

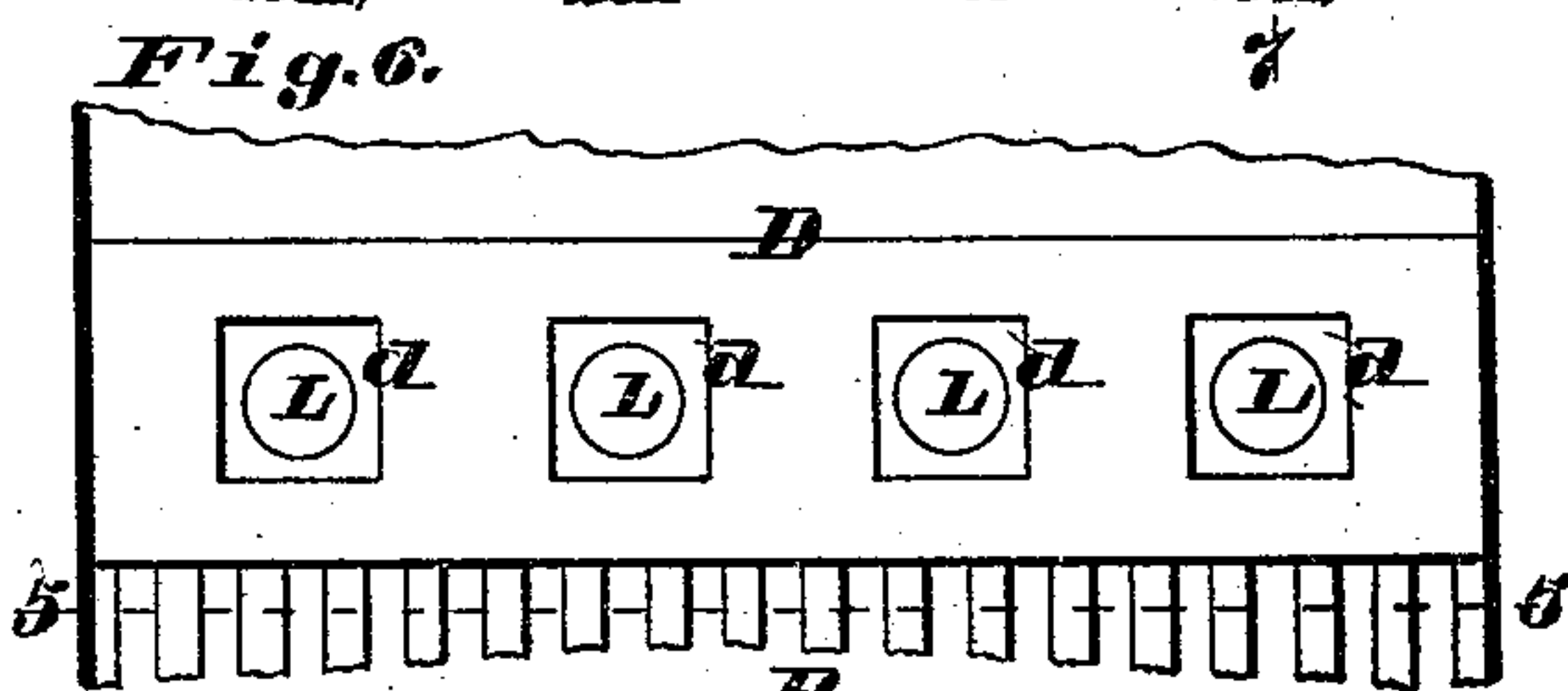
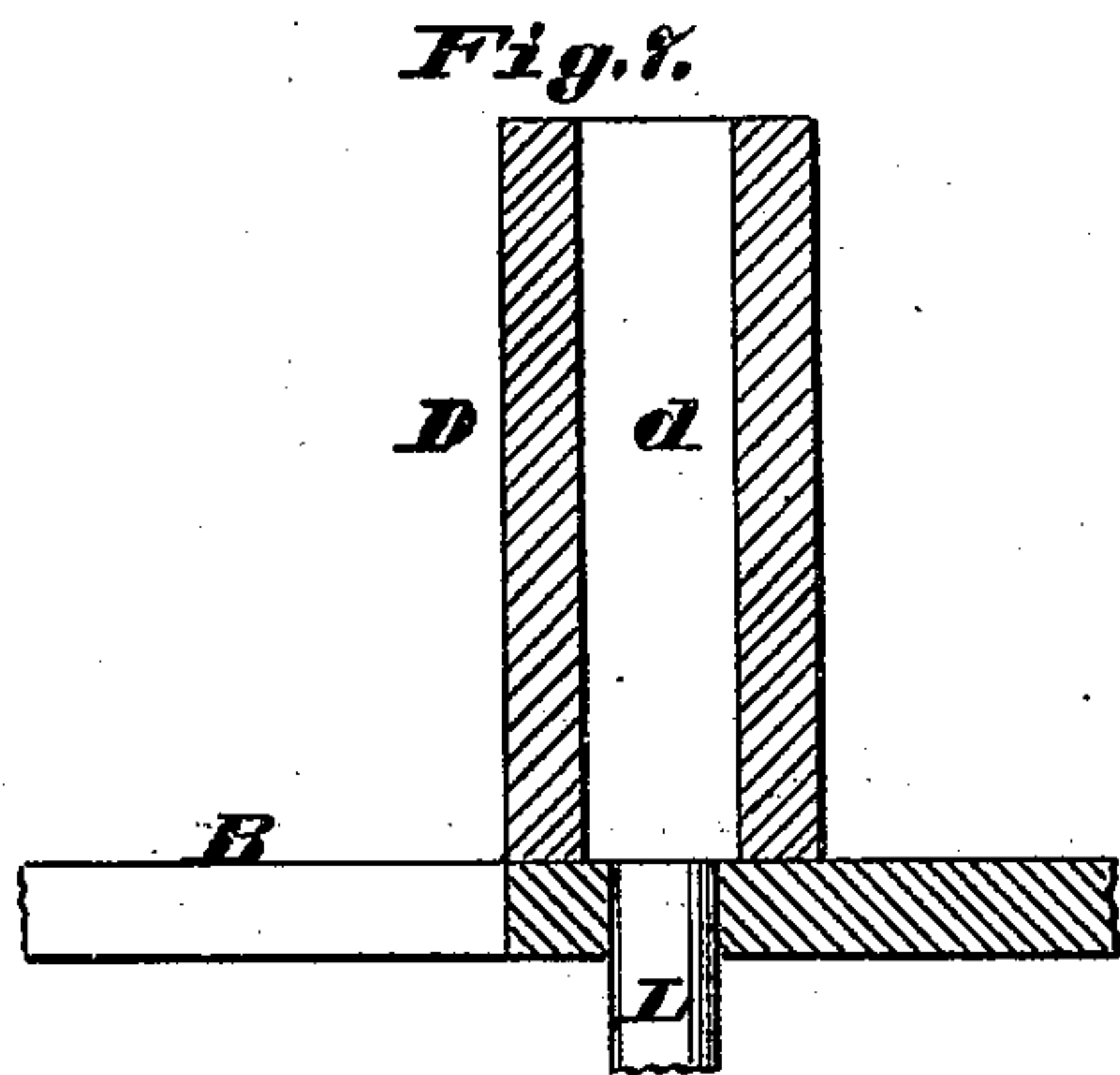
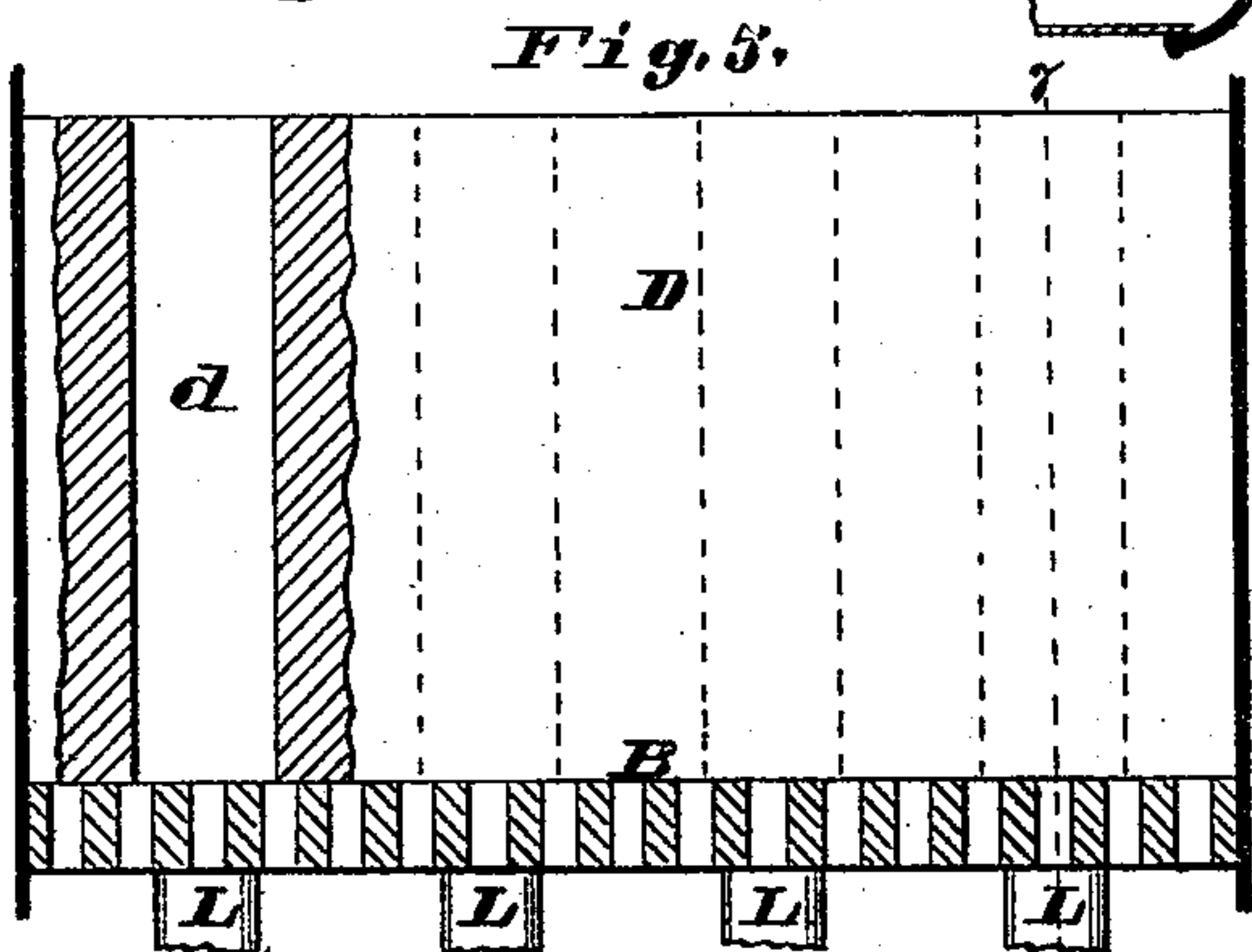
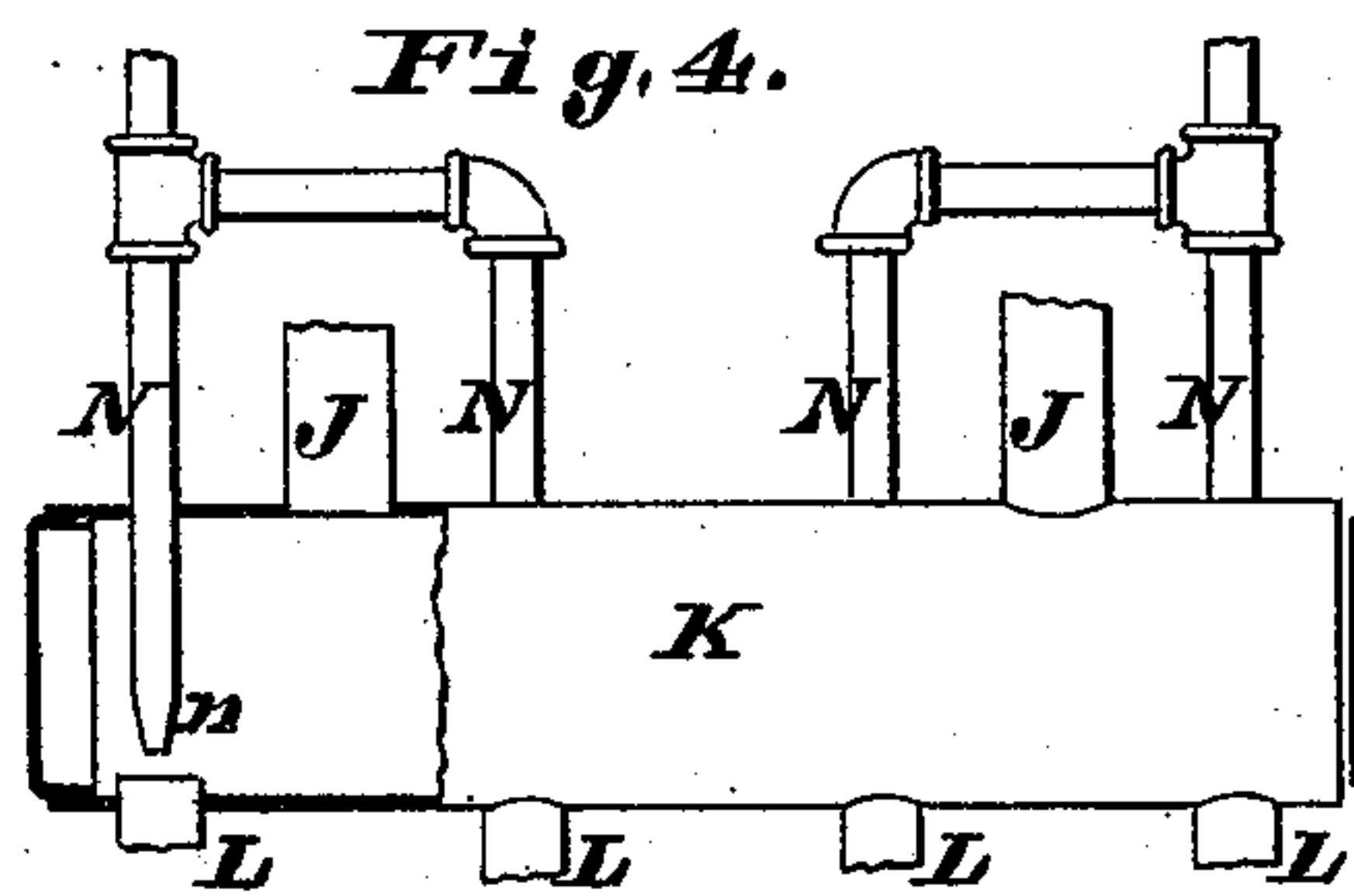
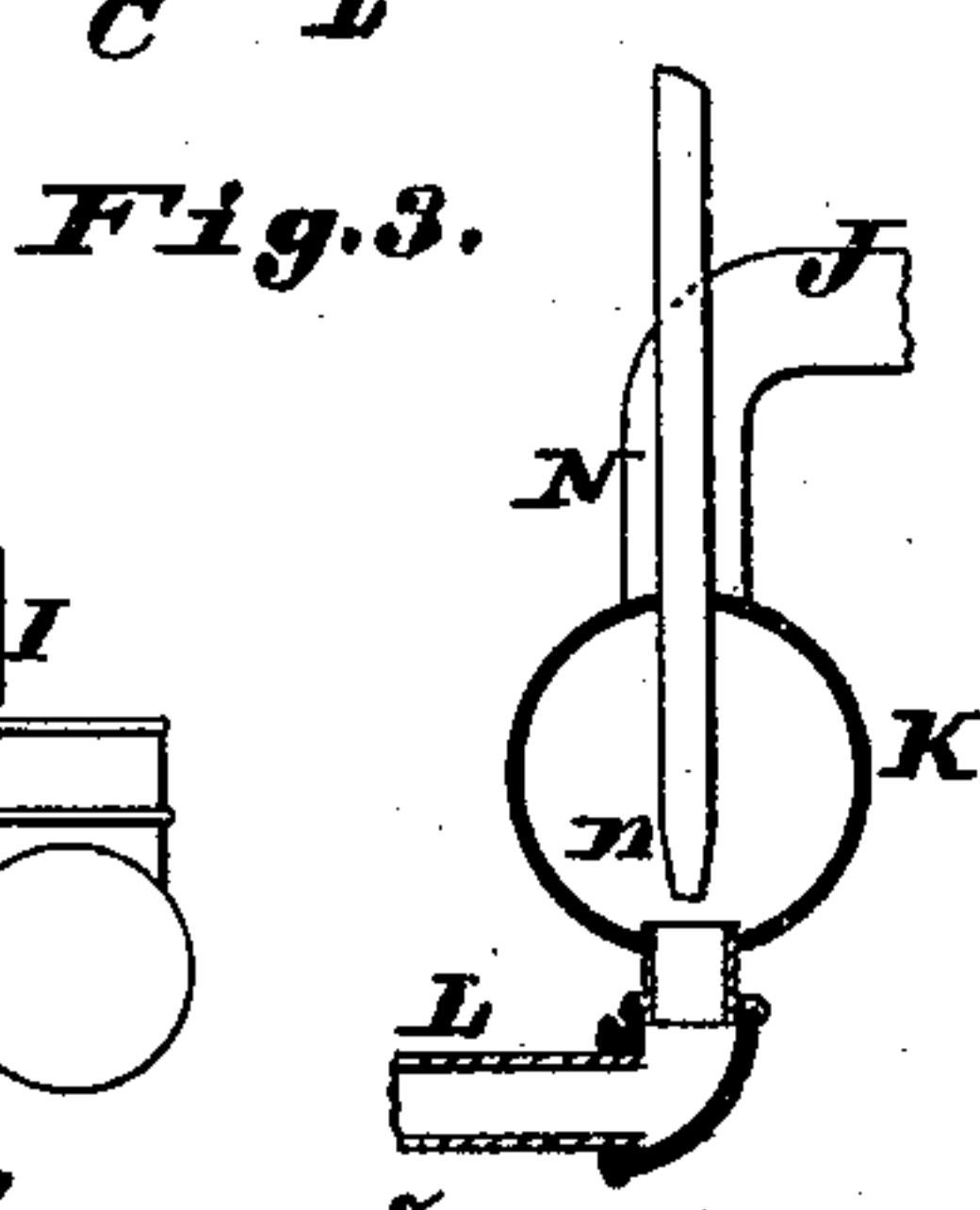
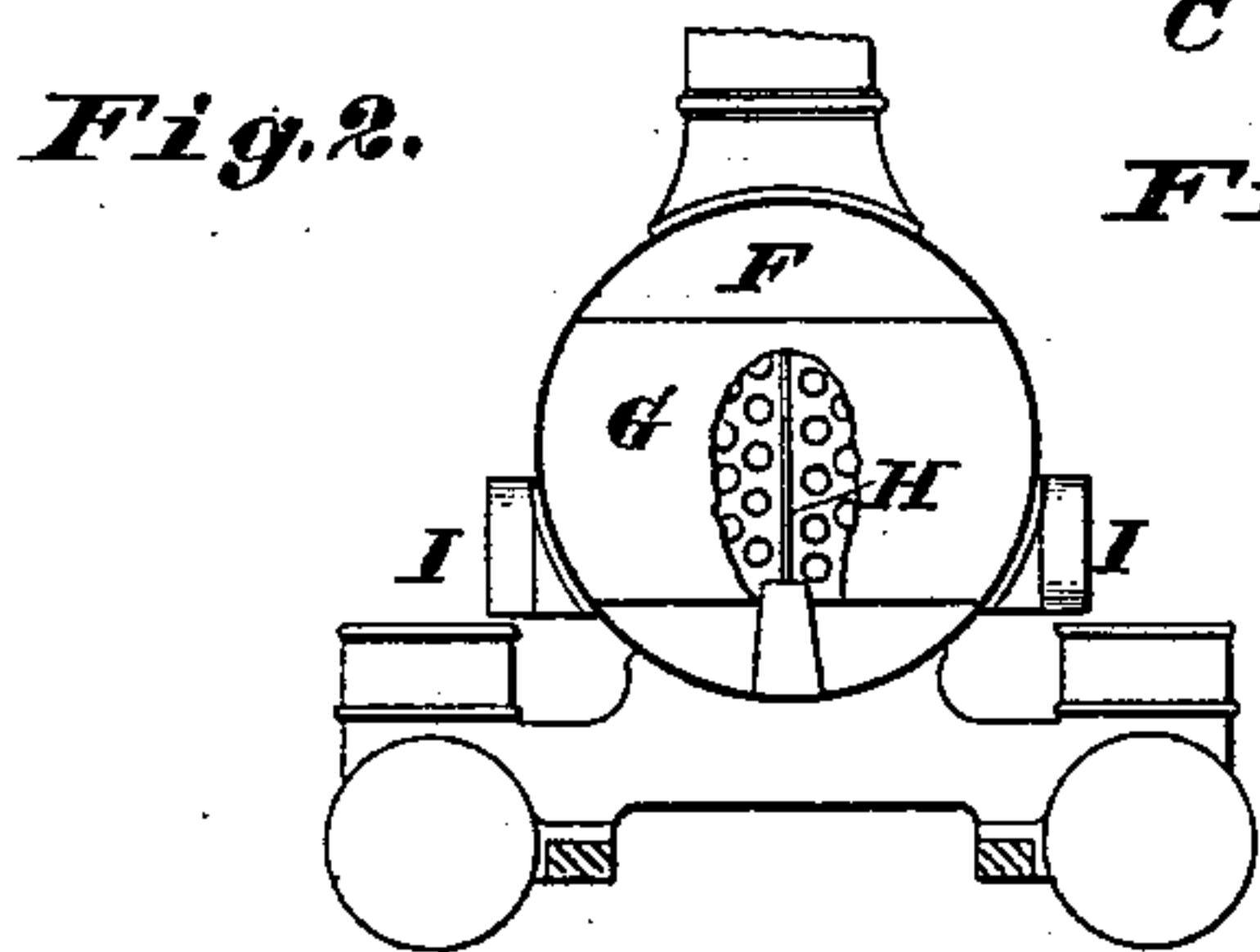
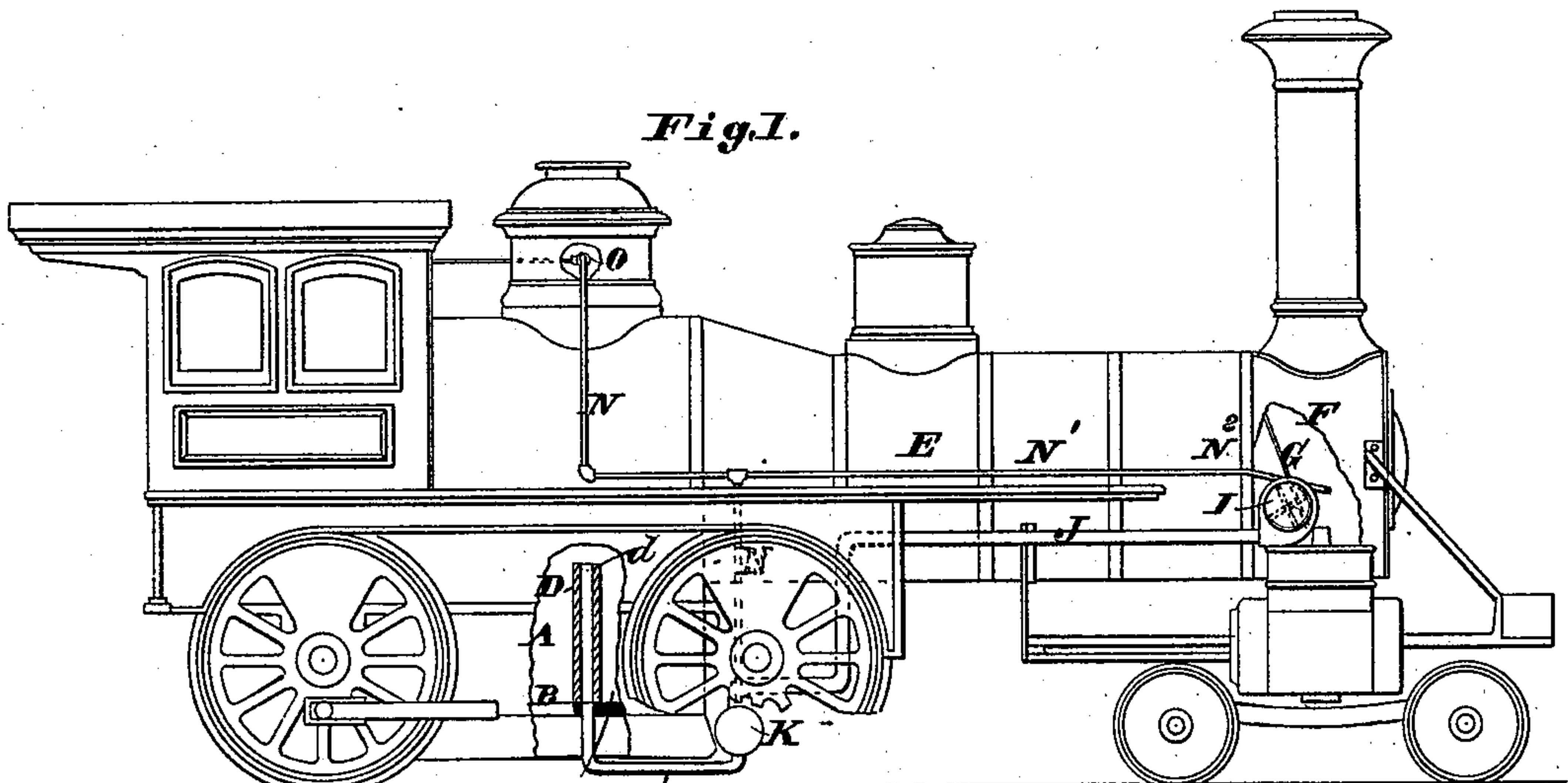
(No Model.)

H. M. SMITH.

SMOKE CONSUMING APPARATUS FOR LOCOMOTIVES.

No. 251,142.

Patented Dec. 20, 1881.



Attest.
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UNITED STATES PATENT OFFICE.

HOWARD M. SMITH, OF ST. LOUIS, MISSOURI.

SMOKE-CONSUMING APPARATUS FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 251,142, dated December 20, 1881.

Application filed August 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, HOWARD M. SMITH, of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Smoke-Consuming Apparatus for Locomotives, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My improvement consists, in the main, of fans each side of the smoke-box taking a part of the contents of said box and forcing the same through pipes into a receiver, from which it is carried by steam jets and discharged into the furnace through vertical passages in a bridge-wall extending upward from the grate-bars.

In the drawings, Figure 1 is a side view of a locomotive, with parts in vertical section. Fig. 2 is a front view of locomotive, with parts in vertical section. Fig. 3 is a detail section of one of the steam-jets. Fig. 4 is a front view of the reservoir or smoke-receiver with part broken out, showing one of the steam-jets. Fig. 5 is a transverse section at 5 5, Fig. 6, of the lower portion of the fire-box, with a front view of the bridge-wall, except that a part is in section, showing one of the smoke-passages. Fig. 6 is a top view of the bridge-wall. Fig. 7 is a section at 7 7, Fig. 5. Figs. 1 and 2 are on a smaller scale than the other figures.

A is the furnace, B the grate-bars, and C the closed bottom of the furnace behind the bridge-wall D. The boiler E is of the ordinary construction, the flues discharging into a smoke chamber or box, F. The smoke-box has the usual inclined transverse deflecting plate or partition, G, extending from side to side and deflecting the smoke issuing from the flues downward to the lower part of the smoke-chambers, where it passes beneath the lower edge of the plate G.

H is a vertical division-plate, parallel to the sides of the smoke-box, and extending from the deflector-plate G to the end of the boiler, dividing the part of the smoke-chamber between the deflector and the boiler into two equal compartments. The plate H extends preferably from the top of the plate G, where the latter joins the boiler end, to the bottom of the smoke-chamber.

Upon each side of the smoke-box is a rotary fan, I, whose suction-orifice is in communication with the smoke-chamber in the part of said chamber between the deflector G and the end of the boiler, the division-plate H insuring that about an equal quantity of the contents of the smoke-chamber shall be withdrawn by each of the fans. The discharge-opening of each fan communicates with a pipe, J, extending to a transverse smoke receiver or reservoir beneath the boiler. From the receiver extend pipes L, leading below the furnace and ending in passages or flues *d*, extending upward through the bridge-wall D and discharging at the top of the wall into the furnace A. The fans may be driven by any suitable means.

I have shown a steam-pipe, N', of which there is one for each fan, leading from steam-pipe N to a steam-jet, N², which latter acts on the buckets of a rotary piston-wheel attached to the fan-shaft, as shown and described in a former application for patent, filed 5th August, 1881, and as the means of driving the fans form no part of the claim of this application, no detailed description of such means of driving would be in place here, not limiting myself to any particular means of driving the fans.

N are steam-pipes taking steam from the steam-drum and communicating with nozzles *n*, one for each of the pipes L. The nozzles *n* are arranged to act as injectors, to carry the contents of the reservoir K into the pipes L and force it along said pipes and the hot flues *d* into the furnace. The mingled steam and unconsumed carbon and carbonaceous gases from the smoke-chamber are heated to a high degree in passing through the hot flues *d* in the bridge-wall, and are discharged into the hottest part of the fire-chamber, where the combustible matter is consumed, increasing the heat of the chamber at this point.

O is the stem of a valve in connection with the part N' of steam-pipe N, which passes through the steam-drum. By means of this valve steam may be cut off from the steam-pipes N, to stop the smoke-consuming apparatus, (or by opening said valve this apparatus is put in operation, the steam-pipes N being in communication with both the fan-motors and the steam-jets *n*.)

I claim as my invention—

1. The combination of smoke chamber or box F, blower I, pipes J L, bridge-wall D, having flues *d*, and furnace A, as set forth.

2. The combination, with the smoke-box F and furnace A, of the fans I I, pipes J J leading therefrom, pipes L L, and bridge-wall D, having flues *d*, the said fans I I, pipes J J, and pipes L L, respectively, being located and adapted to operate on each side of the engine, as set forth.

3. The steam-pipes N N, having nozzles *n n*, and the reservoir K, in combination with pipe J, smoke-box F, pipes L, bridge-wall D, having flues *d*, and furnace A, as set forth.

4. The steam-pipes N *n* and N' N² and blowers I, in combination with pipes J and L, res-

ervoir K, bridge-wall D, having flues *d*, and suitable smoke-box and furnace, the said pipes N *n* connecting with the reservoir K, and the pipes N' N² connecting with the blowers, as set forth.

5. The combination of smoke-box F, having inclined deflecting-plate G and division-plate H, fans I, pipes J and L, bridge-wall D, having flues *d*, and a furnace, as set forth.

Witness my hand this 15th day of August, 1881.

HOWARD M. SMITH.

Witnesses:

SAML. KNIGHT,
GEO. H. KNIGHT.