

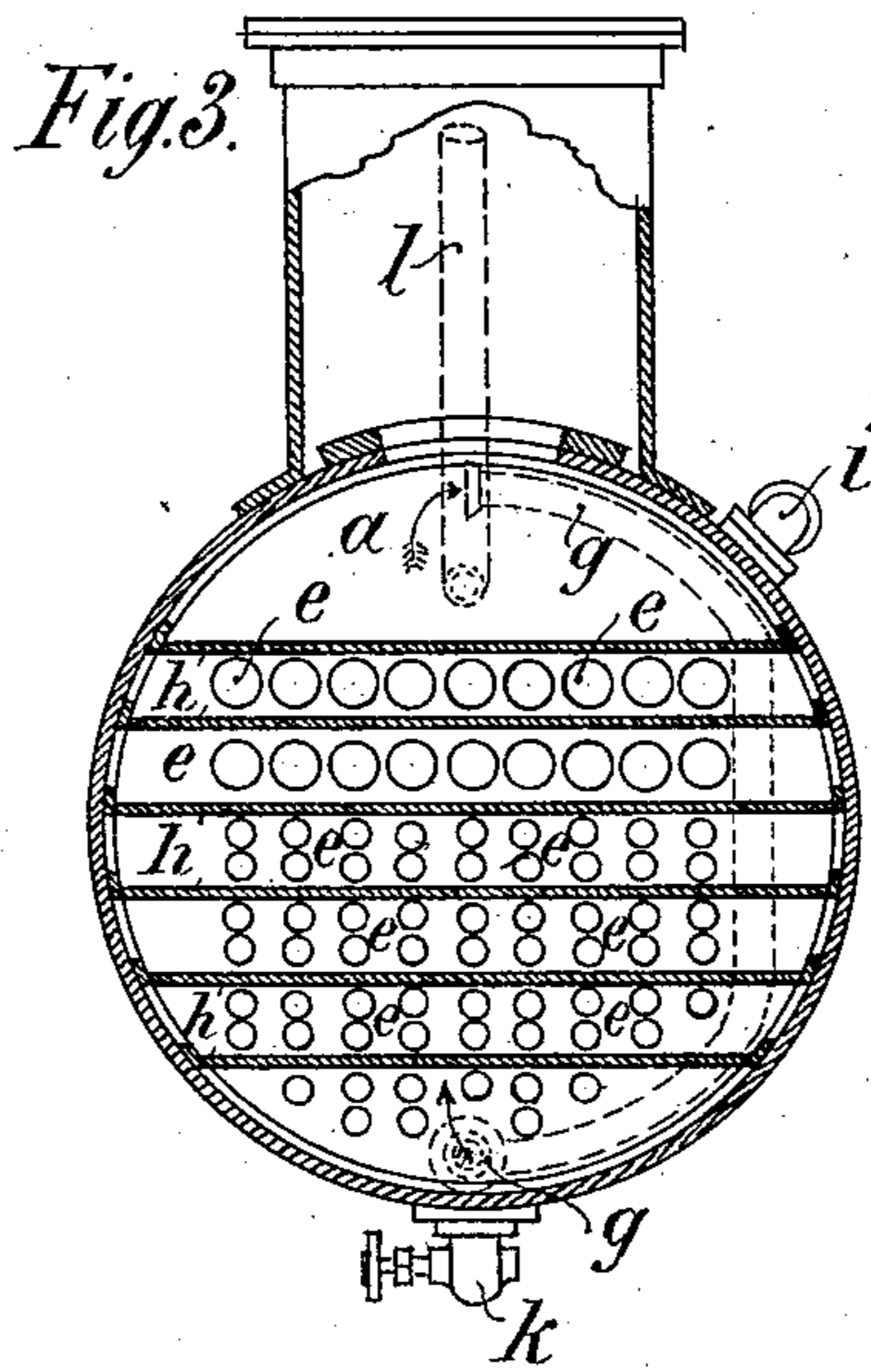
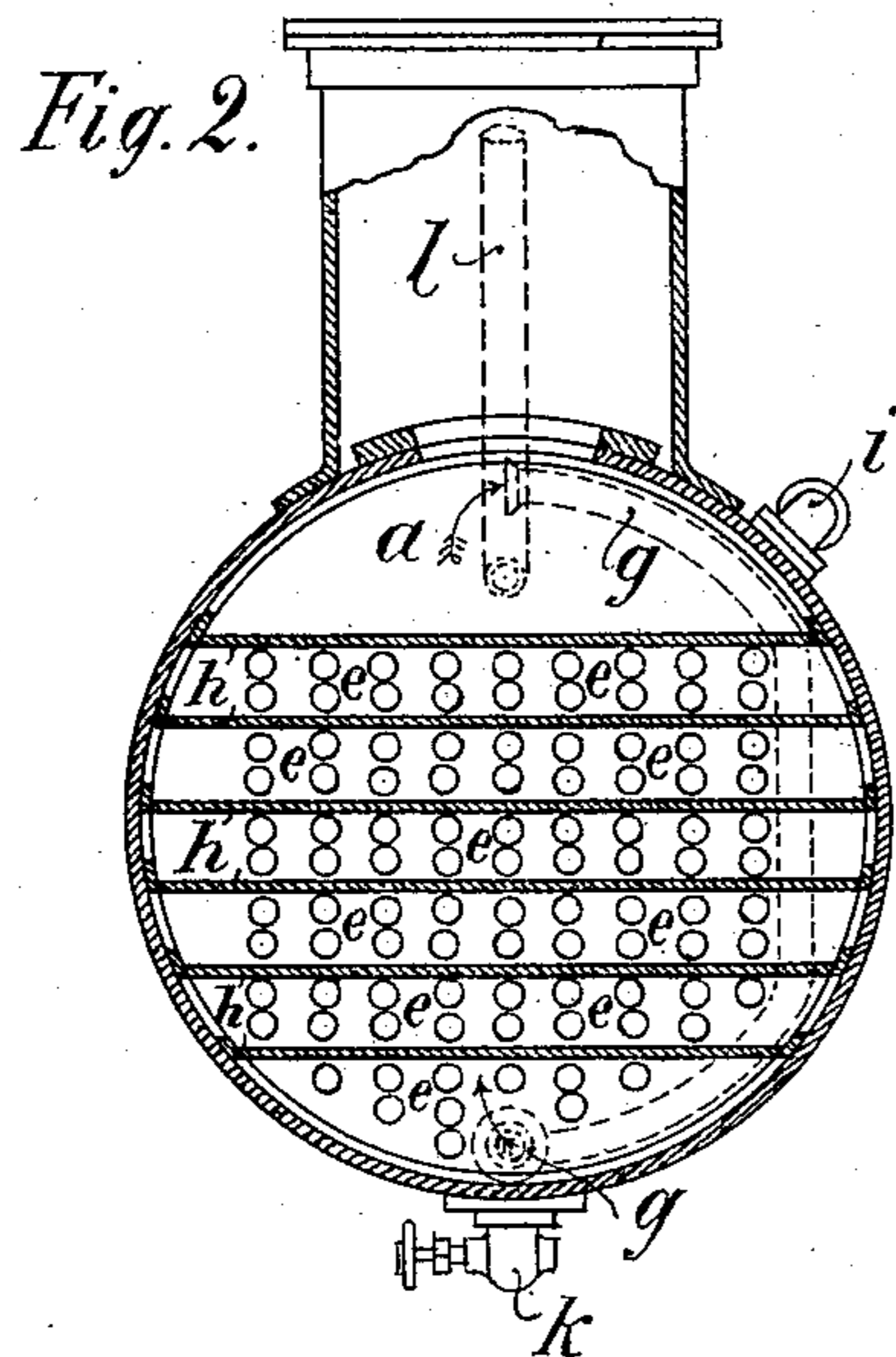
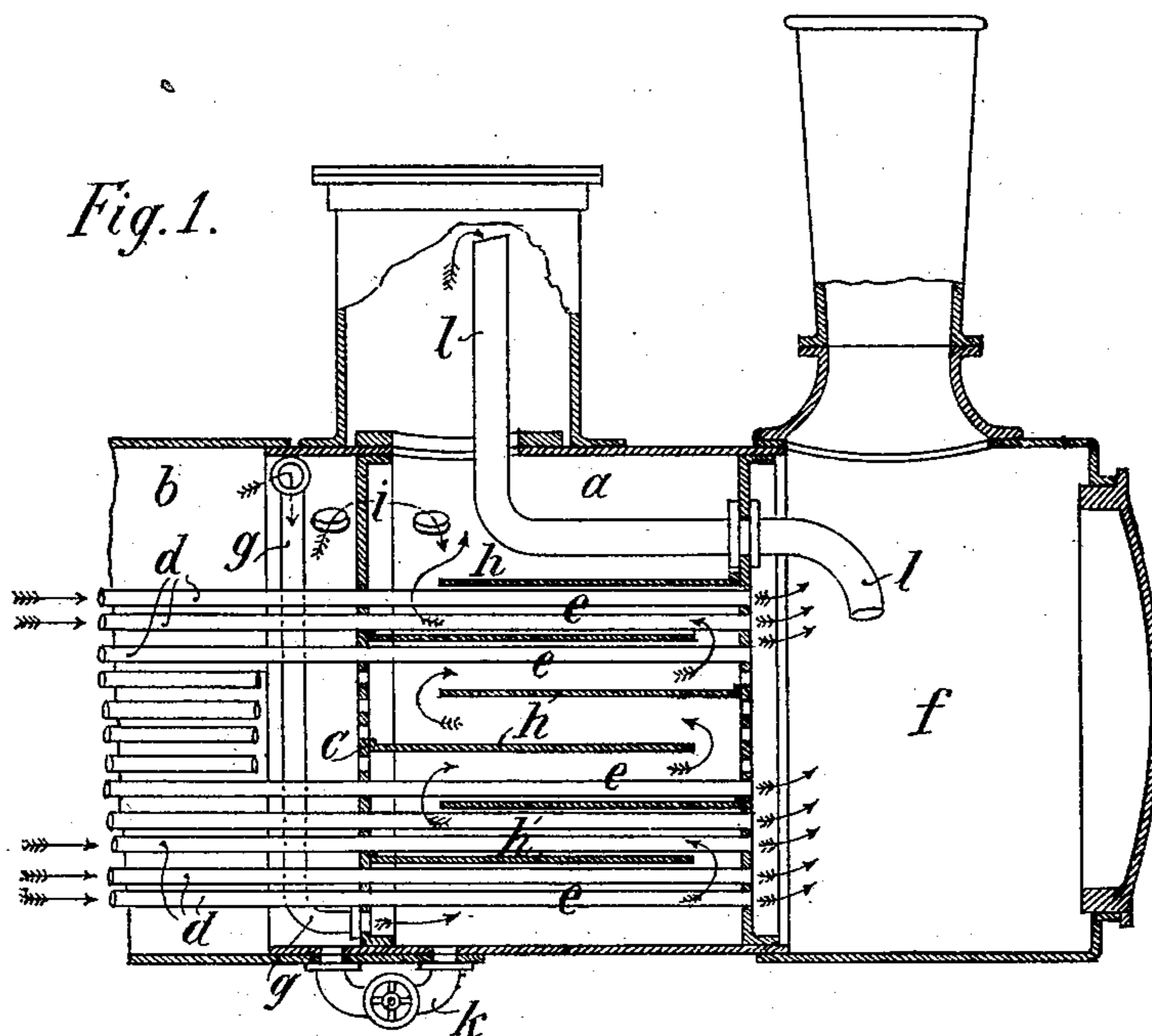
No. 735,791.

PATENTED AUG. 11, 1903.

H. MICHAUCK.
SUPERHEATER.

APPLICATION FILED FEB. 28, 1902.

NO MODEL.



Witnesses.
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UNITED STATES PATENT OFFICE.

HORST MICHAUCK, OF CHEMNITZ, GERMANY.

SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 735,791, dated August 11, 1903.

Application filed February 28, 1902. Serial No. 96,120. (No model.)

To all whom it may concern:

Be it known that I, HORST MICHAUCK, a subject of the King of Saxony, and a resident of Chemnitz, in the Kingdom of Saxony, German Empire, have invented new and useful Improvements in Superheaters for Steam-Boilers, of which the following is a specification.

This invention refers to improvements in superheaters for steam-boilers, and especially to that kind of superheaters in which the fire-tubes of the boiler pass through the superheater, while the steam to be superheated surrounds said fire-tubes.

The main object of the present invention is to allow the steam which is conducted from the boiler or steam-generator into the superheater to come in its course through the superheater in contact with fire-tubes of gradually-increasing temperature, so that the steam is in the highest superheated state while leaving the superheater. For this purpose I arrange my superheater in such a manner that the steam enters the same at bottom and leaves it at top. As those fire-gases issuing from the fire-box are the hottest which pass from the fire-box into the uppermost range or ranges of the fire-tubes, the steam which enters the superheater at bottom by its decrease in specific weight in consequence of becoming more and more superheated will in its ascent come into contact with fire-tubes of increasing temperature, and in order to increase this effect I construct the upper range or ranges of fire-tubes of larger diameter than the lower range or ranges of the fire-tubes, and in order to still more increase the said effect I cause the steam in its ascent in the superheater to prolong its way by means of interposed plates with apertures at opposite ends, which are so arranged that the steam flows partly with and partly against the current of fire-gases within the fire-tubes, said plates being so arranged that they are farther apart from each other at the bottom of the superheater than they are at the top of the superheater. With my said arrangements to get steam superheated to a very high degree I provide suitable connections between the steam-generator and the superheater, so as to be able to commingle wet steam with superheated steam and to vary thereby the degree of superheating according to the

variations in the admission and filling of steam in the cylinder of the steam-engine.

In order that my improvements may be more readily understood, I refer to the annexed drawings, in which I have shown a locomotive-boiler applied with my improved superheater; but I wish it to be understood that I do not confine my improved superheater to this class of boilers.

Figure 1 is a longitudinal section of the boiler and superheater, while Fig. 2 is a vertical cross-section through the superheater with uniformly-distributed ranges of fire-tubes, while Fig. 3 is a vertical cross-section showing the ranges of fire tubes arranged to my above statement.

The superheater *a* is separated from the boiler *b* by a partition-wall *c*. Through this latter wall the fire-tubes *d* pass and are made steam and water tight therein. The fire-tubes *d* pass in direct axial line through the superheater and terminate at the end wall of the superheater into the smoke-box *f*.

Within the superheater the check or guiding plates *h* are arranged parallel to the fire-tubes *d*.

g is a pipe for connecting the steam-room of the generator or boiler *b* with the lower part of the superheater, in which the steam is conducted in zigzag way partly with and partly against the flow of gases of the fire-tubes. In its ascent the steam will touch the upper tubes of increased diameter through which the fire-gases pass. In order to cause the more intimate contact of the steam with these larger fire-tubes, I arrange the plates *h* more together. The steam, now highly superheated, will escape into the dome, from where it is taken away to the cylinders by pipe or pipes *l*. I arrange a valve *i*, by the opening of which the wet steam of the boiler *b* is admitted to the superheated steam for the purpose of varying the degree of superheating according to the variations in filling the steam-cylinders with steam.

It is a main feature of my improvements that the fire-tubes pass in axial line through the boiler or generator and the superheater; but I do not confine myself to the arrangements shown, in which the superheater is at one end of the boiler, as in cases in which the highest degree possible of heat shall be ar-

rived at in the superheated steam the superheater may be arranged at any convenient part of the boiler or generator, even at the very first end of said boiler—that is to say, next to the fire-box.

In order that the superheater may be used sometimes as a generator of steam or boiler, I establish a connection *k* between the lowest part of boiler and lowest part of superheater, so that in opening the valve in said connection *k* equal level of water is established in both, and the fire-tubes passing through both generate steam in the boiler and in the superheater.

I claim—

1. An improved superheater for steam boilers or generators in which the fire-tubes of the boiler pass in axial lines through a partition-wall separating the boiler from the superheater and through the superheater to the end wall of the superheater into the smoke-box.

2. An improved superheater for steam boilers, or generators, in which the fire-tubes of the boiler or generator pass in axial lines through the superheater; a pipe connection between the top of the boiler or generator downward to the bottom or lower part of the superheater.

3. An improved superheater for steam boilers or generators in which the fire-tubes of the boiler or generator pass in axial lines through the superheater; a steam connection between the top, or steam-chambers of the boiler or generator downward to the bottom or lower part of the superheater; check-plates in the superheater parallel to the fire-tubes.

4. An improved superheater for steam boilers or generators in which the fire-tubes of the boiler or generator pass in axial lines through the superheater; a pipe for steam connection between the top or steam-chambers of the boiler or generator downward to the bottom or lower part of the superheater; deflecting-diaphragms or check-plates in the superheater arranged substantially parallel with the fire-tubes with openings at alternate ends of said check-plate.

5. An improved superheater for steam boilers or generators with fire-tubes of larger diameter passing through the upper part of the superheater than through the lower part of the superheater.

ers or generators with fire-tubes of larger diameter passing through the upper part of the superheater than through the lower part of the superheater.

6. An improved superheater for steam boilers or generators with steam connections between the top of the boiler and lower part of the superheater; fire-tubes of larger diameter passing through the upper part of the superheater than through the lower part of the superheater.

7. An improved superheater for steam boilers or generators with steam connections between the top of the boiler or generator and the lower part of the superheater; fire-tubes of larger diameter passing through the upper part of the superheater than through the lower part and check-plates or diaphragms arranged nearer to said fire-tubes in the upper part than in the lower part.

8. An improved superheater for steam boilers or generators in which the fire-tubes of the boiler or generator pass in axial lines through the superheater with steam connections between the top of the boiler or generator and lower part of the superheater and a steam connection with valve between the steam-chamber or upper part of the boiler and that part of the superheater containing the superheated steam.

9. An improved superheater for steam boilers or generators having the fire-tubes of the boiler passing in axial line through the boiler or generator and superheater with steam connection between top of boiler and lower part of superheater having a pipe or other connection with valve between the lower part of boiler and lower part of superheater; substantially as specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 11th day of February, 1902.

HORST MICHAUCK.

Witnesses:

OSLANDER VOIGT,
CARL AUGUST RÖTZSCH.