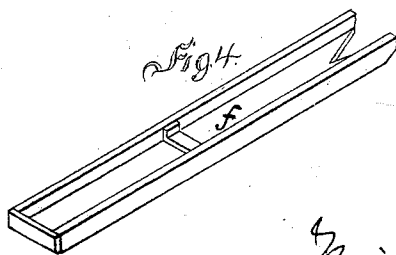
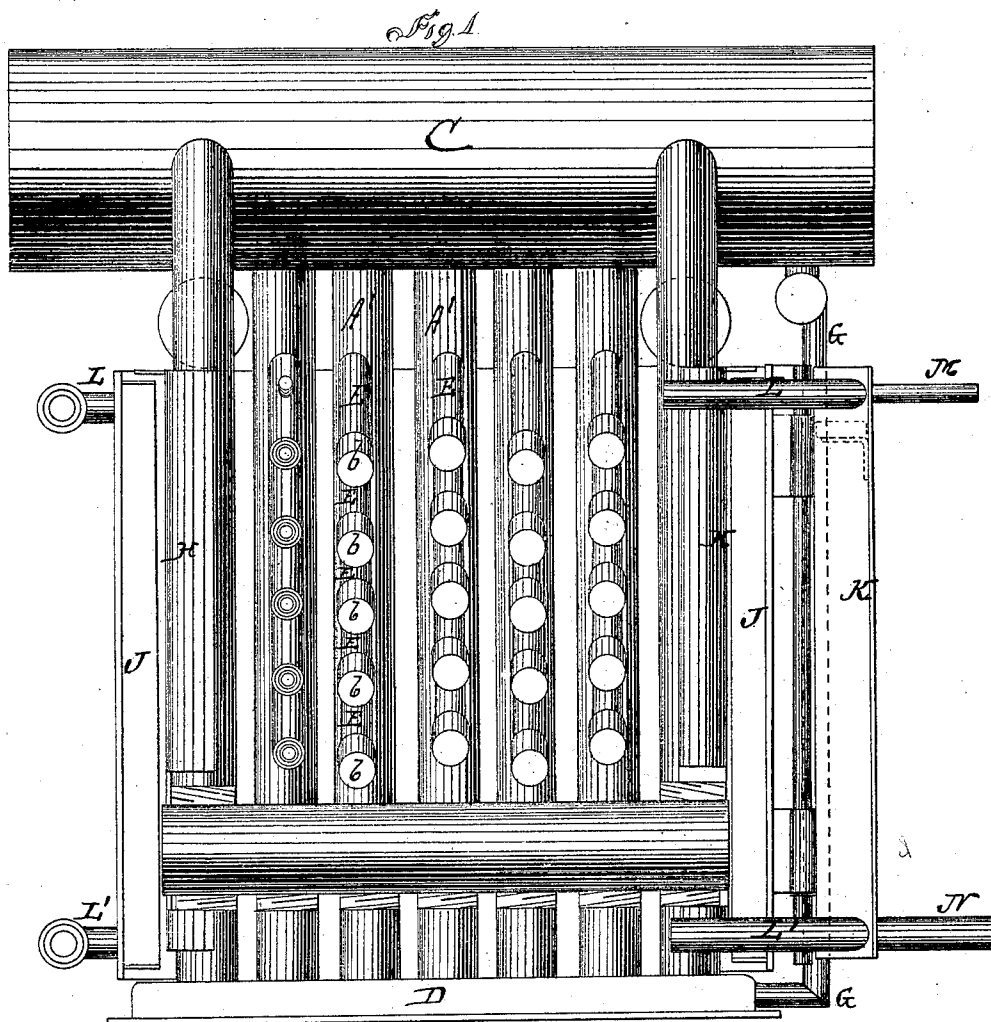


M. N. LYNN.

Improvement in Steam Generators and Feed Water Heaters.

No. 122,042.

Patented Dec. 19, 1871.



Witnesses:

James C. Hutchinson
C. L. Gaert.

Inventor

Mirabeau N. Lynn
per Alexander Mason

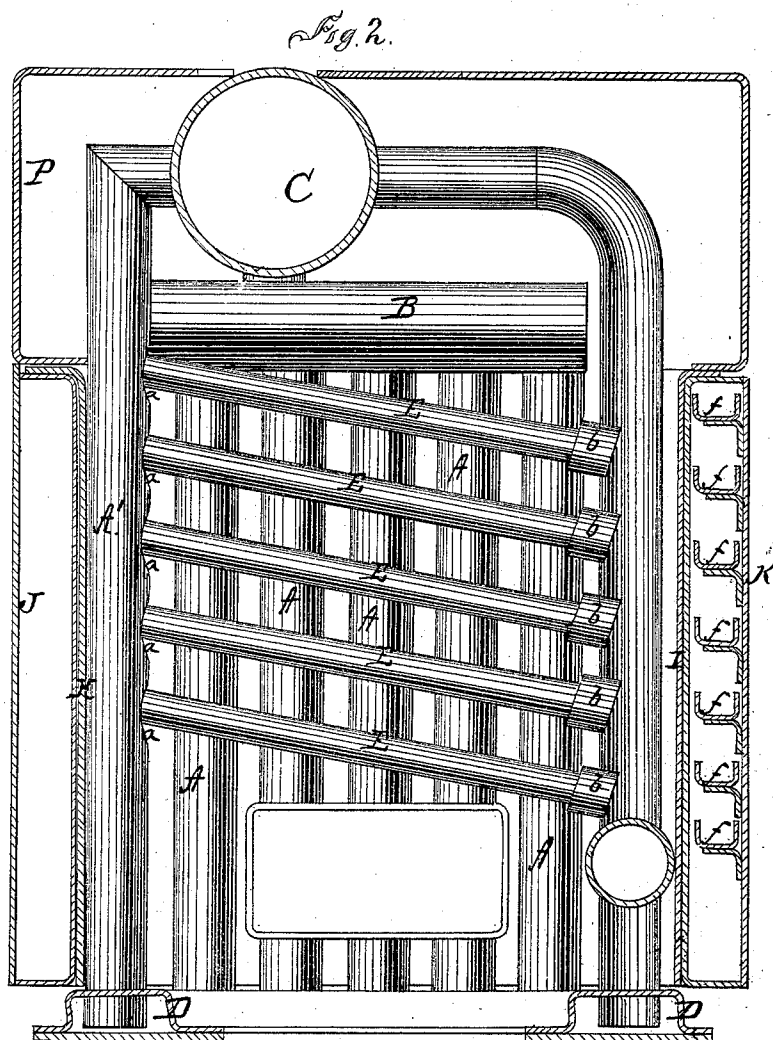
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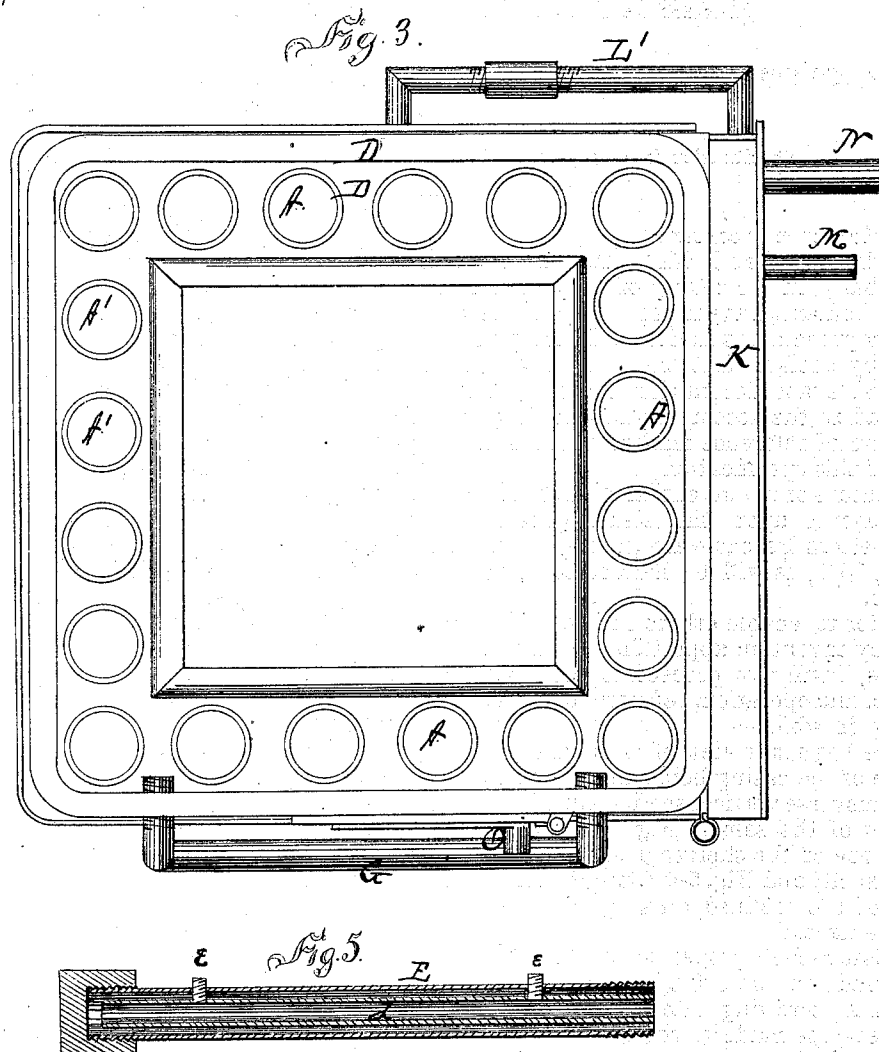
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UNITED STATES PATENT OFFICE

MIRABEAU N. LYNN, OF NEW ALBANY, INDIANA.

IMPROVEMENT IN STEAM-GENERATORS AND FEED-WATER HEATERS.

Specification forming part of Letters Patent No. 122,042, dated December 19, 1871.

To all whom it may concern:

Be it known that I, MIRABEAU N. LYNN, of New Albany, in the county of Floyd and in the State of Indiana, have invented certain new and useful Improvements in Steam-Generators; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marking thereon making a part of this specification.

The nature of my invention consists in certain improvements upon the steam-generator for which Letters Patent were granted to me January 10, 1871, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side view of my steam-generator, one side of the casing being thrown open. Fig. 2 is a transverse vertical section, and Fig. 3 a bottom view of the same. Fig. 4 is a perspective view of one of the shelves used in a part of the outside shell; and Fig. 5 is a longitudinal section of one of the inclined cross-pipes used in my steam-generator.

The boiler-shell proper, as in my former patent, is made on two sides by a series of upright pipes, A A, screwing into a cross-pipe, B, and this cross-pipe made to connect with the upper drum C. The lower ends of these pipes are made to expand in the lower water-leg D as tubes are ordinarily fastened. On the third side are similar but shorter tubes screwed into a cross-pipe which is by other pipes connected with the upper drum C. Upon the remaining side are upright pipes A' A', fastened in the lower water-leg by expansion, and fastened to the upper water-drum C by screws in the same manner as described in my former patent. In each of these upright pipes are placed five cross-pipes, E E, that enter at an angle of about fifteen degrees. There are indentations made in the upright pipes A' A' at the points where the cross-pipes E E enter into them, as shown at *a a*, Fig. 2. These indentations will make the cross-pipes be at right angles to the indented faces, causing the contraction and expansion to be taken up on the outside rim of the indented faces instead of throwing the

strain upon the threads. The cross-pipes E E extend across the fire-box space, and are closed at their ends by caps *b b*, which are screwed on. Inside of each cross-pipe is placed a circulating-pipe, *d*, suspended by means of two steel bolts, *e e*, that will not permit it to touch the sides of the outer pipe. The inside pipes *d d* will cause the water to continually discharge itself at the capped ends of the cross-pipes, keeping up a continual circulation. The water and steam drum C above connects with the water-drum D below by the upright pipes A A', as already described, and also by outside down-circulating pipes G G, which pipes perform a very important office, as they keep constantly a free and uninterrupted flow of water from the top to the bottom of the boiler. The upright pipes, which form the main part or shell of the boiler, are spaced so that a broom can be inserted and the outside of the inclined pipes be swept clean from dirt and soot. On three sides of the body of the outside upright tubes is placed a three-sided protecting-plate, H, to keep the flame off from the exhaust-case and lime-extractor; also, on the remaining side is a one-sided protector, I. These protecting-plates are so made that when necessary for repairs they can be entirely removed without loss of time or trouble. Completely incasing the protecting-plates are the three-sided exhaust-case J and the hinged case or lime-extractor K on the remaining side. The hinged case is united to the three-sided exhaust-case by means of pipes L L', so as to form a steam and water communication with the same. Each of these pipes is made in two parts, one attached to the case J and the other to the case K, and united by right and left thimbles, as shown in Fig. 3. The case K is hinged to the case J for several reasons, prominent among which is that by disconnecting the top and bottom pipes L L', and opening the case and removing the protecting-plate I, the flues may be swept and the inside of the greater part of the boiler inspected. While the case K is open the flat or edge face thereof, upon which the two connecting-pipes L L' are made fast, is made to open, and will be bolted fast by suitable bolts. When this face is open there is disclosed a series of horizontal shelves, water-ways, or lime-holders, *f f*; and when water is introduced through the pipe M on the outside of the case it will traverse the whole length of these shelves back and forth,

and they being surrounded by exhaust steam, which makes its entrance the bottom pipe N, the supply of water becomes heated to such a degree as to be purified, all sediment, lime, &c., settling in the shelves. These shelves can be taken out and incrustation removed and the case cleaned out and replaced with ease and dispatch.

Thus there is around the boiler proper a case in which the exhaust steam from the boiler may play around the entire boiler and effect three purposes, viz.: First, prevent radiation of heat from the boiler; second, heat the feed-water and take out any impurities by means of the shelves *f f*; and, third, a receptacle for accumulated waste-water from the engine condensed from outside air contact and from heating the feed-water.

The exhaust steam which enters through the bottom pipe N makes exit at the pipe O. The pipes L L' answer two purposes—one to communicate with the other three sides, and also a fastening by means of the right and left hand thimbles. This case acts a very important part to traction-engine boilers, as with it about one-third of the water that would otherwise go to waste is constantly saved for re-use.

A smoke case, P, extends around the steam-drum C, and is made in two parts so as to be readily removed.

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

1. The inclined pipes of a steam-generator connected to the vertical pipes by flattening the said

vertical pipes around the orifices and screwing said inclined pipes into the orifices so that the indented surfaces and inclined pipes are at right angles to each other, substantially as and for the purposes set forth.

2. The protecting-plates H I arranged between the upright pipes A A' and the casing J K of a steam-generator for protecting the walls of the casing, substantially as and for the purposes set forth.

3. The hollow three-sided casing J and the casing K provided with the shelves *f* arranged around the exterior of the upright pipes A A' and connected by the elbow-pipes L L', substantially as and for the purposes set forth.

4. The combination of the casings J K, shelves *f f*, connecting-pipes L L', feed-water inlet M, exhaust-steam inlet N, and outlet O, all constructed and arranged substantially as and for the purposes herein set forth.

5. The combination of the upright pipes A A', cross-pipes B B, steam-drum C, base box D, inclined pipes E E with interior pipes *d d*, outside pipes G G, protecting-plates H I, and casing J K with its pipes, all constructed and arranged substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of October, 1871.

MIRABEAU N. LYNN.

Witnesses:

D. R. SCOTT,
D. C. ANTHONY.

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