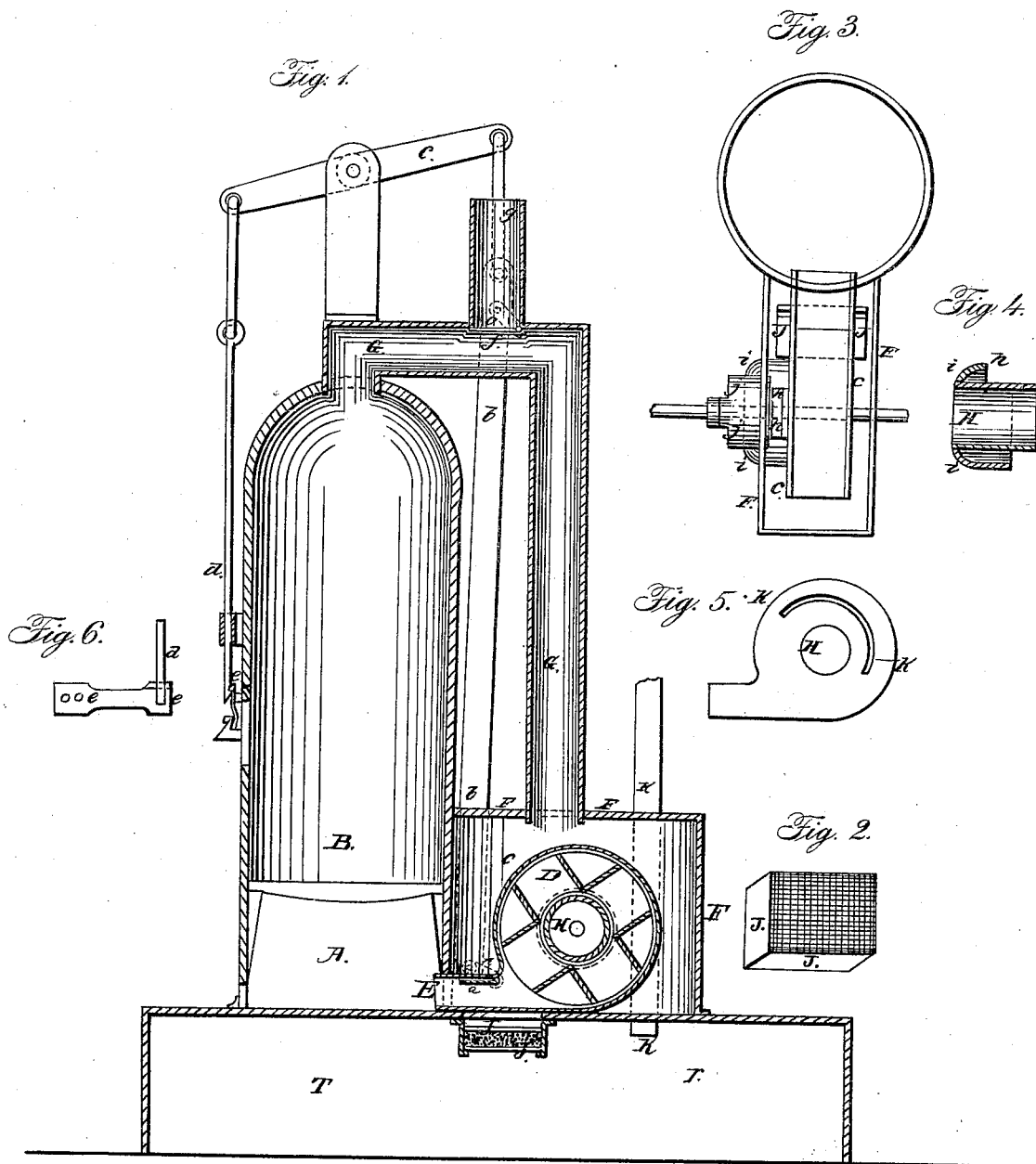


F. P. DIMPFL.  
Hot-Blast Oven.

No. 1,148.

Patented May 9, 1839.



# UNITED STATES PATENT OFFICE.

FREDERICK P. DIMPFEI, OF NEW YORK, N. Y.

## IMPROVEMENT IN FURNACES FOR ECONOMIZING FUEL AND CONSUMING SMOKE.

Specification forming part of Letters Patent No. 1,148, dated May 9, 1839.

*To all whom it may concern:*

Be it known that I, FREDERICK P. DIMPFEI, of the city of New York, in the State of New York, have invented an improvement in the mode of supplying heated air to furnaces of various descriptions, by which improvement a great saving is effected in the quantity of fuel employed, the smoke and combustible gases which ordinarily escape combustion are wholly or in great part consumed, and the sparks given off by the fuel are arrested; and I do hereby declare that the following is a full and exact description thereof.

I intend ordinarily to employ my improved revolving fan for forcing air into the fire, for which improved fan I have applied for Letters Patent of the United States; but I do not intend to limit or confine myself to the use of this particular apparatus, as the ordinary fan-wheel or other contrivances for blowing may be employed and adapted to the other contrivances by which the end in view is to be attained. In my improved mode of blowing, the ash-pit of the furnace is to be entirely closed, excepting at the opening from the fan-wheel through which the wind is admitted and those for its passage to the fuel through the grate-bars. My blowing apparatus I intend in general to inclose in a case or box, constituting an enlargement of the flue or passage through which the highly-heated gaseous products of combustion are to pass from the fire on their way to the point where they pass off into the atmosphere. By this arrangement the atmospheric air admitted through the fan-wheel will be heated in its passage to the fire. I intend, also, in general to make provision for the admission of any desired portion of the air which has passed through the fire into the ash-pit along with the fresh air which is forced in by the blowing apparatus. The air within the furnace is to be retained there in a state of pressure or condensation, and to effect this it is necessary to prevent its free escape therefrom into the chimney or place of final exit. The method I have adopted for obstructing the draft and condensing the air is to place under the blowing apparatus or in some situation between it and the top of the chimney or the place where the gases finally escape into the atmosphere a box or case, the upper and lower sides of which are formed of stout wire or other grating, and which is to contain a quantity of small peb-

ble-stones or of any other suitable material, between the interstices of which air may be made to pass. The quantity and texture of the material thus contained in the box must be determined by the amount of resistance required to produce the intended pressure within the furnace.

In the accompanying drawings, Figure 1 represents the vertical section of a furnace and blowing apparatus, the respective parts of which are so arranged to exhibit the manner in which my improvement may be carried into effect.

A is the inclosed ash-pit of the furnace, of which B is the fire-chamber.

D is a fan-wheel, which is to revolve within its case C C, the wind from which passes into the inclosed ash-pit at E. The fan-wheel, with its case, is represented as inclosed within a box or enlargement of the flue leading from the furnace, (marked F F,) and through which the gaseous products of combustion escaping from the fire are to pass.

G G is a pipe or flue leading from the furnace into the box F F, where a considerable portion of its heat will necessarily be transmitted through the case C C of the fan-wheel to the fresh atmospheric air passing through it. The center tube or opening, H, into the fan-wheel coincides with an opening through one side of the box F for the admission of air to the vanes in the ordinary way.

The furnace and blowing apparatus are represented as standing on the top of a hollow chamber, I I, there being an opening between the box or enlargement F and the chamber I I, in which is placed the box J J, which contains the pebble-stones or other substances intended to obstruct the draft. At Fig. 2 this box is shown separately in perspective.

K K is a pipe or flue leading from the chamber I I, and carrying off the gases which have passed through it.

Instead of the chamber I I and its appendages, there may be a flue or chimney leading from the opening in which the box J J is represented as placed, and said box may be situated at the top or in any part of said chimney, and still answer the purpose of keeping up the pressure in the furnace, by the aid of which time is allowed for a more perfect combustion of the smoke and inflammable gases than would otherwise take place, and also for the

communication of the heat which is generated to a boiler or to whatever else it is intended to heat. Where wood or other fuel emitting sparks is burned, the application of the box J J will effectually arrest or extinguish them. Such a box adapted to the chimney of a locomotive steam-engine would, it is confidently believed, be perfectly effective in this respect, and the resistance which it would offer to the draft would be counteracted by the use of a fan-wheel, requiring but little power to drive it. The pressure may be preserved in the furnace during the period of supplying it with fuel by the addition thereto of either of the well-known kinds of feeding apparatus which have been used in other furnaces with a similar intention. I however have invented a new device for the purpose of arresting the entrance of wind into the ash-pit when the furnace-door is opened to supply fuel, which is as follows: In the passage leading from the fan-wheel to the ash-pit there is a valve, *a*, Fig. 1, represented as open. *b b* is a rod or shaft, the descent of which closes the valve *a* by depressing the joint-piece *n*, (shown in dotted lines,) which is attached to the shaft of the valve *a*. At its upper end the shaft *b* is attached to the vibrating lever *c*, which also has attached to it the rod *d*, the lower end of which is so formed as to be latched by the spring-catch. (Shown separately in Fig. 6.) When the latch of the door is raised, it strikes the piece *e*, disengages it from the rod *d*, and leaves the rod *b* to descend, which it does by its own gravity, and thus closes the valve *a*. By the same action a valve at *f* may be opened, so as to give an escape to the draft through the pipe *g*, the rod *b* being connected by a joint-pin with the piece *o*, attached to the shaft of the valve. I have, however, found the valve *a* sufficient for my purpose without the addition of that at *g*.

When I wish to pass a portion of the gaseous products of combustion a second time through the fire along with the atmospheric air supplied by the fan-wheels, I make an aperture through the case C C of the fan-wheel within the box F F. This opening I locate so that the pressure of the air within the fan-wheel at the place where it is formed shall be nearly the same with that of the condensed air contained within the furnace or within the box F F, as this air is not to enter in consequence of anything like exhaustion being produced in the furnace, as, instead of this, a constant pressure is to be maintained there so long as the fan-wheel is in action, as upon this, mainly, I am dependent for the advantages proposed to be attained by me.

Fig. 3 is a top view of the box F F, the cover of which is removed to show the casing of the fan-wheel within it, which is supposed to be my improved wheel above referred to. C C is the casing of this wheel, and *h h* is the opening for the admission of the heated air into the body of the wheel through the chamber formed by the neck *i i*, which portion of the apparatus is shown separately at Fig. 4, which is a section of it. I regulate the size of the opening *h h* by means of a sliding shutter, which may serve to close it entirely, if desired. This shutter is marked *j j* in the drawings. It is curved so as to adapt it to the cylindrical portion of the casing, and slides in and out through an aperture made to receive it.

When the common fan-wheel is employed, I make an opening through one end of the casing which contains it, as shown at *k k*, Fig. 5, such opening being made at a point where it is judged or where experiment may show that the pressure of the air in the box F F will cause it to enter in proper quantity, or rather with the proper pressure, as its quantity may be regulated by a sliding shutter or valve.

What I claim as my invention, and desire to secure by Letters Patent in the above-described apparatus, is—

1. The employment of a box or receptacle constructed in the manner set forth, and which is to contain a stratum of pebble-stones, or of any other material which will leave interstices through which air may be forced to pass, but which will have the effect of producing pressure within the furnace applied with air from any suitable blowing apparatus, and in which furnace the air is to be forced into a closed ash-pit, the whole being combined and arranged substantially in the manner set forth.

2. The mode described of forcing in with the atmospheric air a portion of that which has previously passed through the fire, by which means it is made to enter in consequence of the pressure to which it is subjected.

3. The manner of shutting off the draft from the blowing apparatus by the opening of the door for feeding the fire, as set forth.

And I do hereby declare that I do not intend by anything herein contained to confine myself to any particular form or arrangement of the respective parts herein described, but to vary these in any way, substantially the same by which they will be adapted to the proposed end, as set forth in my claims.

FR. P. DIMPFEL.

Witnesses:

THOS. P. JONES,  
THOMAS JOHNS.