

D. M. Nichols.

Steam Generator.

N^o 91,255.

Patented Jun. 15, 1869.

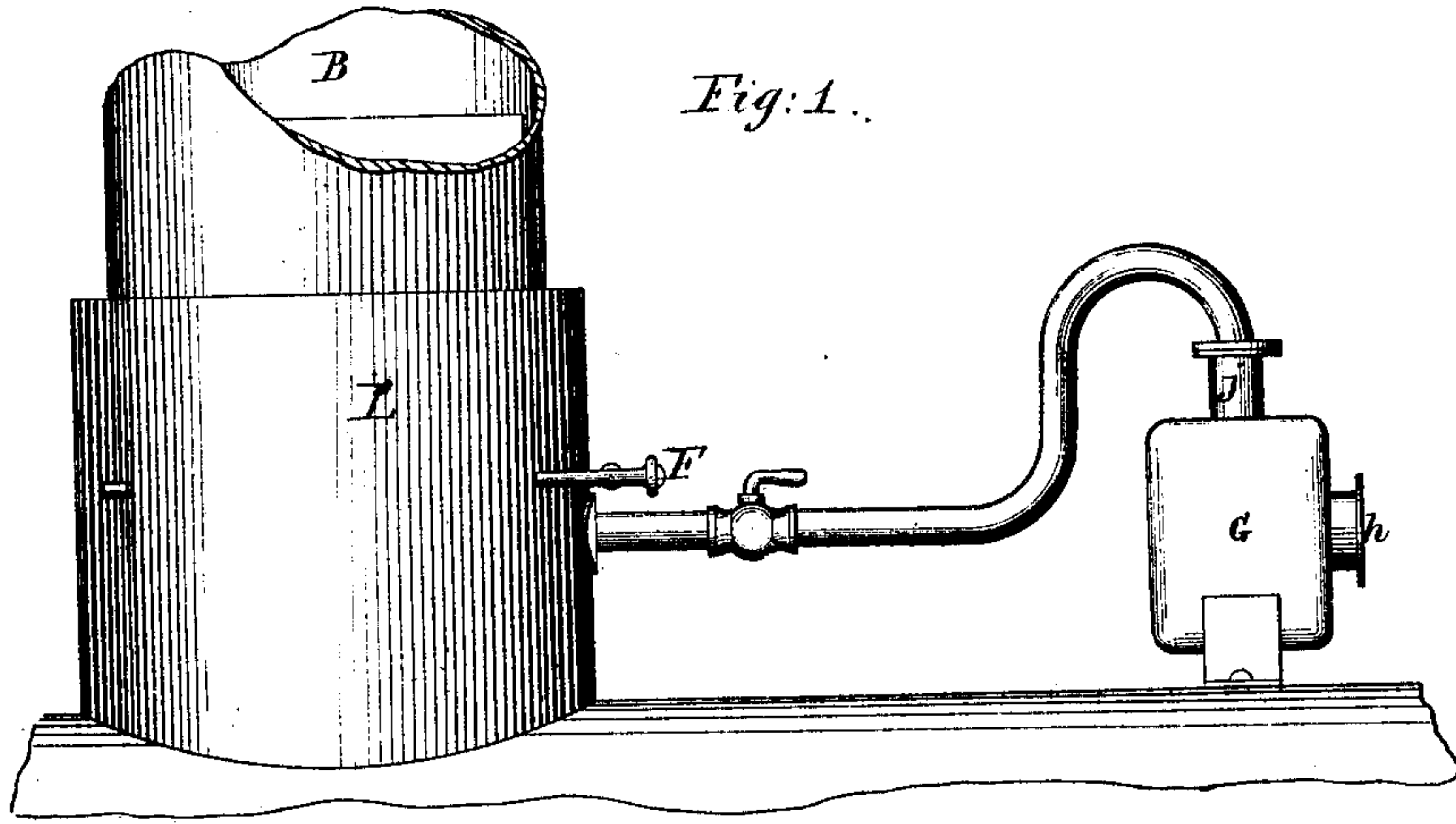


Fig: 1..

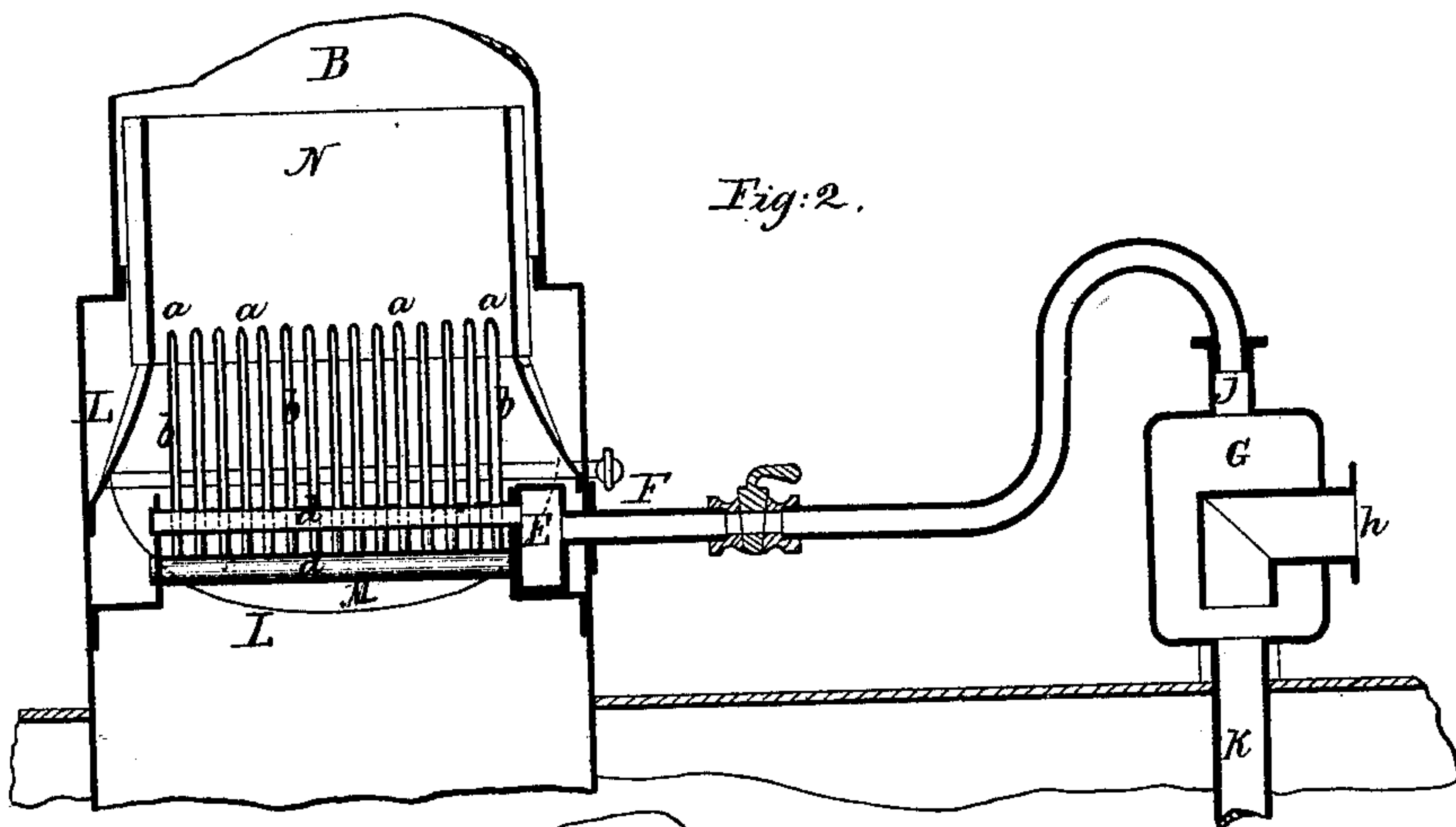


Fig: 2.

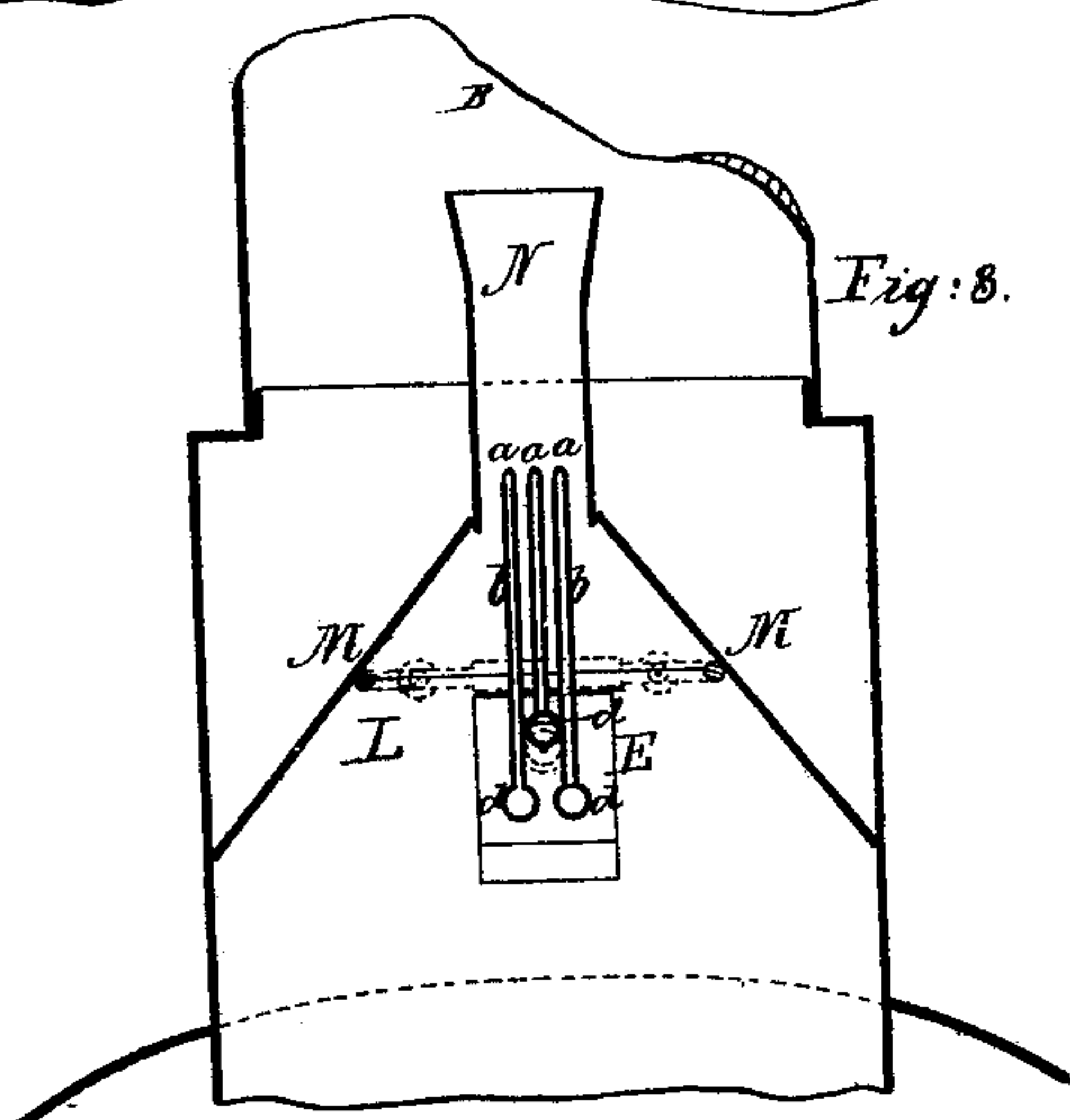


Fig: 3.

*Witnesses;
H. L. Bennett
C. Rathbone Jr*

*Inventor,
D. M. Nichols
Per C. L. Kendrick, Atty*

United States Patent Office.

DAVID M. NICHOLS, OF NEW YORK, N. Y.

Letters Patent No. 91,255, dated June 15, 1869.

IMPROVEMENT IN STEAM-JET DEVICES FOR 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, DAVID M. NICHOLS, of the city, county, and State of New York, have invented certain new and useful Improvements in Steam-Jets, for the purpose of exciting a draught of air or gases; and I declare that the following is a full, clear, and exact description and specification of my said invention.

The invention which constitutes the subject-matter of this patent relates to the steam-jet used for the purpose of accelerating the current of air in the flues of steam-boilers, and for other purposes.

The invention is divided into parts or improvements, the first of which consists of the combination of the steam-jet with a separator, which separates the dry steam from the spray of water and sediment carried off from the boiler with it, so that the jet is supplied with dry steam, and the water is returned to the boiler.

This improvement greatly improves the practical operation of the steam-jet, particularly when the boiler is fed with unclean water, as the sediment, that passes off with the spray of water mixed with the steam, is separated from the steam; consequently the obstruction of the nozzles of the steam-jet by a coating of sediment is effectually prevented.

The second part of my invention consists of the combination of the steam-jet and separator with a valve or valves, by means of which the passage or passages for the escape of the current of gases may be contracted while the steam-jet is in operation, so as to concentrate the action of the nozzles of the jet upon the air or gases on which the steam is to act.

My improvements are embodied in the steam-jet represented in the accompanying drawings, in which—

Figure 1 represents a side elevation of a portion of a boiler-funnel with my improvements applied thereto;

Figure 2 represents a longitudinal section of the same; and

Figure 3 represents a vertical transverse section of the funnel and its appurtenances.

The steam-jet represented in the accompanying drawings consists of a series of nozzles, *a a*, from which the steam is discharged in an upward direction in the funnel B.

Each nozzle is formed, at the upper end, of a pipe, *b*, which communicates, at its lower end, with a horizontal supply-pipe, *d*.

In the present example there are three of these supply-pipes *d d d*, one for each row of nozzles, and these three pipes are connected with a header or distributing-box, E, which is supplied with steam by means of a pipe, F.

The separator G is placed between the nozzles *a* and the boiler, whence the steam is taken. It consists of a box or chest, fitted with three pipes, one, *h*, to convey steam into it, a second, *j*, to conduct the

dry steam to the steam-jet, and the third, *k*, to drain off the water.

This last issues from the lower part of the separator, and the supply-pipe *h* is turned downward in the box, so as to give the current of mixed spray and steam, that enters by it, a downward direction.

The drain-pipe *k* should communicate with the interior of the steam-boiler some distance below the water-level, and by preference near its bottom, so that the passage of water down it will not be obstructed by the ascent of steam.

The supply-pipes *d d d* of the steam-jet are arranged at different levels, so that the horizontal area of the flue at any pipe is greater than it would be if all the pipes were at the same level; and these pipes are arranged in an enlarged portion, L, of the flue or funnel, which is made so much larger than the regular funnel B, that the clear effective area for the passage of gases (notwithstanding the presence of the supply-pipes) is fully as great as the area of the funnel.

The funnel is fitted with two valves, M M, which, when closed, contract the area, so that the effect of the steam-jet is concentrated upon the gases or air in its immediate vicinity; and the effect of the jet is increased by surrounding it with a casing or pipe, N, through which the gases are compelled to pass when the valves are closed.

When the jet is not in operation, the valves may be opened by operating their levers, so as to render the whole area of the flue available for a natural draught.

The operation of the separator is as follows:

The current of mixed steam and spray of water, entering by the steam-pipe *h* into the large space of the separator, is permitted to spread out, and consequently its speed is reduced sufficiently to permit the water and sediment to drop by gravity, and drain out by the drain-pipe *k*, while the dry steam passes off to the steam-jet.

The downward turn of the supply-pipe in the separator facilitates separation, as the watery particles, when once directed downward, do not tend to rise again with the steam.

If the current entering the separator be not directed downward, care should be taken to arrange the steam-delivery aperture *j* out of the direct path of the current entering the separator, so that the latter may be diffused by contact with the side of the separator opposite its entrance.

The form and construction of the separator may be greatly varied, and if preferred it may be arranged in the steam-space of the boiler, so that it will be kept hot to prevent condensation in it.

So also the form of the steam-jet, and number and form of the nozzles of which it is composed, may be varied, as circumstances render expedient.

I do not claim the steam-jet by itself, nor the sepa-

rator by itself; nor do I claim severally the other members of my new combinations; but

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

1. The combination of the steam-jet with a separator, for separating the steam from the water which is mixed with it, substantially as before set forth.

2. Also, the combination of the steam-jet and separator with a valve, to contract the passage for the

escape of the current of gases, substantially as before set forth.

In testimony whereof, I have hereto set my hand, this 11th day of October, A. D. 1867.

DAVID M. NICHOLS.

Witnesses:

MELVILLE BIGGS,

J. RATHBONE, Jr.