AND FURNACE.

APPLICATION FILED SEPT. 22, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

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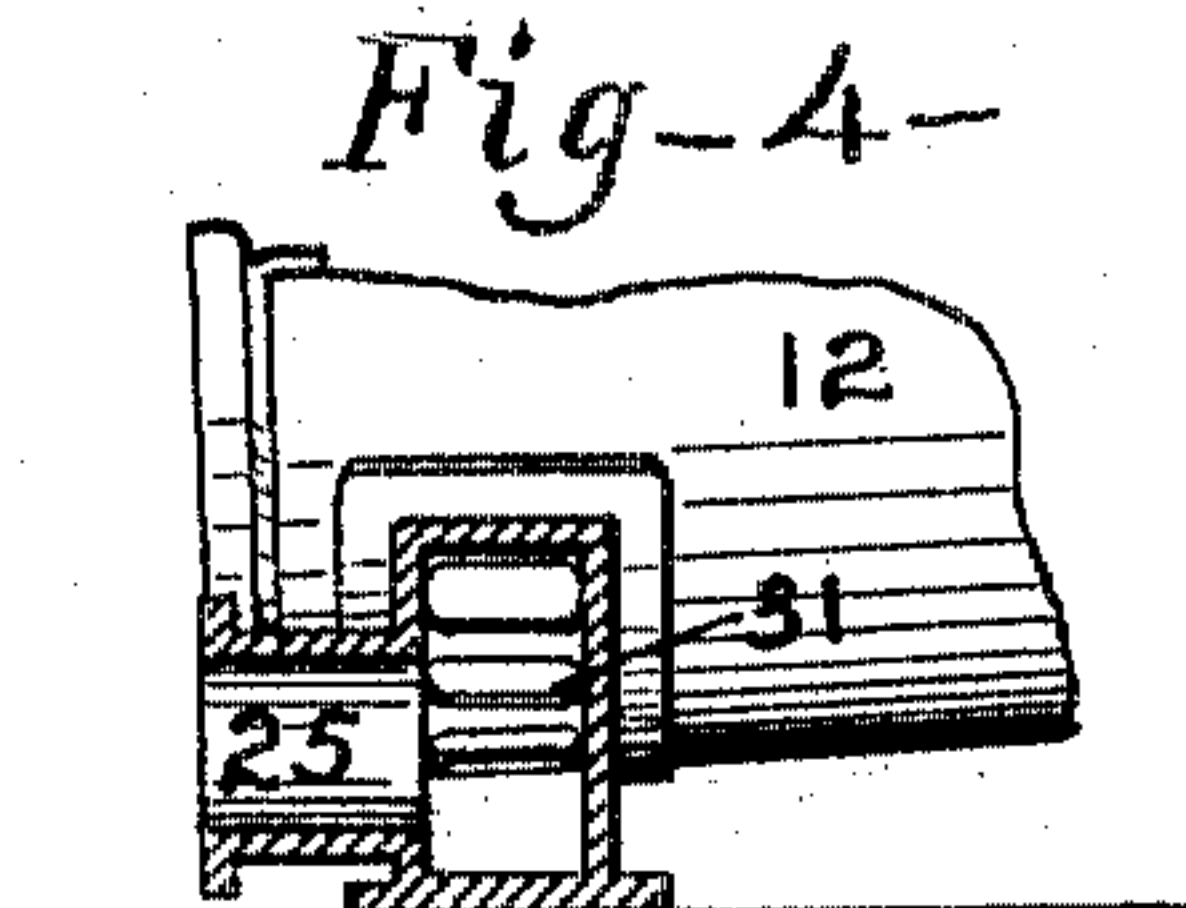
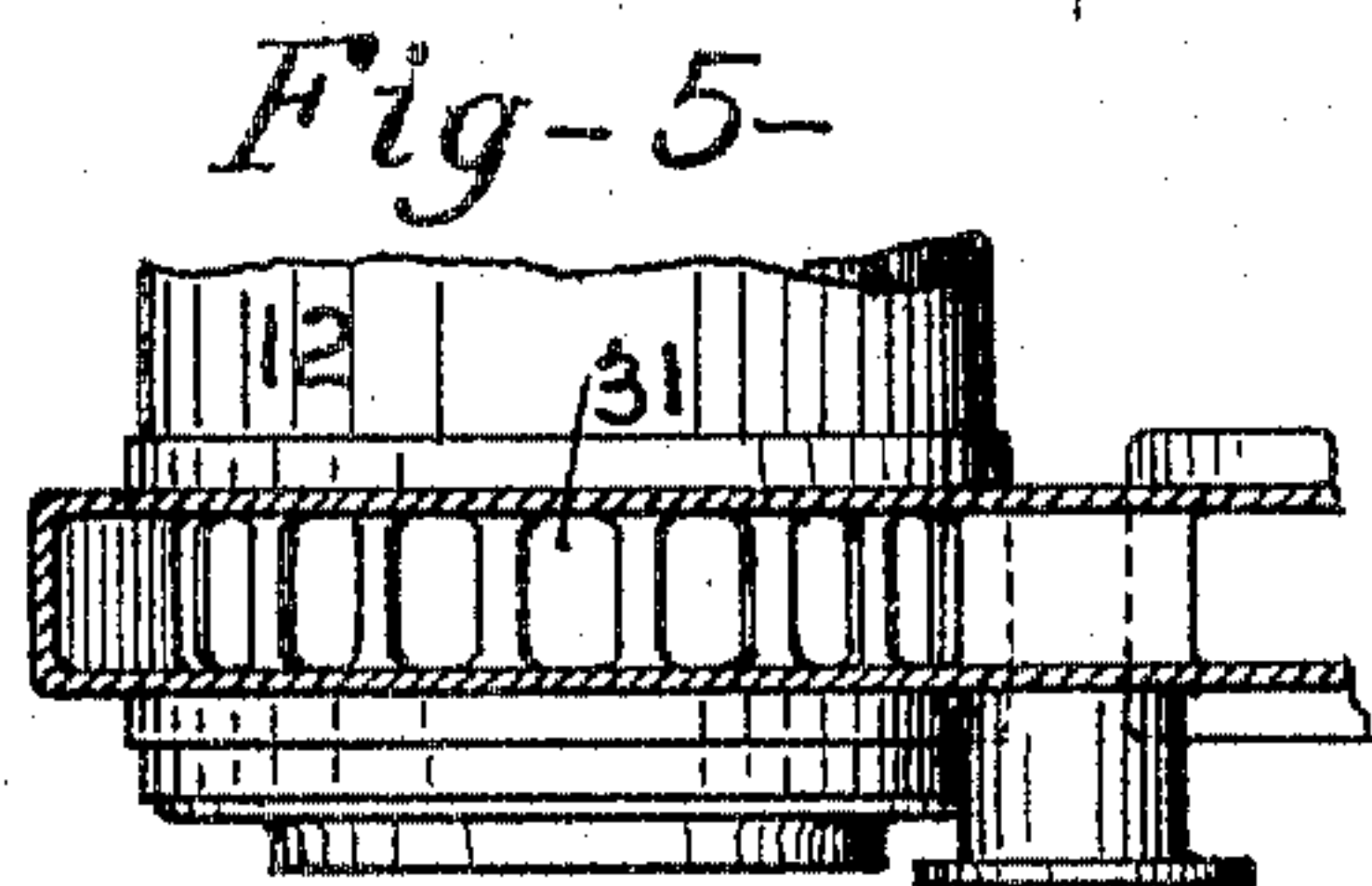
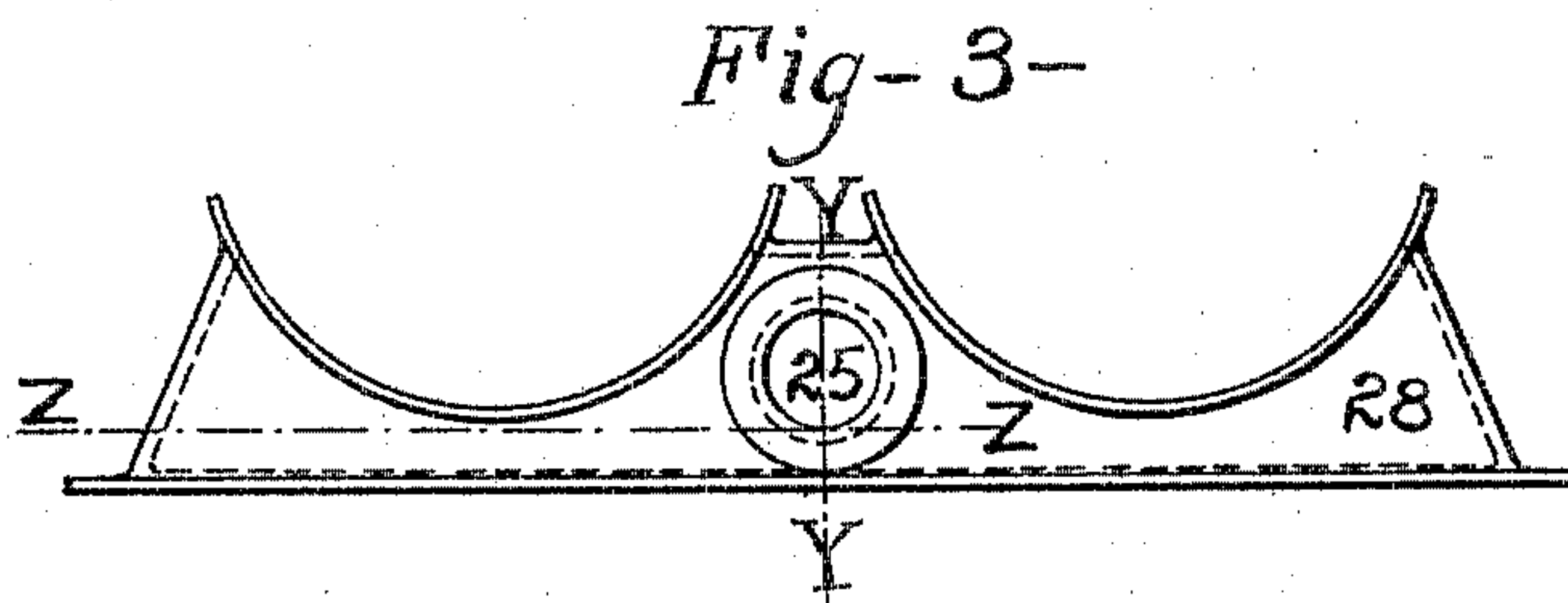
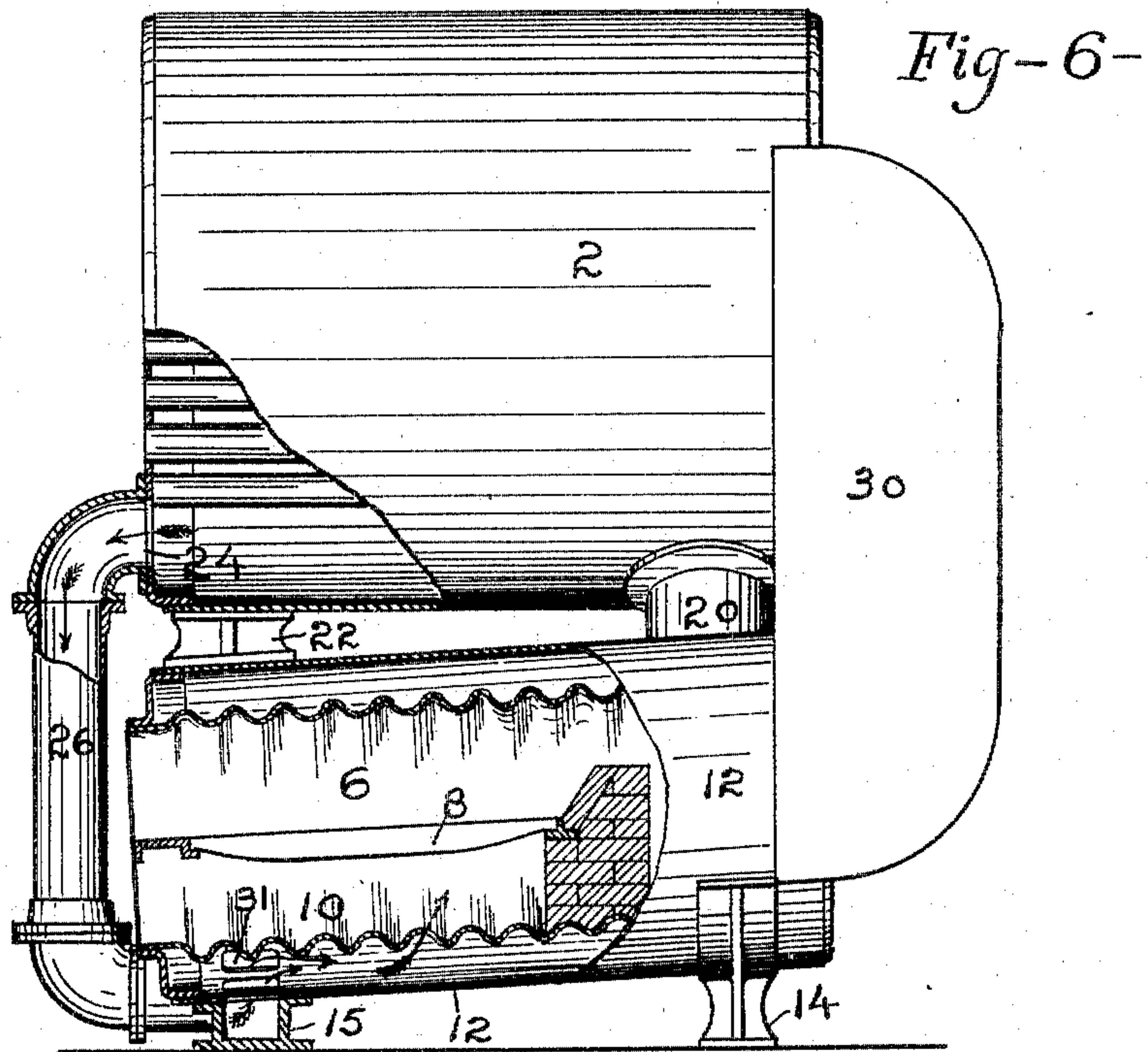
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2 SHEETS—SHEET 2.



WITNESSES:
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UNITED STATES PATENT OFFICE.

ROBERT BONSON, OF DUBUQUE, IOWA, ASSIGNOR TO BONSON FURNACE AND BOILER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

COMBINED BOILER AND FURNACE.

SPECIFICATION forming part of Letters Patent No. 780,263, dated January 17, 1905.

Application filed September 22, 1904. Serial No. 225,422.

To all whom it may concern:

Be it known that I, ROBERT BONSON, a citizen of the United States, residing in the city and county of Dubuque and State of Iowa, have invented certain new and useful Improvements in a Combined Boiler and Furnace; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to boilers and furnaces, with special reference to that class known as "internally-fired" boilers and furnaces, in which the furnace is surrounded with water and connected above to a fire-flue or tubular boiler with which it has a water communication; and the leading object of my invention is to greatly increase the efficiency of the boiler and furnace by so constructing and connecting the two members together and providing them with a mode of water communication that there will be a generous and even a rushing circulation of water both around the furnace and within the boiler member.

It consists in surrounding one or more furnaces, preferably corrugated, with a shell and providing a water-space entirely around the furnace except the ends, then placing over this furnace member a tubular or fire-flue boiler and providing a water communication between the lower portion of the boiler member and the upper portion of the furnace member at the rear and providing a water communication between the boiler member and the base of the furnace member at their forward ends.

The mode by which I accomplish my object will be fully set out in the following specification when taken in connection with the drawings accompanying the same and forming a part hereof.

Figure 1 is a front view of the boiler member with two furnace members. Fig. 2 is a longitudinal section of the device through line *xx* of Fig. 1 and showing the circulation. Fig. 3 shows a front view of the water-saddle in which the furnace members rest and with which they have water communication. Fig. 4 is a vertical section through line *yy* of Fig.

3, showing openings into one of the furnace-shells. Fig. 5 is a section through line *zz* of Fig. 3 looking up and showing openings from the water-saddle through the shell of one furnace member. Fig. 6 is a side elevation of the device with part cut away, showing one of the furnaces.

Like characters of reference denote corresponding parts in each of the drawings.

Referring to the drawings, 2 designates a tubular boiler provided with fire-flues 4 and steam-space 5. Beneath this boiler member is set a furnace member 6. (There may be only one of these furnaces or a plurality; but I have shown two.) These furnaces preferably are set on an incline upward from the front to the rear and are preferably made of corrugated steel and provided on the inside with the usual grate 8 and ash-box 10. The furnace is surrounded except at both ends by a shell 12, providing a water-space between the shell and the furnace. The front end is provided with the usual door, and the rear portion is open and terminates back of the grate in a fire-flue. The furnace and shell or furnace member rests on legs 14 and 15. The leg 14 is somewhat longer than the leg 15, and in this manner the legs sustain the furnace member at an incline, and the leg 15 also forms part of a water-saddle to be hereinafter described.

In the rear of the furnace member there is an opening through the shell 12 which corresponds with a similar opening 18 in the base of the tubular member 2, and these two openings are connected together by a pipe 20. The forward end of the boiler 2 is supported upon a standard 22, resting upon the furnace-shell 12.

In the front of the boiler 2, near the base, is an opening 24, and in the water-saddle, in connection with the shell 12, is another opening 25, and these two openings 24 and 25 are connected together by a tube 26. When two furnaces are set in the water-saddle 28, there is an opening through the shell 12 of each boiler into the water-saddle through which a water communication is formed between the saddle and the base of the furnace member. When two furnaces are used and connected

as above, there is need of but one tube 26, connecting the boiler 2 with the water-saddle 28 to provide a water communication between the base of the boiler 2 and the base of both of the furnace members. For convenience the tube 26 opens into the boiler 2 at the front end near the base and extends down on the outside of the furnace and enters the water-saddle at the base, as shown in Fig. 1.

10 The water-saddle 28, which also serves as the supporting front leg 15 of the furnace member, consists of a shell which extends from the front end of the furnace member back a short distance, and the shell of the furnace is provided with openings 31 into the water-saddle 28, and in this manner there is formed a water communication from the boiler through the pipe 26 into the water-saddle 28 and through the openings 31 into the space 20 between the furnace and the shell 12.

In the rear of the furnace 6 and the boiler 2 there is a back connection 30, formed of some non-heat-conducting material or a wall 32 of brick or iron and lined with asbestos or other non-heat-conducting material. This back connection directs the products of combustion from the rear flue of the furnace to the rear of the fire-flues of the boiler.

30 The mode of operating my invention is substantially as follows: The water is introduced into the boiler 2 near its top and fills the shell 12 of the furnace and the boiler above the fire-flues 4. Then the fire is started upon the grate 8 in the furnace 6, and the water around the upper part of the furnace is heated. As soon as the water is heated and begins to form into steam then the water passes up through the pipe 20, through the opening 18 in the boiler 2, along up near the rear flue-sheet to the top of the boiler, where the steam is released into the steam-chamber. As soon as the heated water begins to pass up from the rear of the furnace into the boiler the colder water at the forward end of the boiler will pass down through the pipe 26 and enter the water-saddle 28 through the opening 31 into the annular water-space surrounding the furnace 12, then up around the furnace toward the rear pipe 20 and will be thoroughly heated in its passage around the furnace. By this mode of construction it will be seen that there will be a rapid circulation of water down through the pipe 26 into the base of the furnace and up around the furnace through the tube 20 into the boiler above. This generous and defined circulation will have a tendency to maintain an even tem-

perature of the water in the boiler and around the furnace, and there will be no cold or dead water beneath the furnace, as is common where there is water communication only between the base of the boiler member and the upper portion of the furnace member, and all of the water being thus brought to an even temperature the metal parts of the boiler and furnace coming in contact therewith are also kept at an even temperature and the expansion on all parts of the boiler is uniform, thus obviating all leaking at the joints.

Having now described my invention, what I claim is—

1. In a device of the character described, a boiler member provided with flues and having an opening at each end near its base, a furnace member consisting of a combustion-chamber surrounded by water, a water-saddle beneath the furnace member and having water communication between said saddle and the furnace member, a pipe connecting the rear ends of the boiler member and the furnace member and forming a water communication between the base of the boiler and the upper portion of the furnace member at the rear ends, and a pipe connecting the base of the boiler member with a water-saddle and forming a water communication between the base of the boiler member and the base of the furnace member at their forward ends.

2. In a device of the character described, a boiler member provided with fire-flues, a furnace member consisting of a furnace, a shell around the furnace with water-space between the shell and the furnace, heat communication between the furnace member and the boiler member, a water-saddle having water communication with the water around the furnace and with the water in the boiler member, a pipe connecting the lower portion of the boiler member with the upper portion of the furnace member and forming a water communication between the two members at their rear ends, and a pipe connecting the base of the boiler member and the water-saddle and forming a water communication between the base of the boiler member and the base of the furnace member at their front ends.

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

ROBERT BONSON.

Witnesses:

M. M. CADY,
HENRY SCHROEDER.