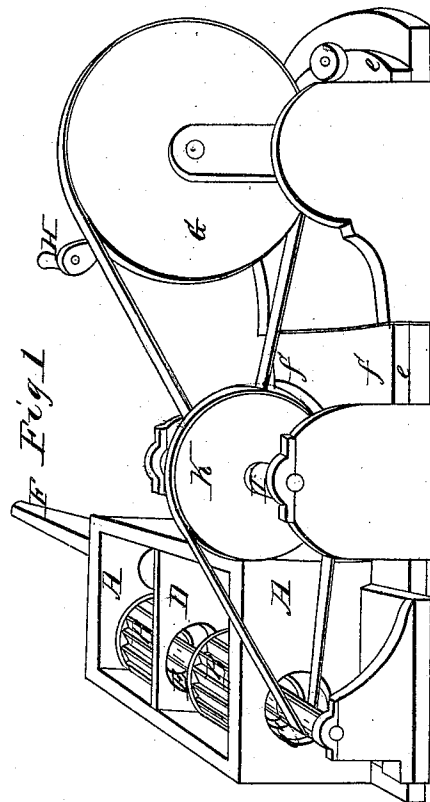
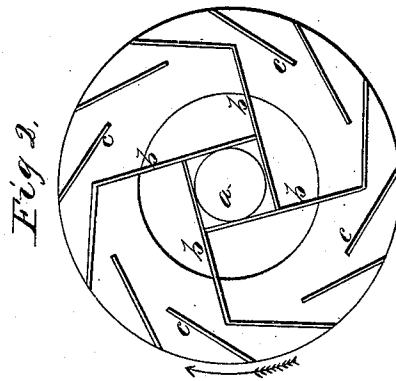


J. A. Stewart,
Rotary Blower.

N^o 1,724.

Patented Aug. 18, 1840.



UNITED STATES PATENT OFFICE.

JAMES A. STEWART, OF SPRINGFIELD, TENNESSEE.

APPARATUS FOR BLOWING FORGES, FURNACES, &c.

Specification of Letters Patent No. 1,724, dated August 17, 1840; Antedated July 1, 1840.

To all whom it may concern:

Be it known that I, JAMES A. STEWART, of Springfield, in the county of Robertson and State of Tennessee, have made a new and useful Improvement in Apparatus for Blowing Forges and Furnaces and for other Purposes; and I do hereby declare that the following is a full and exact description thereof.

My blowing apparatus consists, mainly, of two, or more, fan wheels, which are individually but little varied in their construction and mode of operation from the fan wheels heretofore known and used; but I have discovered that by the combining of two, or more, such wheels on the same shaft, in successive chambers formed in the wind box, the force of the blast is increased with the series, and that any required degree of density, or pressure can be obtained. I have applied my apparatus to the blowing of smiths' forges, in which it has been found preferable in all respects to the ordinary bellows; occupying less room, being more conveniently and easily worked, producing a much more equable blast, and heating the iron to any desired temperature with a considerable saving of fuel.

In describing this machine, I will give the construction and dimensions of such as I have made for smiths' forges; but the principle of action is independent of any particular mode of gearing, or dimension of parts.

Figure 1, in the accompanying drawing, is a perspective representation of my machine, shown as driven by means of band wheels, bands, and whirles.

A, A, is the wind-box, divided into two compartments, or air-chambers, each of which is furnished with a separate fan-wheel upon the same shaft. B, B¹, are the fan-wheels; C, the opening around the shaft to admit wind to the wheels B; D, is the partition by which the wind-box is divided into two chambers, and in this partition there is a hole, or opening, E, for the passage of wind from the first to the second chamber, which opening is in all respects similar to the opening C. When three, or four, fan-wheels are used, the wind-box is to be in like manner divided into three, or four, chambers, the shaft passing through each, and carrying in each its appropriate wheel. F, is the nozzle, or pipe, through which the blast is to pass from the last chamber in

the series. The wind-box is, of course, completely inclosed excepting where air is to be admitted, or discharged; but in the drawing it is shown with its top removed for the purpose of exhibiting the interior.

It might be supposed, without the aid of experiment, that but little difference would be made in the force of the blast by the succession of several fan-wheels in connected compartments, but it has been proved that the force of the wind will be in proportion, or nearly so, to the number of fan-wheels—at all events to the extent of three, or four; and, upon due consideration, the cause of this will be manifest. The last fan-wheel in the series produces a rarefaction of the air within its chamber which would cause a portion of that in the contiguous chamber to rush into it from its own elasticity, and so on throughout the series; and such is the effect of this combination, that a blast of any degree of density, or pressure, required for use in forges, or furnaces, can be readily obtained by a succession of fan-wheels, so combined.

I have sometimes used the fan-wheel with four wings, placed in the ordinary manner, and have found them to operate well; but, after repeated trials, I have proved that a better result can be obtained by surrounding the ordinary wings by others forming a considerable angle with the radii of the wheel, as shown in Fig. 2, which is a section through the fan wheel, drawn to a larger scale than in Fig. 1. In Fig. 2, *a* is the axis of the fan-wheel; *b, b, b*, the vanes placed in the ordinary manner, and four in number; *c, c, c*, are vanes, of which I have used twelve, so placed as to form a tangent with the circle produced by the revolution of the ordinary vanes. These vanes are to be let into grooves in the heads of the wheel; I make them of sheet-metal, using tin plate for those employed for smiths' forges. The wheel is to move in the direction of the arrow.

When made in the form represented in the drawing, and intended for the use of smiths, I have found the following construction and dimensions to answer well. G, is a band-wheel, eighteen inches in diameter, which is to be turned by the handle H; from this, a band passes around the axle I, carrying a band wheel K, the axle two and a quarter inches in diameter, and the band-wheel twelve inches. The band from this wheel

passes around the axle of the fan-wheel, which is one inch and a quarter in diameter; the central wings, or vanes, *b, b*, are two inches and a half long, and two and a quarter wide; the vanes *c, c, c*, two and a half inches long, by one inch and three fourths in width; the opening *C*, for the admission of air, is three inches in diameter; Fig. 2, is drawn to half the size of the actual machine. The standards of the band-wheels are shown as placed on regulating slides *e, e, f, f*, by which the bands may be tightened at pleasure.

In some instances, I have made my wind-box cylindrical, or with a curved surface, but have found that such form interferes with the intended effect, the contained air acquir-

ing a revolving motion, and thereby lessening the force of the blast.

Having thus fully described the nature of my blowing machine, and shown the manner in which the same is carried into operation, what I claim therein as constituting my invention, and desire to secure by Letters Patent, is—

The placing of two, or more, fan-wheels upon the same shaft, but within separate compartments, combined and connected with each other in the manner herein set forth.

J. A. STEWART.

Witnesses:

THOS. P. JONES,
O. R. PAYNE.