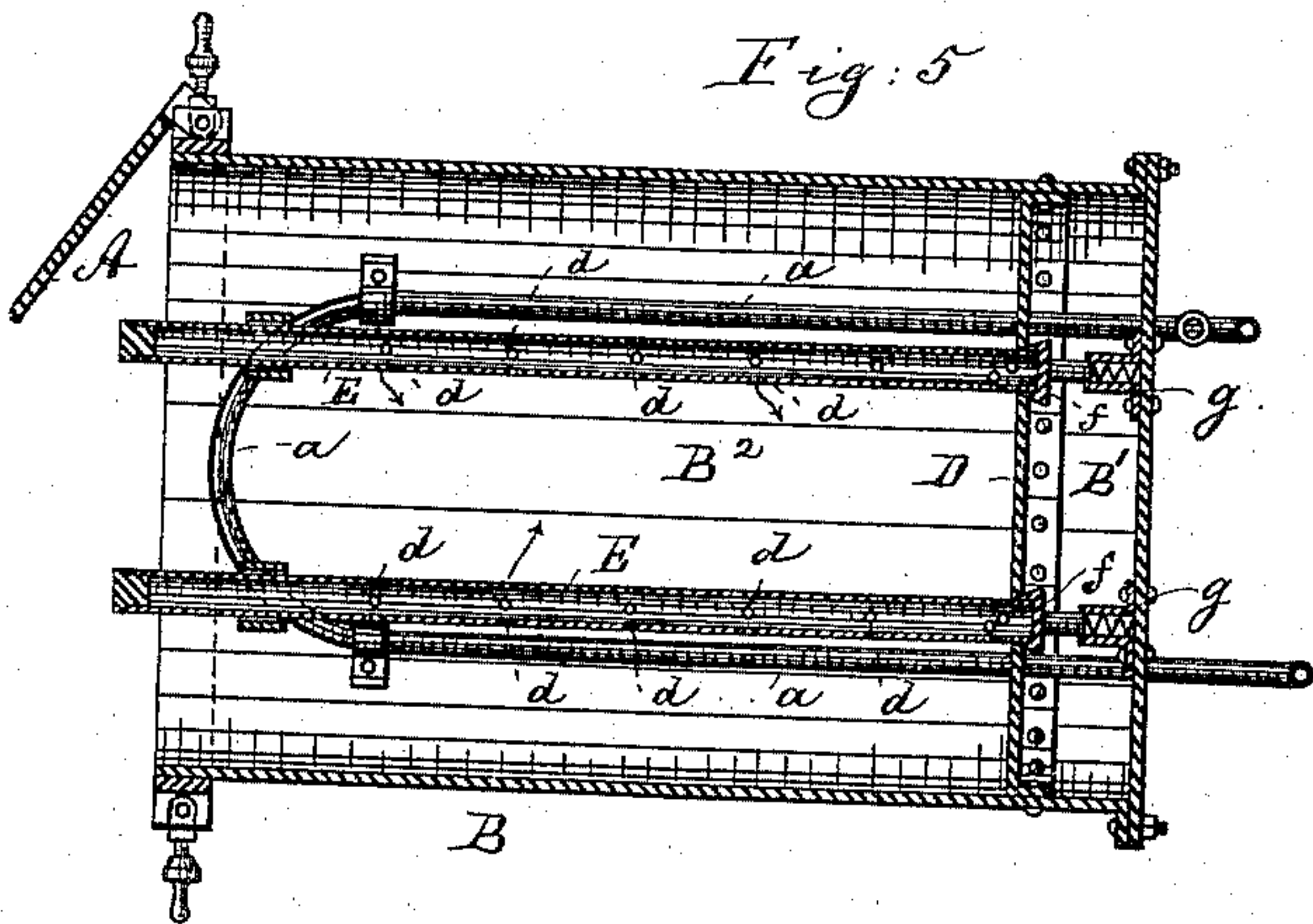
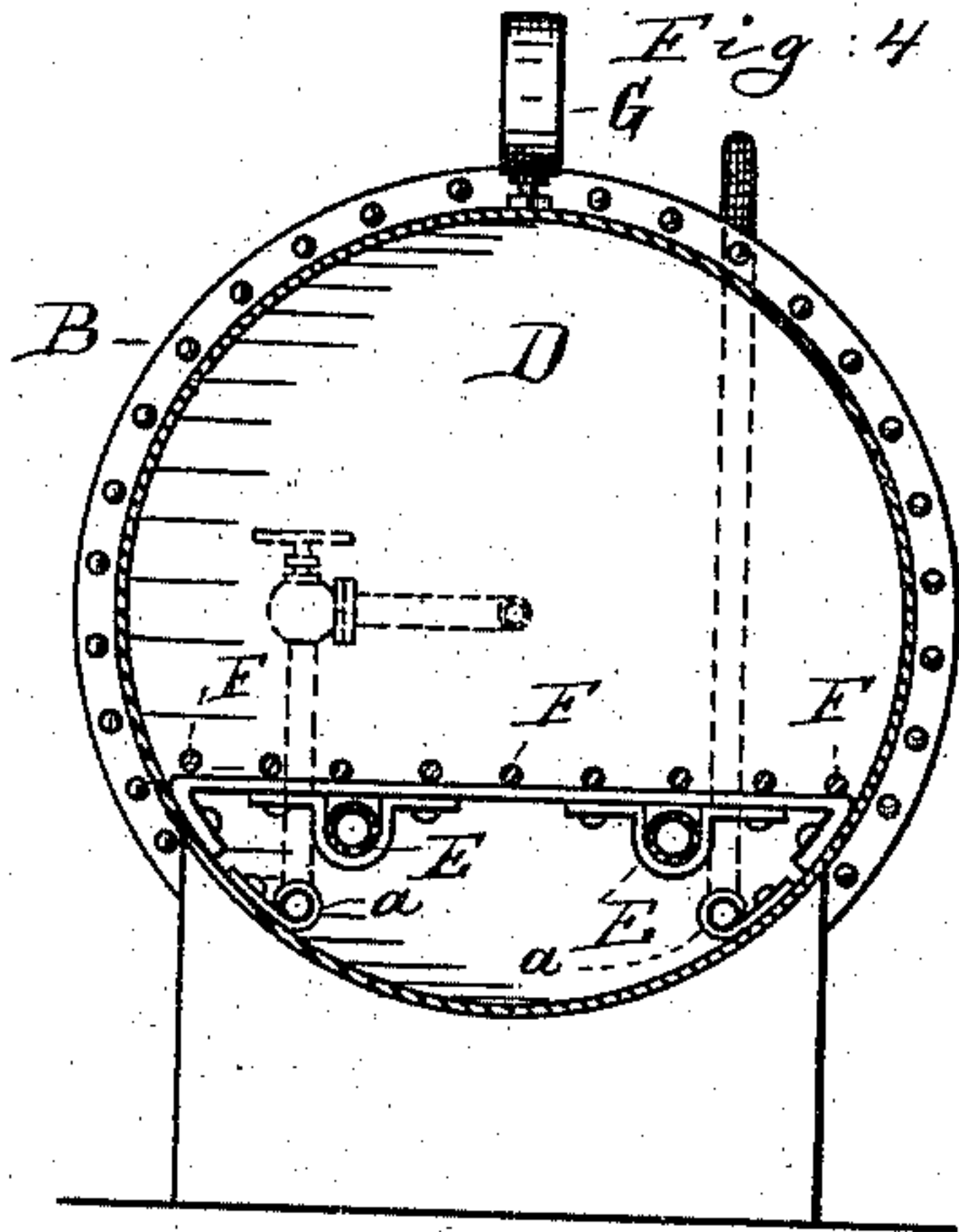
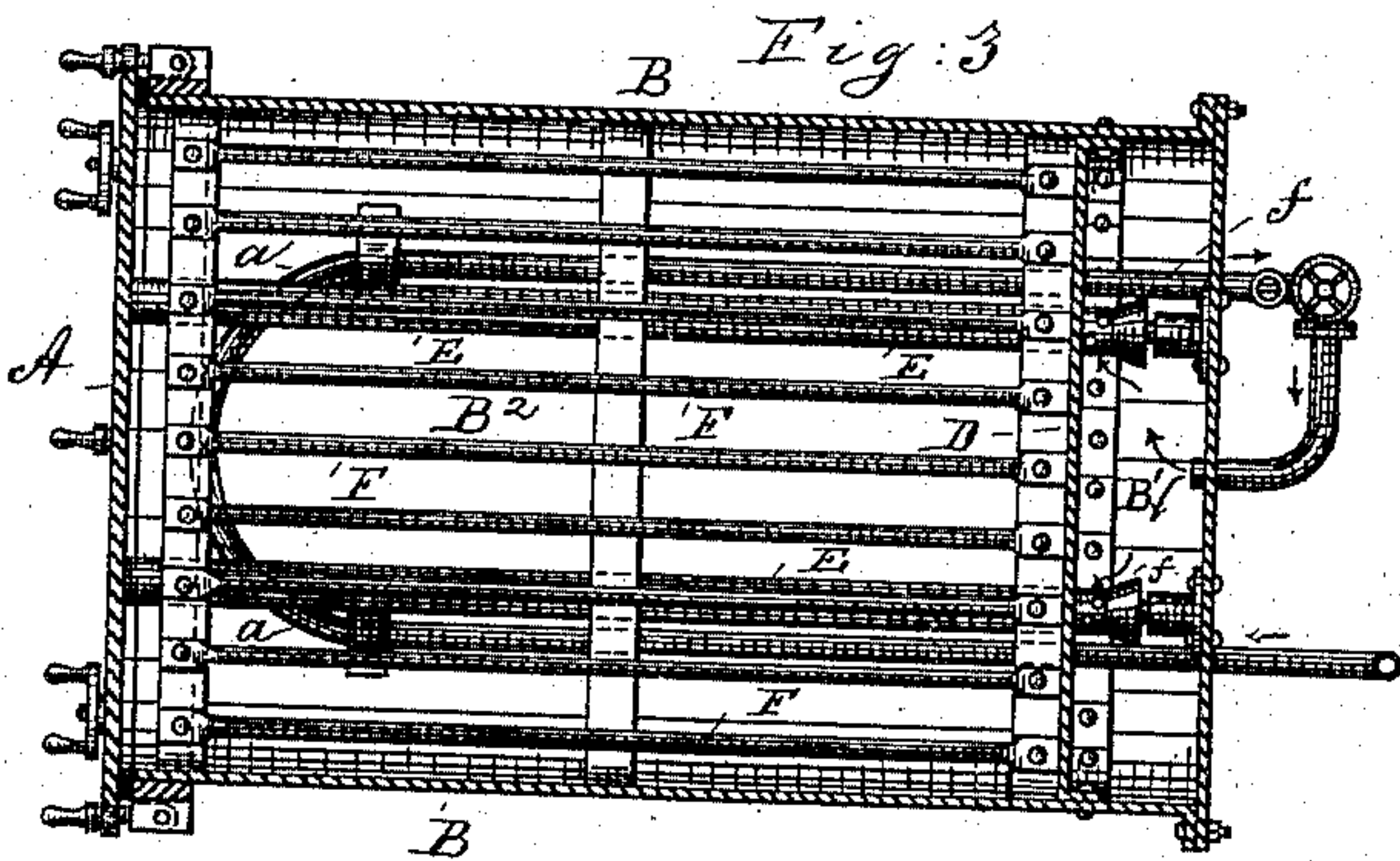
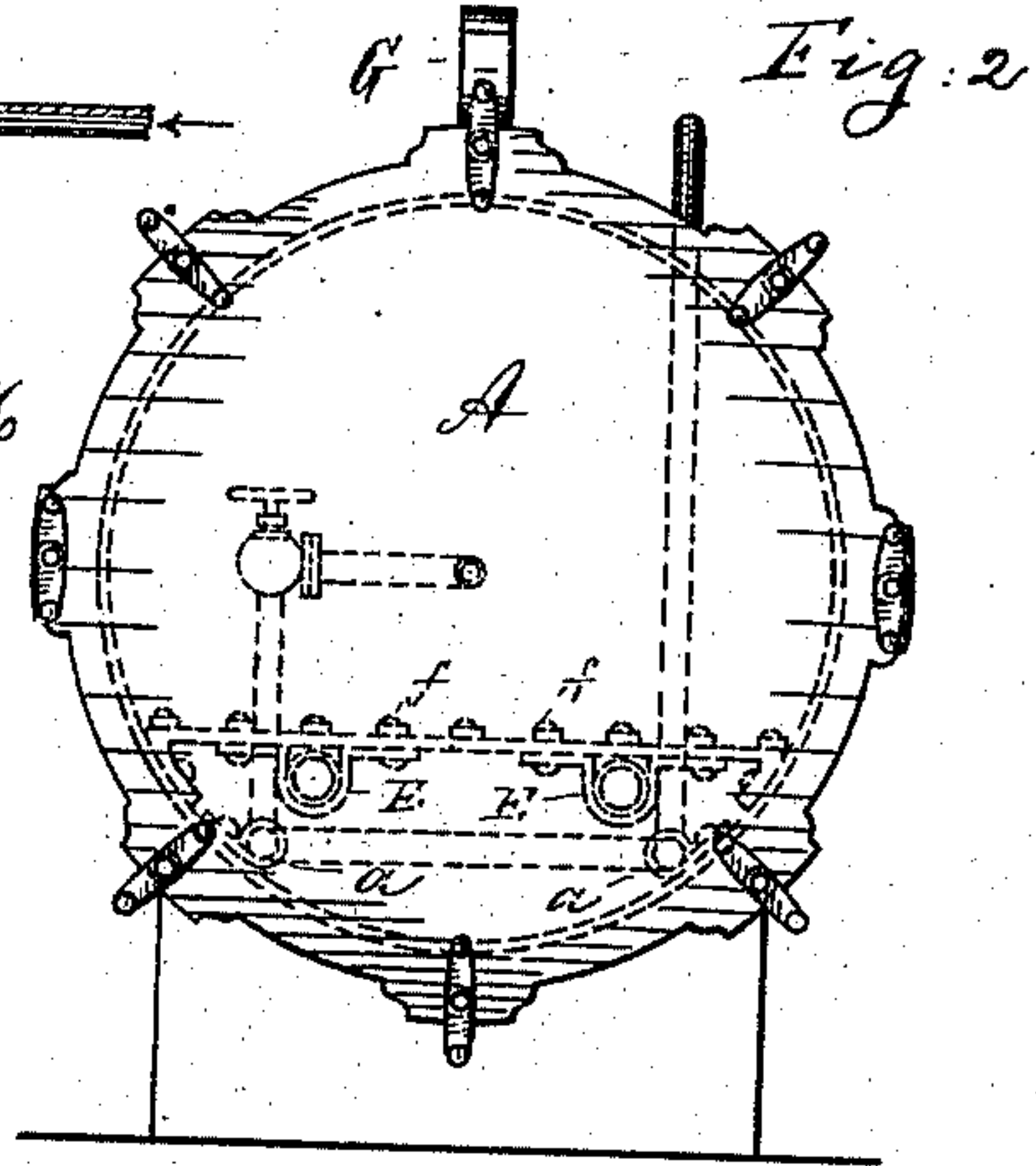
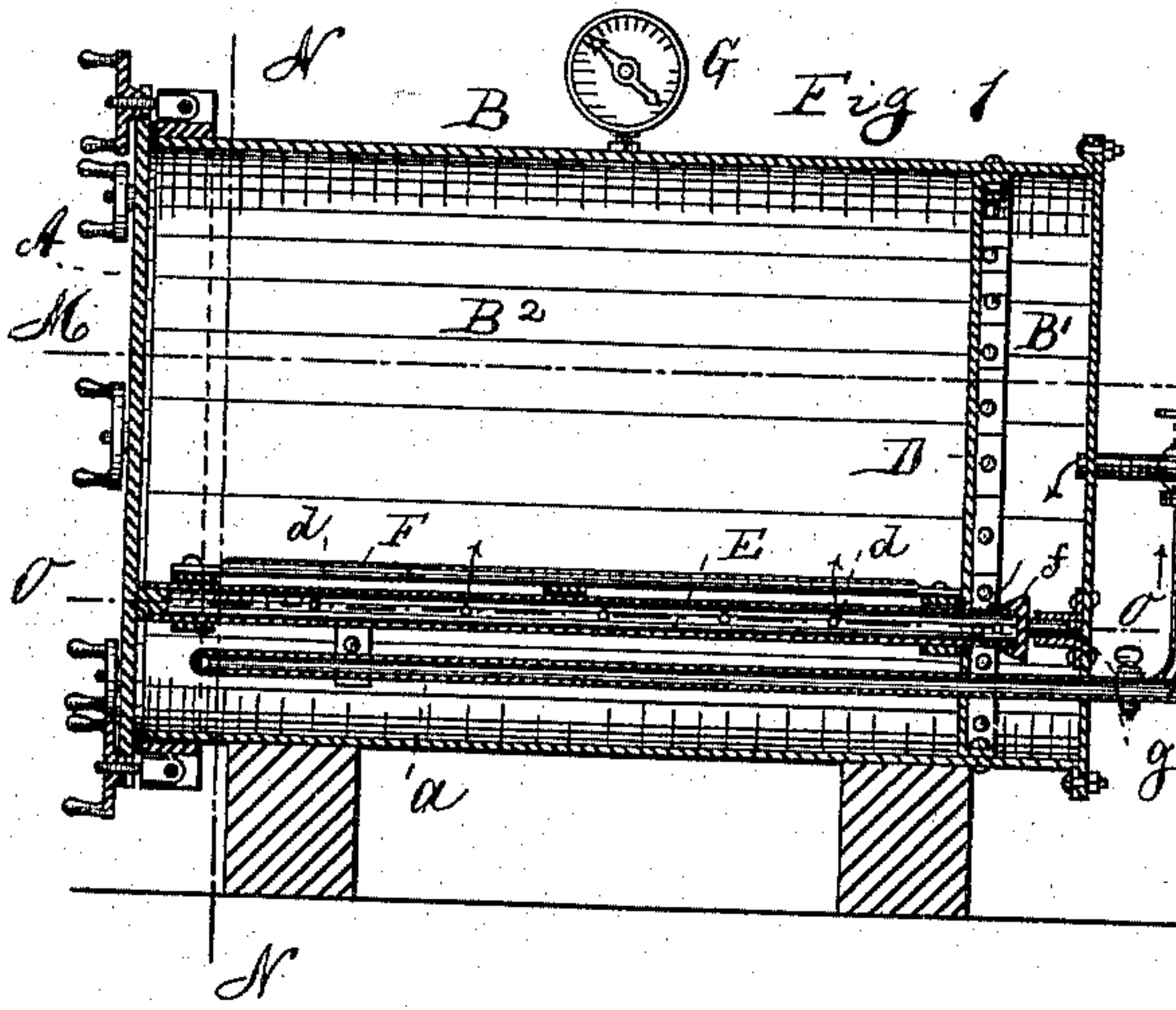


(No Model.)

P. KLUG.
APPARATUS FOR SMOOTHING AND HARDENING THREADS.
No. 488,267.
Patented Dec. 20, 1892.



Witnesses:
A. Schuhl.
Wm. Schulz.

Inventor:
P. Klug
by his attorneys
Roeder & Priesen

UNITED STATES PATENT OFFICE.

PAUL KLUG, OF CRIMMITZSCHAU, GERMANY.

APPARATUS FOR SMOOTHING AND HARDENING THREADS.

SPECIFICATION forming part of Letters Patent No. 488,267, dated December 20, 1892.

Application filed August 4, 1891. Serial No. 401,677. (No model.)

To all whom it may concern:

Be it known that I, PAUL KLUG, of Crimmitzschau, in the Kingdom of Saxony, Germany, have invented a new and useful Improvement in Apparatus for Smoothing and Hardening Threads, of which the following is a specification.

This invention relates to an improved apparatus for smoothing and hardening threads by the action of dry steam.

It consists in the various features of improvement more fully pointed out in the claim.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of my improved apparatus. Fig. 2 an end view thereof. Fig. 3 a horizontal section on line M, M, Fig. 1. Fig. 4 a vertical section on line N, N, Fig. 1, and Fig. 5 a horizontal section on line O, O, Fig. 1.

The letter B represents a drum or other receptacle, having a partition D, that divides the drum off into a steam chamber B' and a work chamber B². The drum B may be tightly closed by a lid A. Steam is admitted into chamber B' by a curved pipe *a* that also enters chamber B², for the purpose of heating the same. This pipe *a* may be placed either near the top or the bottom of the apparatus. Through the partition D pass the tubes E, that are free to slide horizontally backward and forward. These tubes have perforations *d*, within chamber B².

The lid A is adapted to bear against the ends of tubes E, when the lid is closed, and

to thus push the tubes further into the chamber B', against action of springs *g*. The ends *f* of tubes E within chamber B' are perforated, and when these ends are thus projected into chamber B', steam is admitted into tubes E and consequently into chamber B². But when the lid A is opened, the springs *g* push ends *f* of tubes E sufficiently out of chamber B', to exclude the steam.

Above the tubes E, the chamber B² is provided with the bars or open floor F, that support the work. A steam gage G surmounts drum B.

In use, the lid A is opened, which will cause the tubes E to be pushed outward and the steam to be excluded from chamber B². The chamber B² is now filled with the threads to be treated and the lid A is closed to crowd back pipes E and admit the steam in the manner described.

What I claim is:

The combination of receptacle B, divided into chambers B' B², with steam pipe *a*, sliding perforated pipe E entering both chambers and with spring *g* and lid A, bearing against pipe E, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL KLUG.

Witnesses:

MAX MATTHÄI,
CARL BORNGRAEBER.