(No Model.)

I. W. SEAVERNS, Jr.

DEVICE FOR PROMOTING COMBUSTION IN BOILER FURNACES.

No. 286,854. Patented Oct. 16, 1883.

Fig. 1.

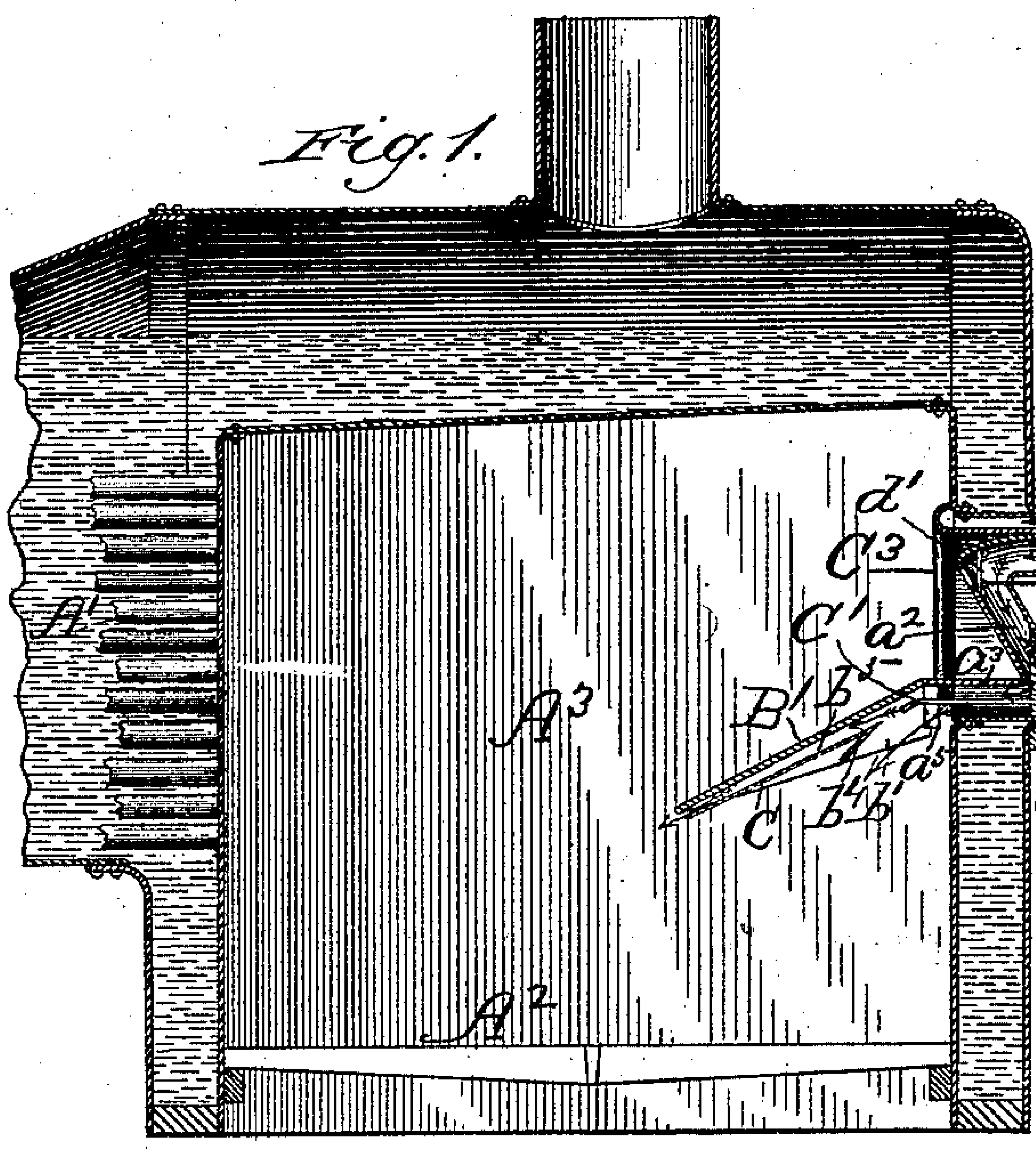


Fig. 2.

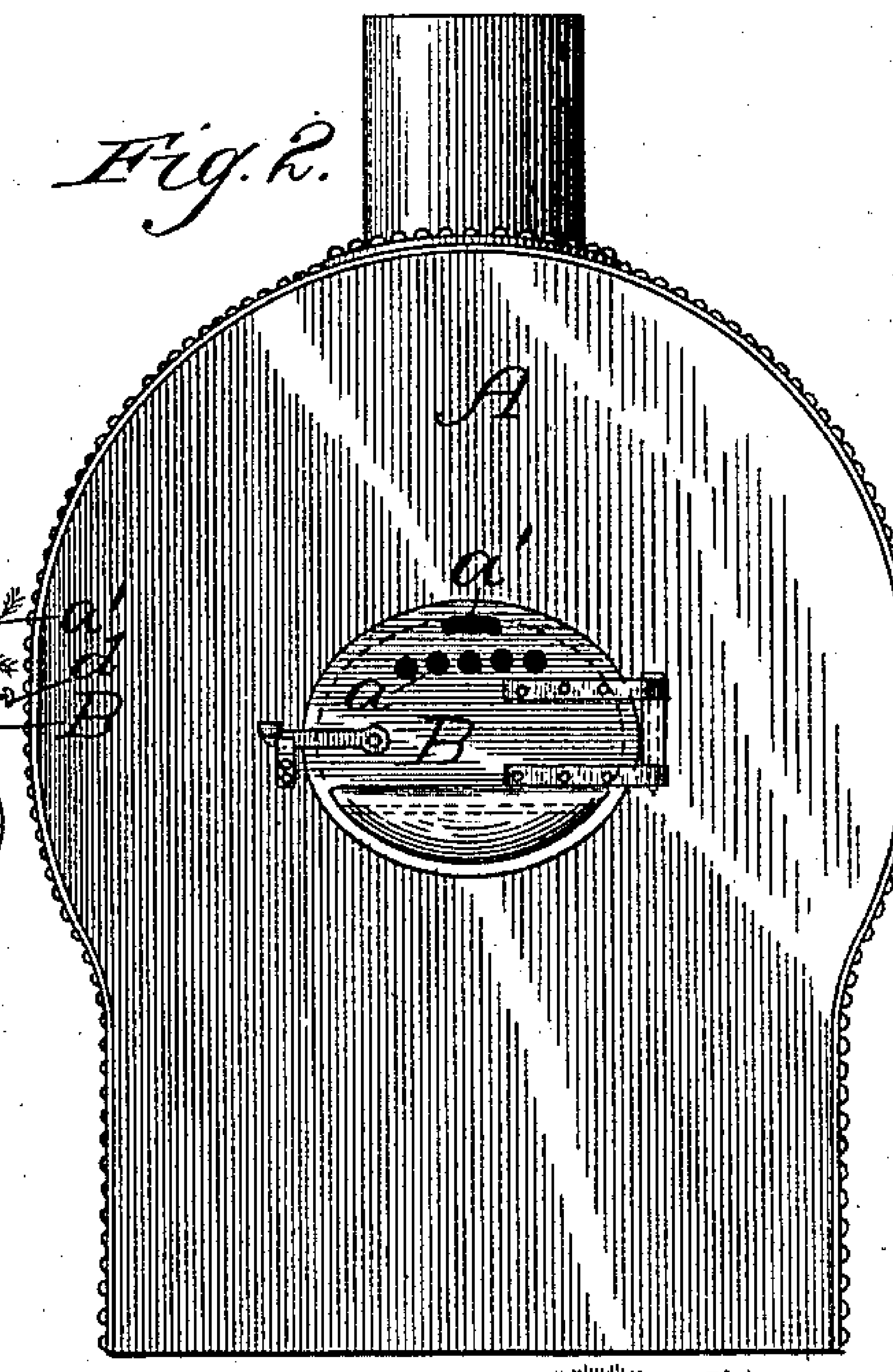


Fig. 3.

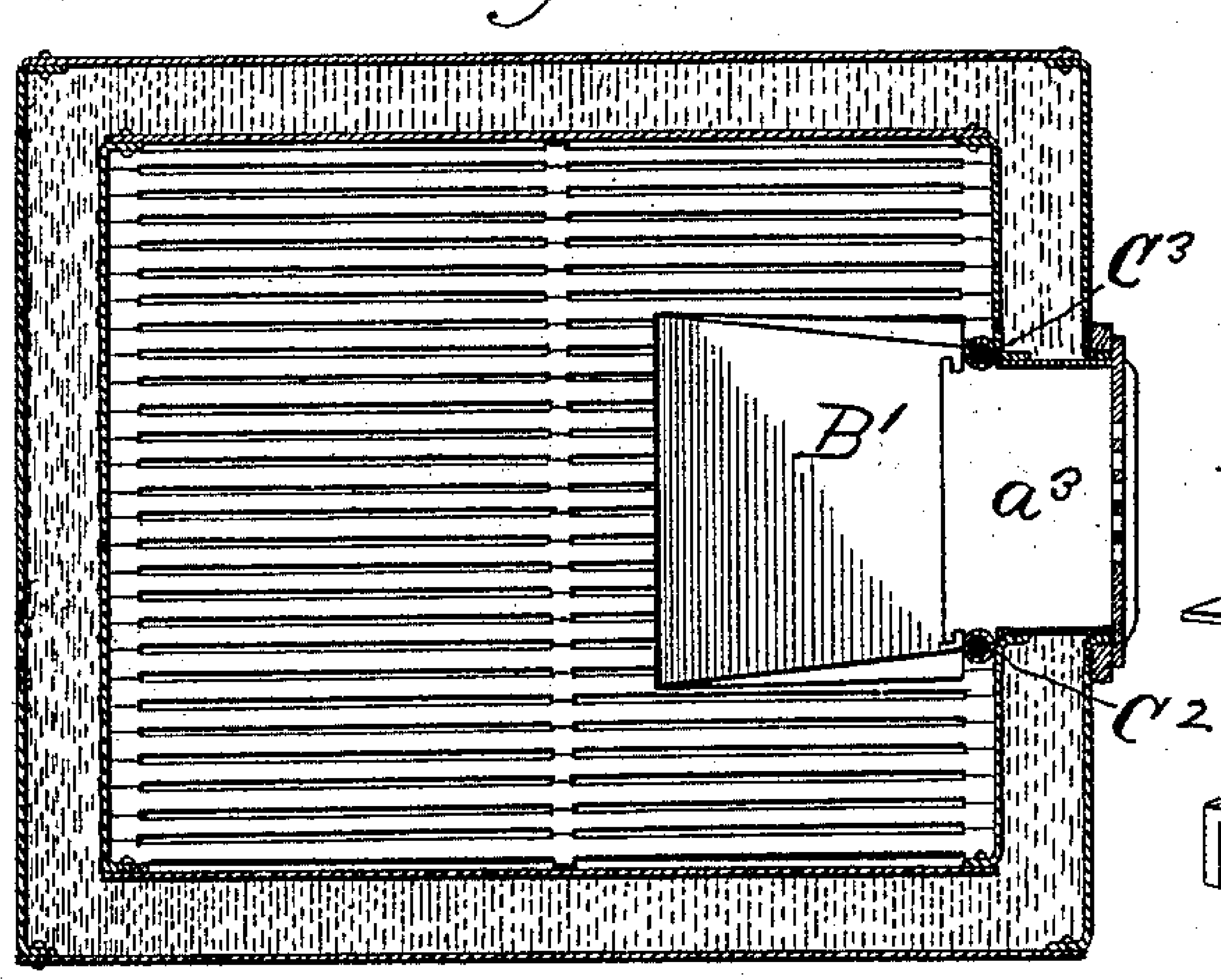


Fig. 4.

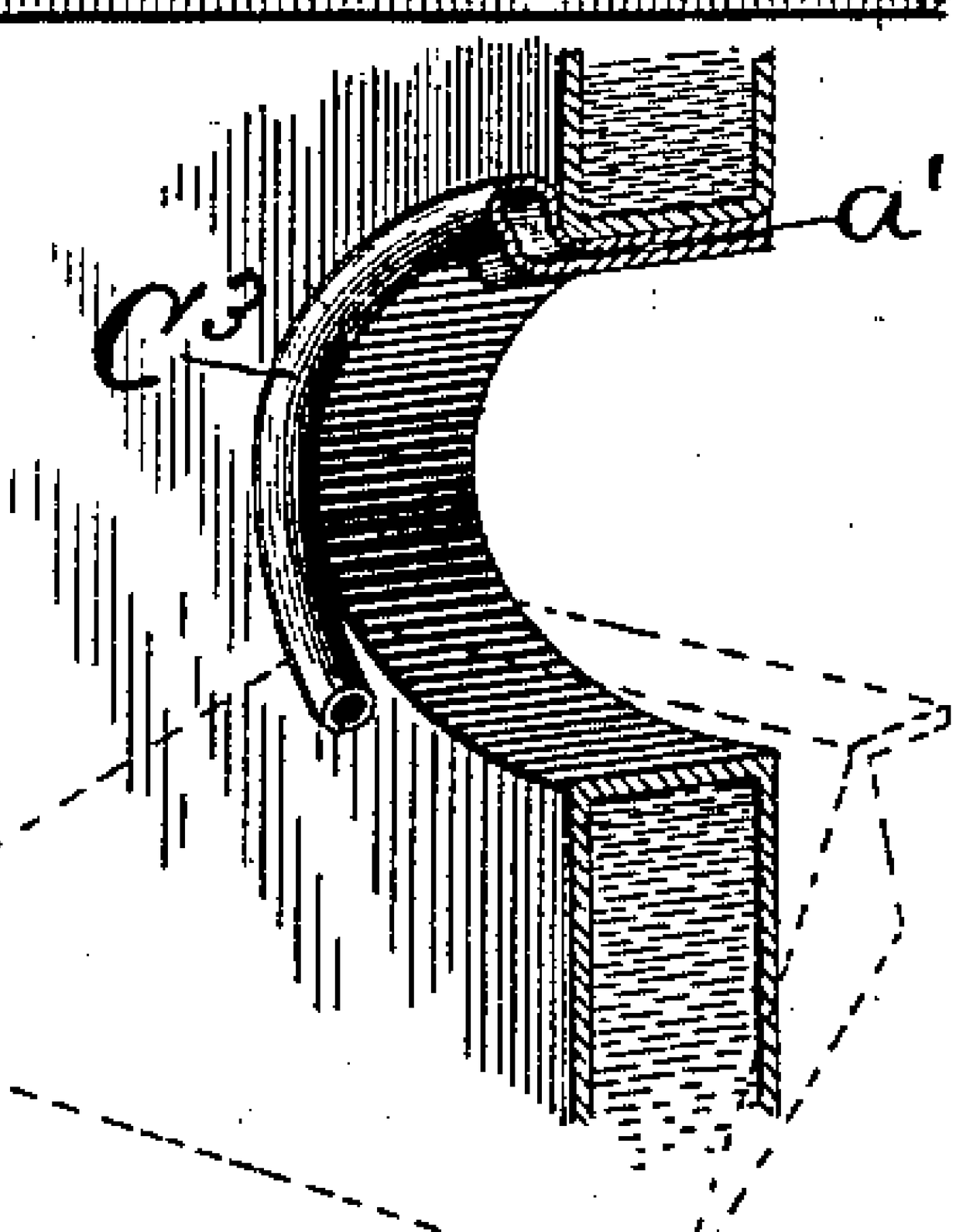
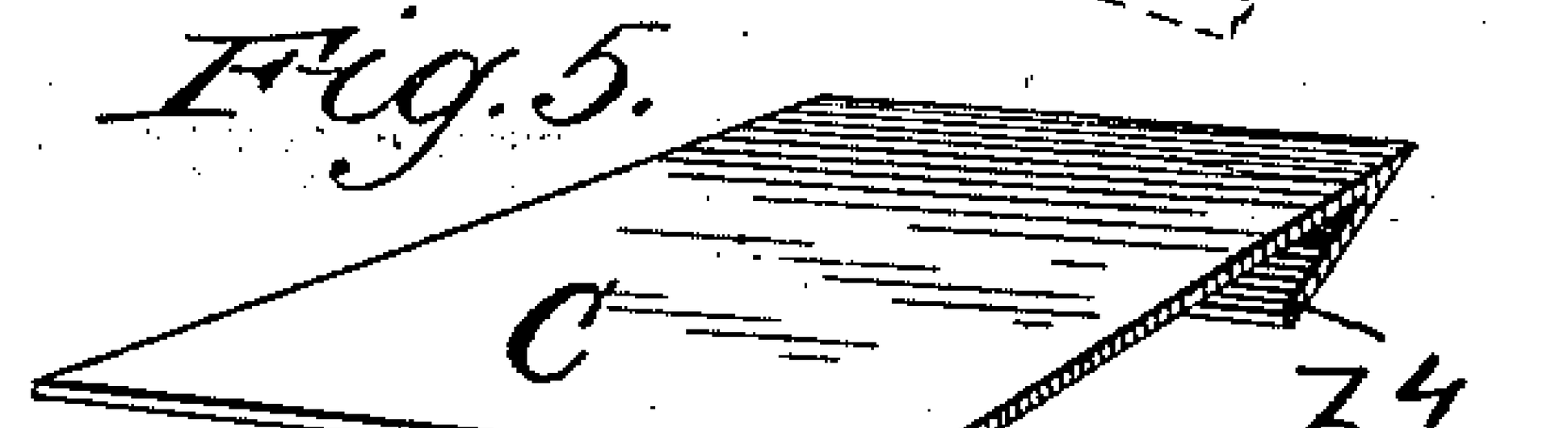


Fig. 5.



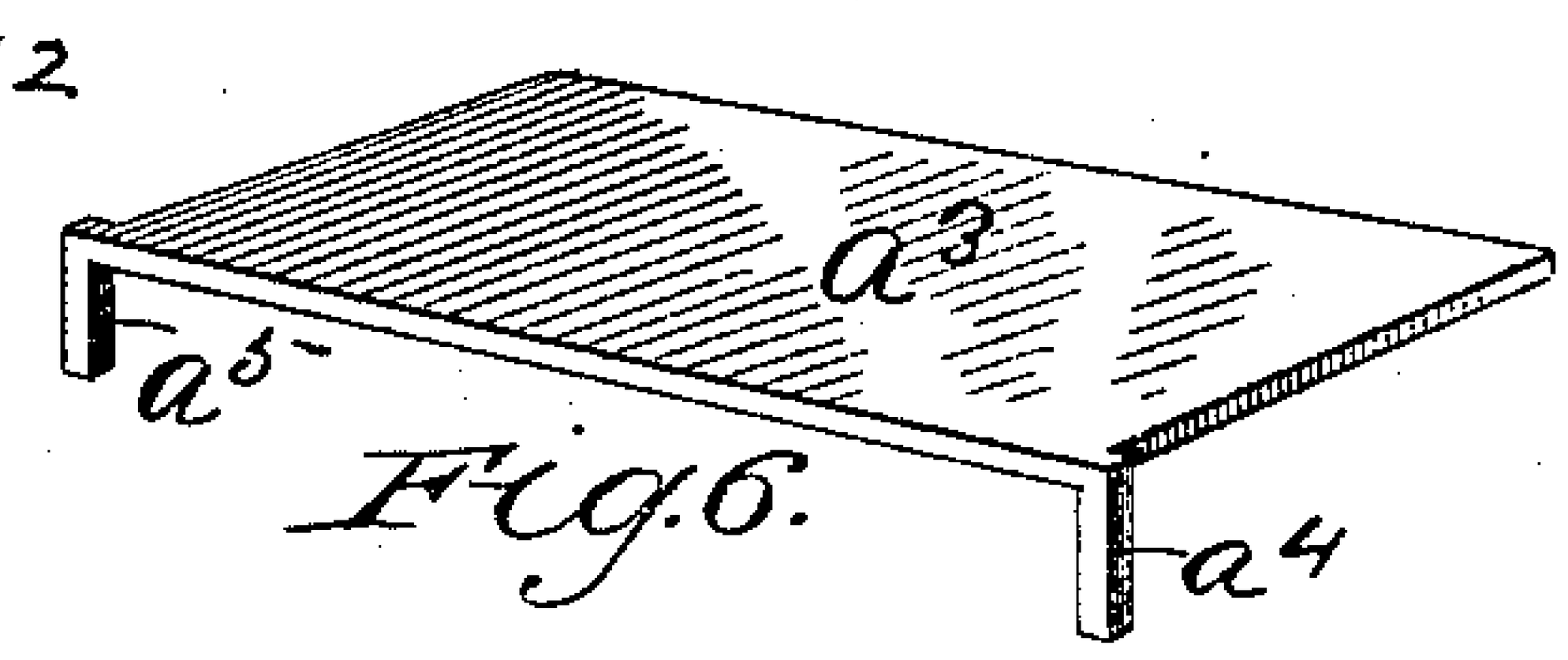
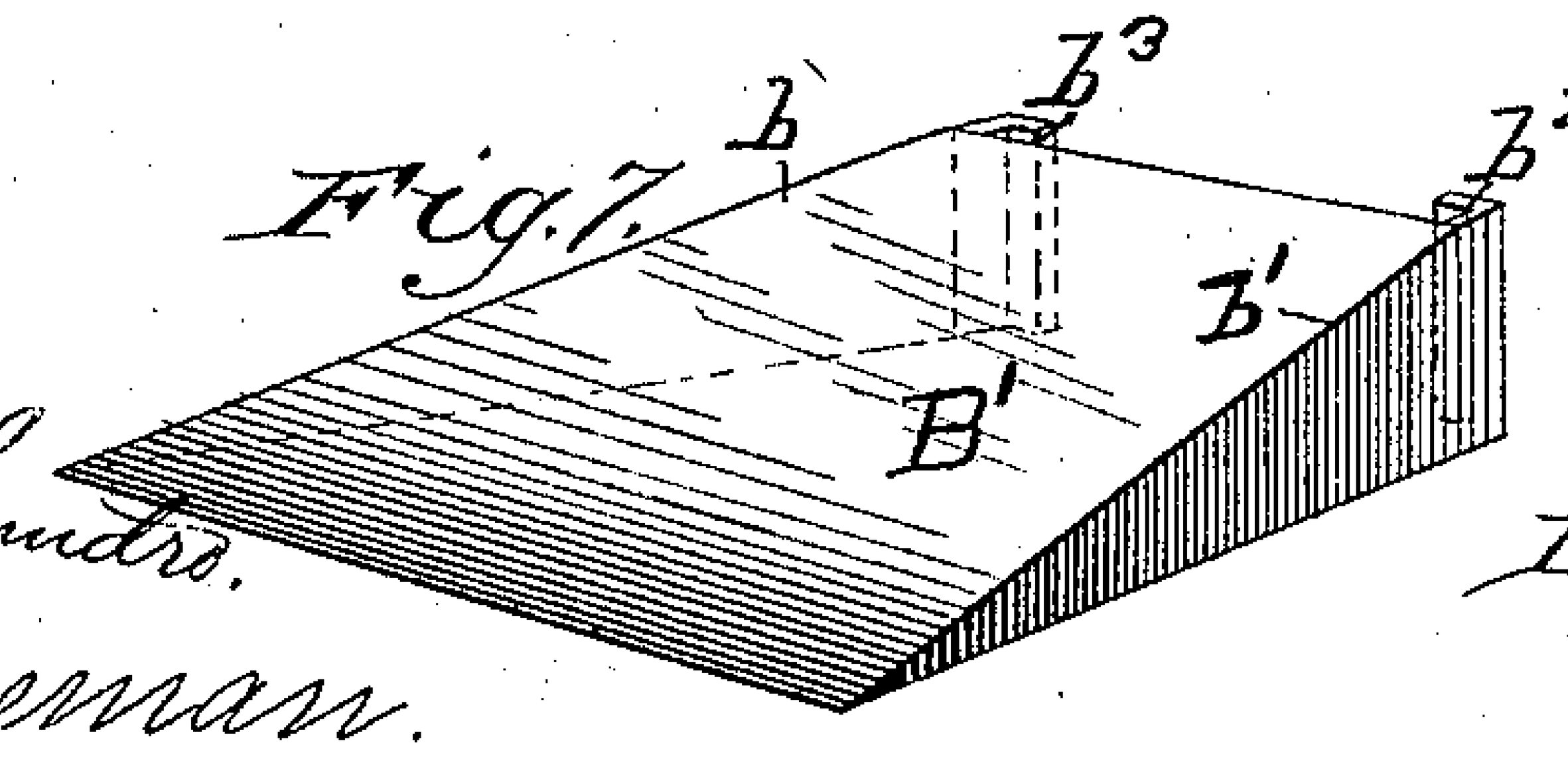


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

ISAAC W. SEAVERNS, JR., OF CHICAGO, ILLINOIS.

DEVICE FOR PROMOTING COMBUSTION IN BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 286,854, dated October 16, 1883.

Application filed July 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, ISAAC W. SEAVERNS, Jr., of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Devices for Promoting Combustion in Boiler-Furnaces, of which the following is a full, clear, and exact description, that will enable others to understand and make use of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates more especially to improvements in locomotive-furnaces; but it may also be applied to other steam-boiler furnaces, the object being to obtain a more perfect combustion through the manner of introducing the air, and the means of distributing the same in the combustion-chamber, as will be hereinafter more fully set forth in detail.

Figure 1 is a vertical longitudinal section of a locomotive-boiler furnace embodying my improved features; Fig. 2, a front end elevation; Fig. 3, a horizontal sectional plan view, and Figs. 4, 5, 6, and 7 details of construction.

Referring to the drawings, A represents the boiler, A′ the boiler-flues, A^2 the grate-bars, and A^3 the combustion-chamber.

The furnace-door B is provided with the series of circular apertures *a* and the elongated aperture *a′*, for the admission of air. The circular apertures communicate with the compartment or passage a^2, arranged on the inside of the furnace-door, as shown in Fig. 1 of the drawings. This compartment extends the full width of the door and forms a hot-air chamber, in which the air is heated on its passage through. The air passes out of this compartment underneath the diaphragm a^3, which lies in a horizontal plane and is placed a little above the lower edge of the door, as indicated by the dotted lines in Fig. 2. This diaphragm projects inward a little beyond the water-lining of the furnace, the inner edge being provided with the lugs a^4 a^5. (Shown in Fig. 6.)

The inclined deflector B′ is provided with the downward-projecting inclined sides *b b′* and the recessed corners b^2 b^3, which are adapted to engage with the projecting corner lugs, a^4 a^5, so as to detachably secure the deflector in position and readily permit of the same being conveniently removed at any time without removing any of the other parts. This deflector extends inward to a point near the center of the combustion-chamber and leaves a space on each side, as shown in Fig. 3, being but a little wider than the furnace-door.

Underneath the deflector B′ is placed a second or division deflector, C, which is supported in position in relation to the deflector B′ by ribs cast on the inner side of the turned-down edges of the same or by short rods passing through both deflectors. This second deflector extends inward as far as the companion deflector, but stops short of the diaphragm a^3, as shown in Fig. 1, and is provided at this end with the short inclined deflecting part b^4, which serves to give the air-current a short downward curve and to prevent the heated air from the air-chamber from passing through the space b^5 between the companion deflectors, as it is through this space the steam-jet passes when discharged from the pipe C′, and is superheated before it mingles with the air that passes under the lower deflector.

The rod *d* connects with the damper *d′*, which covers an opening in the chamber a^2, through which the air or a portion of the air required to promote combustion may be admitted directly over the fire.

The elongated opening *a′* in the furnace-door communicates with the tubes C^2 C^3, which are arranged on each side of and follow the curvature of the door downward and discharge the air underneath the diaphragm a^3, the air being, of course, heated in its passage through these tubes.

The series of openings in the furnace-door may be provided with suitable devices for regulating and controlling the volume of air admitted, and may also permit of all the air being taken in through one passage, or it may be divided and admitted through the different passages, as practical working may seem to require.

By having the deflectors of a less width than that of the combustion-chamber, and the air admitted striking about the center of the furnace, the flames are caused to pass up close to the side inclosing-walls and to curl inward against the crown-sheet, thus not only pro-

ducing energetic combustion, but distributing the flame all over the heating-surface of the furnace.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a furnace-door provided with a series of openings for the admission of air, of the compartment a^2, arranged on the inside of said door, the curved tubes C^2 C^3, and the diaphragm a^3, projecting inward from said compartment, substantially as described.

2. The combination, with the diaphragm a^3, provided with the projecting corner lugs, a^4 a^5, of the deflector B′, having recessed corners b^2 b^3, whereby the same is adapted to detachably engage with the diaphragm a^3, substantially as described.

3. The combination, with a boiler-furnace, of the inclined deflector B′ and the second or companion deflector C, provided with the short inclined deflecting part b^4, and arranged far enough beneath the first deflector to leave a narrow space between the two for the passage of steam or air, substantially as and for the purpose described.

4. The combination, with a furnace-door provided with an opening or openings for the admission of air, of the curved tubes C^2 C^3 and the diaphragm a^3, substantially as described.

5. In a boiler-furnace, the combination, with the deflector B′, of the companion deflector C and the steam-jet pipe C′, substantially as and for the purpose described.

6. The combination, with the furnace-door, of the compartment a^2, having an opening for the admission of air over the fire, of the rod d, the damper d', and the diaphragm a^3, substantially as described.

7. The combination, with a boiler-furnace, of a door having perforations for the admission of air, the hot-air chamber or compartment a^2, the curved tube C^2 C^3, the diaphragm a^3, the companion deflectors B′ C, arranged one above the other and separated by a narrow space, and the steam-jet pipe C′, all combined, arranged, and operating substantially as described.

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