(No Model.)

J. J. BURNSHIRE & D. T. CLICK.

AIR DISTRIBUTER FOR FURNACES.

No. 532,309. Patented Jan. 8, 1895.

Fig. 1

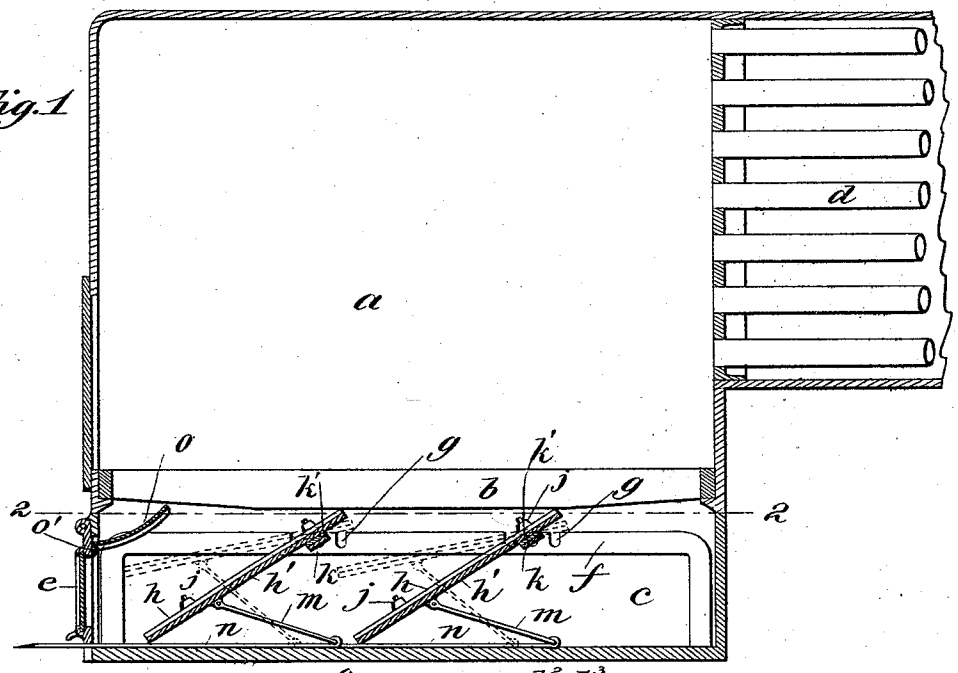


Fig. 2

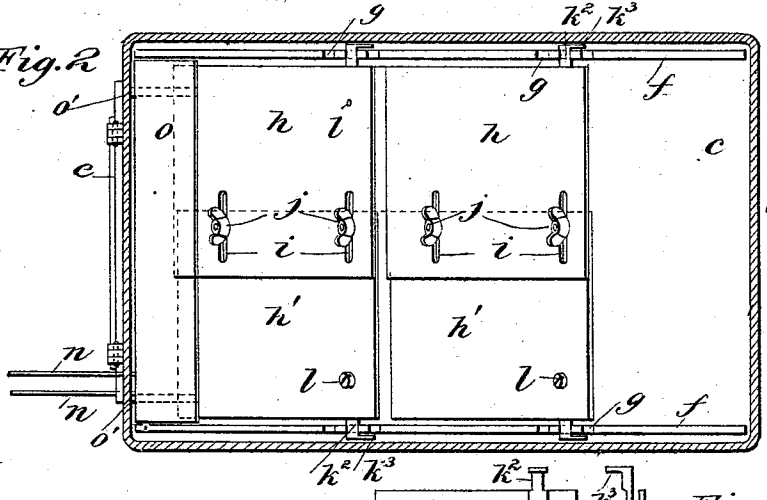


Fig. 5

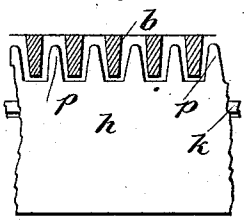


Fig. 3

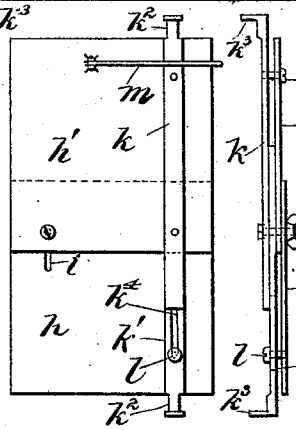
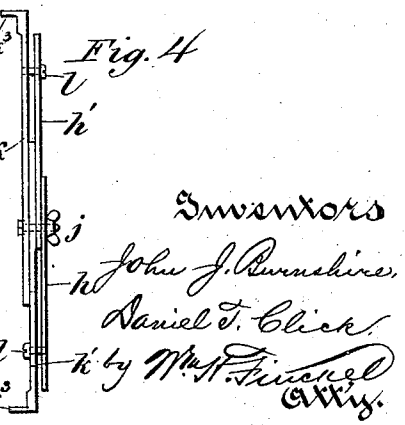


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN J. BURNSHIRE AND DANIEL T. CLICK, OF DAYTON, VIRGINIA.

AIR-DISTRIBUTER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 532,309, dated January 8, 1895.

Application filed May 1, 1894. Serial No. 509,706. (No model.)

To all whom it may concern:

Be it known that we, JOHN J. BURNSHIRE and DANIEL T. CLICK, citizens of the United States, residing at Dayton, in the county of Rockingham and State of Virginia, have invented a certain new and useful Improvement in Air-Distributers for Furnaces, of which the following is a full, clear, and exact description.

It is our experience, and we suppose the experience of others using portable or traction engines for service, for example, in farm work, that, owing to the inability to obtain always the proper kind of fuel, and the consequent necessity of using such fuel as comes to hand, it is impossible to keep a good fire, and consequently, to keep up the desired pressure of steam; and our efforts have been directed to meeting this contingency so as to be able to use such fuel as comes to hand, whether it be coal or the various kinds of wood. We have found that a steady fire and, consequently, the requisite pressure of steam may be maintained by providing in the ash pit, beneath the grate, means for directing and regulating, or, in other words, distributing the air supply to the furnace. Obviously, the most practical form of an invention having this object in view is that whereby one is enabled to apply the invention to an engine already in possession without alteration of the grate, fire pit, or other fixtures; and for the purposes of this case, we will describe our invention as an attachment for portable steam generators; but, we wish to be understood as recognizing as within our invention, its use in the herein described form, or obvious modifications thereof, in steam generators generally, at whatever stage applied thereto.

In its most limited form, then, our invention consists of a portable frame provided with adjustable plates which plates constitute air distributers, the same being constructed and arranged substantially as hereinafter more particularly set forth and claimed, whereby the parts may be transported in a knock-down condition and set up in the ash pit of a steam generator, as may be convenient or desirable.

Having thus stated the principle of our invention, we will proceed now to describe the best mode in which we have contemplated applying that principle, and then will particularly point out and distinctly claim the part, improvement or combination which we claim as our invention.

In the accompanying drawings, illustrating our invention, in the several figures of which like parts are similarly designated, Figure 1 is a sectional elevation of the furnace and portion of the boiler of a portable or traction engine or steam generator. Fig. 2 is a sectional plan view taken in the plane of line 2—2, Fig. 1. Fig. 3 is a bottom plan view of one of the air distributers. Fig. 4 is an edge view of the same; and Fig. 5 is a sectional elevation showing a modification.

a may represent the combustion chamber, *b* the grate, *c* the ash pit, and *d* a portion of the boiler, of ordinary construction.

e is the door, also of ordinary construction, to the ash pit. Ordinarily, as indicated in Fig. 2, this door is narrower in width than the width of the ash pit, and in order, therefore, to introduce our attachment into the ash pit and, at the same time, have it extend the entire width of the ash pit, from side to side; it is necessary that the attachment be made sectional or in knock-down form. For this purpose, we construct saddles or rests or frames *f* of inverted-U shape and of any suitable material; and we prefer to use rods or tubing in order that the proper length of these rests may be easily secured to adapt the device to ash pits of different lengths from front to rear. Notches or other suitable supporting devices *g* are provided in the upper longitudinal portions of these rests, in any desired number, for purposes of adjustment of the distributing plates now about to be described.

In their preferred form of construction, the distributing plates are composed of sections *h*, *h'*, overlapping each other and provided, one with slots *i*, and the other with adjusting bolts *j*, whereby the width of the plates may be regulated in accordance with the width of the ash pit in which they are to be applied, and also to admit insertion of the plates in the ash pit through the ash pit door. These sections *h*, *h'*, are provided with cross-pieces *k*, *k'*, respectively, which terminate in journals k^2, k^2, and these journals may end in overhang-

ing lips or flanges k^3. The cross-piece k' is slotted longitudinally at k^4 for the passage of the upper bolt j in the lateral adjustment of the sections composing the distributing plates, and these pieces k' are permanently bolted or otherwise secured to the sections h, h' by means of bolts or other fastenings l. The cross-pieces k and k' are located some little distance below one edge (the upper edge) of the plates so as to form an axis of rotation for said plates and so as to provide for the projection of the plates above the upper level of their supporting frames or rests f, and so that, when the said attachment is in place in an ash pit, the said plates will come rather close up to and practically against the bottom of the grate bars, as clearly indicated in Fig. 1, and extend thence down to and practically in contact with the floor or bottom of the ash pit.

The distributing plates are arranged to incline toward the front of the furnace; that is to say, toward the ash pit door, so that the incoming air will pass up the first plate or plate nearest the ash pit door and be cut off practically from the ash pit in the rear of said first plate, the bulk of the air that reaches the ash pit back of this first-named plate being directed over the top edge of the first-named plate, and being then again intercepted by the rearmost plate. Any number of these plates may be arranged in the ash pit, but, ordinarily, two or three will be sufficient.

In order to adjust the angle of inclination of the distributing plates in accordance with the quantity of air it is desired to admit into the furnace, and also to provide for the clearing out of the ashes, we provide the said plates on the rear with struts m, pivoted thereto, and the strut of each plate is provided with a rod n extending thence along the bed of the ash pit and out beneath the ash pit door.

We esteem it of prime importance that each distributing plate should have its independent adjusting strut and rod in order to vary the distribution of the air to the various parts of the furnace in accordance with the requirements of the fire and in accordance with the progress of combustion.

Heretofore, in the use of air distributing or deflecting plates in the ash pits of furnaces, the deflector plates have been suspended from the grate bars themselves by attachment to the said grate bars directly, and in their normal positions they are hung down vertically, and all of the several plates have been connected together so as to be moved in unison, but we esteem this a faulty construction, in that it is desirable in many instances to admit air to one portion of the fire in quantity and to admit the least possible air to other portions of the furnace, and this is only possible by having the several distributing plates capable of independent operation and adjustment.

Difficulty has been experienced in controlling the fire at that end of the furnace nearest the door, and we esteem this difficulty to be occasioned by an undue supply of air at that point, and hence, in order to divert the air from that point, we supply the door of the ash pit with the deflector or distributing plate o, and this plate may be a piece of shovel steel or other metal, curved to the arc of a circle so as to swing with the ash pit door, and secured to the door by means of a flange and bolts o', or by means of a bracket or brackets attached to the door.

By means of the series of notches g, the distributing plates may be applied at various points in the ash pit in accordance with the service required.

In some cases, the more effectually to distribute the air, it may be advisable to provide the upper edges of the distributing plates with fingers p, as indicated in Fig. 5, which extend up between the bars of the grate.

In applying our invention to a furnace, one of the frames f may be inserted in the ash pit, and then the various distributing plates, with their fastening devices, j, loosened, may be inserted and their journals connected with the rest or frame, and then the said rest or frame turned up vertically, after which, the other rest or frame may be inserted, or having been previously inserted and laid flat on the ash pit bed, is turned up so as to effect an engagement with the opposite journals of the distributing plates, and then the sections of distributing plates are rigidly connected by turning up their fastening devices j, after which the proper inclination of said distributing plates is secured by means of their struts m and rods n. By reverse operations, the distributing plates may be readily removed; and the work may be done by any ordinary engineer or mechanic, without the necessity of employing specially skilled labor. Thus, the attachment, in addition to its effective distribution of the air, and thereby control of the fire, may be readily applied to the furnace of engines or steam generators or other heaters already built and in use; fired-up or otherwise; and, as already indicated, the invention is equally applicable either in the forms shown or in necessary modifications thereof, to furnaces of engines or steam generators or other heaters, new or in process of construction.

What we claim is—

1. An air distributer for furnaces, consisting of suitable supporting frames and sectional distributing plates movably and detachably supported in said frames, and provided with independent adjusting mechanisms for varying their angles of inclination, substantially as described.

2. An air distributer for furnaces, comprising frames and distributing plates pivotally supported in said frames and each provided with an independent adjusting mechanism, the said distributing plates comprising adjustable sections, substantially as described.

3. In an air distributer for furnaces, plates

composed of overlapping sections provided with journals permanently secured to the individual sections, the sections being adapted to be adjusted laterally to increase or diminish the width of the plates and provided with means for securing such sections in adjusted position, substantially as described.

4. In an air distributer for furnaces, distributing plates provided with fingers or projections extending up between the grate bars, and a support for such plates, substantially as and for the purpose described.

5. The combination with an ash pit door, of a deflector or distributing plate applied to and moving with said door, and extending from the door, when the door is closed, upwardly into contact with the bottoms of the grate bars and inwardly some distance from the mouth of the furnace, substantially as described.

6. An air distributer for furnaces, consisting essentially of a knock-down attachment for use in the ash pit of the furnace, and comprising frames, distributing plates made in adjustable sections and journaled in said frames, and means for moving the several distributing plates independently of one another, substantially as described.

In testimony whereof we have hereunto set our hands this 30th day of April, A. D. 1894.

JOHN J. BURNSHIRE.
DANIEL T. CLICK.

Witnesses:
GEO. W. HESS,
D. H. LEE MARTZ.