J. A. FRIED.

GRATE FOR REFUSE CONSUMERS.

APPLICATION FILED SEPT. 23, 1908.

963,430.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

Fig. 1

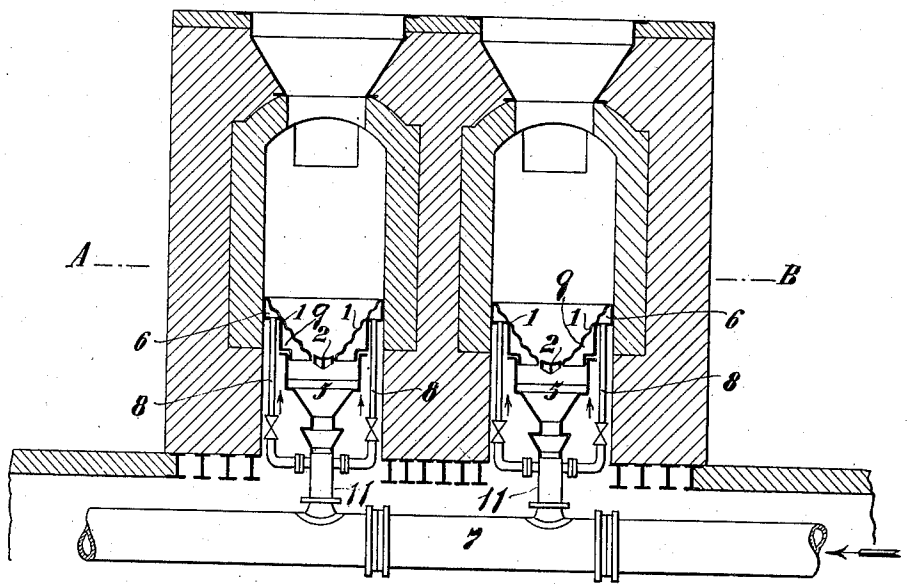

Fig. 2

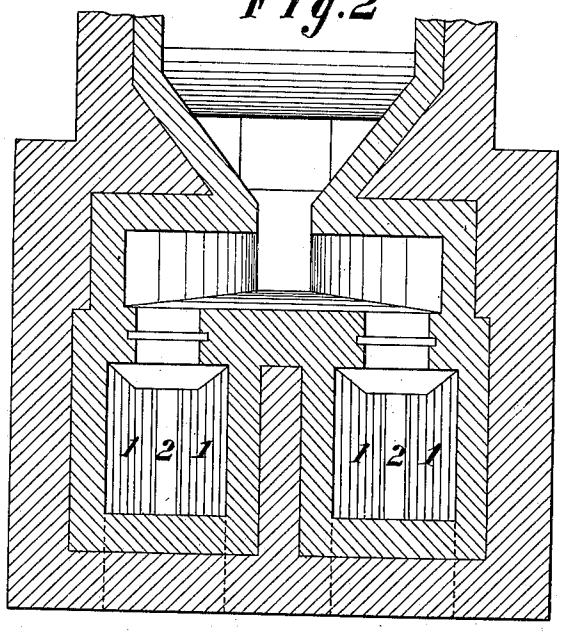

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Fig. 3

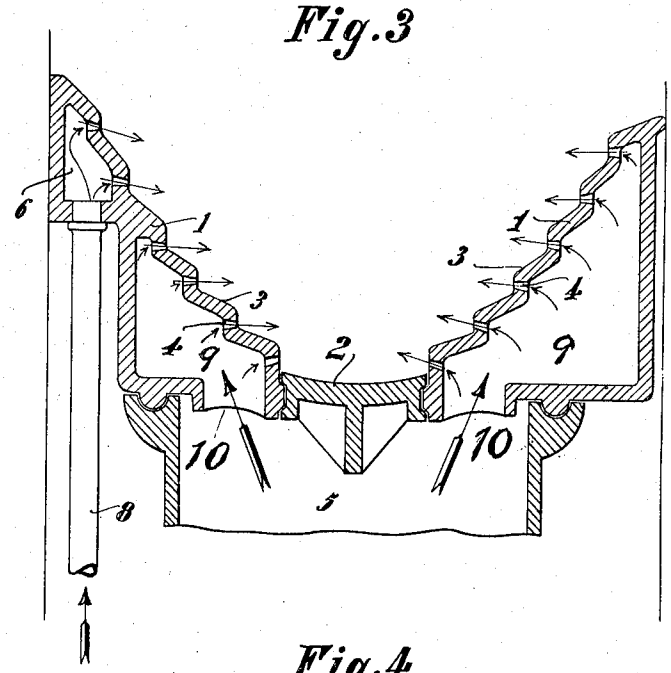
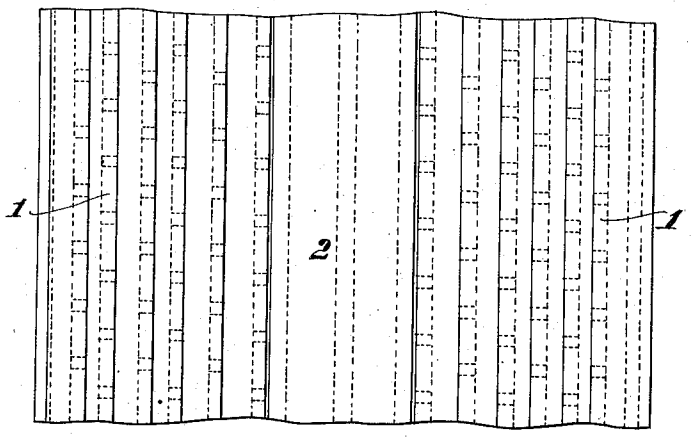


Fig. 4



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UNITED STATES PATENT OFFICE.

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GRATE FOR REFUSE-CONSUMERS.

963,430. Specification of Letters Patent. **Patented July 5, 1910.**

Application filed September 23, 1908. Serial No. 454,425.

To all whom it may concern:

Be it known that I, JOHANN ALOYS FRIED, a citizen of the German Empire, residing at Barmen, in the Province of Rhenish Prussia, Prussia, Germany, have invented certain new and useful Improvements in Grates for Refuse-Consumers; 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.

The subject-matter of the present application is a new grate for refuse and the like consuming furnaces operated with a blast supplied below. In the case of the hitherto customary construction of these consuming furnaces the blast enters from below through the openings in the grate vertically upward into the refuse charged on the grate and makes its way through the same. In this case there exists the defect that the blast passes through at those places where there is the coarsest material because large empty spaces are associated with this material. The result of this is that the combustion is non-uniform.

The object of the present invention is to provide a new grate in which these defects are non-existent.

The essence of the grate according to the invention consists in it possessing blast holes which direct the blast upward and inward in lines much more nearly horizontal than vertical from both sides toward the middle of the grate. In this way the air forming the blast is prevented from entering into the refuse at right angles to the plane of the grate and in the direction in which the gases leave the furnace and from being blown through the refuse. At the same time the danger of the blast holes becoming stopped up is avoided.

In the drawing one embodiment of the invention is illustrated by way of example. In said drawing:—Figure 1 is a vertical section of a refuse furnace fitted with the new grate, and Fig. 2 is a horizontal section of said furnace, the section being on the line A—B Fig. 1. Fig. 3 shows to an enlarged scale and in vertical section a grate arranged according to the invention and illustrates also a modification thereof, and Fig. 4 is a plan of a portion of said grate.

In the case of the illustrated form of grate according to the invention, the grate is approximately trough-shaped in cross-section, being provided with two diverging side walls 1, arranged at an angle to one another, at the line of meeting of which walls, an imperforate plate 2 concave downward is arranged as a middle part forming the bottom of the grate. The obliquely rising side parts 1 of the grate are, in the example illustrated, provided with steps 3 which possess in their vertical or approximately vertical portions horizontal or approximately horizontal blast passages or openings 4 which are shaped like nozzles. According to Fig. 1 and to the left-hand portion of Fig. 3 the lower blast passages of the oblique side parts lead from a middle blast chamber 5 while the upper blast passages at each side lead from a separate blast chamber 6. The air is blown into these chambers through the pipe 7, the air being supplied to the upper lateral chambers 6 by the pipes 8 fitted with shutting-off devices. The right-hand portion of Fig. 3 shows a construction of the grate in which a single blast-chamber is provided. The middle part of the grate, that is, the plate 2 does not possess any openings for the air blast. It is, however, directly struck by the blast and is consequently cooled.

By means of the trough-shaped formation of the new grate the effect is obtained that the combustion process is not started immediately throughout the charged heaps of refuse, but, being promoted by the glowing clinkers left over from the previous charge on the lower middle part 2 of the grate, combustion is first started in a definite part (in fact, in the lower part) of the heap of refuse. It is thus impossible for the fine parts of the refuse, particularly ashes, to be blown through the empty spaces formed by coarse materials, so that these fine parts as also all the materials combustible with ease or with difficulty are retained and are simultaneously consumed. As soon as the materials forming in the lower zone of the center of combustion are reduced to slag and have therefore become reduced in volume the refuse gradually sinks of its own accord into the center of the fire, being assisted in doing so by the lateral oblique grate walls, and burns quickly in consequence of the blast from both sides, extraordinary heat being developed. On account of the great heat the readily combustible

parts are indeed first consumed, but immediately afterward the parts combustible with difficulty are also consumed, all being consumed only in the combustion zone, however, and the readily combustible parts serving in this trough-shaped grate the purpose of immediately igniting with certainty the parts combustible with difficulty. All the readily combustible materials throughout the refuse are not, however, consumed immediately nor before they have initiated the ignition of the materials combustible with difficulty, as in the case of flat grates and in the case of the ordinary stepped grates. The middle part of the grate, that is, the plate 2, at the same time renders it possible conveniently to remove the clinkers.

This invention of course is not restricted to the precise construction shown, but may be modified in various ways without departing from the spirit and scope of my invention.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A grate provided with two diverging side walls, each having air passages through it, in combination with air-chambers independent of each other outside of said walls, an air inlet pipe directed upward from below said grate and branch pipes from said air pipe supplying said air chambers substantially as set forth.

2. A grate consisting of an imperforate lower middle part and two upwardly extending perforated parts and a pair of chambers outside of said perforated parts, also an additional chamber 6 of the grate as independent of the chambers first mentioned in combination with means for supplying said pair of chambers and means for supplying said supplemental chamber 6 substantially as set forth.

3. A grate provided with two upwardly extending outwardly inclined perforated side walls, a pair of chambers outside of the same and an additional independent air chamber also outside of the grate and discharging through some of its perforations, in combination with means for supplying air to said pair of chambers and an additional independent means for supplying said additional chamber.

4. A grate provided with upwardly extending outwardly inclined perforated side walls and a pair of independent superposed chambers outside of one of said walls in combination with means for supplying air independently to each of said chambers substantially as set forth.

5. In combination with a grate having raised and perforated side walls and two superposed separate air chambers outside of each wall, a bottom air chamber communicating with the two lower side chambers, a pipe 11 supplying said bottom chamber and a pair of air pipes 8 supplying the two upper side chambers substantially as set forth.

6. A grate for refuse consuming furnaces operated with a blast introduced below the grate comprising two obliquely rising lateral pieces with blast passages directed toward the middle of the grate and a middle piece without blast passages, a middle blast-chamber under the middle piece and the lower parts of the lateral pieces of the grate and separate lateral blast-chambers under the upper parts of the lateral pieces.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JOHANN ALOYS FRIED. [L. S.]

Witnesses:

OTTO KÖNIG,

AUGUST HELLER.