

No. 705,099.

Patented July 22, 1902.

J. G. LANGDON.  
SECTIONAL HEATER.

(Application filed Jan. 24, 1901.)

(No Model.)

4 Sheets—Sheet I.

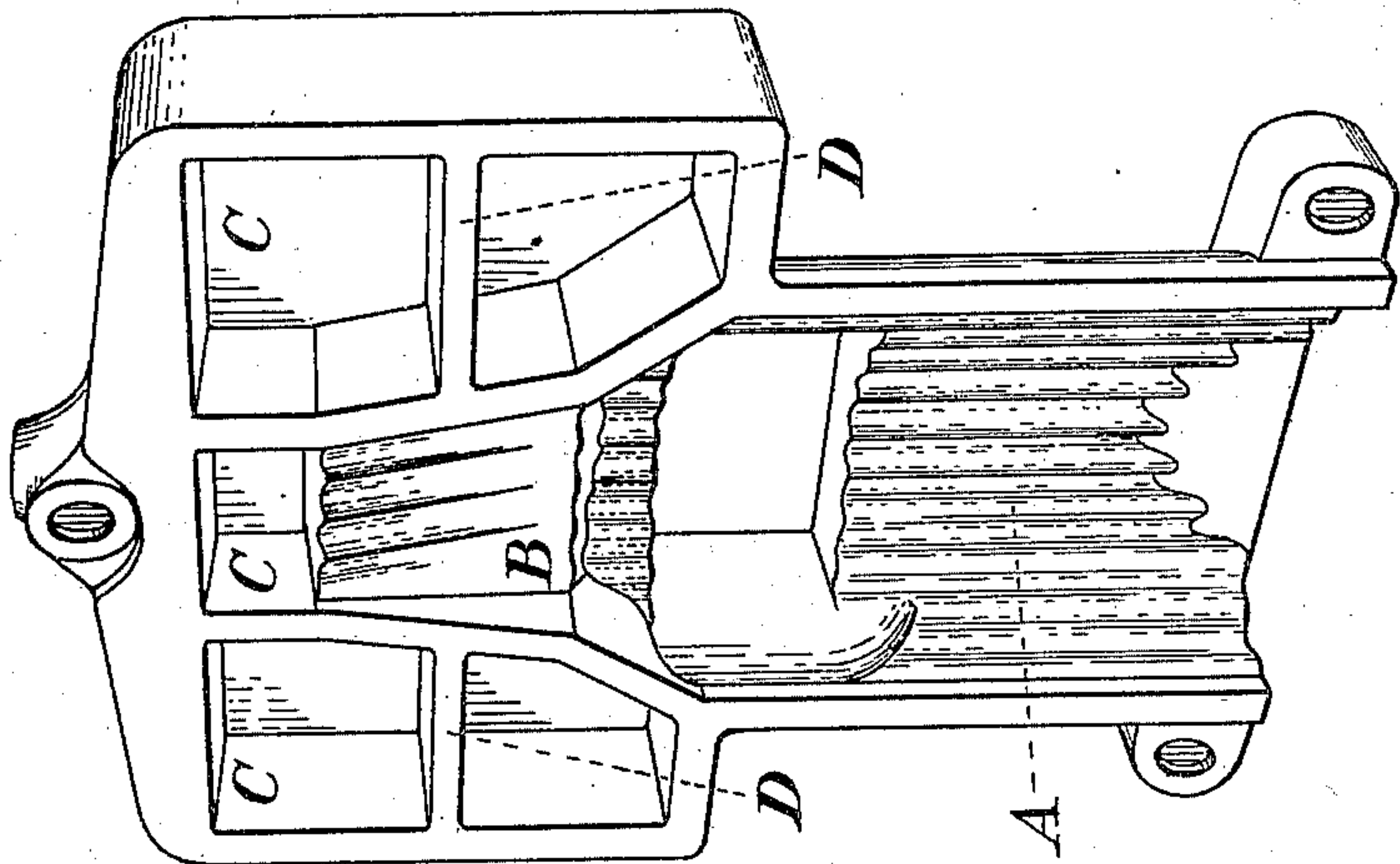


Fig. III.

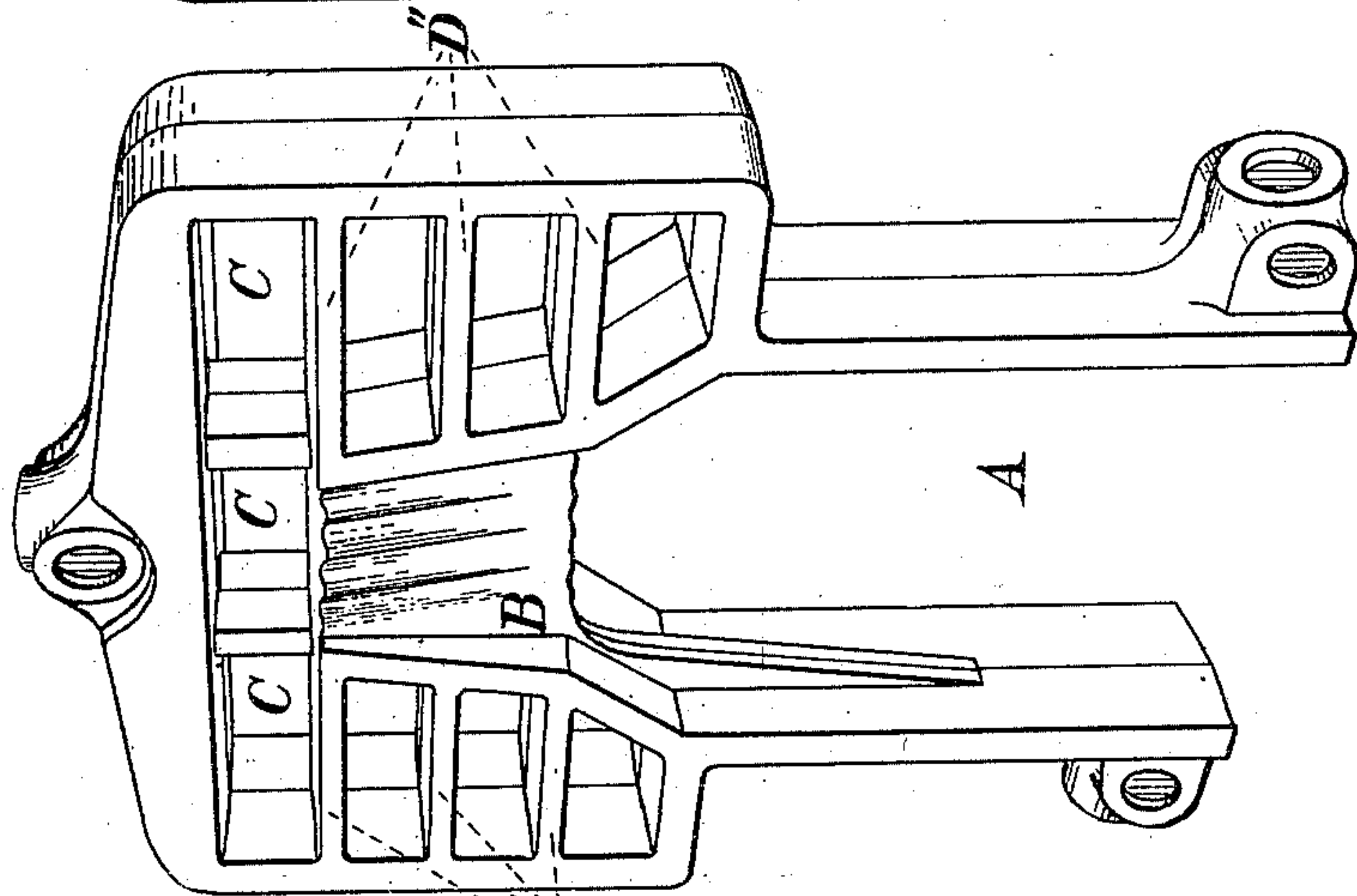


Fig. II.

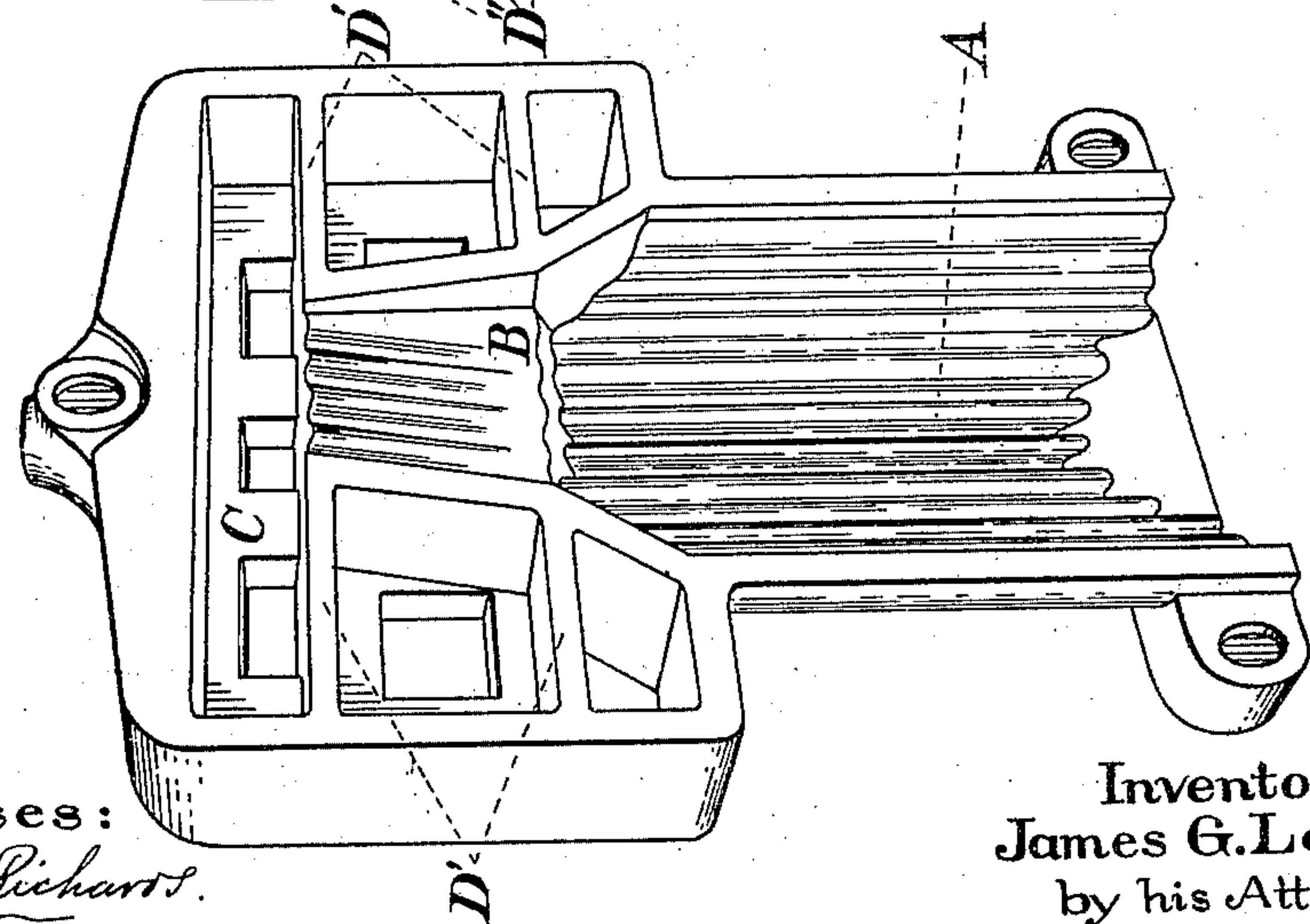


Fig. I.

Witnesses:

*William P. Richards.*  
*Oliver B. Tomlinson.*

Inventor:  
James G. Langdon  
by his Attorney

*Alex. P. Brown*

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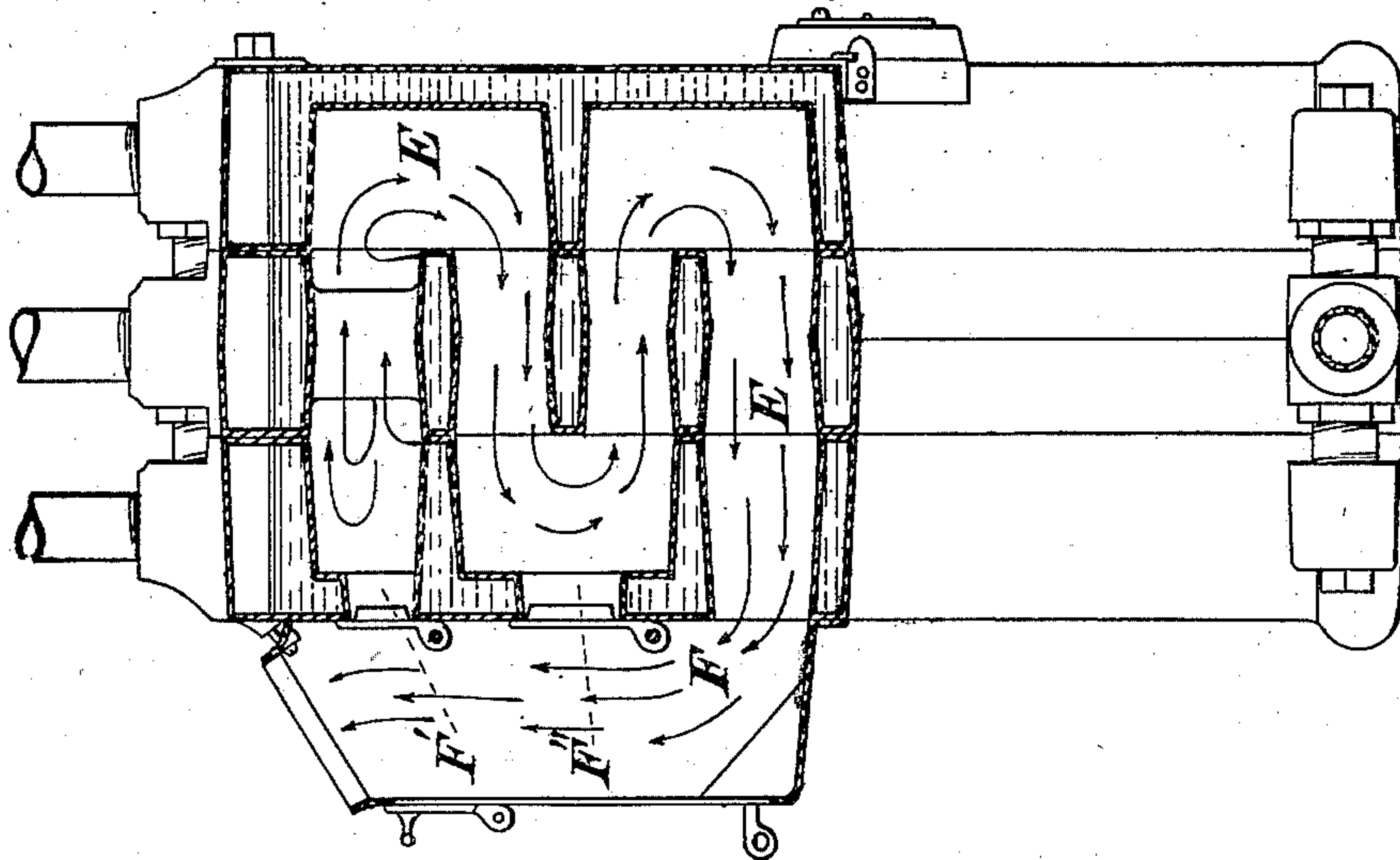


Fig. V.

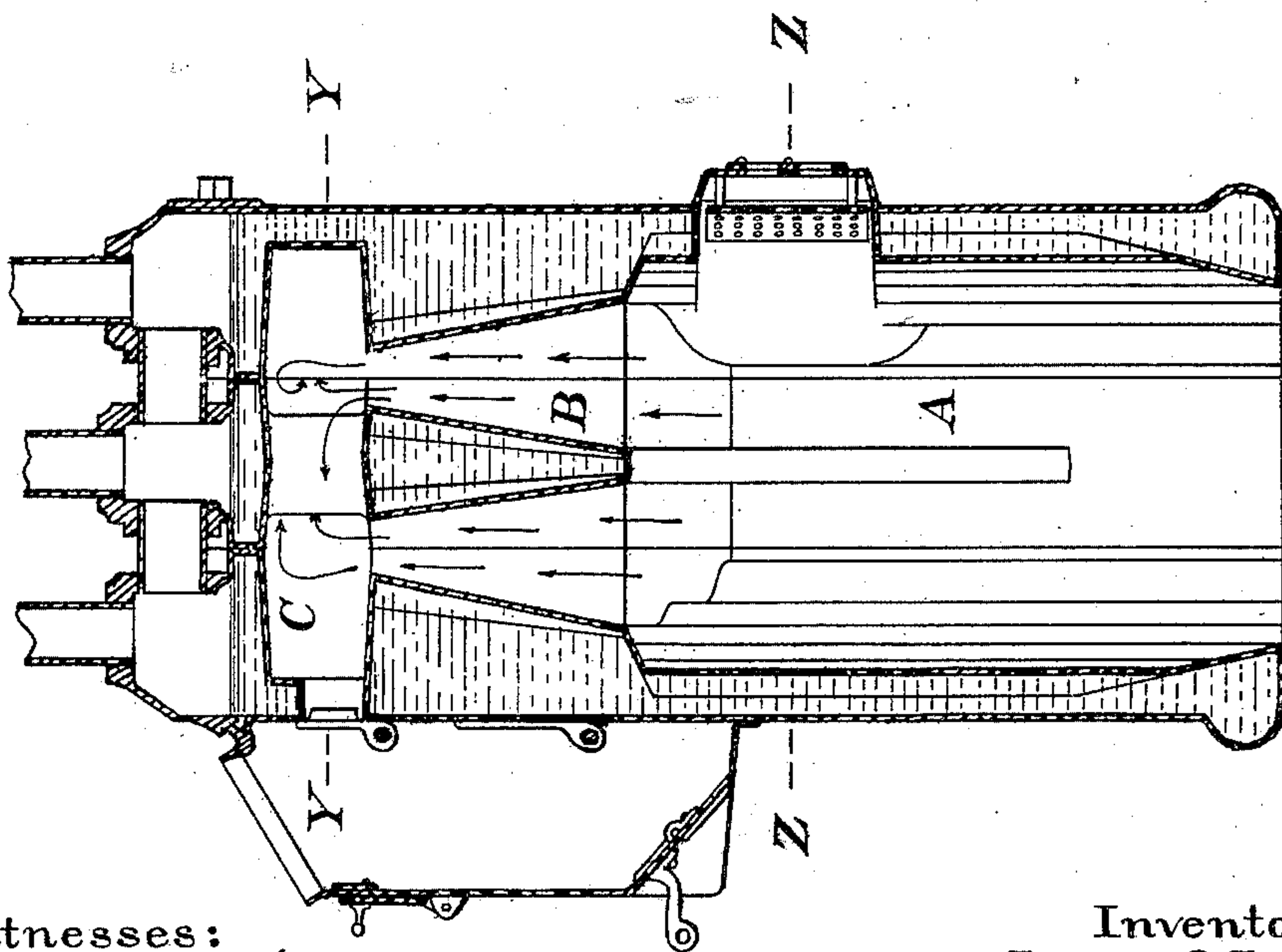


Fig. IV.

Witnesses:

*William P. Richards*  
*Ellen B. Tomlinson*

Inventor:  
James G. Langdon  
by his Attorney

*Alex. P. Brown*

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Fig. VI.

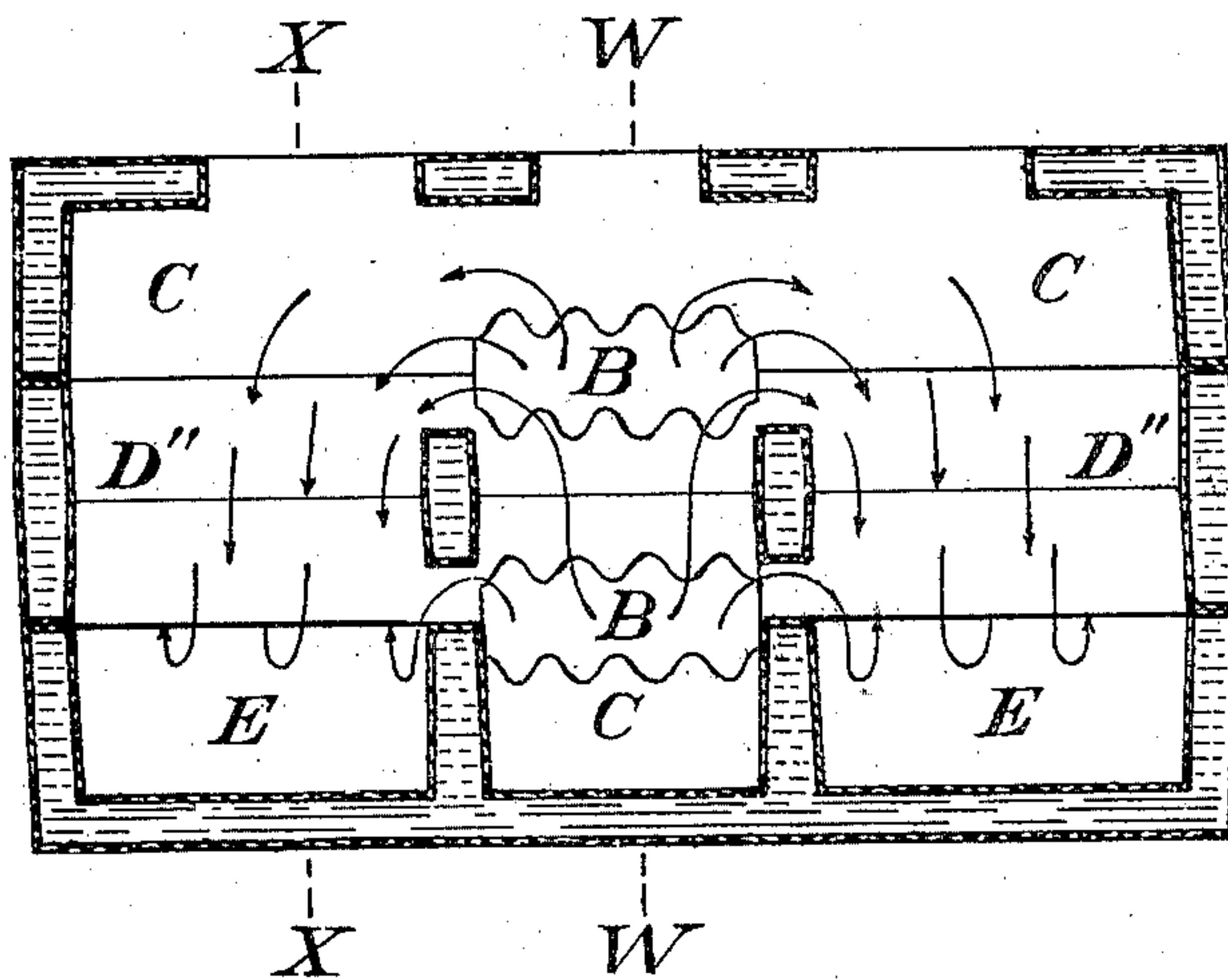


Fig. VII.

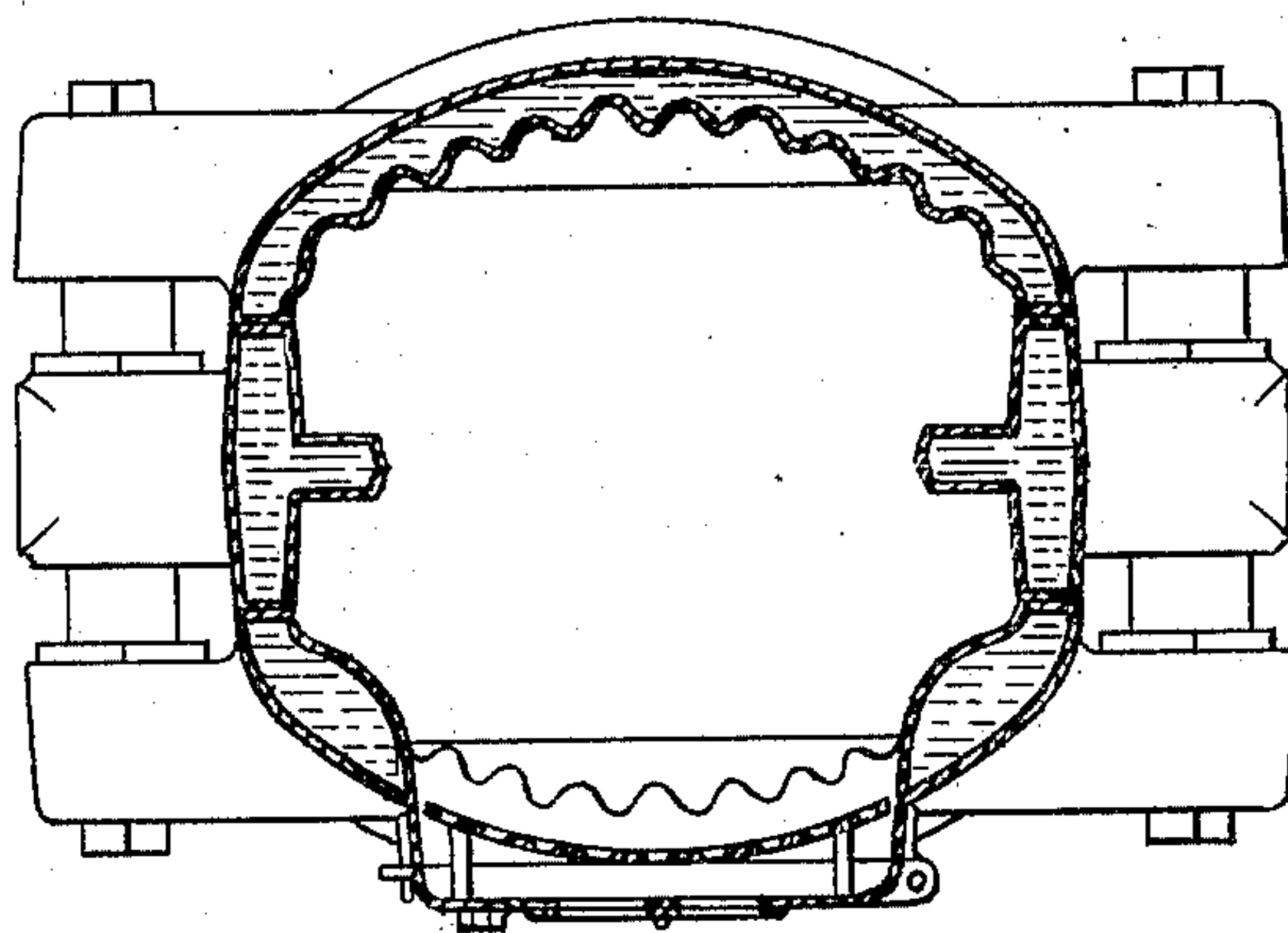
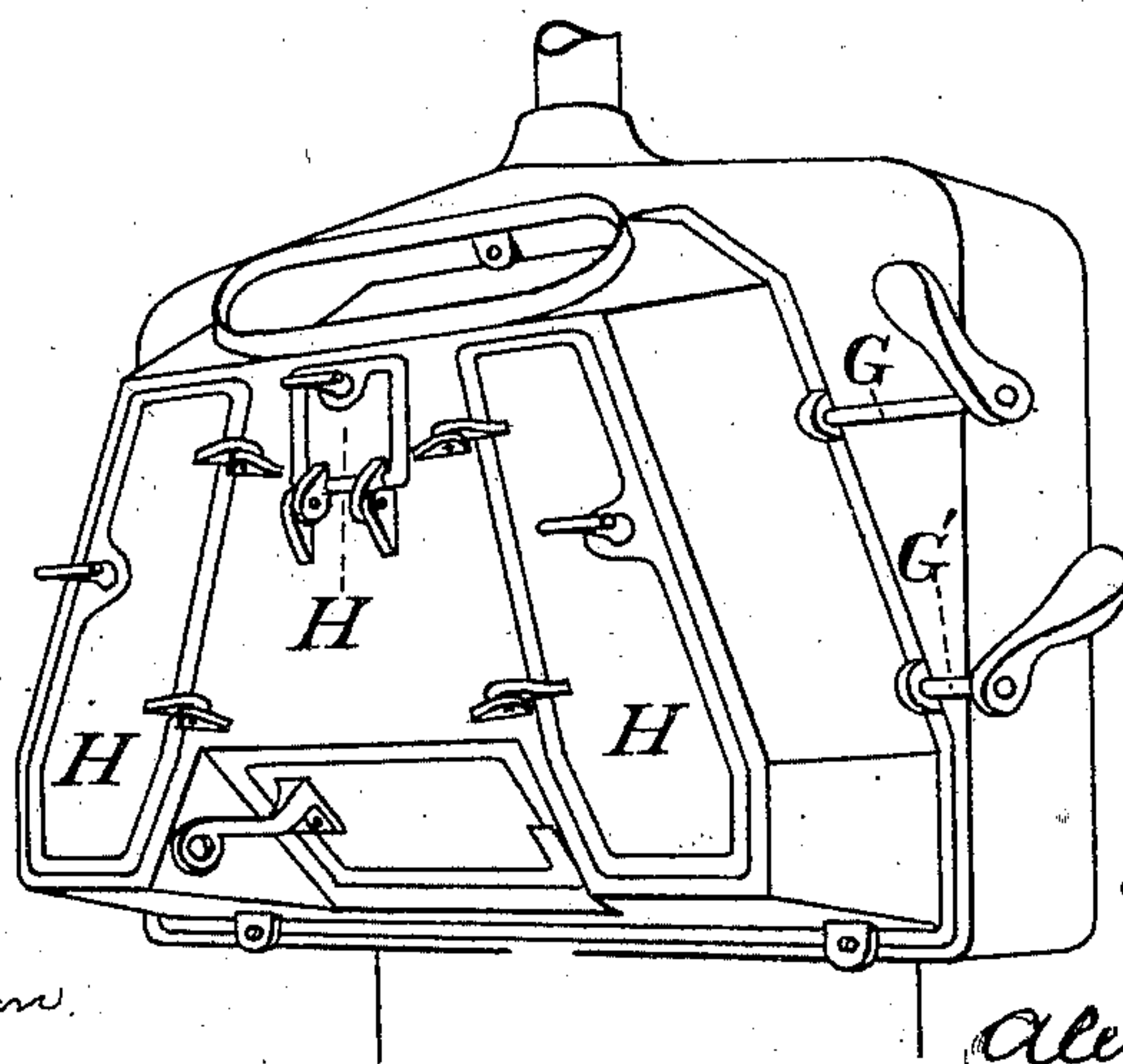


Fig. VIII.



Witnesses:  
*William P. Richards*  
*Ellen B. Tomlinson*

Inventor:  
**James G. Langdon**  
by his Attorney

*Alex. P. Brown*



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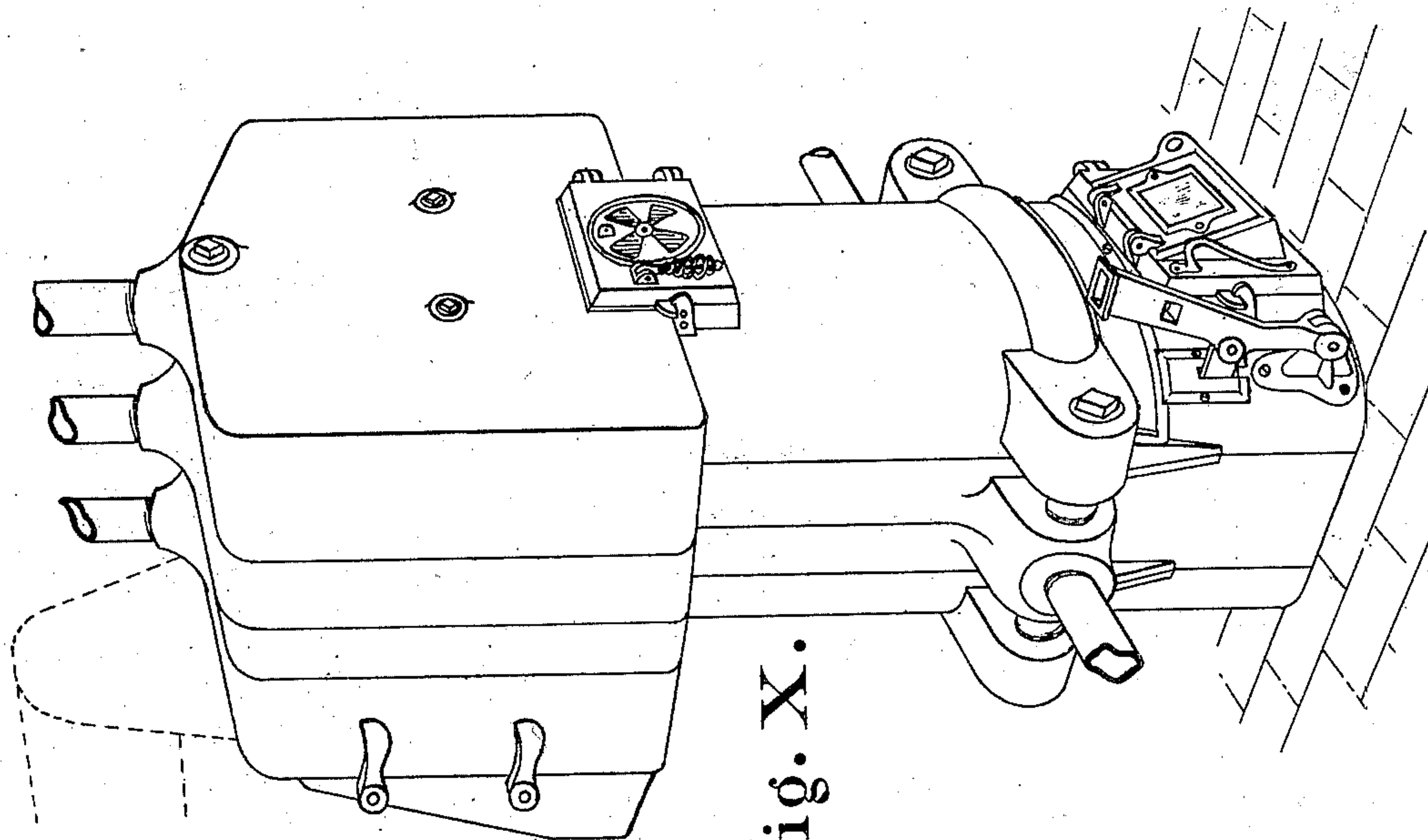


Fig. X.

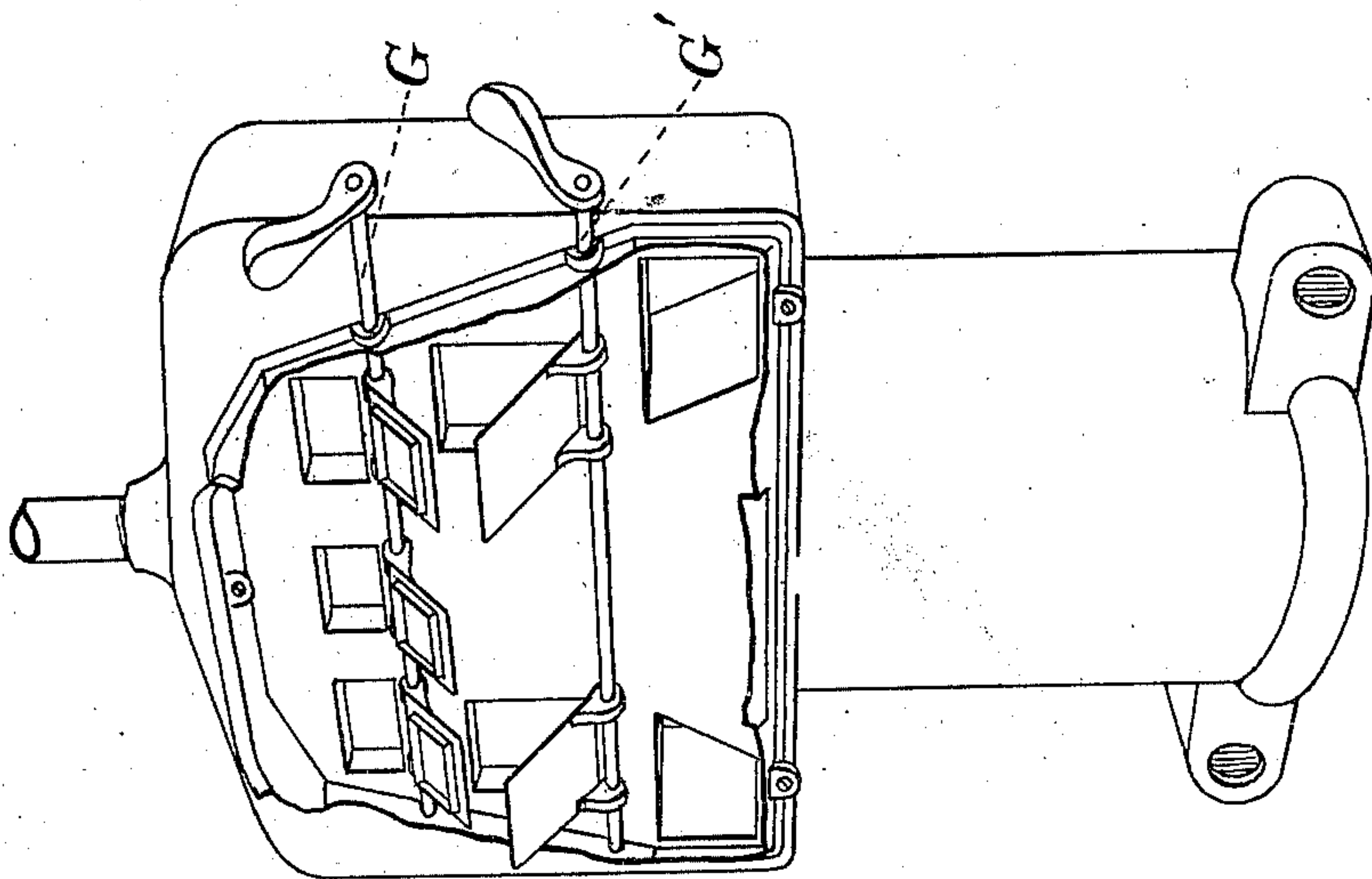


Fig. IX.

Witnesses:  
*William P. Richards*  
*Eileen B. Tomlinson*

Inventor:  
**James G. Langdon**  
by his Attorney  
*Alex. P. Brown*



# UNITED STATES PATENT OFFICE.

JAMES G. LANGDON, OF NEWTON, MASSACHUSETTS.

## SECTIONAL HEATER.

SPECIFICATION forming part of Letters Patent No. 705,099, dated July 22, 1902.

Application filed January 24, 1901. Serial No. 44,613. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES G. LANGDON, a citizen of the United States, and a resident of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Sectional Heaters, of which the following is a specification.

The heater of my present invention belongs to the well-known sectional type, in which a plurality of independent intermediate sections are used in connection with a single front and rear section, the base being correspondingly constructed and extended.

In the accompanying drawings I have shown in perspective at Figures 1, 2, and 3 the rear, intermediate, and front sections, respectively, of my improved heater; at Figs. 4 and 5, vertical sections of the heater upon the lines *ww* and *xx*, respectively, of Fig. 6; at Figs. 6 and 7, horizontal sections of the heater upon the lines *yy* and *zz*, respectively, of Fig. 4; at Fig. 8, a view in perspective of the smoke-chamber and clean-out box; at Fig. 9 a view of the interior of the same, the rear cover being broken away, and at Fig. 10 a perspective view of the heater as a whole.

Inasmuch as my present improvements relate wholly to the construction of the sections above the grate and grate-frame I have indicated the latter only in perspective in Fig. 10.

The component sections of the heater (well shown at Figs. 1, 2, and 3) are formed of cast-iron or other suitable cast material, the lower parts of the interior A forming, collectively, the fire-pot and combustion-chamber, the middle parts of the interior B next above forming heat-passages, and the upper parts of the interior C forming, collectively, a heat-chamber under substantially the whole of what may be called the "crown-sheet" of the heater. The relative arrangement and construction of these portions A, B, and C may also be clearly seen at Fig. 4. It will be understood that each of the sections is made hollow or with double walls throughout, the interior space thereby obtained constituting the water-containing portion of the heater. The water-spaces of each section are connected with those of the adjacent sections in the ordinary manner, as shown at Figs. 5 and 10.

Coming now to the construction of the

smoke-flues, whereby I intend to designate the passages through which the products of combustion pass away after leaving the heat-chamber C, it will be noticed that the front section, Fig. 3, contains a single transverse floor or partition D, arranged on opposite sides of the heat-passage B. The rear section contains two such floors or partitions D' and the intermediate section three similar partitions D''. From this construction it follows that when the parts are joined together ready for use the flue system (shown at E, Figs. 5 and 6) communicates at its upper end with the front of the heating-chamber C and at its lower end with the smoke and clean-out box F, the upper portion of which is connected with the chimney or smoke-stack. As has already been mentioned, the partitions D, D', and D'' are hollow, the inclosed water forming a part of the water system of the heater.

It will be observed that whatever the number of sections employed the heat-passages B, formed thereby, will all lie in the longitudinal central axis of the heater, as shown in Fig. 6, where two such passages are represented. The heating operation of the device is therefore as follows: The heat generated by the combustion of fuel at the base of the lower portion A of the interior of the heater passing upward heats the water in that portion. Next continuing upward through the passages B it heats the water contained within the interior of the walls of those passages, and finally entering the upper heating-chamber it heats the water in the upper part or above the crown-sheet of the heater. The apparatus is so designed and proportioned that the passage of the heat to the crown-sheet shall be as direct as possible, with the object of imparting the greatest heat possible to the water above it at the point where said water after being heated passes upwardly out and into the circulating-pipe system. The continued downward to-and-fro passage of the heated gases again heats the water contained in the interior of the portions D D' D'', and finally these gases pass off upwardly at the upper part of the smoke-chamber before mentioned.

It will of course be understood that when the apparatus is in operation the ordinary



circulation of the water through the various portions of the water-containing interior of the device is going on.

I have heretofore spoken of the smoke-chamber as the "smoke and clean-out box," and it will be observed by reference to Fig. 5 that the rear section is provided with clean-out holes F' F''. When the apparatus is running, these passages are ordinarily closed by dampers operated by damper-rods G G', the construction being well shown in Fig. 9, and the smoke box or chamber is also closed, as shown in Figs. 4 and 5.

At certain times—as, for example, at the opening and closing of the heating season and occasionally upon unusually warm days—it may be desirable to reduce the heating capacity of the heater. This may readily be done by opening the damper covering the passages F' or F'', whereby the length of travel of the combustion products inside the heater will be correspondingly reduced.

When it is desired to remove such ashes, soot, &c., as may accumulate upon the partitions D, ready access is afforded through the smoke-box by opening the doors H, formed in the rear of the smoke-box, as shown in Fig. 8. It will be seen by inspection of the apparatus that when the doors H and the passages F' F'' are opened for the purpose of cleaning the apparatus there will still be direct draft from them to the chimney, and consequently the dust produced by cleaning and also unpleasant gases will pass up through the chimney and not outwardly into the cellar or room where the heater is, as in the case of the ordinary construction of devices of this character. The soot and ashes after being drawn and pushed to the lower flue can be removed by means of an ordinary fire-shovel in the cleanliest manner possible. It will be seen that owing to the above arrangement the heat-chamber and flues can be as thoroughly cleaned while the fire is at its greatest intensity as when there is little or no fire.

I claim—

1. In a vertical, sectional, water-heater, the combination of front, intermediate and rear tubular sections adapted when assembled and connected to provide a fire-pot and combustion-chamber at the bottom of the heater, a heat-chamber near the top of the heater, a series of vertical passages connecting said combustion and heat chambers and arranged in the longitudinal central plane of the heater, and circuitous passages extending downwardly from said heat-chamber on opposite sides of said central passages, and a smoke or escape flue communicating with the lower ends of said circuitous passages, whereby the products of combustion will be conducted on vertical lines directly to the heat-chamber near the top of the heater from all parts of the combustion-chamber and then downwardly and horizontally from said heat-chamber to the escape-flue.

2. In a vertical, sectional, water-heater, the combination of front, intermediate and rear tubular sections, each having a fire-pot section at its lower end and an enlarged heating-section at its upper end, said enlarged section being interiorly divided by suitable partitions into a central, upwardly-tapering, channel and a series of horizontal flues or chambers on opposite sides of and above said channel, the partitions forming the horizontal flues or chambers of the front and rear sections being out of alinement with each other but alining with the corresponding partitions of the adjacent intermediate section, whereby when the sections are assembled they form a fire-pot or combustion-chamber at the bottom of the heater, a heat-chamber near the top of the heater, a series of tapering flues extending from the fire-pot to said heat-chamber, and circuitous flues or passages extending downwardly from said heat-chamber on opposite sides of the said tapering flues, and an escape-flue communicating with the lower ends of said circuitous passages.

3. In a vertical, sectional, water-heater, the combination of a rear section having a lower portion, forming the back and part of the sides of the fire-pot or combustion-chamber, and an upper, enlarged portion, the interior of said enlarged portion being divided into an upper heat-chamber extending continuously across the section, a central flue or passage extending from the combustion-chamber to said heat-chamber, and chambers on both sides of said central flue, a casing secured to the back of said enlarged portion of the rear section and covering outlet-apertures in the rear walls of all of the chambers therein, said casing having an outlet or escape opening at its upper end and being provided with suitable doors through which access can be had to said casing and the interior passages and chambers of the heater, a front section having a lower portion, forming the front and part of the sides of the combustion-chamber, and an upper, enlarged portion which is interiorly divided to provide a central passage extending from the combustion-chamber to an upper chamber arranged in the plane of the heat-chamber of the rear section, and a series of chambers on both sides of said central passage, the horizontal partitions between said chambers being out of alinement with the horizontal partitions in the rear section, one or more intermediate sections having lower portions forming parts of the sides of the combustion-chamber and upper, enlarged, portions which are interiorly divided to provide in each a central flue or passage extending from the combustion-chamber to a flue connecting the upper chambers of the front and rear sections and a series of horizontal passages on both sides of said central passage, the partitions between said horizontal passages alining with partitions in both the front and rear sections, to provide circu-



itous passages from the upper heat-chamber  
to the lower chambers of the enlarged por-  
tion of the rear section, and dampers for  
closing the outlets of chambers in the rear  
5 section, the walls and partitions of said sec-  
tions being hollow to provide a water-pass-  
age through the heater.

In testimony whereof I have hereunto sub-  
scribed my name this 23d day of January,  
1901.

JAMES G. LANGDON.

Witnesses:

WILLIAM P. RICHARDS,  
ALEX. P. BROWNE.