

W. F. SELLERS & C. J. DAVIDSON.
BOILER.

APPLICATION FILED APR. 9, 1909.

976,103.

Patented Nov. 15, 1910.
3 SHEETS—SHEET 1.

Fig. 1.

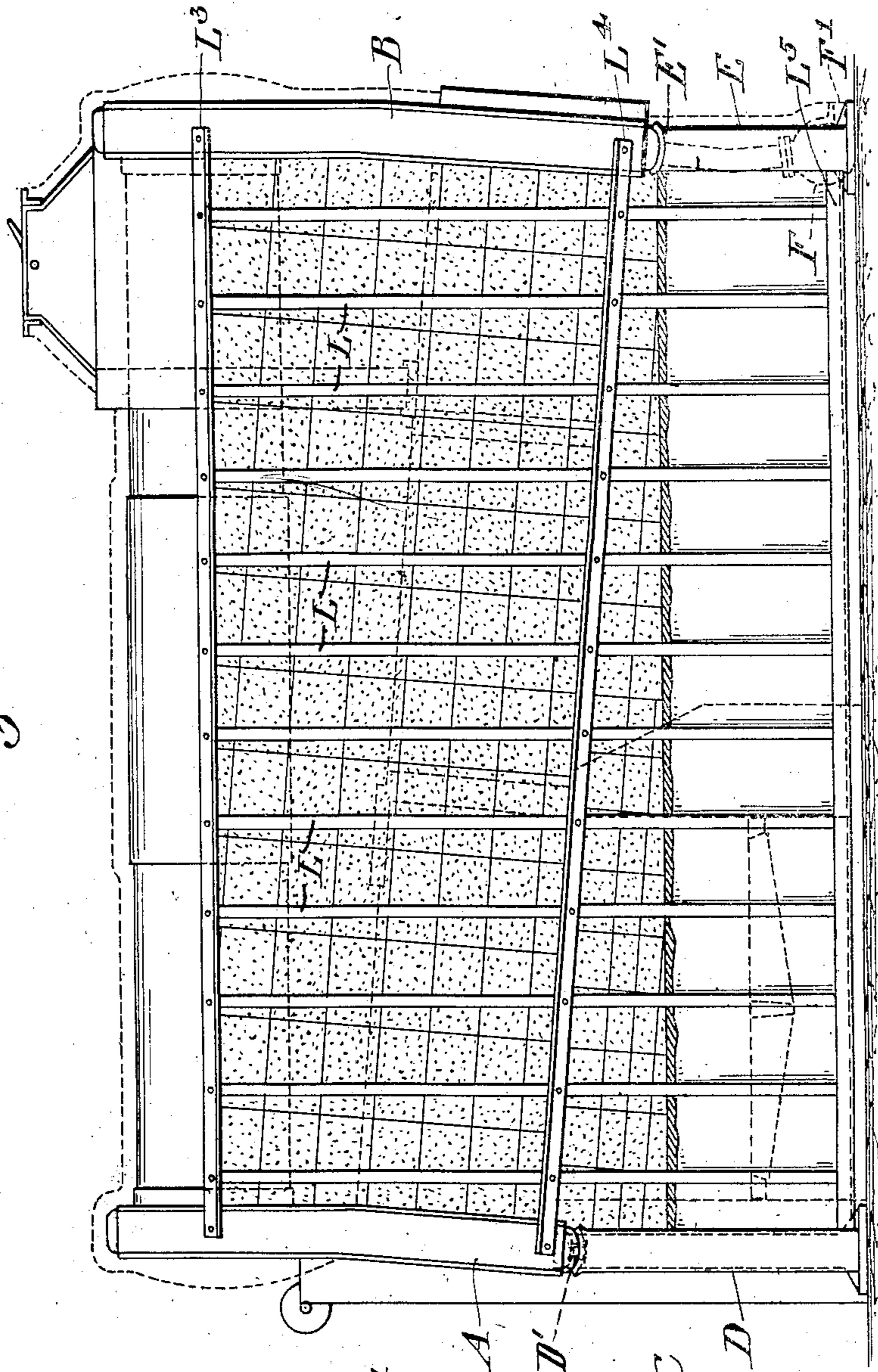


Fig. 2.

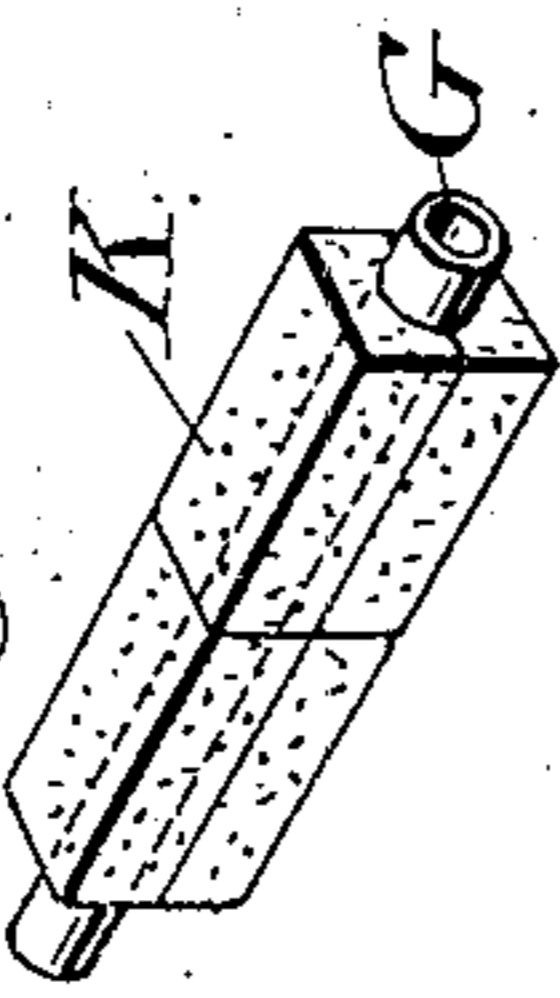
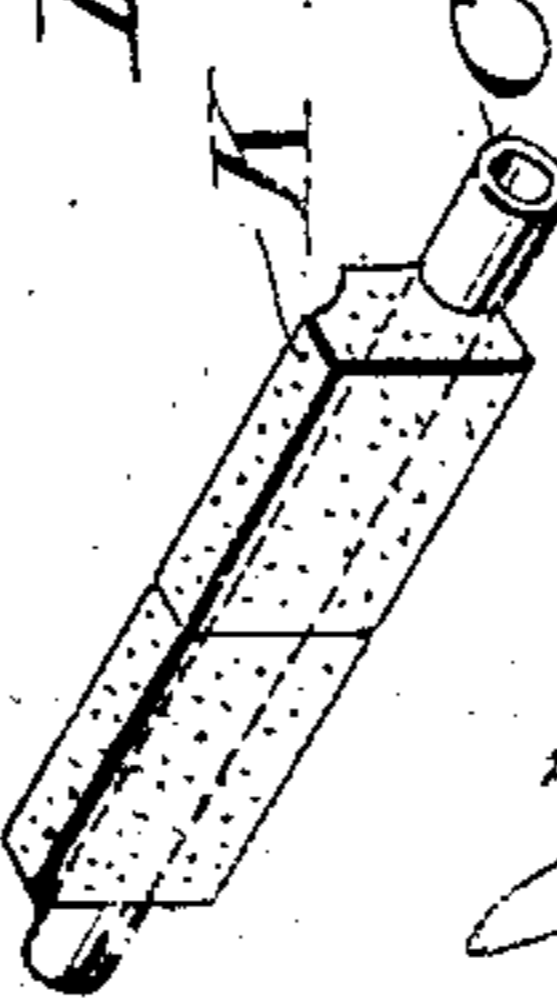


Fig. 3.



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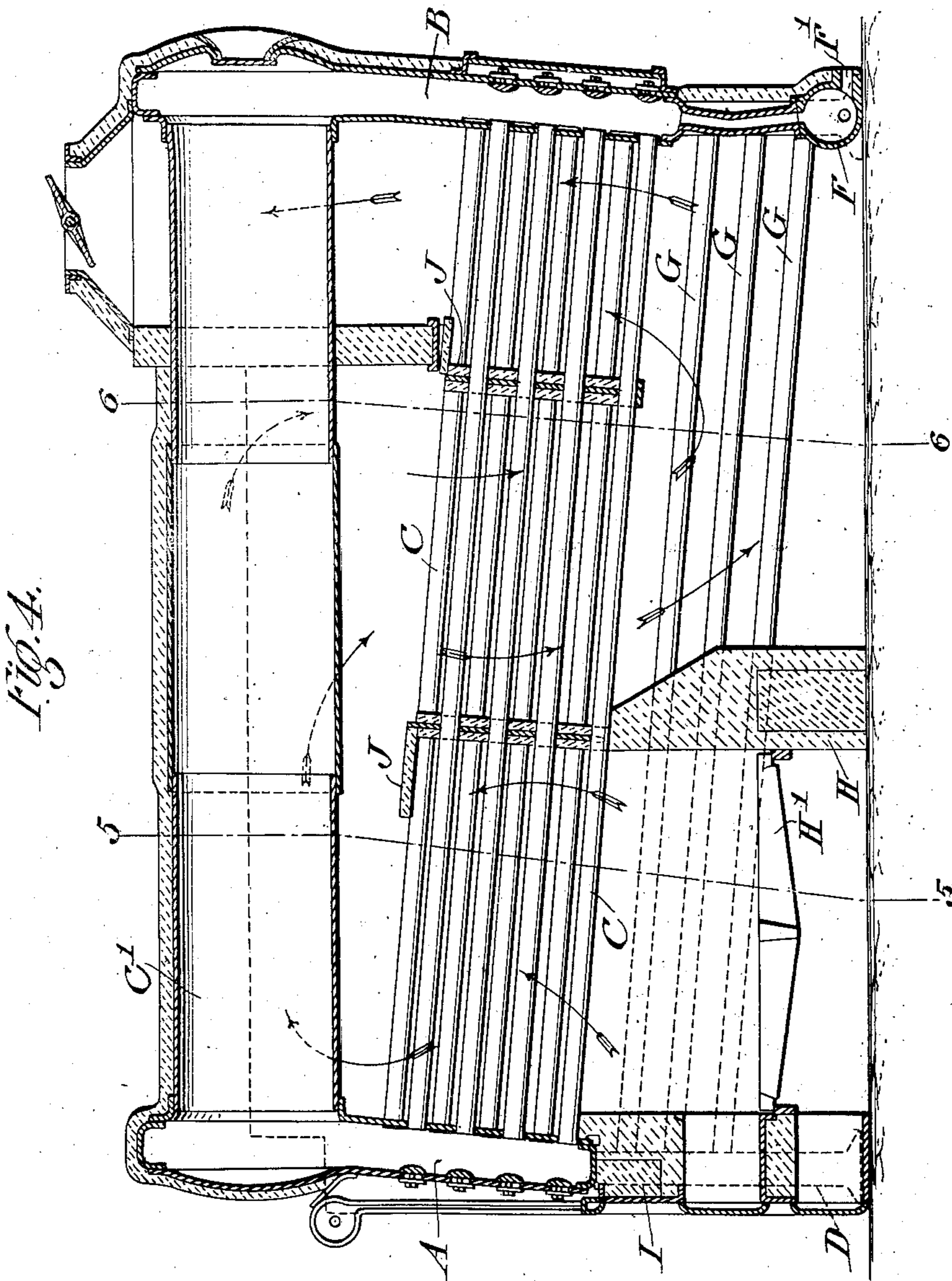
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

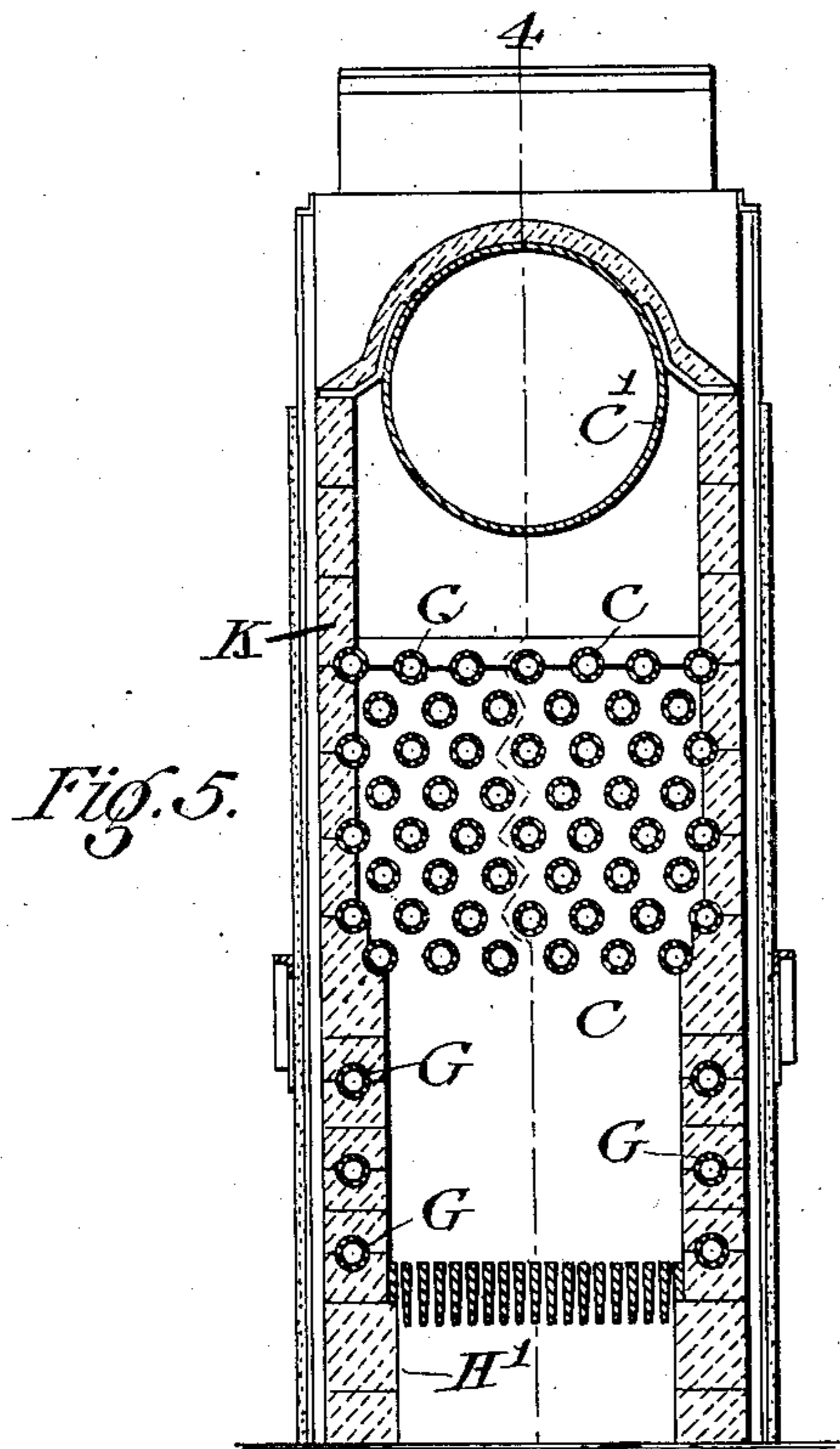


Fig. 5.

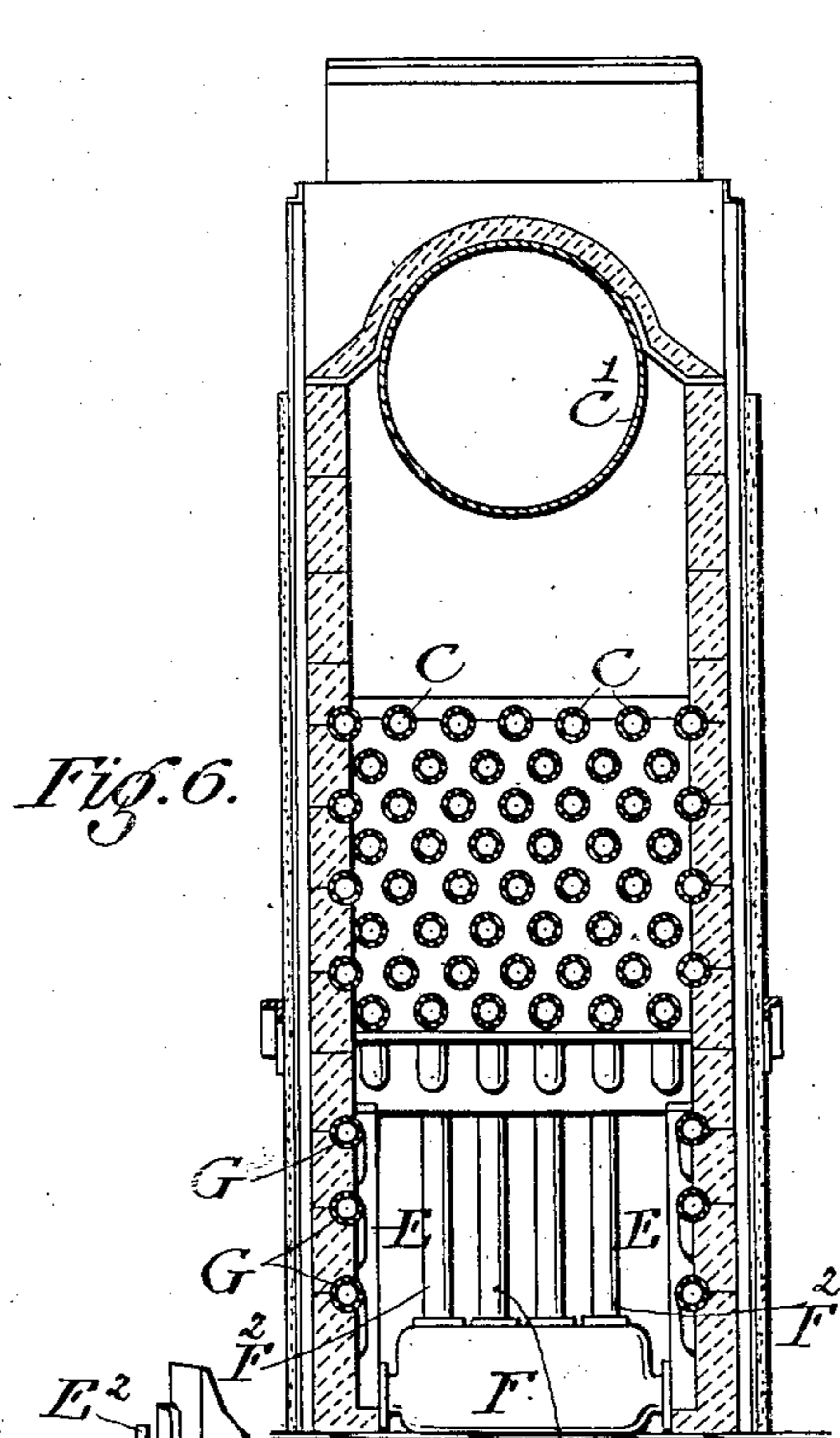


Fig. 6.

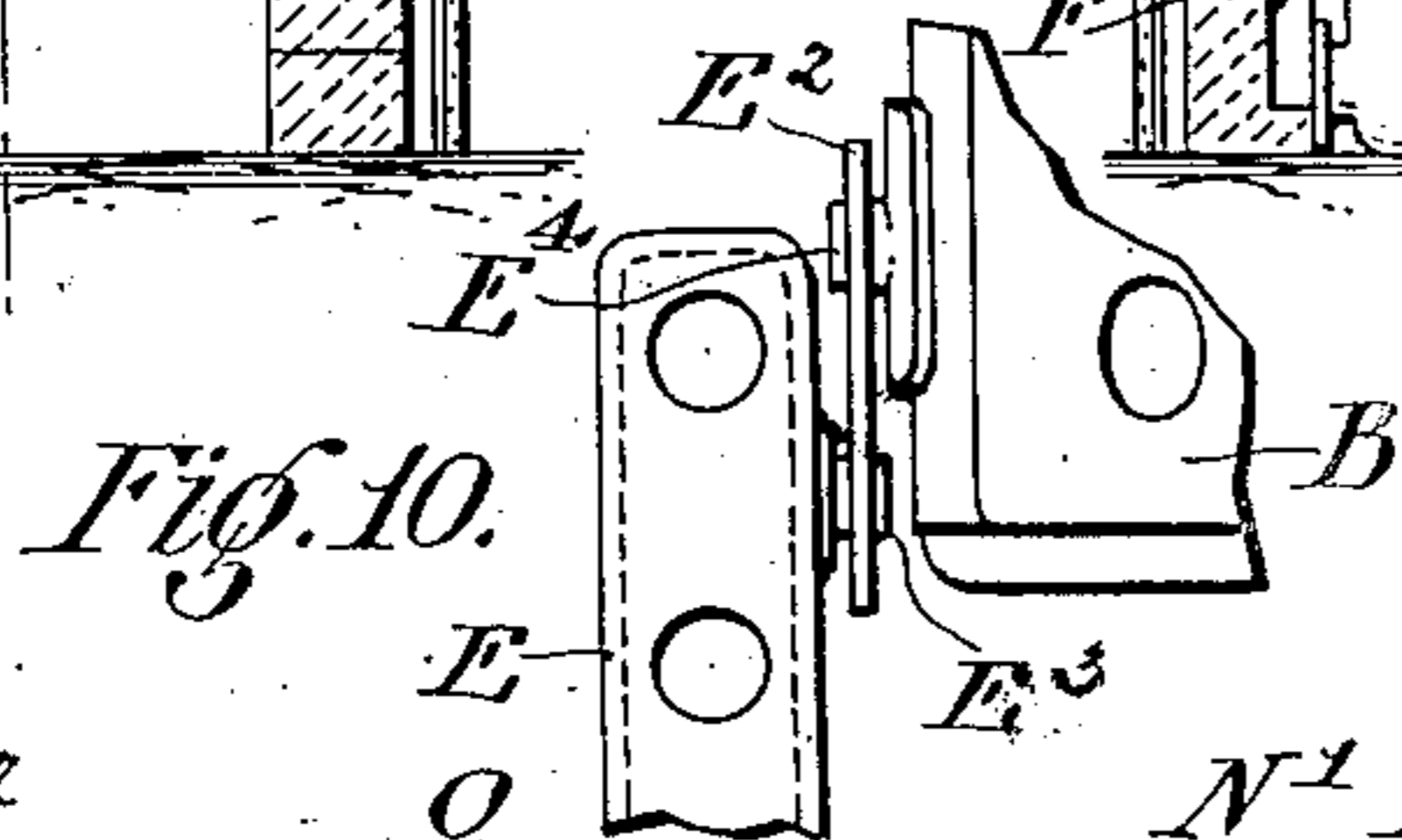


Fig. 10.

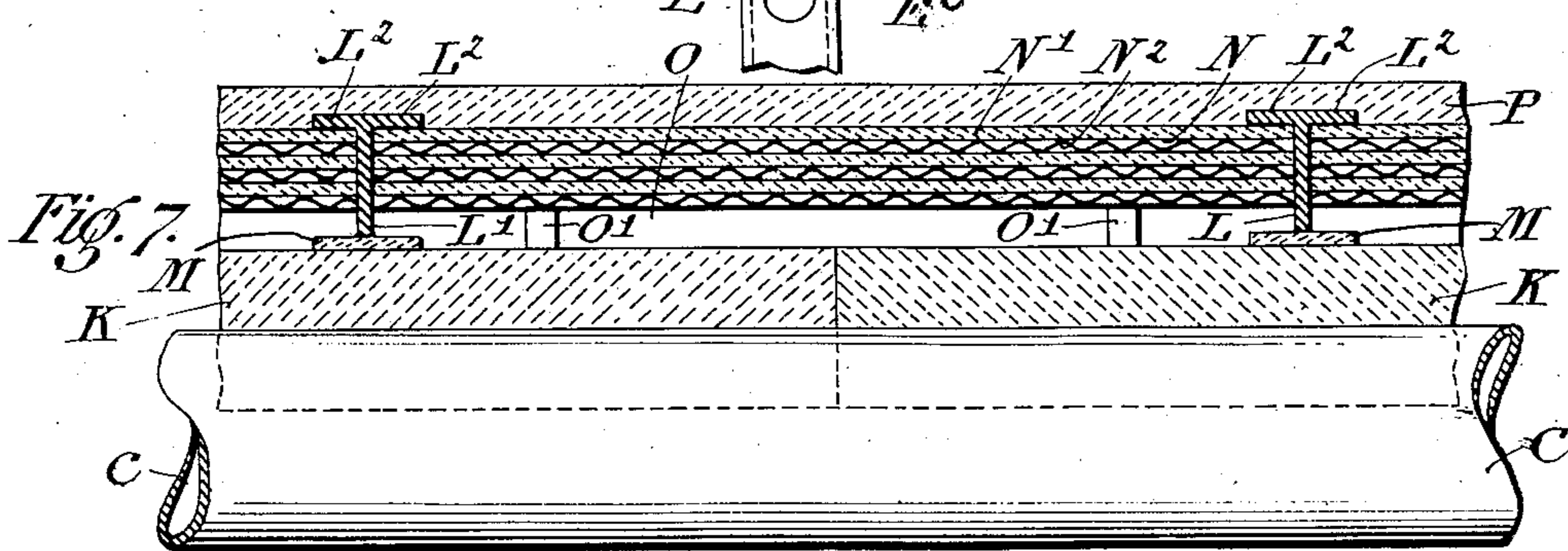


Fig. 7.

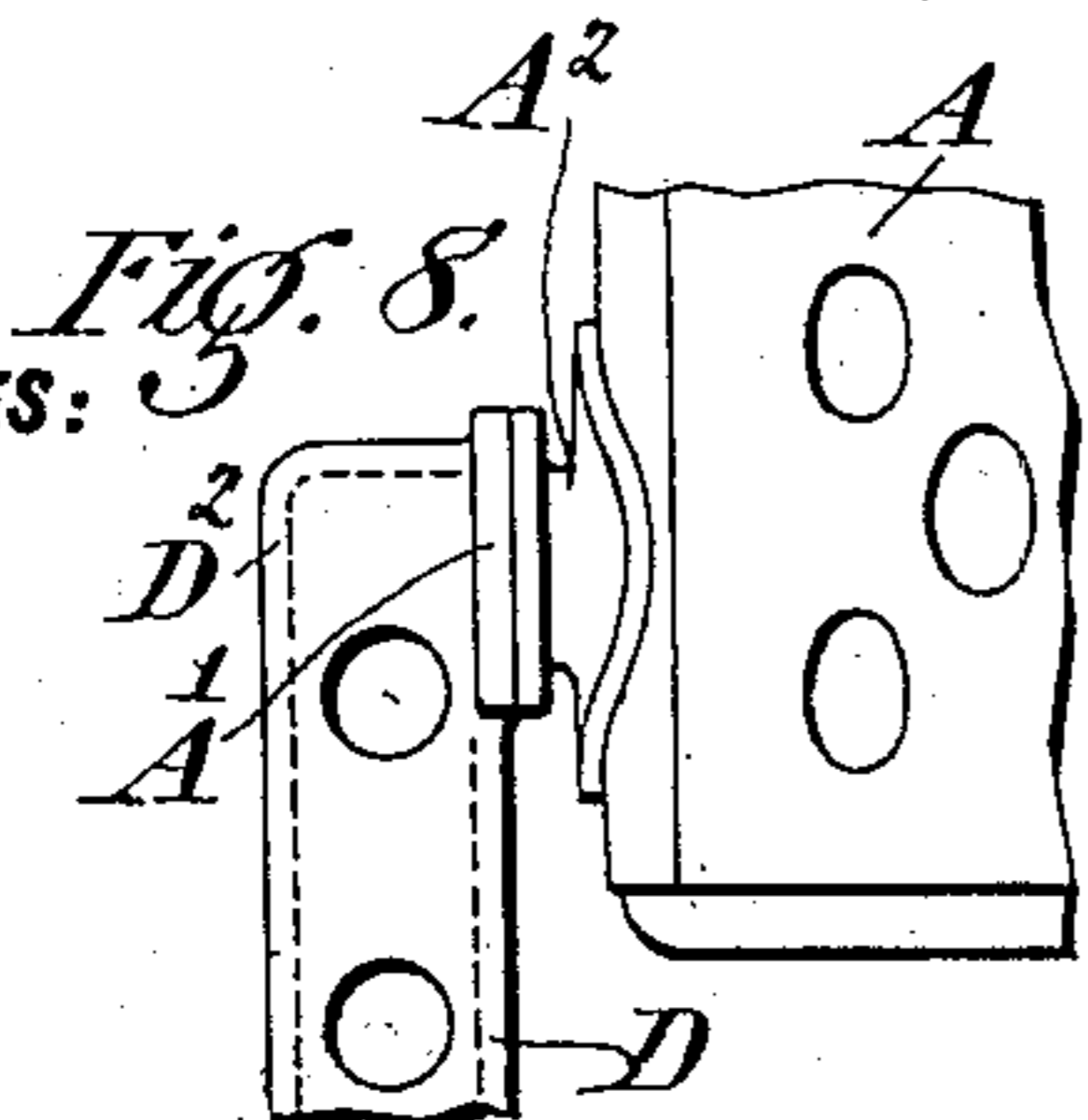


Fig. 8.

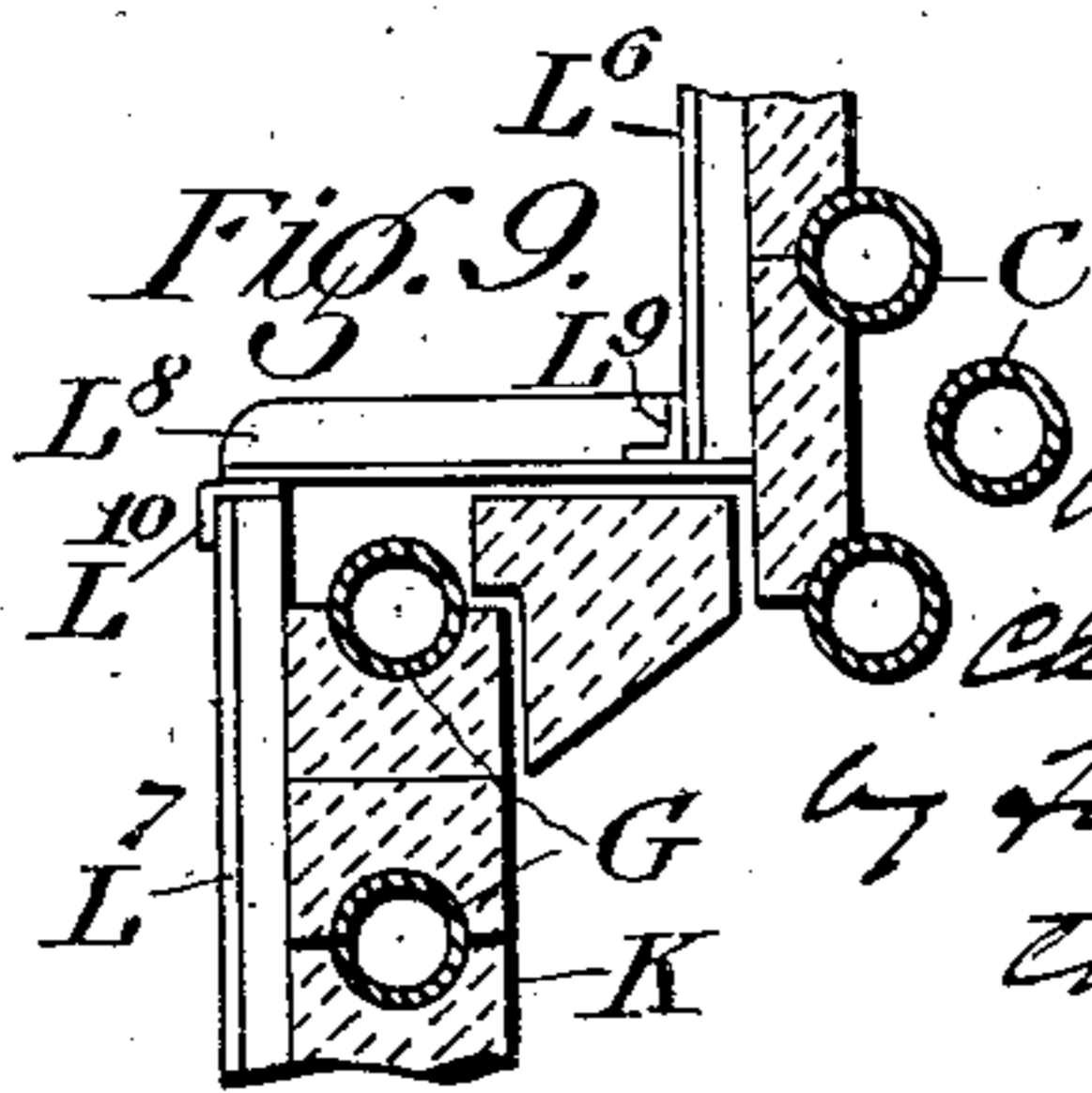


Fig. 9.

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UNITED STATES PATENT OFFICE.

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BOILER.

976,103.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Original application filed March 15, 1907, Serial No. 362,541. Divided and this application filed April 9, 1909. Serial No. 488,834.

To all whom it may concern:

Be it known that we, WILLIAM F. SELLERS, residing at Wilmington, county of Newcastle, State of Delaware, and CHARLES J. DAVIDSON, residing in Milwaukee, county of Milwaukee, and State of Wisconsin, both citizens of the United States of America, have invented a certain new and useful Improvement in Boilers, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

This invention relates to steam generating boilers and is particularly designed for use with the box header type of water tube boiler, though the invention in all of its aspects is not limited to such use.

The object of the invention is to improve a boiler of this kind by providing a novel housing therefor, characterized by its mechanical strength, heat insulating properties, durability, and the ease and comparatively low cost of assembling it and repairing it when necessary.

The various features of novelty which characterize our invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of our invention, however, and the advantages possessed by it, reference may be had to the accompanying drawings and descriptive matter in which we have illustrated and described forms in which our invention may be embodied.

Of the drawings Figure 1 is a side elevation of a boiler with the outside heat insulating covering shown in dotted lines. Fig. 2 is a perspective view of a portion of a tube and the tiling or brick in which it is totally embedded. Fig. 3 is a view similar to Fig. 2 showing a construction in which the tube is only partially embedded in the tiling. Fig. 4 is a sectional elevation of the boiler, taken on the line 4—4 of Fig. 5. Fig. 5 is a sectional elevation on the line 5—5 of Fig. 4. Fig. 6 is a sectional elevation on the line 6—6 of Fig. 4. Fig. 7 is a sectional plan showing a portion of the side wall of the boiler housing. Fig. 8 is a partial front end elevation showing a modified form of connection of the front header to the water legs. Fig. 9 is a partial

transverse section of the boiler containing the modification of Fig. 8 taken similarly to Fig. 5 but with the outer heat insulating jacket removed. Fig. 10 is a partial rear end elevation of the rear header showing a third arrangement of supporting the rear header and connecting it to the water legs.

In the form of our invention shown in Figs. 1 to 7, the boiler proper consists of a front box-like header A and a rear box-like header B, which are connected at their lower ends by the usual set of inclined water tubes C and at their upper ends by the usual horizontal steam and water drum or large tube C¹. The front header A to which the upper ends of the tubes C are connected is supported by two hollow columns or water legs D, which engage the under ends of the header at opposite sides of the boiler. Each column D is placed in communication with and mechanically connected to the header A by a nipple D¹. The rear header B is supported by two hollow columns or water legs E located one at each side of the boiler. As shown, bearing plates E¹ are located between the header B and the upper ends of the columns E, to permit the sliding movement between the header B and the water columns E resulting from the expansion and contraction of the boiler parts as their temperatures vary. The water columns E are connected at their lower ends by a mud drum F, having a blow-out aperture F¹. The drum F is in communication with the header B through flexible conduits or tubes F². The columns D and E at each side of the boiler are connected to each other by a set of inclined tubes G which are in the same vertical plane with, and are parallel to, the corresponding outside row of tubes C. It will, of course, be understood that the front header of the boiler may be movably supported by the water columns and the rear header rigidly supported instead of as in the arrangement just described.

The usual abutment or wall H forms the rear wall of the fire box and supports the rear ends of the grate bars H¹, the front ends of which are supported by the front wall I of the fire box. The usual diaphragms or baffles J are provided to cause the flame to circulate in the manner indicated by the large arrows in Fig. 4.

The side walls of the furnace are lined by blocks of heat resisting tile or brick K. As shown in Figs. 5 and 6, the tiles K are so formed that the outer halves of the outer row of tubes and the portions of the tubes G at the rear of the wall H are partially embedded in the tiling, while the portions of the tubes G at the side of the fire box are entirely embedded in the tiling.

The tiling is held in place against the tubes C and G by an outer frame-work consisting of vertical metal bars L, each of which in the form shown has a portion of rib L¹ extending transversely to the side of the furnace, and having its inner edge bearing against the outer surface of the tiling, and cross bars L³, L⁴ and L⁵. From the outer edge of each rib L¹ extend flanges or ribs L², which are parallel to the side of the furnace. Pads M of suitable heat insulating material are preferably inserted between the tiling and the adjacent edge of the rib L¹. In the form shown the upper cross bars L³ and L⁴ are riveted at their ends to the headers A and B and the lower cross bars are anchored in any suitable manner to the boiler structure or foundation. Between each adjacent pair of ribs L¹ and between the tiling and the flanges L² are removably inserted a series of blocks N of a heat insulating material. These blocks may consist of layers N¹ of an asbestos composition having air cells N² formed in them. Preferably an air space O is formed between the tiling and the blocks N. The blocks and the tiling may be spaced apart to form the air space O, by the spacers O¹ which may be in the form of lugs formed either on the tiling or on the blocks. The boiler as a whole may be covered by a jacket or coating of a heat insulating plaster or compound P. It will be understood that the boiler is connected at its rear end to a source of cold water in any suitable manner (not shown in the drawings).

With the construction described the circulation through the tubes G is as follows: Relatively cold water enters the drum F from the header B through the tubes F². From the drum F water passes into the columns E, and from them through the tubes G and water columns D into the header A. The circulation of the water through the tubes G not only increases the capacity of the boiler by increasing the effective heating surface, but also prolongs the life of the tiling by withdrawing heat from it as well as directly from the flame. The water columns and tubes serve, therefore, not only as an effective support for the boiler setting, but also as an efficient feed water heater, while at the same time they make the boiler more durable. We make no claim herein, however, to the arrangement of the hollow supporting columns and connecting tubes

broadly. Such parts are claimed herein only in combination with the other features which unite to form the boiler housing. The arrangement of hollow supporting columns and connecting tubes in conjunction with the box header type of water tube boilers is claimed independently of the housing in our copending application Serial No. 362,451, filed March 15, 1907.

The boiler housing described is simple and relatively cheap to construct, possesses good mechanical and heat insulating properties, and may be repaired with comparative ease.

Under some conditions we find it desirable to make the fire box wider than the boiler proper. One means of accomplishing this is illustrated in Figs. 8, 9 and 10 where the tubes G and front and rear water legs D and E, at one side of the boiler are not in the same plane with the outer row of tubes C but are at one side of said plane. With this construction the front legs D are connected to the header A by means of horizontally extended hollow trunnions or nipples A¹, having flanges A² secured to the header, which trunnions or nipples extend laterally into the legs D through openings formed to receive them. In this form each leg E is provided with a pintle or trunnion E³ and the header B is provided with a similar pintle or trunnion E⁴. A rocker plate E² connects each pair of bosses, being provided with a lower aperture receiving the pintle E³, and an upper aperture receiving the pintle E⁴.

Where the tubes G are spread apart the single vertical tile retaining parts L of the construction shown in Figs. 1 to 9, inclusive, are replaced by similar but shorter upper bars L⁶ at the sides of the tubes C and lower bars L⁷ at the sides of the tubes G. The lower ends of the bars L⁶ are connected to a cross bar L⁹ and the upper ends of the bars L⁷ are connected to a cross bar L¹⁰. Short horizontal bars L⁸ connect the cross bars L⁹ and L¹⁰.

In Fig. 9, as in Figs. 5 and 6, for convenience and simplicity the blocks N and spacers O¹ are omitted. In Fig. 9, also, the outer heat insulating layer P is omitted to simplify the illustration of the feature of the construction intended to be shown by this figure.

While the forms of our invention disclosed have been found in actual practice to be very satisfactory, it will be readily understood by those skilled in the art that changes may be made in the form of our invention without departing from its spirit.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent is—

1. In a water tube boiler having tubes at its sides, a boiler housing having side walls

formed by tiling bearing against the side tubes of the boiler, tiling retaining devices comprising a series of parallel bars at each side of the boiler, the inner edges of said bars holding the tiling against the tubes, each bar being provided at its outer edge with flanges extending toward the adjacent bars and blocks of heat insulating material removably inserted between each adjacent pair of bars and retained in place by said flanges.

2. In a water tube boiler having tubes at its sides, a boiler housing having side walls formed by tiling bearing against the side tubes of the boiler, tiling retaining devices comprising a series of parallel bars at each side of the boiler, the inner edges of said bars holding the tiling against the tubes, each bar being provided at its outer edge with flanges extending toward the adjacent bars, blocks of heat insulating material removably inserted between each adjacent pair of bars and retained in place by said flanges, and means for spacing said blocks away from the tiling.

3. A housing for a boiler having a lower portion of greater width than the upper portion and having tubes at its sides, said housing comprising tiling bearing against said tubes, tiling retaining devices at each

side of boiler, comprising a series of parallel bars at the side of the lower portion of the boiler and a similar series of parallel bars at the side of the upper portion of the boiler, a frame member to which the upper ends of the series of bars at the side of the lower portion are connected, another frame member to which the lower ends of the series of bars at the side of the upper portion of the boiler are connected, and horizontal tie bars connecting said frame members, the inner edges of said bars of said series holding the tiling against said side tubes, and each bar of said series being provided at its outer edge with flanges extending toward the adjacent bars of the same series, and blocks of heat insulating material removably inserted between each adjacent pair of bars and held in place by said flanges.

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