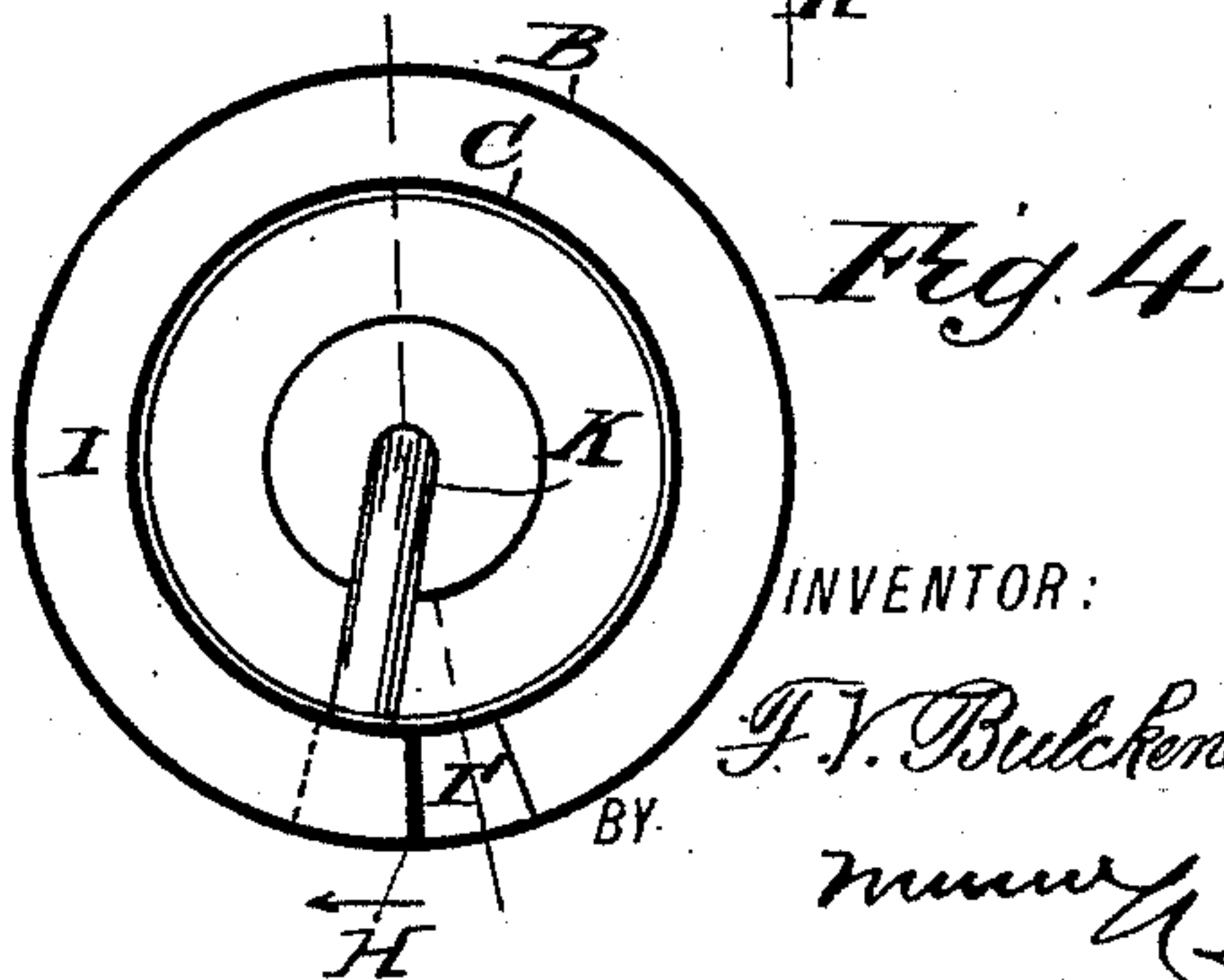
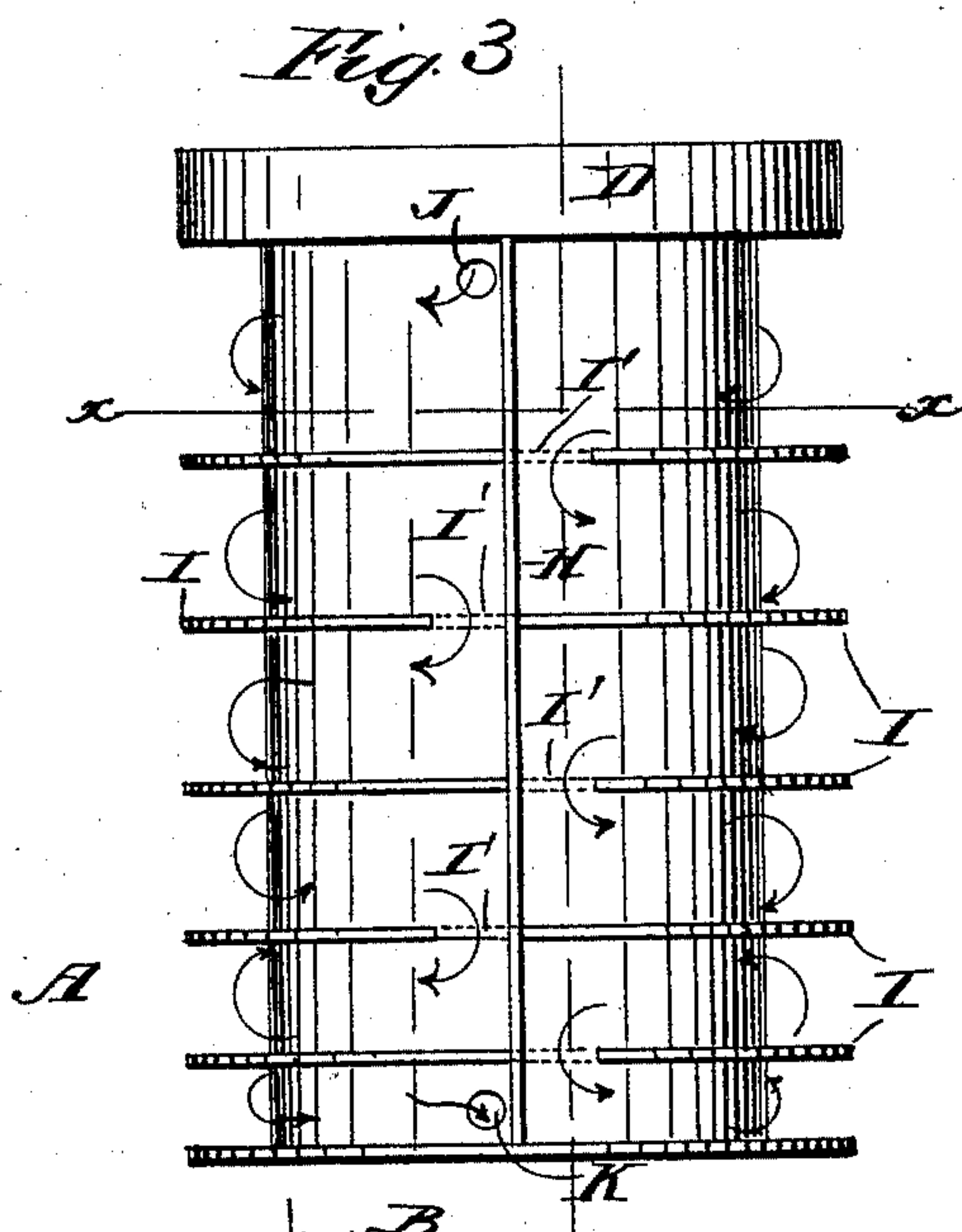
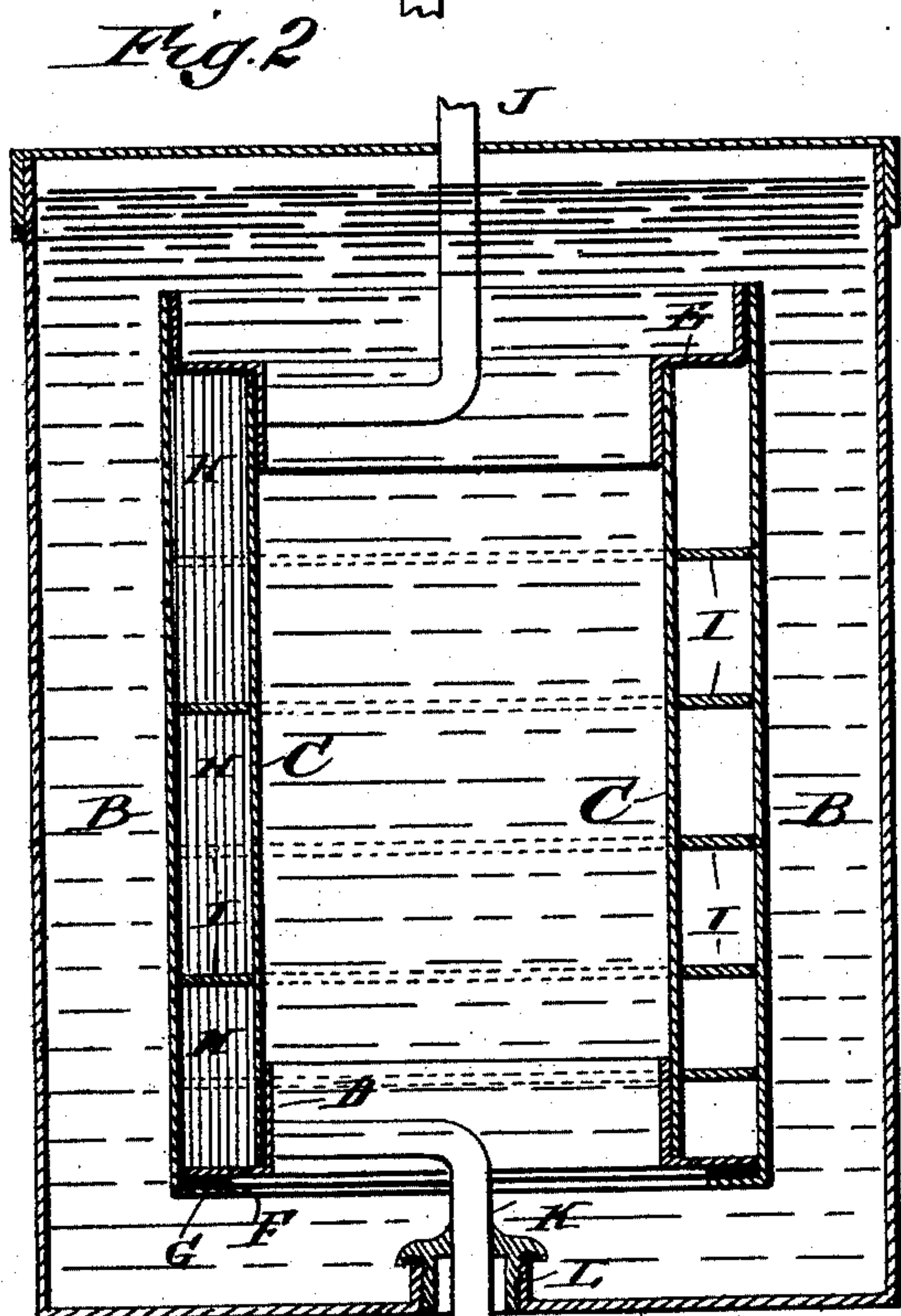
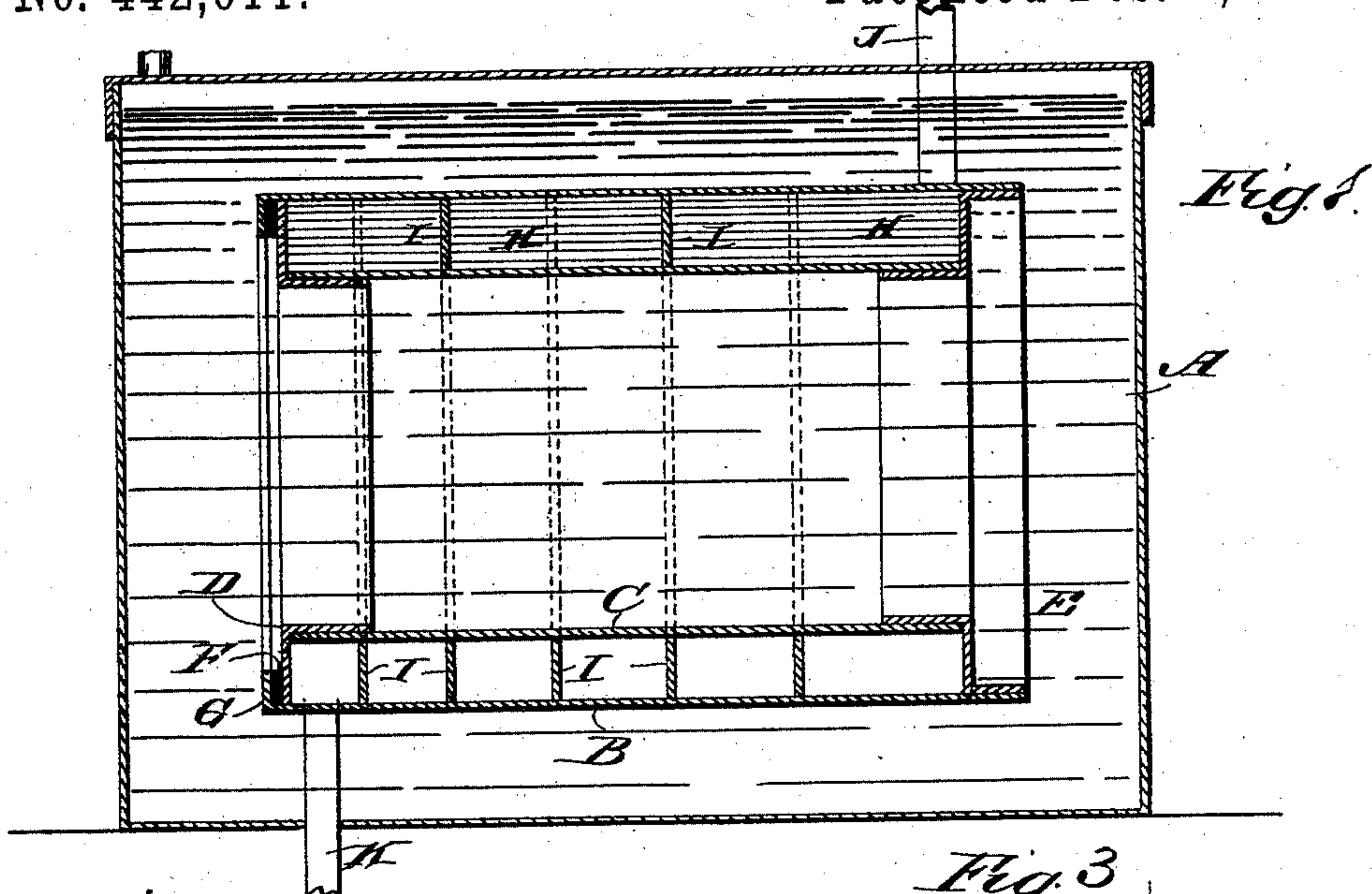


(No Model.)

F. V. BULCKENS.
TEMPERATURE REGULATOR FOR LIQUIDS.

No. 442,011.

Patented Dec. 2, 1890.



WITNESSES:
F. McArdle
E. M. Clark

INVENTOR:
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BY *Murray*
ATTORNEYS

UNITED STATES PATENT OFFICE.

FRANK V. BULCKENS, OF OREGON, ILLINOIS.

TEMPERATURE-REGULATOR FOR LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 442,011, dated December 2, 1890.

Application filed July 31, 1890. Serial No. 360,579. (No model.)

To all whom it may concern:

Be it known that I, FRANK V. BULCKENS, of Oregon, in the county of Ogle and State of Illinois, have invented a new and Improved Temperature-Regulator for Liquids, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved regulator, designed for cooling or heating liquids to a desired temperature, and which is simple and durable in construction and very effective in operation.

The invention consists of an outer vessel containing the cooling or heating substance or fluid, a cylinder open at its ends, and a second flanged cylinder fitted within the other cylinder and provided with a longitudinal partition and transverse segmental partitions, each extending from one side of the longitudinal partition to within a short distance of the other side of the said partition, so as to form circulating-compartments through which the liquid to be cooled is passed.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement as arranged horizontally. Fig. 2 is a like view of the same as arranged vertically. Fig. 3 is a side elevation of the inner flanged cylinder, and Fig. 4 is a sectional plan view of the same on the line *xx* of Fig. 3.

The improved temperature-regulator for liquids is provided with an outer vessel A, in which the cooling or heating substance or fluid—such as cold or hot water or ice—is placed. Within this outer vessel A is arranged a cylinder B, open at its ends and adapted to receive a second cylinder C, having the flanges D and E at its ends, the flange D abutting or resting against a washer F, held on an interior flange G, secured on the outer vessel B, so as to prevent leakage between the two cylinders.

The flanges E and D extend outward from

the inner cylinder C to the inner surface of the outer cylinder B, so as to form a space between the two cylinders. Into one end of this space leads an inlet-pipe J, and an outlet-pipe K extends from the other end of the said space, as is plainly illustrated in the drawings, the pipes J and K passing through the walls of the outer vessel A, the pipe K extending through a suitable packing-box L.

The inner cylinder C is provided with a longitudinally-extending partition H and a series of segmental transverse partitions I, each of which commences on one side of the partition H and runs around the exterior of the cylinder C to within a short distance of the other side of the said partition, as is plainly illustrated in Figs. 3 and 4, so that an opening I' is formed, leading into the space between two successive partitions. The openings I' are alternately arranged on opposite sides of the partition H, as is plainly shown in Fig. 3.

The operation is as follows: When the several parts are in the position shown in Figs. 1 and 2, and the liquid to be cooled or heated is passed through the inlet-pipe J, it passes into the space formed between the flange D and the first partition I, then travels around this space to the opening I' in the first partition I into the space between the first and second partitions I. The liquid then flows in an opposite direction in the space between the first and second partitions to the next opening I' in the second partition, and then changes its course to travel between the second and third partitions, to be discharged through the opening I' in the third partition into the space between the second and third partitions. This operation is repeated until the liquid arrives in the last compartment, from which leads the discharge-pipe K. It will be seen that the liquid flowing through the space between the cylinders C and B in the manner above described is cooled or heated according to the substance or fluid in the outer vessel A, as the said substance or fluid surrounds the outer cylinder B and is free to pass to the inner surface of the inner cylinder C, as is plainly illustrated in Figs. 1 and 2. The liquid, when it leaves the dis-

charge-pipe K, has about the same temperature as the substance or fluid contained in the outer vessel A.

This device is well adapted for cooling milk, cream, and similar liquids, or for heating liquids by charging the outer vessel A with a hot liquid or hot substance.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A temperature-regulator for liquids, comprising an outer vessel adapted to contain a cooling or heating substance or fluid, a cylinder open at its ends and arranged within the said vessel, and a second flanged cylinder arranged within the other cylinder and provided with a longitudinal partition and transverse segmental partitions, each extending from one side of the said longitudinal partition to within a short distance of the other side of the said partition, so as to form circulating-compartments through which the liquid to be cooled or heated is passed, substantially as shown and described.

2. A temperature-regulator for liquids, comprising an outer vessel adapted to contain a cooling or heating substance or fluid, a cylinder open at its ends and arranged within the said vessel, a second flanged cylinder arranged within the other cylinder and provided with a longitudinal partition and transverse segmental partitions, each extending

from one side of the said longitudinal partition to within a short distance of the other side of said partition, so as to form circulating-compartments through which the liquid to be cooled or heated is passed, an inlet-pipe leading into one end of the space formed between the said two cylinders, and a discharge-pipe leading from the other end of the said space, substantially as shown and described.

3. A temperature-regulator for liquids, comprising an outer vessel adapted to contain a cooling or heating substance or fluid, a cylinder open at its ends and arranged within the other cylinder and provided with a longitudinal partition and transverse segmental partitions, each extending from one side of the said longitudinal partition to within a short distance of the other side of the said partition, so as to form circulating-compartments through which the liquid to be cooled or heated is passed, an inlet-pipe leading into one end of the space formed between the said two cylinders, a discharge-pipe leading from the other end of the said space, and a packing arranged between the two cylinders to make the same water-tight, substantially as shown and described.

FRANK V. BULCKENS.

Witnesses:

ADAM KNORNSCHILD,
ALMER A. WAGONER.

It is hereby certified that the name of the patentee in Letters Patent No. 442,011, granted December 2, 1890, for an improvement in "Temperature-Regulators for Liquids," was erroneously written and printed "Frank V. Bulckens," whereas said name should have been written and printed *Frank T. Bulckens*; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 16th day of December, A. D. 1890.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

C. E. MITCHELL,
Commissioner of Patents.