Z. H. Mann,

Tuyere,

No. 3,374. Patented Dec. 15, 1843.

Fig 2.

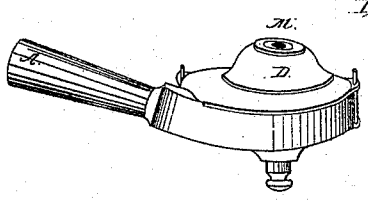
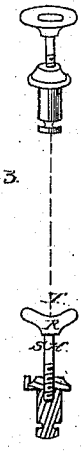


Fig 4.



Fig 3.



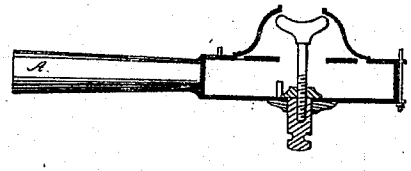
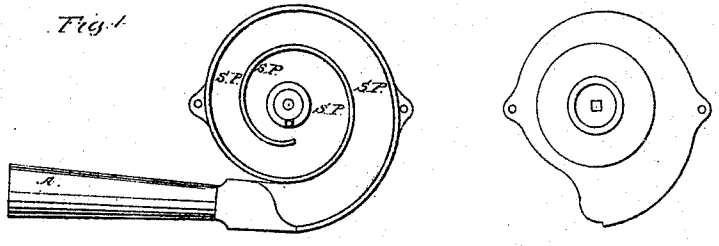


Fig 1.



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UNITED STATES PATENT OFFICE.

ZADOK H. MANN, OF LOWELL, MASSACHUSETTS.

TWYER.

Specification of Letters Patent No. 3,374, dated December 15, 1843.

To all whom it may concern:

Be it known that I, ZADOK H. MANN, of Lowell, in the county of Middlesex and State of Massachusetts, machinist, have invented a new and Improved Mode of Accelerating Combustion by the Use of My "Tornado-Twyer;" and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in providing a spiral conductor or scroll, which takes the air from the nozzle of the bellows, conducts it one or more times around in a circular or spiral course, and then projects it through an orifice or mouth, so formed that the current of air rushes out with a direction or inclination toward the center, at an angle of forty-five degrees, or any other desired angle. The air as it comes out of the mouth or orifice still keeps the whirling motion acquired by having been forced around in the spiral conductor, and the current will escape from the mouth at an angle or with an inclination toward the center, and thus will form a focus at a certain distance from the mouth, this distance varying according to the diameter of the orifice and the angle made. At this point I place the fuel in which combustion is desired. In my "tornado twyer" I have used an annular orifice or mouth, as being on the whole the best form, and in the following description I call it an annular orifice. Still it is obvious, that a square or an octagonal, or oval, mouth, might be used and would bring the same principle into operation, and with nearly or quite the same result as I obtain from an annular orifice.

The above described "tornado twyer" has but a single mouth and is complete in itself. But I can construct another interior mouth, which is made and used in connection with the one already described. This interior mouth is an annular orifice which surrounds a movable shaft and both the exterior and interior orifices are concentric around this same center shaft. This shaft is movable, and can be raised or lowered at pleasure. When the most rapid combustion is needed, I keep both orifices or mouths open, but if I want only a moderate combustion, I close the exterior mouth by raising up the shaft with the damper or regulator at its top, leaving the interior mouth open; or I can shut up the interior mouth by turning the damper, and leave the exterior mouth open for use.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

I construct a scroll, see Fig. 1, which takes the air from the nozzle of the bellows at A, see Fig. 1, and conducts it around in the spiral pipe *sp*, *sp*, *sp*, *sp*, in Fig. 1. Over this spiral pipe I place a cover with an opening at the center. The space in this spiral pipe I call the lower chamber. Above this cover I erect a dome, designated by D, in Fig. 2, open at the top M, in Fig. 2. I then place a movable shaft SH, see Fig. 3, perpendicularly within this opening in the dome; this shaft passes down through the center of the dome, through the opening in the cover, thence passes out through the center of the bottom of the scroll, or lower chamber. The shaft may be made in one piece movable upward and downward; or in two parts. If in two parts, I make, on the lower end of the upper part, a thread or male screw S, see Fig. 3, which passes into a female screw at the upper end of the lower part of the shaft; and when these two parts are united by the insertion of the male into the female screw, they together form one shaft, movable upward and downward as I please. The space within the dome above the corner I call the upper chamber.

To the top of the shaft I attach a head, R, see Fig. 3, which is circular, if the orifice is circular, and is concave upward. This head I call a regulator. It is situated within the dome, immediately beneath the opening at the top of the dome, and is so much larger than that opening, that its periphery projects under the lip or inner edge of the dome, wholly around the opening. If then I lift up the shaft, it will carry up the regulator, so as to completely close or shut the opening in the top of the dome, the outer edge or periphery of the regulator extending under the lip of the dome. The inclination of this lip or upper ring over the outer edge of the regulator gives the current of air, as it passes out between the lip and the regulator, an inclination toward the center, so that, the current passes out at an angle of forty-five degrees, or at any other required angle. This annular space, between the lip of the dome and the regulator, is the orifice or

mouth, through which the air is forced to create blast and form a focus at the point of combustion. The air comes from the nozzle of the bellows, passes around in the spiral pipe of the lower chamber, then escapes through the opening around the shaft into the upper chamber, thence it escapes from the upper chamber through the annular orifice or mouth and so escapes with an inclination toward the center and forms a focus at the point of combustion.

In combination with the "twyer" already described I can also construct another annular orifice, interior to the former and concentric with it. For this purpose, I take the regulator R, see Fig. 4, and elevate the center of it where it unites with the shaft at E, see Fig. 4, to a point higher than any part of the periphery. On this regulator I place a circular plate of the same diameter, concave downward. This upper plate I call a damper, see DR, in Fig. 4. The center of the damper is open; and through this opening the elevated center of the regulator rises, see E, in Fig. 4, but the elevated center being of a less diameter than the opening, it leaves an annular orifice open completely around this elevated center of the regulator. This open space around the elevated center and within the opening in the damper, is the interior mouth of my "tornado twyer." The sides of the damper, which surround the interior mouth, are placed at an angle with the base of the scroll, so that they incline toward the center of the shaft, and this position of the sides gives the current of air passing from the mouth a direction toward the center and causes it to come to a focus at any required distance. To let the air from the upper chamber into the cavity between the regulator and the damper, I cut off small parts of the periphery of the regulator, at opposite sides. The parts of the periphery of the damper, not opposite to the parts cut out of the regulator, project so much farther downward, that when I turn the damper around as much as a quadrant. these projections come over and completely close up the openings in the periphery of the regulator; and thereby prevent the air from passing from the upper chamber into the cavity and thence to the interior orifice or mouth.

When I use my "tornado twyer" having two mouths combined, I can shut up one or both the mouths. The interior mouth I close, by turning the damper till the projections on its periphery close up the openings in the periphery of the regulator. When this is done, the exterior mouth is not affected, but remains open. The exterior orifice I can close either by screwing up the upper part of the shaft until the top of the damper touches the lips of the dome and so closes the orifice; or I can raise the entire movable shaft and thereby carry up the damper and close the orifice in the same manner. This last is the best mode of closing the exterior orifice. Indeed the construction of the shaft in two parts, to be united by a male and female screw, is chiefly convenient as a mode of enlarging or diminishing the breadth of the exterior orifice, when in use according to the power required; and is seldom used wholly to close up the mouth.

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

1. The use of the scroll or spiral pipe which takes the air from the nozzle of the bellows, and carries it around as herein described, giving the air a whirling motion as it leaves the mouth of my "twyer."

2. I claim as my invention the method herein before described of shutting up the exterior orifice or mouth by raising the shaft by a male and female screw or by a damper, so that the damper shall completely close or shut up the mouth, and the combination of an adjustable interior blast or mouth with the exterior mouth or blast, constructed and operating as herein before described.

ZADOK H. MANN.

Subscribed in our presence:

ELISHA FULLER,

ANDREW J. GUNNISON.