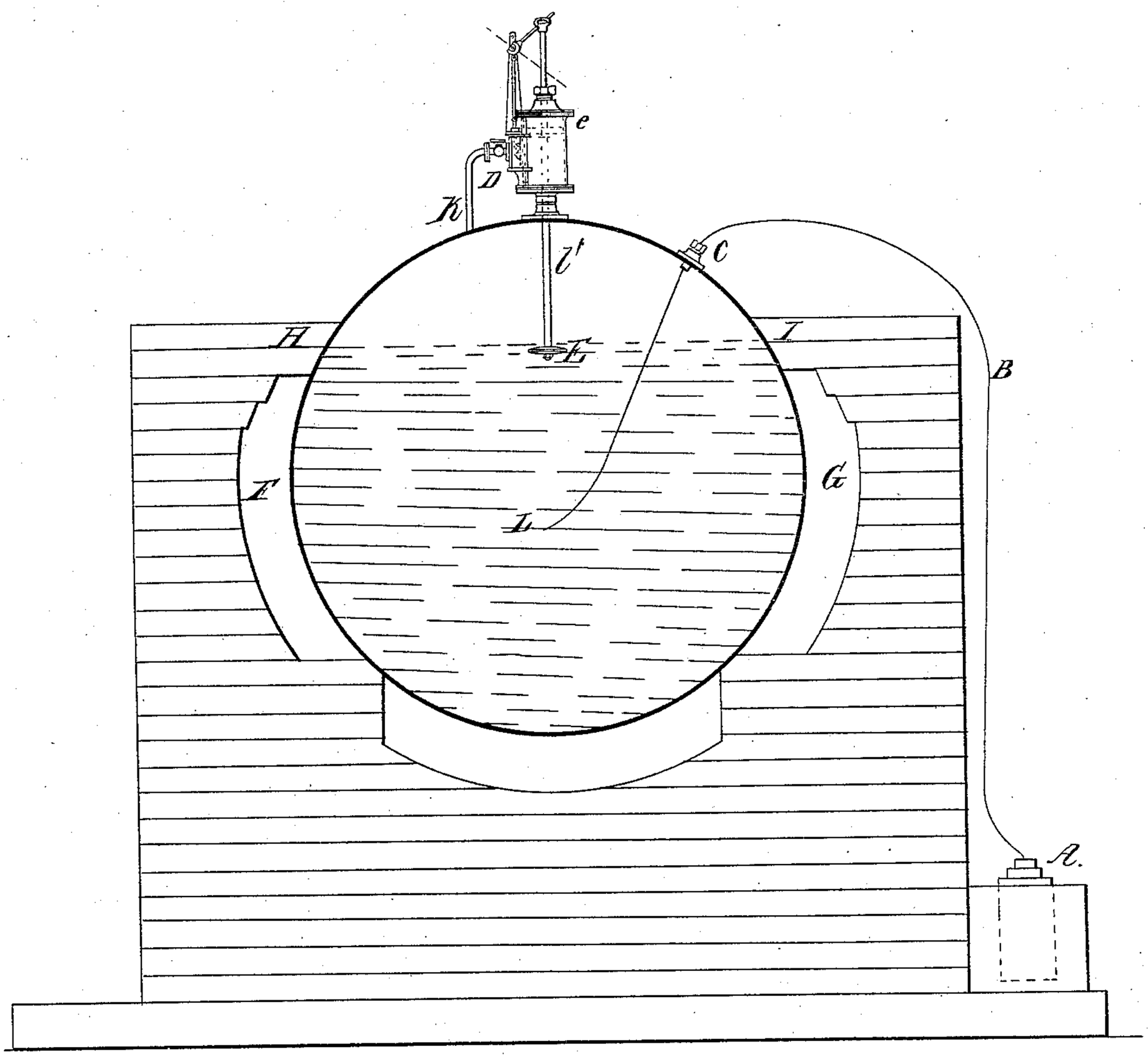
C. Kinkel,

Steam Safety Valve.

No. 57,637. Patented Aug. 28, 1866.



Witnesses:
Chs. Loehle
Henry Wenke

Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES KINKEL, OF NEW YORK, N. Y., ASSIGNOR TO CHARLES WEHLE, OF HOBOKEN, NEW JERSEY.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **57,637**, dated August 28, 1866.

To all whom it may concern:

Be it known that I, CHARLES KINKEL, of the city, county, and State of New York, have invented a new and useful Method of Preventing the Explosion of Steam-Boilers; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawing, making a part of this specification, which represents a cross-section of a steam-boiler with the application of my said new method for preventing its explosion.

I deem it proper to state that the present theory of boiler explosions explains this phenomenon as by a sudden generation of steam when the water comes into contact with the red-hot walls of the boiler, or by decomposition of the water producing inflammation of explosive gases, or by generating inflammable gases through a decomposition of the organic substances contained in the water, or by an accidental destruction of the material of which the boiler is constructed, or by similar causes.

Numerous observations and experiments, however, have convinced me that the true cause of these explosions is to be found in the overheating of the water, or, what amounts to the same, in the retardation of the boiling of the water. I call water overheated when it requires a higher temperature than about 100° Celsius in order to be brought to a boiling state, and cold water may, under certain circumstances, be heated to a temperature of 170° Celsius without being thereby brought into a boiling state. That this is the true cause of explosions is demonstrated by the fact that by far the most numerous cases of boiler explosions take place at a time when the boiler is at rest, after having been worked for some time, and when the pressure of the steam inside of the boiler is apparently less than the pressure during the usual working of the engines.

To avoid this cause of explosions, the surface of the water in the boiler must be prevented from remaining in a quiet state after the same has reached the minimum of boiling temperature—say about 100° Celsius; and this may be attained by mechanical means, whereby the water in the boiler is kept in constant and regular vibrating motion.

The nature of my invention consists in combining the boiler with a mechanical apparatus which maintains a regular and constant motion of the water in the boiler.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the annexed drawing, F G represent the boiler. H I represent the surface of the water in the boiler. K represents a small pipe leading from the top of the boiler into a small steam-engine, D, constructed in the usual manner, the piston *e* of which is connected below with a piston-rod, *e'*, ending in piston E, formed of plastic or other coal, and reaching somewhat below the surface of the water in the boiler.

As soon as the water commences to boil the steam generated in the boiler will ascend through the pipe K into the steam-engine D, and will cause a vertical ascending and descending movement of the steam-piston *e* and of the water-piston E, which latter will cause a regular and constant commotion of the water in the boiler. Thus the steam generated in the boiler will, by means of the small steam-engine, cause a vibrating motion of the surface of the water H I without causing or creating a circulation of the said water, or without creating violent motions, which are to be avoided.

I do not limit my claim to the exact mechanism described; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The new method herein described for preventing explosions of steam-boilers, by a combination of a steam-boiler with the mechanism, substantially as described, which keeps the water in the boiler in constant and regular motion.

CHARLES KINKEL.

Witnesses:

CHAS. WEHLE,

HENRY WEHLE.