

T. Champion,

Steam-Boiler Water-Tube.

N^o 12,993.

Patented June 5, 1855.

Fig:2.

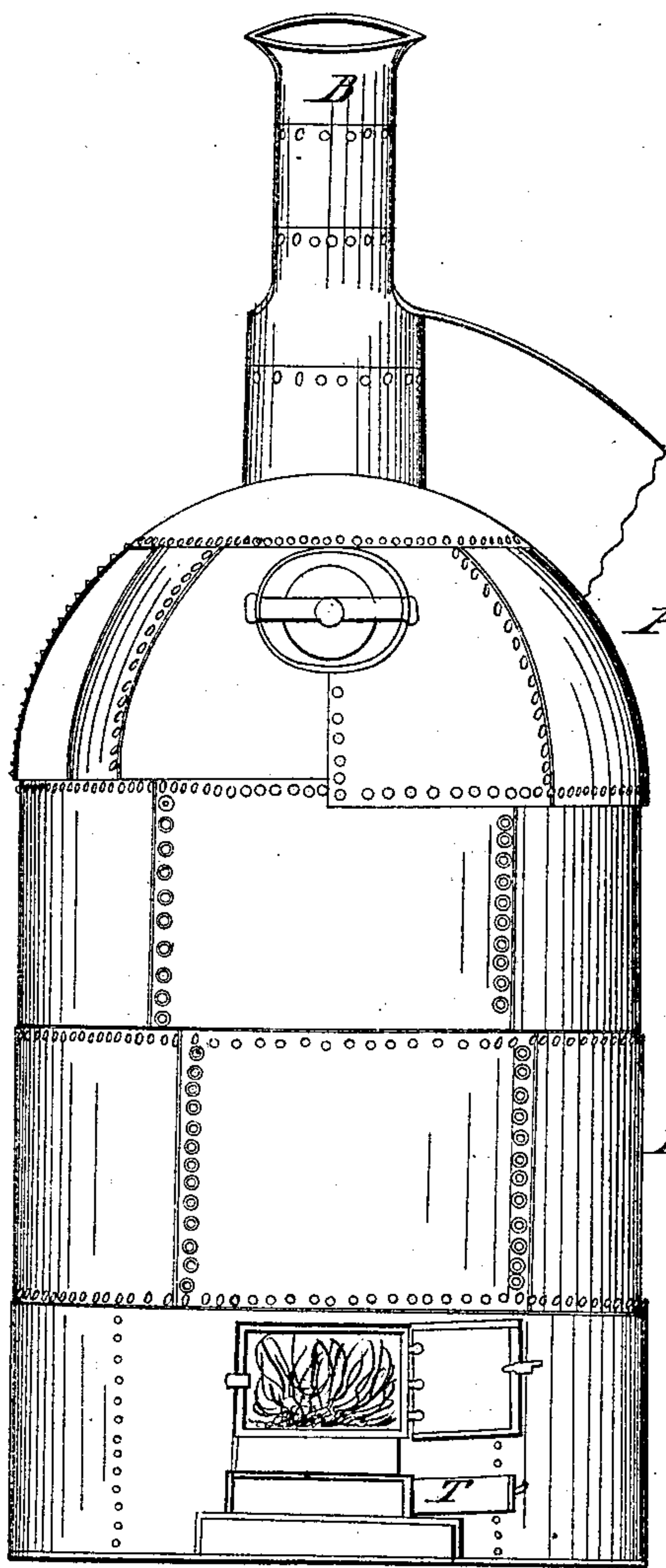
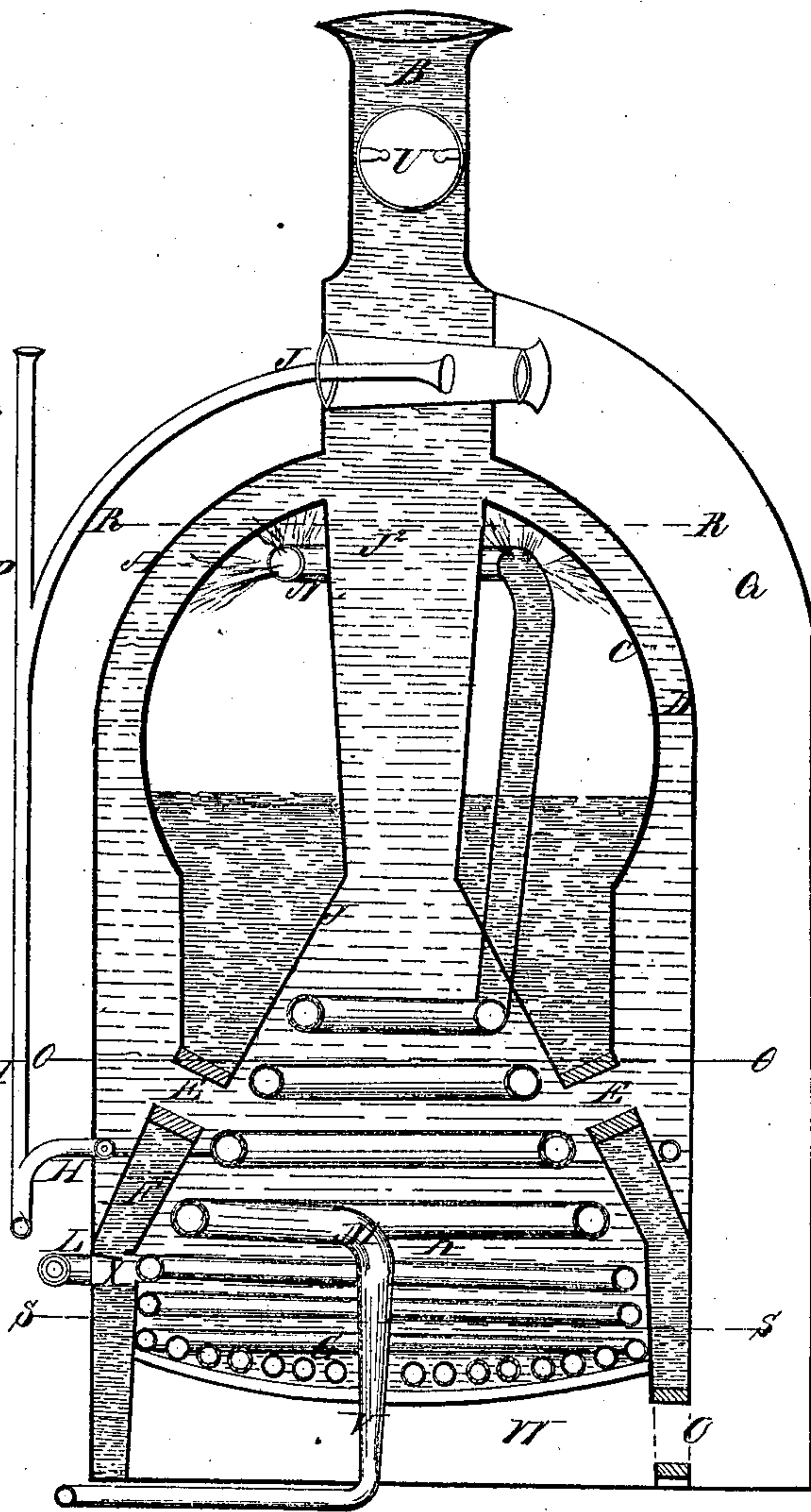


Fig:1



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Fig: 5.

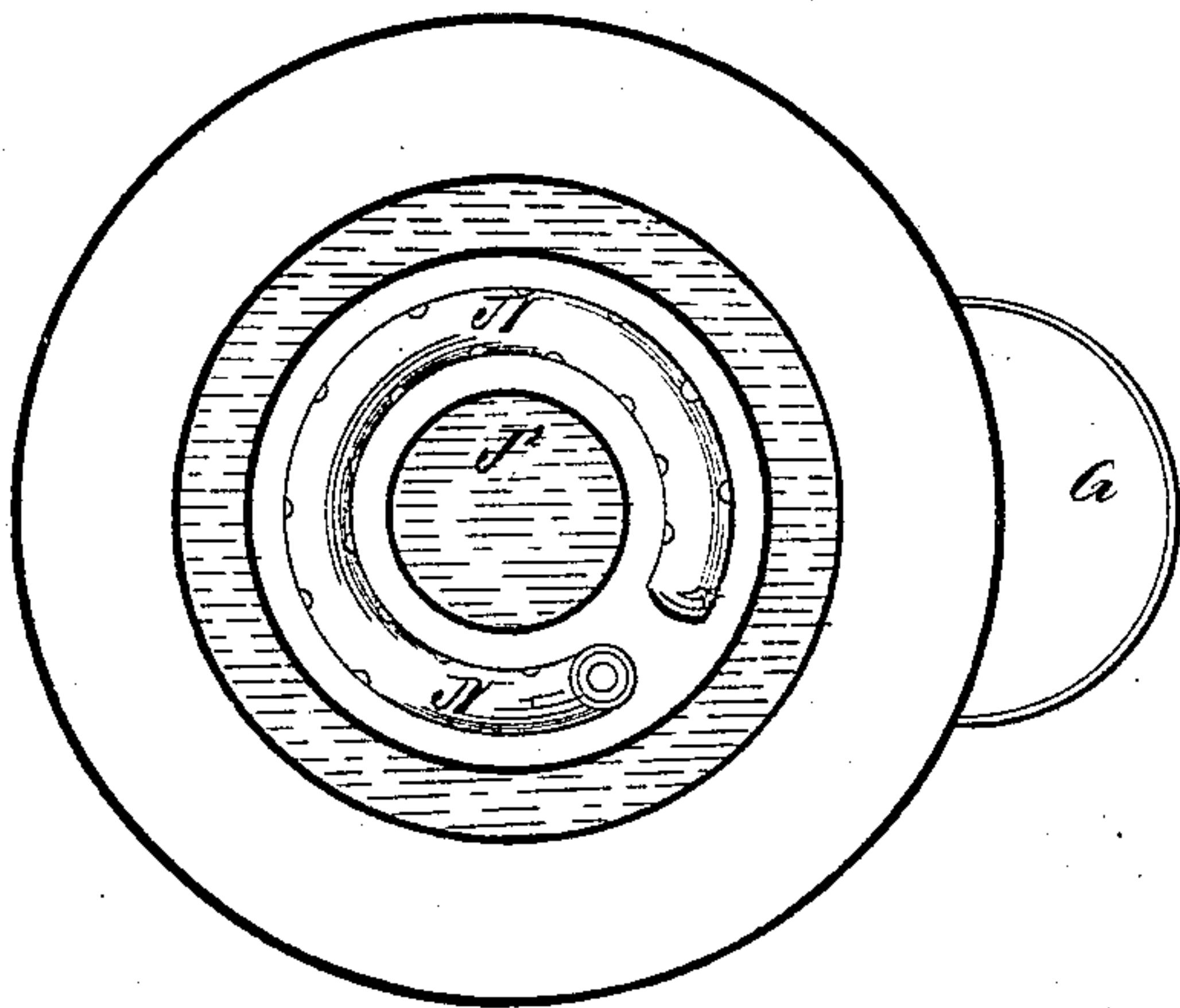


Fig: 4.

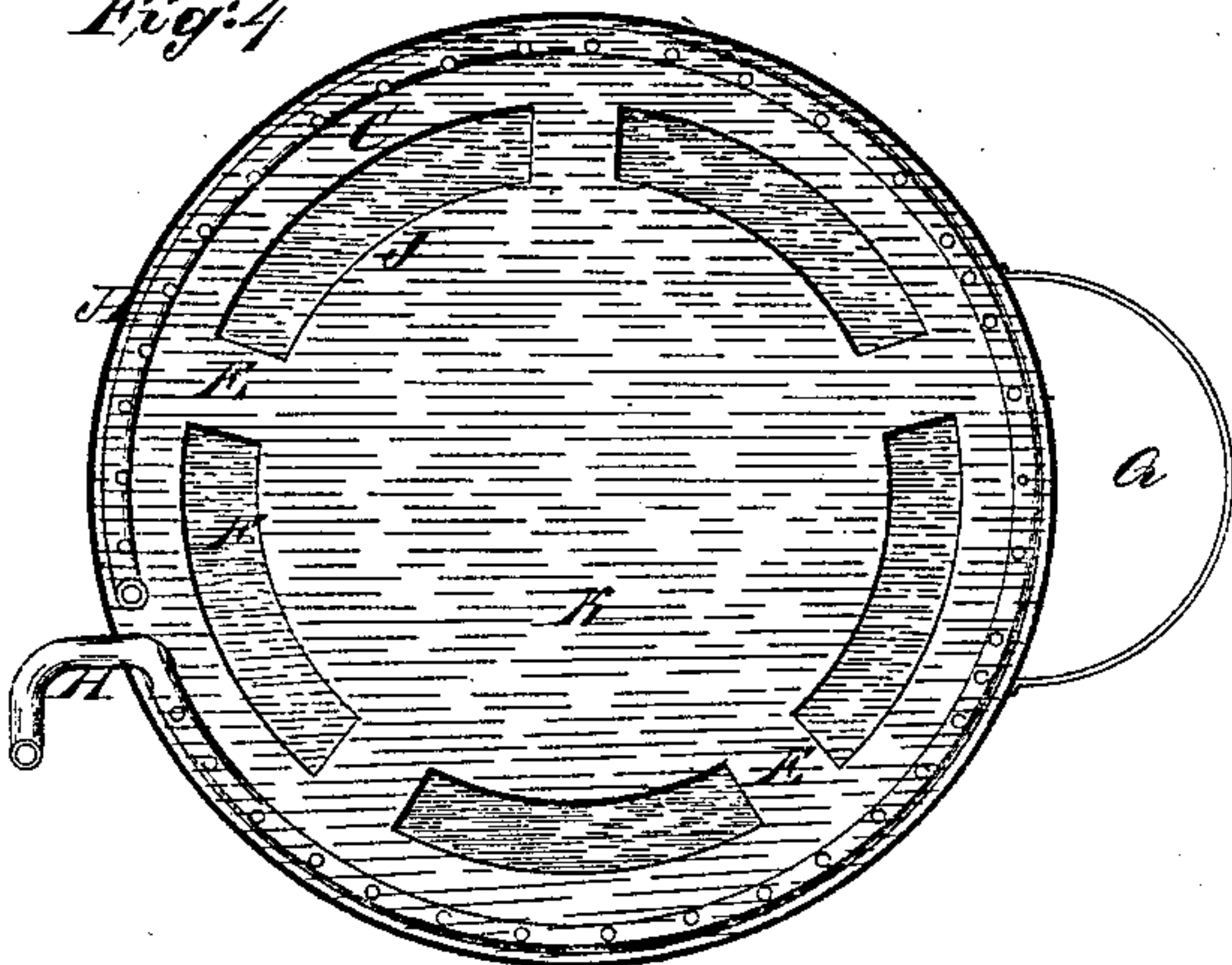


Fig: 3.

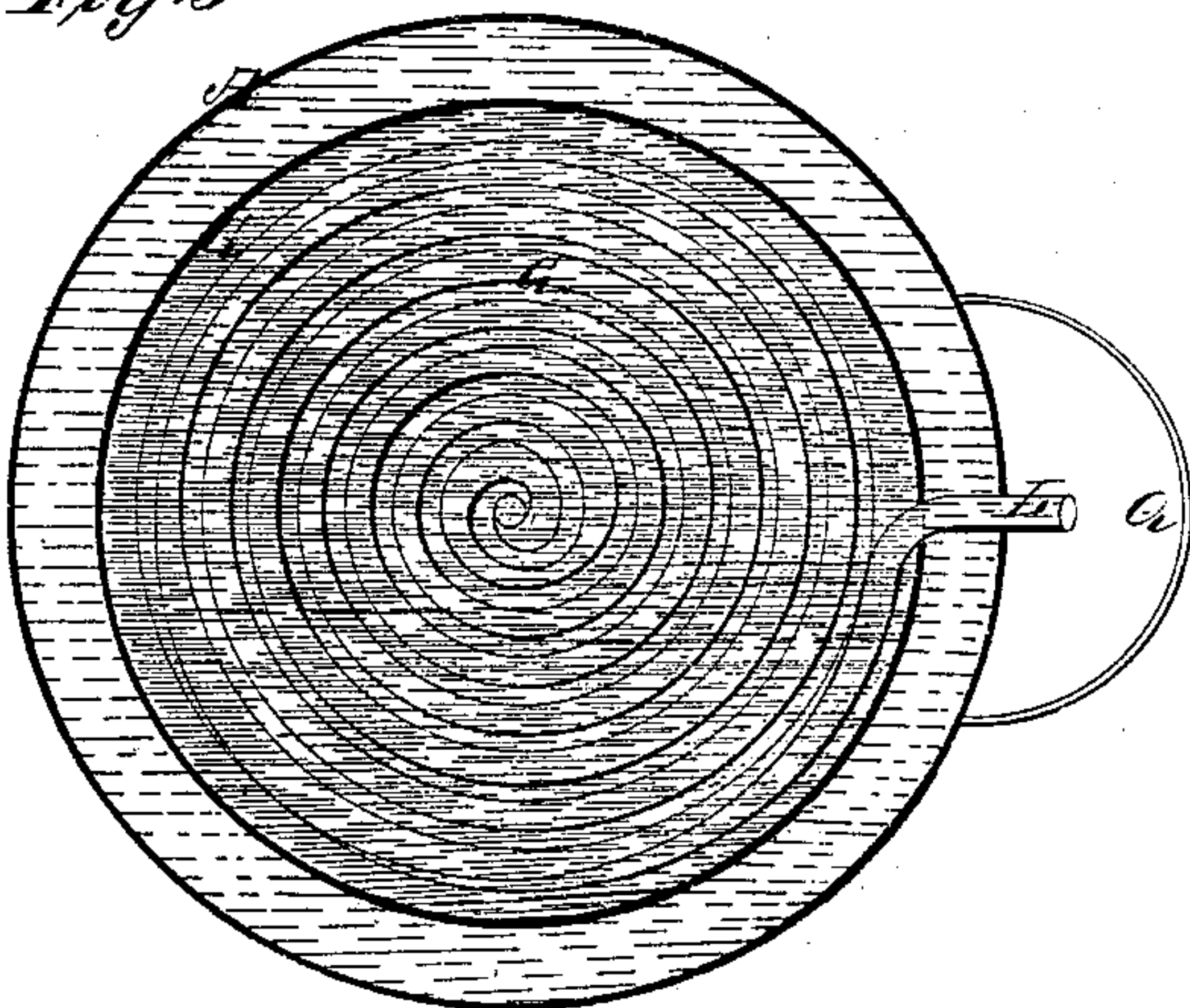


Fig: 7.

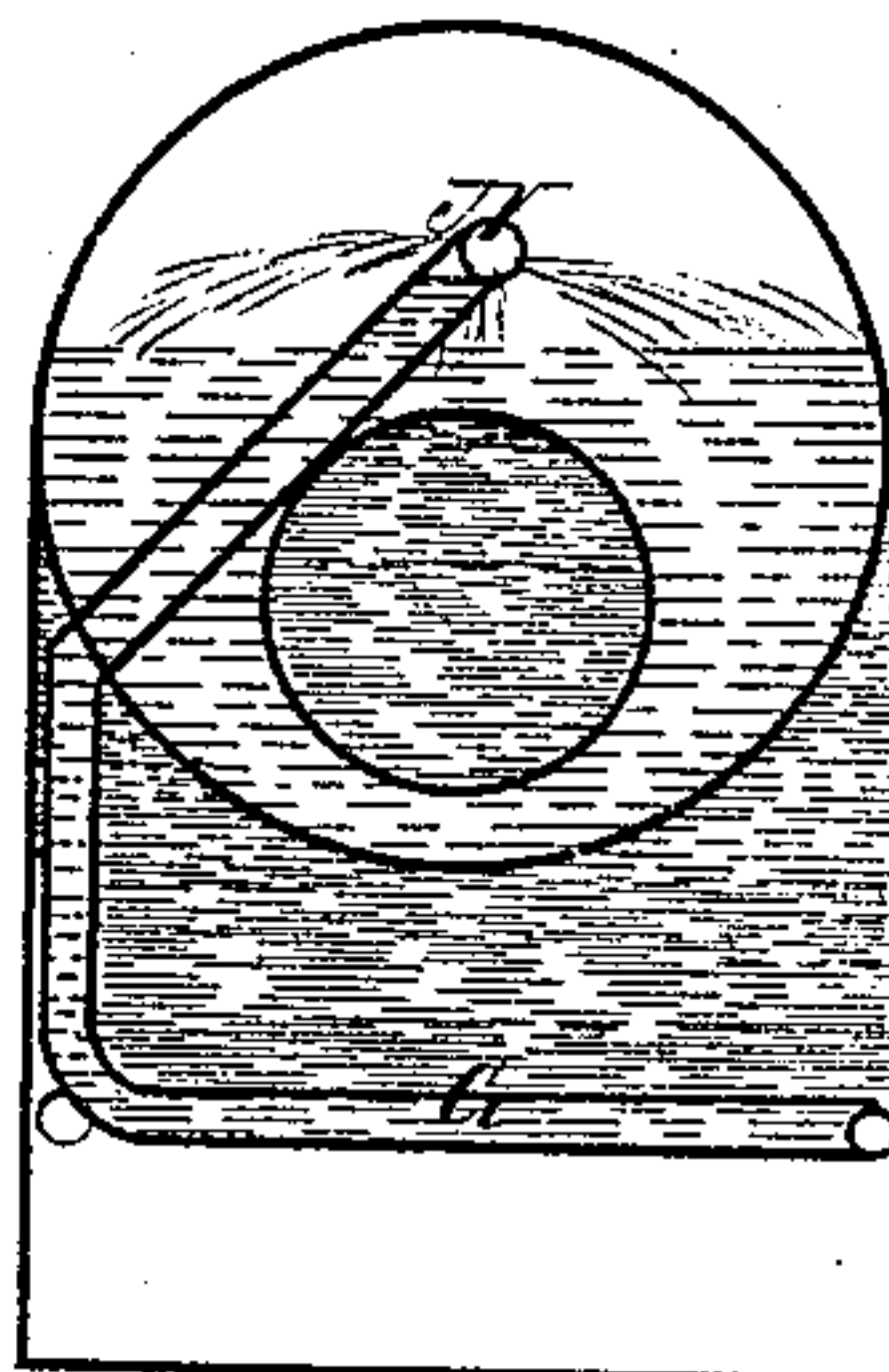
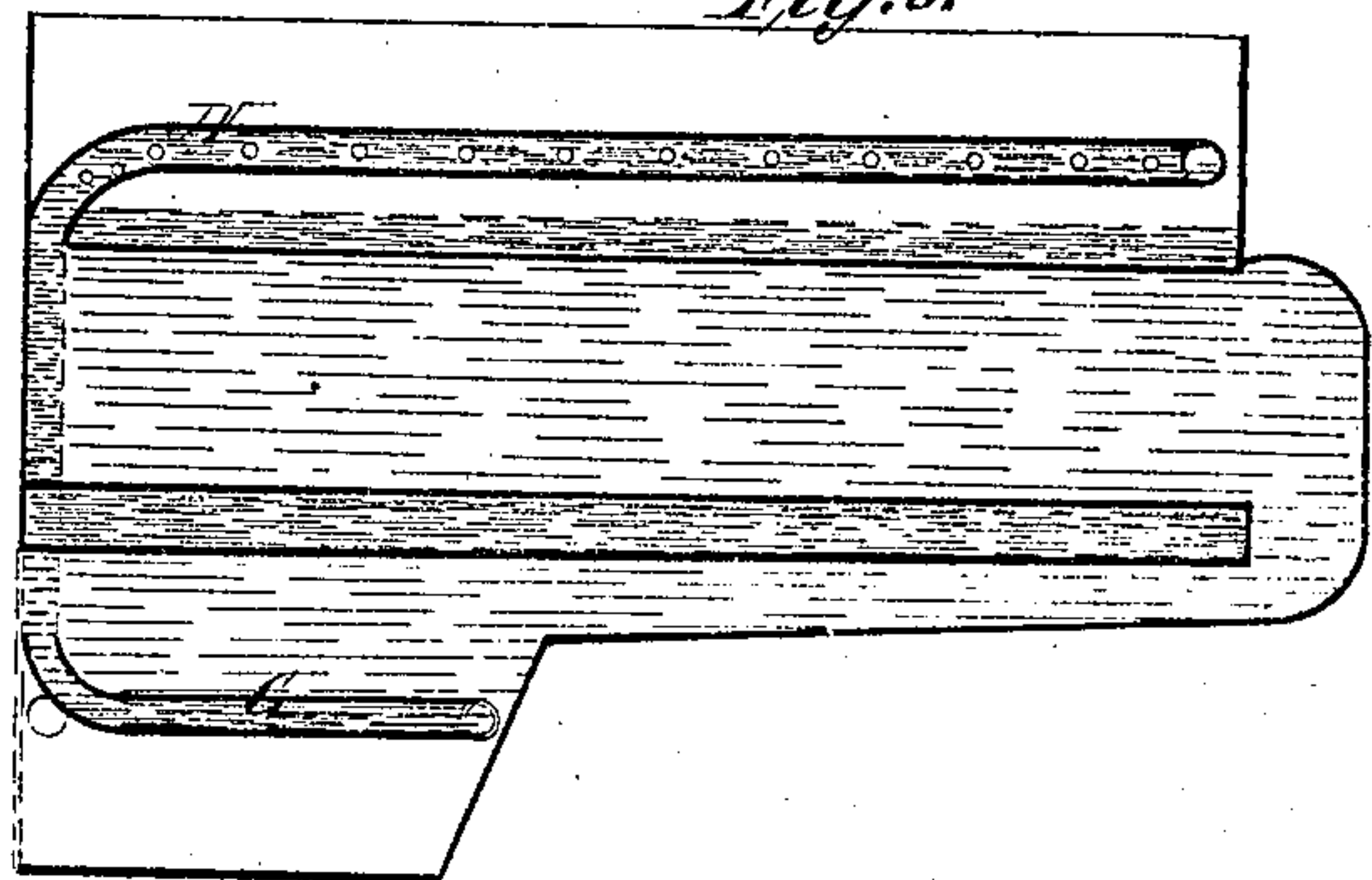


Fig: 6.



UNITED STATES PATENT OFFICE.

THOMAS CHAMPION, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN FEEDING WATER TO STEAM-BOILERS.

Specification forming part of Letters Patent No. **12,993**, dated June 5, 1855.

To all whom it may concern:

Be it known that I, THOMAS CHAMPION, of the city and county of Washington, in the District of Columbia, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and in which—

Figure 1 is a vertical section of a boiler embracing my improvements. Fig. 2 represents an external view of the same. Fig. 3 represents a horizontal section taken at the line *s s* of Fig. 1. Fig. 4 represents a similar section taken at the line *o o* of Fig. 1. Fig. 5 represents a section through the line *R R* near the top of Fig. 1. Fig. 6 represents a side view or elevation of a horizontal-cylinder flue-boiler with my improvement attached. Fig. 7 is a front view of Fig. 6.

My invention consists in placing a hollow tube or tubes within the interior of the boiler above the water-line, made to suit the form of the boiler, having many small exit apertures or fissures made through it at short intervals, so directed as to sprinkle all the inner surface of the boiler that is bare or likely to become bare of water while fire is acting on the opposite sides of the plates.

The boiler shown most conspicuously in the drawing is of the upright variety, and consists of an external shell *A*, which, together with its chimney *B*, may be made of sheet iron. Within this shell there is another shell *C*, the dome of which forms the steam-space, and the space *D* between these two shells conducts the smoke and gases to the chimney *B* and the channel *Q*, to be forced by the exhaust-steam from the pipes *H* and *I* to the ash-pit *W* beneath the grate *G* to supply combustion to the fuel. There is a furnace *K* and a double conical shell *J* and *J*² extending from the bottom to the top of the boiler, uniting with the shell *C* above and below by any suitable means that will insure the requisite strength to the several parts. The flues *E* conduct part of the heat and products of combustion through the water-space *F* from the conical furnace to heat the shell *C* and its dome on the outside, that all the heat may be saved.

The grate *G* of the furnace *K* consists of a scroll, being hollow, and supported upon tubes

or cross-bars in any suitable way. The transverse section of this grate-tube in this instance is round, but may be made of any other form that will suit the purposes of the hollow scroll-grate. I propose to make the grate in one piece with the convolutions regular, commencing at the center and winding horizontally therefrom till a scroll-grate is formed, with one or more coils round above the grate next to the fire-box plates, and then joining its end to a tube *L*, which passes out of the boiler and connects with the feed-pump or supply-pipe, having an aperture through it in the water-space fitted with a valve opening inward, which valve is closed by the pressure of the water passing in from the pump, but will open and admit the water from the lower water-jacket when the pump is not feeding. The inner end of the grate-tube is joined to another tube *M*, which passes up into the steam-space of the boiler and connects with the sprinkling-tube *N*, which is made to suit the size and form of that region of the boiler, pierced with apertures in the proper direction to eject the water in small drops or spray on one side of the plates, where fire is acting on the opposite side above the water, whether it be flue, dome, or any other surface, thus supplying a free communication to the internal surfaces that are otherwise bare of water through the grate and sprinkling-tube, whether the pump is feeding or not. There is another tube *V* attached to the under side of the grate to allow the dirt to settle into, where it may be blown out. The tube *H* is a branch of the exhaust-pipe, which is passed in round the lower part of the fire-jacket *D*, pierced on its upper side with many holes or fissures for the escape of exhaust-steam to assist the draft and mingle with the products of combustion to be forced through the channel *Q* by the exhaust through the branch *I* from the engine beneath the grate round and round.

The advantages of this construction of grate, besides supplying the boiler through it, saving heat, and having no joints in the furnace: Leakage is thereby prevented. It is far more durable, answering all the purposes of a heater, allowing the pump to supply with cold water, which supply is far more certain than when hot water is used, and the cold water passing in through the coils round

and round close to the furnace-plates cools them, and thereby prevents their destruction—a desideratum long sought for in boiler-furnace plates, and it effectually precludes the possibility of cold water suddenly entering the boiler to create an explosion. Neither is it likely to choke with dirt, having a blow-pipe attached below to discharge the sediment.

An aperture X is made in the tube L where it passes through the water-space between the furnace and force-pump, which is fitted with a valve opening inward, which valve will close when the pump is feeding by the pressure upon it, and will open when there is no feed-water passing in from the pump, and admit the water from the leg to flow freely through the grate and tube into the boiler when the pump is not feeding, and this will be caused by the pressure of the water in the boiler at the aperture and valve, assisted by the tendency of the hot water and vapors in the tube to pass upward into the boiler, and this is another advantage incident to the scroll-grate, the circulation of the water in the boiler being continuous and not dependent alone on the action of the force-pump. An exit sprinkling-tube N is placed in the boiler near the top, which communicates below with the pipe, coils, or scroll-grate. Said tube is perforated with many exit-apertures at the proper angles to spray or sprinkle all the internal surfaces that are liable to be overheated by fire acting on the plates above the water, thus preventing all the explosions that take place in consequence of the water on one side of the plates falling below where fire is acting on the other side of the same. The saving of heat and fuel by this arrangement will be immense, and of life and property incalculable. By means of this sprinkler, no matter if the water should be reduced far below the upper fire-surface while the water in the boiler remains above the valve X, there is no danger of explosion, because all the water enters the boiler through the sprinkler.

The tubes H and I convey the exhaust-

steam from the engine in round the lower part of the fire-jacket for the escape of the exhaust-steam through small apertures (in small quantities to assist the draft and mingle with the gases) in the jacket and passage, while the pipe I enters in the cold-air pipe through the chimney, which pipe admits fresh air to enter in round the exhaust-pipe to mingle with the heat, smoke, and gas, all to be forced and mixed with the exhaust-steam from the branch I through the channel beneath the grate round and round, saving all the heat without any loss of power in driving a blower. I have described the scroll-grate as being round, but that need not necessarily be so unless to suit the boiler, as in this instance I propose to make the convolutions oval or approaching the square. I have also made the sprinkling-tube in the form of a circle to suit the present vertical boiler; but I propose to apply this method to long flue-boilers, as shown in the drawings, and to all other forms. I also propose to apply my divisional exhaust-pipe to all other forms with the channel over the top or between or alongside or under horizontal boilers.

Various other modifications may be made in the construction of the several parts without changing the character of my improvements; but as such changes as these are obvious I do not deem it necessary to describe them further in detail.

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

Supplying steam-boilers with all their water through a sprinkler that is connected with the lower water-space and feed-pipe by a valve X at their junction, which allows the water that passes up through the sprinkler to jet the plates when the pump is not acting and so long as any water remains in the boiler above the fire or feed-pipe, substantially in the manner and for the purpose set forth.

THOMAS CHAMPION.

Witnesses:

A. B. STOUGHTON,

THOMAS H. UPPERMAN.