

L. M. G. DELAUNAY-BELLEVILLE.

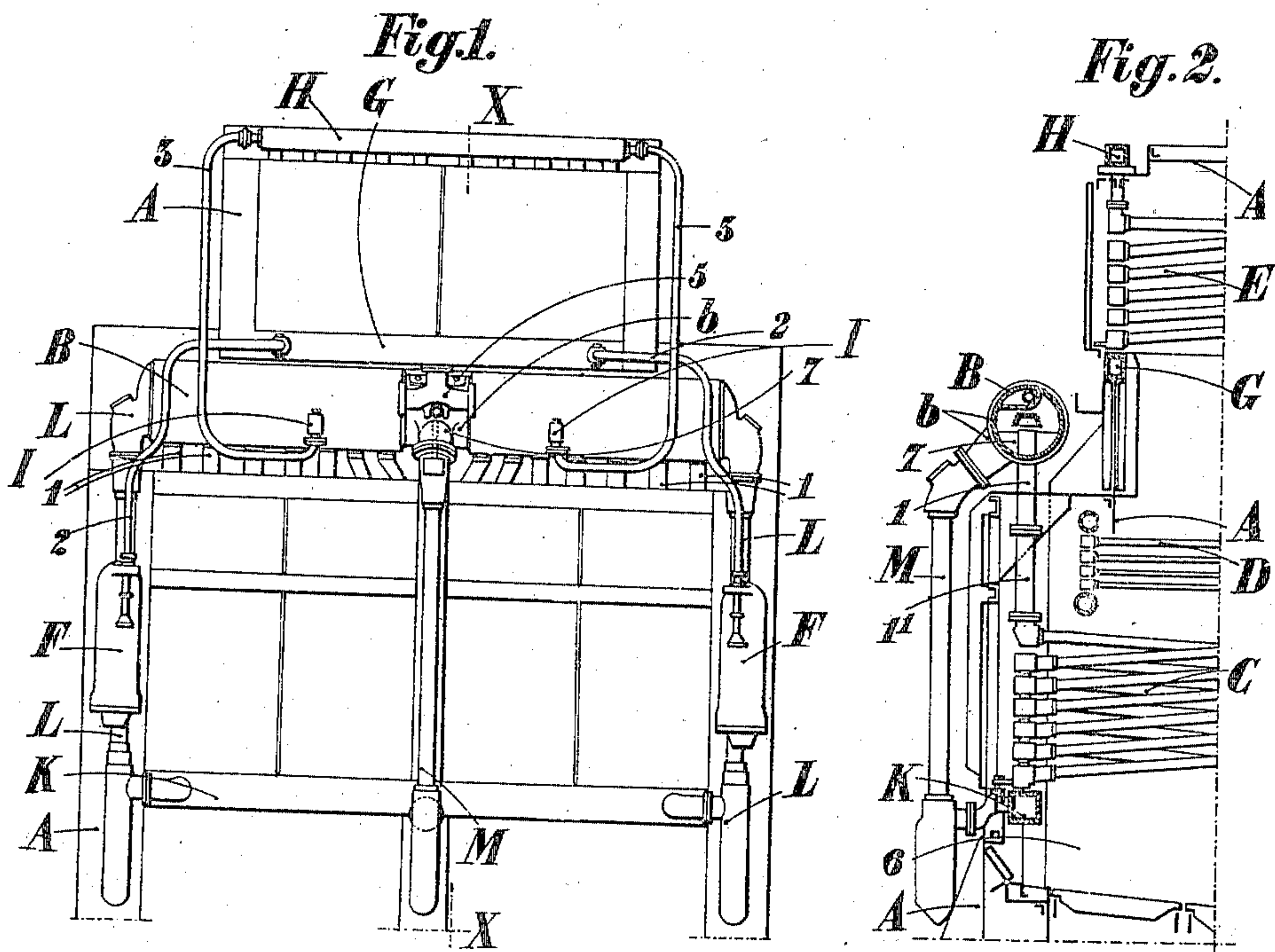
HIGH POWER BOILER.

APPLICATION FILED FEB. 25, 1908.

951,679.

Patented Mar. 8, 1910.

3 SHEETS—SHEET 1.



Witnesses:

*[Signature]*

*[Signature]*

Inventor  
Louis M. G. Delaunay Belleville

*[Signature]*

*[Signature]*

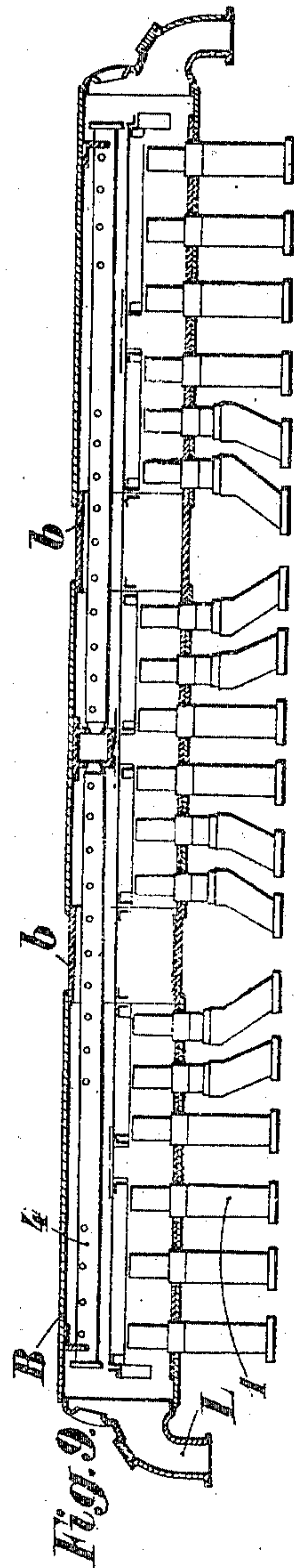
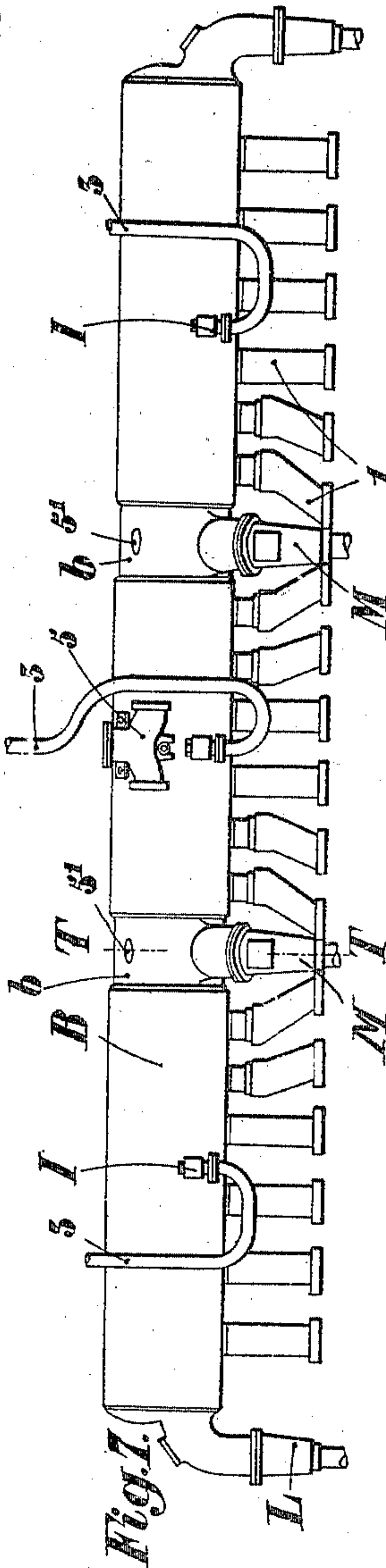
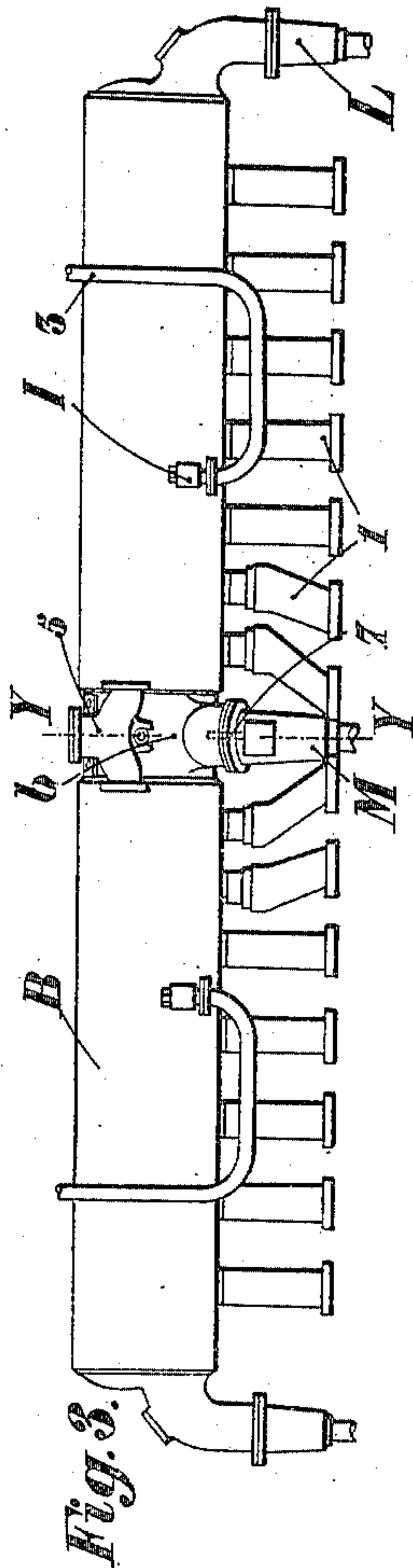
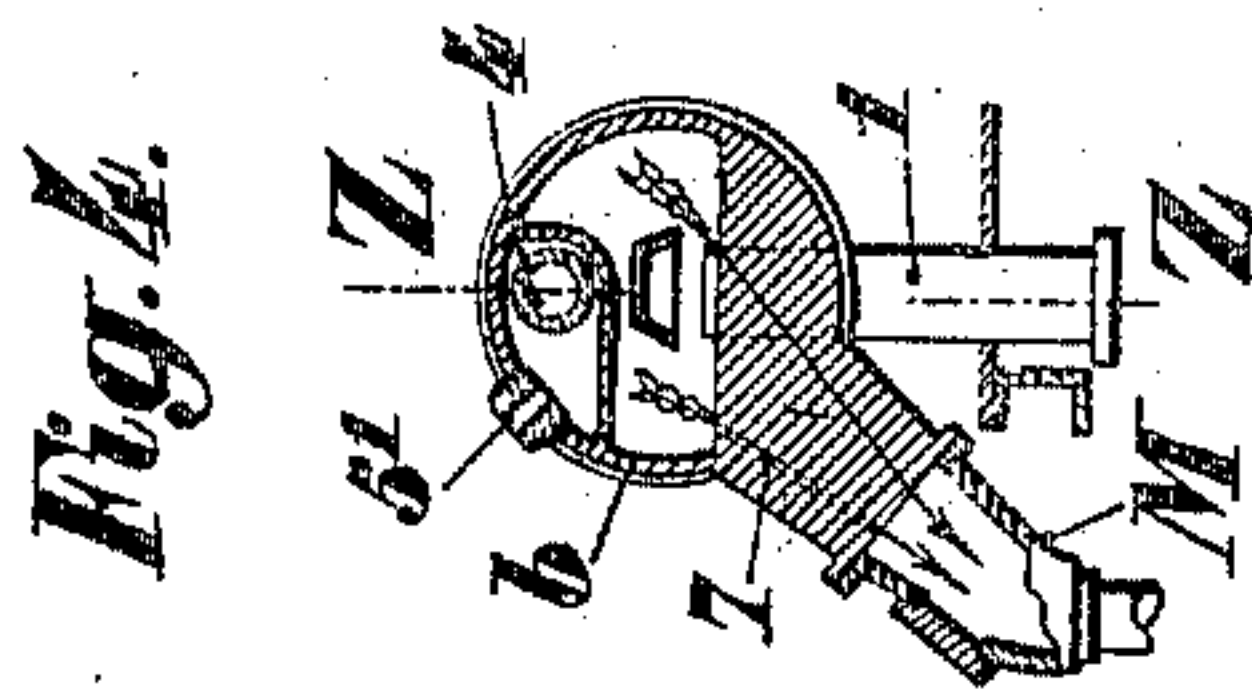
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3 SHEETS—SHEET 2.



Witnesses:

*W. B. Keeler*

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*Louis M. G. Delaunay Belleville*

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3 SHEETS—SHEET 3.

Fig. 5.

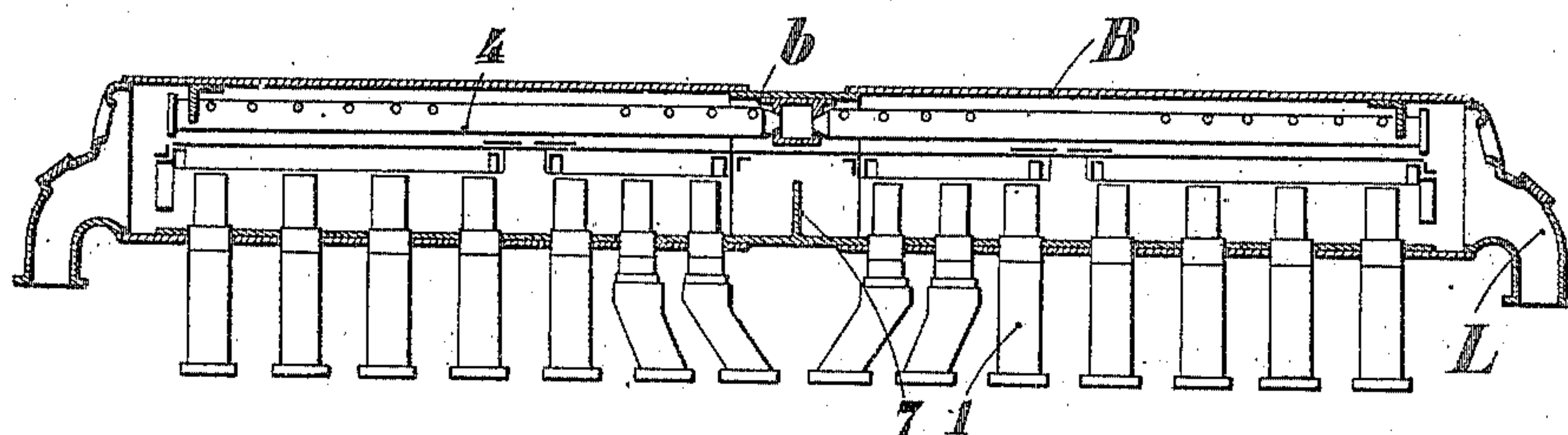


Fig. 6.

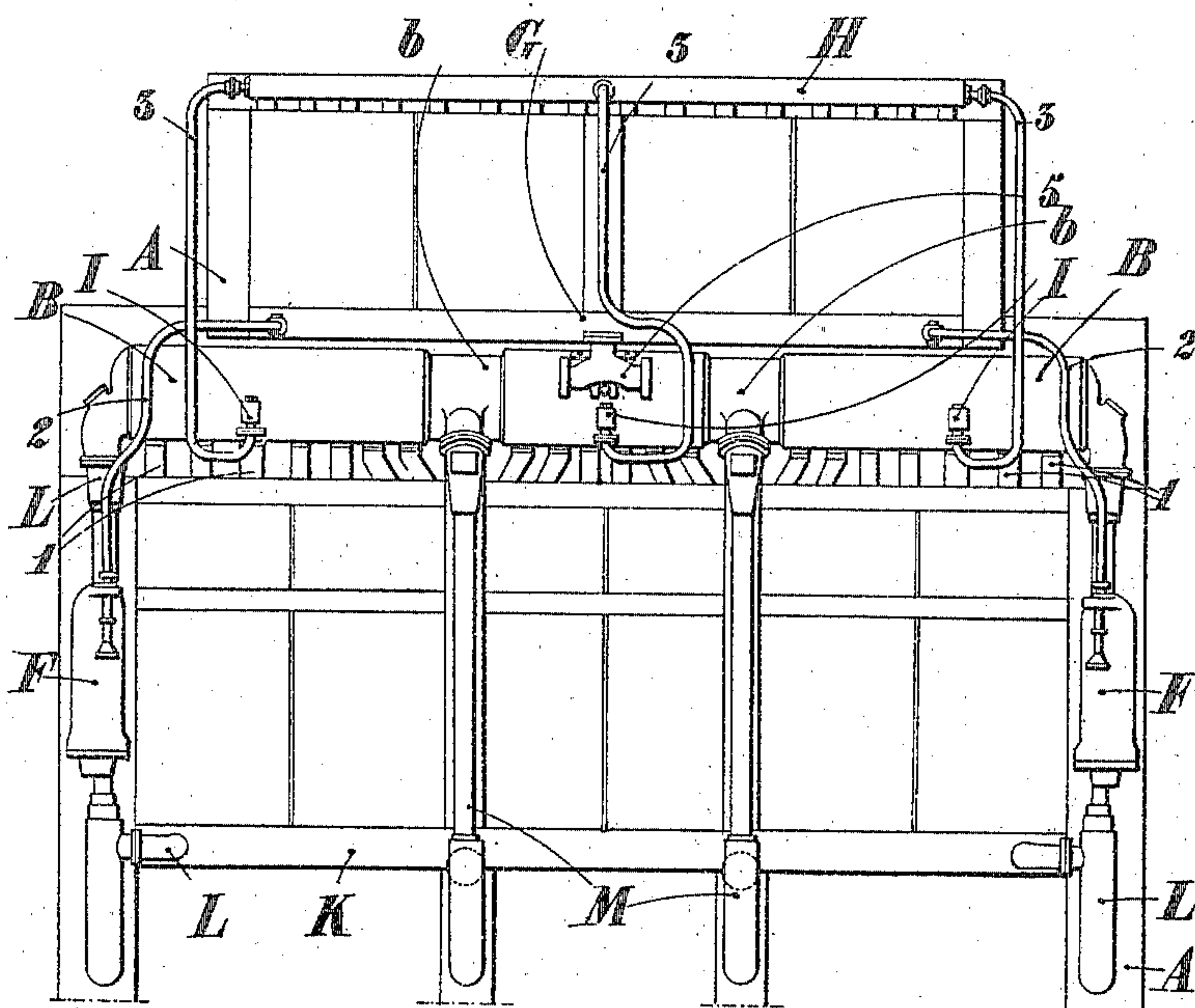
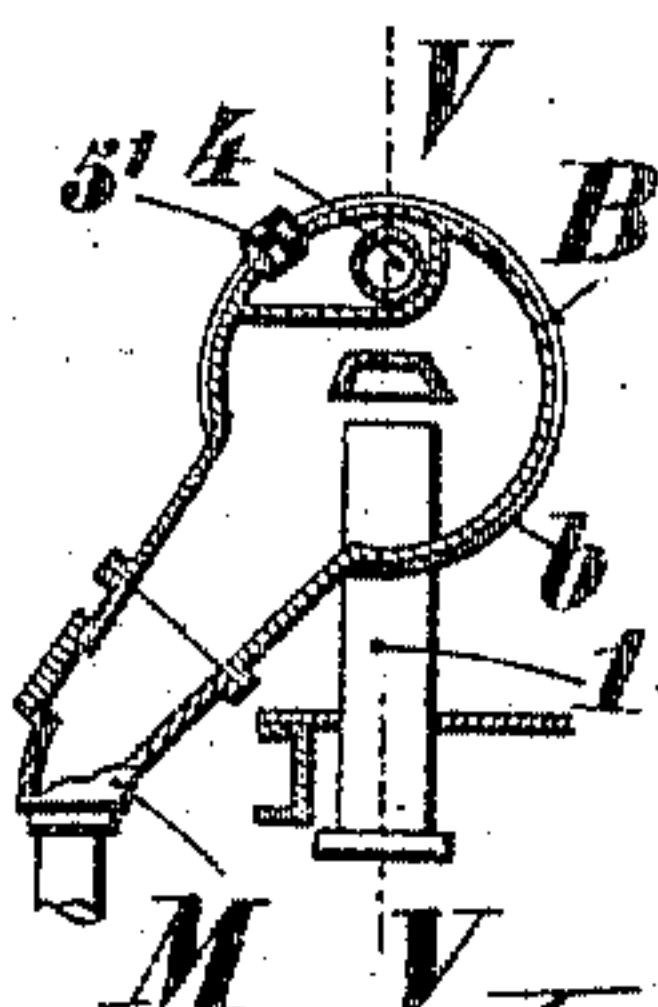


Fig. 8.



Witnesses;

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*Louis M. G. Delaunay Belleville*

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# UNITED STATES PATENT OFFICE.

LOUIS MARIE GABRIEL DELAUNAY-BELLEVILLE, OF PARIS, FRANCE.

## HIGH-POWER BOILER.

951,679.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed February 25, 1908. Serial No. 417,639.

*To all whom it may concern:*

Be it known that I, LOUIS MARIE GABRIEL DELAUNAY-BELLEVILLE, citizen of the French Republic, residing at Paris, Department of the Seine, France, have invented certain new and useful Improvements in High-Power Boilers, of which the following is a specification.

The invention has for its object a high-power boiler, constituted by a certain number of generators arranged in juxtaposition and having in common feed collectors and a steam collector.

The accompanying drawings show, by way of example, the application of the principle of the invention to Belleville generators, but this invention extends to all water tube generators comprising a transverse steam collector at the upper part and a transverse feed collector at the lower part.

Figures 1 to 5 represent a boiler composed of fourteen vaporizing elements of the Belleville type, a number which is larger than the exigencies of an efficient operation would permit of attaining with the arrangements heretofore adopted; the novel arrangement consists in providing this boiler with an intermediate return and with two feed injectors. The assemblage thus comprises three water returns and three ejectors; one at each extremity and one in the middle of the boiler. Fig. 1 is a front elevation of the boiler. Fig. 2 is a section on the line X—X of Fig. 1. Fig. 3 is a front elevation of the steam collector. Fig. 4 is a section on the line Y—Y of Fig. 3. Fig. 5 is a section on the line Z—Z of Fig. 4. Figs. 6 to 9 relate to a boiler composed of eighteen vaporizing elements of the Belleville type; in this case there are two intermediate water returns and three feed injectors. The assemblage comprises four water returns and four ejectors; one at each extremity and two intermediate. Fig. 6 is a front elevation of the boiler. Fig. 7 is a front elevation of the purifying collector. Fig. 8 is a section on the line T—T of Fig. 7, and Fig. 9 is a section on the line V—V of Fig. 8.

The water enters the boiler through one of the regulators F. One of these regulators is arranged at the right hand of the boiler and the other at the left hand in communication with the adjacent elements. In the case of a very large boiler a third regulator may be

mounted in communication with the middle elements of the boiler. The water issuing from one of the regulators F passes through the tubes 2 and passes into the feed collector G of the re-heater which extends throughout the entire width of the boiler. The water then enters the re-heaters E and then the hot water collector H arranged at the outlet from the re-heater. The elements G and E are not indispensable and may be omitted. On leaving H, the water passes through the tubes 3—3 to the injectors I—I which give access to the general steam collector B. There are as many feed injectors on this collector as there are assembled lengths. Each feed injector is in direct communication with the hot water collector H, or in default of a re-heater with a single collector such as G at which the force pipe of the two feed regulators terminates. On leaving the steam collector B, the water descends through the extreme returns L—L and through the intermediate returns M—M which are fixed at the end of the sockets which carry the ferrules b—b. These ferrules b—b serve for assembling two adjacent lengths of the steam collector B; they may be of molded steel.

The returns L and M conduct the water into the feed collector K which distributes it between the vaporizing elements C arranged directly above the furnace 6. The steam is formed in the tubes of these elements. In cases in which the feed collector is divided, the return M is mounted upon a socket which places the two adjacent lengths of the collector K in communication.

By employing one or more intermediate returns, the feeding of water to the middle portions of the feed collector K and the generating elements is rendered more efficient, for in that case, the water has shorter paths to traverse from the respective returns M to the different parts of the collector K and the generating elements communicating therewith, as compared to those cases wherein the intermediate portions of the collector and of the generating elements are fed solely from the ends or extremities of the collector. This arrangement is particularly advantageous by reason of the fact that the middle portions of the feed collector and of the vaporizing or generating elements are more highly heated than are the outer ends of these parts, the intermediate returns serving



to conduct the water directly to these highly heated portions and thus insure an even circulation of the water and uniform generation of steam.

5 In the case of marine boilers the ferrule 6 is provided with a median partition 7 (Figs. 3 and 4). In the case of rolling or pitching this partition forces the water in that part of the steam collector which is momentarily  
10 the highest to return to the central parts of the feed collector, instead of rushing to the lowest part of the steam collector whence it might enter the return leading to one extremity of the feed collector and thus fail  
15 to enter an intermediate return leading to an intermediate portion of the feed collector. This partition is of no use in the case of generators arranged at a fixed station. It is not shown in Figs. 7 and 8 representing  
20 the boiler with 18 elements.

The vaporizing elements may be of any desired number in each of the lengths of the steam collector, but as regards uniformity in the construction it is preferable  
25 that they should be the same number of elements for each length of the collector. The feed water is thus better distributed and more uniformly heated in contact with the steam and with the outlet of the vaporizing elements.  
30

The steam which issues from the tubes C reaches the steam collector through the tubes  
35 1<sup>1</sup> 1. The steam supply tubes 1 are arranged as indicated in Figs. 3 and 5. At the upper part of the reservoir B steam supply tubes 4 are situated. These tubes are provided with valves 5. In the case of a very large boiler two steam supply valves  
40 5<sup>1</sup> 5<sup>1</sup> may be provided instead of one. The steam proceeds to the super-heating tubes D and then leaves the boiler. In cases where there is no super-heater, its place may be occupied by the re-heater or the steam collector is arranged immediately above the  
45 vaporizing tubes and the tubes 1<sup>1</sup> are dispensed with. There is however nothing arbitrary about the arrangements shown in the drawing.

If it is desired to construct a boiler of 24  
50 vaporizing elements a steam purifier formed of three lengths each comprising eight elements may be employed. In this case, the boiler will have three feed injectors and two intermediate water returns. The purifying  
55 collector may also be constructed in four lengths of six elements; there are then four feed injectors and three intermediate water returns. Whatever the combination adopted may be it is essential that the boiler should  
60 be provided with at least two automatic feed regulators arranged at the two extremities of the façade and in communication with the adjacent elements.

It is the height of the apparent level

which, by the intermediary of a float, regulates the aperture of the feed cock; now for a given quantity of water in the boiler the height of the level depends upon the activity of the fire. There may be an appreciable difference between the intensity of the  
65 fire at the two extremities but each of the automatic feed regulators supplies on its side a quantity of water proportionate to the activity of the fire to which the corresponding elements are subjected. It may  
70 even be advantageous in the case of a very large boiler, to arrange the third automatic feed regulator in the median part of the boiler. This auto-motor will regulate the feed appropriately for the fire to which the  
75 corresponding elements are subjected. The partial feeds thus obtained become merged in the steam purifier collector forming a composite feed which is suitable for the boiler as a whole.  
85

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A steam boiler comprising a steam collector divided by a partition into sections, a feed collector arranged below it, a steam generating element connected respectively to the said steam and feed collectors, returns  
90 connecting the ends of the steam and feed collectors respectively, and an intermediate return connecting the steam and feed collectors at points intermediate their respective ends, the inlet of the intermediate return being divided by said partition in the  
95 steam collector. 100

2. A steam boiler comprising a steam collector composed of a set of sectional lengths, a feed collector arranged below the steam collector, returns establishing communication  
105 between the ends of the steam and feed collectors respectively, intermediate returns communicating with the steam collector at the junction points between its sectional lengths thereby communicating with the adjacent  
110 lengths of the steam collector and connected to intermediate portions of the feed collector, a steam generating element communicating respectively with the steam and feed collectors and feed injectors communicating with the respective sectional  
115 lengths of the steam collector.

3. A steam boiler comprising a steam generating element, a sectional steam collector extending transversely at the upper portion  
120 of the boiler and communicating with the generating element, a feed collector also extending transversely of the boiler below the steam collector and communicating with the generating element, return pipes establishing  
125 communication between the respective ends and the intermediate portions of the steam and feed collectors, a pair of feed

regulators arranged at the respective ends  
of the steam and feed collectors, and in-  
jectors connected to receive feed water from  
the respective regulators and discharging  
5 into the respective sections of the steam col-  
lector.

In testimony whereof I have hereunto set

my hand in presence of two subscribing wit-  
nesses.

LOUIS MARIE GABRIEL  
DELAUNAY-BELLEVILLE.

Witnesses:

H. C. COXE,  
EMILE KLOTZ.