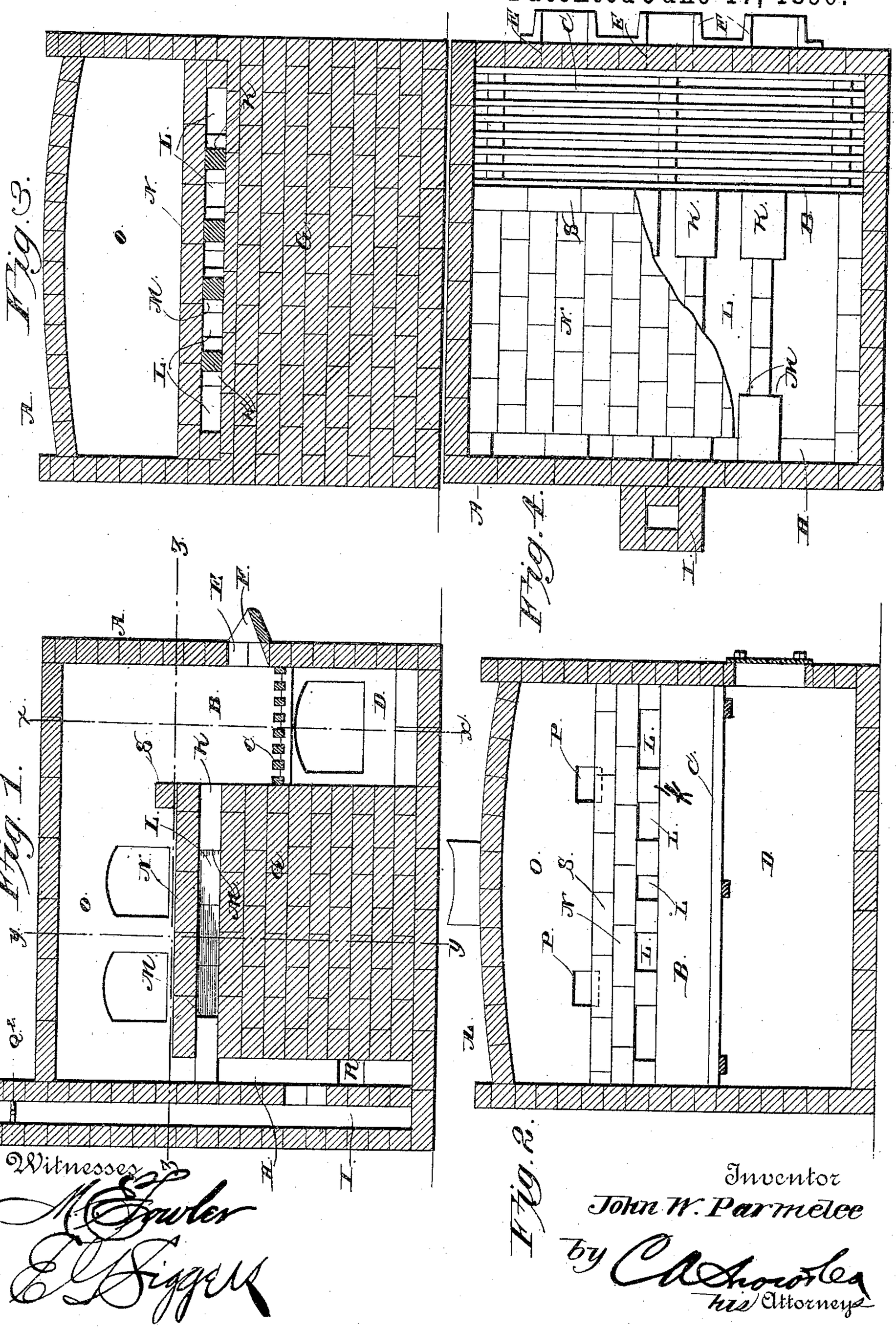
(No Model.)

J. W. PARMELEE.

FURNACE FOR HEATING METAL.

No. 430,538. Patented June 17, 1890.



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UNITED STATES PATENT OFFICE.

JOHN W. PARMELEE, OF WILKES-BARRÉ, PENNSYLVANIA.

FURNACE FOR HEATING METAL.

SPECIFICATION forming part of Letters Patent No. 430,538, dated June 17, 1890.

Application filed March 20, 1888. Serial No. 267,893. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. PARMELEE, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Improvement in Annealing-Furnaces, of which the following is a specification.

My invention relates to an improvement in furnaces for annealing or hardening purposes, especially designed to heat axles or axle-boxes to a "cherry-red;" and it consists in the peculiar construction and arrangement of parts that will be more fully set forth hereinafter, and particularly pointed out in the claims.

The object of my invention is to provide a furnace having a hearth which is adapted to permit the caloric currents to circulate both over and under the hearth, so as to subject the same to a maximum degree of heat with a minimum expenditure of fuel, and this object I attain by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central longitudinal sectional view of an annealing-furnace embodying my improvement. Fig. 2 is a vertical transverse sectional view of the same, taken on the line *x x* of Fig. 1. Fig. 3 is a similar view taken on the line *y y* of Fig. 1. Fig. 4 is a horizontal section taken on the line *z z* of Fig. 1, parts of the hearth being omitted in order to display the arrangement of the heating flues or passages under the hearth.

A represents the annealing-furnace, which is provided at one end with a combustion-chamber B, which is separated by the grate C from the ash-pit D. In the front wall of the furnace, at a suitable height above the grate, are a number of fuel-openings E, on the under sides of which are arranged downwardly-inclined chutes F. The rear side of the combustion-chamber and of the ash-pit is formed by a bed of masonry G, which rises to a suitable height above the grate and extends nearly to the rear wall of the furnace, thereby forming an open space or flue H between the said bed and the rear wall of the furnace.

I represents the smoke pipe or stack, which is erected on the rear end of the furnace and communicates at its lower end with a flue or space H.

On the upper side of the bed G, and extending throughout the entire length thereof, are a series of walls or partitions K, the central portions of which are only half as thick as the end portions thereof. The said walls or partitions are arranged comparatively closely together on the center of the bed, and are arranged at regularly-increasing distances apart from the center to the sides of the bed, so that the channels L or flues which are formed between the said walls or partitions will be wider at the sides of the furnace than the channels which are nearer the center thereof. By making the walls or partitions narrower at their central portions than at their ends abutting offsets M are formed at the ends of the said partitions or walls, for the purpose to be hereinafter set forth.

The space in the flue L between the offsets M is twice the thickness or width of the end portions of the flues.

N represents the hearth, which is arranged directly over the flues or channels L, and is supported on the walls or partitions K at a suitable height from the bottoms of the channels or flues. This hearth extends from the front side of the bed to the rear side thereof, thus leaving the upper end of the space or flue H between the rear ends of the walls or partitions K unobstructed and in communication with the heating-chamber O above the hearth.

The rear wall of the furnace is provided with a suitable number of openings P, which are covered by sheets of mica, and through which the material on the hearth may be inspected when the furnace is in operation. In one side of the furnace, near the bottom thereof, is an opening R, which communicates with the flue or space H, the function of the said opening being to supply air to the furnace in suitable quantities to facilitate the draft up the chimney or stack, and thereby promote active combustion of the fuel on the grate.

The hearth is provided on its front side with the usual bridge-wall S.

The operation of my invention is as follows: When the furnace is in operation, the caloric currents from the fire box or chamber pass over the hearth and downward through the flue or space H, through the stack or chimney, and caloric currents also pass through

the channels L under the hearth, and thus the hearth is heated both from its upper and its lower sides. It will thus be seen that the products of combustion from both above and below the hearth must pass down before reaching the stack.

The offsets M at the ends of the partition-walls K cause the caloric currents to eddy in the said channels L, and thereby impart the maximum amount of heat to the bottom of the hearth, inasmuch as the heat is thereby caused to be retained in the channels longer than would be the case were the offsets omitted. The said channels L are made wider at the sides of the hearth than at the center thereof, for the reason that the sides of a furnace are usually at a somewhat lower temperature than the central portion thereof, and by widening said channels as they near the sides of the furnace the capacity of the channels is increased, and the caloric currents which pass through the said outer channels are of greater volume than those which pass through the central channels, and consequently all parts of the hearth are maintained at a uniform temperature.

A damper Q^2 is provided in the smoke-stack to regulate the draft and cause the caloric currents to remain in the heating-chamber time enough to effect the desired results.

The extension of the flue H below the heating-chamber O enables the flue to be cleaned through the opening R.

Having thus described my invention, I claim—

1. An annealing-furnace having the fire-box, the hearth arranged above the plane of the fire-box and to one side of the same, and the channels arranged under the hearth and communicating with the fire-box, and also with the escape-flues, said channels having their partition-walls made thicker at different points, so as to form the offsets or shoulders M, and being thereby adapted to cause the caloric currents to eddy under the hearth, substantially as described.

2. An annealing heating-furnace having the fire-box and the hearth above the fire-box and to one side of the same, the channels L, formed under the hearth and communicating with the fire-box to receive the gases therefrom, and the escape-flues with which the channels L also communicate, said channels having the offsets or shoulders M, and being thereby adapted to cause the caloric currents to eddy under the hearth, said channels being made wider at the sides of the hearth than at the center of the same, for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN W. PARMELEE.

Witnesses:
E. G. SIGGERS,
FRANK W. PARMELEE.