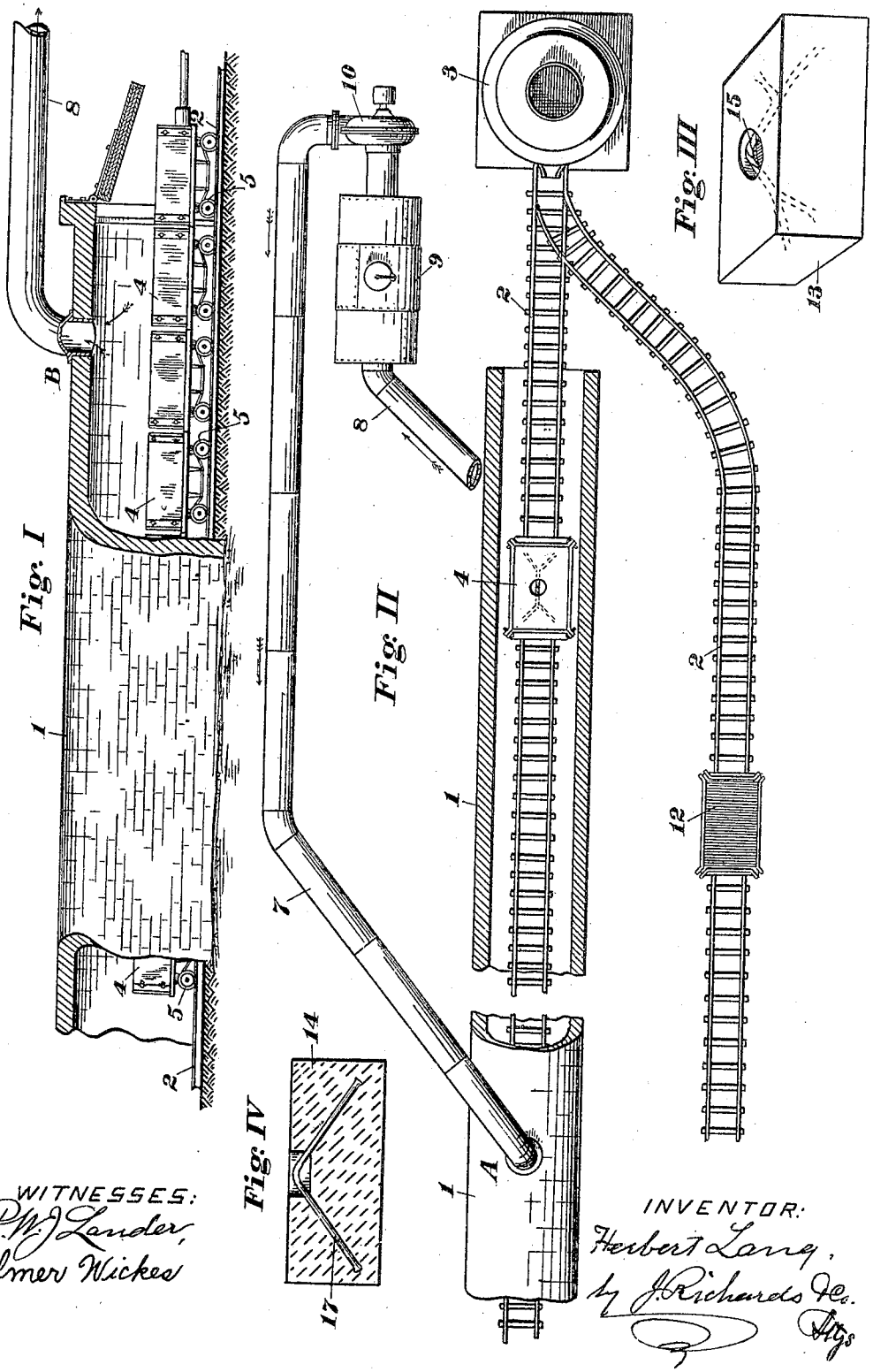
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H. LANG.

HEAT CONSERVING APPARATUS.

APPLICATION FILED JUNE 13, 1905.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HERBERT LANG, OF OAKLAND, CALIFORNIA.

HEAT-CONSERVING APPARATUS.

No. 818,541. Specification of Letters Patent. Patented April 24, 1906.

Application filed June 13, 1905. Serial No. 264,995.

To all whom it may concern:

Be it known that I, HERBERT LANG, a citizen of the United States of America, residing at Oakland, county of Alameda, and State of California, have invented certain new and useful Improvements in Heat-Conserving Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to an improved process and apparatus for utilizing the heat and also the substance of slag from smelting-furnaces in the manner hereinafter described and illustrated by drawings that form a part of this specification.

My invention consists in moving by mechanical means, preferably by pushing from the rear, a series of sectional molds mounted on trucks and containing the hot slag through an inclosed arched furnace or retort-chamber lined with refractory material and traversed in the opposite direction by an impelled current of air, so the air will cumulatively absorb or take up the heat from the slag, this hot air being thence conducted away and applied to some useful purpose, such as generating steam, and then, if not too much polluted, returned to the slag-heated chamber and circulated. The vessels or molds containing the slag being separable, preferably mounted on wheels and abutting one against the other to save room, dispense with connecting devices and increase the heating area. The invention also consists in means to facilitate the handling and use of the units of slag for structural or other purposes when these are annealed, cooled, and indurated.

My invention further includes the devices in their proper combination to produce these results and in features constructive and otherwise, as hereinafter more fully explained in connection with the drawings.

The objects of my invention are the conservation, first, of the heat of the furnace-slag and its application to useful purposes; secondly, of the substance of the slag and its adaptation to industrial uses.

I am aware that the heat of furnace-slag has been to some extent utilized locally—namely, by convection or through the medium of air—but not impelled or circulated air that would by its motion effectually take up the radiated heat and permit the conveyance of this heat and its application to separate purposes not connected with the heating-chamber. I am also aware that blocks of slag have been provided with inset devices, such as eyes or hooks, to facilitate handling, but not by any means so simple and inexpensive as by sections of metallic rope, that will not only serve to lift the blocks, but bind them in case of their fracture.

Referring to the drawings, Figure I represents a partial longitudinal section through an arched retort-chamber in which the slag moves and gives off its heat. Fig. II is a plan view of the same retort-chamber with its accessories for supplying and impelling air thereto and applying the same after it is heated. Fig. III is a view in perspective of a block or unit of slag provided with a bail for handling according to my invention, and Fig. IV a section through a similar block or unit with an iron rod embedded to form a lifting eye or staple.

In the drawings the principal notations for reference are as follows: 1, the heating or retort-chamber; 2, railways for moving the slag; 3, a smelting-furnace of the common construction; 4, separable molds to contain the slag; 5, trucks on which the molds are mounted; 7, the conducting or induction pipe for air; 8, the discharge or eduction pipe for heated air; 9, a steam-boiler heated by air from the chamber 1; 10, a rotary fan to impel and circulate the air; 12, a car to remove refuse material from the furnace; 13, a complete block or unit of slag with a wire bail; 14, a similar block of slag with a solid bail; 15, a lifting device made of metallic rope; 17, a lifting device made from a solid iron rod.

The hot slag in a liquid state flows from the furnace 3 into the molds 4, mounted on the trucks 5, which are moved into the retort-chamber 1, preferably in a close row, each car or truck pushing those in front of it, so they will be close together. By thus moving the cars or trucks they require no pulling connections that are liable to derangement in the heat and are not necessary during their passage through the chamber 1. I do not show a means of moving the cars or trucks. This can be done by any of the usual devices capable of exerting sufficient pushing force on the rear car to move the train.

The retort-chamber 1 is made of a sufficient length and the rate of moving the slag therein such that the heat of the latter will be given off down to a point where it is no longer valuable—to 200° Fahrenheit, for example.

The air is forced in at A by means of the fan 10 and moves in the chamber 1 oppositely to the hot slag, thus cumulatively and progressively extending the heat from the latter by a gradual approximation of temperature that favors convection. After the air has been heated in this manner it escapes at B and is conducted to some place of application—a steam-boiler 9, for example—and after it has given up as much of its heat as the respective ranges of temperature permit is conducted to the fan 10 and forced back through the pipe 7 to the chamber 1 and thus circulated.

The cubes of slag in the molds 4 are prepared for handling by placing in the molds pieces of spent or rejected wire rope 15, that become embedded therein, as indicated in Fig. III, serving as devices for handling, by means of which the blocks can be conveniently handled when cool. The sections of wire rope 15 are frayed at the ends, as indicated in Fig. III, before being placed in the molds, and thus gain a permanent hold in the slag, serving to bind and hold the same if cracked or broken, which frequently occurs to solid blocks of slag.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

The apparatus for conserving and utilizing the heat of hot furnace-slag as herein described, consisting of a smelting-furnace, an elongated chamber, open at both ends, refractory lined, a series of separable molds for receiving the molten slag from the furnace, means for transporting the molds continuously through the chamber, an air-inlet near the outlet of the chamber, an air-outlet near the slag-receiving end of the chamber, means to impel air through the chamber in reverse direction to the travel of the molds, and means to push the train of molds through the chamber from end to end, substantially as specified.

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

HERBERT LANG.

Witnesses:
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