

(No Model.)

3 Sheets—Sheet 1.

W. McCLAVE.

STATIONARY GRATE FOR FURNACES.

No. 393,843.

Patented Dec. 4, 1888.

Fig 1.

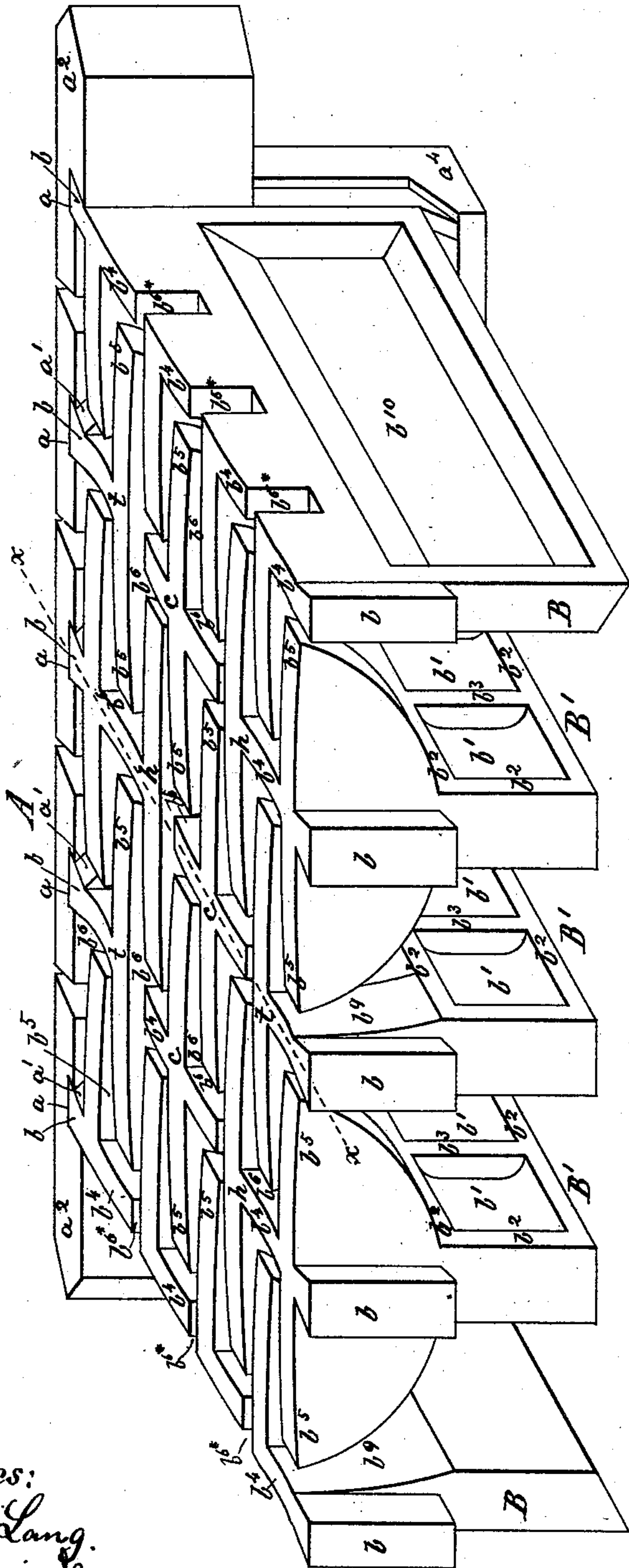
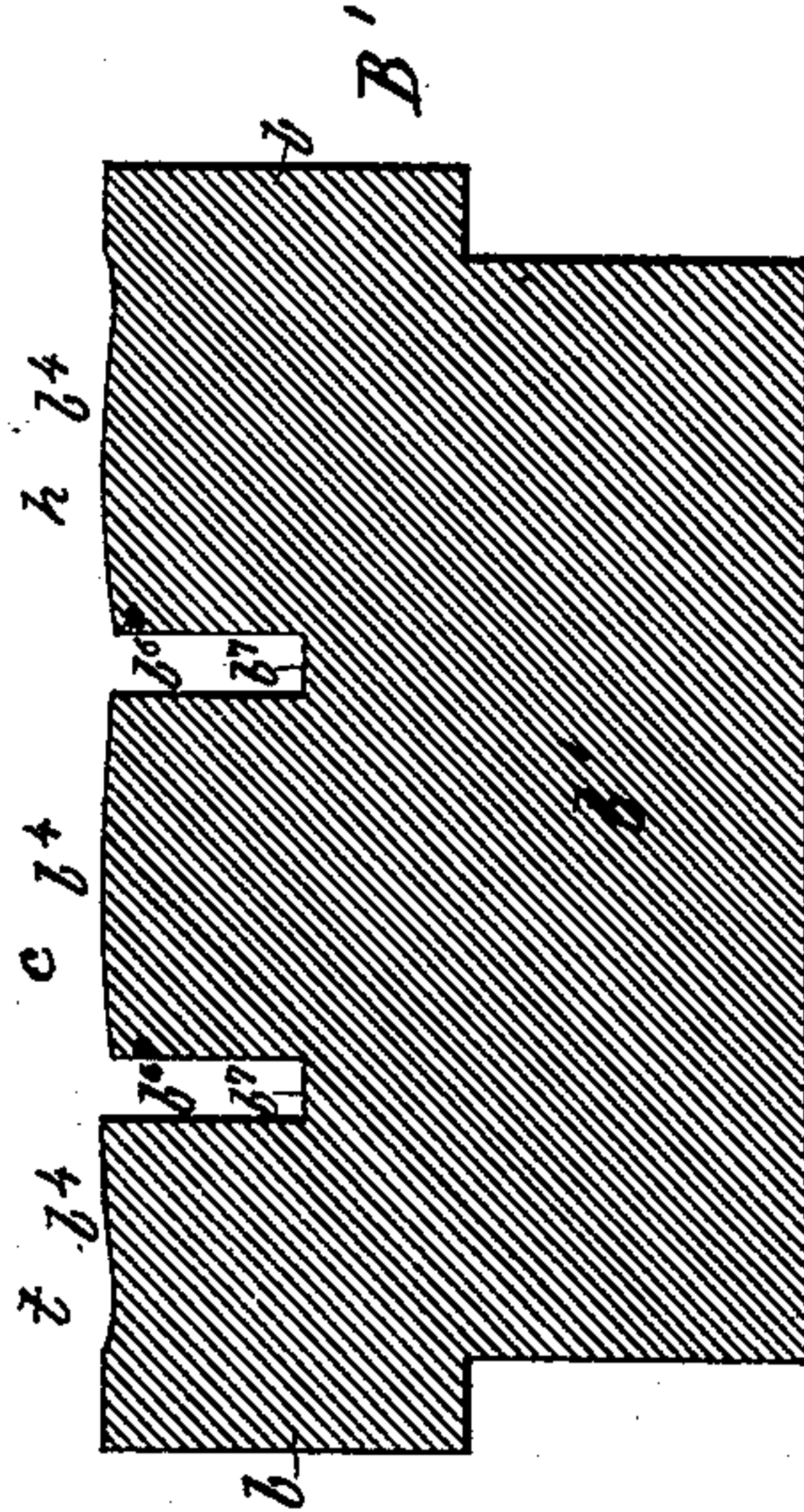


Fig 3.



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Fig 2.

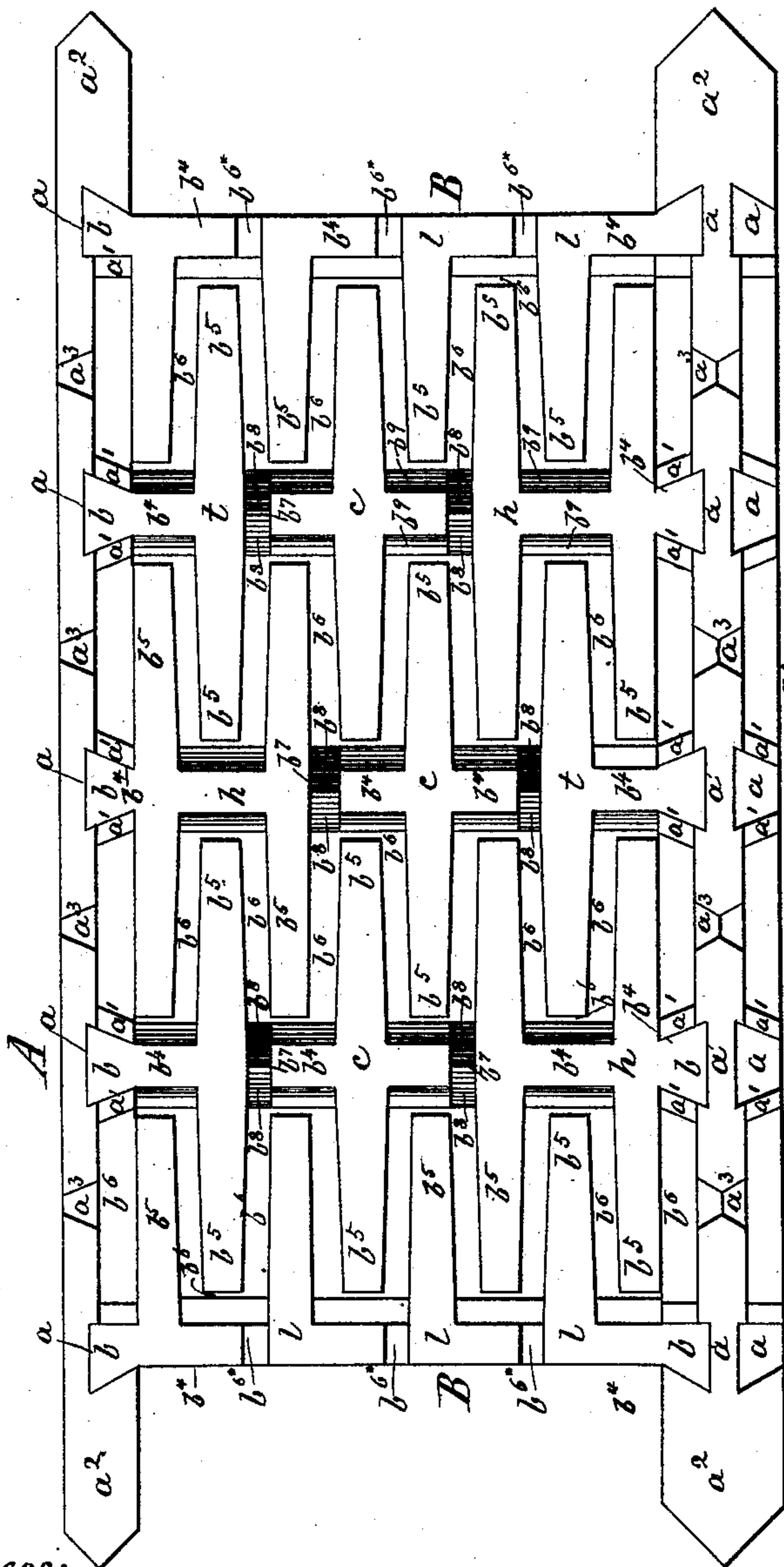
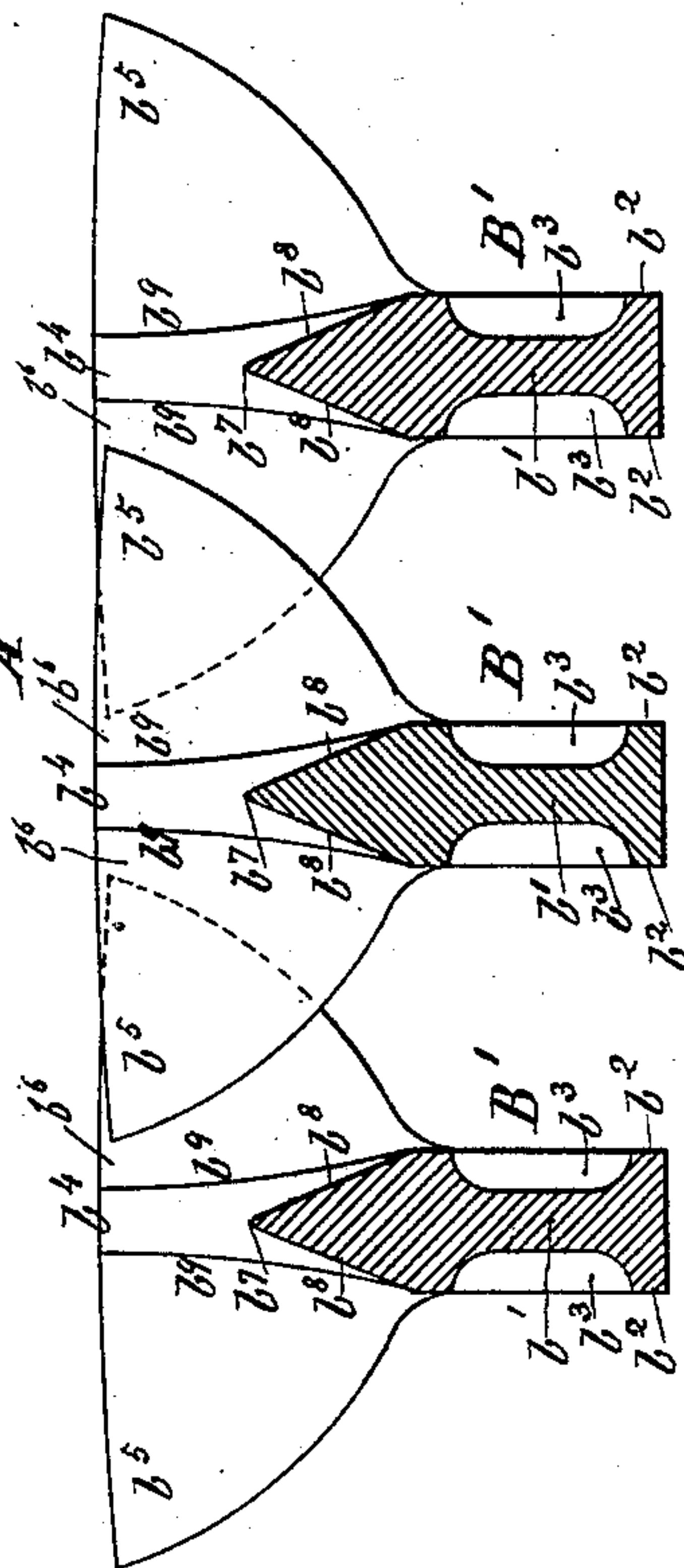


Fig 4.



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Fig. 6.

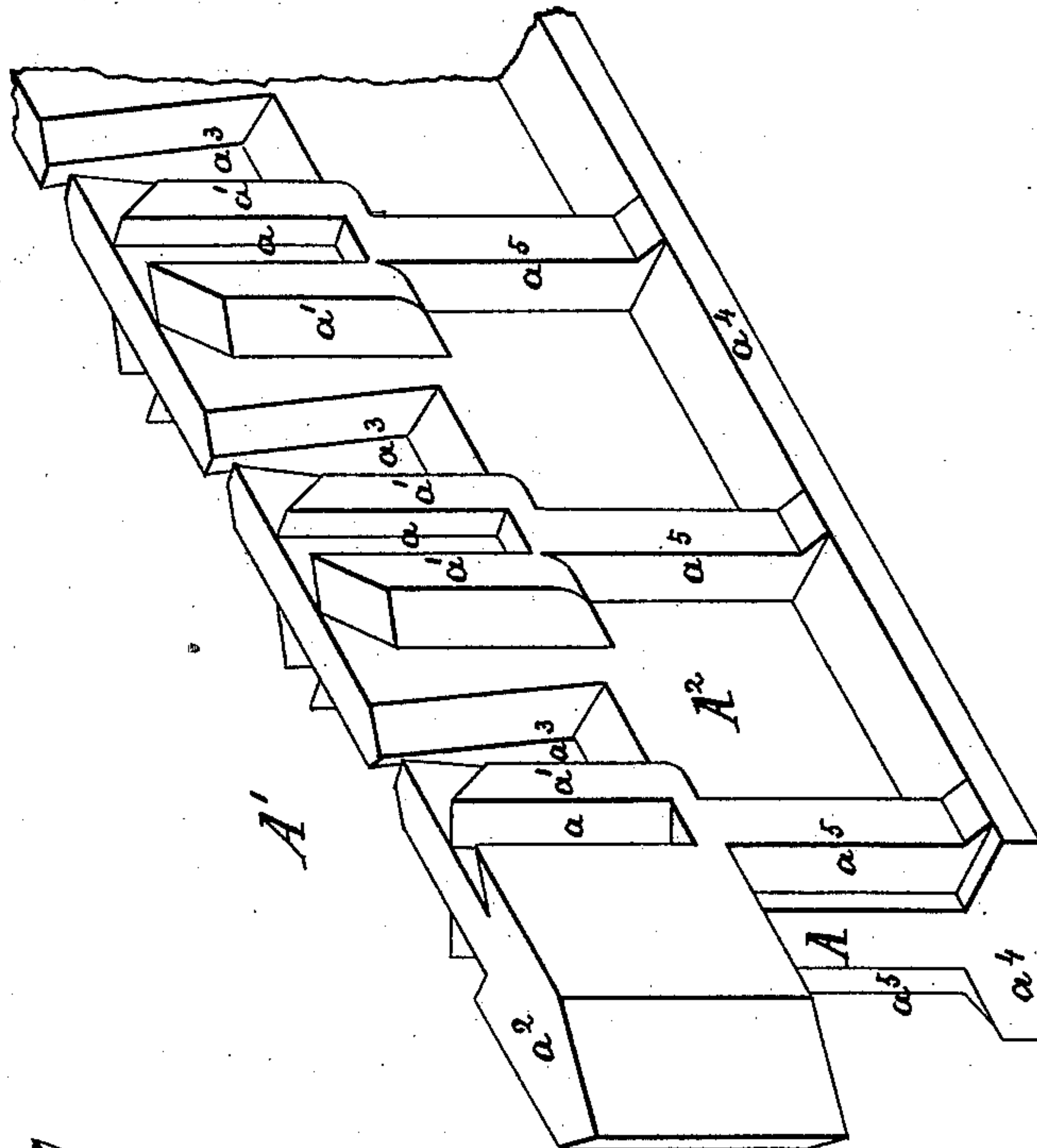
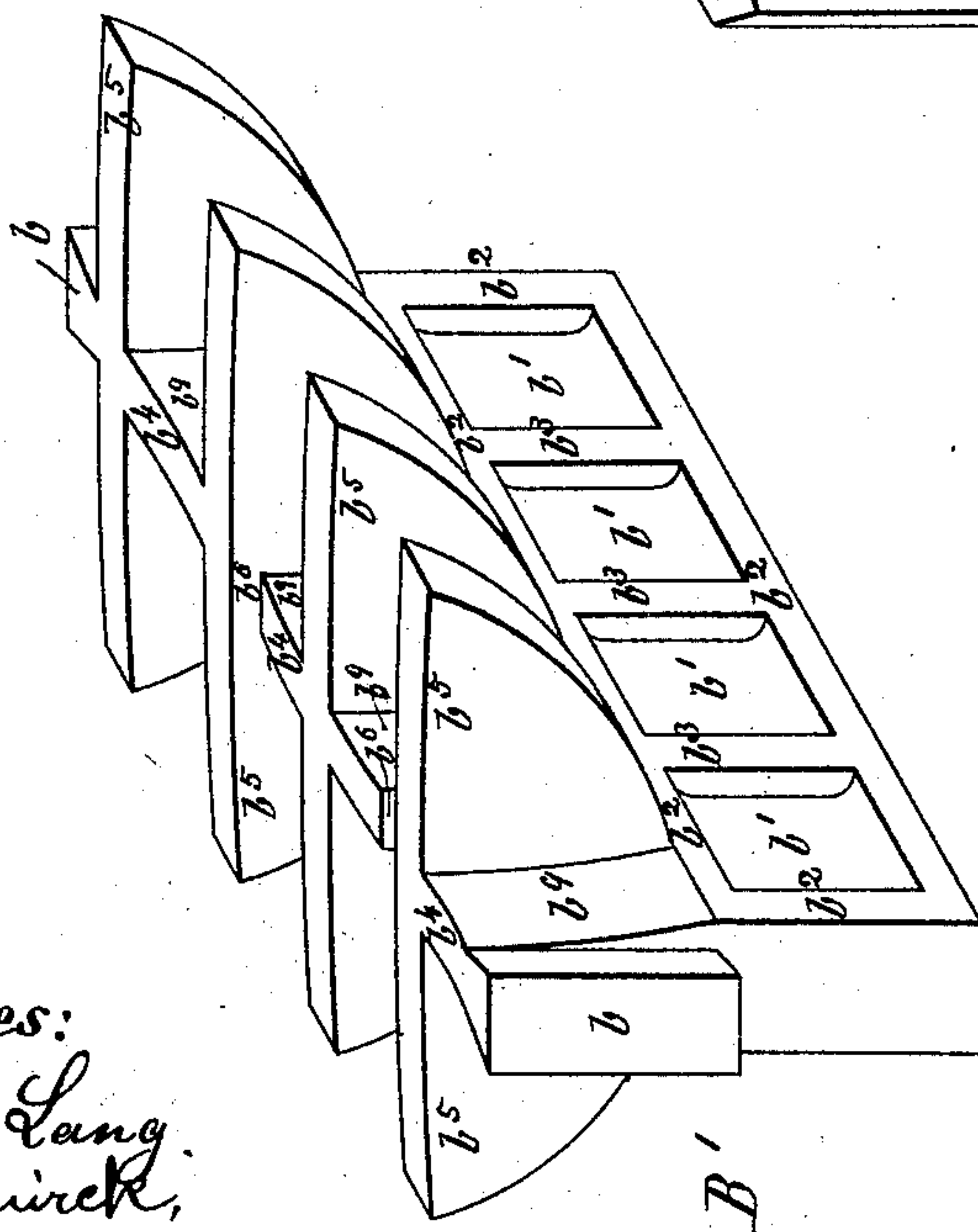


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM MCCLAVE, OF SCRANTON, PENNSYLVANIA.

STATIONARY GRATE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 393,843, dated December 4, 1888.

Application filed March 26, 1888. Serial No. 268,516. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MCCLAVE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Stationary Grates for Furnaces, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to stationary grates for furnaces, &c., adapted to burn all kinds and sizes of anthracite and bituminous fuel, but especially adapted to burn anthracite culm and bituminous slack; and it consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described, and pointed out in the claims, whereby a grate-surface having an air and ash passage running longitudinally and laterally or zigzag is produced, the same giving increased draft and facilities and greater freedom for the discharge of ashes and cinders, and also in having the weakest points of the surface sufficiently below the rest of the surface to prevent the liability of being broken by the iron hoes used by firemen in breaking clinkers, and at the same time permitting the hoe to glide freely from one section to another during the operation of cleaning the fire without danger of being caught by any extreme points of the sections which might, if otherwise constructed, project above the general surface, or which, if perfectly even with the rest of the surface, would catch the blade of a hoe that had an edge made convex by wear.

In the accompanying drawings, Figure 1 is a perspective view of sections of my grate. Fig. 2 is a top view of the same. Fig. 3 is a section of an improved grate-bar in the line xx of Fig. 1. Fig. 4 is a transverse section through the air and ash spaces of the grate-bars. Fig. 5 is a perspective view of one of the sections or grate-bars, and Fig. 6 is a perspective view of a portion of an improved central or intermediate bearing-bar.

The letter A in the drawings represents a

side bearer; A', an intermediate bearer; B, an end bar, and B' intermediate grate-bars.

The side bearers, A, are provided with dovetail notches a , formed between vertical ribs a' , except the two extreme notches, which are formed each by a rib, a' , and the thicker end portion, a^2 , of the bearer A. Between the notches a downwardly tapering or diverging and inwardly-beveled slots a^3 are provided, whereby the bar is prevented from warping from exposure to the intense heat.

The bearer A has its body portion A^2 provided with a broad base portion, a^4 , and short vertical ribs a^5 , ending near the base of the slots a^3 and uniting with the ribs a' , which form the dovetail notches a , thus enhancing the bearing capacity of the bar and enabling it to be made with a light portion, A^2 .

The intermediate bearer, A', (shown partly in Fig. 6,) is constructed with a light web, A^2 , and on both sides provided with dovetail notches a and ribs a' and a^5 , and the slots a^3 are beveled, as shown, in order to more effectually prevent the accumulation of ashes and cinders therein. The purpose of the notches a is to receive and hold the dovetail vertical lugs b at the ends of the grate-bars B and B', and thereby keep the grate-bars in place and support them, while the ribs a' strengthen the web A' in conjunction with the ribs a^5 .

The grate-bars B' consist, respectively, of a webbed lower portion, b' , provided with a circumferential rib, b^2 , and a number of vertical ribs, b^3 , and an upper portion constituting transverse wings b^4 and segmental longitudinal wings b^5 , said wings being of such lengths as to leave an air and ash space, b^6 , as shown. The top surfaces of the wings b^4 b^5 form together figures similar to a T, a cross, and an H, as seen at t c h , respectively. The spaces b^6 between the bars or sections of the forms mentioned produce numerous longitudinal and lateral air and ash passages, as shown. The longitudinal spaces b^6 are formed above slanting sides of a central ridge, b^7 , which is sufficiently far below the grate-surface to allow the draft to move freely over it, while the transverse spaces are formed above slanting sides b^8 and b^9 , which have suffi-

cient inclination to allow ashes and cinders to slide easily down along the same. The top surface of the portion forming the wings b^4 and the web b' are of the same width or thickness, while the thickness of this portion increases downwardly on a slant or curve until it reaches the thickness of the ribs b^2 , thus forming the curved surface b^9 under the transverse spaces b^6 between the wings b^4 and b^5 , whereon the cinders and ashes glide downward into the ash-pit, thus avoiding any accumulation of ashes or cinders thereon. These grate-bars B' are so arranged between the bearers that the wings b^5 are interlocked, leaving a connected air-passage and ash-space between and all around them.

The end grate-bars, B , have a plain outer surface with a depression, b^{10} , in their lower portions, and with top surfaces, l , in the form of an **L**, the wings b^5 and b^4 being separated by spaces b^{6*} , as seen in the drawings, said spaces serving to prevent injury by warpage. The wings b^5 next to the bearers stand off sufficiently to allow the draft to pass between them as freely as through any other portion of the grate. The end portions of the bearers $A A'$ rest upon the masonry or brick-work of the furnace of a stationary boiler or in suitable brackets of a metallic fire-box.

The grate bars or sections $t c h$ are constructed with high center portions and low extremities in order to protect the latter from destruction by the cleaning-hoe or other implement of the fireman. In the drawings the highest portions of the grate-surface are in the center of the wings b^4 and b^5 , from which ends of the wings slope downward, and thus the ends of the wings cannot be struck by the fireman's hoe, which is held above them by the higher portions, which are always on a plane above the ends of the fellow bars or sections.

It is readily seen that my grate may be constructed of bars or sections, of which all are either **T**-shaped, **L**-shaped, or **H**-shaped, or cross-shaped instead of combining the several different formations, as shown.

In constructing the wings I make them on a taper from the bars $B B'$ to their ends, so that they shall draw more readily from the sand; but while this is so the spaces between the wings remain parallel.

By constructing grates in the manner herein described and shown I am enabled to have the longitudinal spaces b^6 to one side of the ends of the wings b^5 , and thus nothing can hang between the ends of said wings b^5 and the ends and sides of the wings b^4 , the depressed ridges b^7 and the upwardly-diminishing surfaces b^9 of the wings b^4 being important features of construction, whereby the advantage just stated is secured, and at the same time the lower portions of the bars B' can be made stiff and strong, as shown.

What I claim is—

1. A stationary furnace-grate having longitudinally and transversely connected air and ash spaces b^6 and formed of sections, as $h l l c$, in forms of an **H L T**, respectively, and a cross, said sections at ends of grate comprising grate-bars B , with wings $b^4 b^5$, and those intermediate said ends comprising grate-bars B' , with a depressed ridge, b^7 , and wings $b^4 b^5$, substantially as and for the purpose described.

2. A stationary furnace-grate having longitudinally and transversely connected air and ash spaces b^6 and combining in its construction **T**-shaped sections comprising, respectively, grate-bars with depressed ridge b^7 and wings $b^4 b^5$, substantially as and for the purpose described.

3. A stationary furnace-grate having longitudinally and transversely connected air and ash spaces b^6 and combining in its construction **H**-shaped sections comprising grate-bars B' , with a depressed ridge, b^7 , and wings $b^4 b^5$, substantially as described.

4. A stationary furnace-grate having longitudinally and transversely connected air and ash spaces b^6 and combining in its construction cross-shaped and **L**-shaped sections, the **L**-shaped sections comprising grate-bars B , with wings $b^4 b^5$, and the cross-shaped sections comprising grate-bars B' and a depressed ridge, b^7 , and wings $b^4 b^5$, substantially as described.

5. A stationary furnace-grate having longitudinally and transversely connected air and ash spaces and combining in its construction cross-shaped sections comprising grate-bars B' , with depressed ridge b^7 and wings $b^4 b^5$, substantially as described.

6. The bearer A , formed with a base, a^4 , vertical ribs a^5 and a' , and dovetail receptacles a , substantially as described.

7. The intermediate bearer, A' , formed with a web, A^2 , having a thick base, and vertical ribs on both sides of the web of less height than the bearer and united, respectively, to two other separated vertical ribs extending up and forming a receptacle, a , for the dovetails of the transverse section supporting-bars, substantially as and for the purpose described.

8. A grate formed of bars having wings b^5 , depressed ridges b^7 , and wings b^4 , having curved or bevel surfaces b^9 , all the parts of each of said bars being constructed in one piece, and the wings b^4 made with a diminishing thickness and their beveled or curved surfaces rising from strong lower portions of the bars and terminating at the top surfaces of the wings, and the said wings b^4 and b^5 being arranged to form longitudinal spaces b^6 above the ridges of the intermediate bars of the grate and connecting transverse spaces above the beveled or curved surfaces b^9 , substantially as and for the purpose described.

9. A grate formed of bars provided with wings b^5 , depressed ridges b^7 , and wings b^4 , all the parts of each of the bars being constructed in one piece, and the top surfaces of the
5 wings curved transversely and longitudinally in opposite directions from points at or near the center of the sections, and the wings arranged to form longitudinal and transverse spaces above the ridges b^7 and the curved or

beveled surfaces b^9 , substantially as and for the purpose described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WILLIAM MCCLAVE.

Witnesses:

JOHN HORTON PHELPS,
EBENEZER WILLIAMS.