

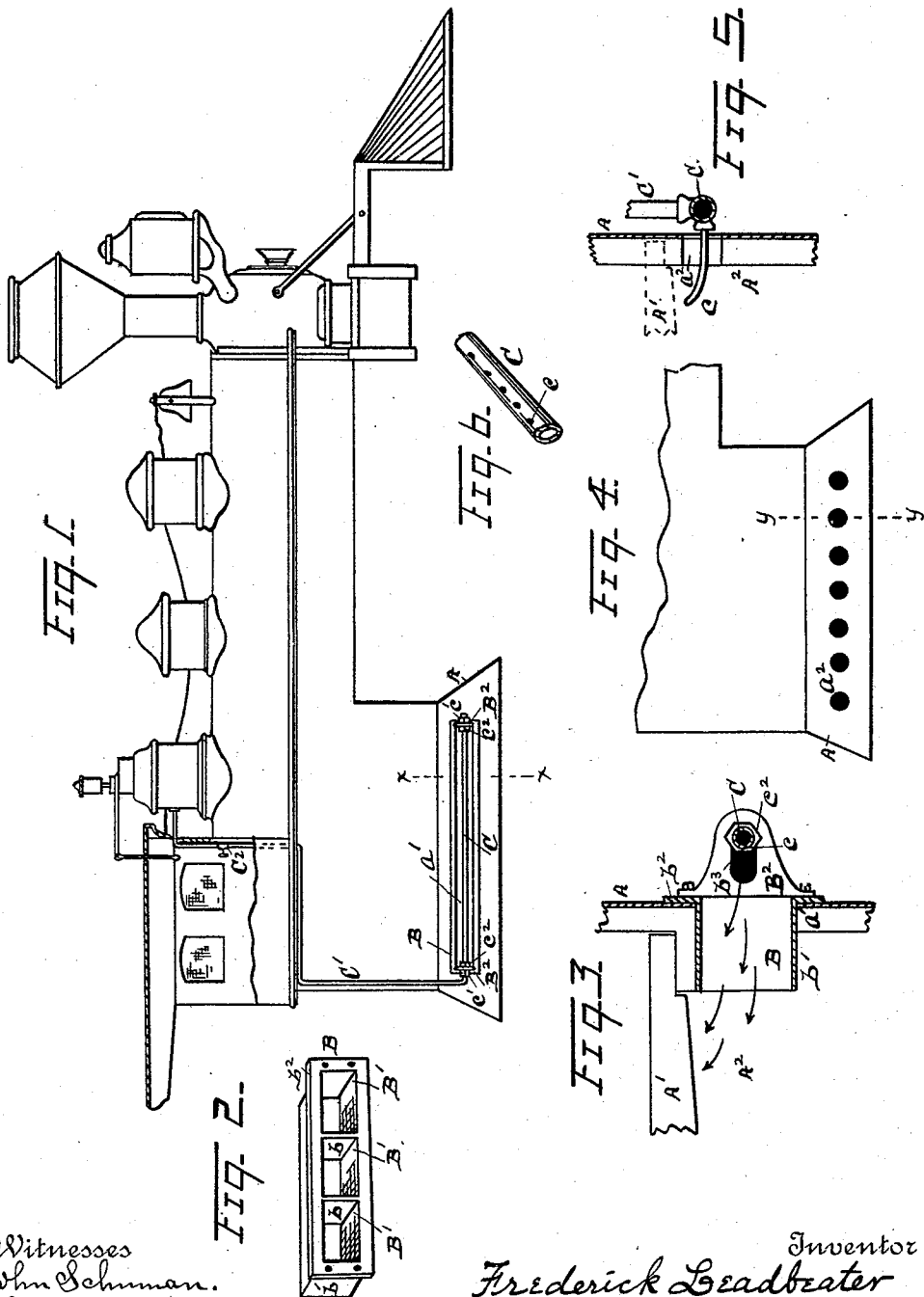
(No Model.)

F. LEADBEATER.

STEAM AND AIR INJECTOR FOR LOCOMOTIVES.

No. 486,934.

Patented Nov. 29, 1892.



Witnesses
John Schuman.
John F. Miller.

Inventor
Frederick Leadbeater
By His Attorney
Newell S. Wright.

UNITED STATES PATENT OFFICE.

FREDERICK LEADBEATER, OF DETROIT, MICHIGAN.

STEAM AND AIR INJECTOR FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 486,934, dated November 29, 1892.

Application filed February 26, 1892. Serial No. 422,840. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK LEADBEATER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Steam and Air Injectors for Locomotives; and I 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 appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The purpose of my invention is to provide a novel steam and air injector for locomotives of superior utility and efficiency as well as of simple and economical construction.

It is well understood that in devices formerly employed to create increased draft in locomotives, as where an exhaust apparatus is located at the base of the smoke-stack, whereby cold air is drawn through the tubes of the boiler, a great injury is liable to result to the boiler, owing to rapid contraction and expansion of the metal. Moreover, in former devices employed to promote increased draft in locomotives their efficiency is very materially modified when the engine is running slow, as on upgrades, while they cease to be operative while the locomotive is at a standstill.

My invention is designed to overcome these objections and to prevent these difficulties in locomotives and to provide means for effecting a desired draft in the locomotive-furnace while the engine is running slow, on upgrades, and also while the engine is standing still, as by my improved device I am enabled to generate steam as required, either when the engine is running slow or standing still or when running at desired speed, the operation of my steam and air injector not being at all dependent on the speed of the engine or on its being in motion at all. I accomplish not only these results, but at the same time I do away with any cold-air draft through the boiler-flues of the locomotive, as by means of my invention only heated air enters the flues of the boiler.

To these ends my invention consists of the devices and appliances, their combination and arrangement, as hereinafter specified and

claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of parts of a locomotive, illustrating my invention. Fig. 2 is a separate view of the box. Fig. 3 is a vertical section on the line *xx*, Fig. 1. Fig. 4 illustrates in side elevation a modification. Fig. 5 is a vertical section on the line *yy*, Fig. 4. Fig. 6 is a view in detail of a portion of the pipe C shown in Figs. 1 and 3.

I carry out my invention as follows: A represents the walls of a locomotive ash-pit. A' is the grate; A², the ash-pit.

My invention contemplates the injection of steam and air into the ash-pit of a locomotive-furnace by suitable means, whereby a draft will be effected from beneath the grate up through the fuel-bed thereon to facilitate required combustion. As shown in Figs. 1 and 2, one of the walls of the ash-pit, preferably one of the side walls thereof, is cut away, as at *a*, to form an orifice *a'* therethrough into the ash-pit. This orifice I prefer to extend longitudinally of the locomotive, as shown in Fig. 1, and running nearly or quite the full length of the side wall of the ash-pit. Into this longitudinally-extended orifice I locate a correspondingly-elongated box B of dimensions to fit snugly into said orifice. This box preferably has compartments, as shown at B', therein formed by division walls or partitions *b*. These partitions may, however, be omitted. The introduction of the box B serves to strengthen the walls of the ash-pit. These compartments of the box, if employed, in reality constitute so many flues or passages, through which communication is effected with the ash-pit from the exterior. The box is constructed, preferably, at its extremities with brackets B², constituting bearings to engage and support a steam-pipe C, extended longitudinally of the box, constructed with jets *e* at desired intervals to inject steam into and through the passages formed by said box into the ash-pit beneath the grate. A pipe C' leads from the steam-space of the boiler, as from the steam-dome or dry-pipe, to the longitudinally-extended pipe C. The pipe C' is provided with a controlling-valve C², preferably located in a convenient position to be operated by the engineer, as occasion may demand. The jets *e* of

the pipe C communicate through the flues or passages above mentioned in the wall of the ash-pit into the ash-pit underneath the grate-bars. The sides of the box preferably extend inward into the ash-pit a few inches, as shown at b' , the exterior edge being preferably formed with a bead or flange b^2 , sitting snugly against the exterior face of the wall of the ash-pit. Space is thus left, it will be observed, in the flues or passages of the box for the entrance of air as well as steam. As so constructed, it will be evident that the expansion of the steam takes place chiefly after it has passed through the flues of the box into the ash-pit. The consequence is that a great amount of air is carried into the ash-pit and forced up through the grate-bars and fuel. This method of injecting steam and air into the ash-pit and through the fuel-bed from beneath not only furnishes an efficient draft-supply, but also keeps the grate-bars comparatively cool, thereby effectually preventing clinkers from forming thereupon. This is a matter of great importance. Thereby, also, any desired fuels can be effectually consumed. While I prefer to employ the box in the wall of the ash-pit to strengthen the wall and to carry the steam inward before expansion takes place, yet I would have it understood that I do not limit myself thereto, as the wall of the ash-pit might simply be formed with orifices therein, as shown in Figs. 4 and 5 at a^2 ; but in the latter case the wall has nothing to strengthen it. The partitions in the box, if employed, serve chiefly to strengthen the construction; but I do not limit myself thereto alone. The said brackets B^2 are designed to carry the steam-pipe C, which may be firmly engaged therewith in any suitable manner, as by lock-nuts

c' and c^2 . I prefer, however, to construct the brackets with elongated slots b^3 , in which the ends of the pipe C are engaged and in which the pipe is made adjustable nearer to or farther from the wall of the ash-pit, as may be desired.

What I claim as my invention is—

1. In a steam and air injector for locomotives, the combination, with one of the walls of the ash-pit of the locomotive having one or more orifices therethrough, of a steam-pipe located adjacent to the orifices to deliver steam therethrough to the ash-pit and carry an air-supply through said orifices to the ash-pit, said steam-pipe set outward and spaced from the wall of the ash-pit and made adjustable to and from said wall, substantially as described.

2. In a steam and air injector for locomotives, the combination, with the wall of the ash-pit of the locomotive having an inlet-passage therein, of a box shaped to correspond to said orifice, brackets located at the ends of the box, a steam-pipe engaged with said brackets, communicating through the box into the ash-pit and with the steam-space of the boiler, and a controlling-valve located in said steam-pipe in proximity to the cab of the locomotive, said steam-pipe extending longitudinally of the box and spaced from its outer edge, the extremities of the pipe adjustable in said brackets nearer to and farther from the wall of the ash-pit, substantially as described.

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

FREDERICK LEADBEATER.

Witnesses:

N. S. WRIGHT,
JOHN F. MILLER.