

(No Model.)

E. L. LONG.  
ALTERNATING DUMPING GRATE.

No. 501,623.

Patented July 18, 1893.

Fig.1

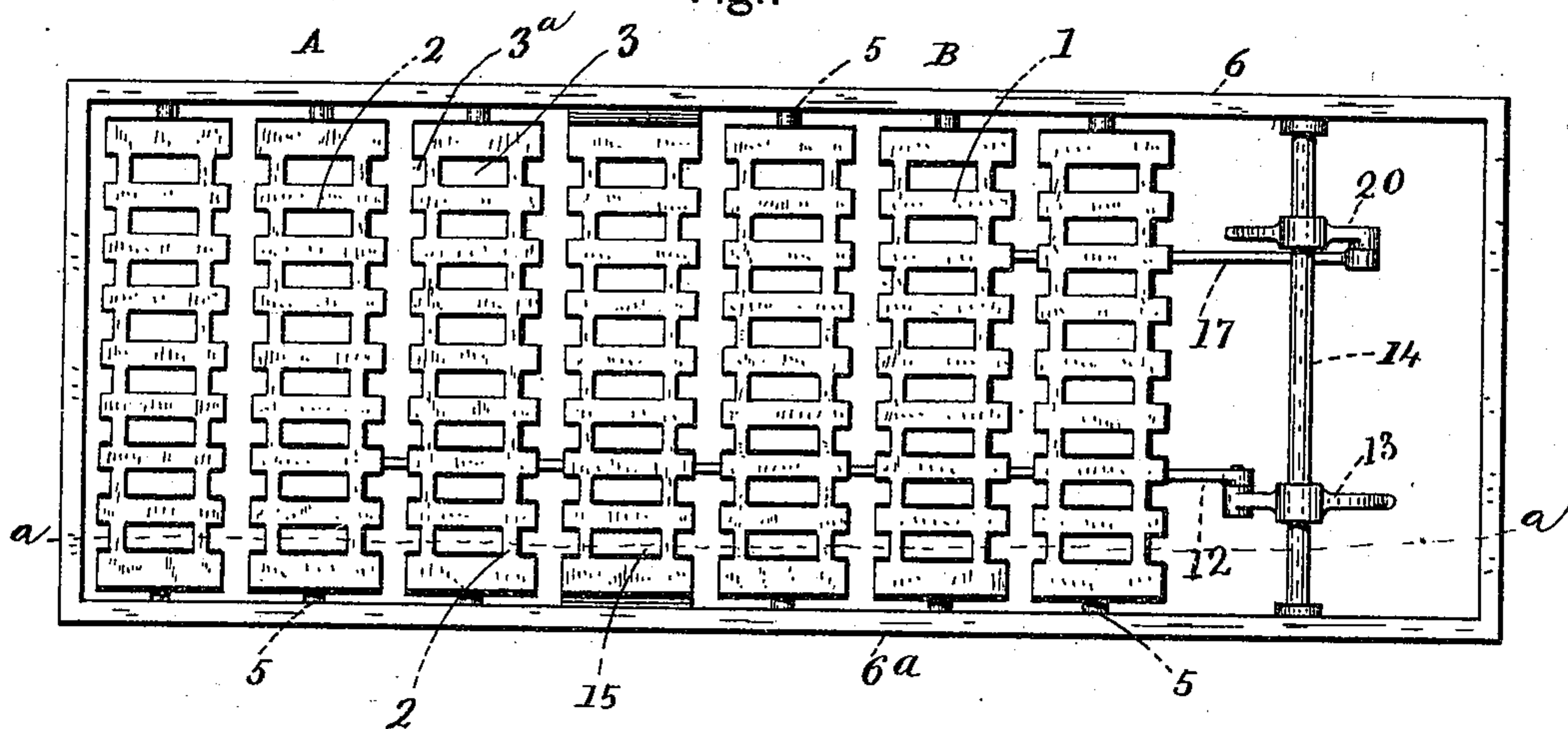


Fig.2

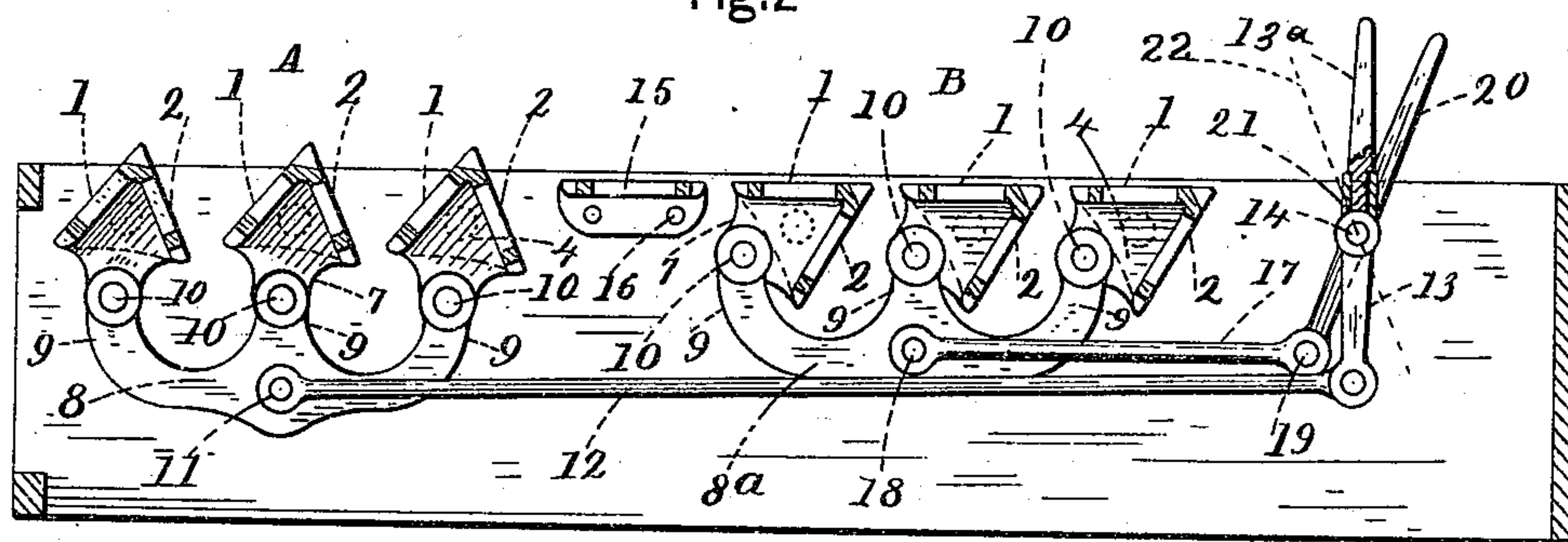
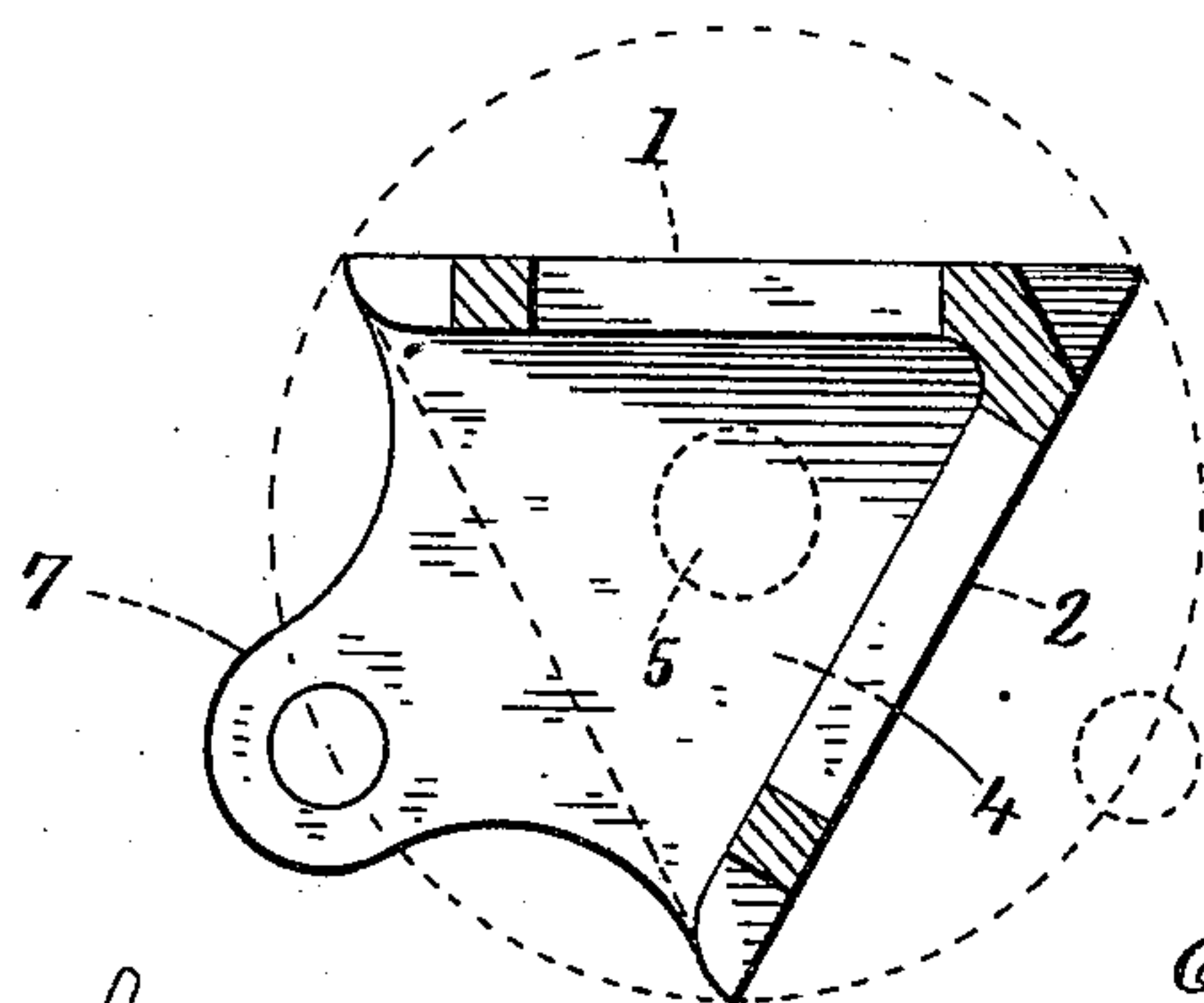


Fig.3



Witnesses:

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# UNITED STATES PATENT OFFICE.

ELI L. LONG, OF CHEEKTOWAGA, NEW YORK.

## ALTERNATING DUMPING-GRATE.

SPECIFICATION forming part of Letters Patent No. 501,623, dated July 18, 1893.

Application filed September 5, 1892. Serial No. 445,040. (No model.)

*To all whom it may concern:*

Be it known that I, ELI L. LONG, a citizen of the United States, residing in Cheektowaga, in the county of Erie and State of New York, have invented certain new and useful Improvements in Alternating Dumping-Grates, of which the following is a specification.

My invention relates to certain improvements in dumping furnace grates whereby the ashes and cinders may be easily removed when required, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a double grate. Fig. 2 is a sectional elevation in or about line *a—a* Fig. 1. Fig. 3 is an enlarged cross section through one of the grate sections.

Each grate section consists of the two grate portions 1 and 2, formed in one piece and arranged in the form of an inverted V shaped trough, see Fig. 3 where this construction is shown. Each end of each section is provided with an end piece 4, to receive a trunnion or pivotal pin, 5, by which it is pivoted to the sides 6 and 6<sup>a</sup>, of the furnace. On the under side of each section diametrically opposite the apex is an extension portion, 7, see Fig. 3. These sections are mounted on their trunnions in the furnace so as to be easily turned thereon, substantially as shown in Figs. 1 and 2.

Each grate portion or face is provided with central openings 3 and edge openings 3<sup>a</sup>, through which air is supplied to the fire and through which the ashes fall as the coal is consumed.

The edges of the grate are at the same distance from an axial line through the trunnions so that it does not make any difference which face is upward, the distance between the adjacent faces of the bars or sections will be the same, and as the edges are notched or recessed, a free passage will be given for ashes, &c., and in dumping the grate, if any substances as coal, or clinkers should be caught between the edges of the sections, the sharp corners of the projections will assist in crushing the obstruction and letting the grates assume their normal position. The notches at the apex of the section do not pass through to the interior of the grate as such a construction would weaken the grate at a point

where it is exposed to the greatest action of the heat. When the sections occupy their natural position, as shown in Fig. 3, the openings in the lower portion or face will permit of the passage of the ashes which have passed through the openings in the upper face. This in connection with the absence of any bottom or wall on the other side of the trough formed by the grate sections will prevent any possible accumulation of ashes within the section, as would happen with a hollow section having its walls perforated.

When these grates are thus mounted in place, they are connected together by a holding piece, 8, having a series of upwardly projecting portions 9, each holding bar, 8, having as many projecting portions 9 as there are grate sections, each one being pivoted by a pin, 10, to the extension portion, 7, so that when the holding piece, 8, is moved all the grates move at the same time. To the under side of the holding portion 8, is pivoted by a pin 11, (see Fig. 2,) a connecting rod, 12. At the opposite end, the connecting rod, 12, is pivoted to an operating arm, 13, and the operating arm, 13, is mounted on a cross shaft 14, so as to be easily turned thereon.

In the drawings, I have shown two series of connected dumping alternating grates, the series A and B, and between them is a stationary grate, 15, rigidly secured to the furnace by bolts, 16, substantially as shown in Fig. 2, but a single series of two or more such grates may be used and connected together and operated in the same way. The series B of said grates are connected by another holding piece, 8<sup>a</sup>, similar to the holding piece, 8, which are connected by pins, 10, to the extension portion of each double grate, and by a connecting-rod 17, pivoted by a pin 18 to the under side of the holding portion, 8<sup>a</sup>. The opposite end of the connecting-rod, 17, is pivoted by a pin, 19, to an operating arm, 20, also mounted on the cross shaft, 14, so as to easily turn thereon.

In Fig. 2, I have shown one of the operating arms as made in two parts, 13, and 13<sup>a</sup>, the part, 13, being provided with a socketed portion, 21, and the part 13<sup>a</sup>, being adapted to slip into the socket and is thus made easily removable.

I have shown the above portions of both



parts in section, so that the parts may be understood more clearly.

The operation of the grate will be easily understood by reference to the drawings. By turning the operating arm 20, for instance, back in the position shown in Fig. 2 the grates 1 will be brought level or substantially so, so as to be used. By reversing the arm, 20, so as to be substantially in the position shown by the dotted line, 22, in said Fig. 2, the grate, 2, will be brought into use or into a horizontal position. It will be further seen that this turning of the grates so as to bring the two grates in each section alternately into use, will dump the ashes and cinders at the same time. It will also be noticed, that this construction will double the durability of the grate as only one grate of a section is in use at the same time.

In operating a series of such grates it is necessary that each one of them be rotated a full third of a revolution. To rotate them this distance in each direction, with their load of coal, requires that the projection to which the holding bars are connected should be located diametrically opposite the apex, as any other location would cause the bar to operate more easily when turning in one direction than in the other. It also necessitates the use of the upward projections upon the holding bars to prevent the edge of the grate bar from coming in contact with the holding bar when the grate is operated.

If desired the grates can be made longer and comparatively narrower and arranged

longitudinally in the furnace and operated in exactly the same way.

I claim as my invention—

1. A grate bar formed into a substantially inverted V shaped trough, the ends of which are each provided with a trunnion, each face of the bar being provided with openings, and adapted to be turned into a horizontal plane, with an open side below it for the escape of ashes, and the entrance of air, said bar being also provided with an extension portion, diametrically opposite the apex of the bar, for operating it, substantially as set forth.

2. In a grate, the combination, with a series of inverted V shaped trough bars pivotally secured at their ends, each bar having its edges the same distance from an axial line through the trunnions and each face and edge of the bar being provided with openings, said bar being further provided with an extension portion diametrically opposite the apex, a holding piece for said series of bars provided with a series of upward projections, one for each extension of the bar to which it is pivotally secured, and means for moving said holding piece longitudinally whereby the bars may be rocked on their trunnions so as to bring either face into a horizontal plane without the other face coming in contact with the holding piece, substantially as set forth.

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