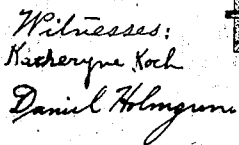


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3 SHEETS—SHEET 1.



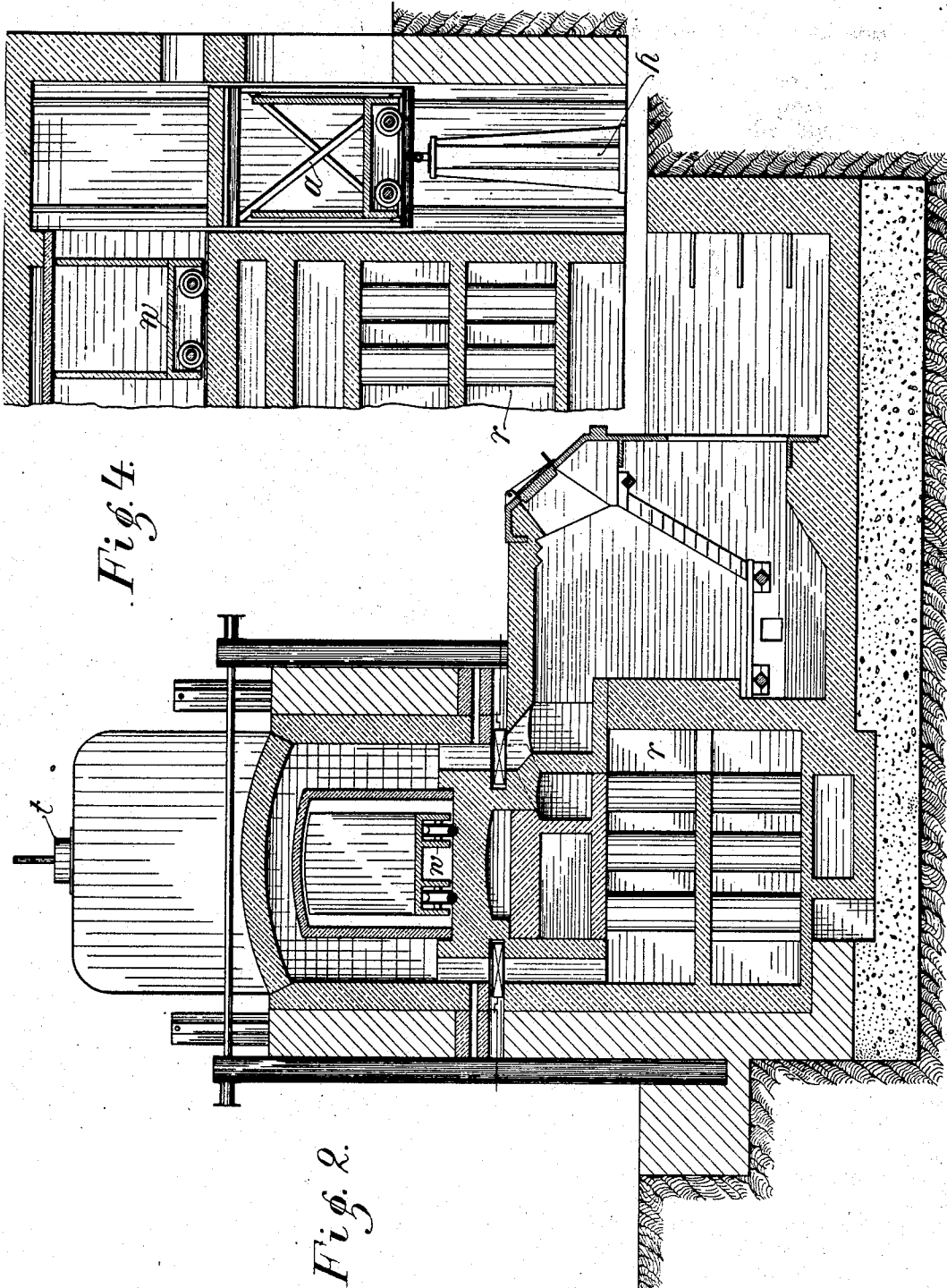
Inventor:
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H. GÄRTNER.
ANNEALING FURNACE.
APPLICATION FILED JAN. 23, 1912.

1,027,471.

Patented May 28, 1912.

3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

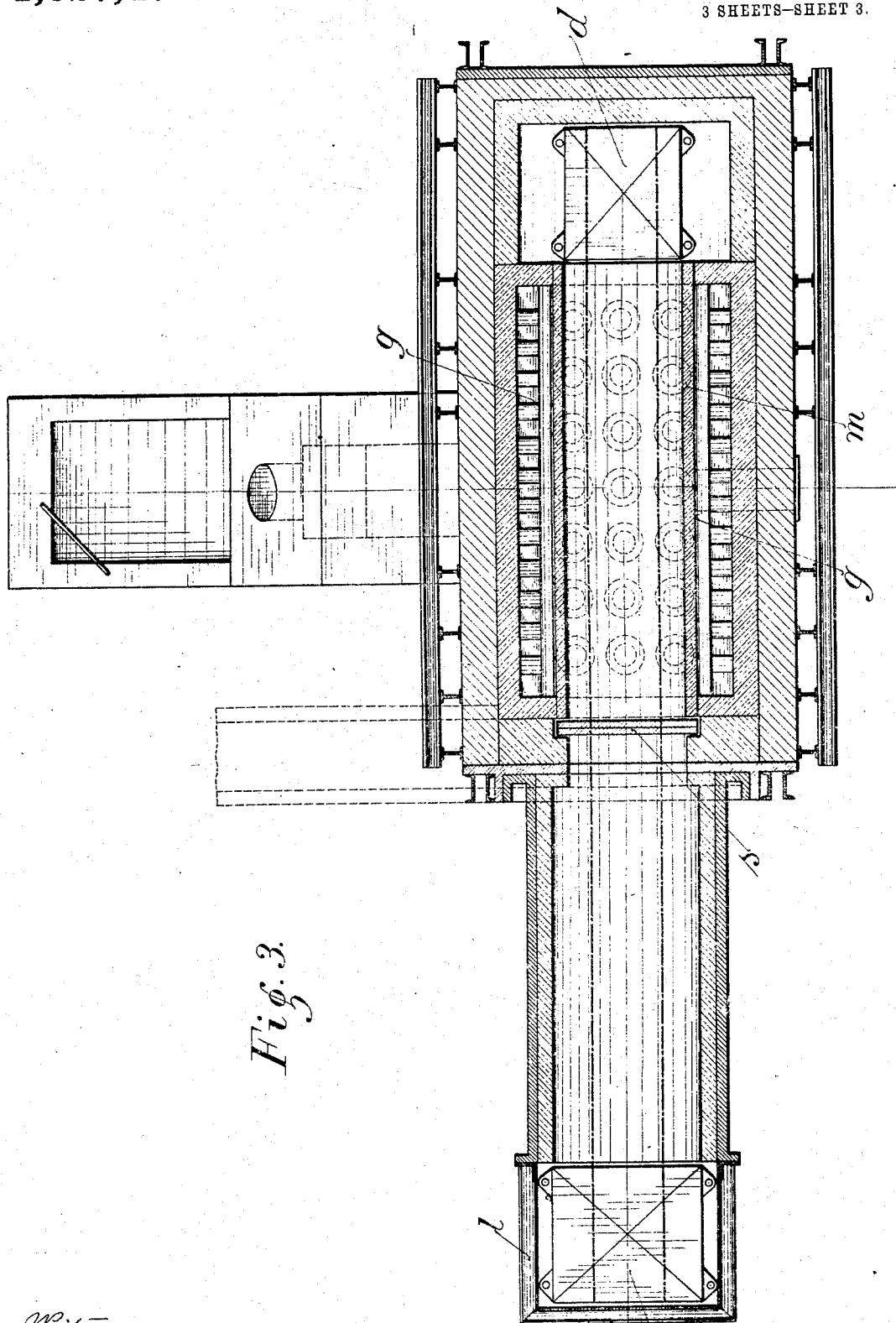


Fig. 3.

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UNITED STATES PATENT OFFICE.

HERMANN GÄRTNER, OF LINTORF, NEAR DUSSELDORF, GERMANY.

ANNEALING-FURNACE.

1,027,471.

Specification of Letters Patent.

Patented May 28, 1912.

Application filed January 23, 1912. Serial No. 672,899.

To all whom it may concern:

Be it known that I, HERMANN GÄRTNER, a subject of the German Emperor, and residing at Lintorf, near Düsseldorf, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Annealing-Furnaces, of which the following is a specification.

The present invention relates to an arrangement for annealing bright metallic articles in indifferent gases, the entrance and outlet openings being arranged below the filled annealing chamber or cooling down chamber respectively. The subject invention differs from other known arrangements for this purpose by that at the outer ends of the annealing chamber and cooling down chamber arranged in a straight line behind each other and closable against other by means of a damper, vertical shafts are provided, which can be closed below, and that in these shafts elevators are arranged, with which the charge to be annealed can be continuously introduced in large quantities and discharged respectively on trucks and the like fitting into the annealing and cooling down chamber.

In the accompanying drawing a constructional form of the furnace is exemplified, Figure 1 being a longitudinal section; Fig. 2 is a transverse section along A—B in Fig. 1 and Fig. 3 is a plan section along C—D in Fig. 1. Fig. 4 is an elevation of another constructional form of the charging device.

The furnace, which is fitted with a recuperator *r*, consists essentially of a horizontal shaft, which can be divided by a damper *s* into an annealing chamber *g* fitted with the annealing muffle *m*, and a cooling down chamber *k* respectively, and at its two ends two vertical shafts *v* and *u* respectively, in which elevators *a* and *b* are arranged for introducing and discharging the trucks *w*. These elevators have insulating tops *d*, for preventing the heat from penetrating downward into the elevator. These trucks *w* are provided at their ends with vertical walls *c* of refractory bricks, which will just fill out the width of the muffle so that when a truck is conveyed from the annealing chamber, it will be impossible for all the hot gases to pass from the annealing chamber into the cooling chamber. The latter is free on all sides and is therefore well cooled by the air; besides it may be provided with a separate water cooling arrange-

ment. In order to protect the vertical guides of elevator *a* against distortion by heat, which might interfere with the proper operation of the elevator, these guides *x* are made tubular so as to be cooled by water, which may be supplied thereto in any suitable manner. The rods of the damper *s* and the elevators *a*, *b* are guided in known manner in sand cups *t* thereby affording tight joints.

Into the upper part of elevator shaft *v* opens a pipe *o* for admitting an inert gas into the annealing chamber, while a valve controlled burner pipe *p* is provided below the sole of said chamber, so that by lighting said burner the nature of the flame will indicate the character of the gas charge within the annealing chamber.

Through the head wall of the shaft *v* is passed in a stuffing box a rod *f*, which can be pushed by means of a driving device *i* into the shaft *v*, and will thereby push the trucks off the elevator into the annealing chamber. The elevator shaft *u* has on its walls a plurality of gutters *l*, through which a continuous stream of cooling water flows and thus assists in cooling the cooling down chamber. The vertical shafts have in their lower part doors *e* and *n* for allowing of the trucks entering and leaving the elevators. These elevators may be operated either from above, preferably by means of hoisting gears attached to the roof-work of the building, or also from below by means of a hydraulic lifting gear *h*, as shown in Fig. 4.

The operation is as follows: After the annealing muffle and the extension muffle have been filled with an inert gas, which can be ascertained by means of the controlling flame lighted at the pipe *p* the truck laden with the material to be annealed is rolled through the opened door *e* on the elevator and the door is closed again. As soon as the elevator is raised by means of the hoisting or lifting gear the truck laden with the material will act as an insulation against the heat rushing out. When the elevator, which is fitted with a striking gear operating at always the same level, has reached this level, the truck is pushed by means of the ejector device *f*, *i*, into the annealing muffle and the elevator will again sink into its initial position. The annealing muffle can be made of any desired length according to the respective conditions. The damper *s* remains closed during the an-

nealing process, for the heat not to escape into the cooling down muffle. After the material has been annealed the damper *s* is raised and the truck is pushed by the following trucks or the ejector into the cooling down muffle. While the door *e* is being raised, the walls *c* of the trucks will prevent the heat from rushing into the cooling down muffle. After the truck has been moved into the cooling muffle the damper is closed down again. From the cooling down muffle, the length of which depends likewise on the respective circumstances the truck is moved into the second elevator *b*, being pushed onto the same by the following cars. A device may, however, also be provided by means of which the operator can draw the truck from the cooling down muffle on to the elevator by means of a rod with a hook passed through a stuffing box into the interior. Windows with mica panes allow of an observation of the process within the muffle. After the elevator *b* charged with a truck *w* has arrived at its lower level, door *n* is opened and the truck is drawn out by hand. As the annealing muffle is constantly under heat, the charge is very quickly in a glowing heat and can be rolled at any time into the cooling down muffle, whether there is a fresh charge ready to be introduced or not. In the same manner material may be fetched out or introduced at any time. If for instance the annealing muffle is occupied, and the first truck is not yet thoroughly annealed, the freshly introduced truck can remain standing in the elevator after having been raised, and is preliminarily heated in this position. As the introducing and removing of the trucks may be carried out at any moment

and these two operations are independent of each other one man will be sufficient for operating the plant, so much the more, as the mechanical outfit is so designed, that the parts will automatically return into their initial position after the work has been completed.

The material is removed from the furnace in as bright a state as it was introduced into it, as it is entirely out of question for the heavy air below to rise into the higher chambers filled with gas. At the same time all draft is avoided, as the doors are opened alternately only and the elevator rising while the door is closed, will further serve as a tight closure. The arrangement may also be made that it is impossible to open the door while the elevator is raised.

I claim:

In an annealing furnace of the character described, an annealing chamber, an adjacent horizontally alined cooling chamber, a damper intermediate said chambers, elevator shafts communicating with the outer ends of said chambers and extending downwardly therefrom, elevators reciprocable within said shafts, and charge-receiving trucks adapted to travel through the annealing and cooling chambers, said trucks being provided with end walls that closely fit into the profile of the chambers, so as to separate the annealing chamber from the cooling chamber, while the damper is opened and while a truck is passed from the annealing chamber into the cooling chamber.

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Witnesses:

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