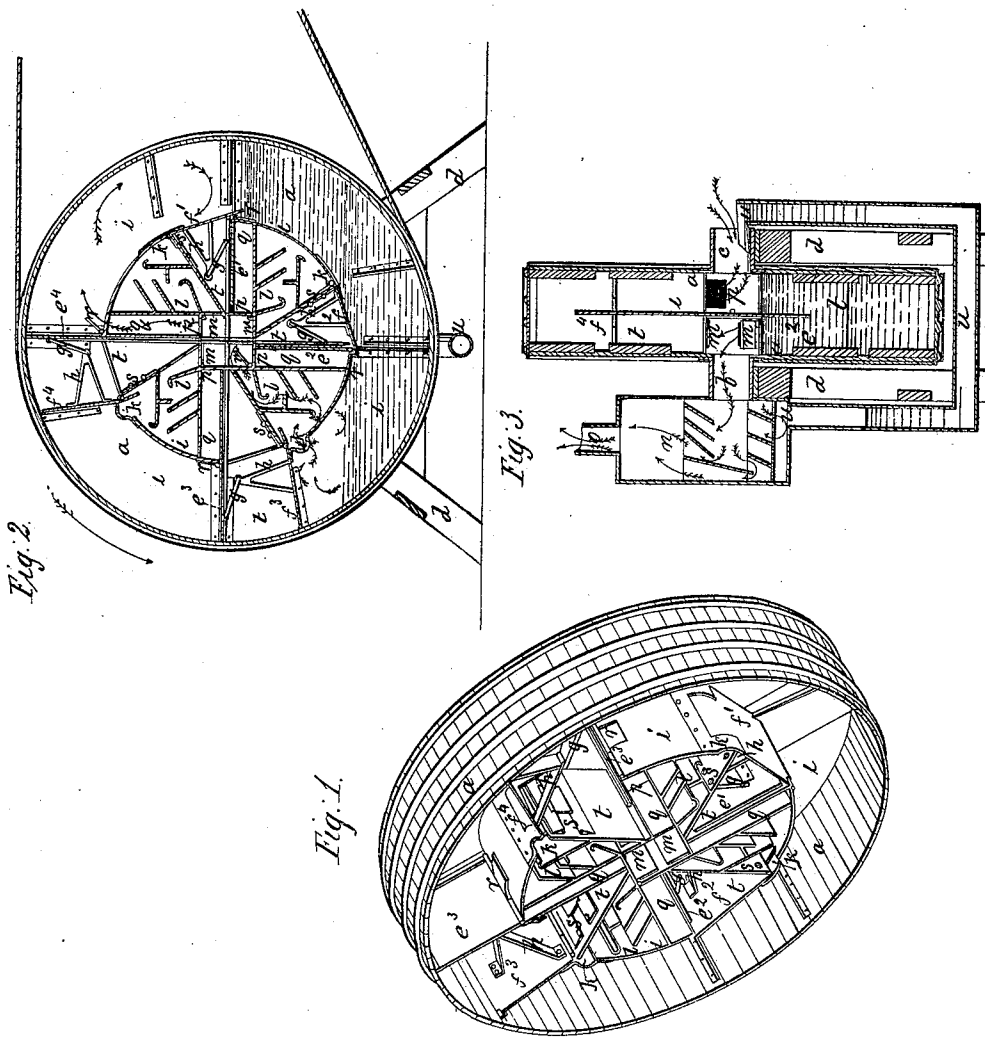


*J. Darling,
Blast Machine,*

N^o 7853.

Patented Dec. 24, 1850.



UNITED STATES PATENT OFFICE.

J. DARLING, OF CINCINNATI, OHIO.

HYDRAULIC BLOWER.

Specification of Letters Patent No. 7,853, dated December 24, 1850.

To all whom it may concern:

Be it known that I, JEREMIAH DARLING, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain
5 Improvements in Rotary Hydraulic Blowers, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from
10 all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawings, of which—

Figure 1 is a perspective view of the drum with one side removed. Fig. 2 a section of
15 the same and Fig. 3 a transverse section.

Similar letters refer to the same parts in the several figures, and numbers are used when it is necessary to distinguish similar parts from each other.

20 My invention consists of an apparatus by which a continuous, and powerful blast is produced for smelting, forging and other purposes, which works with little friction, and requires but a small power to drive it,
25 and being simple in its construction is not expensive; and it is not liable to get out of order. One great advantage over cylinder blowers is that it does not require to be
30 stopped to pack pistons, &c., which in smelting operations frequently produces injury to the iron by stopping the blast. All that is necessary to keep this apparatus continually in action, till worn out, is to keep up
35 the supply of water, which can be done while in action.

The apparatus consists of a water tight drum or flat cylinder (*a*) which revolves on hollow journals (*b* and *c*) in the frame (*d*). The inside of the drum is divided into an
40 annular chamber (*i*) and a number of compartments which communicate with each other and the hollow journals by various passages, valves, &c.

(*e*¹ *e*² *e*³ *e*⁴) are sliding gates or valves
45 which slide to and from the center on proper seats, across the annular chamber (*i*), the opposite valves being connected to each other by their rods, so as to move simultaneously, one closing when the other is
50 opened. Four other valves (*f*¹ *f*² *f*³ *f*⁴) move on hinges, and are jointed to the fronts of the valves (*e*) by the pieces (*g* and *h*) so that when the valves (*f*) are forced down they withdraw the sliding valves (*e*); at the
55 same time the opposite valves (*e* and *f*) are

made to close across the annular chamber (*i*).

A quantity of water is introduced into the drum, so that when the machine is in motion, the water is kept on a level with the
60 center on one side of the annular chamber by the air on the opposite side being compressed between the surface of the water and the closed valves. The drum revolves in the direction of the arrow. The valves (*e*³ *e*⁴)
65 on the left and upper sides being closed, the air which is between the left hand valve (*e*³) and the water, is compressed and forced through one of the openings (*k*) into one of the chambers (*l*), from which the air passes
70 through one of the valves (*m*) into one side of the center of the drum which is divided from the other side by a partition. The hollow journal (*b*) communicates with the center of the drum and through it the air
75 passes into a chamber (*n*), and from thence by the pipe (*o*) to the tuyère. The air enters through the hollow journal (*c*) into the center of the drum and passes by an opening (*p*) into the passage (*q*) and the
80 valve (*r*) into that part of the annular chamber (*i*) on the right hand side above the water, filling that portion of the drum, as the vacuum is made between the valves
85 and the water. The valves (*e*³ and *f*³) on the left side are opened by the resistance of the water as they come round and strike on its surface; and by their connection with the valves (*e*¹ and *f*¹) on the other side the latter
90 are closed across the annular chamber (*i*). When the valves (*e*² and *f*²) are open on the left and under sides, the part of the valve (*f*²) which projects beyond the hinge closes the passage (*k*) and prevents the
95 water entering the chamber (*l*). The chambers (*l* and *n*) are provided with a number of partitions and cells, which serve to catch and detain any drops of water which may pass from the annular chamber
100 (*i*) with the blast. The water which collects in the chambers (*l*) escapes by its gravity into the chamber (*t*) through the valves (*s*) and from thence back into the annular chamber (*i*); and that which is
105 separated from the blast in the chamber (*n*) falls to the bottom through a grating and drains off through a pipe (*u*). This pipe (*u*) is continued under the drum and its opposite end enters the hollow journal (*c*) and discharges the water, again into the
110

drum. By this pipe also the water is poured into the drum, to supply that lost by waste, evaporation, &c. The several valves (*m*, *r*, *s*,) of course close when the pressure is above them, and open when the pressure is underneath, to allow the passage of the air or water. The drum is made to revolve by a band around the outer circumference or by gearing connected with the journals or otherwise. Thus the air which is drawn into the drum through the hollow journal (*c*) passes through one of the openings (*p*) into the passage (*q*) and from thence through the valve (*r*) into that part of the annular chamber on the right hand side and fills the vacuum caused by the valves (*e*⁴) receding from the water. When this portion of the drum has arrived at the upper side, the air is confined between two of the closed valves (*e*⁵ *e*⁴ and *f*³ *f*⁴) until the lowest of the valves on the left side is opened by striking on the surface of the water. The air is then compressed between the surface of the water and the valves (*e*³ and *f*³) which remain closed, with a force corresponding with the difference of level of the water in opposite sides of the drum, and is

consequently forced through the passage (*h*), the chamber (*l*) and the valve (*m*) into the center of the drum, and from thence to the tuyère as before described. 30

Having thus fully described my improvements, what I claim as new therein, and which I desire to secure by Letters Patent is— 35

1. The apparatus substantially as above described, consisting of a revolving drum partly filled with water, and provided with chambers, valves, &c., which cause the air to enter at one hollow journal, and escape in a compressed state at the other, for the purpose of producing blast as set forth. 40

2. I claim, the manner of separating the water accidentally mixed with the blast, by means of the partitions and cells in the chambers (*l* and *n*). 45

3. I claim, the pipe (*u*) for conducting the water accumulated in the chamber (*n*) to the hollow journal (*c*) and returning it again to the drum, substantially as described. 50

JEREMIAH DARLING.

Witnesses:

EDWARD EVERETT,
WM. GREENOUGH.