(No Model.)

A. BACKUS, Jr.

BOILER FURNACE.

No. 301,324. Patented July 1, 1884.

Fig. 1.

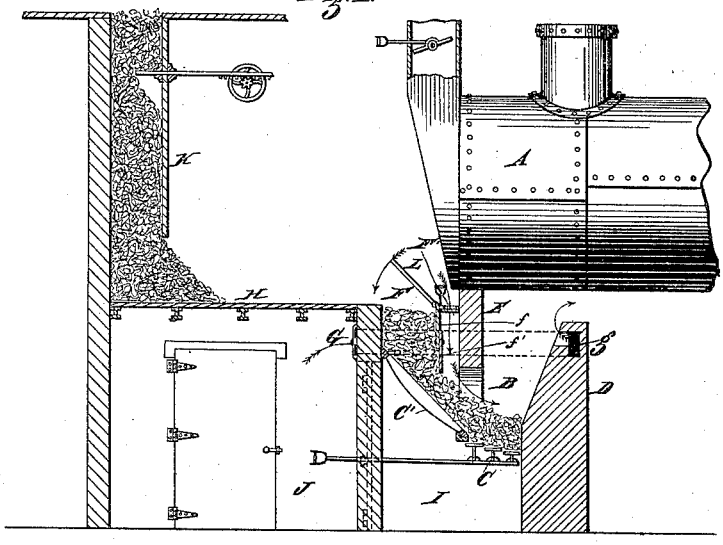
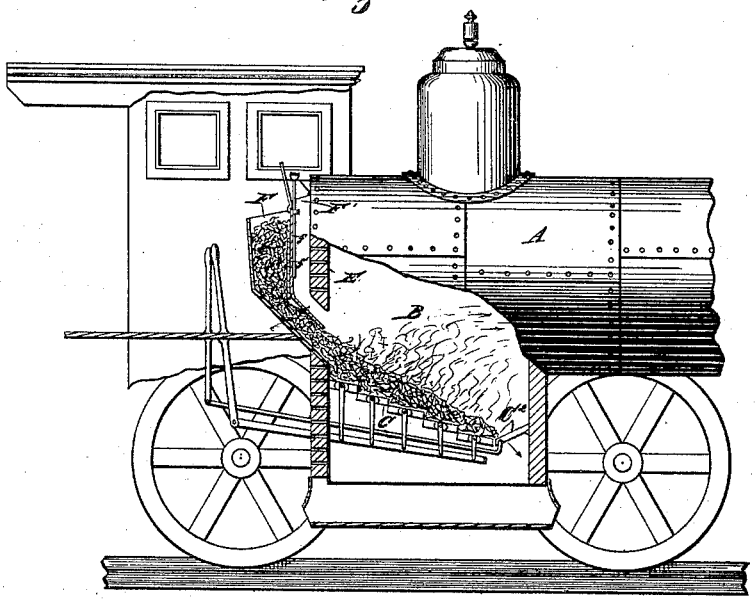


Fig. 2.



WITNESSES

Jno. E. Wiles.

N. S. Wright.

Absalom Backus Jr. INVENTOR

By A. W. Seymour.

Attorney

UNITED STATES PATENT OFFICE.

ABSALOM BACKUS, JR., OF DETROIT, MICHIGAN.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 301,324, dated July 1, 1884.

Application filed March 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, ABSALOM BACKUS, JR., of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Boiler-Furnaces; and I 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 pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists of the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal sectional view illustrating my invention. Fig. 2 shows it adapted to a locomotive.

My invention relates to furnaces, and is more particularly designed as an improvement upon the device patented to me the 19th day of February, 1884, No. 293,933.

A is a boiler; B, the combustion-chamber of the furnace; C and C′, the horizontal portion and upright portion, respectively, which constitute the grate.

D is the bridge-wall.

E is a depending wall.

F is a feeding-throat.

G represents air-flues leading from the front through the furnace-walls and discharging at *g* in the bridge-wall D.

H is a feeding-floor; I, the ash-pit; J, the chamber for access to the ash-pit and grate.

F′ is an air-passage for feeding air into the combustion-chamber just above the point of entrance of the fuel.

f f′ represent the parts composing the side of the air-passage F′, adjacent to the feeding-throat F. These parts may be made in a single piece; but I prefer generally to make them of two parts, one adjustable upon the other, so that the lower part may be adjusted up and down, so as to enlarge or contract the discharging end of the feeding-throat. The same effect may of course be accomplished by making this partition in a single piece capable of being raised or lowered bodily from the upper end. At some part of the air-passage F′, preferably at its upper end, is a suitable air valve or register, whereby the amount of air entering the passage may be regulated.

K represents a chute through which the fuel is fed to the feeding-floor. This fuel may be either coal, sawdust, shavings, or other usual substance, and the elevated feeding-floor is perfectly well adapted, as described in my former patent, for the feeding of light fuel to the furnace, such as sawdust, shavings, &c., from a wood-working establishment. The feeding-floor may be at the level of the bottom of the boiler, or somewhat above or somewhat below that level, depending upon the particular circumstances of any particular case. I also prefer that the horizontal portion C of the grate shall be provided with a rotary section or dumping section or other ordinary means for clearing the grate of clinkers, the upright portion C′ serving somewhat to enlarge the grate-surface and insure substantially a uniform depth of fuel over the entire grate.

I have found by experiment in the burning of shavings, &c., that without the air-passage F′ the furnace is apt to become somewhat choked and relieves itself in slight explosions of the gas, the explosions amounting in their regularity to pulsations; but with the air-passage F′ this is entirely obviated. Moreover, without the air-passage, the fuel is apt not to be sufficiently supplied with air to effect the thorough consumption of the smoke, while with the air-passage F′ the supply may be quickly and easily regulated without any regard to the amount of fuel in the feeding-throat to entirely consume the smoke. If, in any case, it is desired to feed the fuel rapidly and in considerable quantities from the base of the feeding-throat F, it is only necessary to raise the movable section *f* of the division-plate *f′*, or lift the entire plate bodily, if it is in a single piece, to enlarge the discharge end of the feeding-throat, and the reverse operation will check the discharge of fuel.

It is not absolutely necessary that the feeding-floor should be on the level with the top of the feeding-throat, for the feeding-floor may, if desired, be located, as shown, at or near the level of the ash-pit. In that case, however, the fuel would have to be lifted into the feeding-throat. I prefer, therefore, to locate the feeding-floor in such position that the fuel may be shoveled directly into the top of the feeding-throat from the same level.

The section C of the grate may be horizontal; or it may be inclined forward; or it may be inclined backward, and generally where it is designed to burn coal I prefer to incline it backward, as shown, so as to direct the clinkers to the extreme rear, where they may be readily passed through an opening for that purpose.

The furnace constructed as herein described produces an effective base-burning and smoke-consuming boiler-furnace. I would have it understood that the air-flues in the furnace-walls and at the top of the bridge-wall may or may not be employed, the essential feature of this device, and that feature wherein it differs from the device formerly patented by me, hereinbefore mentioned, is the employment of the air-passages F′ and the parts immediately connected therewith.

L is a door or valve for closing the upper end of the feeding-throat. It may or may not be employed.

The section C of the grate, it will be observed, is shown as constructed of several bars, each one of which is pivoted, and has an arm projecting down and engaging with a rod which projects out, so as to be operated by the firemen. By drawing upon this rod or lever the bars are all shaken simultaneously by being tilted around their axes. I prefer that the lowest bar shall have a short arm, and the succeeding upper bars shall have longer arms, as shown, so that as the lever is pulled it will tilt the upper bar slightly, and the next one a little more, and the last bar will be tilted very considerably, the effect being to discharge clinkers and ashes freely at the back of the grate, and yet afford sufficient agitation throughout that whole section C of the grate.

C² (shown in Fig. 2) is a grated shelf separate from the grate proper, and it may, if desired, be pivoted at its ends, as shown, so as to be dumped when it is desired to clear the grates or to discharge clinkers and dead fuel or ashes that may have collected.

What I claim is—

1. The combination, with the depending wall E, constituting one wall of the combustion-chamber, and the feeding-throat F, of an adjustable partition between the throat and wall, to form an air-passage between said parts and control the size of the discharge end of the throat, and a valve for regulating the flow of air through said passage, substantially as described.

2. The combination, with the feeding-throat and the air-passage, of a divided partition, a part or all of said partition made adjustable up and down for regulating the discharge-orifice at the base of the feeding-throat, substantially as and for the purposes described.

3. A grate consisting of several pivoted bars engaging with a common handle, the said bars having arms of different lengths connecting with said handle, substantially as and for the purposes described.

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

ABSALOM BACKUS, JR.

Witnesses:

N. S. WRIGHT,

M. B. O'DOGHERTY.