

(No Model.)

3 Sheets—Sheet 1.

W. D. HOXIE.

PNEUMATIC ATTACHMENT FOR CLEANING STEAM GENERATORS.

No. 585,956.

Patented July 6, 1897.

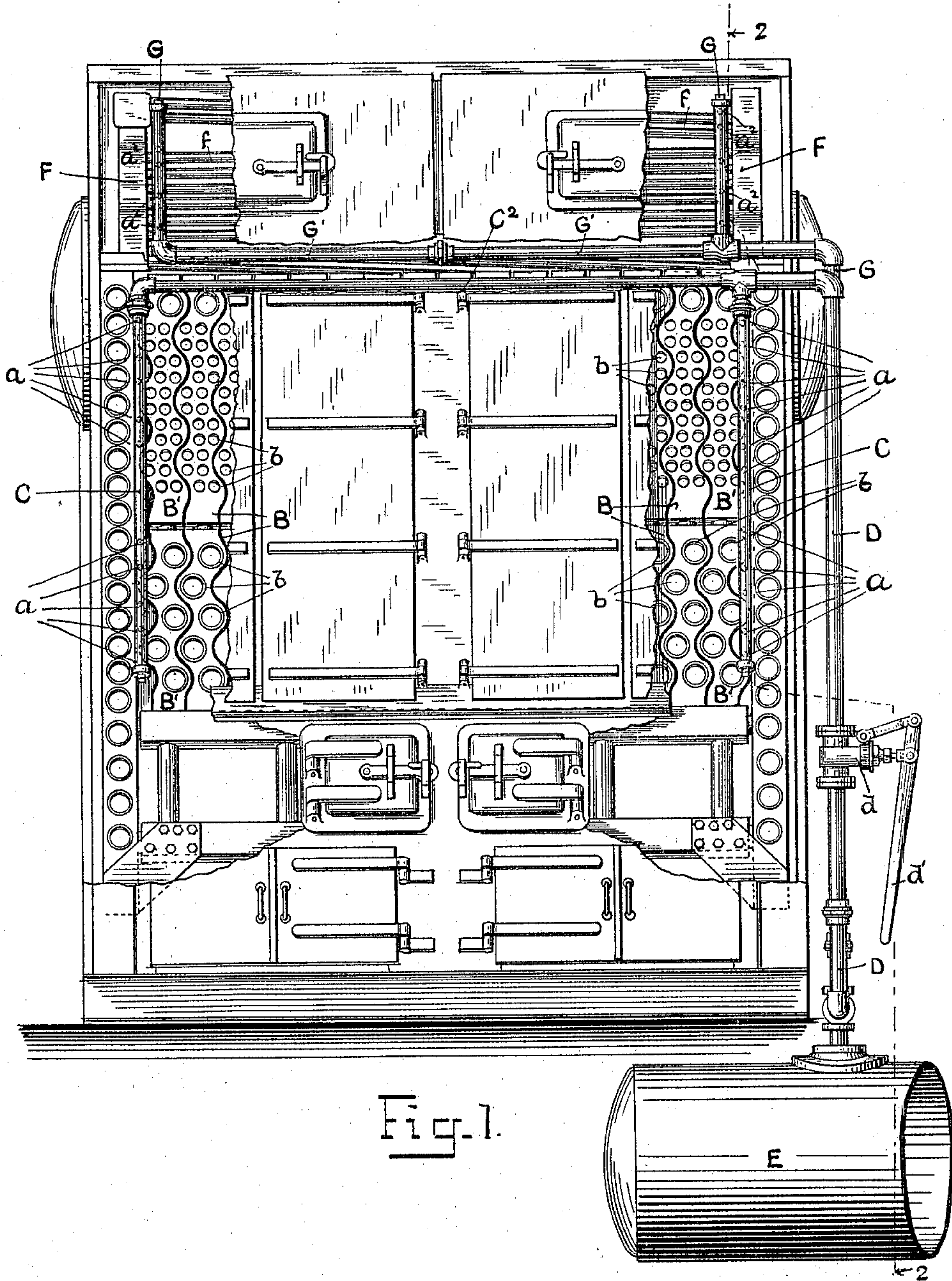


Fig. 1.

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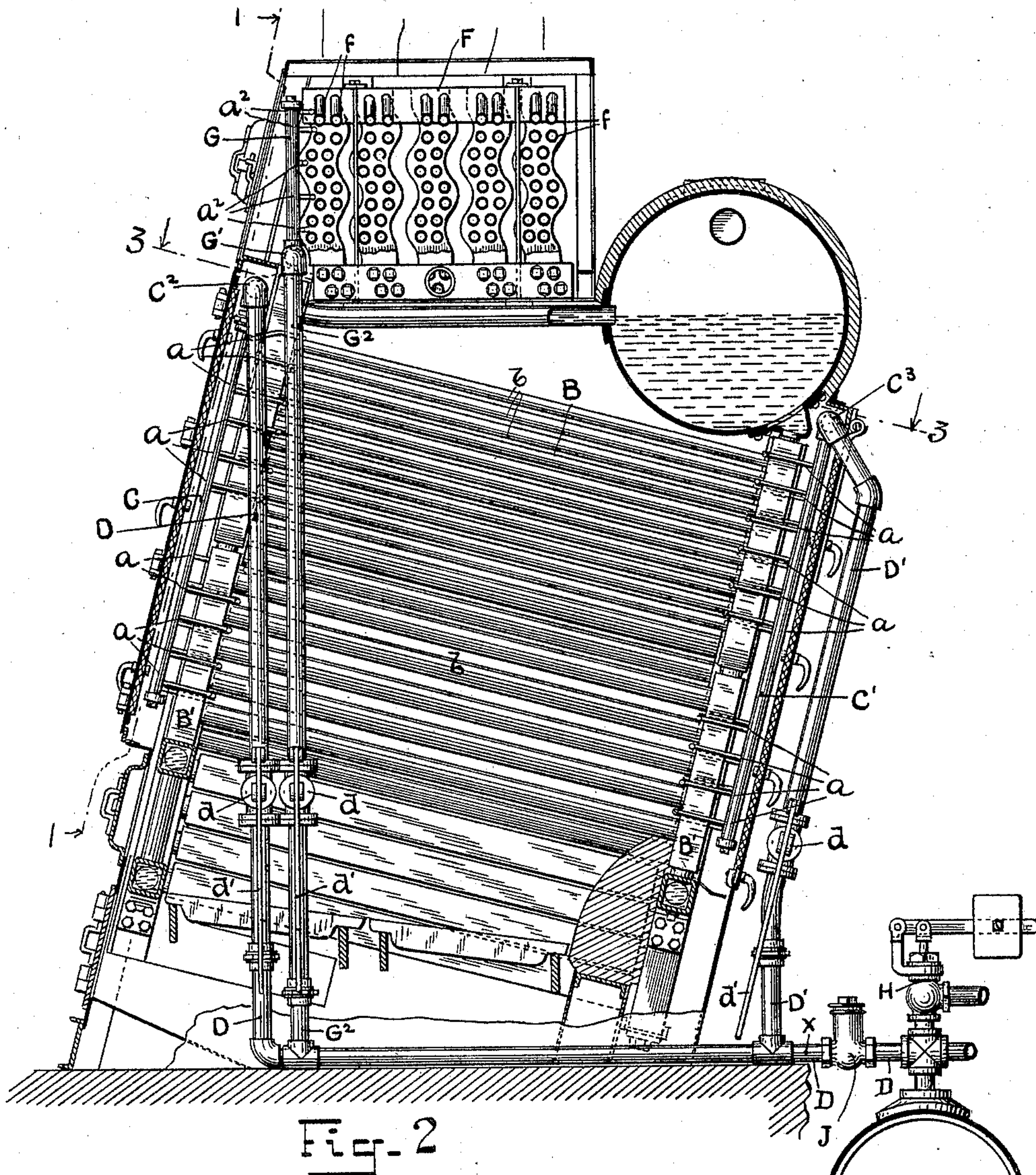


Fig. 2

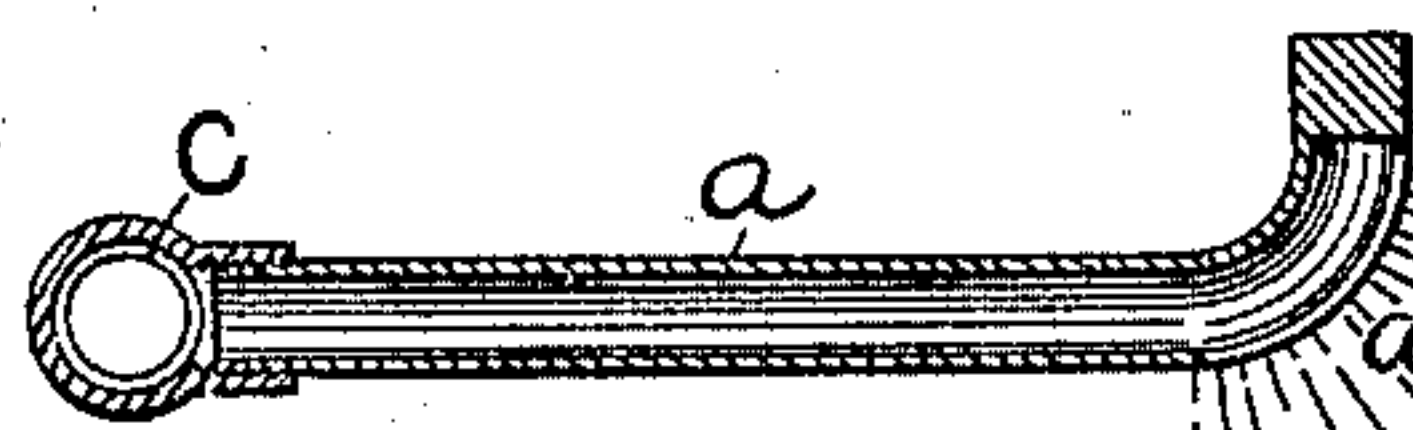


Fig. 4.

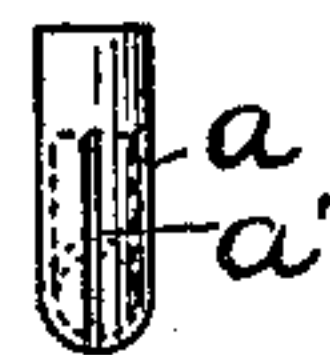
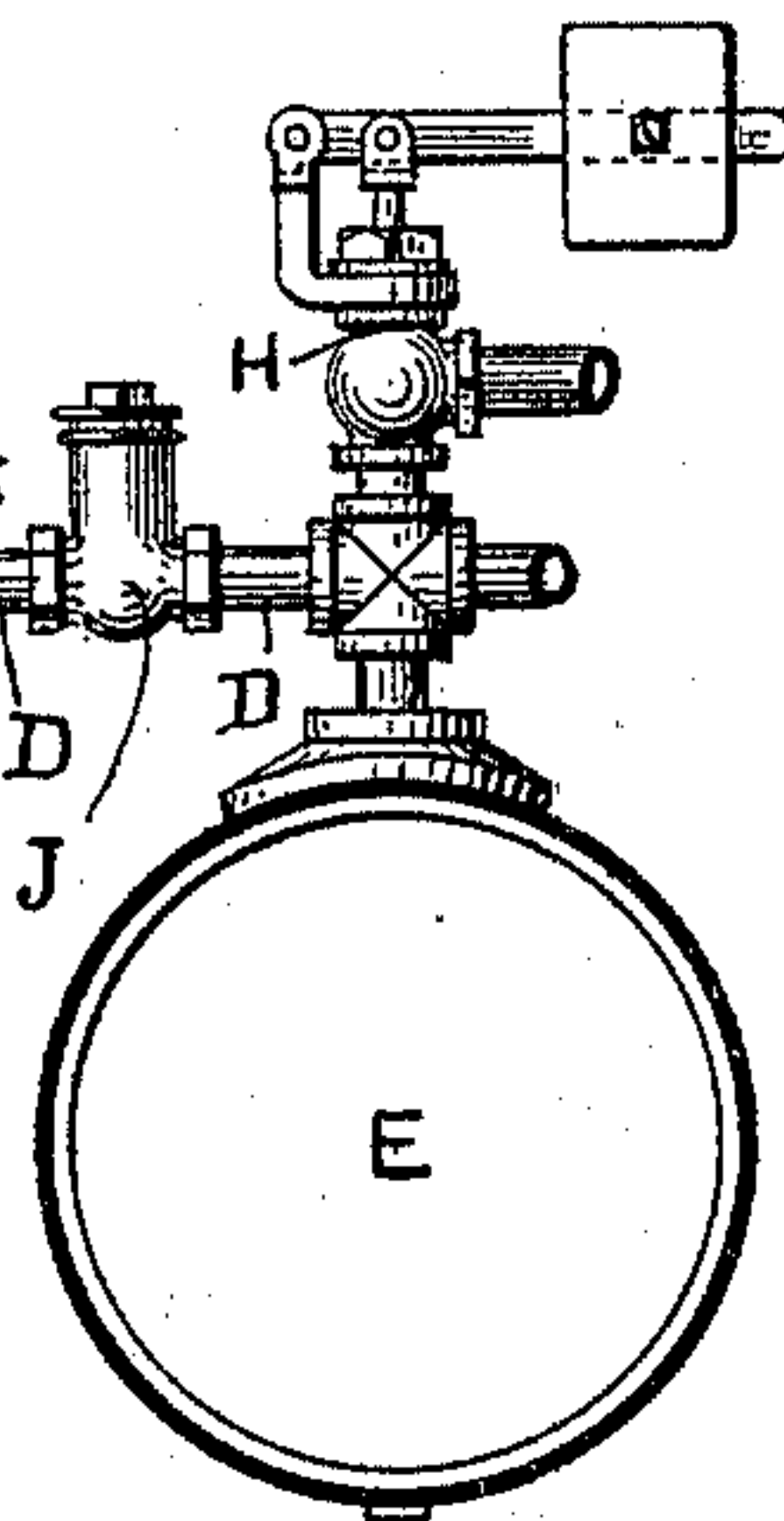


Fig. 5.



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3 Sheets—Sheet 3.

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PNEUMATIC ATTACHMENT FOR CLEANING STEAM GENERATORS.

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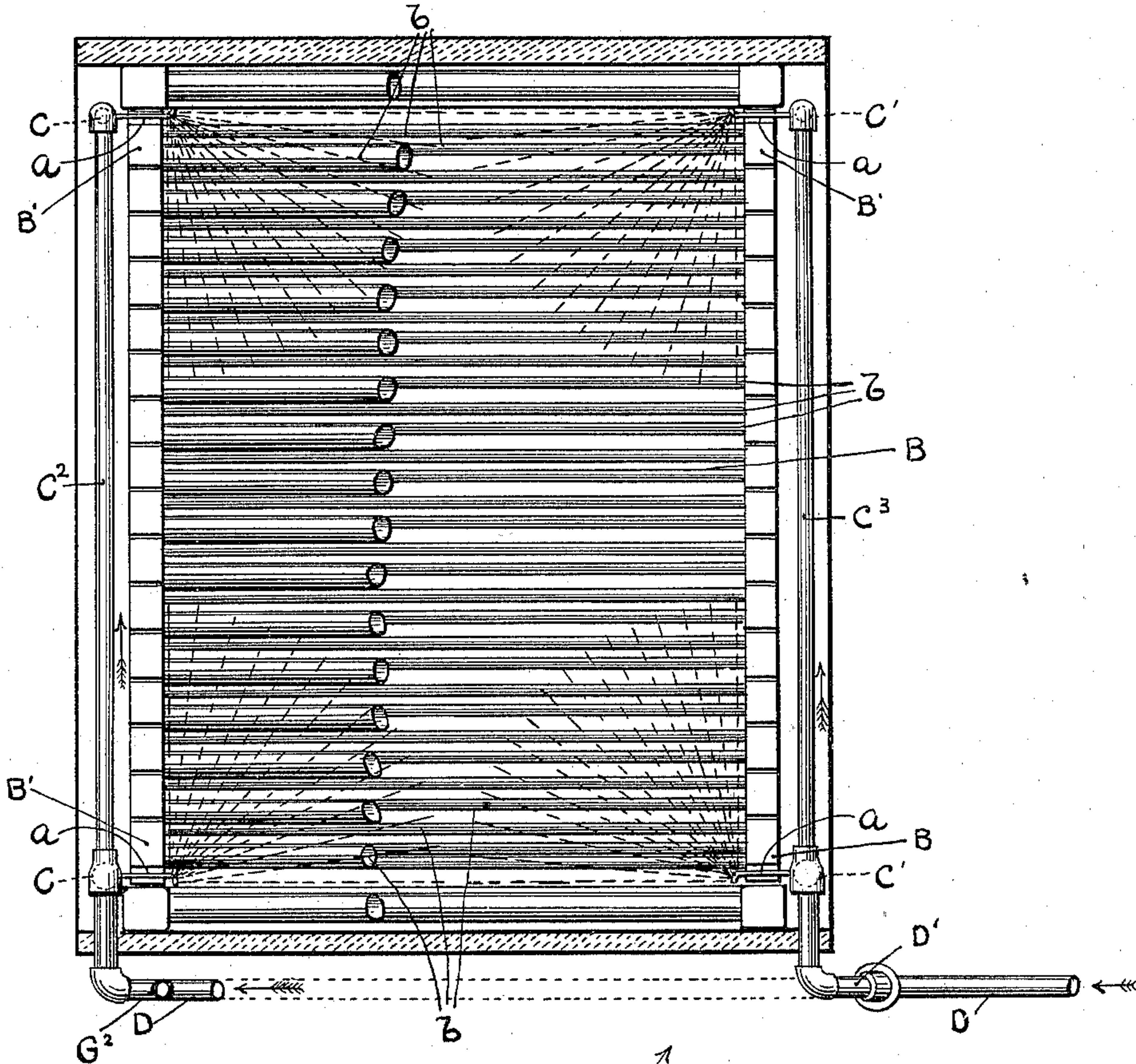


Fig. 3.

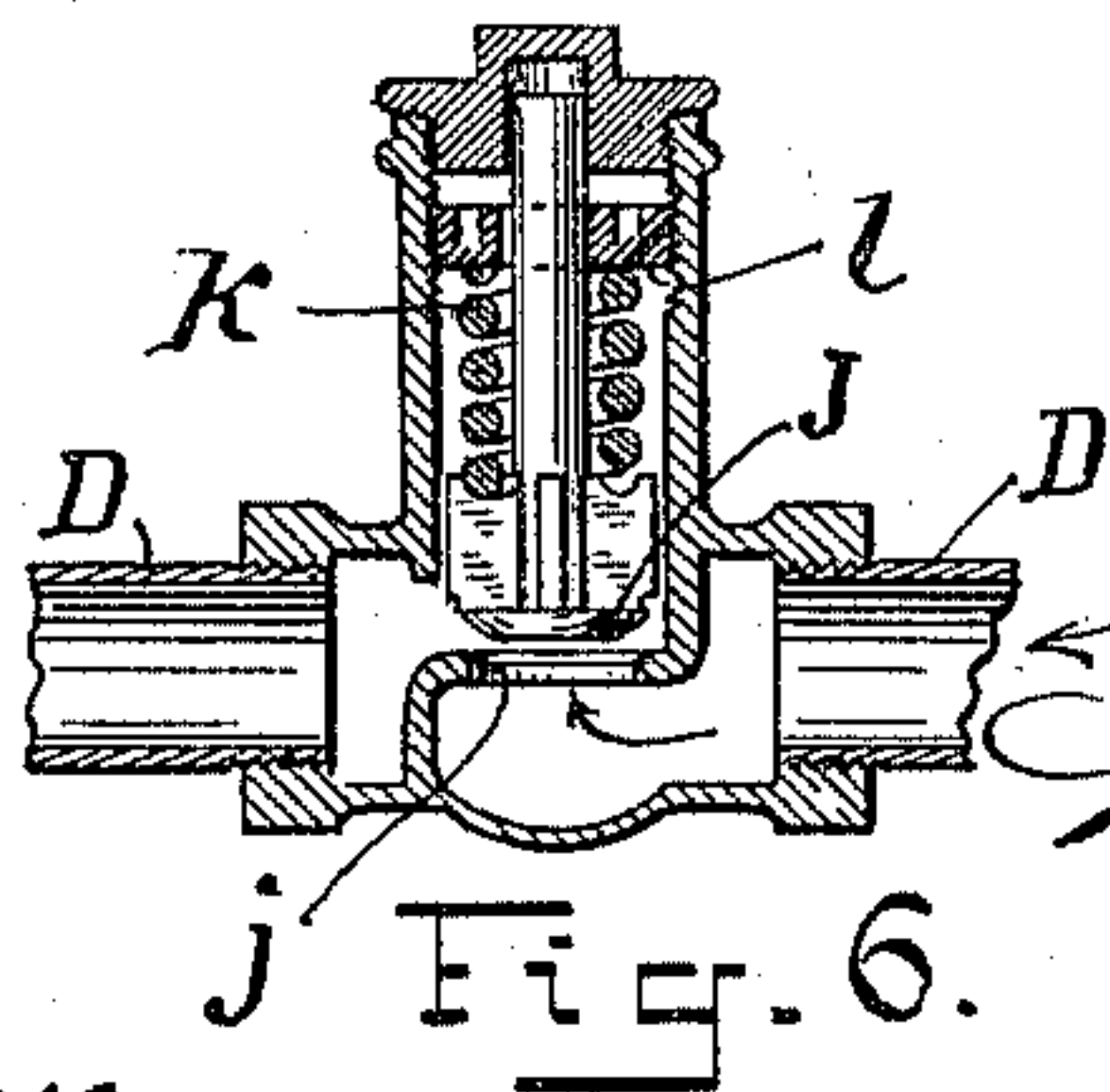


Fig. 6.

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WILLIAM DIXIE HOXIE, OF BROOKLYN, NEW YORK.

PNEUMATIC ATTACHMENT FOR CLEANING STEAM-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 585,956, dated July 6, 1897.

Application filed October 17, 1896. Serial No. 609,184. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DIXIE HOXIE, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Pneumatic Attachment for Cleaning Steam-Generators, of which the following is a specification.

This invention relates to means for cleaning the tubes of a steam-generator, &c., from the soot and ashes which collect upon such tubes.

It consists in arranging in proper position with relation to the surfaces to be cleaned a series of jet-pipes, through which air under pressure can be forced, so as to blow the soot, &c., from the surfaces of the tubes.

The invention is not only applicable to the tubes composing a sectional steam-generator and to the feed-water pipes thereof, upon the exterior surfaces of which soot and ashes collect, but may also be applied to various forms of generators, as to a tubular boiler of the class composed of a cylindrical shell through which run tubes for conveying the heated products of combustion, upon the interior surfaces of which tubes the fouling takes place.

The object of the invention is not only to clean the tubes, but to enable the work to be done while the boiler is steaming or in use and without the necessity of opening any portion of the casing or setting of the boiler, which opening would allow of the escape of heat.

For the purpose of illustrating and describing the invention a steam-generator of the sectional type and having a sectional feed-water heater has been chosen, it being deemed unnecessary to show all the various forms to which the improvement is applicable, as the application to other forms than that shown will be readily understood by those skilled in the art.

In the accompanying drawings, Figure 1 represents a front view of a sectional steam-generator and feed-water heater to which the invention is applied, portions of the casings which inclose the front of the same being broken away. Fig. 2 shows a vertical longitudinal section of the same on line 2 2 of Figs. 1 and 3. Fig. 3 represents a substan-

tially horizontal section on line 3 3 of Fig. 2. Fig. 4 shows one of the jet-pipes of preferred form in longitudinal section and on a larger scale. Fig. 5 represents an end view of the air-delivery portion of such pipe. Fig. 6 shows a vertical section through the valve for automatically preventing an escape of air from the reservoir when the pressure therein is reduced below a certain point.

As shown in Figs. 1, 2, and 3, four vertical series of jet-pipes *a* are arranged at the four corners of the boiler *B* and outlying the outside "headers" *B'* thereof, such pipes extending substantially parallel with the tubes *b* of the boiler and beyond the inner faces of the headers. Preferably the delivery ends of these pipes are curved, as particularly shown in Fig. 4, and the convex portion of the curve is perforated to allow the escape of air under pressure, the perforation preferably being in the form of a slot *a'* of sufficient length to allow the air to escape over one-fourth the area of a circle, more or less. Several such slots may be provided, however, or several holes of other forms may be made in such end of the pipes, as will be readily understood.

The outer ends of each of the series of jet-pipes are respectively connected to pipes *C C C' C'*, the front ones *C C* of which are shown as joined at the top by a pipe *C²* and the rear ones by a pipe *C³*. An air-supply pipe *D* is shown as extending from a compressed-air reservoir *E* and connecting with the front pipes and an air-supply pipe *D'* as connecting with the rear pipes; but it is evident that any suitable pipe connections between the reservoir *E* and jet-pipes *A* may be made.

In order to govern the admission of air to the jet-pipes, the pipes *D* and *D'* are furnished with valves *d*, those shown being of the "gate" pattern and being opened and closed by levers *d'*. A valve upon each of said pipes is deemed preferable in order that a comparatively small reservoir *E* may be used, though it is evident that a single valve located on the pipe *D* anywhere between the reservoir and the pipe *D'* may be employed to govern the entrance of air to the front and rear series of jets.

For the purpose of cleaning the tubes *f* of the feed-water heater *F* two series of jet-pipes *a²* are shown as employed, one at each end of

the heater, the outer ends of which pipes are respectively connected to pipes G G. A pipe G' is shown as connecting the pipes G G, which are supplied with air through a pipe G², branching from the pipe D and having a controlling-valve *d*, as particularly shown in Fig. 2. Any suitable pipe connections between the reservoir E and jet-pipes *a*², however, may be employed.

10 The number and location of the jet-pipes to be combined with a generator, &c., will depend upon the number and shape of the tubes to be cleaned. In the boiler illustrated it is evident that a greater number of jet-pipes
15 than shown may be used, that they may be located elsewhere than as illustrated, and that additional series of them may be placed intermediate the length of the boiler, if desired.

20 The reservoir E may be charged to the desired pressure by any suitable means, (as an air-pump, not shown,) and is preferably supplied with a safety-valve, as H, Fig. 2.

As a certain pressure of air is needed to
25 effect a cleaning of the tubes, it is desirable that automatic means be employed to prevent an escape of air from the reservoir after the pressure therein has been reduced below such effective point and a wasteful blowing of air
30 be prevented as well as time saved in recharging the reservoir. The means shown for this purpose consist of a valve J, Fig. 6, which is forced toward its seat *j* by a spring *k*. If desired, a nut *l* may surround the stem
35 of the valve and be screwed into the casing thereof to regulate the pressure of the spring, which pressure is designed to close the valve when the air-pressure in the reservoir falls below the effective point. It is evident that
40 so long as the pressure in the reservoir exceeds that of the spring *k* air will pass through the pipe D (one or more of the valves *d* being open) until the pressure of air becomes less than the force of the spring, when the spring

will close automatically and prevent further 45 and useless blowing.

When it is desired to clean the tubes, the reservoir is charged and the valves *d* are opened in succession, such time being allowed to elapse between the several openings as will 50 enable the reservoir to be desirably recharged if it be a small one. The blasts of air from the perforated ends of the jet-pipes will remove the soot and ashes from the tubes and cause the same under influence of the usual 55 draft to pass to a soot-chamber, from whence removal can be effected, or into the smoke-stack or other especially-arranged conduit.

What I claim as my invention, and desire to secure by Letters Patent, is— 60

1. A steam-generator provided with a pneumatic apparatus for cleaning its interior, connected directly therewith and composed of a suitable air-compressor, a series of jet-pipes 65 directed to such parts of the generator as desired, valves for governing the admission of air under pressure to such pipes, and means for automatically shutting off the air when the pressure falls below a predetermined point, substantially as set forth. 70

2. A steam-generator provided with a pneumatic apparatus directly connected with the generator and forming a part of the same whereby its interior may be cleaned during the use of the generator and while closed as 75 set forth.

3. A steam-generator provided with a pneumatic apparatus for cleaning its interior connected directly therewith and composed of a suitable air-compressor; a series of jet-pipes 80 directed to such parts of the generator as desired, and suitable valves for operating and regulating the same, as set forth.

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