

No. 707,575.

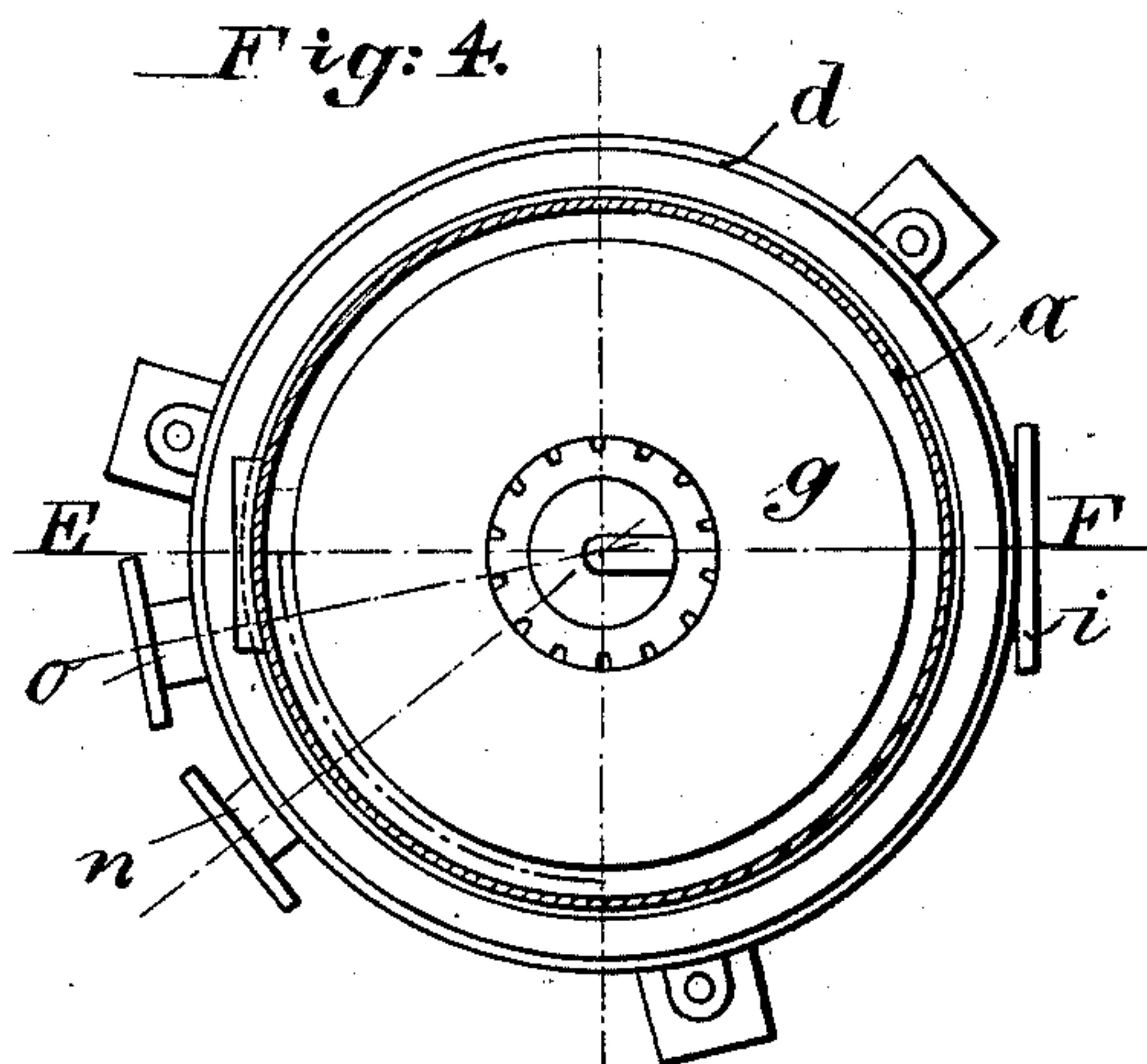
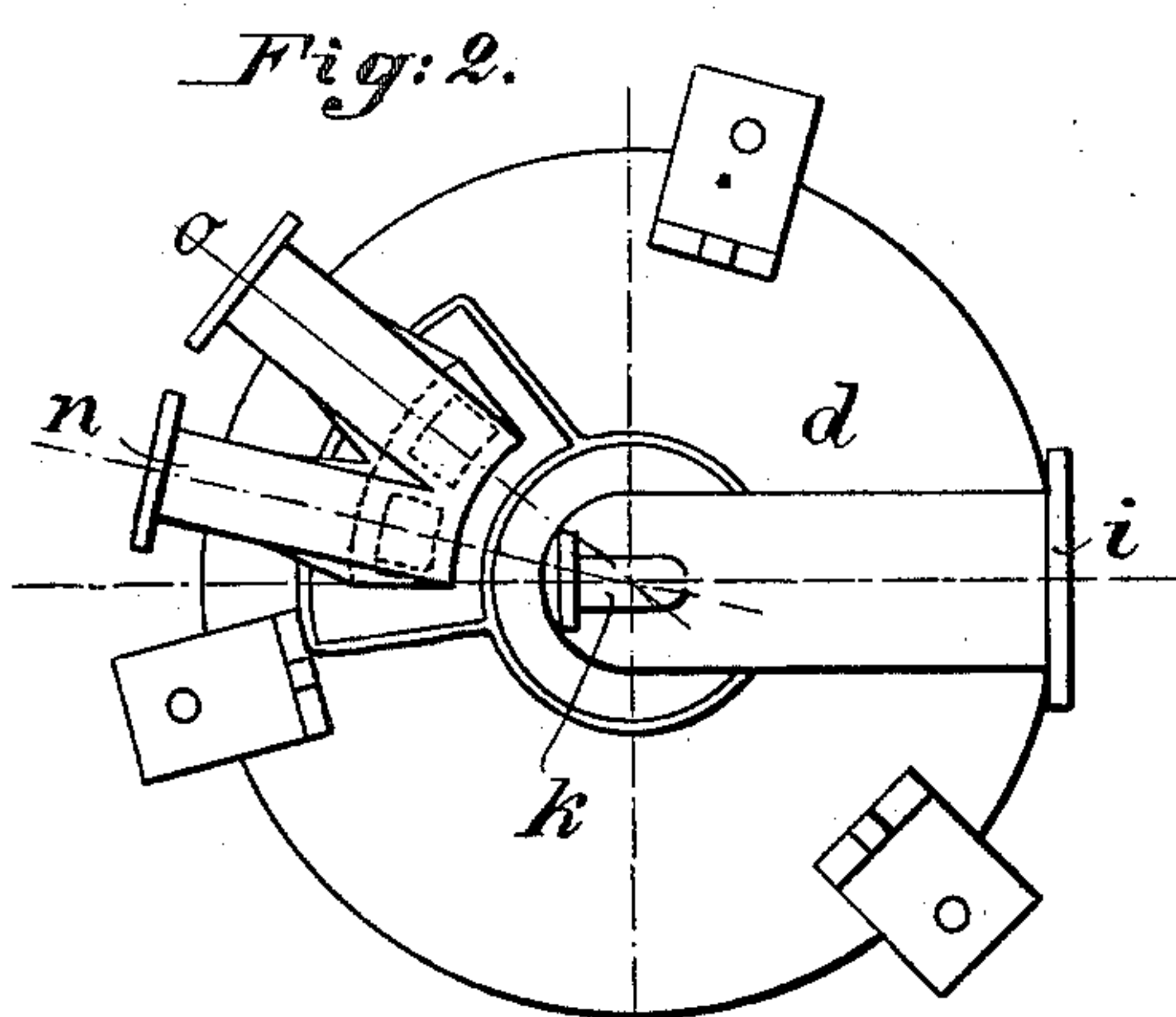
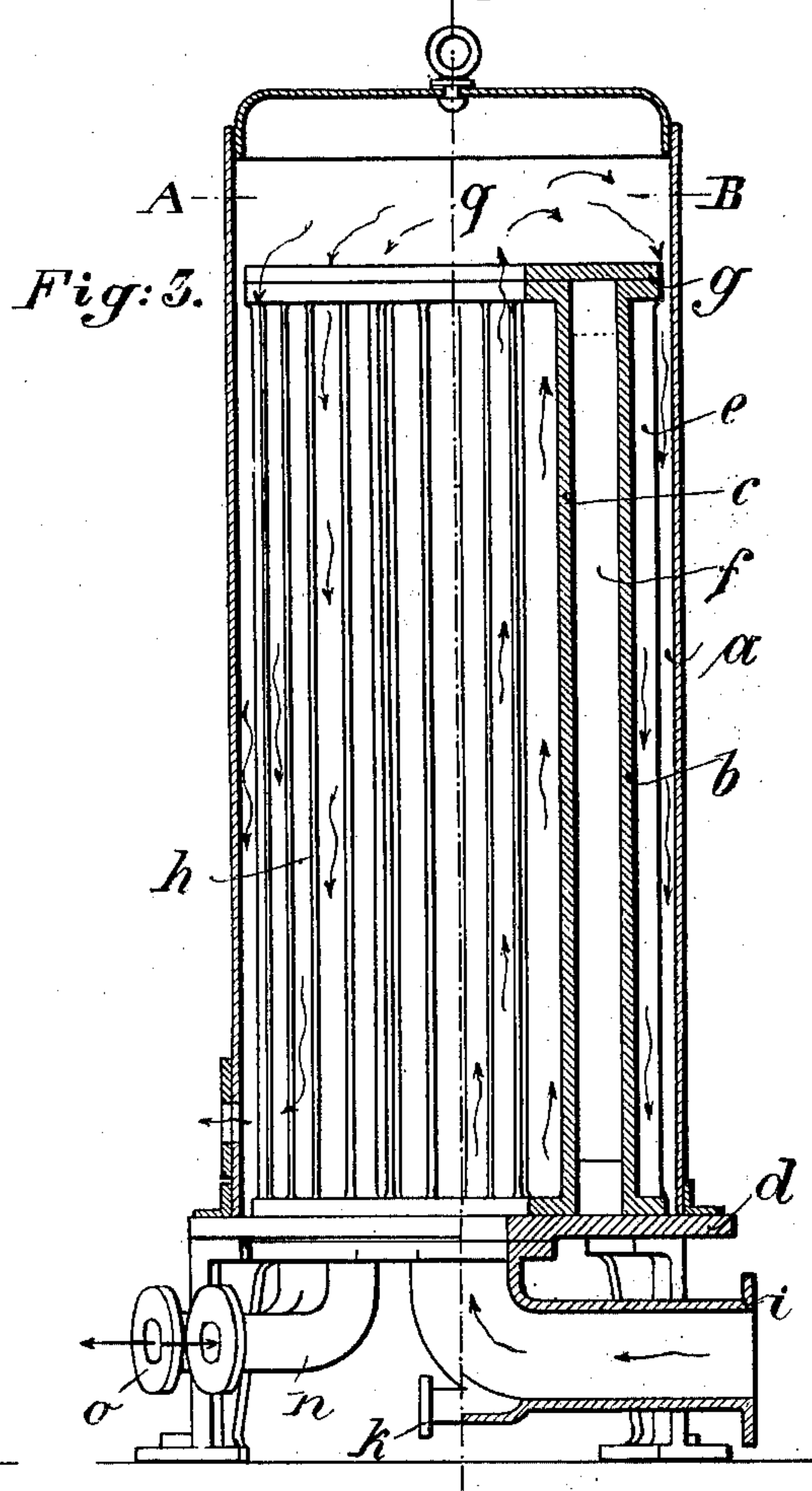
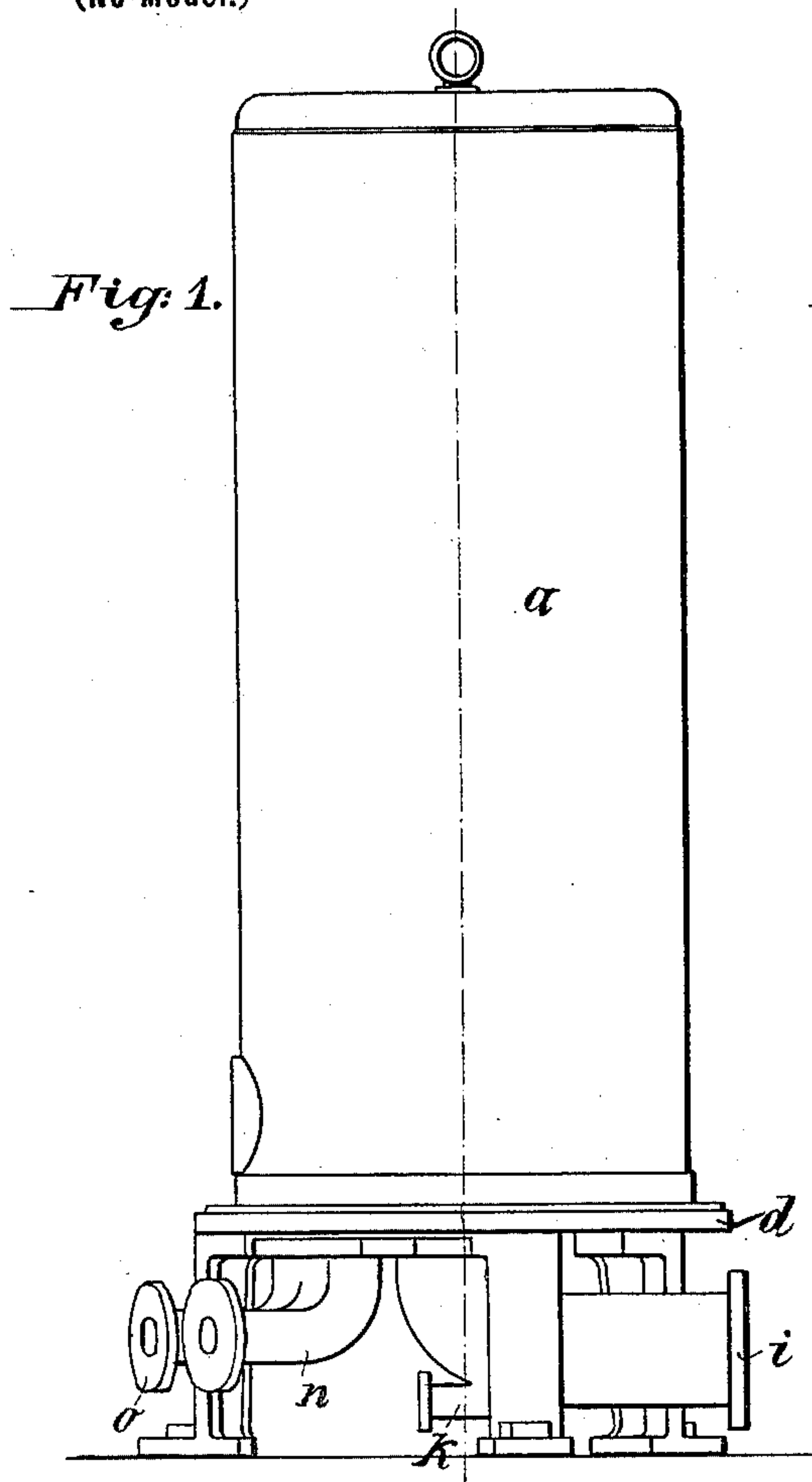
Patented Aug. 26, 1902.

G. FLORACK.  
FEED WATER HEATER.

(Application filed Oct. 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
William Schuby  
Edward Ray

Inventor  
Gottfried Florack  
by his attorneys  
Roeder & Briesen

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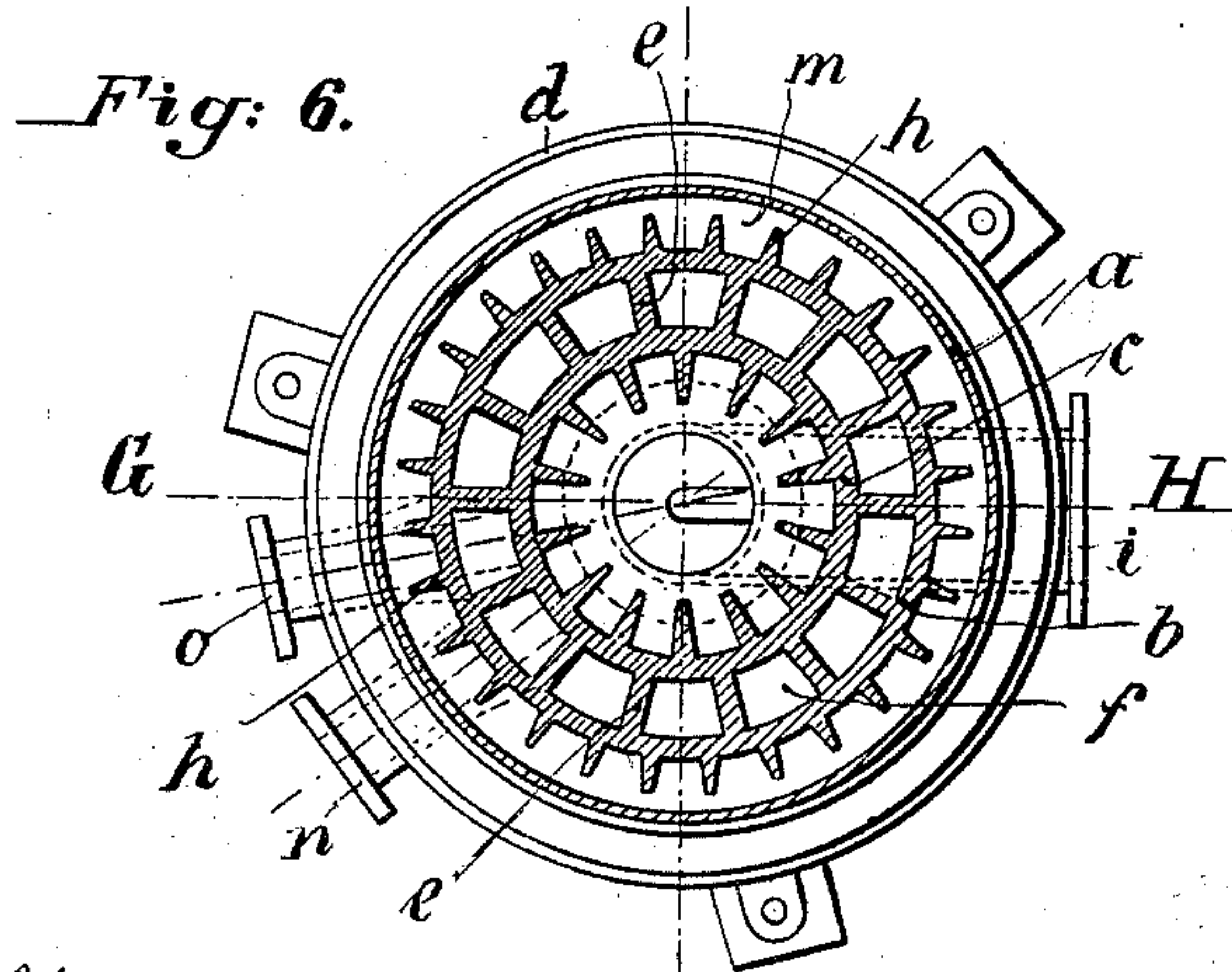
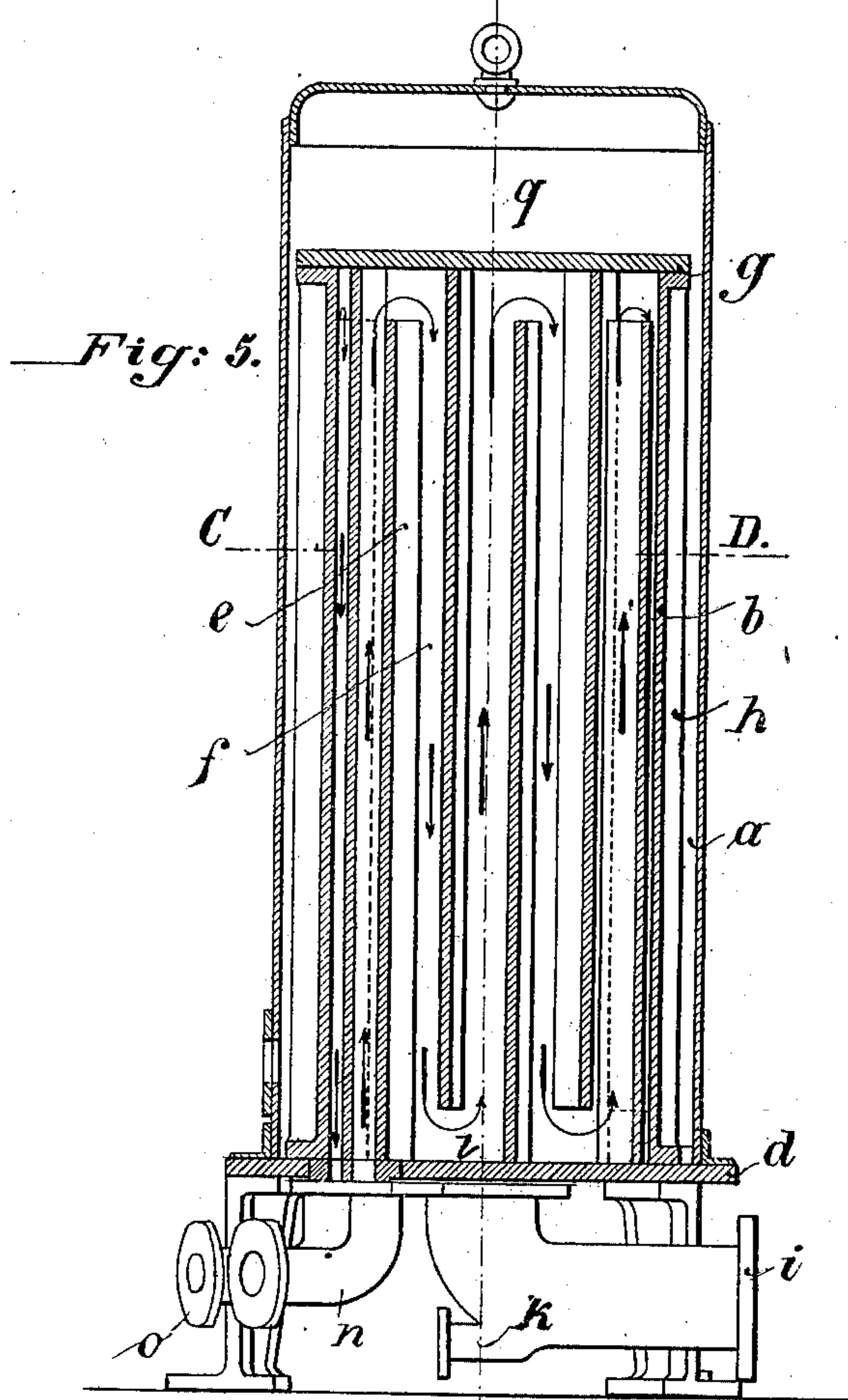
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2 Sheets—Sheet 2.



Witnesses:  
William Schulz.  
Edward Ray.

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# UNITED STATES PATENT OFFICE.

GOTTFRIED FLORACK, OF DUSSELDORF, GERMANY.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 707,575, dated August 26, 1902.

Application filed October 15, 1901. Serial No. 78,691. (No model.)

*To all whom it may concern:*

Be it known that I, GOTTFRIED FLORACK, a citizen of Germany, and a resident of Dusseldorf, Germany, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

This invention relates to apparatus for heating the feed-water of boilers by means of the exhaust-steam, and has for its object to construct a feed-water heater which combines great efficiency as regards the utilization of the exhaust with compactness, simplicity, cheapness, and facility for cleaning.

In the accompanying drawings, Figure 1 is a side view, and Fig. 2 a bottom view, of a superheater embodying my invention. Fig. 3 is a sectional elevation along line E F of Fig. 4. Fig. 4 is a horizontal section along line A B of Fig. 3. Fig. 5 is a vertical section along line G H of Fig. 6, and Fig. 6 a horizontal section along line C D of Fig. 5.

The superheater chiefly comprises a cylindrical casing *a*, mounted on a base-plate *d* and secured to the same by bolts, and a double cylindrical heating-body *b c*, also mounted on the said base-plate. The annular space between the inner cylinder *c* and the outer cylinder *d* of the heating-body is provided with radial partitions *e*, which divide the said space into compartments serving to conduct the water. The compartments communicate with one another alternately at the top and at the bottom, because the partitions *e* stop short of the top plate or roof *g* or of the bottom *d*, as shown by Fig. 5. The walls *b* and *c* of the heating-body are provided with ribs or gills *h*, arranged not only on the outside of the same, as shown by the drawings, but also on the inside, so as to project into the water passages or compartments *f*.

The steam-supply pipe *i* is provided with a small draw-off pipe *k* and terminates at the base-plate *d* in the steam-chamber *l*, inclosed by the inner wall *c* of the heating-body *b c*. The said chamber *l* is left open at the top, so that the steam may subsequently pass into the space *m* left between the outer wall *b* of the heater and the outer casing *a*. The base-plate *d* is also connected with the water-supply pipe *n*, with the water-outlet pipe *o*, and

with a small pipe (not shown) for discharging the water of condensation from the space *m*. The fresh water flows through the pipe *n* into one of the compartments *f*, ascending in the same and then descending in the adjoining compartment, and so on—that is to say, it flows up and down in a zigzag line, as indicated by the arrows of Figs. 3 and 5, until it reaches the outlet-pipe *o*, leading to the boiler. The steam flows through the inlet-pipe *i*, Fig. 3, into the chamber *l*, in which it ascends along the wall *c* of the water-heater and the ribs or gills projecting from the same into the space *g* left free at the top, which it fills, and then descends in the space *m*, while heating the body *b c* from the outside. The ribs or gills abstract heat from the steam very rapidly and transmit it to the water through the walls *b c e*, as well as the ribs projecting into the water-space. As the water comes into contact consecutively with the colder and with the hotter parts of the heating-body, which is completely surrounded with steam, the water will be heated uniformly and the pressure in the superheater will be approximately constant. On its way through the compartments *f* the water is heated very rapidly by the heating-ribs *h*, and the heat of the steam is thereby well utilized.

What I claim is—

1. A feed-water heater composed of a pair of cylindrical casings, a series of intervening radial partitions to form communicating water-passages, a steam-chamber inclosed by the inner casing, and a communicating steam-chamber surrounding the outer casing, substantially as specified.

2. A feed-water heater composed of a pair of cylindrical casings, a series of intervening radial partitions to form communicating water-passages, a steam-chamber inclosed by the inner casing, a communicating steam-chamber surrounding the outer casing, and ribs projecting from the casings into both of the steam-chambers, substantially as specified.

Signed by me at Dusseldorf, Germany, this 24th day of September, 1901.

GOTTFRIED FLORACK.

Witnesses:

WM. ESSENWEIN,  
V. V. VLEKERS.