

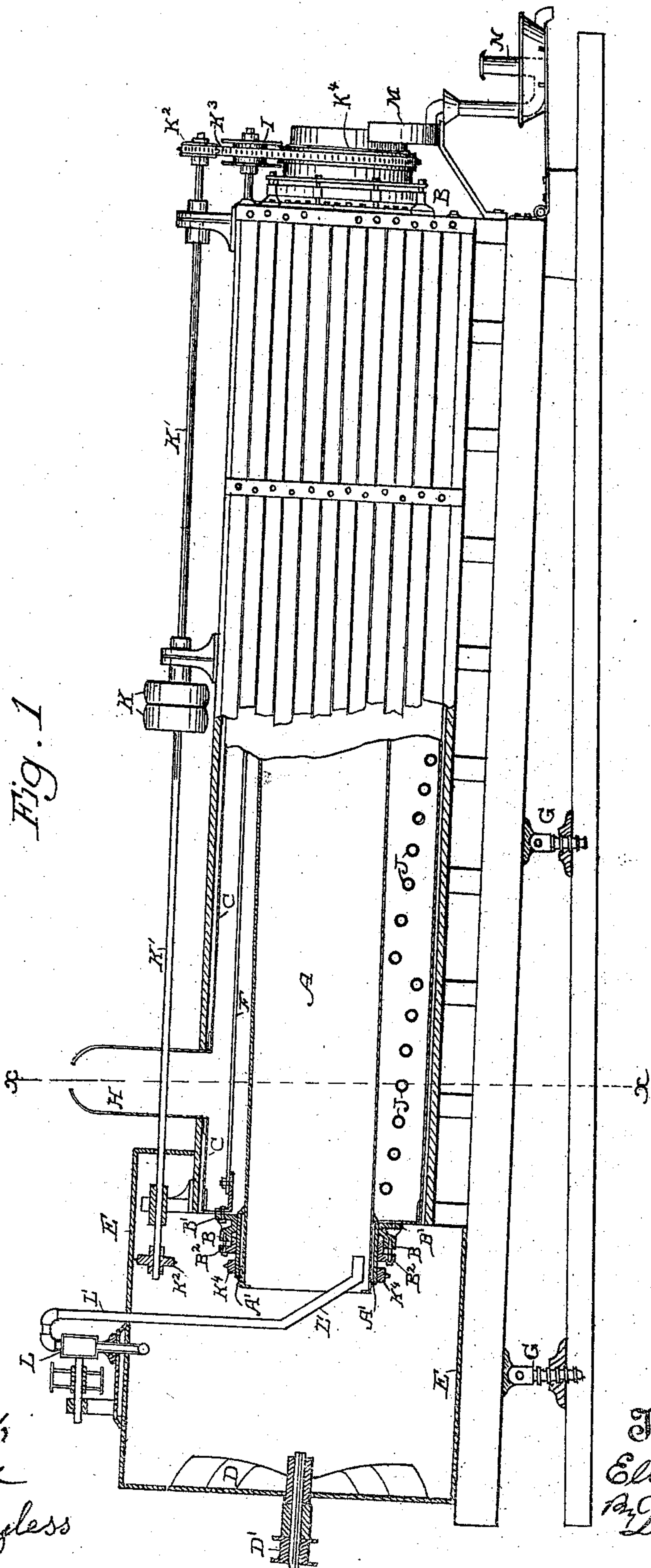
(No Model.)

3 Sheets—Sheet 1.

E. R. SHAW.
EVAPORATING PAN.

No. 501,848.

Patented July 18, 1893.



Witnesses,
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(No Model.)

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Fig. 3.

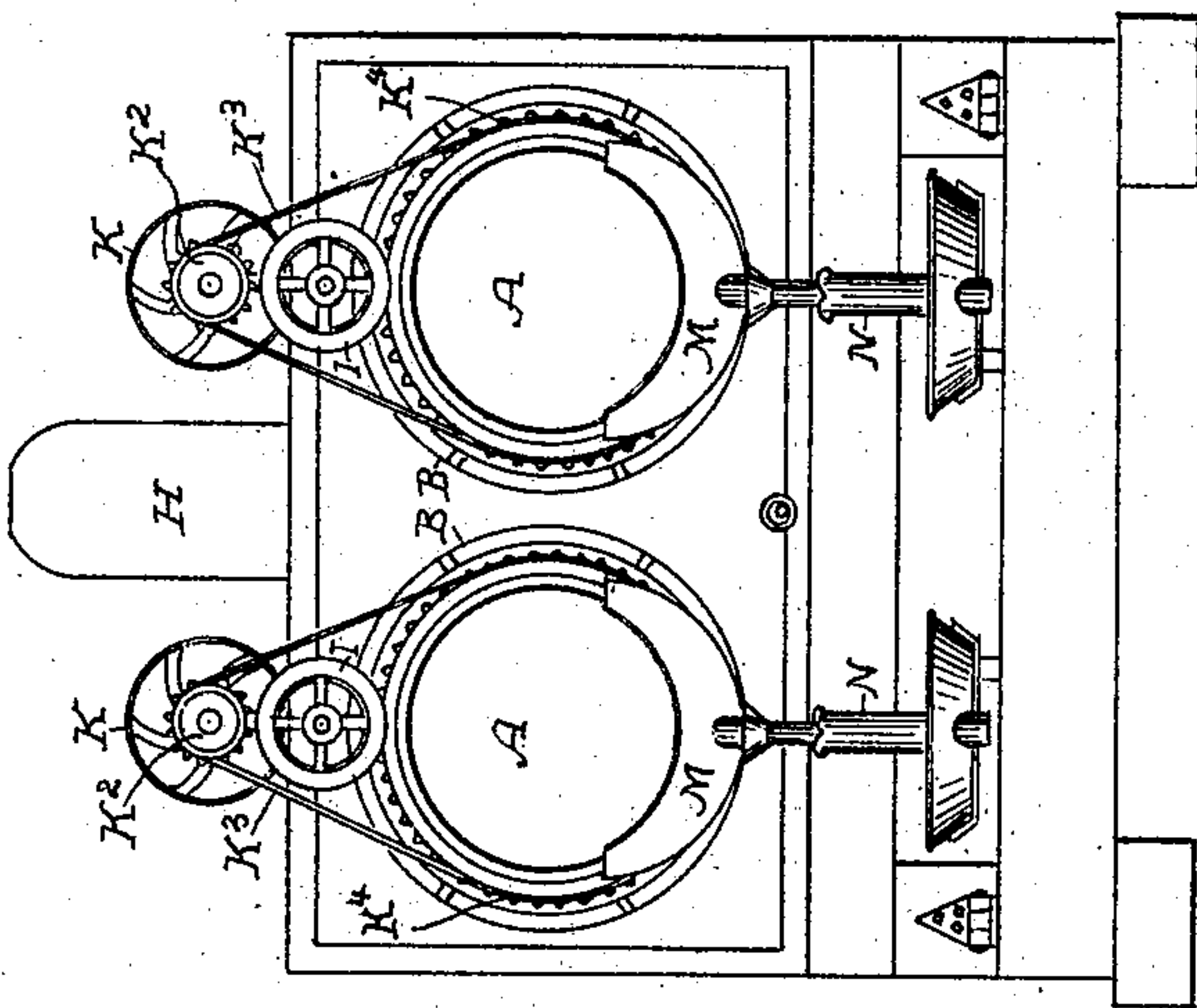
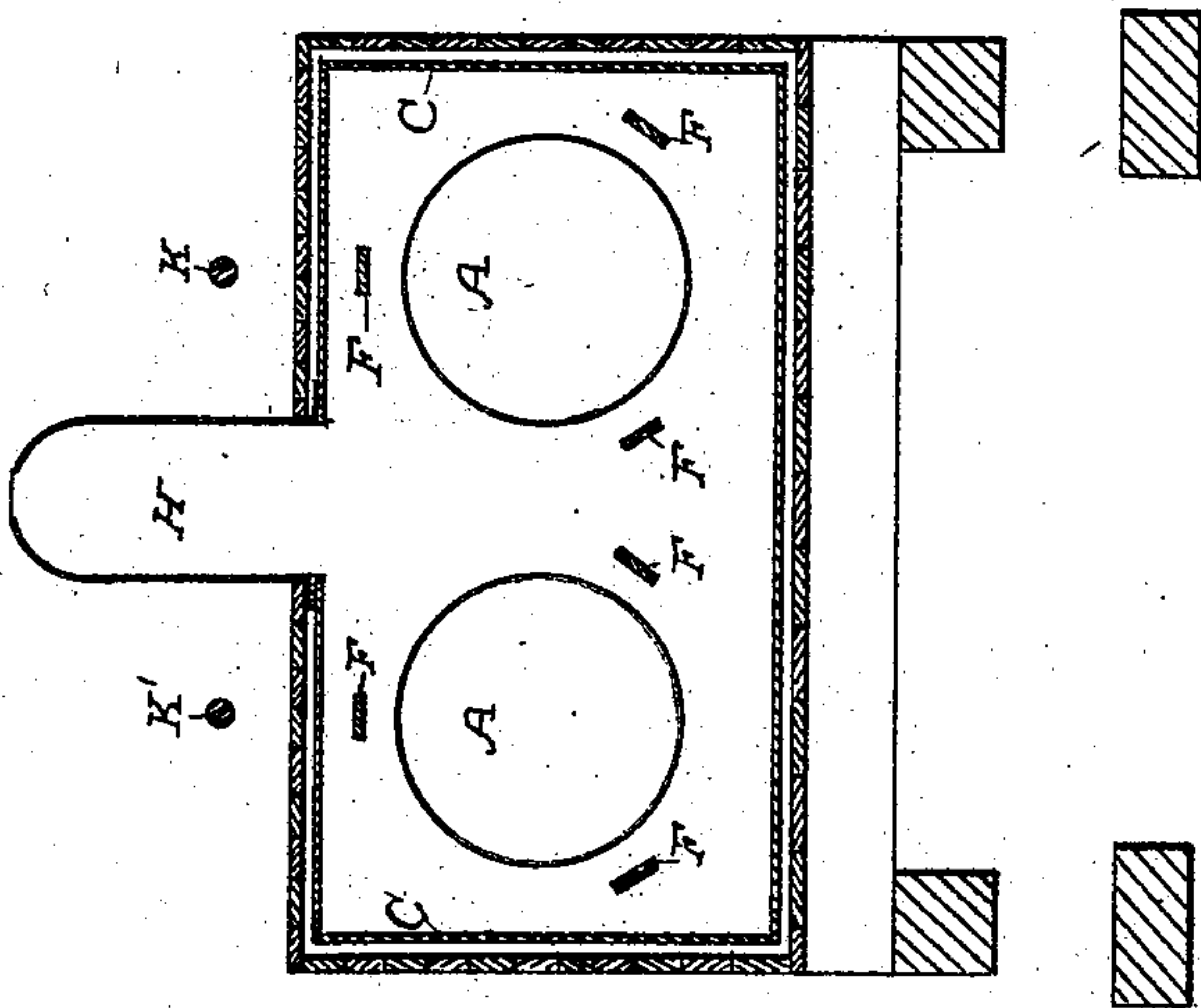


Fig. 2.



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Fig. 5.

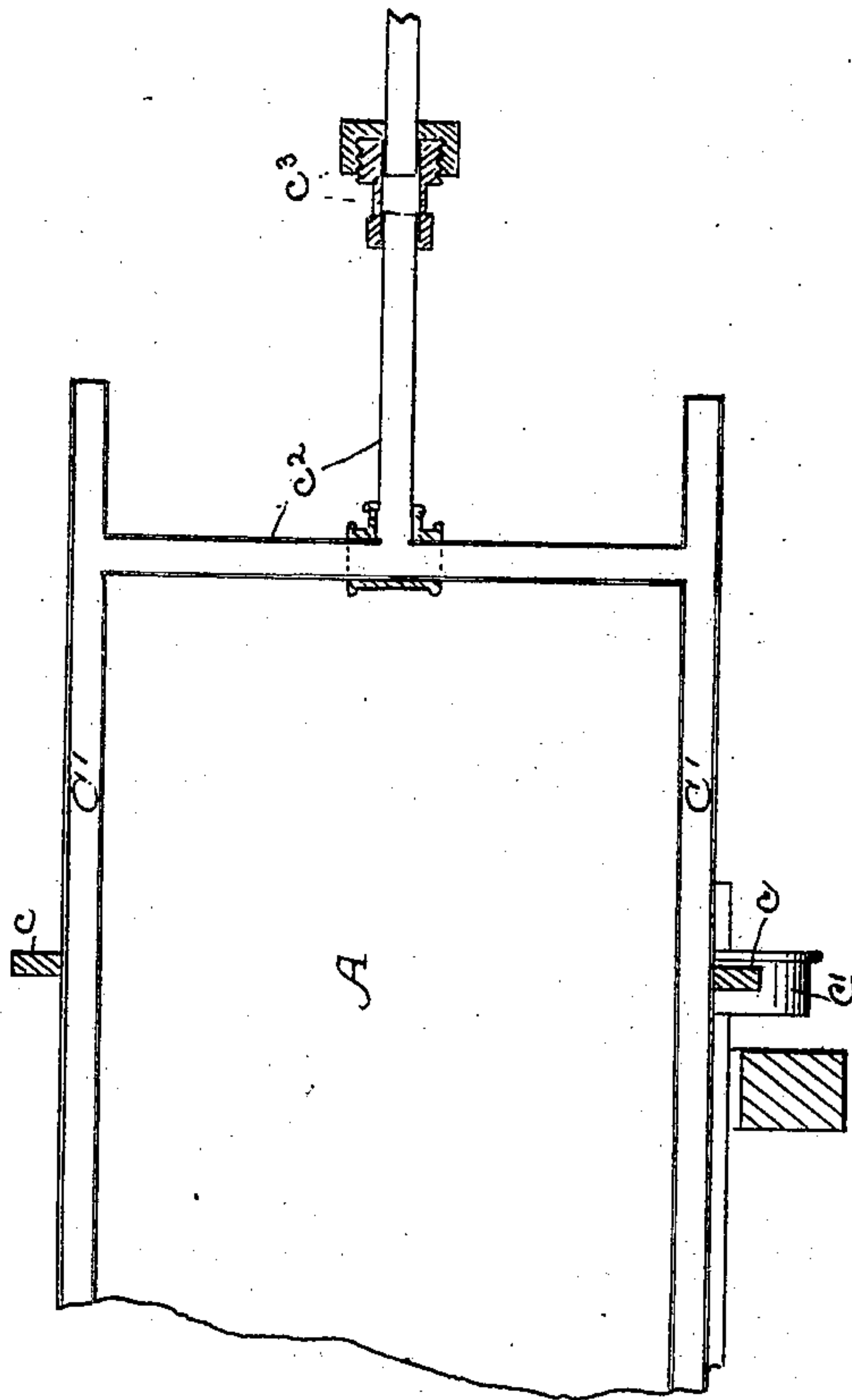
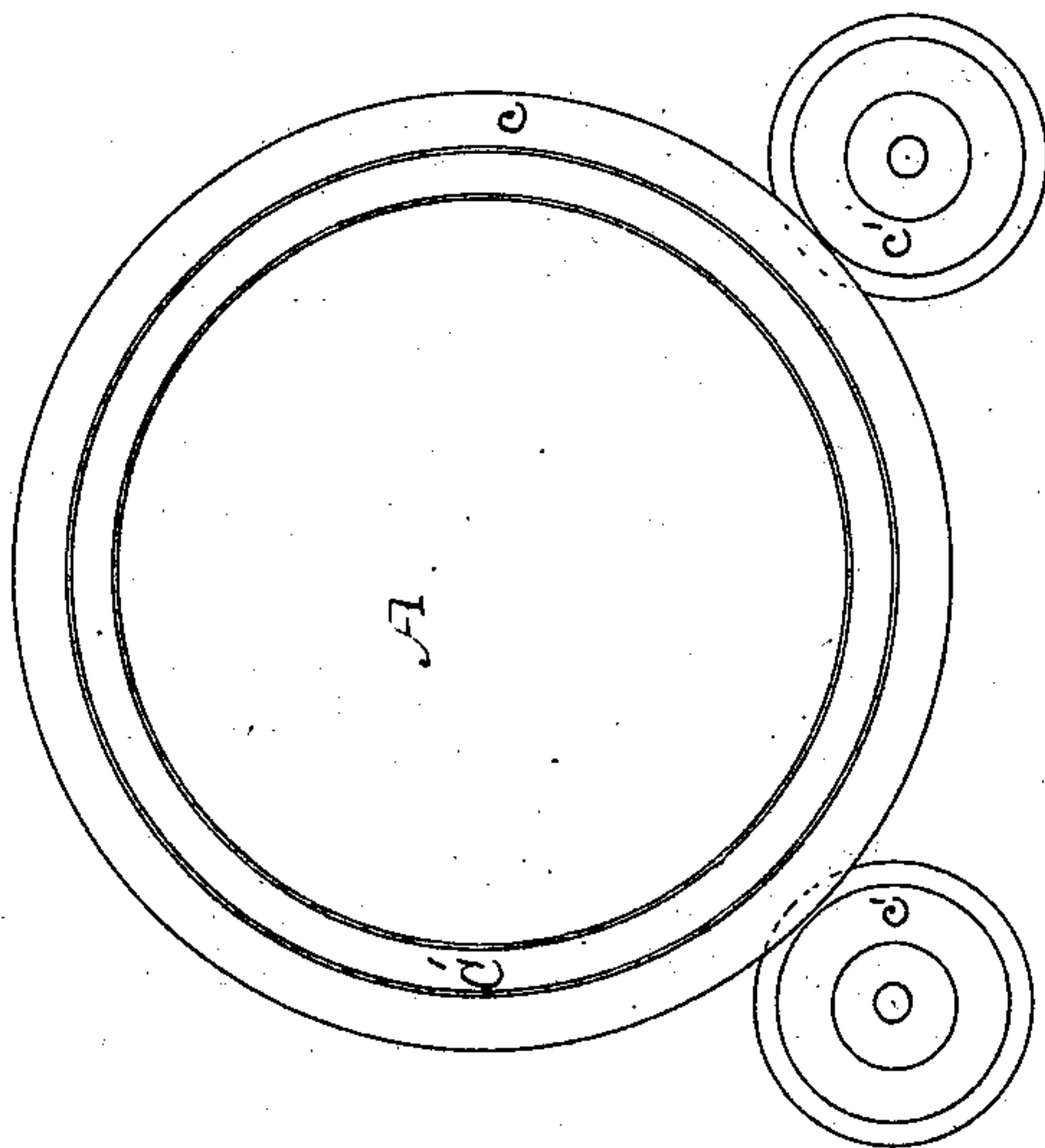


Fig. 4.



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UNITED STATES PATENT OFFICE.

ELTON R. SHAW, OF LOS GATOS, CALIFORNIA.

EVAPORATING-PAN.

SPECIFICATION forming part of Letters Patent No. 501,848, dated July 18, 1893.

Application filed January 12, 1893. Serial No. 458,182. (No model.)

To all whom it may concern:

Be it known that I, ELTON R. SHAW, a citizen of the United States, residing in Los Gatos, Santa Clara county, State of California, have
5 invented an Improvement in Liquid-Evaporators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of evaporators, in which the liquid to be evaporated
10 is exposed in thin sheets or films to the action of the evaporative agents.

There are many liquids, notably saccharine liquids, in which deleterious chemical changes take place at or near their normal boiling point.

15 It is the object of this invention to avoid such changes and to provide simple means for rapidly evaporating liquids at a low degree of heat, and with mechanism that is easily controlled and readily cleansed from scale or
20 other dirt.

The essential parts of the invention are one or more rotating cylinders, which may be made of metal, paper, glass, or other substance, incased in a tight jacket, which may be filled
25 with water, steam, hot air, or other vapor, or liquid, and an exhaust fan for creating a current of air through the cylinder or cylinders.

The apparatus represented in the accompanying drawings shows a jacket containing two
30 cylinders, but any number of cylinders may be placed in the same jacket, such jacket with its accompanying cylinders constituting an "effect."

The means by which the object stated is
35 sought to be accomplished may be described as follows.

Reference being had to the accompanying drawings, Figure 1 is a part side elevation and part sectional view. Fig. 2 is a sectional end
40 view on the line $x-x$ of Fig. 1. Fig. 3 is a front or discharge end elevation. Figs. 4 and 5 are detail views showing the jacket arranged to rotate with the cylinder.

The letters used relate to corresponding
45 parts of the drawings.

The action of both cylinders being identical, a description of one will suffice.

A is an open cylinder, resting at either end in a tight connection B, which is composed of
50 the cylinder sleeve A', the packing ring B', and the fixed bearing B', attached to a jacket

C which is incased in non-conducting material to prevent the outside radiation of heat.

D represents an exhaust fan supported in, and forming the only outlet for air of the
55 housing E.

F F F are longitudinal stays holding the packing heads of the jacket in place.

G G are screws for giving greater or less inclination to the apparatus. 60

H represents an expansion dome through which water or other liquid is introduced inside the jacket, and which allows for the expansion or contraction of such liquid under
65 varying degrees of heat.

The expansion dome is to be closed with a safety valve, when steam or other vapor is used inside the jacket.

I is a guide pulley which prevents the longitudinal travel of the cylinders. 70

Having thus explained the principal parts of the invention, I will proceed to describe its operation. The space surrounding the cylinder, inside the jacket, having been filled with water heated by means of the steam coils J J, 75 or otherwise, power is applied to the pulley K, which transmits motion to the shaft K', the sprockets K² K², the link chains K³ K³, and the sprocket rings K⁴ K⁴, attached to the cylinder, causing the cylinder to revolve in its tight 80 bearings. Power is also applied to the fan at the fan pulley D' which immediately draws a strong current of air, either heated artificially, or of normal temperature, through the revolving cylinder. The liquid to be evaporated is 85 now fed by the rotary pump L through the tube L' into the upper or elevated end of the cylinder where, as it falls in a continuous stream upon the inner moving surface, it is picked up and spread out in a sheet or film by 90 the natural adhesiveness of the liquid, combined with the centrifugal force produced by the revolutions of the cylinder. The thickness of the film and the forward movement of the liquid are absolutely controlled by the 95 speed of revolution combined with the inclination of the cylinder and the density of the liquid. As the liquid spreads over the inner surface of the cylinder, it is acted upon on its side, next to the cylinder, by the heat radiated 100 from the hot water or other heating agent, in the jacket, and upon its surface it is acted

upon by the current of dry air passing through the cylinder. The bulk of the water having been removed from the liquid in its progress through the cylinder, the condensed product
5 falls from the lower end of the cylinder into the funnel M, thence into the hydrometer vase N, from which it is conducted to a suitable receptacle.

The application of the evaporative agent to
10 the inner surface of the film of material within the cylinder, need not necessarily be by means of a current of air drawn through, for it is obvious that a vacuum, more or less complete, produced in the cylinder will serve the purpose.
15

I do not confine myself to making the cylinder rotate within the jacket, for as shown in Figs. 4 and 5, the jacket C' may be arranged to rotate with the cylinder. In these figures
20 the jacketed cylinder has a ring c resting on bearing wheels c' and the evaporative agent is supplied to the jacket through a pipe c² having a packed joint c³.

Having thus described my invention, what

I claim as new, and desire to secure by Letters 25 Patent, is—

A liquid evaporator consisting of a rotating cylinder inclined in the direction of its length, means for supplying the liquid to the head end of the cylinder, whereby it spreads out in a
30 thin film therein, and is gradually advanced through the cylinder, a receiver at the foot of the cylinder to receive the condensed liquid, a tight jacket surrounding the cylinder and adapted to receive an evaporative agent 35 whereby the side of the film next to the cylinder is acted upon, and a fan opposite the head end of the cylinder for creating an evaporative air current through the cylinder, to act upon the inner side of the film, substantially 40 as herein described.

In witness whereof I have hereunto set my hand.

ELTON R. SHAW.

Witnesses:

S. H. NOURSE,
J. A. BAYLESS.