

F. Armstrong.

Boiler Cleaner.

N^o 93,851.

Patented Aug. 17, 1869.

Fig. 1.

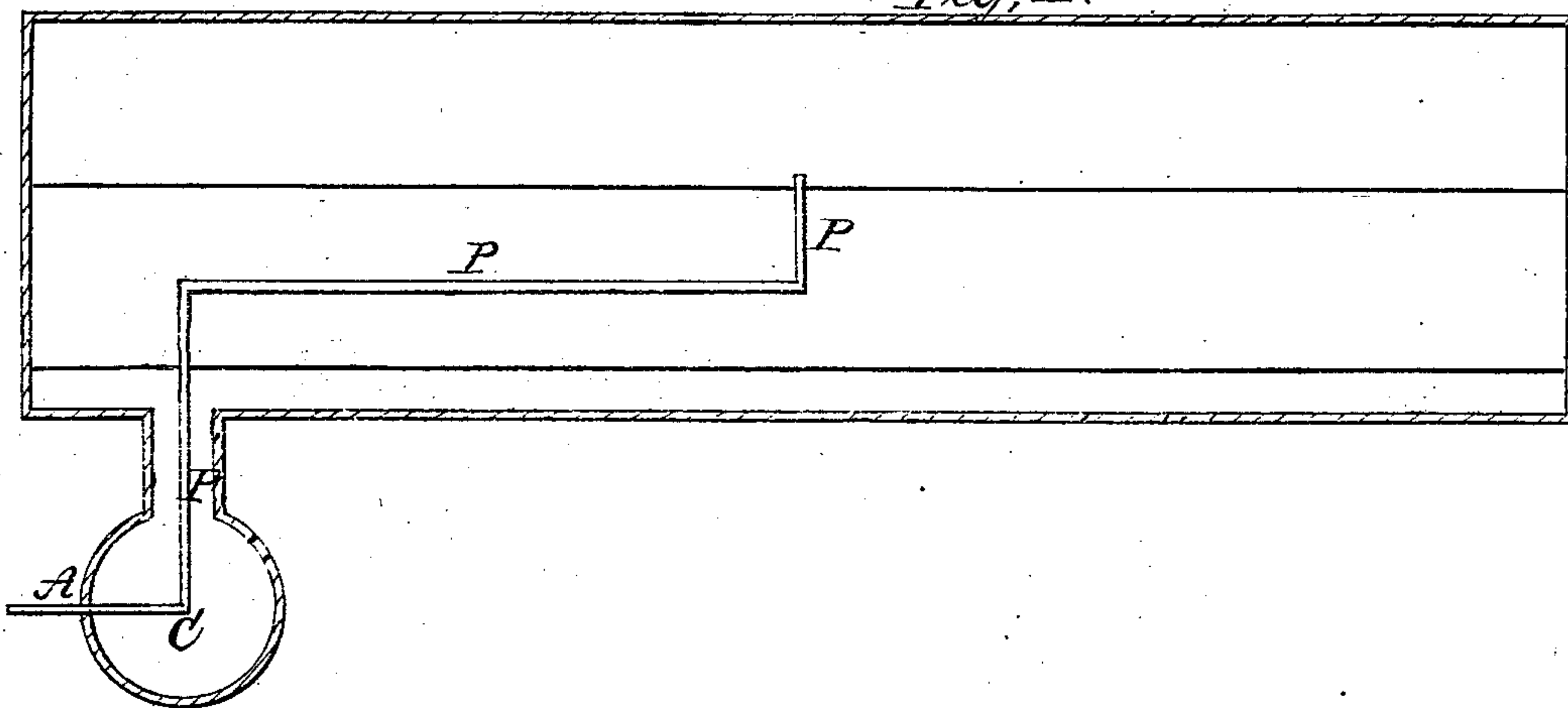


Fig. 3.

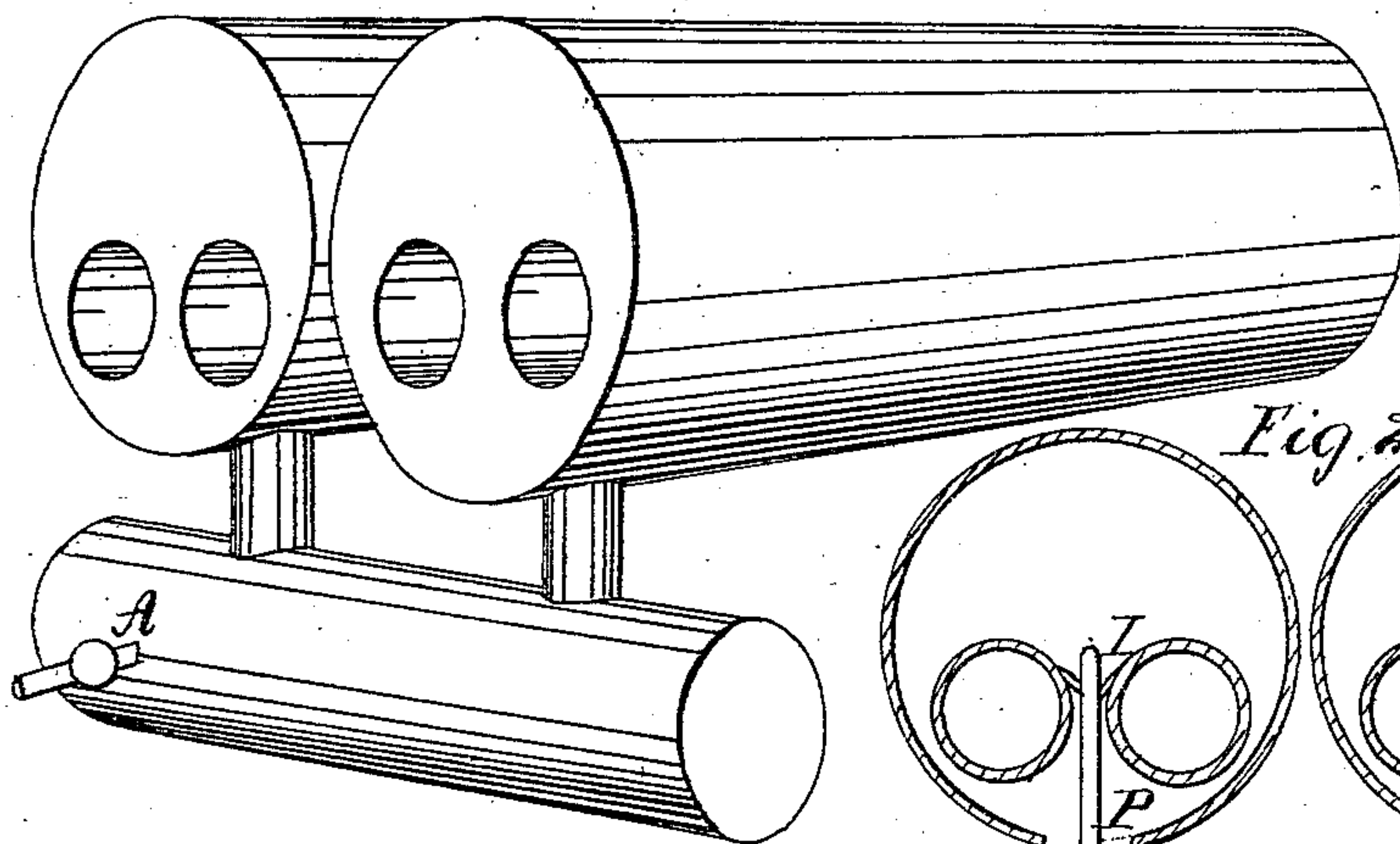
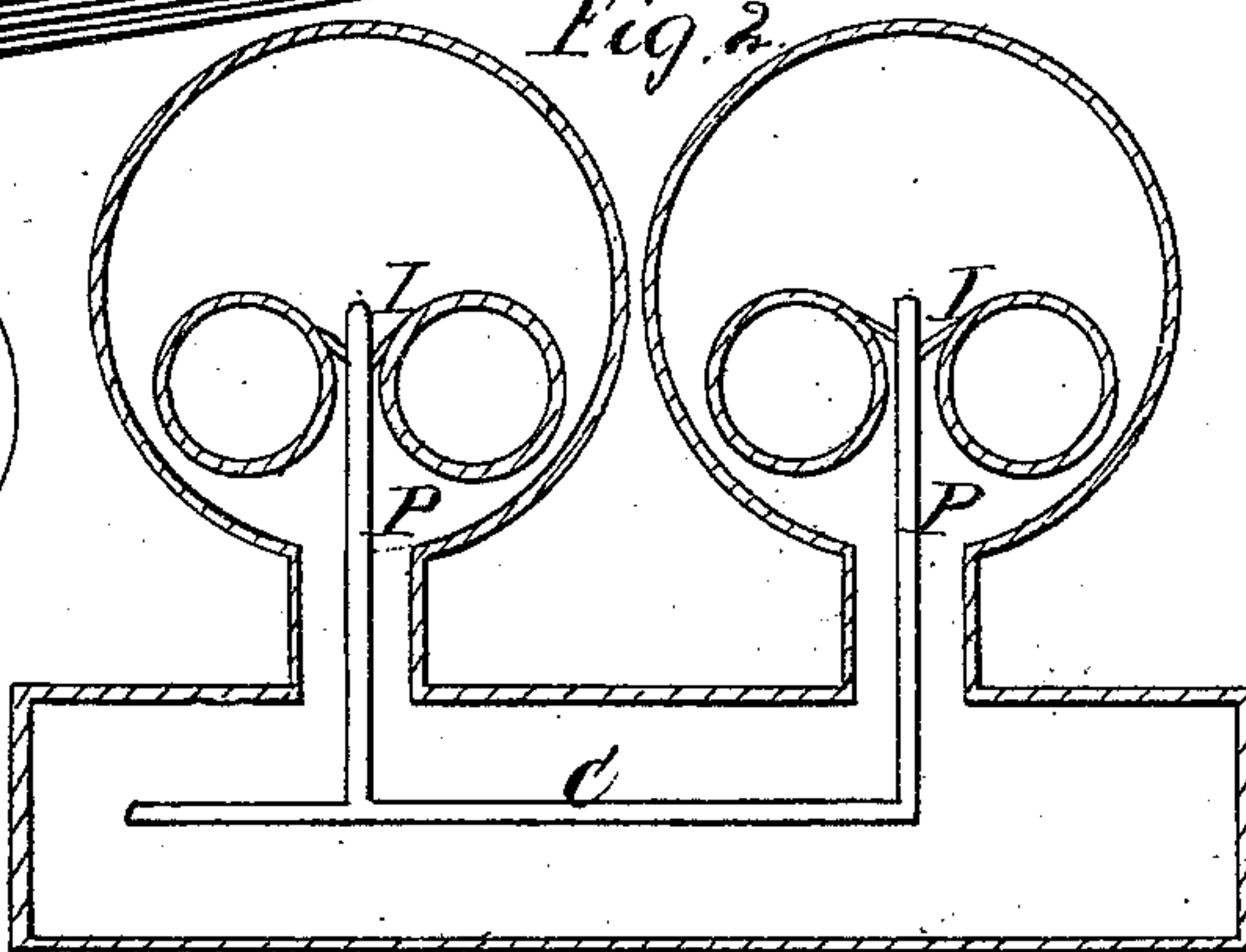


Fig. 2.



Witnesses,

Chas. H. Wheeler
V. D. Burns.

Inventor,

Francis Armstrong
by his attorney

Chas. & Whitman

United States Patent Office.

FRANCIS ARMSTRONG, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 93,851, dated August 17, 1869.

IMPROVED DEVICE FOR RELIEVING STEAM-GENERATORS OF FOREIGN SUBSTANCES.

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, FRANCIS ARMSTRONG, of Pittsburg, State of Pennsylvania, have made a new and useful Improvement for the Surface-Drainage of Water in Steam-Boilers; and I hereby declare that 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, making a part of this specification, the same letters being used to designate the same parts shown in the different figures.

Figure 1 is a sectional side elevation of a double-flue boiler, and

Figure 2 is a cross-section of two boilers of same construction.

Figure 3 is a perspective view.

My invention relates to that class of devices or apparatus which is used for the purpose of removing argillaceous and silicious matters, or any of the various solid substances held in solution or suspension in natural waters, from boilers used for the purpose of generating steam; and

My invention consists in the arrangement of devices hereinafter set forth, whereby to produce a vortex in the water of boilers, which, when applied within the first scope of the conditions hereinafter set forth, will perform the function sought.

In order to form a vortex in a boiler, or other confined places, through the medium of tubing applied thereto, the physical laws require that only a small quantity of water shall be discharged, for if too much is discharged, the evacuation will relieve the water of the pressure under which it labors so suddenly that it must instantly be relieved of a portion of its heat by evaporation, the action of which would agitate the current, and destroy the spiral motion of the particles of water, which is essential to the production of a vortex and requisite to insure vortex action.

The discharge must be small in quantity and slow in action, in order that the pressure exerted upon the water in the tubes, hereinafter described, shall be uniform with that upon the water of the boiler.

It is for this reason that the common surface blow-off used in marine boilers is entirely inefficacious for this purpose of producing vortex action.

The practical application of the devices which constitute my invention, causes a vortex in the water of boilers under certain conditions thereto, so that foreign substances, held in suspension in the water, are conveyed, and thus impurities, which would otherwise settle and form hard incrustations on the boiler-plates, are removed.

In constructing and applying this apparatus, as the drawings indicate, when applied to the common flue-

boilers, and having a mud-receiver placed below their after-ends, a tube, marked *c*, is placed in this mud-receiver, making the main connection for all the tubes going into the boilers.

This tube *c* has a length equal to that required for as many boilers as may be operated on at the same time, and one end, or some part of it, has a branch coming through the mud-receiver, to make the outlet, having a valve, marked *a*, to be opened to allow the drainage to go on, and closed to suspend it.

For each boiler, a branch extends from *c*, marked *P*, passing up through the connection or leg, joining the mud-receiver to the boilers, then passing longitudinally with the boiler to near its centre, having the end turned upward, to present a correct position for the water to enter, having the end held in position by a stay resting on the flues marked *i*.

If the steam is taken out of the boilers, at or near their middle, longitudinally, the pipe *P* must be set away from the influence of the current, which may agitate the surface of the water, and counteract the action of the vortex.

The distance below the water-level for the opening of pipe *P*, will depend considerably on the size of such tube.

One having a diameter of three-fourths of one inch, can be set about six inches below the water-line, and which will have sufficient influence to draw substances on the surface of the water, spreading over a superficial area of eighty to one hundred feet.

The size of pipe *c* should be equal or nearly so to all those of *P* combined, to insure as much uniformity as possible in the discharge from all the boilers.

The mode of operation consists in opening the valve every two or three hours, and for a few minutes each time, and while evaporation is active.

The extent of the drainage necessary to draw the sediment, will establish itself, so as to be understood in a few operations, as different pressures of steam in different boilers will require slight variations in this respect.

After this my description,

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

1. The construction and arrangement of the tubes *P* and *c*, whereby to produce a vortex, substantially as herein set forth.

2. The arrangement of the said tubes with the stop-cock *A*, the mud-drum, and the boiler-flues, as described.

FRANCIS ARMSTRONG.

Witnesses:

JOHN BIRMINGHAM,
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