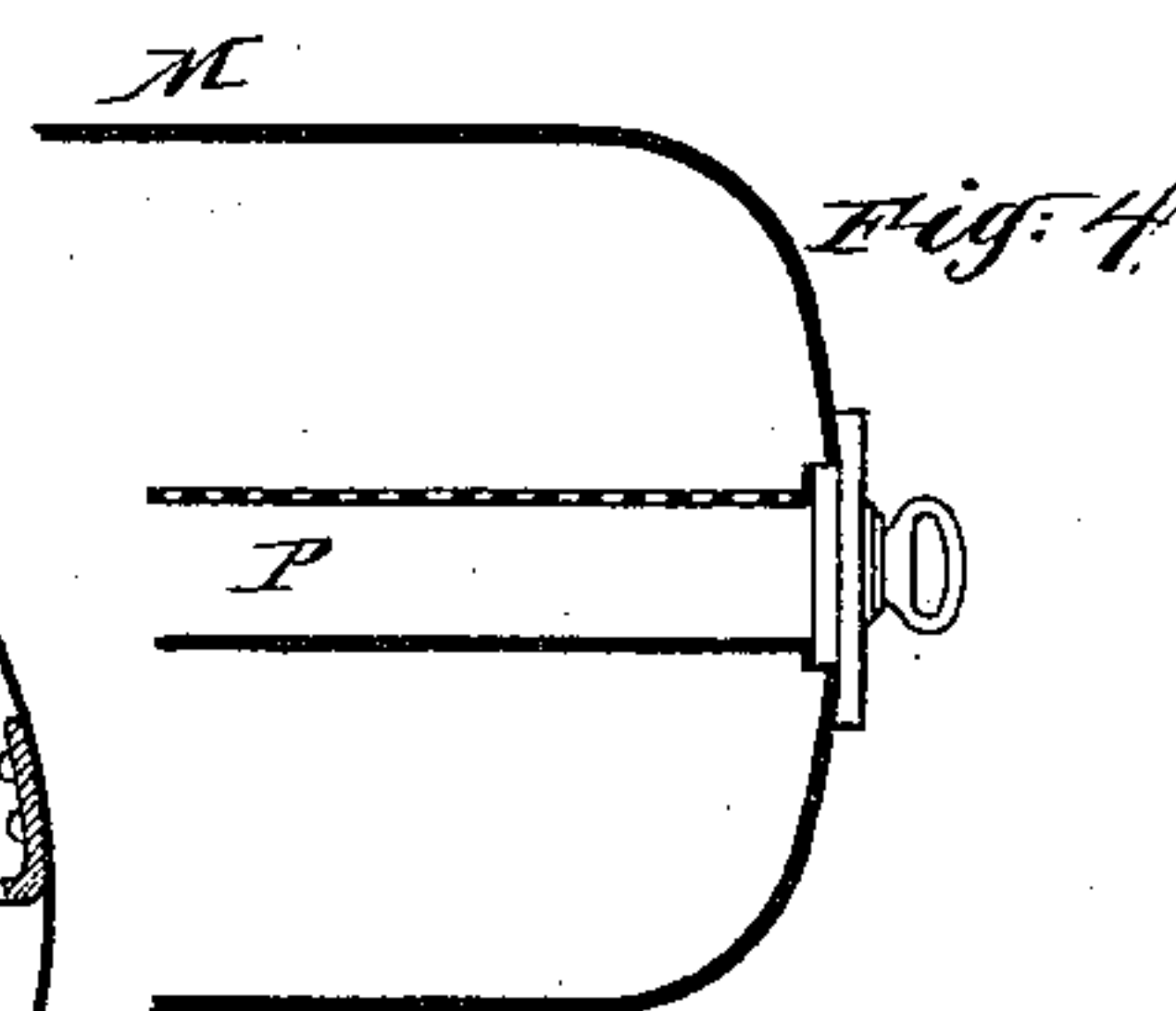
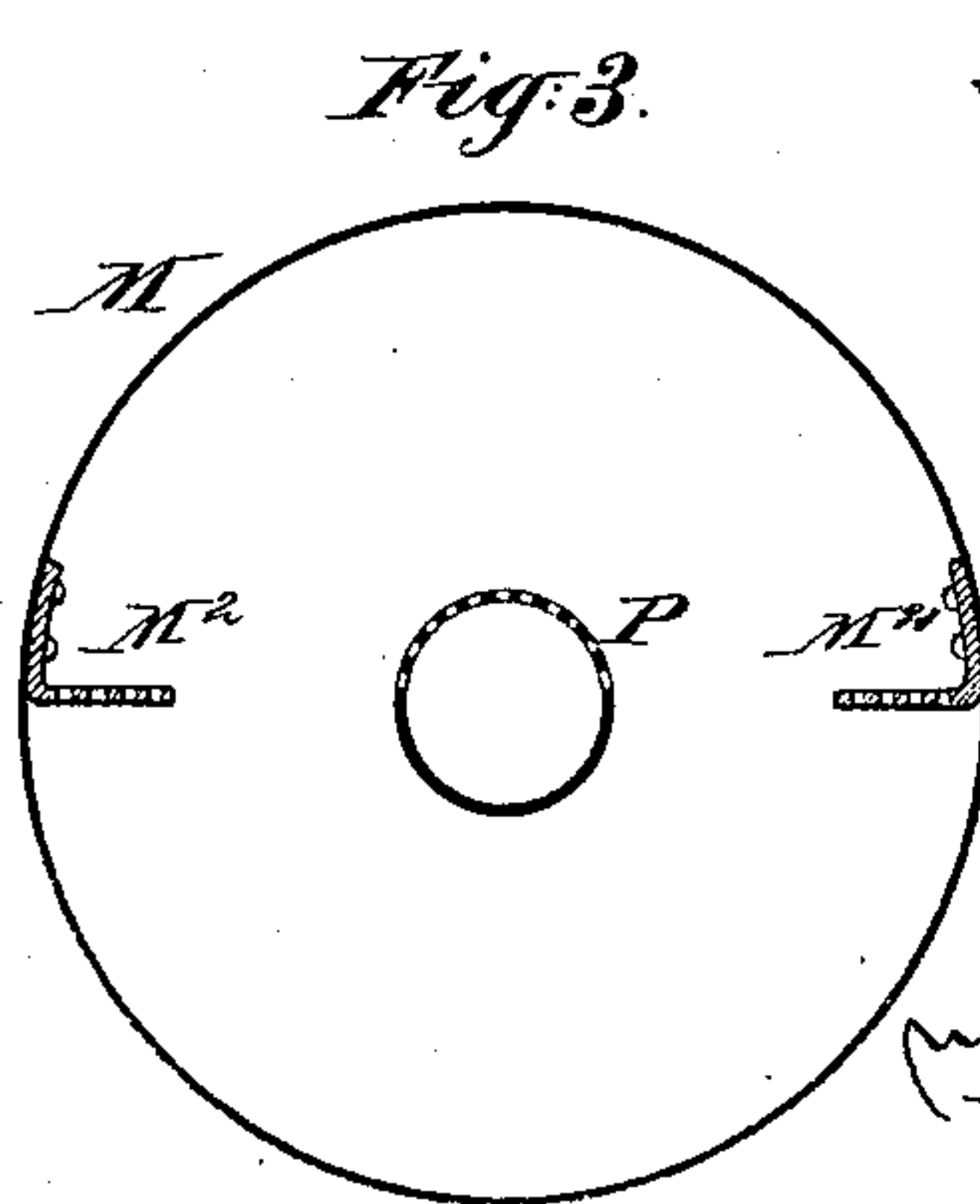
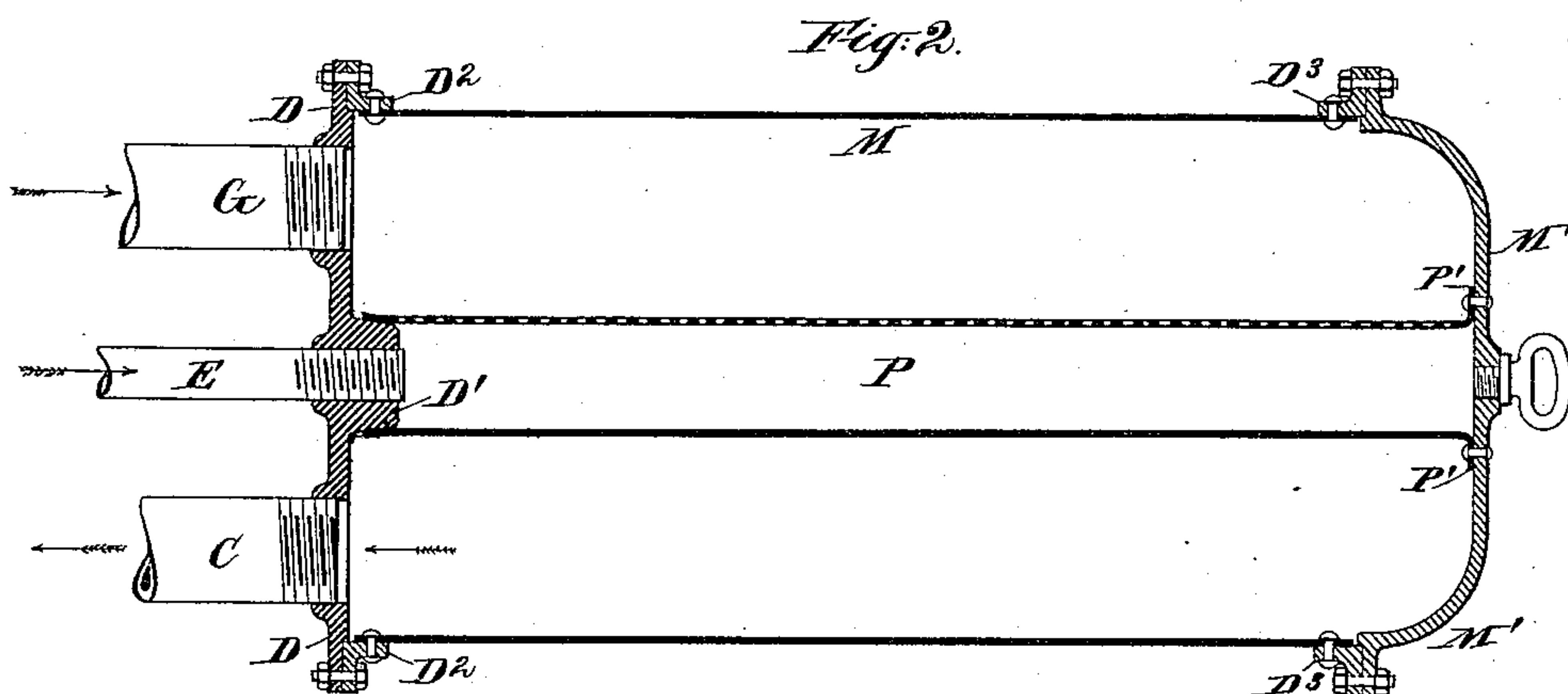
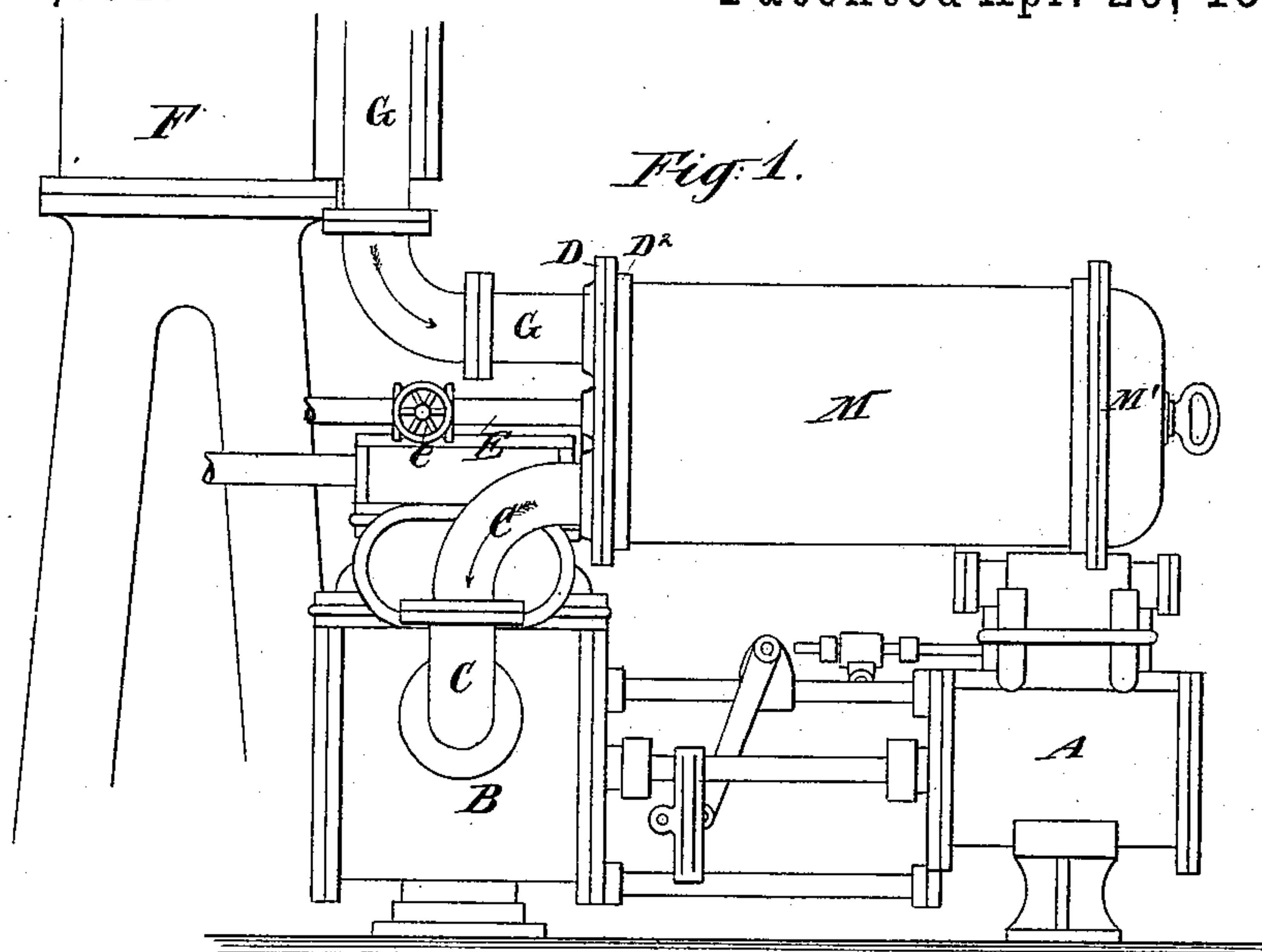


(No Model.)

F. M. WHEELER.
CONDENSER.

No. 426,891.

Patented Apr. 29, 1890.



Witnesses:
Charles R. Searle,
Chas. J. Butler.

Inventor:
Frederick M. Wheeler
by his attorney
Thomas D. Stetson

UNITED STATES PATENT OFFICE.

FREDERICK MERIAM WHEELER, OF MONTCLAIR, NEW JERSEY.

CONDENSER.

SPECIFICATION forming part of Letters Patent No. 426,891, dated April 29, 1890.

Application filed May 16, 1889. Serial No. 310,943. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MERIAM WHEELER, of Montclair, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Condensers, of which the following is a specification.

My improved condenser is of the style known as "jet," in which the steam is allowed to come into direct contact with the water. I have devised a construction in which the main portion is a thin shell. One end is made with the proper nozzles for the several connections; the other is domed and as thin as practicable.

The invention allows a high degree of efficiency with little bulk or weight.

My condenser is eminently adapted for fast steam-yachts, torpedo-boats, light-draft steamers, &c., where the weight of machinery must be reduced as much as possible.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation showing the condenser and the immediately-connected parts. The remaining figures are on a larger scale. Fig. 2 is a central longitudinal section through the condenser, and Fig. 3 is a cross-section thereof. Fig. 4 is a longitudinal section of a portion, showing a modification.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

Referrings to Figs. 1, 2, and 3, A B indicate an independent horizontal air-pump of any ordinary or suitable construction, the part A being the steam-cylinder, and the part B the pump operated thereby. It will be understood that there are proper valves and connections suitably operated to constitute an efficient pump for pumping out the water and vapors against the pressure of the air.

C is a passage leading the water and vapors down from the condenser. D is a casting adapted to form one end of the condenser. It has a large orifice connected with the passage C. A central nozzle D' connects with the injection-pipe E, which is controlled by a screw-valve or other suitable controlling-valve e.

G is a passage communicating with the exhaust of the steam-engine F above. There is a liberal aperture in the upper portion of the condenser end D, which receives the exhaust-steam through the passage G.

The barrel or body M is a thin but strong and rigid cylinder of steel, copper, or other suitable material. Both ends are riveted to flanges D² and D³. One end is bolted to the head D, and the other end to the swelled or domed end M'.

P is a tube or spray-pipe a little larger than the injection-pipe E. It extends horizontally along the axial line of the condenser. Its upper half is perforated. One end is matched on the end of the nozzle D', which is extended a little into the condenser and nicely finished on the exterior to make a moderately-tight joint with the pipe P. The other end is flanged outward, as indicated by P', and is fastened to the interior of the end M'.

When the condenser is in use, the steam is received through the passage G in a succession of exhausts, which are more or less rapid, according to the rate of reciprocation of the engines. The injection-valve e being set wide open or partially open, the injection-water enters through the pipe E, fills the pipe P, and induces a multitude of jets from the several holes in P. The steam is by this means rapidly condensed, and the water of condensation falls with the injection-water into the lower part of the condenser M, and thence through the passage C into the air-pump, and is removed.

Whenever it is desired to examine, clean, or repair the interior, the removal of the series of bolts holding the flange D³ and head M' together sets the perforated pipe P free for removal and inspection. On returning head M' to its position care must be taken to slide the end of the perforated pipe P over the end of the injection-nozzle D' and make a reasonably close joint therewith. When the injection-cock is open and a good vacuum obtained in the condenser, the injection-water will jet from the holes in P very strongly and will bathe the whole inner surface of the shell M. When it is partially shut off, it will jet less forcibly, but always so as to present the water with an active circulating movement and with a large surface presented in direct contact

with the incoming steam. When the head M' with the sprinkling-pipe P are removed, both the interior and the exterior of the sprinkling-pipe P can be readily examined 5 and cleaned.

M² M² are perforated shelves extending horizontally inward from the interior of M at about the mid-height. They retard the descent of the water which has been thrown up by the 10 jet and further scatter and expose it to the contact of the steam.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The end M' may 15 be brazed to the main body M, or it may be both brazed and riveted, or the two parts may be made in one; but the latter construction involves more difficulty in joining the pipe P, and also in subsequently obtaining access 20 to its exterior to clean the holes when they shall have become clogged from any cause.

The condenser may be held in an inclined or upright position, the several connections being properly formed to introduce the steam 25 and to remove the water and uncondensed vapor therefrom; but in what I esteem the most complete form of the invention the condenser lies, as shown, in the horizontal position in close proximity to the steam-engine F 30 and between it and the air-pump A B.

I claim as my invention—

1. The jet-condenser described, having the cylindrical thin metal body M and corresponding thin end M', in combination with the cast end D, the latter being formed with all the 35 nozzles for the several connections, as herein specified.

2. In a jet-condenser, the injection-nozzle D', extending within the end D and adapted to receive an open end of the spray-pipe P, 40 in combination with the latter and with the thin horizontal barrel M, thin end M', and means, as flanges and bolts, for connecting the parts and allowing the spray-pipe to be removed and cleaned without disturbing the 45 other parts, all substantially as herein specified.

3. In a jet-condenser, the thin cylinder-body A, with connections for water and steam to one end D, in combination with a central 50 spray-pipe P, perforated on its upper side, and perforated shelves M², arranged to serve substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, N. Y., this 15th 55 day of May, 1889, in the presence of two subscribing witnesses.

FREDK. MERIAM WHEELER.

Witnesses:

CHARLES R. SEARLE,
CHAS. F. BARTER.