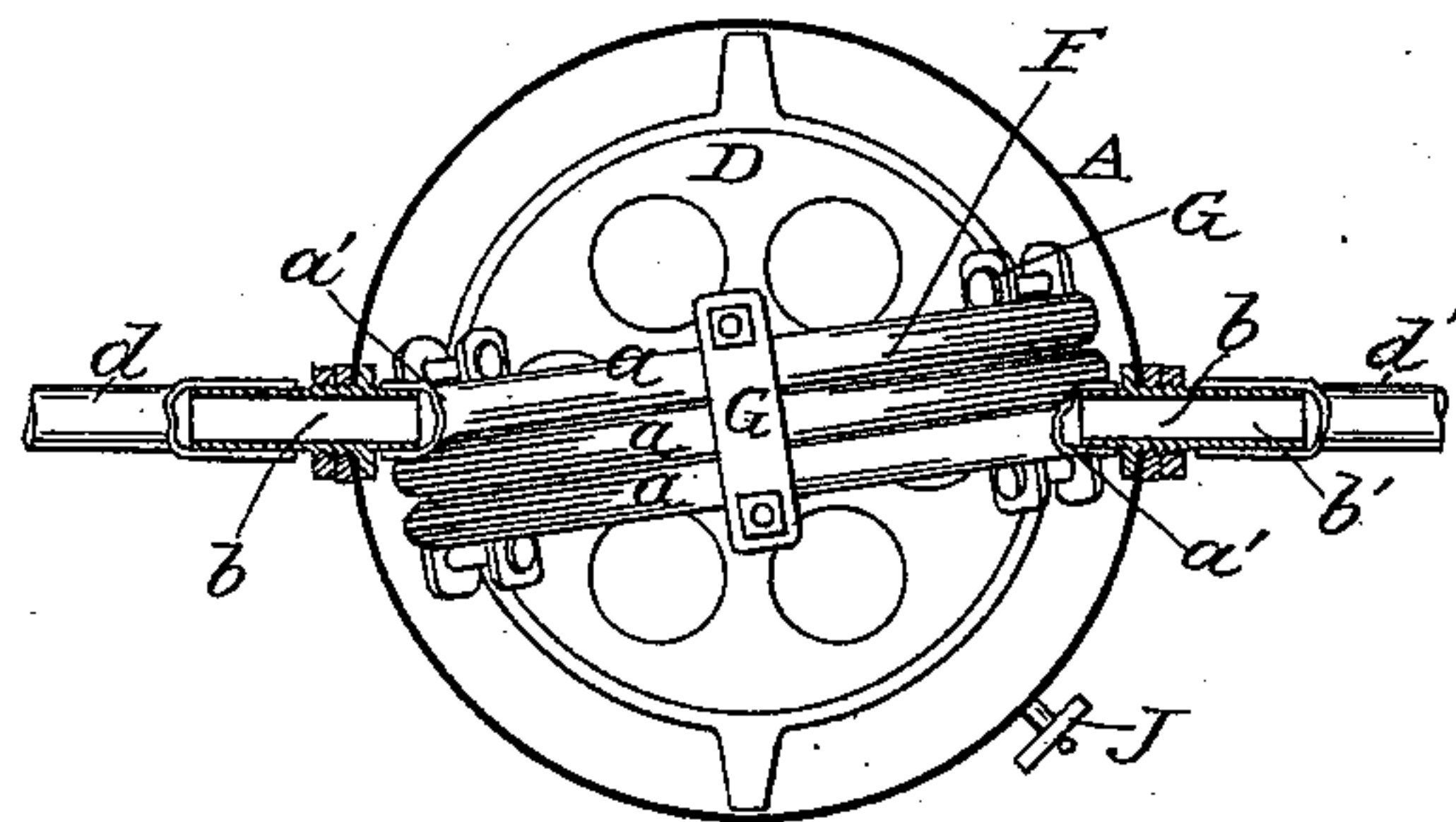
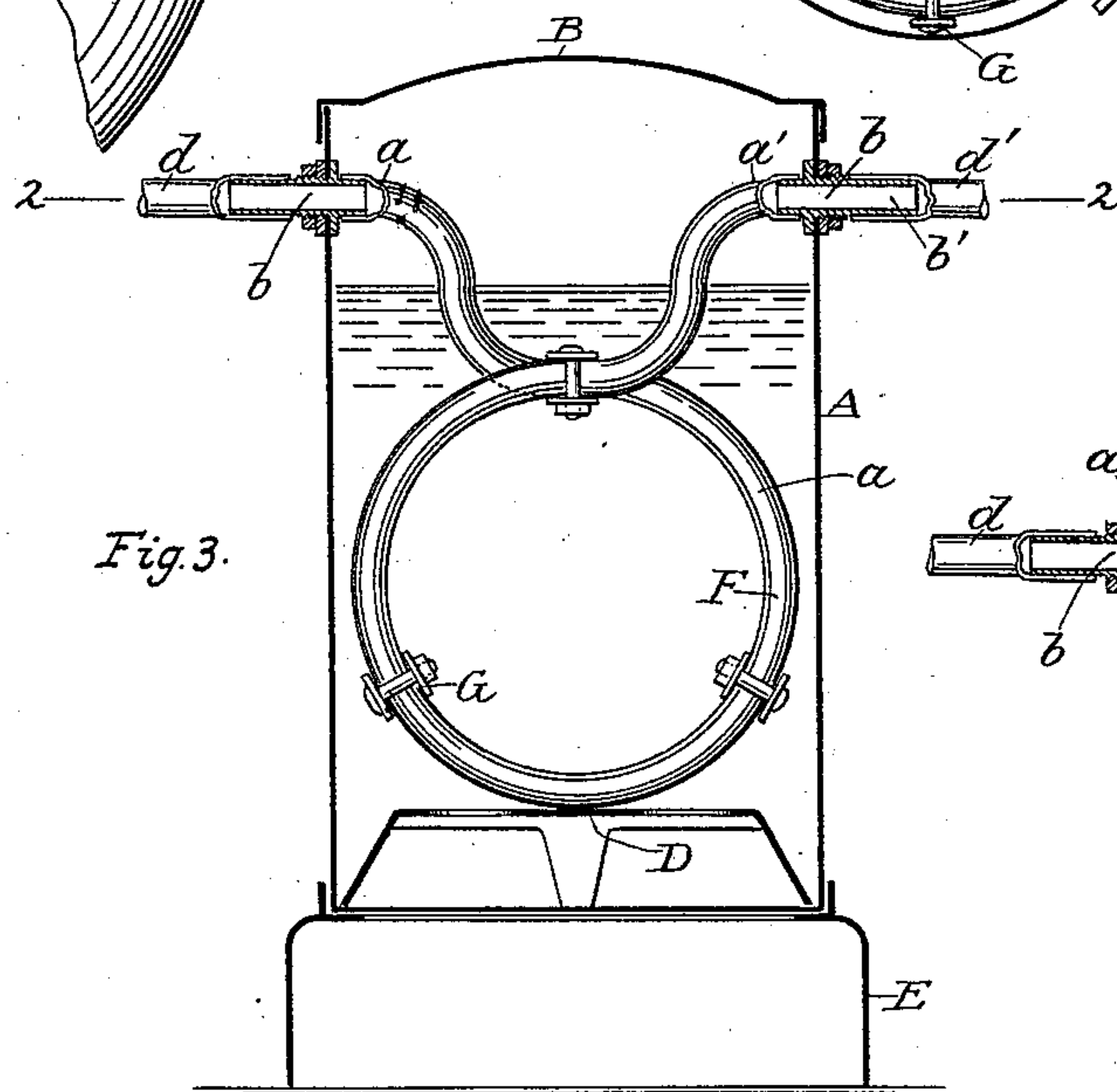
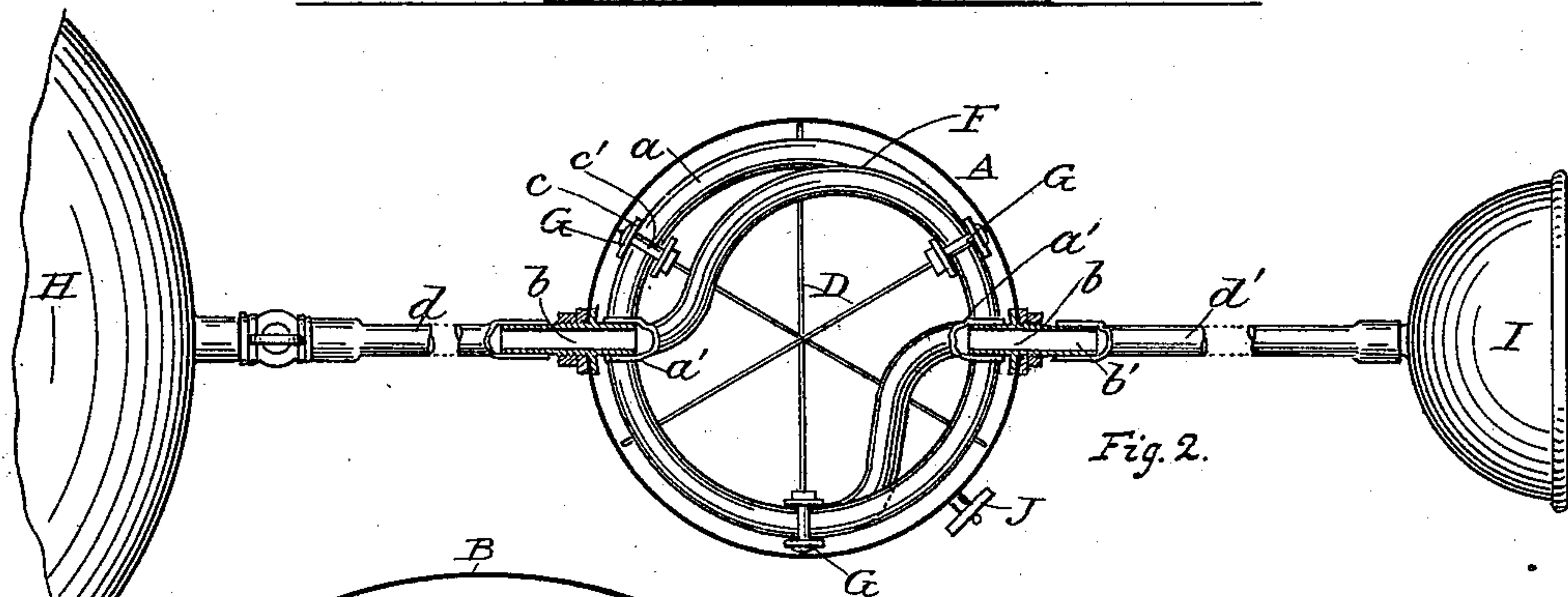
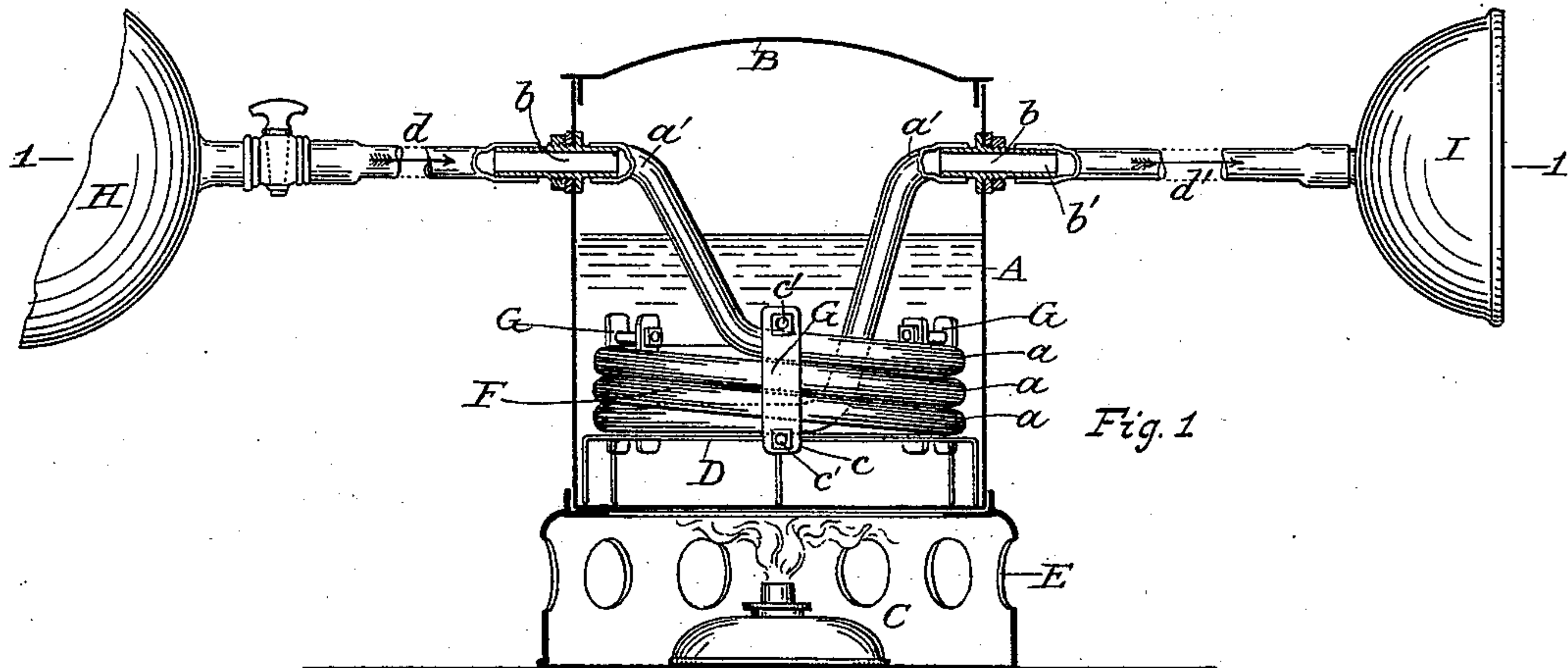


(No Model.)

E. MADDEN.  
INHALER.

No. 540,504.

Patented June 4, 1895.



Witnesses. *Charles S. Kirk.*  
*A. S. Kirk Jr.*

*Edward Madden*  
Inventor  
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# UNITED STATES PATENT OFFICE.

EDWARD MADDEN, OF AMSTERDAM, NEW YORK.

## INHALER.

SPECIFICATION forming part of Letters Patent No. 540,504, dated June 4, 1895.

Application filed February 23, 1894. Serial No. 501,196. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD MADDEN, a citizen of the United States, and a resident of Amsterdam, in the county of Montgomery and State of New York, have invented a new and useful Apparatus for Administering Medicinal Gases, of which the following is a specification.

My invention relates to an apparatus for administering medicinal gases to invalids, and it consists of the combinations of devices and parts hereinafter described and particularly set forth in the claims.

The object of my invention is to provide a simple, inexpensive and convenient apparatus for heating oxygen gas, or other medicinal gases to any desired degree of temperature as may be desired, or be found to be advantageous for best administration of the same to invalids afflicted with pulmonary diseases, catarrhal, bronchial, or lung complaints, so that the cold or chilling sensations attending the administration of medicinal gases and consequent shock to the patient is made impossible, while at the same time both the flow and volume of the gas may be adapted to the inspirations of the patient and his physical condition. I attain this object by the means illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a sectional elevation of an apparatus embodying the features in my invention. Fig. 2 is a view in section, taken at line 1 in Fig. 1. Fig. 3 is a sectional elevation of the apparatus, illustrating the gas-heating coil in a vertical position within the heating-vessel; and Fig. 4 is a sectional view of the same, taken at line 2 in Fig. 3.

The same letters of reference refer to similar parts throughout the several views.

In the drawings A is a suitable water tight vessel, preferably made of sheet metal. B is a removable cover for the same, loosely applied to the open upper end of the said vessel.

C is a suitable heating device, which device may be in the form of a spirit or other lamp, or a flame from a gas-jet.

The vessel A is suitably supported by any known means above the heating device, but preferably by the perforated skirt E.

D is an open work platform provided with

suitable legs or supports by means of which the said platform will be supported above the bottom of vessel A.

F, is a coiled tube or pipe for passage of gas to be warmed, which coiled tube or pipe may be made of any suitable material and preferably of rubber tube and composed of several coils *a*, which will aggregate in length, before coiling, about six feet, more or less. The ends *a'* of this coil are each secured with a coupling tube *b* fixed in the wall of the vessel A, preferably at the opposite sides of the same, and at a short distance below the cover B. The several coiled portions *a* of this coiled tube or pipe F, are secured together by a series of two or more clips G, which are formed by straps *c* and bolts *c'*. The coupling tubes *b* after passing through the walls of the vessel project outwardly from the said walls to a distance sufficient for receiving each a short flexible hose as *d*, and *d'* respectively.

H is a suitable reservoir for holding the medicinal gas intended to be administered, which is preferably of bag form and capable of being compressed at will, and is provided with a valve or cock with which hose *d* connects.

I is a discharge piece connected to the outer nipple *b'*, of the coupling tube *b* opposite to that with which the hose *d* is connected, by means of the hose *d'*, having its end portion at the discharge piece I, flexible so as to be readily compressed and closed by pressure of the fingers of an operator. This discharge piece may be made of a form which will be calculated to adapt it for application to the mouth or to the nose or to both as may be preferred. The piece I, serving as a mouth or nose piece may be made of glass, metal, or rubber.

The coiled tube F, when made of metal or glass, may have its respective ends connected with the coupling tubes *b* by means of short pieces of rubber tube.

By means of a suitable thermometer J having its bulb communicating with the water within the vessel, the temperature of the same may be readily ascertained, and the flame of the heating device be regulated accordingly.

The manner in which this apparatus is operated is as follows:—The vessel is charged with water sufficient for submerging the coiled tube. The reservoir H is charged with the



gas to be administered, and may be supported by any suitable means so that it may be in a convenient place for being readily compressed at will. The heating lamp is placed beneath the vessel and a full flame may at first be applied to the bottom of the vessel until the temperature of the water is raised to the degree calculated to warm or heat the gas when flowing through the coiled tube F to the degree desired or necessary, say as to temperature of blood heat, or to a lower or higher degree as the nature of the disease of the invalid, or the parts affected may require for comfort or for producing soothing effects. The discharge piece I will then be applied to the mouth, or nose, or both, when the cock of the reservoir will be turned sufficiently open for escape of a suitable volume of gas into the heating coil to be warmed before being inhaled and the flow of the warmed gas will be regulated by the patient, or an attendant, compressing the hose *d'* so as to stop the escape of the gas from the discharge piece I at the beginning of each exhalation and relieving the hose of such compression at the beginning of each inspiration.

A suitable stop cock not shown may be provided at near the discharge piece to cut off the flow of gas when not required.

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

1. In an apparatus for warming and administering medicinal gases, the combination with a water tight vessel, a cover loosely applied to

the open upper end of the same, means described for heating the bottom of said vessel, of an open work platform supported within said vessel and above the bottom thereof, a coiled tube supported by said platform, water submerging said coiled tube a pipe or tube connecting one end of said coiled tube with a gas reservoir provided with a valve, and a pipe or tube connecting the opposite end of said coiled tube with a discharge piece calculated to be applied to either the nose or mouth or both, substantially as and for the purposes set forth.

2. In an apparatus for administering and warming medicinal gases, the combination with a water tight vessel provided with a loose fitting removable cover, a heating device described, the open work platform and the coupling tubes *b b* tightly fixed in the side walls of said vessel, of the coil F of rubber tube supported by the said platform and having ends *a' a'* coupled respectively with the inwardly projected portions of said coupling tubes *b b*, the reservoir H provided with a cock and a hose *d* for connection of said reservoir with the outer end of one of said coupling tubes *b* and the mouth piece I and hose for connecting the latter to the outer end of the other coupling tube *b* substantially as and for the purposes set forth.

EDWARD MADDEN.

Witnesses:

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