

No. 644,507.

Patented Feb. 27, 1900.

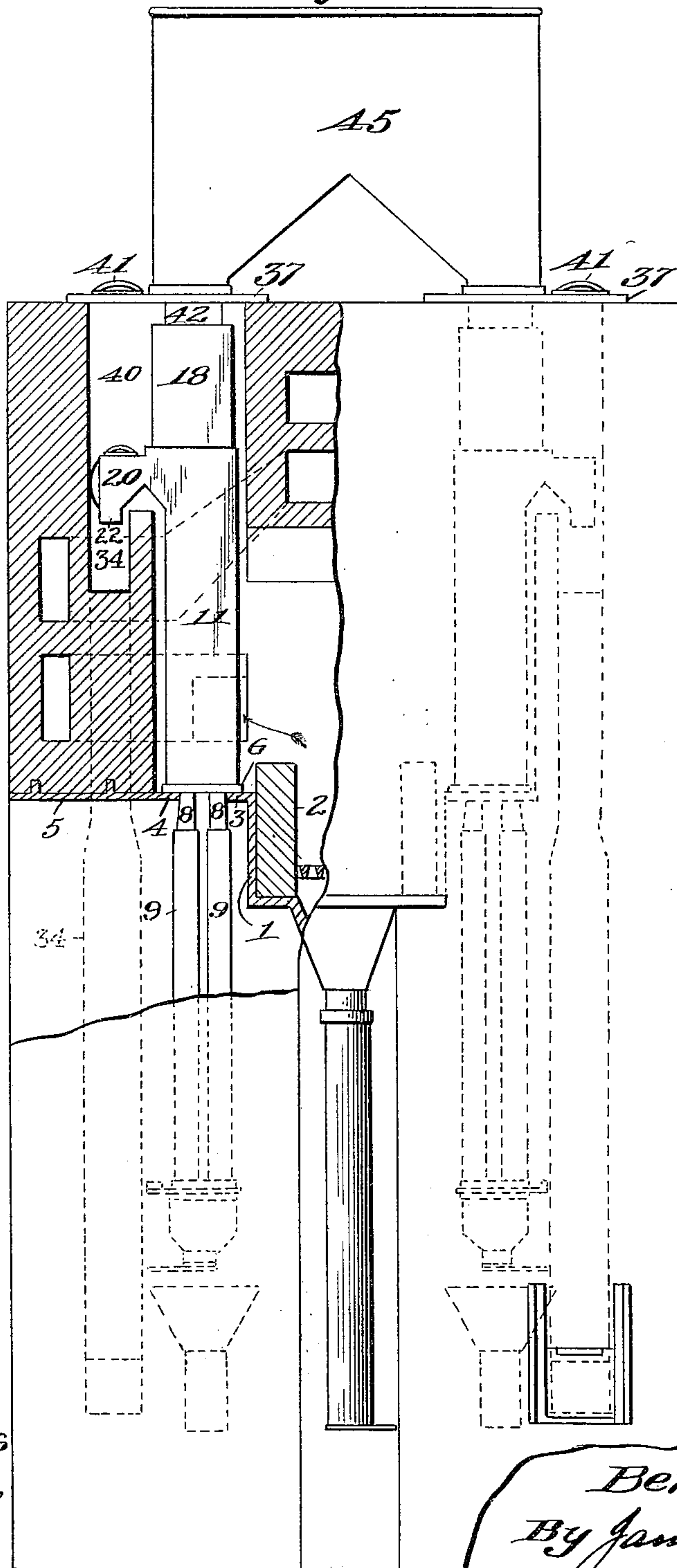
B. EBA.
BONE BLACK RETORT.

(Application filed Dec. 5, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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2 Sheets—Sheet 2.

Fig. 2.

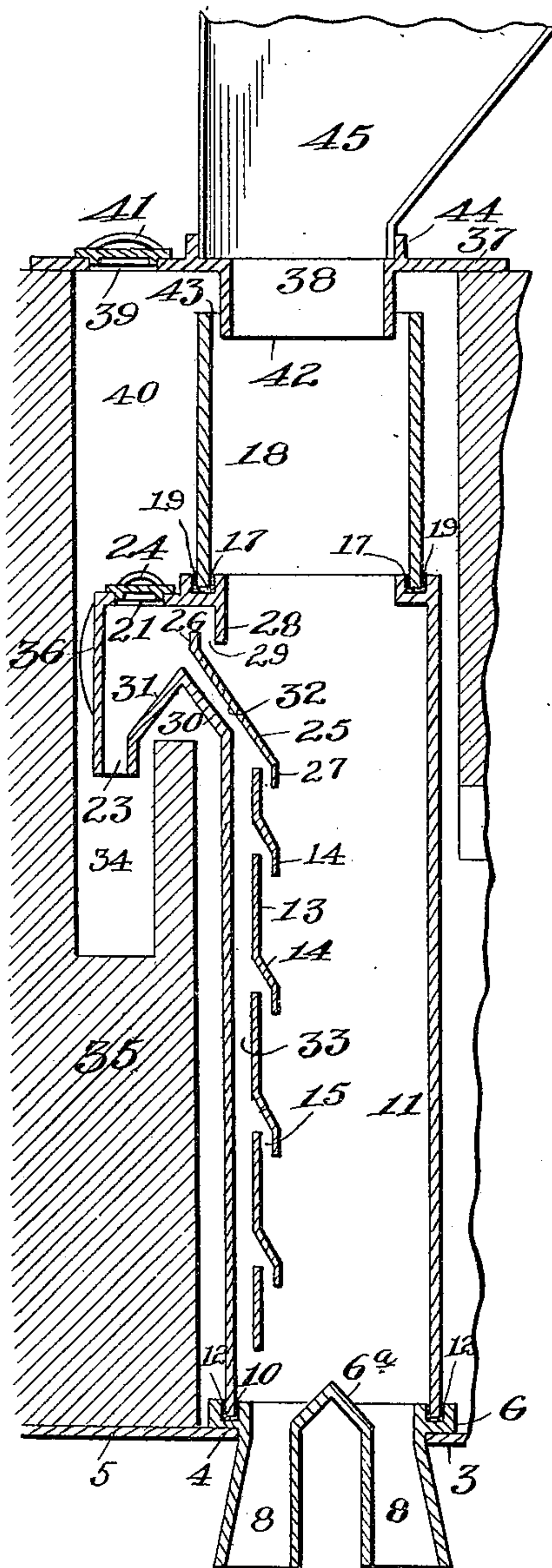


Fig. 3.

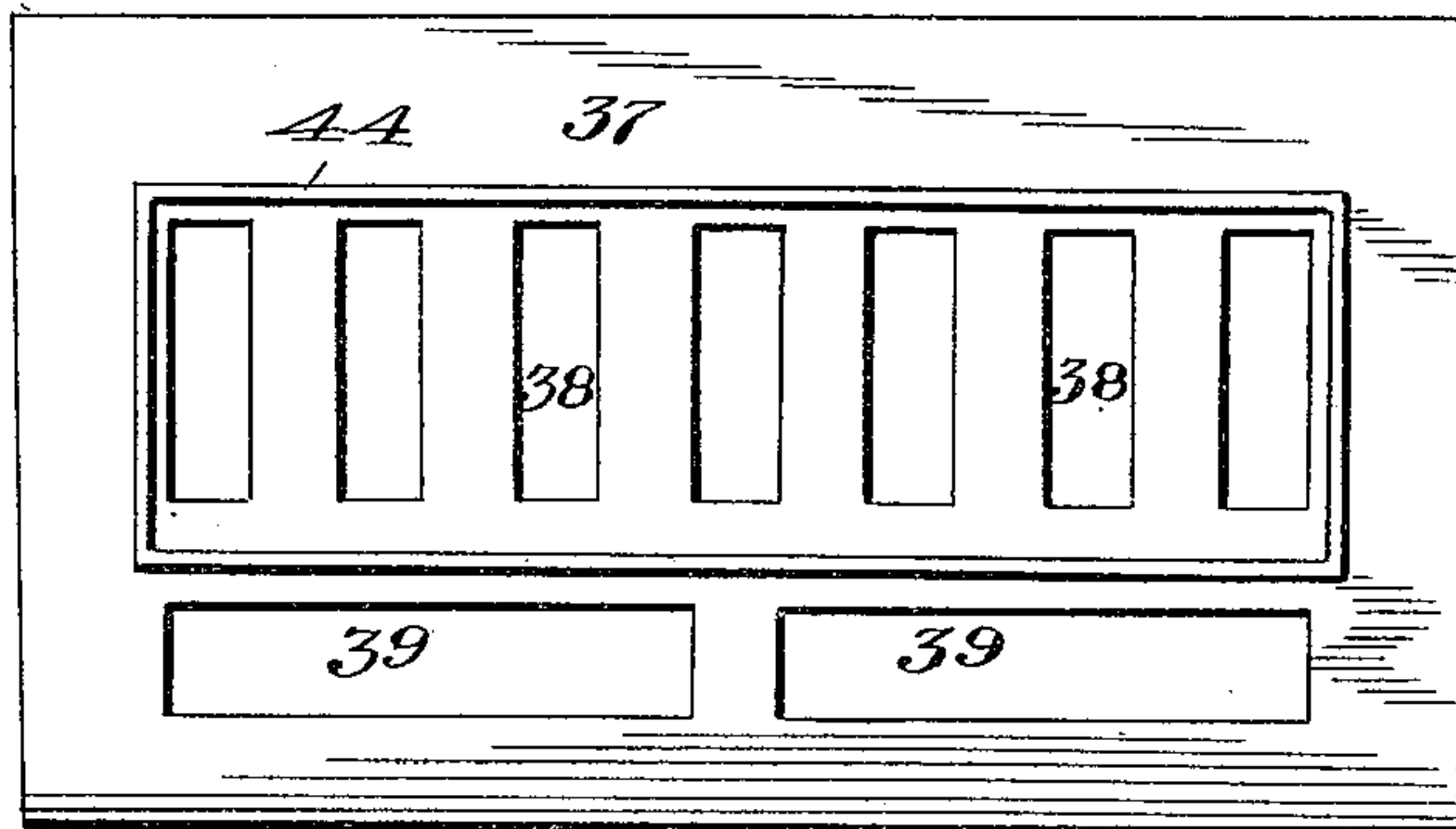


Fig. 4.

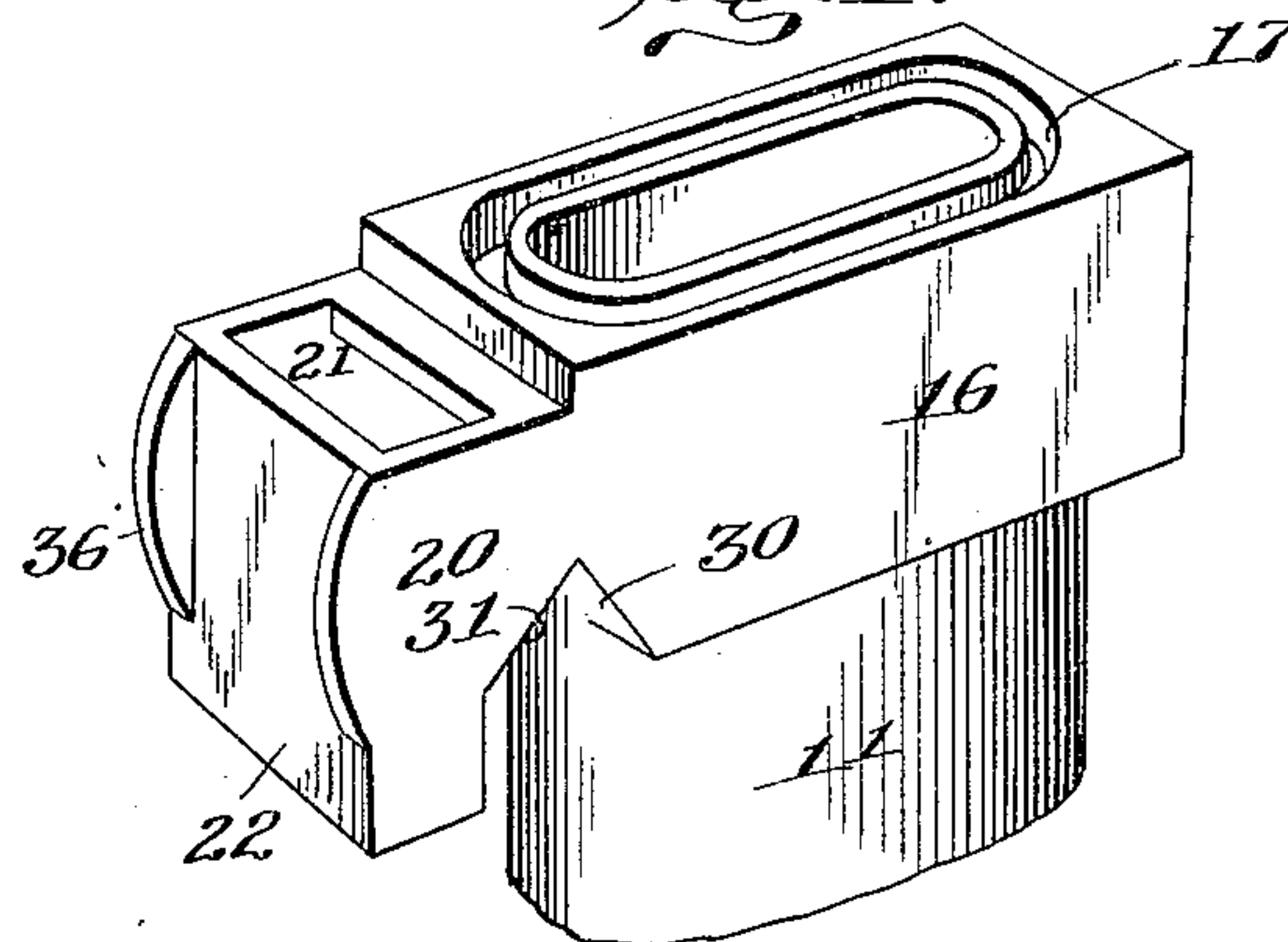
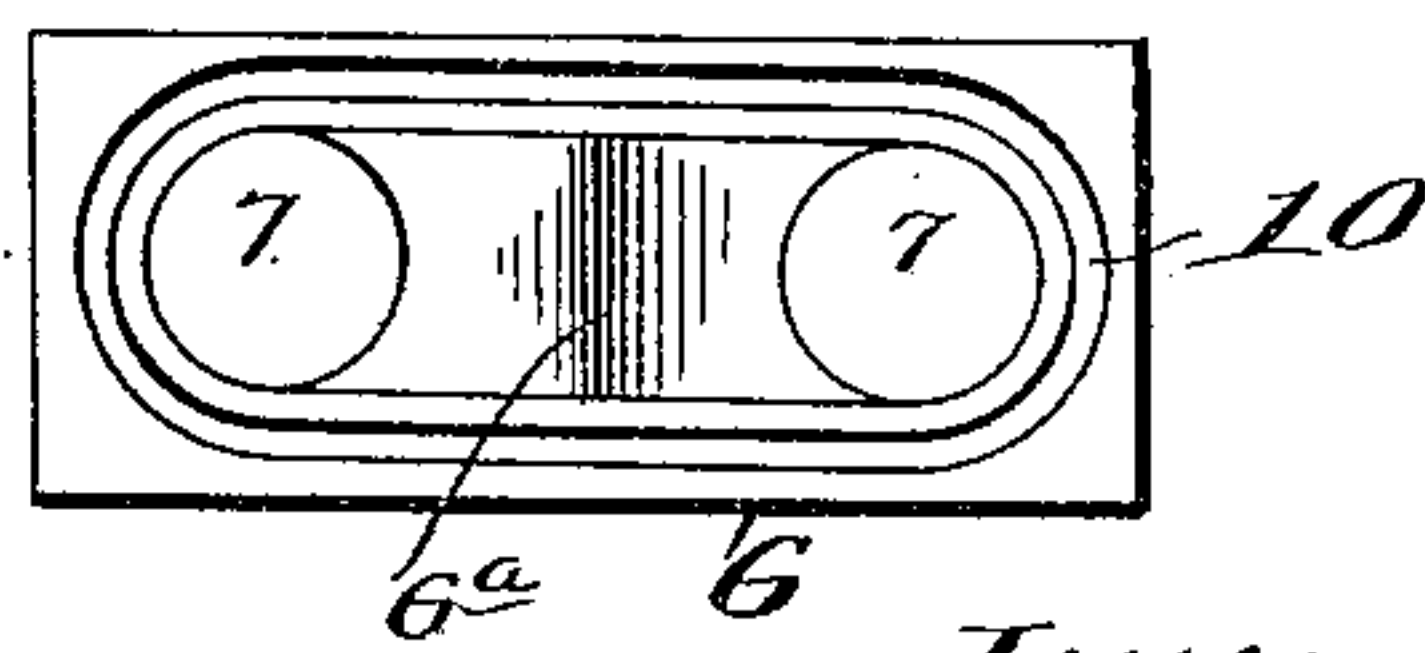


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BONE-BLACK RETORT.

SPECIFICATION forming part of Letters Patent No. 644,507, dated February 27, 1900.

Application filed December 5, 1899. Serial No. 739,268. (No model.)

To all whom it may concern:

Be it known that I, BERNHARDT EBA, a citizen of the United States, residing at North Warren, in the county of Warren and State of Pennsylvania, have invented new and useful Improvements in Retorts of Kilns for Revivifying Bone-Black, of which the following is a specification.

My invention relates to improvements in retorts of kilns for revivifying bone-black.

Objects of the invention are to provide a novel construction and arrangement of heating-box for preliminarily heating the bone-black before it falls into the retorts to be re-burned, to provide improved means for permitting the ready expansion and contraction of the retorts, to provide novel means for conducting the bone-black which may be blown out of the retort and the vapors generated therein into a waste-chute, so as to prevent the same in large measure from escaping through the expansion-joints to the fire-box, to provide a novel construction and arrangement of parts for permitting the vent-hole which leads into the waste-chute to be readily cleansed, to provide a novel construction of expansion-joint, and to provide a novel construction of hopper at the bottom of the retorts which shall operate to divide the bone-black passing from the retorts into the cooling-cylinders.

With these objects in view my invention consists in the features of construction, the combination or arrangement of parts, and the principles of operation hereinafter described and claimed.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a sectional elevation of a kiln for revivifying bone-black, illustrating in full lines my invention applied thereto and in dotted lines the general construction of the kiln. Fig. 2 is an enlarged sectional view through one of the retorts. Fig. 3 is a plan view of the plate supporting the hopper on the top of the kiln. Fig. 4 is an enlarged perspective view of the upper end of a retort, and Fig. 5 is a plan view of the plate for supporting the lower end of the retort.

Before proceeding with a description of the drawings it may be remarked that in kilns of the above character it is usual to arrange the retorts in two gangs, one on either side of a central fire-box, seven retorts, more or less,

comprising each gang. For an illustration of the general arrangement of the kiln reference may be had to my prior patent, No. 612,319, dated October 11, 1898. As the construction of the kiln proper does not enter into the present invention and as those skilled in the art will readily understand the application of my invention, I have for the sake of clearness confined the description and illustration to a single retort and the parts immediately connected therewith, it being understood that all of the retorts in each gang have the same construction and that the feed-hopper hereinafter referred to is common to all of the retorts in a gang.

Referring to the drawings, the numeral 1 indicates a strong metal-plate boxing supporting the fire-brick 2 of the fire-box and having projecting from its opposite sides lateral flanges 3, forming the main supports, respectively, for one side of the retorts on opposite sides of the fire-box. The metal boxing 1 is supported in the brickwork of the kiln. The main support for the opposite side of the retort is afforded by the projecting edge 4 of a strong metal plate 5, also secured in the brickwork of the kiln. The numeral 6 indicates a plate which is supported at opposite ends from ledges 3 and 4 and is provided near opposite ends with circular apertures 7, in each of which is suitably secured the upper end of a discharge-tube 8. The lower ends of the discharge-tubes 8 are made larger than their upper ends, to which end the outer wall of each tube is tapered upwardly and inwardly, while the inner wall extends perpendicularly, as clearly shown in Fig. 1. On the lower end of each of the discharge-tubes is inserted the upper end of a cooler-cylinder 9, the purpose of the construction just described being to facilitate placing the cooler-cylinders in position and removing the same by inclining or tilting them outwardly on the discharge-tubes.

On the upper side of plate 6 I provide a bridge or arch 6^a, which is in the form of an inverted V and lies between the openings 7, its sides inclining downwardly toward said openings, whereby the revivified bone-black as it falls to the bottom of the retort will be divided and caused to pass equally into both discharge-tubes 8 and then into the cooler-cylinders 9. I also provide on the upper side of the plate a continuous rectangular seat or

recess 10, which extends around said plate in the form of an oval and in which is adapted to be seated the lower end of the retort 11. In order to make a close joint, I fill in the space between the wall of the retort and the sides of the slot or recess 10 with asbestos 12. The retort 11 is oval in cross-section throughout the greater portion of its length and is provided at one side with a series of vertical partitions 13, arranged one above the other, and the lower end of each partition being provided with an inwardly-extending lip or flange 14, that overhangs the upper edge of the partition next below it, thereby forming a series of apertures 15, through which the bone-dust blown out of the retort and the gases and vapors may escape and be conducted to the waste-chute, as explained later on.

At their upper ends each of the retorts is provided with a rectangular offset or shouldered portion 16, so that when the retorts are placed in position side by side these shouldered portions will engage against each other and hold the retorts in the proper spaced relation. Extending around this shouldered portion on its upper side is a rectangular slot or recess 17, in which is adapted to be seated the lower edge of a heating-box 18, a filling of asbestos 19 being employed to make a close joint. Beyond this shouldered portion the retort is provided with an integral chambered extension 20, having in its upper side a rectangular opening 21. The extension 20 also has a depending tapered portion 22, provided in its lower end with an opening 23 in line with the opening 21. The opening 23, which constitutes a vent-hole, is always open, while the opening 21, which is for the purpose of giving access to the vent-hole 23 to clean the same, is normally closed by a cover 24. Above the uppermost partition 13 I arrange an inclined partition 25, the upper end of which projects within the extension 20 and is there provided with a short vertical portion 26. The lower end of the partition 25 is likewise provided with a depending vertical portion 27, which overhangs the upper end of the partition 13 in a manner to afford a space 15 between the two, as described with reference to the other partitions 13. Depending from the edge of the retort adjacent to the extension 20 is a short vertical flange 28, which extends parallel with the upright portion 26 of the inclined partition 25, but at a distance therefrom to afford a passage 29, leading from the retort into the chamber of the extension 20. The flange 28 operates, in conjunction with the upright portion 26 of the partition 25, as a baffle to prevent the bone-dust falling from the heating-box into the retort from passing into the chambered extension 20 and out through the vent 23. The bottom of the extension 20 is in the form of an inverted V, having an upwardly-inclined portion 30, leading from the retort 11, and a downwardly-inclined portion 31, leading to the vent-hole 23. The partition 25 extends parallel with the

inclined portion 30, but at a distance therefrom, to afford a passage 32, leading into the chamber of extension 20, which passage 32, as will be seen, forms a continuation of a flue 33, afforded in the retort by the vertical partitions 13.

The numeral 34 indicates a waste-chute provided in the brick wall 35 of the furnace, into which the vent-hole 23 discharges. The outer wall of the chambered extension 20 is straight, as shown, and at its outer edges is provided with integral projecting flanges 36, which form continuations of the side walls of the extension 20 and have their outer edges curved or rounded and bearing against the wall 35 of the kiln, whereby they may readily slide up and down on said wall in the expansion and contraction of the retort.

The numeral 37 indicates a rectangular metal plate which rests upon the top of the kiln and covers the space or chamber formed in the wall thereof for the accommodation of the retorts and their heating-boxes. This plate is provided with a series of rectangular apertures 38, corresponding in number with the number of retorts in a gang and extending transversely of the length of the plate, while extending longitudinally of the length of the plate, at one side thereof, are two rectangular openings 39, which when the plate is in position lie above and in line with the openings 21 in the various extensions 20, whereby by the use of a suitable implement the cover 24 of each opening 21 may be removed and the walls of the vent-hole 23 freed from coke or other matter adhering thereto. A space 40 is provided between the inner sides of the heating-boxes 18 and the brick wall of the furnace for this purpose. The openings 39 are normally closed by means of removable covers 41. Pendent from each aperture 38 is a short tube 42, which extends down a short distance into the heating-box 18, but is of less size than said heating-box, so that a space 43 is provided between the two, forming what I term an "expansion-joint"—that is to say, this space permits each heating-box to expand or contract without affecting its connection with the short tube 42.

The numeral 44 indicates a flange projecting upward from the upper side of plate 37 and extending around the same in a manner to afford a rectangular inclosure, which is of a size to receive snugly the lower or discharge end of a hopper 45, which is common to all of the apertures 38.

The operation is as follows: Bone-black being fed into the hopper 45 falls through the openings 38 and tubes 42 into the heating-boxes 18, where it is submitted to a preliminary heating before entering the retort. This heat in practice, however, is rarely so great as to cause the bone-black to be blown out of the expansion-joints 43. As the bone-black passes into and through the retort it is reburned and revived. In its downward course it passes freely over the inclined sur-

faces 25 and 14, while the gases and vapors generated by the heat will pass through the openings 15 and up the flue 33 and through the passage 32 to the chamber of the extension 20, whence it is discharged through the vent-hole 23 into the waste-chute 34, with which, of course, suitable clean-out ducts will communicate. The body of revived bone-black falling upon the bridge 6^a will be divided and caused to fall through the discharge-tubes 8 into the cooler-cylinders 9.

As previously stated, any coke adhering to the walls of the vent-hole 23 may be readily discharged by removing the covers 41 and 24 and employing a suitable implement, such as a poker, for the purpose.

A further valuable feature of the invention is that should the retort "blow" the bone-dust will pass through the space 29 or through the openings 15 and passage 32 to the vent-hole 23 and will almost entirely be prevented from passing upward through the heating-box and through the expansion-joint 43 or through the hopper 45.

The fact that the construction described permits the free expansion and contraction of the retort and heating-box has already been mentioned, while the manner of seating the lower ends of the heating-box and retort in the asbestos-filled recesses 17 and 10, respectively, prevents the escape of gases or bone-dust at these joints.

Having thus fully described my invention, what I claim as new is—

1. A retort for the purpose described, comprising a hollow metal body provided at its upper end with an integral depending chambered extension having in its lower end a vent-hole, substantially as described.

2. A retort for the purpose described, comprising a hollow metal body provided at its upper end with an integral, depending, chambered extension having in its lower end a vent-hole and in its upper side an opening in line with said vent-hole, and a removable cover for said opening, substantially as described.

3. A retort for the purpose described comprising a hollow metal body provided at its upper end with an integral, depending, chambered extension having in its lower end a vent-hole, a series of spaced, vertically-arranged partitions provided at one side of the retort in a manner to afford a flue, and an inclined partition having its lower end projecting over the upper end of the uppermost of said partitions and its upper end into said chambered extension and affording, in connection with the bottom of said extension, a continuation of said flue, substantially as described.

4. A retort for the purpose described comprising a hollow metal body provided at its upper end with an integral, depending, chambered extension having in its lower end a vent-hole and depending from its upper side a flange, a series of spaced vertically-arranged

partitions provided at one side of the retort in a manner to afford a flue, and an inclined partition having its lower end projecting over the upper end of the uppermost of said partitions and its upper end into said chambered extension and having therein a vertical portion extending upward above the lower end of said flange, but at a distance therefrom, for the purpose described, said inclined partition affording, in connection with the bottom of said extension, a continuation of said flue, substantially as described.

5. A retort for the purpose described comprising a hollow metal body provided at its upper end with an integral depending chambered extension having a vent-hole in its lower end and provided at opposite side edges with rounded flanged projections, for the purpose described.

6. In a kiln for revivifying bone-black, a retort comprising an upright tube provided at its upper end with an integral, depending, chambered extension having in its lower end a vent-hole and in its upper side an opening in line with said vent-hole, a removable cover for said opening, a heating-box supported on said tube, a plate supported on the top of the kiln having pendent therefrom a short tube extending downward into said heating-box but spaced therefrom, and having an aperture in line with said opening in the chambered extension, a removable cover for said aperture and a hopper supported on said plate.

7. In a kiln for revivifying bone-black, in combination with a plate supported in the brickwork of the kiln having near opposite ends apertures and in its central portion a bridge or arch inclined downwardly toward said apertures, and affording on its upper side a seat, of a retort having its lower end received into said seat, a discharge-tube extending downward from each of said apertures and a cooler-cylinder having its upper end inclosing the lower end of each of said discharge-tubes, substantially as described.

8. In a kiln for revivifying bone-black, a retort comprising an upright tube provided around its upper edge with integral projections affording a recess or seat and having at said upper end an integral depending chambered extension provided in its lower end with a vent-hole, a heating-box supported on said tube and having its lower edge portion received in said seat or recess, and a plate supported on the top of the kiln having pendent therefrom a short tube extending downward into said heating-box but spaced therefrom, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BERNHARDT EBA.

Witnesses:

JNO. A. HAWKE,
T. A. LESSER.