

(No Model.)

2 Sheets—Sheet 1.

G. H. WATSON.

STEAM GENERATOR AND FEED WATER HEATER.

No. 251,393.

Patented Dec. 27, 1881.

Fig. 1.

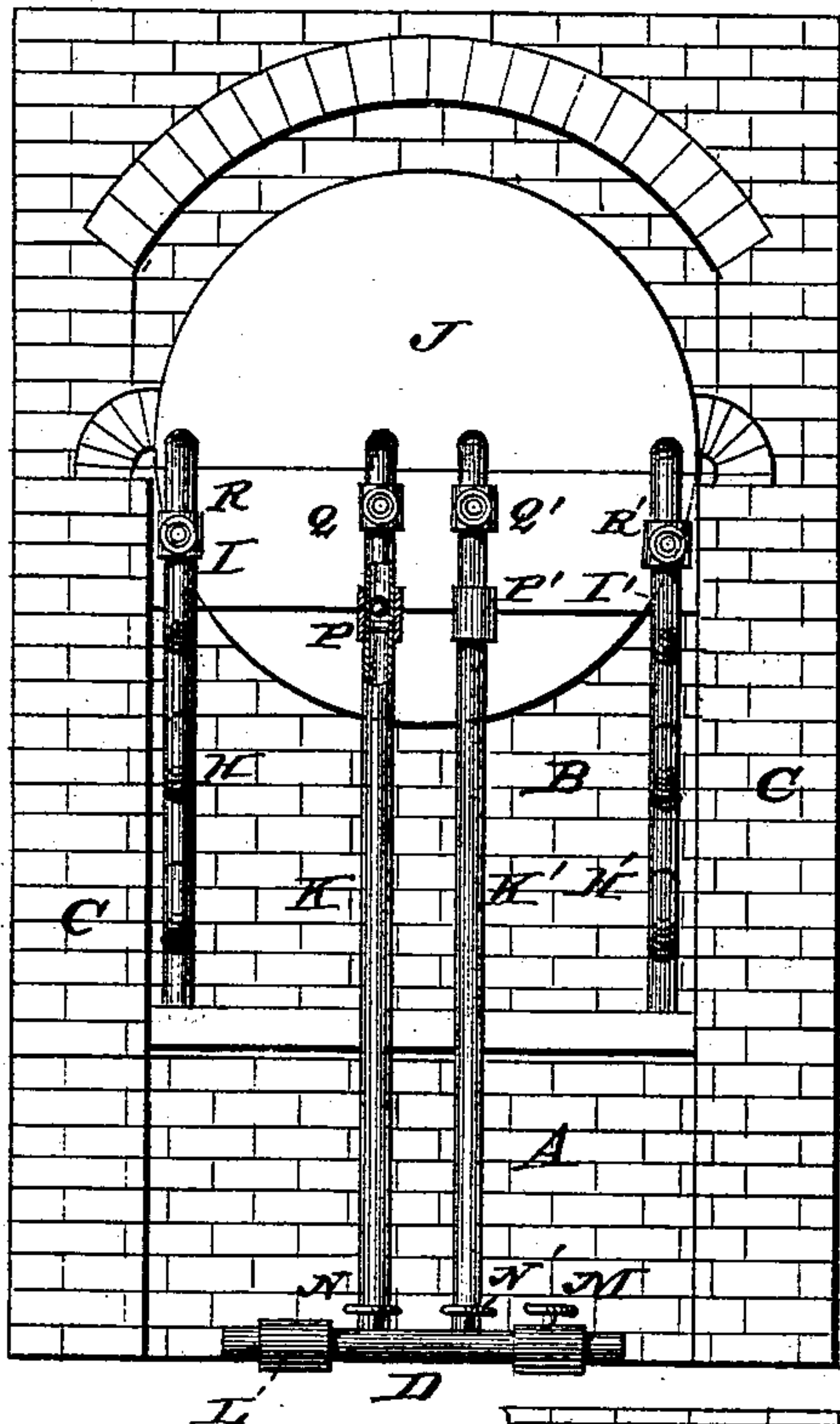


Fig. 3.

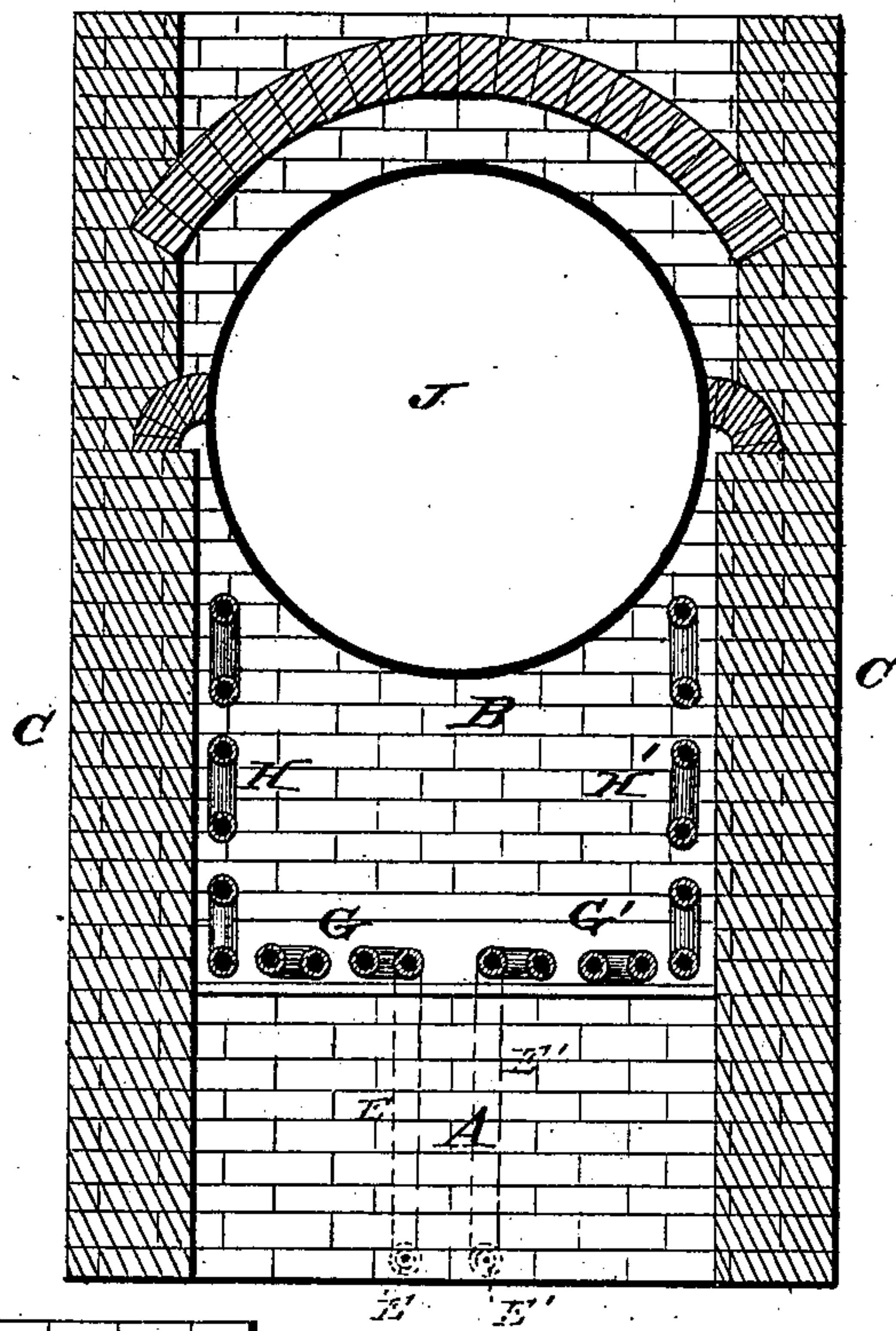
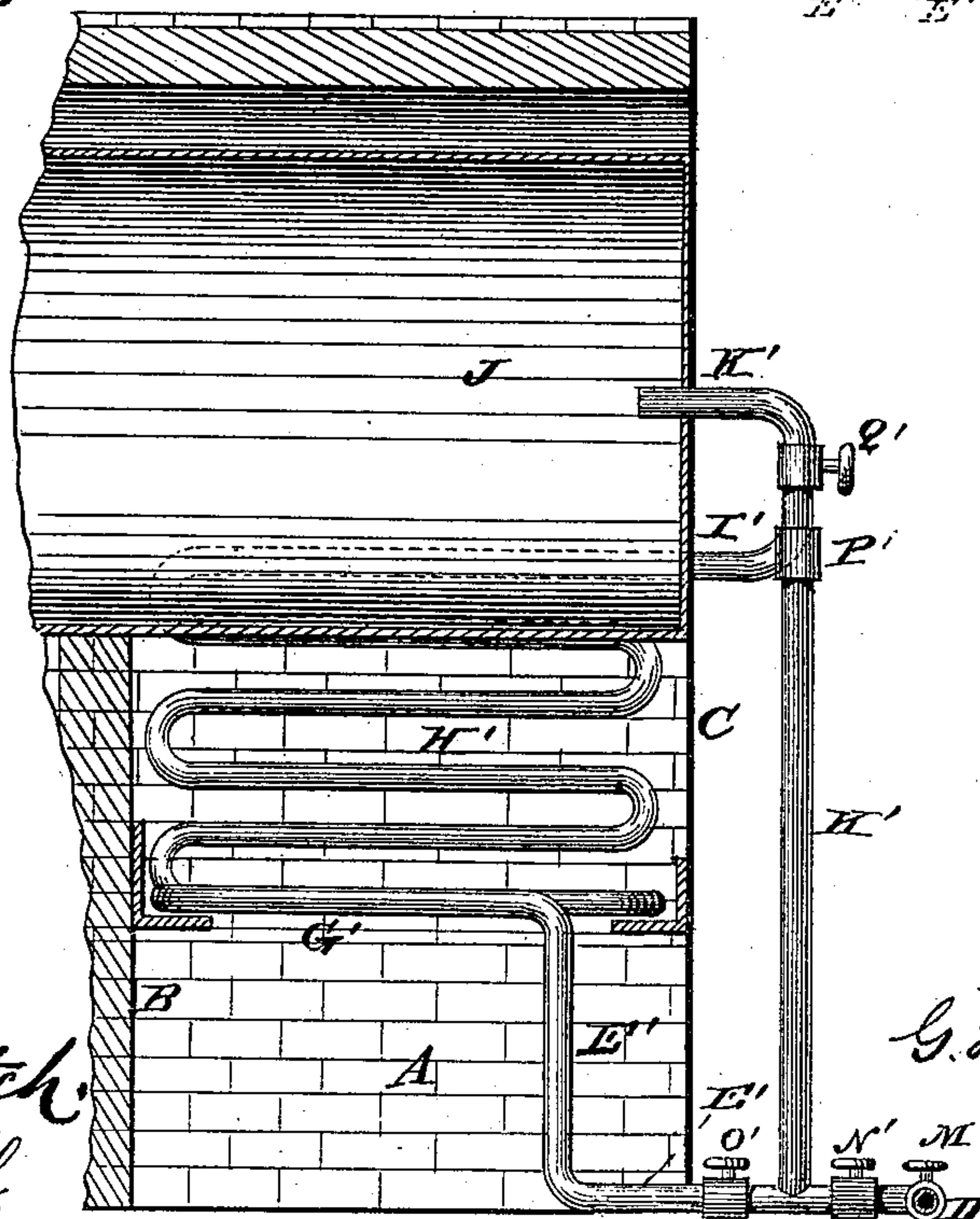


Fig. 2.



WITNESSES

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(No Model.)

2 Sheets—Sheet 2.

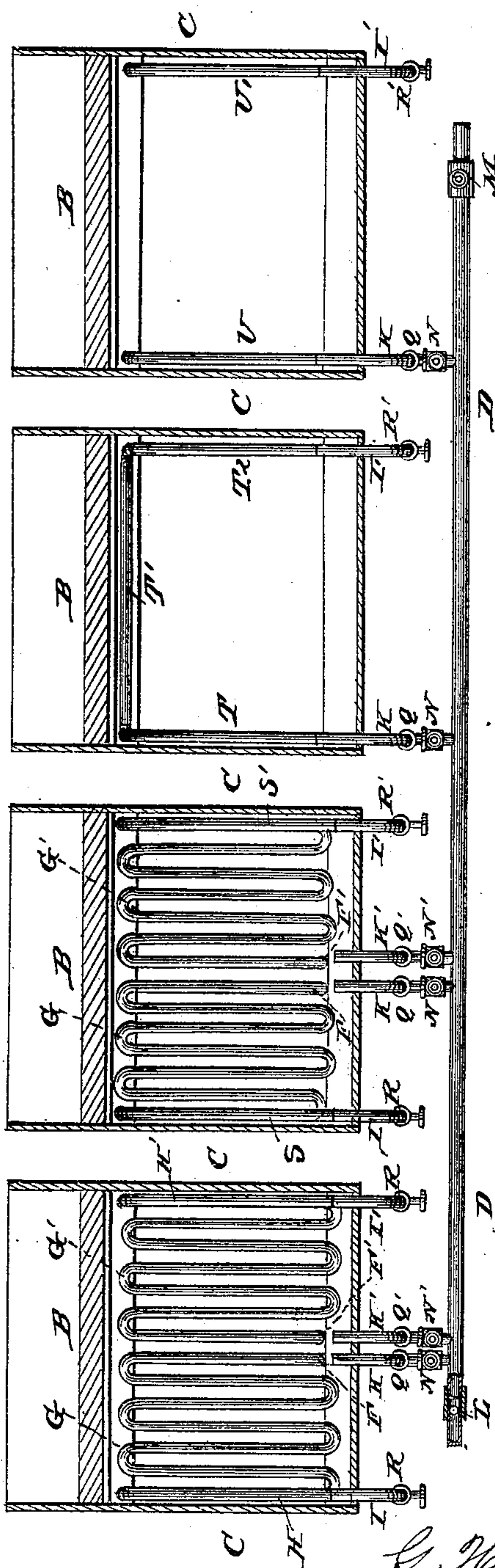
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Fig. 4.



WITNESSES

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# UNITED STATES PATENT OFFICE.

GEORGE H. WATSON, OF ST. LOUIS, MISSOURI.

## STEAM-GENERATOR AND FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 251,393, dated December 27, 1881.

Application filed September 1, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. WATSON, of St. Louis, in the county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Steam-Generators and Feed-Water Heaters; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a front view of a boiler-furnace embodying my invention. Fig. 2 is a longitudinal vertical sectional view of the same. Fig. 3 is a vertical cross-section; and Fig. 4 is a plan view, showing a chain of boiler-furnaces illustrating my invention and modifications thereof.

Corresponding parts in the several figures are denoted by like letters of reference.

This invention relates to steam-boiler furnaces; and it consists in certain improvements in the construction of the same, embodying a steam-generator and a feed-water heater, as will be hereinafter fully described, and particularly pointed out in the claim.

In the drawings hereto annexed, A represents the ash-pit, B the back wall, and C C the side walls, of an ordinary furnace. The feed-water pipe D, which runs horizontally in front of the boiler-furnace, has two branches, E E', extending inward into the ash-pit, and thence upward, from whence they are coiled in horizontal divergent parallel courses G G' to form the grate of the furnace. The said pipes are then coiled upward in two vertical, parallel, or zigzag courses, H H', adjoining the sides of the furnace-walls, passing out through the front of the furnace, thence upward, as at I I', and finally back into the boiler, which is in the drawings denoted by letter J. From the branches E E' pipes K K' extend upward and into the boiler, as shown. The feed-water pipe is provided at one end with a check-valve, L, and at the other end with a hand-valve, M. The branch pipes E E' are provided with hand-valves N N' and O O', located respectively in front and in rear of the pipes K K'. The latter are provided with downward-opening check-

valves P P', above which stop-cocks Q Q' are located, and the outer ends, I I', of the main feed-pipes have hand valves or cocks R R'.

When, in operation, the fire is started the water contained in the grate-bars G G' and side bars, H H', is heated and steam is generated, which passes through the valves R R' (which are usually open) into the boiler. A continuous course of circulation is thus established through the bars G G' H H', valves R R', and the boiler, any escape or waste of water being prevented by the check-valves P P'. This course of circulation may be continued for any length of time, or until, from leakage or any other cause, it becomes necessary to replenish the feed-water. This may be supplied in any suitable manner and by any suitable means, although naturally the feed-water pipe D, constructed and arranged as hereinbefore shown and described, is to be preferred.

Separate mechanism may be employed for forcing the feed-water into the boiler; but this is not necessary. When steam is up the feed-water passes through the check-valve L into the feed-water pipe D, at the end of which the flow is arrested by the hand-valve M, which is normally in a closed position. From the pipe D the feed-water passes through the branches E E', the valves N N' and O O' of which are normally open, thence through the pipes F F', the grate-bars G G', the side coils, H H', and into the boiler. The stop-cocks Q Q' of the pipes K K' are normally open to permit the feed-water to circulate.

In Fig. 4 of the drawings I have shown several modifications of my invention, which consist in a somewhat different arrangement of the feed-pipes. These may either, as at S S', be coiled at the sides of the furnace only, or as T T' T<sup>2</sup> around the sides and back, as at U U' at the sides, or, if preferred, at the bottom only. In every case the principle of operation is substantially the same, and the difference lies solely in the construction, which enables a single principle to be applied to a single device.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood. When it shall be desirable to blow out scales or other impurities

from a single boiler or from one or more of a chain of boilers having my improvement, open the hand-valve M and close the valves O or O' and Q or Q', thus blowing out the scales and  
5 obstructions from either or both sides or sections of pipe.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

10 The combination of a boiler-furnace, the feed-pipe D, having branches coiled through said furnace and connected with the boiler, the pipes

K K', extending upward from said branches and connected with the boiler, and the valves LM, N N', O O', P P', Q Q', and R R', all arranged and operating substantially as herein  
15 described, for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GEORGE H. WATSON.

Witnesses:

C. K. ALLEN,  
WM. BAGGER.