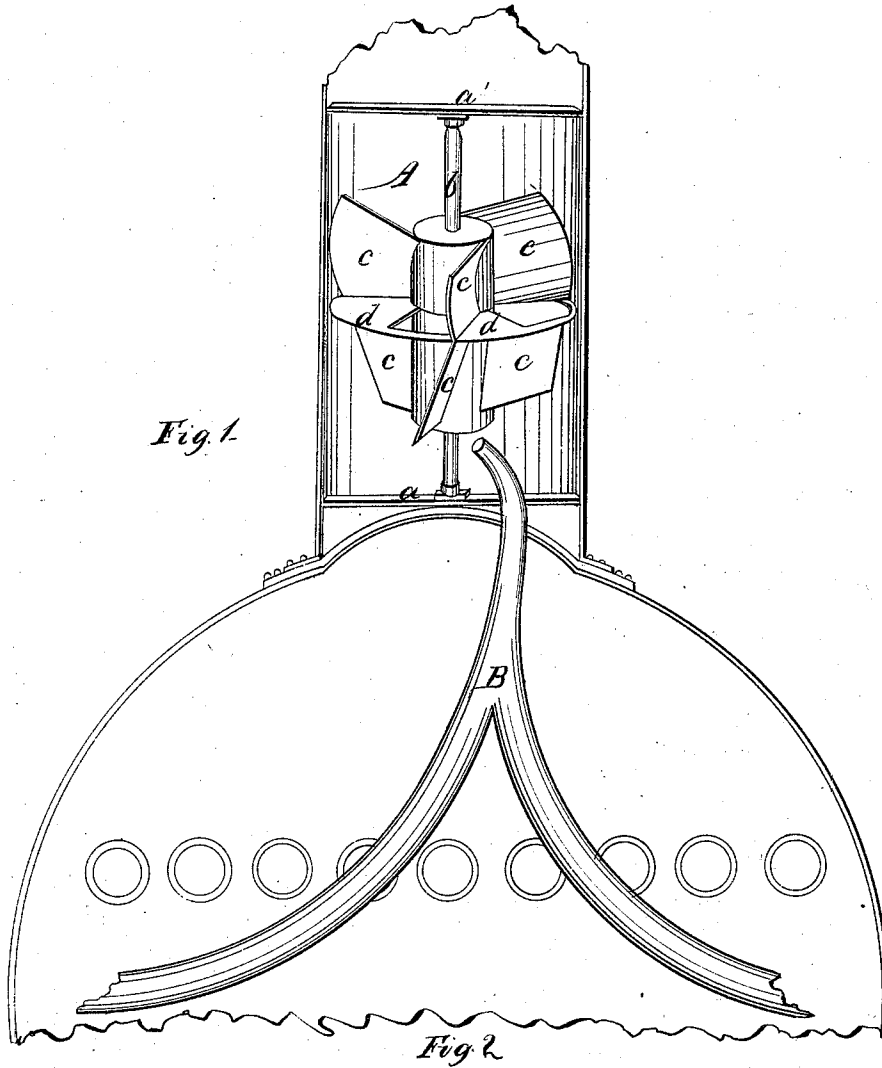


J. B. Martin,
Spark Arrester,
N^o 22,814, Patented Feb. 1, 1859.



Witnesses
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J. B. MARTIN, OF WILMINGTON, NORTH CAROLINA.

APPARATUS FOR INCREASING THE DRAFT OF FURNACES.

Specification of Letters Patent No. 22,814, dated February 1, 1859.

To all whom it may concern:

Be it known that I, J. B. MARTIN, of Wilmington, county of New Hanover, in the State of North Carolina, have invented certain new and useful Improvements in Apparatus for Accelerating the Draft of Locomotive and other Steam Engines and in Arresting the Discharge of Sparks Therefrom, of which the following is a full, clear, and accurate description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1, represents a section through the smoke box and stack of a locomotive with my improvements shown in perspective. Fig. 2, represents a transverse horizontal section on the line *x x* of Fig. 1.

Various plans have been proposed for employing the power of the exhaust discharge from locomotives and other engines to accelerate the draft in the furnace. One of the simplest of these plans is the discharge of the exhaust in the center of the chimney or smoke stack of the engine, the surrounding air being carried upward by the influence of the blast from the exhaust pipe. This plan generally requires a certain amount of contraction in the smoke stack to bring the products of combustion issuing from the furnace within the influence of the blast; a contraction which limits to some degree the quantity of air that can be drawn through the furnace. This plan also requires the elongation of the smoke stack to produce the most favorable effect, which is disadvantageous in various ways, preventing the passage of locomotives under bridges, arches, or other covered ways, of ordinary elevation, and exposing an undue surface to the resistance of the air, and increasing the cost of construction. This arrangement has also the further disadvantage that, no obstacle is offered to the discharge of the sparks and cinders, which are compelled to pass with the current of air and can be only imperfectly intercepted by an additional contrivance in the shape of a spark catcher. Another contrivance consists in passing the exhaust steam over the blades of a revolving fan, which turns upon the same axis with another fan, (in a separate compartment) which is made to force air into the fire box of the locomotive. This is at best but an indirect application of the power of the exhaust, which is much diminished by the circuitous path which the air

is made to describe. My plan differs from these, and from all others, in placing the fan directly in the path of the exhaust which causes it to turn so that the back of its blades shall operate to draw the air through the furnace and propel it together with the products of combustion through the stack, thus directly accelerating the draft through the whole diameter of the stack; however great this may be.

Another branch of my improvement consists in placing transverse deflecting plates upon the surface of the blades, so that while the gaseous or aeroform products pass onward the solid matter in the shape of sparks, cinders or coal, may be detained and allowed to fall downward.

In carrying out my improvements the smoke stack (A) is best made for a certain length of a cylindrical form. At the upper and lower part of this portion cross pieces (*a a*) are provided, with bearings for the vertical axis (*b*) of the fan, whose blades (*c*) are made as is usual in screw or other formed fans or propellers, so that the force of the blast or exhaust pipe (B) upon the blades shall cause the fan to turn and force the air and products of combustion to pass with increased velocity through the smoke pipe. At right angles to the axis of the fan a set of deflecting plates (*d*) are arranged so as to aid in detaining the sparks and cinders as the air passes upward over the face of the blades.

The deflecting plates may be greater or less in size, or they may be made adjustable to increase or diminish the opening through which the air or steam passes, according to the required force of draft; and they may, sometimes, be placed on both sides of the blades, so as to intercept the passage of the sparks over both surfaces, thereby diminishing the quantity of cinder or sparks reaching the top of the stack, where any ordinary spark arrester will be sufficient to produce a better effect, than in a stack blown by the exhaust pipe alone. These deflectors on the blades are superior to fixed deflectors in the stack, which retard the discharge of the products of combustion, and increase the quantity of smoke by the imperfect combustion resulting from the diminished supply of air. As solids and gases do not follow strictly the same law of reflection, after impinging upon a plane, my arrangement of deflectors will allow the free discharge of

air, and yet, in part, at least, prevent the cinders from passing upward over the surface of the blades of the fan, even when the deflectors are reduced to mere ridges on the surface of the blades.

In some cases it may be found desirable to place a series of radial partitions below the fan, as is done in pumps and wheels in which such blades are made to force a fluid or air through a chamber.

I do not intend to limit myself to any particular dimension, number or form, of blade, as long as the fan performs the functions above described. And in certain cases the deflecting plates, instead of being at right angles to the axis of the fan, may be made slightly inclined from this position, so as to corroborate the action of the blades, and yet, materially, aid in intercepting the sparks and cinders.

Having thus described my improvements in apparatus for accelerating the draft of locomotives and other steam engines &c.

what I claim as my invention and desire to secure by Letters Patent is—

1. The combination of a fan with the exhaust when arranged within the smoke stack substantially as described, so that the exhaust steam as it issues from the exhaust pipe acts directly on the blades of the fan, and then passes with the products of combustion in a direct path through the fan and through the smoke stack, thus causing the fan to turn with high velocity and thereby accelerating the draft of the furnace as set forth.

2. The combination of deflecting plates with the blades of the fan, for the purpose of intercepting sparks and cinders, as above described.

In testimony whereof I have subscribed my name.

J. B. MARTIN.

Witnesses:

F. SOUTHGATE SMITH,
JOHNS HOLLINGSHEAD.