

(No Model.)

3 Sheets—Sheet 1.

W. HANSEN.

APPARATUS FOR DRYING CASTING MOLDS.

No. 530,641.

Patented Dec. 11, 1894.

Fig. 1.

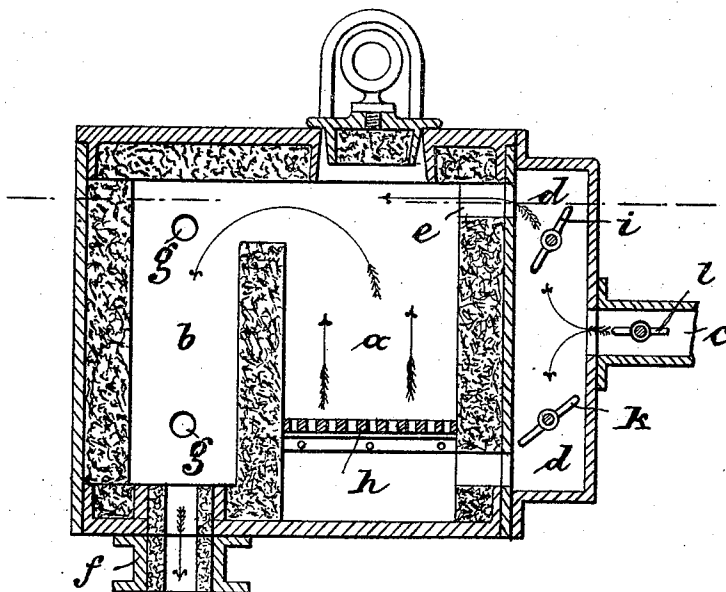
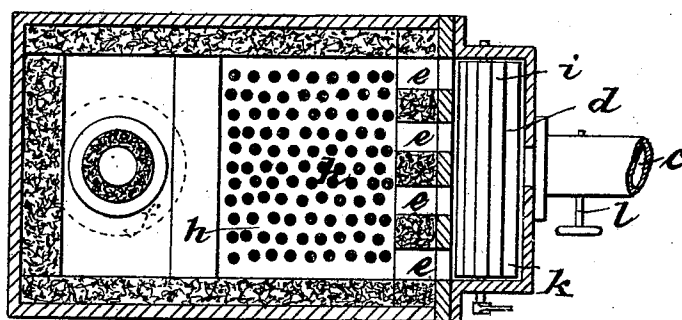


Fig. 2.



Witnesses:
E. H. Sturtevant.
W. H. Howell

Inventor:
Wilhelm Hansen
by *Richard R. Edwards*
attorney

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Fig. 3.

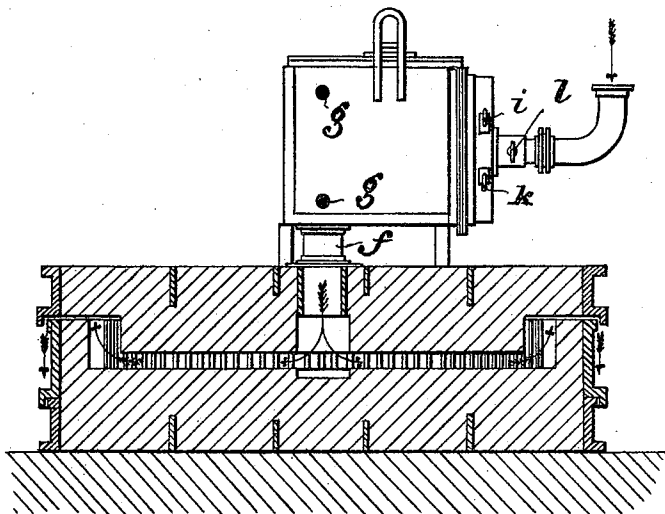
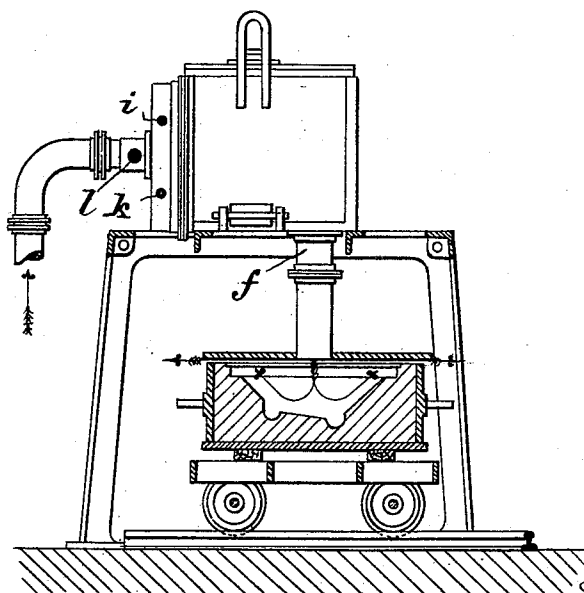


Fig. 4.



Witnesses:
E. H. Sturtevant.
H. Munnell

Inventor:

Wilhelm Hansen

by *[Signature]*
attorney.

(No Model.)

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Fig. 5.

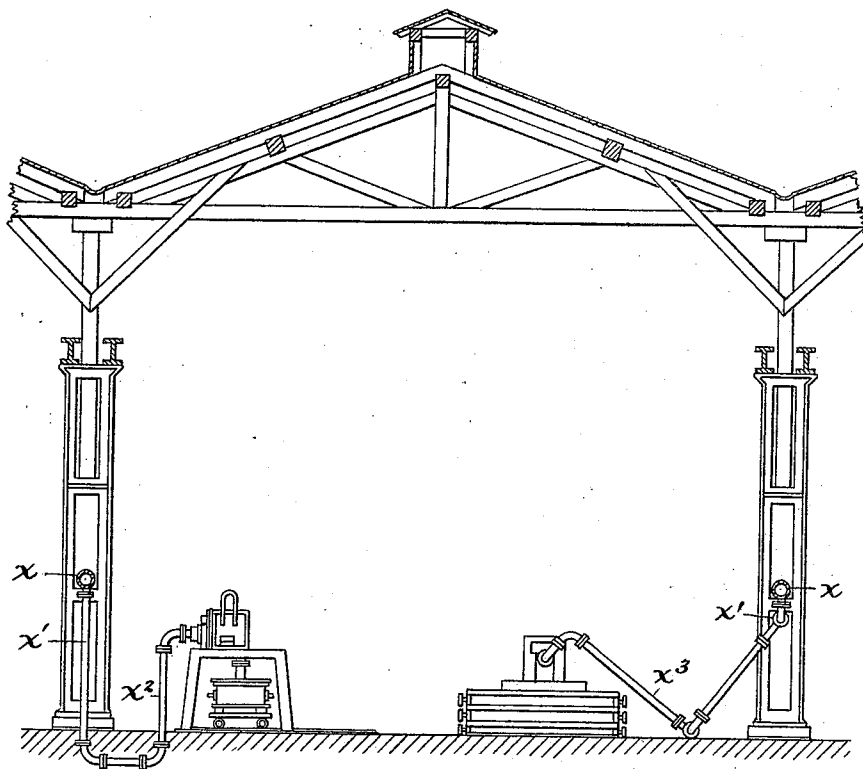
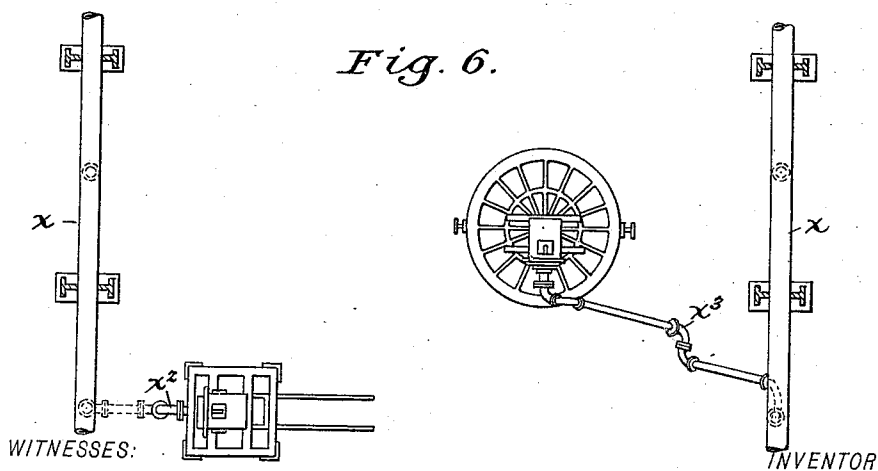


Fig. 6.



WITNESSES:

Robert Murrell
E. H. Sturtevant

INVENTOR

Wilhelm Hansen

BY

Reinhardt
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILHELM HANSEN, OF GOTHA, GERMANY.

APPARATUS FOR DRYING CASTING-MOLDS.

SPECIFICATION forming part of Letters Patent No. 530,641, dated December 11, 1894.

Application filed January 10, 1893. Renewed January 11, 1894. Serial No. 496,552. (No model.)

To all whom it may concern:

Be it known that I, WILHELM HANSEN, a subject of the Emperor of Germany, residing at Gotha, Germany, have invented new and useful Improvements in an Apparatus for Drying Casting-Molds, of which the following is a specification.

It is the object of my invention to provide an apparatus of simple and effective form adapted for supplying heated air and gas to molds for the purpose of drying them, said apparatus being intended to operate in connection with loam molds or molds in the ground which cannot be moved bodily or upon cast molds generally, capable of being transported to the heating apparatus or upon cast molds which cannot be moved.

My invention is intended to obviate many of the inconveniences suffered by the workmen heretofore arising from the smoke or gas discharged from the heating device, to reduce the time necessary to complete the drying as also the amount of fuel used.

The heating apparatus in order to meet the above objects must be capable of being transported or of being fixed in place. The air required for combustion and for the generating of heat and which must be superheated is carried into the apparatus, from a blowing machine through pipes or through a hose adapted for that purpose.

Figure 1, shows a vertical longitudinal section of the apparatus; Fig. 2, a horizontal section through the upper air channels. Fig. 3, shows the apparatus applied to a mold for casting a spur wheel. Fig. 4, shows the apparatus for heating light molds. Figs. 5 and 6, are respectively an end elevation and a detail plan view of the apparatus as set up in connection with a casting house.

The apparatus consists essentially of two combustion chambers, *a* and *b*. The first chamber for instance is filled up to a certain point with coke, which rests upon a perforated roasting plate *h*, or grate. A free space is left above the bed of coke for combustion. The chamber *b*, is the super-heating chamber.

The cold air enters a channel *d*, *d*, through inlet pipe *c*. Here it is divided into two parts. One part enters the chamber *a*, through the plate *h*, and the bed of burning material, but the other part passes through the opening *e*,

e, *e*, *e*, over the burning material and from there it mixes with the products of the combustion in the super-heating chamber *b*. Here where the flame can develop freely, the mixing becomes more thorough and the combustion more complete. Finally, the final product consisting in a highly heated mixture of atmospheric air and gas, passes into the casting mold which is to be heated, through the socket piece *f*.

The proportions of the quantities of air passing through and over the burning material are regulated by the regulator valves *i* and *k*, in the separating channel *d*, *d*. By this arrangement it is possible when the valves are put in the proper position, to cause the temperature of the incoming air to rise to any desired degree of heat and to keep it at that desired point. As a rule the lower regulator valve *k* is almost closed and the upper one *i*, almost entirely open.

The spy-holes *g*, *g*, are provided to enable the attendant to see the length of the flame in the chamber *b*, so that the same may be regulated. The main regulator valve *l*, is intended to regulate the quantity of incoming air which is varied according to the different requirements of the work.

The mixture of super-heated air and gas which issues into the casting mold through the socket-piece *f*, has in its strongly over-heated state, an extraordinary evaporating power and acts uniformly upon every nook and corner of the mold when brought into it from above.

Fig. 3, shows the application of the drying apparatus to the casting mold for a spur wheel. For the sake of distinctness the curbs are abnormally thick. The top box does not fit tight to the drag box but a small space is left for the escape of the air and gas. The escape pipe for the core gas is made a little larger than necessary in order to facilitate the coming in of the air which escapes from the air heating apparatus. The arrows show the direction in which the hot air moves. The top box and the drag box are dried simultaneously. For the drying of long and proportionately narrow casting molds as for instance for cheeks of a lathe, faces of a planing machine, plates of a steam engine or base plates, &c., the molds are built together but

the so-called false pieces or false cores are not left sticking upon them so that the hot air can circulate under the same. The top box, as has been said already is not fixed tightly but the intermediate space is filled with loose sand and several light tin pipes are passed through the false cores which are located in the middle so that the lower openings reach near to the bottom of the lowest parts of the mold. In this case it is necessary as a rule to use two ovens or more which must be mounted at the extremities of the casting mold in such a way that the hot air is introduced from above.

If the false cores are not attached to the top box, it is possible to carry the same into a drying stove so that only the part which is formed in the ground and the top box need to be dried by the apparatus above described. When it is desired to treat molds of clay or of so called paste for steam cylinders or large pipes, said molds must be shut off at their upper part by a cast iron plate in the center of which a hole is drilled for introducing the super-heated air. The latter is blown downward into it and only a small circular space is left open at the bottom for the escape of the hot air. For the drying of small molds it is better to use fixed apparatus supported upon a frame as shown in Fig. 4. A light wagon runs over rails below. The mold upon the wagon is covered with a cast iron plate in the center of which a hole is drilled for the inlet of the super-heated air. For smaller molds it is not necessary to use the covering plate. The said covering plate may be supported on the nozzle *f*, so as to leave a space between it and the mold for the escape of the air.

Figs. 5 and 6 represent a casting house provided with this super-heating apparatus. The main air supply pipes *X* are located between the iron bearers or beams which carry the frame of the roof and the movable cranes. Between each two of the beams one or more nozzles *x'* (when the machine is not working they are closed by covers) project from the lower part of the main air pipes for supplying air to the heating apparatus. The connection between these nozzles and the fixed air heating apparatus is established by fixed pipes *x²*. The connection between the movable apparatus and the nearest nozzle *x'* is effected by flexible pipes or any suitable form of hose *x³*.

I claim as my invention—

1. An apparatus for heating and drying molds by a current of air and combustion gases comprising a furnace, a valved conduit

having branches communicating with the space below the grate and with the space between the grate and the outlet for conveying compressed air thereto in regulated quantities and a mixing chamber communicating with the combustion space and having a downwardly projecting nozzle, to discharge the hot products into the mold, substantially as described.

2. An apparatus for heating and drying molds by a current of air and combustion gases comprising a furnace, a conduit having branches communicating with the space below the grate and with the space between the same and the outlet, the valves in said branches regulating the supply of compressed air under the grate of the furnace and into the combustion chamber, a main valve in the main portion of the conduit for regulating the entire blast entering the apparatus and a mixing chamber communicating with the combustion space and having a downwardly projecting nozzle to discharge the hot products into the mold, substantially as described.

3. An apparatus for heating and drying molds by a current of air and combustion gases comprising a furnace, a conduit having branches communicating with the space below the grate and with the space between the grate and the outlet, the valves for regulating the flow of compressed air through said branches, a main valve in the main portion of the conduit for regulating the entire blast entering the apparatus and the mixing chamber communicating with the combustion space above the grate and having the downwardly projecting nozzle leading therefrom to discharge the hot products into the mold, said mixing chamber having also the sight holes therein, substantially as described.

4. An apparatus for drying molds by a current of air and combustion gases comprising a furnace, a conduit having branches communicating with the space below the grate and with the space between the grate and the outlet, and a mixing chamber communicating with the combustion space and having a downwardly projecting nozzle to discharge the hot products into the top of the mold, said apparatus being portable, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILHELM HANSEN.

Witnesses:

FRANZ KASSLACHER,
FRIEDRICH CORRELL.