A. BOUILLY.

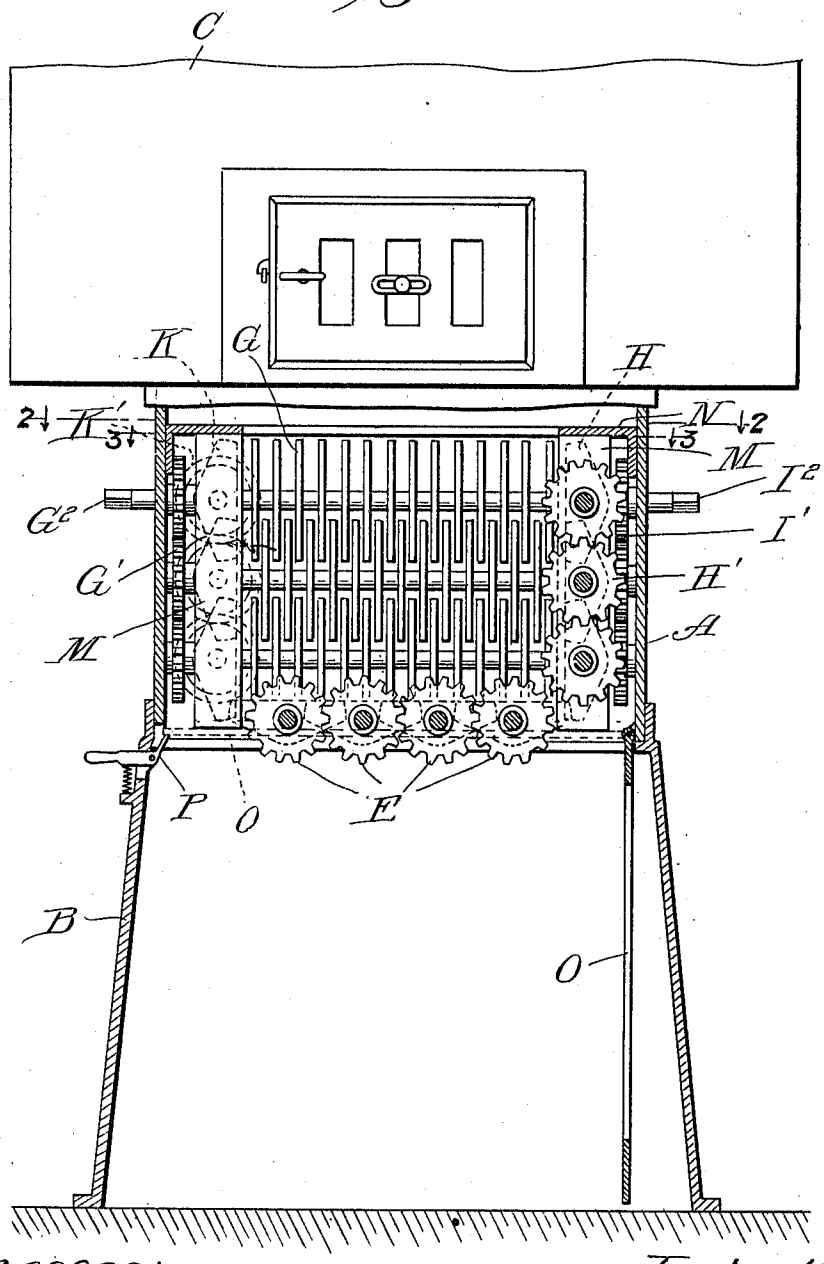
FURNACE.

APPLICATION FILED MAR. 19, 1910.

988,435. Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

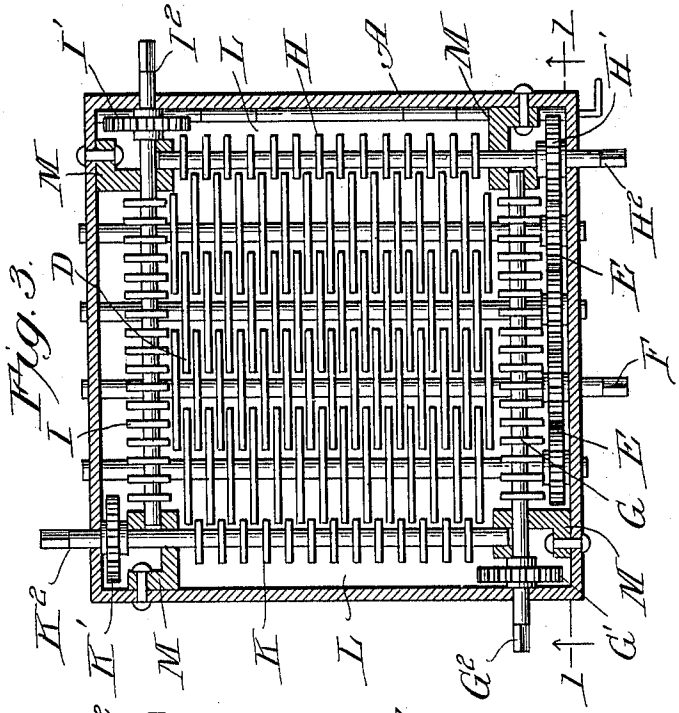


Fig. 5.

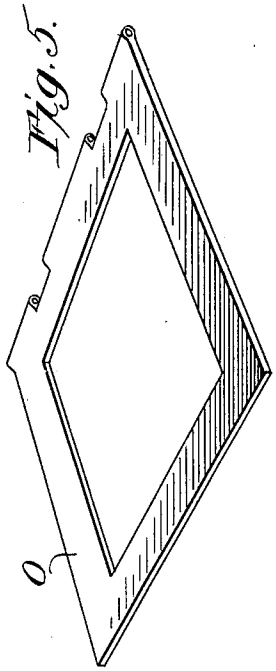


Fig. 2.

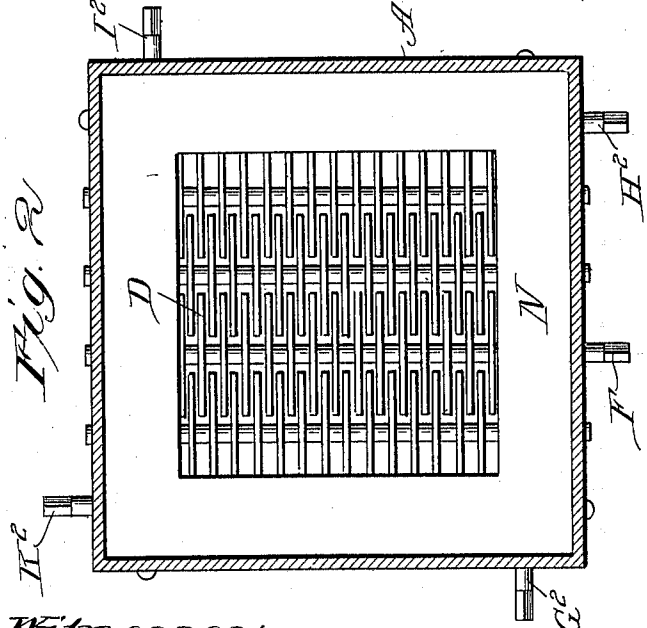
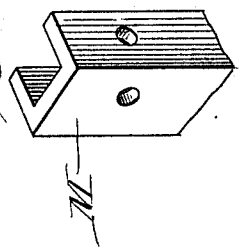


Fig. 4.



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FURNACE.

988,435. Specification of Letters Patent. Patented Apr. 4, 1911.

Application filed March 19, 1910. Serial No. 550,496.

To all whom it may concern:

Be it known that I, AUGUST BOUILLY, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Furnaces, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

It is difficult in the ordinary furnace to shake down the fire so as to clear it of ashes without loss of a considerable amount of unconsumed coal. This coal is either wasted or else it must be recovered through the tedious and disagreeable process of sifting the ashes. This objectionable characteristic of the ordinary furnace is due to the fact that all of the ashes, either near the grate or adjacent to the sides and top of the bed of coals, must be discharged through the grate at the bottom of the bed of coals.

The object of my invention is to overcome this objection in furnaces and to make it possible to keep the fire clean and bright at all times.

A further object of my invention is to produce a furnace which may be operated with a normal effective grate area and also, when desired, with a greatly increased grate area.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but for a full understanding of my invention and of its object and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a view partly in side elevation and partly in section of a portion of an ordinary heating furnace arranged in accordance with the present invention, the portion in section being taken on line 1—1 of Fig. 3; Fig. 2 is a section on line 2—2 of Fig. 1; Fig. 3 is a section on line 3—3 of Fig. 1; Fig. 4 is a perspective view showing a fragment of one of the posts for supporting the side grates; and Fig. 5 is a perspective view of the baffle plate which permits the furnace to be operated as though it had only the ordinary horizontal grate.

In accordance with my invention I use, in addition to the usual grate, one or more side grates which form with the horizontal grate a basket-like structure for containing the fuel; air being admitted to the burning fuel, not only from the bottom but around the sides. I prefer to make the sides of the fuel-receiving structure of several independent grate sections which may be manipulated independently of each other so as to agitate the fuel and shake the ashes therefrom. By this arrangement I obtain a greatly increased grate area without increasing the size of the fire box and at the same time can shake the ashes from the bed of fuel at any point where there may happen to be an accumulation without disturbing the rest of the bed. Furthermore, whenever it is desired to clean the fire thoroughly, each of the grate sections may be shaken separately until the ashes adjacent thereto are discharged, so that with a little care, the fire may be cleaned thoroughly without agitating any portion of it so violently and so long as to cause unconsumed coal to be discharged. By providing means for cutting off the air to the side grates when this is desired as, for example, when it is desired to run a low fire, all of the air to the fire may be made to enter through the bottom grate in the usual way; so that it is unnecessary to keep a deep fire at times when a low fire will suffice.

Referring to the drawings, A represents the fire box of a furnace; B the ash pit; and C the superstructure which may be a boiler or any other device adapted to be heated. All of these parts may be constructed in any usual way and may take any desired form, since they of themselves constitute no part of the present invention.

D represents a horizontal grate which may take any usual or preferred form, that illustrated consisting of four grate bars geared together by means of gear wheels E and one of the bars having an extension F for receiving the end of a crank. By placing a crank upon the extension F all of the bars of the horizontal or bottom grate may be oscillated. In accordance with my invention I place above the bottom grate an annular shell of grate bars. In the arrangement shown the fire box is rectangular and I have therefore illustrated the side grates as made up of four sections indicated at G, H, I and K. The side grates may be of any desired height, preferably though not necessarily being shallower than the width

of the bottom grate. In the arrangement shown, each of the side grates is made up of three bars; the bars of the grate G being connected together by gearing G′, the bars of the grate H being connected together by gearing H′, the bars I being connected together by gearing I′ and the bars K being connected together by gearing K′. One of the bars of each of the side grates has an extension corresponding to the extension F; these being indicated at G^2, H^2, I^2, and K^2. By placing a crank handle upon any one of the extensions it is possible to oscillate the bars of the corresponding section so as to clear the adjacent portion of the fire of ashes.

In order to make the side grates effective it is necessary to provide means for permitting air to pass through these grates from the outside into the fire. This may conveniently be accomplished by making the shell of side grates smaller than the fire box, thereby providing an annular space L extending upwardly from the ash pit around the side grates and permitting the air from the ash pit to flow into the fire through all of the grates. The side grates may be suitably supported in any manner as, for example, by means of combined posts and spacers M riveted or otherwise secured to the interior of the fire box. The annular chamber around the grate must be closed at the top in order that the air flowing therethrough will be compelled to pass through the grates before it can escape. This may conveniently be accomplished by fitting within the fire box above the ends of the posts a rectangular plate N having the central portion cut away so as to provide an opening approximately equal to the size of the bottom grate.

It will be seen that unless a deep bed of fire is maintained some of the air will be drawn through the upper portion of the side grates at points above the fire. At times it is not desirable to maintain a deep fire and, in order to make the furnace efficient under these conditions, I provide means for excluding air from the whole or a part of the side grates so that no air can flow into the combustion chamber at points above the fire. A simple arrangement for accomplishing this result is to hinge a plate O corresponding to the plate N at a point just below the bottom grate. Normally this plate is allowed to hang down and air is supplied from the ash pit to all of the grates. When it is desired to maintain a low fire, the plate is swung upwardly as indicated in dotted lines in Fig. 1 and is held in this position by a suitable catch P which engages the plate at a point opposite the hinged support. When in the raised position the plate closes the chamber L at the bottom and prevents access of air from the ash pit to this chamber; and consequently the lower grate alone remains effective as a grate area. However, it is still feasible to shake the side grates so as to assist in discharging the ashes.

It will thus be seen that I have provided a simple and novel arrangement whereby the effective grate area of a furnace may be greatly increased when this is desirable or in which only an ordinary grate area may be employed when a low fire is desired. It will furthermore be seen that I have provided an arrangement in which the fire may be kept clean and clear of ashes at all times without danger of losing any material amount of unconsumed coal.

While I have illustrated and described with particularity only a single form of my invention I do not desire to be limited to the specific details so illustrated and described; but intend covering all constructions and arrangements which fall within the terms employed in the definitions of my invention constituting the appended claims.

What I claim is:

1. In a furnace, a horizontal grate and a series of upright side grates arranged in the form of an annular shell above the horizontal grate, each of said grates being composed of a plurality of relatively movable members, and independent actuating means for the members of each of said grates.

2. In a furnace, a horizontal grate, and a series of upright side grates arranged in the form of an annular shell above the horizontal grate, each of said grates being composed of a plurality of movable bars, and actuating mechanisms associated with said grates and each arranged to move the bars of one grate independently of the other grates.

3. In a furnace, a horizontal grate, four upright side grates arranged above the horizontal grate in the form of an annular shell, each of said grates being composed of a plurality of relatively movable bars, and actuating means connecting together the bars of each of said grates, the actuating means of one grate being independent of the other grates.

In testimony whereof, I sign this specification in the presence of two witnesses.

AUGUST BOUILLY.

Witnesses:
WM. F. FRENDENREICH,
H. S. GAITHER.