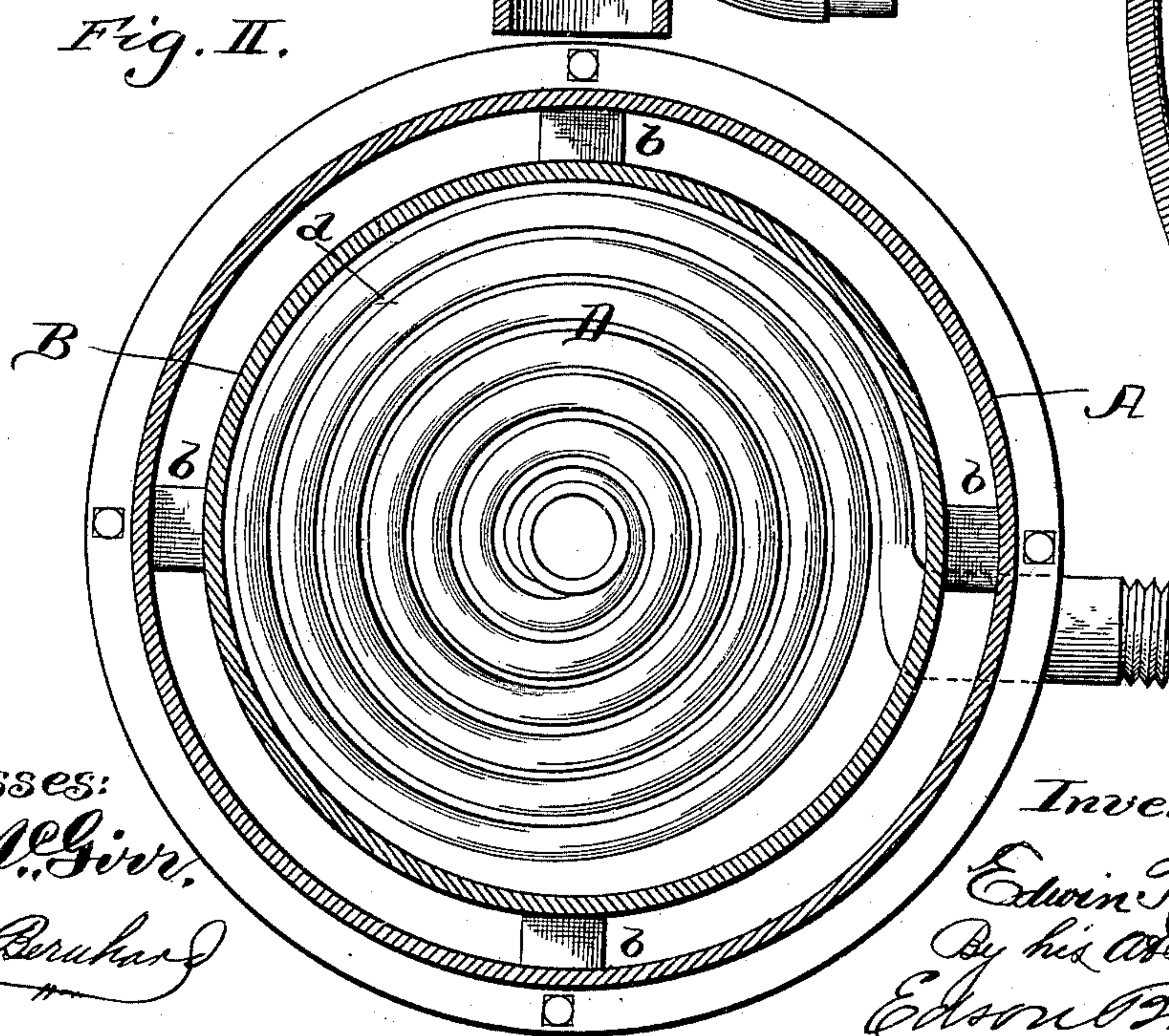
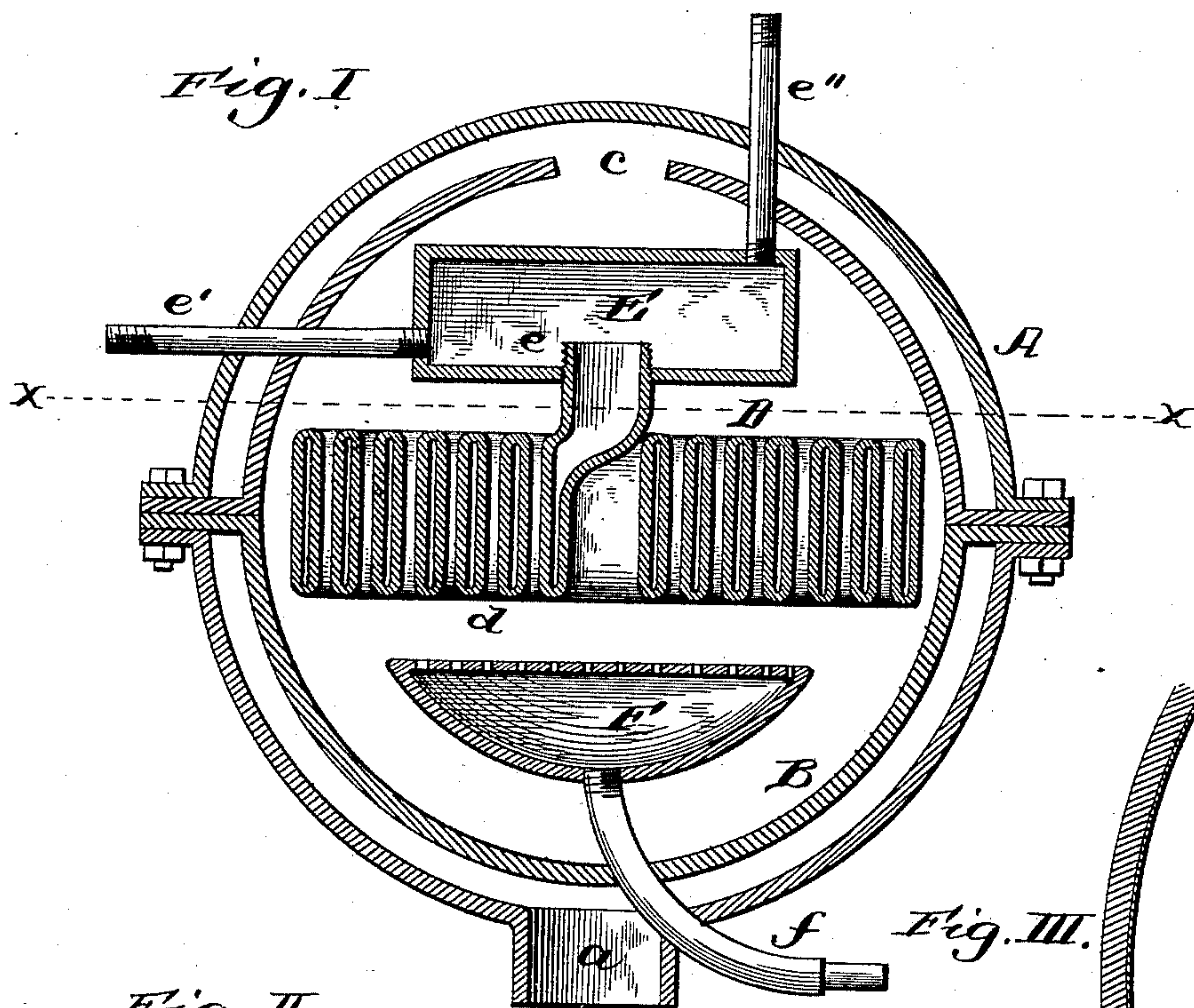


(No Model.)

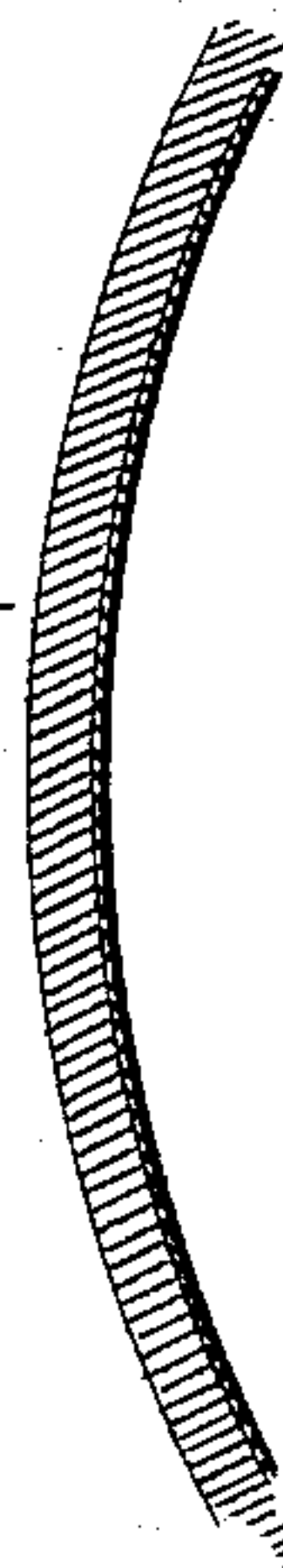
E. REYNOLDS.  
FLASH STEAM GENERATOR.

No. 461,985.

Patented Oct. 27, 1891.



*Fig. III.*



Witnesses:

J. B. McGinnis.  
H. H. Beruhard

Inventor:

Edwin Reynolds  
By his Attorneys,  
Edson Bros.



# UNITED STATES PATENT OFFICE.

EDWIN REYNOLDS, OF BROOKLYN, NEW YORK.

## FLASH STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 461,985, dated October 27, 1891.

Application filed April 7, 1891. Serial No. 388,005. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN REYNOLDS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Flash Steam - Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in flash steam-generators; and the objects of the invention are, first, to provide a simple, cheap, and efficient apparatus for the instantaneous generation of steam, and, second, to provide an apparatus which will be automatic in its operation and in which there is no liability to explode.

With these ends in view my invention consists in the combination, with a coiled flattened tube having capillary spaces for the vaporization of fluid which is injected therein, of a hollow bulb or receptacle receiving from the discharge end of said coil, a hydrocarbon-burner arranged below said coil, and an inclosing case or shell provided with a suitable opening for the escape of gases and other products of combustion.

My invention further consists in the peculiar construction and arrangement of parts, as will hereinafter be more fully pointed out and claimed.

To enable others to more readily understand my invention I have illustrated the same in the accompanying drawings, in which—

Figure I is a vertical sectional view through a flash steam-generator constructed in accordance with my invention, and Fig. II is a horizontal sectional view on the line *xx* of Fig. I. Fig. III is a sectional view of a portion of the pipe of which the coil is formed.

Like letters of reference denote corresponding parts in all the figures of the drawings, referring to which—

A designates the inclosing case or shell of my apparatus, which shell is made of steel or any other suitable material and is preferably, though not necessarily, of spherical form, as shown in the drawings. This case or shell A is provided with an outlet or open-

ing *a* in its lower side, and within said shell is arranged another concentric shell B, the two shells A B being connected by transverse brace rods or bars *b*. The inner shell or casing B is also provided with an outlet-opening *c*, which, as shown in the drawings, may be diametrically opposite to the opening *a* in the outer shell, or the two openings *a c* may align and the chamber between the two shells A B be filled with any suitable refractory or non-heat-conducting material.

Arranged centrally within the inner casing B is a coil D, which is formed of a light (or moderately light) metallic tube lined with copper or other non-corrosive material. This pipe is flattened before being coiled, so as to form narrow small passages *d*. The outer end of this coil D extends through the shells B A and is connected with a suitable pump, while the inner end of the coil is screw-threaded, as shown in Fig. I. On this threaded end is fitted a metallic bulb or vessel E of any desired shape, the inner end of the coil D extending some distance into the said bulb, so as to terminate above the floor or bottom *e* of the receptacle.

The bulb or vessel E is provided with two outlet-pipes *e' e''*, the former opening into said bulb near the bottom thereof, while the other *e''* opens into the bulb near or at its upper side. Both of the pipes *e' e''* extend through the shells B A, and the latter pipe *e''* is connected with a radiator or a motor, according to the use the steam is to be put—for heating purposes or to drive machinery.

F designates a hydrocarbon-burner, which is arranged within the inner shell B, below the coil D therein, and this burner is connected with a suitable fuel-reservoir by means of a pipe or conduit *f*.

The operation of my invention may be briefly stated as follows: The burner F is ignited by any suitable means, and water is admitted or injected into the coil D. The coil D, as heretofore stated, is composed of a flattened tube, so that there is a comparatively small amount of water contained in each of the chambers or passages *d* which is exposed to the action of the heat, so that steam is instantly generated and escapes into the bulb E. Should the water be carried through the coil with the steam and lifted by the force of



the steam into the bulb, it falls to the bottom thereof when the body of steam comes in contact with the roof of the bulb, the water being permitted to escape through the pipe *e'*.

5 The steam escapes or passes out from the bulb E through the pipe *e''*.

It will thus be seen that I have provided a safe non-explosive flash generator in which the vapor cannot accumulate, and on the slightest break in any part of the generator the supply of fluid is instantly cut off.

I am aware that changes in the form and proportion of parts of the devices herein shown and described as an embodiment of my invention can be made without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

20 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A flash steam-generator, substantially as herein described, comprising an exterior shell or case, a coil composed of a flattened tube arranged within said shell or case and having its inner end extended or projected upward beyond the plane of the coil, the closed bulb or receptacle arranged above the coil to receive the inner end thereof, the steam-pipe leading from the upper part of said bulb or receptacle, another waste-pipe leading from the lower part of said bulb or receptacle, and a heat-generator arranged wholly within the

exterior shell, below the coil therein, as set forth. 35

2. A flash steam-generator comprising an outer shell or case, an inner shell arranged within and concentric with the outer shell, a coil arranged within the inner shell and provided with a series of narrow chambers or passages, one end of said coil extending through the inclosing shells, a bulb or vessel receiving from the inner end of the coil, the escape-pipes, and a hydrocarbon-burner arranged within the inclosing shells, below the coil therein, substantially as described. 45

3. A flash steam-generator comprising an outer inclosing case or shell provided with a suitable outlet, another shell or casing arranged within and concentric with the outer casing, a coil formed of a flattened tube lined with non-corrosive material and arranged within the inner shell, a bulb fitted on the inner end of the coil, a pipe extending from the lower portion of said bulb, another pipe leading from the upper part of the bulb, and a hydrocarbon-burner arranged within the inner shell, below the coil therein, substantially as shown and described, for the purpose specified. 50 60

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN REYNOLDS.

Witnesses:

DORUS R. McREA,  
GEO. H. PENDLETON.