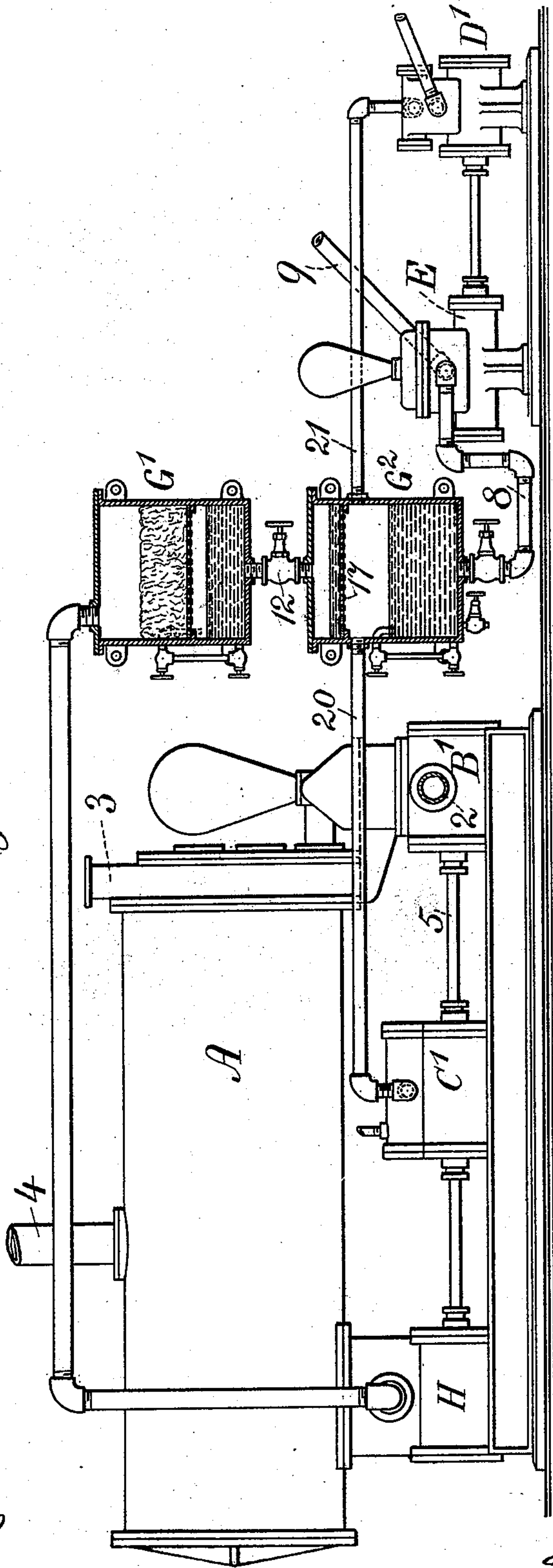


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3 Sheets—Sheet 1.

F. M. WHEELER & G. W. LYON.
COMBINED CONDENSING AND FEED WATER APPARATUS.
No. 506,292. Patented Oct. 10, 1893.

Fig. 1.



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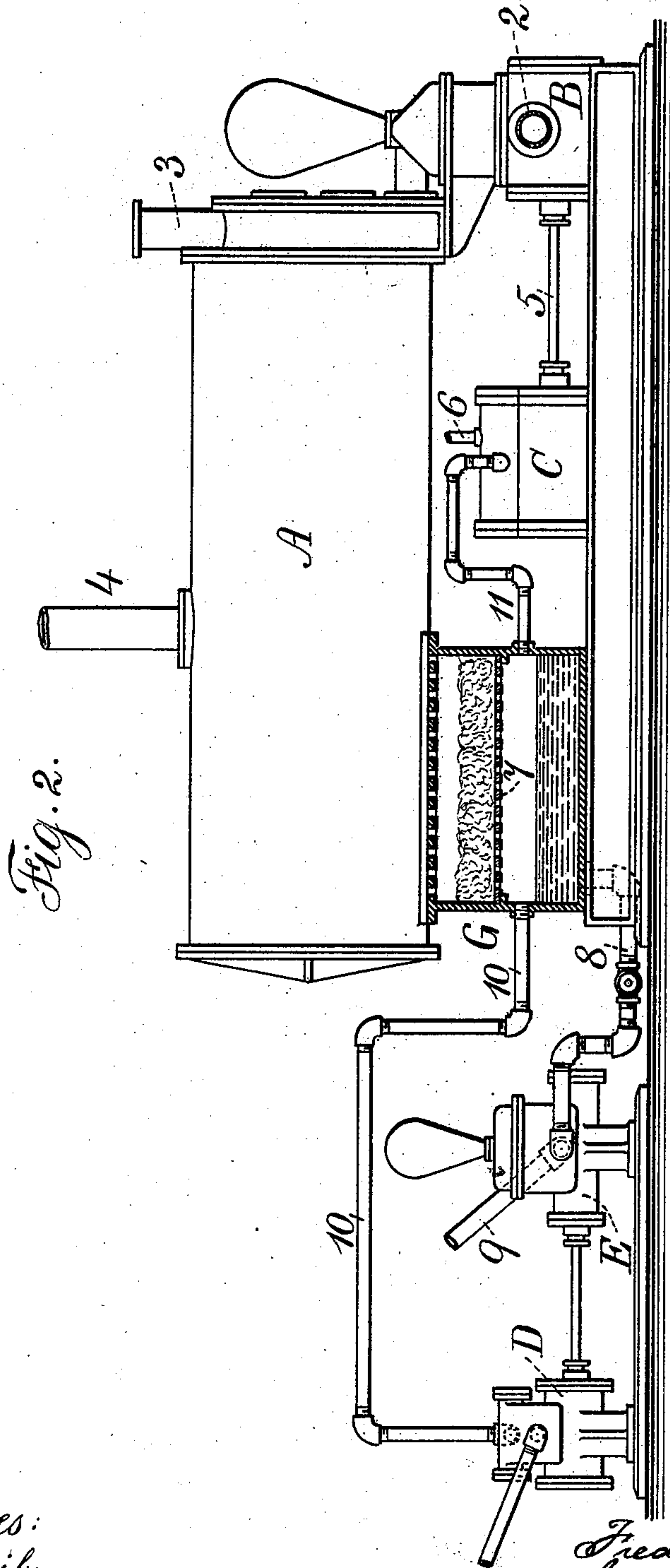
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COMBINED CONDENSING AND FEED WATER APPARATUS.

No. 506,292.

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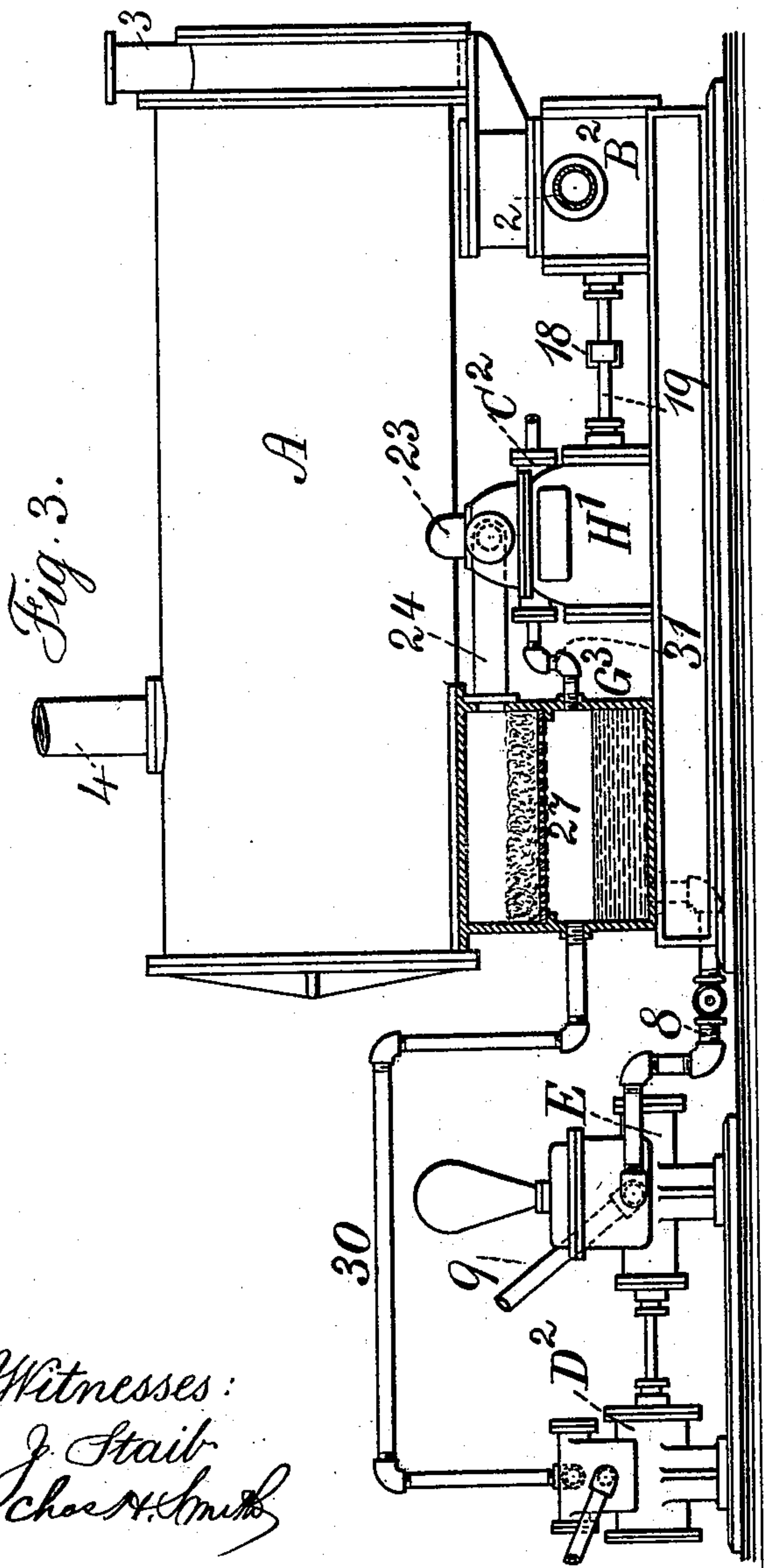
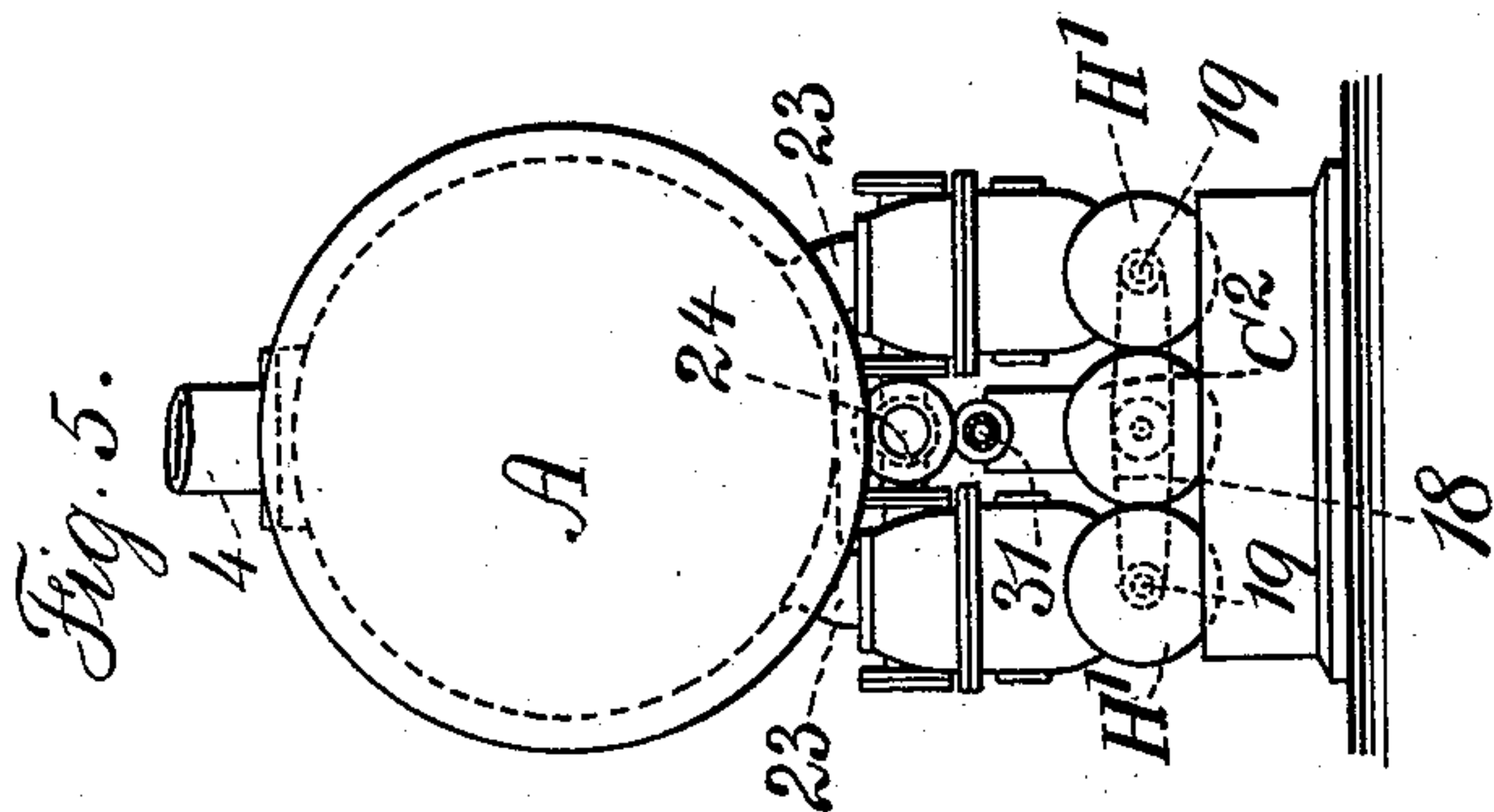
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F. M. WHEELER & G. W. LYON.

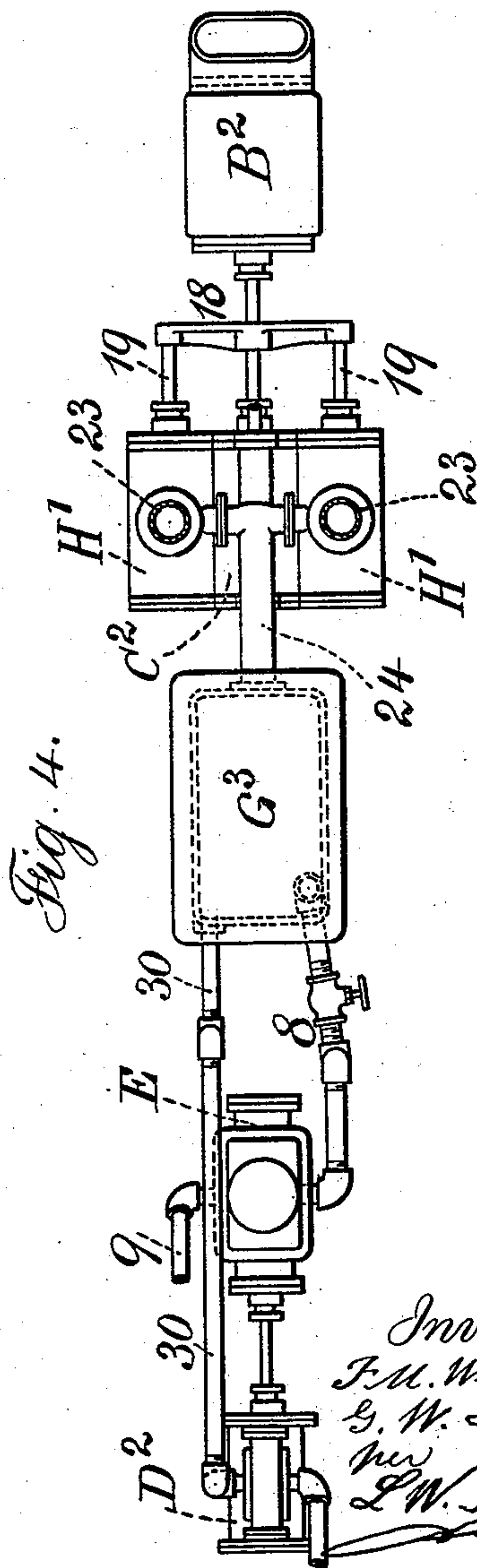
COMBINED CONDENSING AND FEED WATER APPARATUS.

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Patented Oct. 10, 1893.



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UNITED STATES PATENT OFFICE.

FREDERICK MERIAM WHEELER, OF MONTCLAIR, NEW JERSEY, AND GEORGE W. LYON, OF NORWICH, CONNECTICUT, ASSIGNORS TO THE WHEELER CONDENSER AND ENGINEERING COMPANY, OF CARTERET, NEW JERSEY.

COMBINED CONDENSING AND FEED-WATER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 506,292, dated October 10, 1893.

Application filed January 31, 1893. Serial No. 460,224. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK MERIAM WHEELER, of Montclair, in the county of Essex and State of New Jersey, and GEORGE W. LYON, of Norwich, in the county of New London and State of Connecticut, citizens of the United States, have invented an Improvement in Combined Condensing and Feed-Water Apparatus, of which the following is a specification.

In connection with engines, especially those employed on steam vessels, it has been found advantageous to make use of a separate steam engine to drive the water circulating pump for supplying the condensing water to the condenser and an air pump also operated by the same engine for maintaining the required vacuum in the condenser, and a separate feed water pump has been employed for taking the water of condensation from the condenser and returning it to the boiler. In this case however the exhaust steam from the engine of the water circulating, air and feed pumps has either passed into the condenser or else escaped into the atmosphere, involving the loss of the water of condensation and of the heat in such steam.

In the present improvement we make use of the feed water from the condenser as a means for condensing the steam from the engines that drive the water circulating and other pumps, so as to prevent loss of water and of heat, and to this combined condensing and feed water apparatus our invention relates.

In the drawings, Figure 1 is an elevation partially in section representing our improvement as adapted to a vacuum outfit. Fig. 2 is a similar view with the parts adapted to a non-vacuum outfit. Fig. 3 is an elevation partially in section of the present improvements with an engine and pump differently arranged. Fig. 4 is a plan view with the condenser removed, and Fig. 5 is an end elevation of the engine and condenser with the feed water pump and hot well removed.

The condenser A is of any desired character and the pump B', Fig. 1, is adapted to circulate water through the condenser, the wa-

ter supply pipe is shown at 2 and the discharge pipe 3 takes the warm water away from the condenser, and 4 is the pipe passing the exhaust steam into the condenser. This present improvement is specially adapted to tubular surface condensers, but the same may be availed of with jet or other kinds of condensers.

The piston of the steam engine cylinder C, Fig. 2, is connected to the piston of the pump B by the piston rod 5, and steam is supplied to the cylinder C by a suitable pipe such as the pipe 6 to the valve chest, and D is the steam cylinder for driving the feed water pump E; and we remark that these pumping engines are to be of any suitable construction and they may be arranged in whatever position is most convenient for the condenser.

In Fig. 2 we have represented a hot well and filter tank G as below the condenser for the water of condensation to run into the hot-well filter tank, and there is a perforated partition 7 upon which is suitable material such as sponge for the absorption of oily materials, and the water drips through the perforated partition 7 to the bottom of the hot well from which the pipe 8 leads to the pump E, and the pipe 9 from the pump is carried to the boiler that is to be supplied with feed water. The pipe 10 from the steam cylinder D leads into the hot well. So also does the pipe 11 from the steam cylinder C, and these connections are made below the perforated partition 7, so that the water running through such perforated partition serves as a jet condenser to condense the steam from the cylinders C and D, thus saving the loss of heat and of water that would result if the exhaust from the cylinders C and D passed into the atmosphere, and the feed water which is returned by the pump E to the boiler is raised to a higher temperature than the water passing from the condenser. Hence the consumption of fuel in the boiler is less and the hot well is kept at as high a temperature as consistent with the pumping operation.

In Fig. 1 the air pump H is represented in addition to the parts before described, and the stem cylinder C' is made to act both upon

the circulating pump B' and the air pump H; and the water of condensation from the air pump H is taken to the filter tank and hot-well G', and in this figure we have represented the hot-well as having an upper and a lower vessel connected by a cock 12, the water of condensation passing into the upper vessel and through the cock 12 to the lower vessel G², in which is the perforated partition 17 which causes the water to descend in jets to condense the exhaust steam passing by the pipes 20 and 21 from the cylinders C' and D' respectively. By this means the same benefit is derived by the condensation of the steam made use of in operating the pumping engines; and we remark that the feed water pump E and the steam cylinder thereof are the same as shown in Fig. 2, only they are represented at the other end of the condenser.

In Figs. 3, 4 and 5 the parts are represented in a more compact form than in Fig. 1, because we have shown the filter tank and hot-well G³ as well and the air and circulating pumps and the engine as below the condenser, and the steam cylinder C² that drives the circulating pump B² is connected by a cross head 18 with the piston rods 19 of the air pumps H', and these air pumps receive the water of condensation by the pipes 23 from the condenser, and the water of condensation is passed by the pipe 24 to the filter tank and hot-well G³ above the partition 27, and the exhaust steam from both the cylinders C² and D² is passed by the pipes 30 and 31 and condensed in the hot-well for increasing the temperature of the feed water and utilizing the steam and saving water.

The before mentioned improvements are available with engines for bilge water or other pumps, the steam from such separate

engines being taken into the hot-well as before set forth.

We claim as our invention—

1. The combination with the surface condenser, water circulating pump and steam engine for actuating the same, of a hot-well, a filter tank above the hot-well and its chamber and a pipe from the chamber to the engine and in which chamber the feed water acts to condense the exhaust steam, substantially as set forth.

2. The combination with the surface condenser, water circulating pump and steam engine for actuating the same, and a feed water pump, of a hot-well, a filter tank above the hot-well and its chamber and a pipe from the chamber to the engine and in which chamber the feed-water acts to condense the exhaust steam from the engine, substantially as set forth.

3. The combination with a condenser, of a water circulating pump directly below one end of such condenser, of a steam engine also below the condenser for actuating such pump, an air and water pump for discharging the water of condensation, a filter chamber containing a sponge or similar material and having a perforated bottom, a hot-well below the same, a pipe for connecting the air and water pump to the hot-well, and a pipe for passing the steam from the engines of the pumps into the chamber of the hot-well below the perforated partition, substantially as set forth.

Signed by us this 2d day of November, 1892.

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