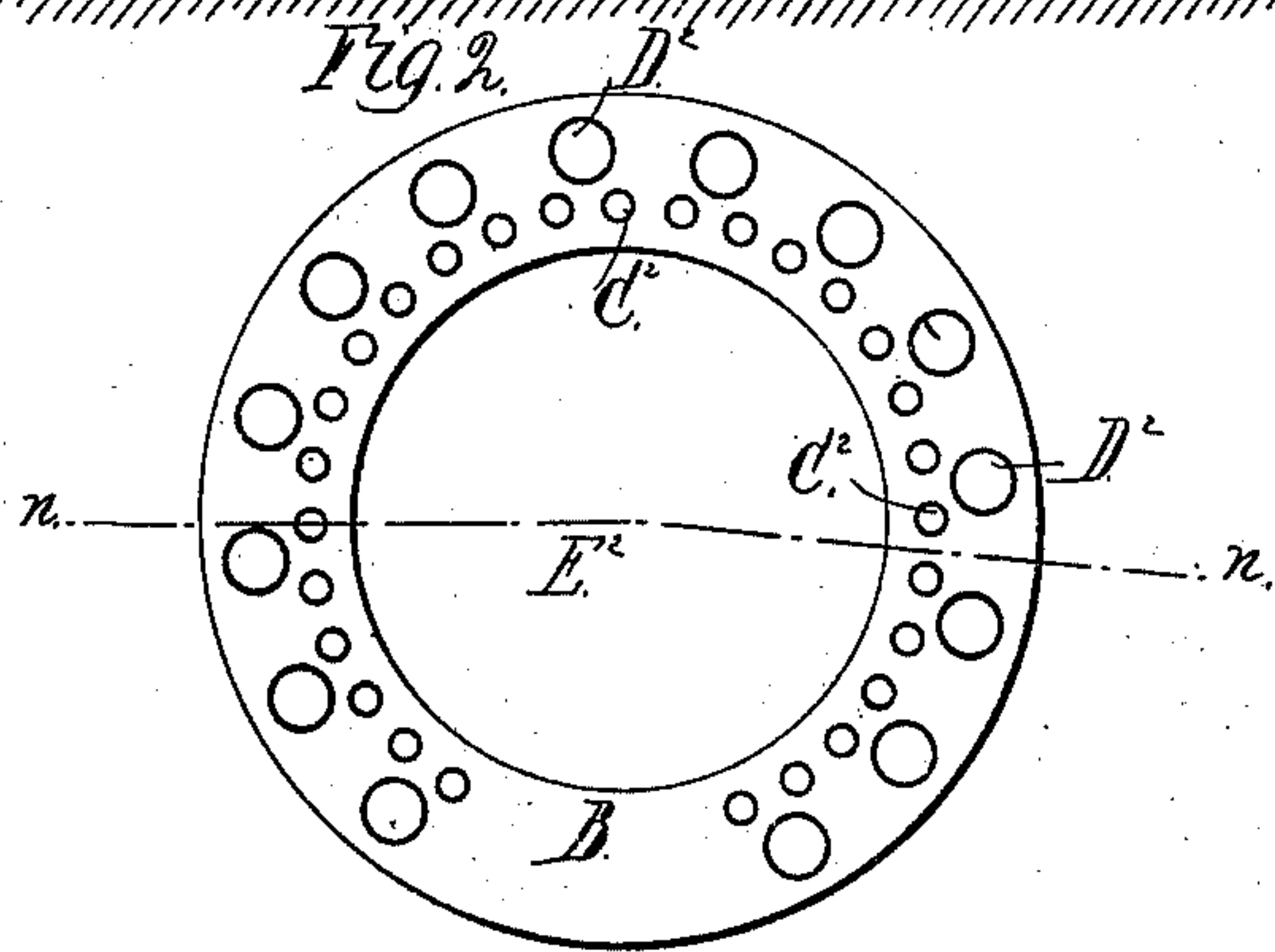
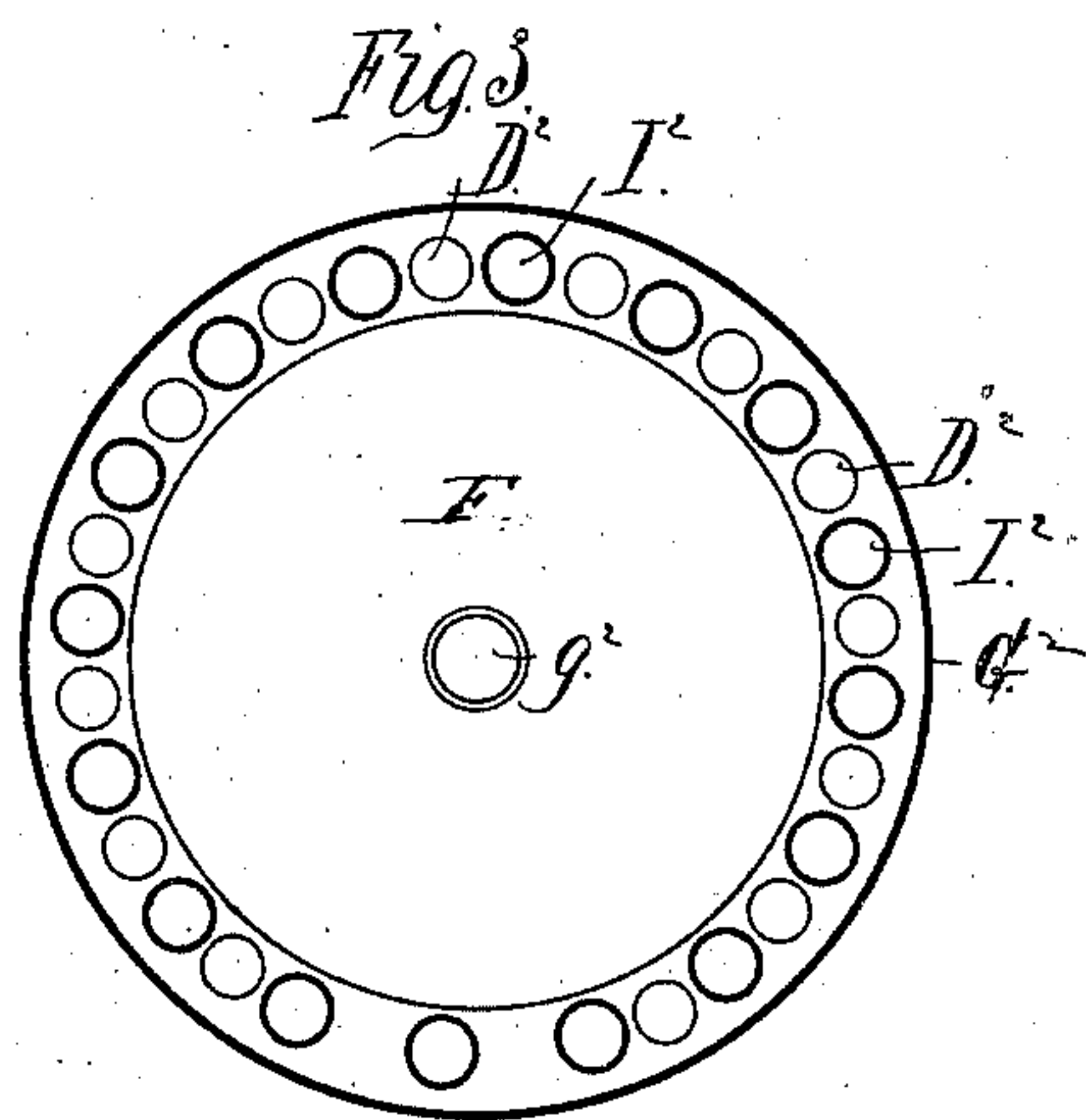
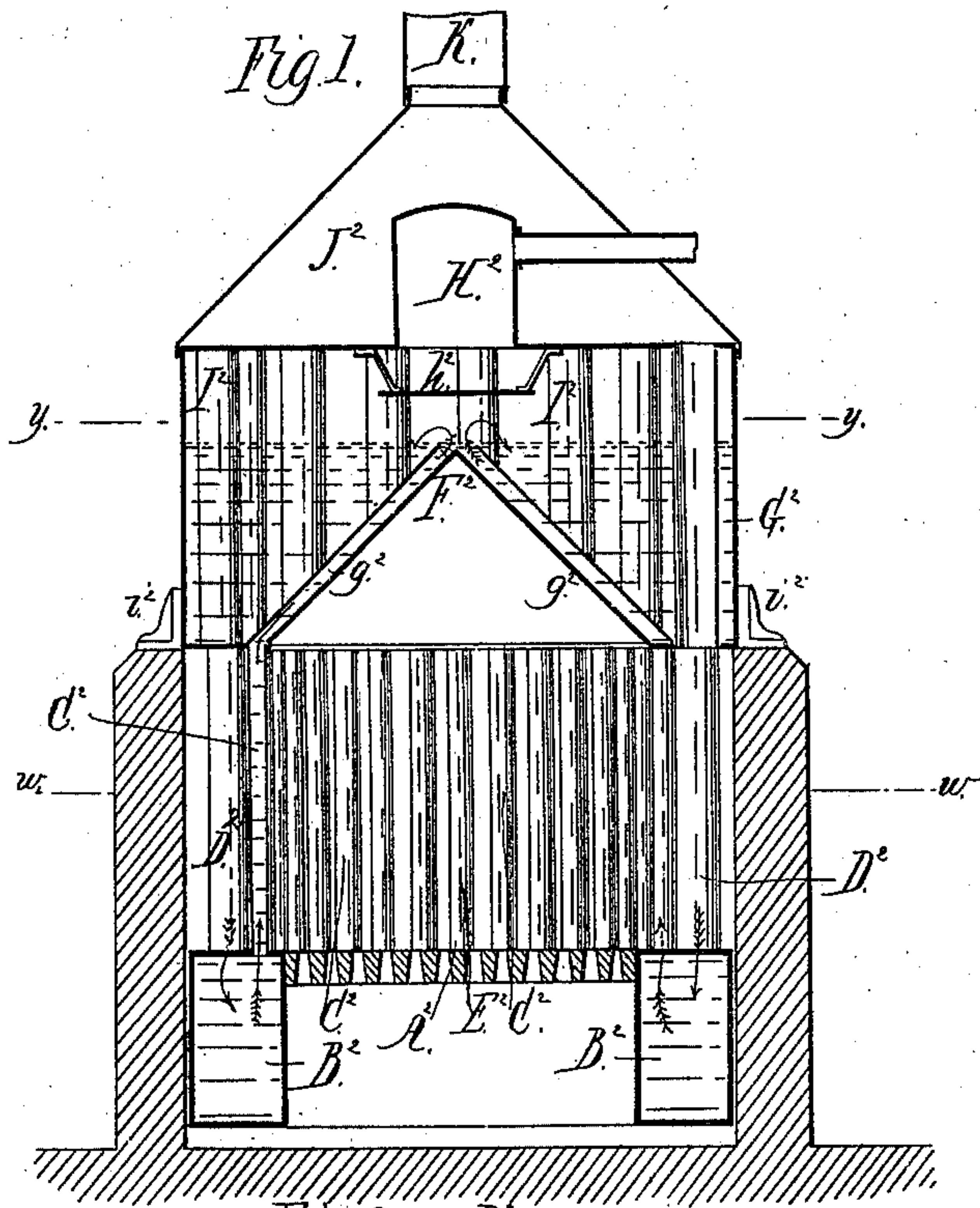


J. A. Miller,

Steam-Boiler Water-Tube.

N^o 63,923.

Patented Apr. 16, 1867.



Witnesses;
J. W. Combs
G. W. Reed

Inventor;
Joseph A. Miller

United States Patent Office.

JOSEPH A. MILLER, OF NEW YORK, N. Y.

C.

Letters Patent No. 63,923, dated April 16, 1867.

IMPROVEMENT IN STEAM GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOSEPH A. MILLER, of the city, county, and State of New York, have invented a certain new and useful Improvement in Steam Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, marked C, forming part of this specification, and in which—

Figure 1 represents a vertical section of a boiler constructed according to my improvement, taken through the line *n n* in fig. 2.

Figure 2, a horizontal section thereof, through the line *w w* in fig. 1; and

Figure 3, a similar view, through the line *y y* in fig. 1.

Like letters indicate like parts throughout the several figures.

The nature of the invention includes an annular or other shaped water base arranged below the grate, and having mounted upon and in communication with it an inner and outer row or series of water tubes, the inner row being the smaller of the two, and being in communication at their tops with a hollow dome or roof to the fire situated within a cylinder or space, and the outer shell of which dome is open at the top at or about the water level to the steam space of said cylinder, which has smoke tubes connected with it, the stack running up through it, and is connected at its bottom with the water base by the larger and outer row of pipes surrounding the fire-box, and that form return-water spaces, while the inner and smaller row of pipes and hollow dome constitute isolated sheet or thin water spaces and steam generators proper.

Referring to the accompanying drawing, the boiler, which is represented as of vertical cylindrical character, has arranged below the level of its grate, *A*², a water base, *B*², which may be of annular form, and has mounted on and connecting with it an inner and outer row of vertical water tubes, *C*² *D*², the inner ones, *C*², being smaller than the outer ones, and forming sides and back to the fire-chamber *E*². Said small tubes, *C*², communicate at their tops with a water-jacket or space, *g*², of a conical or other suitably-shaped fire-box roof, *F*², arranged to project upwardly within an upper chamber or cylinder, *G*², to the water level. This water-jacket or space *g*² and tubes *C*² form film or thin isolated water spaces and steam generator proper, upon which the fire is made to act direct to the exclusion of the remaining or main body of water in the boiler, which remaining body or portion is contained within the cylinder *G*² in the space surrounding the water-jacket *g*² and within the return-water tubes *D*² that connect the cylinder *G*² at its bottom with the water base *B*². The steam generated in the isolated water spaces *C*² and *g*² has a ready and free escape without passing through a superincumbent body of water into the steam space in the upper portion of the cylinder *G*², and round or over a deflecting plate, *h*², into a steam dome, *H*², while any water carried over the water-jacket *g*² by the steam serves to keep up a circulation by its return or flow of water down the return tubes *D*² into the water base *B*² below the grate. The smoke and gaseous products pass off from the fire-chamber *E*² up smoke tubes *I*² in the cylinder *G*² into a smoke-box, *J*², surrounding the steam dome and off up the stack *K*².

By this construction and arrangement most or all of the heat is utilized. If desired, the water space may be continued by an annular cylinder surrounding the return pipes *D*² from the cylinder *G*² to the water base *B*² below, and the boiler be suitably built up in outer brick-work; or, which admits of more freedom for expansion of the several parts, it may be suspended at its upper part by knees, *i*², on a lower brick or other support, as represented in fig. 1.

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

The combination of the water base *B*², grate *A*², steam-generating tubes *C*², and jacket *g*², to the fire-box roof *F*², cylinder or upper chamber *G*², return-water pipes *D*², and smoke tubes *I*², the whole being arranged relatively to each other substantially as specified.

JOSEPH A. MILLER.

Witnesses:

J. W. COOMBS,

A. LE CLERC.