

Fig. 1.

Nº 92490

PATENTED
JUL 13 1869

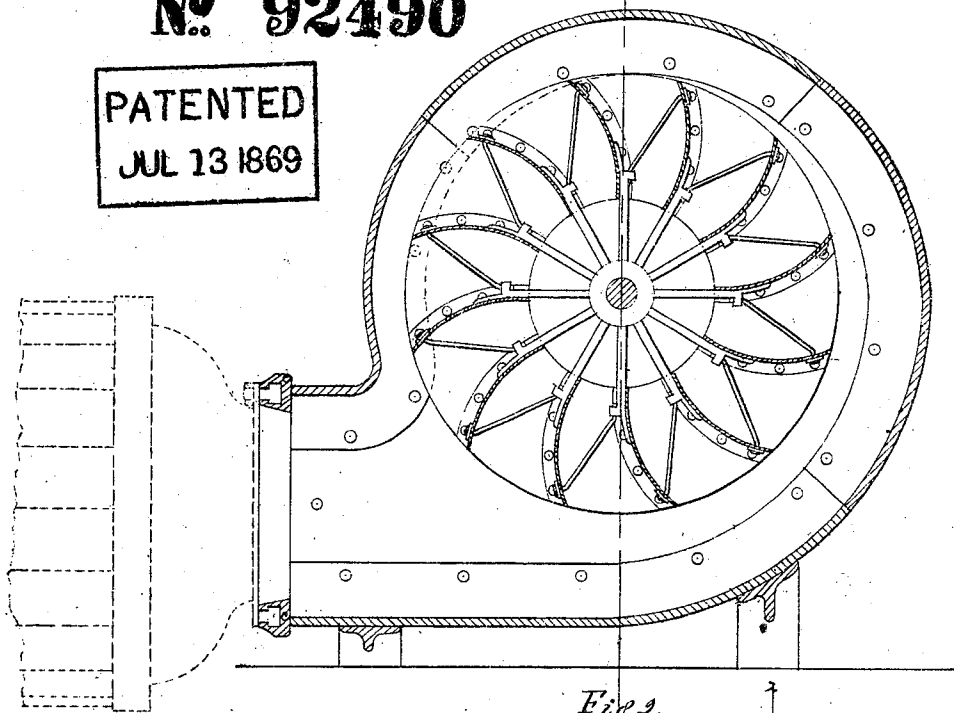
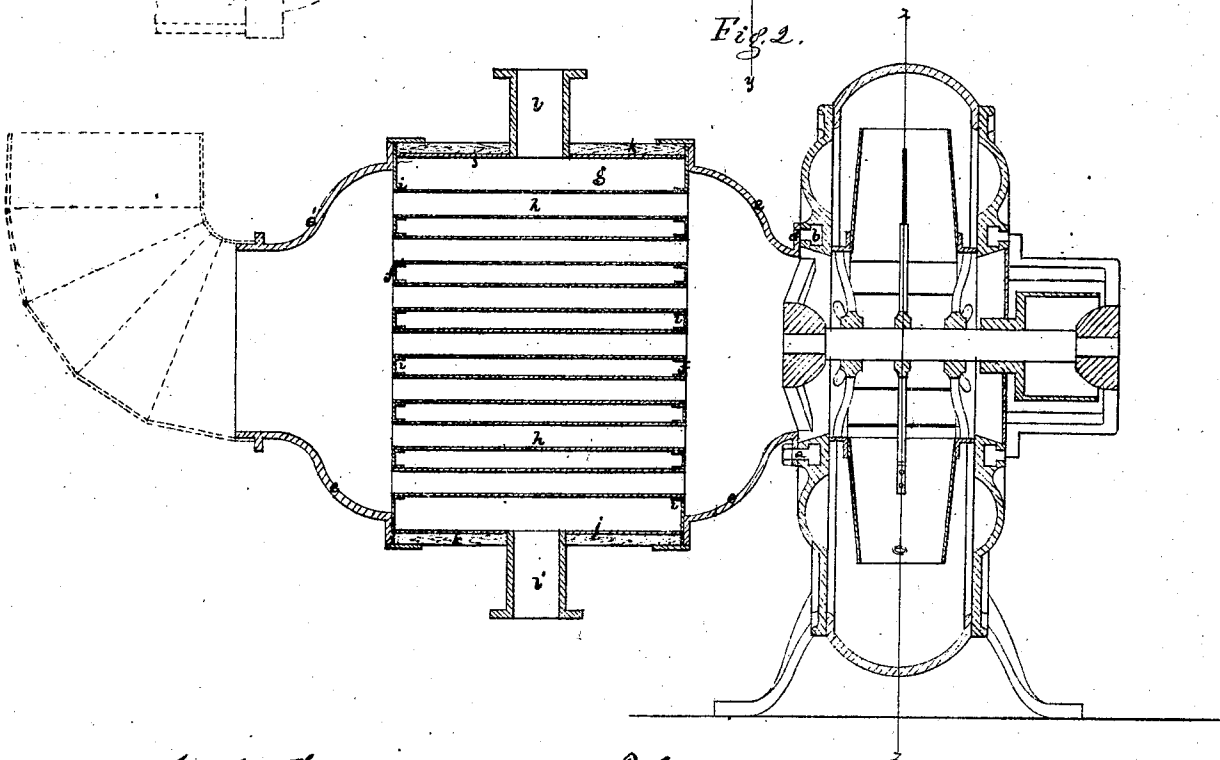


Fig. 2.



Constructors
Francis Gould
C. Warren Brown.

Benj. A. Stewart

United States Patent Office.

BENJAMIN F. STURTEVANT, OF WEST ROXBURY, MASSACHUSETTS.

Letters Patent No. 92,490, dated July 13, 1869.

IMPROVEMENT IN BLAST-APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, BENJAMIN F. STURTEVANT, of West Roxbury, in the county of Norfolk, and State of Massachusetts, have invented Improvements in Blast-Apparatus; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practise it.

In employing centrifugal blowers, it is often an object to heat or to cool the air moved thereby, on its passage into or from the blower, and sometimes to cool the air before it enters, and to heat it after it leaves the blower, as in cases where very dry hot air is needed.

The air, moved by the blower, and heated or cooled, or both cooled and heated, is under pressure, so that it can be conveyed and directed to any locality within reasonable limits, to be utilized in mechanical and manufacturing-operations, or for sanitary purposes.

In most cases where a blower is used, the power of a steam-engine is employed to drive it, and I propose to utilize the heat escaping with the exhaust-steam, for heating the air acted upon by the blower. As air is extremely mobile, and as centrifugal blowers are operated at high velocities, and as the heat of the steam must be transmitted or conducted through metal, a heater or cooler, to be combined with a blower, must have peculiarities involved in my invention in order to be effective in heating or cooling an air-current moving at the rate of speed usual in centrifugal blowers.

Figure 1, of the drawings, is a section taken in the plane of the line *z z*, seen in

Figure 2; which is a section illustrating an embodiment of my invention, said section being taken in the plane of the line *y y*, fig. 1.

The blower shown is one of my well-known construction, having a central inlet and a tangential outlet, to either or both of which heaters or coolers, or one heater and one cooler, may be connected, by means of bolts, *a*, which have their heads coupled in the dovetailed groove *b*, surrounding the inlet-passage, or in a similar groove in the ring *c*, which is secured to the end of the blower-outlet, said bolts passing through the flange *d* of the bonnet *e*, covering one tube-sheet, *f*, of the heater or cooler *g*.

The body of the cooler is preferably made of metal which does not readily oxidize like iron, such as copper or brass, and the heads *f f'*, and the tubes *h*, which are secured therein, should be made of such metal, of the minimum thickness suited for practical use, as said

heads and tubes form the surfaces through which heat is conducted to the air-currents passing to or from the blower, or through which heat is abstracted from said currents.

The heads *f f'* are so thin that the tube-ends cannot be secured in the tube-sheets in the ordinary way; hence, I flange each hole therein, for reception of the tube-ends, and this enables me to effectually secure the tube-ends to the tube-sheets by soldering or brazing.

The flanges of the tube-sheets *f f'* around the tube-ends are denoted by *i* in the drawing.

The metal, *j*, forming the periphery of the heater or cooler *g*, is preferably covered by a jacket, *k*, to prevent radiation of heat when heating, or absorption of heat from the atmosphere when cooling air-currents passing through the tubes *h*.

The space contained in the heater or cooler around the tubes *h*, and between the heads or tube-sheets *f f'* and the periphery *j*, is provided with passages, *l l'*, through which exhaust steam can be made to enter said space, and the water resulting from condensation of the steam can pass off, if the object is to heat the air moving through tubes *h*, while, if the object is to cool the air, frigorific mixtures, like ice or snow and salt, for example, are introduced around the tubes, or a current of cold water may be made to fill the space around the tubes flowing in through one opening and out at the other.

The bonnet *e'*, like the bonnet *e*, expands from the size of the central air-passage, so as to enclose the ends of all the tubes in the heater or cooler, and in order to retard the air-current in the tubes *h*, so as to give time for the air passing through them to receive or to part with heat, the joint area of the tubes should considerably exceed the area of the main air-pipe and the area of the inlet and outlet of the blower.

It will be seen, that from the manner in which the heater or cooler is connected with the inlet or delivery of the blower, the whole body of the heater or cooler can be turned to bring the passages *l l'* into any convenient location for the attachment of exhaust-steam or other pipes to suit the requirements of special cases.

I claim an air-blast apparatus, consisting of the combination, with a rotary blower, of the heater or cooler, constructed and arranged for mutual operation together, substantially as described.

BENJ. F. STURTEVANT.

Witnesses:

FRANCIS GOULD,
C. WARREN BROWN.