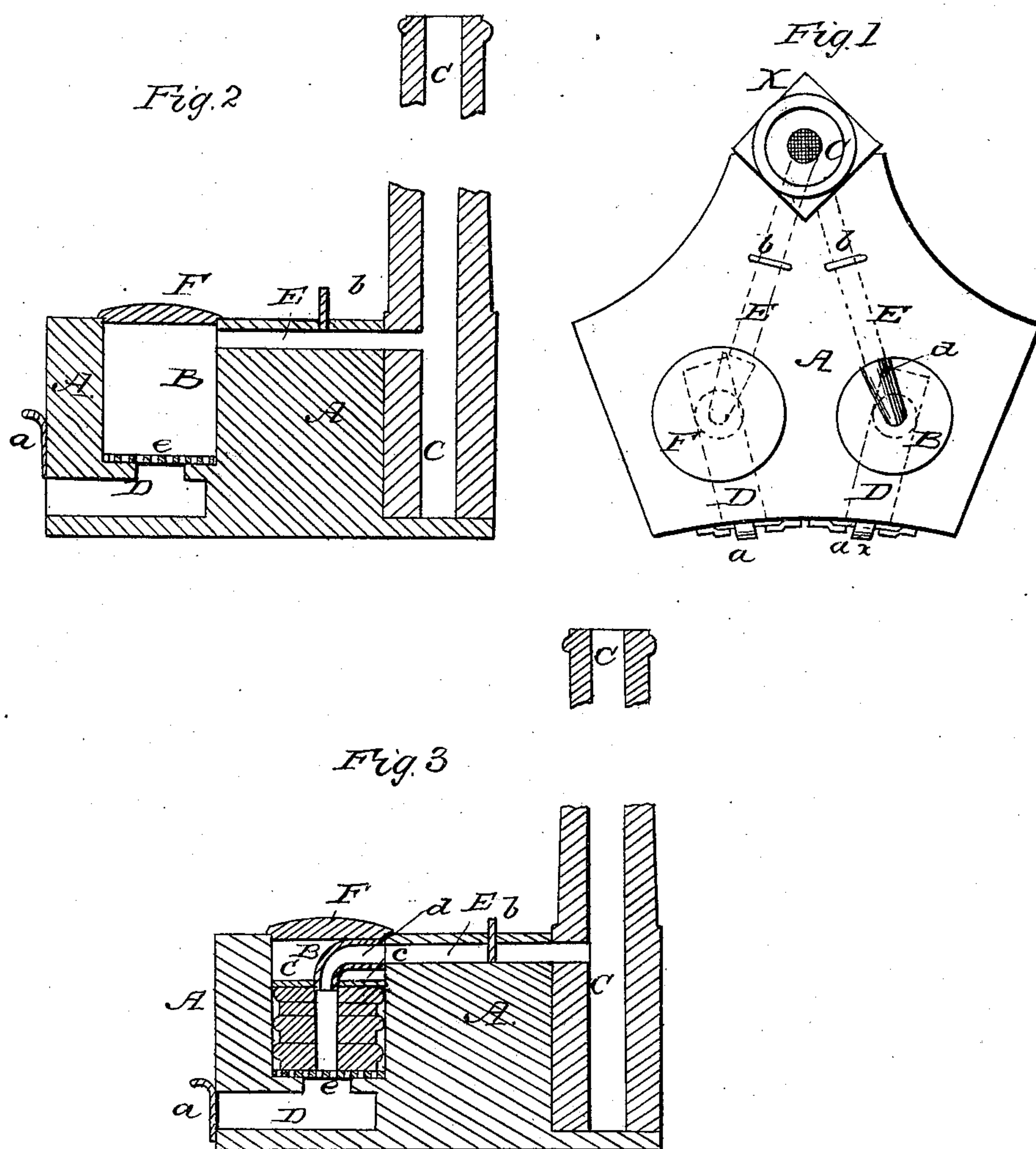


P. F. GEISSE.
Tempering Oven.

No. 23,671.

Patented April 19, 1859.



Witnesses
Guy L. Humphries
Jos. C. Clayton

Inventor.
P. F. Geisse,

UNITED STATES PATENT OFFICE.

P. F. GEISSE, OF WELLSVILLE, OHIO.

OVEN FOR COOLING CASTINGS.

Specification of Letters Patent No. 23,671, dated April 19, 1859.

To all whom it may concern:

Be it known that I, P. F. GEISSE, of Wells-ville, in the county of Columbiana and State of Ohio, have invented a new and useful Im-
5 improvement in Cooling Chilled Cast-Iron Car-Wheels or other Chilled Castings; and I do hereby declare the following to be a full and exact description thereof.

The nature of my invention consists in so
10 constructing, and governing the operation of, a cooling oven, as that the wheels—of which as many as are desirable are placed in its pits at a high temperature—may be al-
15 lowed to gradually cool in such a manner, that the rate of contraction, in every part of each one of them, may be uniform, and the act of final contraction be induced to com-
20 mence at the centers of the wheels and extend gradually to their peripheries; thus preventing the hubs of the wheels from shrinking away from the rims after these last shall have become set, and weakening the wheels; while the chill given them in the
25 molds shall not be softened or changed in any degree, nor the metal deteriorated in quality from being exposed to too great or long a heat.

In the accompanying drawings Figure 1, is a plan or top view of my oven showing
30 two pits and their flues leading to the stack; Fig. 2 is a section through line X X X of Fig. 1, showing the connection of the pits with the stack, and Fig. 3 is a similar sec-
35 tion showing the oven in operation and filled with wheels.

A is the body of the oven constructed of any suitable material, having any number of pits B, B, sunk in it. These may be ar-
40 ranged circularly around the smoke stack C, or in any other desirable manner; and their diameter is just sufficient to allow a car wheel to be received within them. Below the oven pits are the draft flues D. Regu-
45 lating dampers *a* wholly or partially close the draft flues D.

The flues E lead from the pits into the stack C, and have gates *b* so arranged as to shut off communication with the stack when
50 necessary. The pits B are each furnished with a tight cover F and with a close fitting plate *c* with a hole through its center. They each also have a pipe *d* fitting at one end the hole in the plate *c*, and at the other end fitting the flue E at its junction with the
55 pit. *e* are the grate bars.

The operation of my invention is as fol-

lows: When the chilled wheels are set enough in the molds to bear removal from them, the pits B are heated to a temperature about equal to that of the wheels; and these after
60 having the cores in their eyes removed, are then placed in the pits—one on the other—as many as the pits will hold. The draft flues D are then entirely closed by the regu-
65 lating dampers *a* the plate *c* is placed on the top of the wheels, the pipe *d* fitted to the hole in the plate *c* and to the mouth of the flue E. The cover F is placed over the pit and the gate *b* shut down, thus preventing
70 all communication between the wheels in the pit and the external air except by radiation through the mass A of the oven. No more heat is applied to the wheels but they are permitted to remain say two or three days
75 thus inclosed until they have come down to what is called a black heat and have shrunk sufficiently to allow the final contraction to take place in a manner to be presently de-
80 scribed. While thus shut up no one portion of any one of them shrinks more than another portion; being in every part of them exposed to the same gradually decreasing temperature.

The final cooling and uniform contraction is effected as follows. The gates *b* are lifted
85 to the position shown in Fig. 2, and the regulating damper *a* opened to the required extent, when a current of cool air will flow through the draft flue D, up through the eyes in the hubs of the wheels, and through
90 the pipe *d* and flue E to the stack. It will be seen that in consequence of the close proximity of the rims of the wheels and of the plate *c* to the sides of the pits that no cold air will reach the rims; but it will be con-
95 fined in its passage to the eyes in the hubs, and here the final set will begin to take place first. This will not take place suddenly, nor will the cold air in the least chill the wheel at that part while the other portions are still
100 hot. For the air in its passage absorbs a portion of the caloric in the wheel at the eye, and there is immediately an effort through natural laws to establish an equilibrium
105 throughout the whole wheel by a flow of caloric in an infinite number of currents converging from the rim to the center. If the flow of cold air should be stopped the wheel in a short time would become of an equal temperature throughout in consequence of
110 the effectual operation of natural laws. But the cold air continues to flow no matter how

gradually and the wheel becomes uniformly and evenly cooled by the continuous flow of its caloric in currents converging from the rim to the hub where it is absorbed and carried away by the cool air. When the wheels have been reduced to a black heat there remains but a very slight degree of contraction for them to undergo; and this final contraction is so effected by the cooling flow of air just above mentioned that it is like shrinking rings of infinite thinness successively one upon the other.

It is obvious that if the rim of a wheel be shrunk and set before any other part it will exert a crushing force upon the metal between it and the eye which is still distended by heat; and when the eye is completely contracted and lessened in its diameter, there will exist in action a force tending to pull apart the metal, between the eye and rim, which metal was already weakened by the crushing force first exerted by the contraction of the rim. My manner of cooling prevents the action of opposite forces in immediate succession which are always detrimental to the cohesive strength of metals by their disintegrating power especially when there remains a tensile force in constant operation.

It is well known from experience that cast-iron, when subjected to a high degree of heat, for too long a time, loses its elasticity and cohesive strength. As generally expressed among iron workers "the life is taken out of it"; and if it happens to have

been chilled it will become annealed and softened so that no treatment will restore the hardness. The same results occur when it is exposed to vicissitudes or alternating changes of high temperature even if such exposure be only for a short time. My manner of cooling prevents any such effects from being produced because the wheels are constantly decreasing in temperature, and are never raised, from the time they are put into the pits until they are finally cooled and taken out.

I am aware that ovens for raising the temperature after the wheels have been put into them, have been used, therefore I do not claim an oven of itself as new. I am also aware that a current of air has been allowed to pass through the hubs of car wheels when introduced into a case not susceptible of having its temperature raised, therefore I do not claim this as new; but

What I do claim as new and desire to secure by Letters Patent is—

The pipe *d* connecting the eyes or hubs of the wheels with flue *E* and plate *c* for causing the current of air to pass through the eyes only of the hubs in cooling, in combination with the heating oven *A*, and pits *B* operating as described and for the purposes set forth.

P. F. GEISSE.

Witnesses:

GUY C. HUMPHRIES,
JOS. C. CLAYTON.