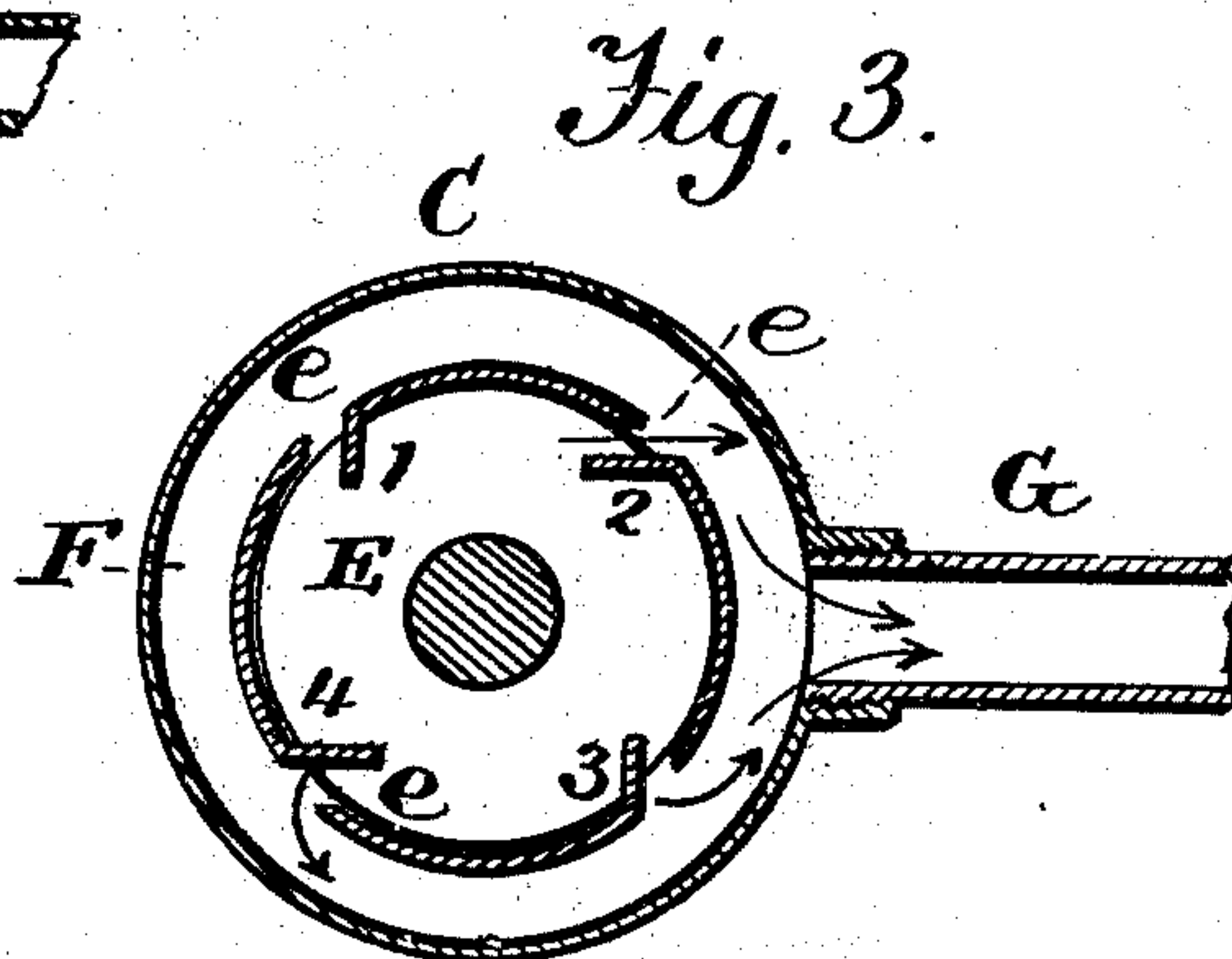
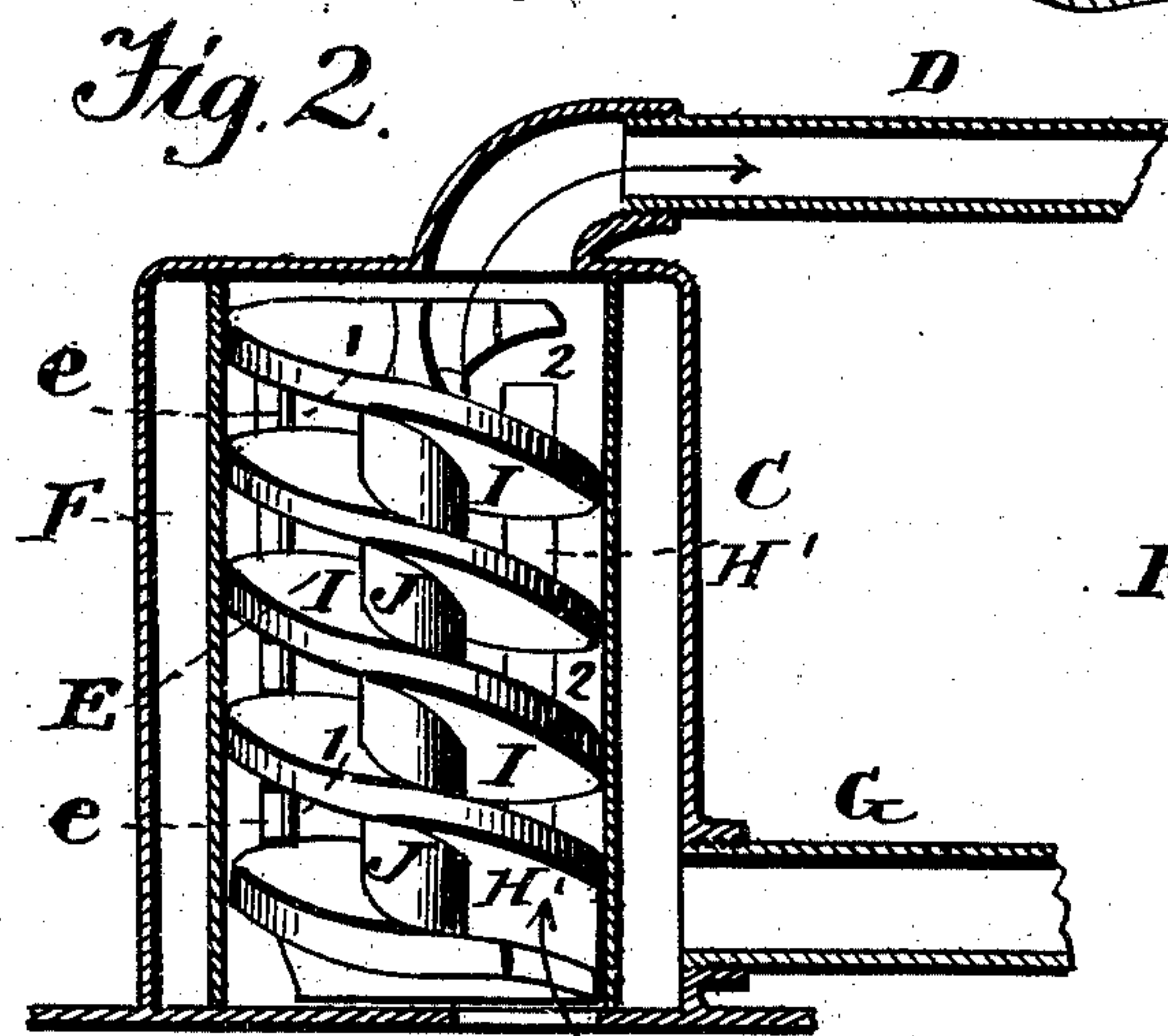
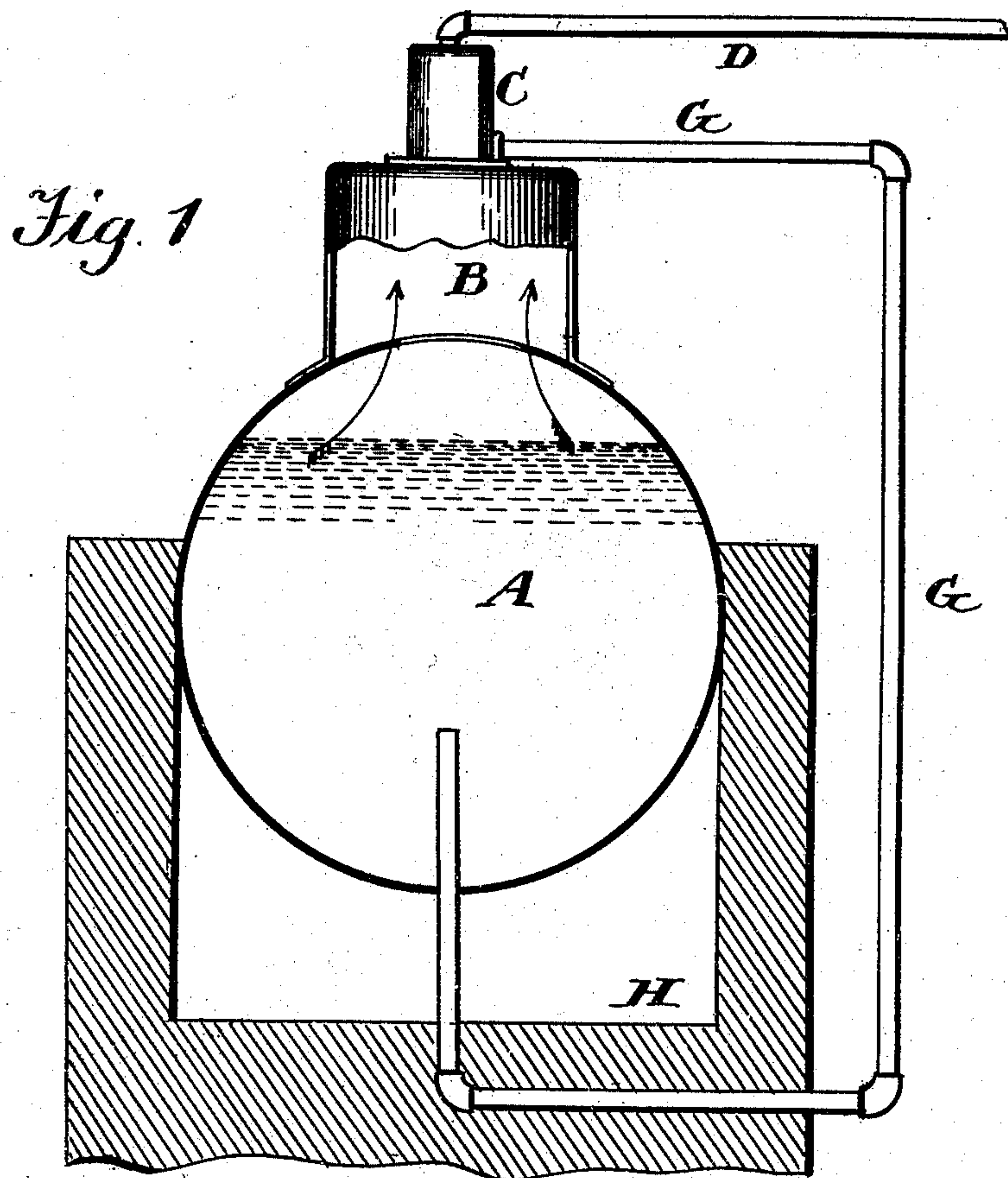


(No Model.)

C. J. LARSON.
STEAM BOILER SEPARATOR.

No. 505,709.

Patented Sept. 26, 1893.



Witnesses.
A. Rupert.
H. A. Daniels

Inventor
Chas. J. Larson.
Per
Thomas P. Simpson.
att'y.

UNITED STATES PATENT OFFICE.

CHARLES JOHN LARSON, OF LAKE PARK, MINNESOTA.

STEAM-BOILER SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 505,709, dated September 26, 1893.

Application filed October 10, 1892. Serial No. 448,355. (No model.)

To all whom it may concern:

Be it known that I, CHARLES JOHN LARSON, a citizen of the United States, residing at Lake Park, in the county of Becker and State of Minnesota, have invented certain new and useful Improvements in Steam-Boiler Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The special object of the invention is to separate water from steam, as the latter leaves the boiler, and return it to the boiler, thus economizing the water and the heat contained by it, enabling the feed water to be fed to boiler uniformly and preventing the engine cylinders from being subjected to "foaming" and collecting water.

Figure 1 of the drawings is a vertical cross-section of the boiler, its dome, bridge and setting; Fig. 2, a detail vertical section of my neck connecting steam dome with the steam outlet pipe; Fig. 3, a horizontal section thereof.

In the drawings, A represents an ordinary steam boiler provided with a steam dome B. I connect this dome with the steam outlet pipe D by means of a neck. This neck C has within it a tube E connecting at bottom with the steam dome B and at top with the steam outlet pipe D. Between the neck and tube E, is an annular space. On the inside of tube E are arranged the projections 1, 2, 3, 4 and the apertures *e* while near the bottom of neck or case is attached a water pipe G—which passes down to and horizontally through the bridge wall H, then up and into the boiler.

The mode of operation is as follows: The steam passes up from the dome B into the tube E and through a spiral channel H formed by a spiral thread I on the central post J. so

that the particles of water, mechanically mixed with the steam, may be thrown by centrifugal force against the outer side of tube E where they are caught by the small projections or lips 1, 2, 3, 4 and caused to pass through the apertures *e* under said lips. From thence the liquid flows back through pipe G into the boiler, thus allowing no water to escape except in the form of steam. As the pipe G passes down through the furnace or combustion chamber of the boiler, and the water is thereby kept in a heated condition, there is induced a circulation in the said pipe and this is aided by gravity acting on the column of water from the level of the separator to the water level in the boiler. I make the cross-sectional area of the tube E larger than that of the steam pipe D.

This attachment or separator may be attached to any type or form of boiler. It will be perceived that my separator is automatic and can be made to take the steam from the top or bottom.

Having thus described all that is necessary to a full understanding of my invention, what I claim as new, and desire to protect by Letters Patent, is—

A separator attachment for steam boilers consisting of the chamber C and inclosed spirally channeled tube E separated by a space F, the tube E being provided with the lips 1, 2, 3, 4 and apertures *e*; whereby the water of separation may be conveyed back to the boiler through a pipe G as and for the purpose set forth.

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

CHARLES JOHN LARSON.

Witnesses:

E. T. VIGEN,
ALFRED S. BOE.