C. J. HAGSTREEM.

DEVICE FOR FEEDING AIR TO FURNACES.

No. 184,519. Patented Nov. 21, 1876.

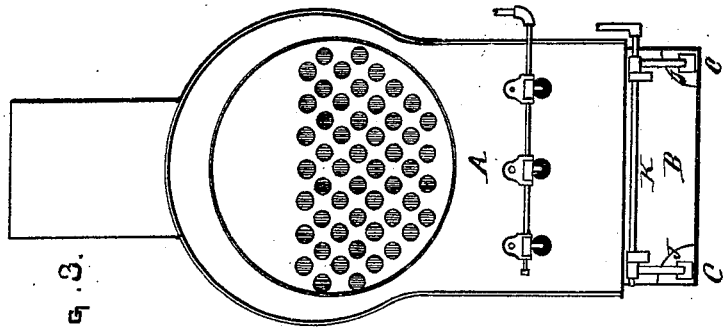

Fig. 3.

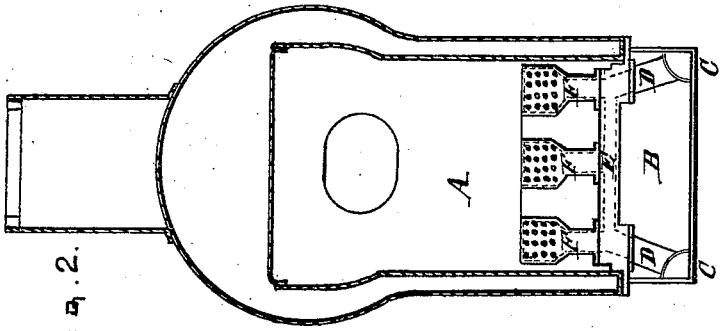

Fig. 2.

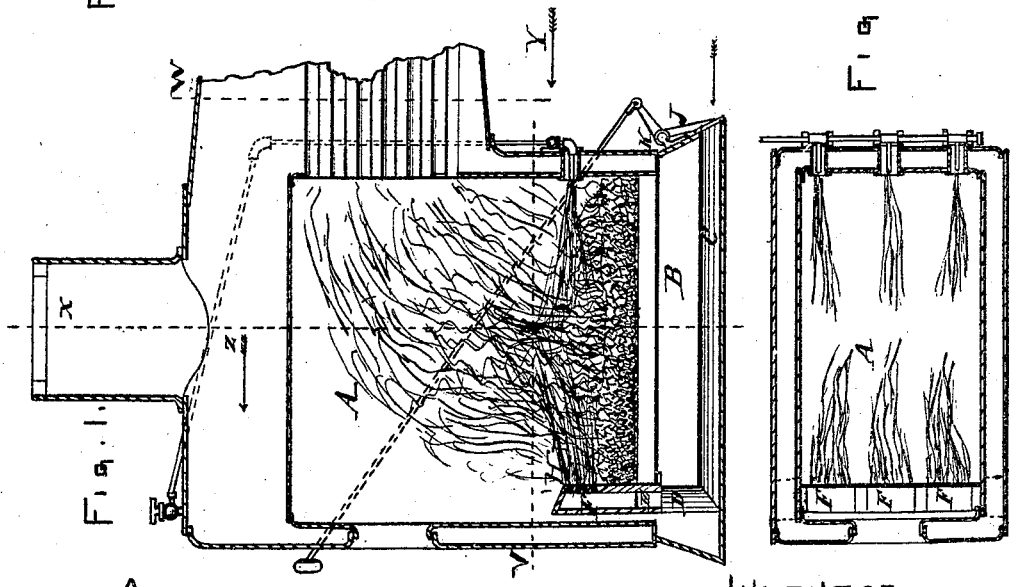

Fig. 1.

Fig. 4.

ATTEST:

O. H. Adix

William Goggin

INVENTOR:

Charles J. Hagstreem

By G. L. Chapin

Atty

UNITED STATES PATENT OFFICE.

CHARLS J. HAGSTREEM, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN DEVICES FOR FEEDING AIR TO FURNACES.

Specification forming part of Letters Patent No. **184,519**, dated November 21, 1876; application filed August 7, 1876.

To all whom it may concern:

Be it known that I, CHARLS J. HAGSTREEM, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Smoke-Burning Fire-Boxes, of which the following is a specification:

The nature of the present invention consists in pipes placed under the fire-box, and combined with perforated vertical air-ports, discharging air at the rear of locomotive-furnaces, and producing a forward blast to meet the blast at the front of the furnace, which gives a backward blast, by means of which a very much greater heat is obtained in the middle of the furnace, and over the burning fuel, for consuming the rising products of combustion.

The pipes are open at the front end of the furnace, and, by suitable doors, can be made to take in the same amount of air as the front draft or steam blast, so that the two blasts shall be even—that is, no more air and steam is admitted than can be consumed—and thus produce an intense heat.

I am aware that air-blasts for increasing heat in locomotive-furnaces are old devices; but I am not aware that a forward blast has been attained by air-pipes opening to the front of the furnace, and so combined with a forward blast as to concentrate the heat in the middle of the furnace, where the forward movement of the locomotive would produce the current of air to feed both blasts with the same momentum of air, as is the case in my improvements.

In the drawings, Figure 1 is a longitudinal section of a locomotive fire-box, and a broken section of the boiler. Fig. 2 is a transverse section of the fire-box on line X, Fig. 1, looking in the direction of dart Y. Fig. 3 is a section of the boiler on line W, Fig. 1, looking in the direction of dart Y. Fig. 4 is a horizontal view of the fire-box on line V, Fig. 1, looking down.

A represents an ordinary fire-box of a locomotive, which is provided with a forward steam-blast, as now used. I place below the ash-pit B, and longitudinally with the boiler, one or more air-pipes, C, which are open at their front ends, and provided with valves J for regulating the blast of air to enter the furnace A. These pipes communicate with vertical air-pipes D D, which communicate with a horizontal pipe, E, lying at the back and at the bottom of the fire-box. To the top of this pipe E are attached two or more hot-blast pipes, F F, which are provided on their front sides, at their top ends, with a series of small holes, as shown at Figs. 1 and 2, for the air from pipes C to enter the fire-box A in numerous fine jets, to concentrate the heat in the middle of the furnace, and consume the products of first combustion.

In practice, in an experimental furnace, I find that iron answers well for all the parts of the device, even for the hot-blast pipes F, the induction of cold air preventing the burning of the iron to any injurious extent; but fire-clay may be employed.

I am aware that the state of the art reveals, in William R. W. Smith's patent for smoke-consuming apparatus, dated November 25, 1873, and numbered 145,022, hollow grate-bars, through which air is taken at the front of the fire-box and carried to the feed end of said box, and conducted by a return pipe or pipes to the front of the box, and discharged directly under the boiler-flues, where the air escapes and acts simply as blast, to drive the flame through the flues, and out at the smoke-stack, having no effect in the consumption of gases or first products of combustion immediately over the burning coal, and the greater the rush of air through the hollow grates the more rapid will be the escape of the products of combustion, as the tendency of such draft is to produce a vacuum in the fire-box. It has been my intent to obviate this difficulty by discharging the air at the feed end or rear of the fire-box directly onto the surface of the burning coal, as stated, using the air as a means to produce combustion, instead of a blast. In the Smith patent if more air is forced into the fire-box than readily escapes out at the boiler-flues, the heat of the box will be reduced. Where grate-bars are used, as in the Smith patent, there would be no vacuum; but the air through the return-pipe would act wholly independent of the draft between the grates, and have no effect in consuming the gases directly over the coal. I obviate this objection by subjecting the coal on its

upper and lower surfaces to such supply of air as necessary to produce almost complete combustion.

I know that in the A. C. Rand's patent, dated March 20, 1872, and numbered 125,080, are shown a retort and air-chamber, and that the latter takes air from the rear or feed end of the fire-box, and discharges the air midway in the fire-box. I therefore disclaim such central delivery of air, and also disclaim to be the original inventor of a pipe beneath the grates.

I claim and desire to secure by Letters Patent—

The combination of air-pipes C C, placed under the grates of the fire-box, blast-pipes F F E, and vertical air-pipes D D, communicating with the said blast-pipes and air-pipes, and of such length as to eject air onto the surface of the coal in the fire for subjecting the fuel to a current above and below, as set forth.

CHARLS J. HAGSTREEM.

Witnesses:
O. H. ADIX,
G. L. CHAPIN.