

(No Model.)

2 Sheets—Sheet 1.

A. LAUGHLIN & C. EVANS.
HEATING FURNACE.

No. 599,146.

Patented Feb. 15, 1898.

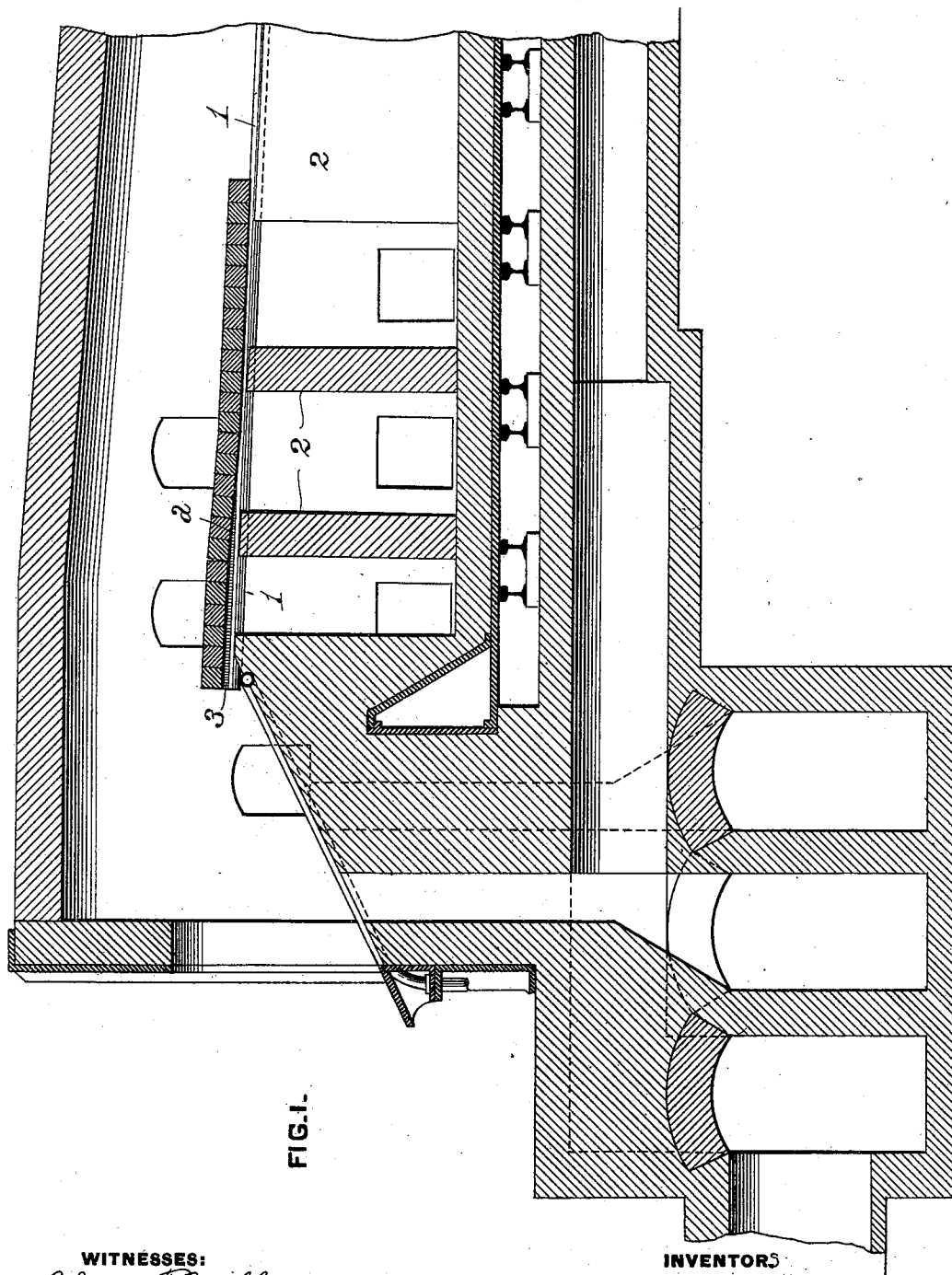


FIG. 1.

WITNESSES:

Chas. F. Miller.
J. E. Gaither

INVENTORS

Alexander Laughlin
Cadwallader Evans
by Saml. S. Wolcott

Att'y

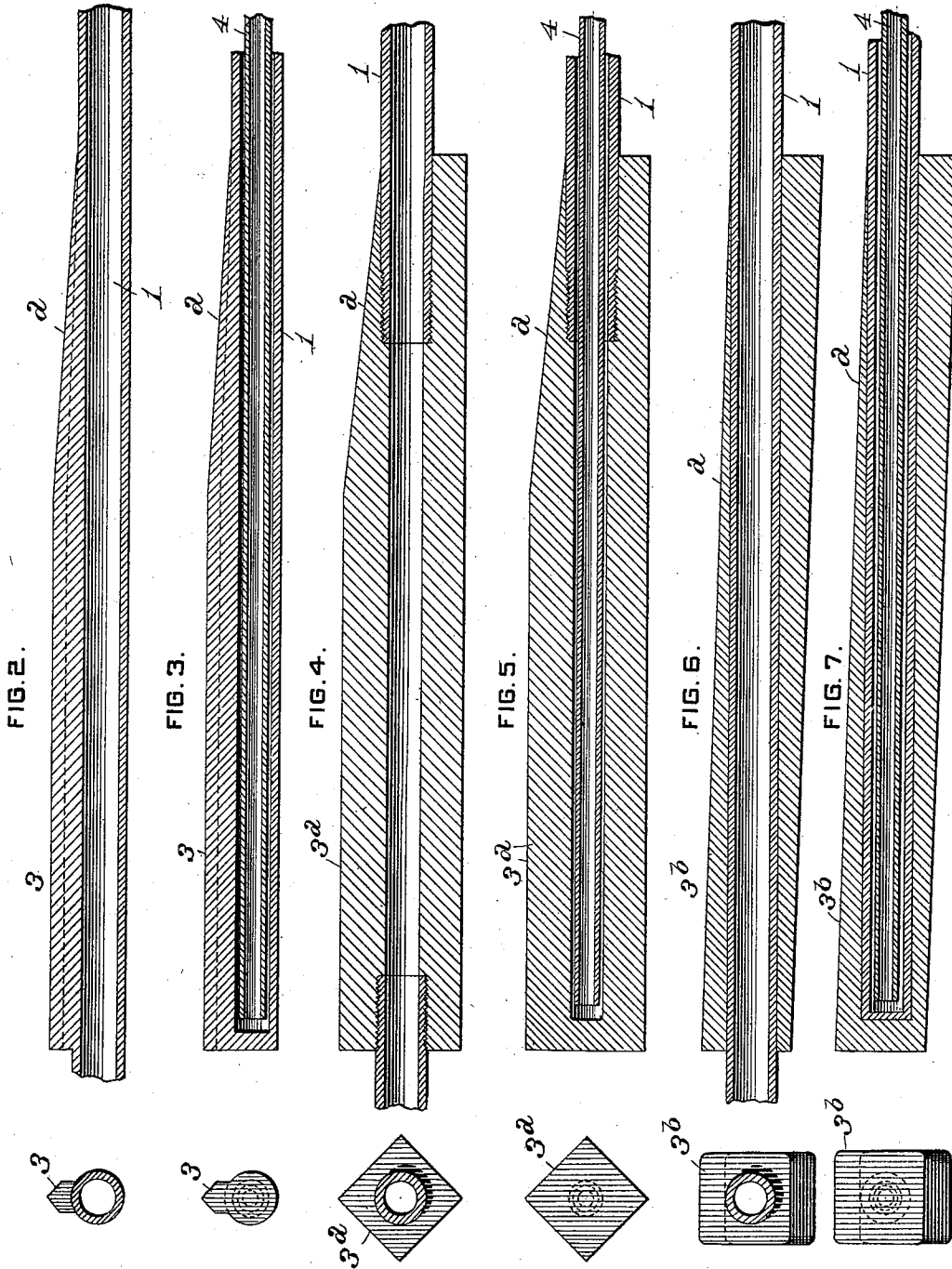
(No Model.)

2 Sheets—Sheet 2.

A. LAUGHLIN & C. EVANS.
HEATING FURNACE.

No. 599,146.

Patented Feb. 15, 1898.



WITNESSES:

Chas. F. Miller.
J. E. Gaither.

INVENTORS

Alexander Laughlin
Cadwallader Evans
by Saml. S. Wolcott

Att'y.

UNITED STATES PATENT OFFICE.

ALEXANDER LAUGHLIN, OF SEWICKLEY, AND CADWALLADER EVANS, OF
PITTSBURG, PENNSYLVANIA.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 599,146, dated February 15, 1898.

Application filed June 2, 1897. Serial No. 639,114. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER LAUGHLIN, a resident of Sewickley, and CADWALLADER EVANS, a resident of Pittsburg, in the county of Allegheny, State of Pennsylvania, citizens of the United States, have invented or discovered certain new and useful Improvements in Heating-Furnaces, of which improvements the following is a specification.

The invention described herein relates to certain improvements in the bearings or supports which are usually employed in continuous-heating furnaces for supporting the billets while passing through the furnace. In order to preserve these supports, which are usually made of metal, from injury by heating, it is customary to make the supports or rails hollow and to cause the circulation of water therethrough. As a consequence of the circulation of water the rails or supports are always of a comparatively low temperature, and as a consequence thereof the portions of the billets resting upon such supports are not as highly heated as the remaining portions of the billets, and in fact it is usually found that while the larger portion of such billets is at a good rolling temperature the portions in contact with the rails are black and are therefore detrimental in rolling the billets.

The object of the present invention is to provide the rails or supports, especially at or adjacent to their ends or the points where the billets are removed from the supports, with shoes, so that a considerable body of metal will be interposed between the water circulating through the rail and the point of support of the billet.

In general terms, the invention consists in the construction and combination substantially as hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional elevation of the rear or discharge end of a continuous-heating furnace having our improved rails or billet-supports applied thereto. Fig. 2 shows a longitudinal and a transverse section of one form or construction of our improved rail, in which the water

will pass through continuously in one direction. Fig. 3 shows a longitudinal section of an end elevation of a construction similar to that shown in Fig. 2, but adapted for a return circulation of the cooling medium. Figs. 4 and 5 are views similar to Figs. 2 and 3, illustrating a modified form or construction of the rail or support. Figs. 6 and 7 are similar views illustrating a further modification of the invention.

In the practice of our invention the pipes 1, which are to form the support for the billets, are arranged, as customary, from the charging-opening at one end of the furnace to or approximately to the discharge-opening at or near the opposite end of the furnace and supported on longitudinal or transverse piers 2, as shown in Fig. 1. In order to prevent contact of the billets with the walls of the pipe, which are approximately of the temperature of the water flowing through them, said pipes are provided with shoes or enlargements extending along the pipes for any desired portion of their length. These shoes or enlargements may be constructed in the form of ribs 3, arranged on top of the pipes and preferably at or near the point at which the billets are to be removed from the furnace. In order to prevent any displacement of the shoes by the movement of the billets, they may be secured in position in any suitable manner—as, for example, by welding them onto the outer surface of the pipe. When arranged at or near the discharge end of the pipes or billet-supports, the forward ends of the shoes are tapered or inclined, as at *a*, so as to gradually merge with the wall of the pipe, thereby permitting the easy movement of the billets onto the shoes, as clearly shown in Figs. 2 and 3.

In lieu of the construction shown in Figs. 2 and 3 the shoes may be made in the form of tubes to be connected to or slipped over the pipes 1. In such case the tubes 3^a are formed with walls of a greater thickness than those of the pipes 1, as shown in Figs. 4, 5, 6, and 7. In the construction shown in Figs. 4 and 5 the tubes 3^a are constructed to form a section of the supports for the billets and are secured to the ends of the tubular casting forming the shoes 3^a in any suitable manner—as, for ex-

ample, by screwing the tubes into the shoes. These shoes, which are preferably rectangular in cross-section, are so arranged, as shown in Figs. 4 and 5, that one corner of the casting will form the support for the billet, or they may be so arranged that one of the sides of the rectangular casting will form such support, as shown in Figs. 6 and 7. The front ends of the shoes may be tapered or inclined, as shown at *a*, for the easy movement of the billet from the pipes onto the shoe, or, as shown in Figs. 6 and 7, the opening through the casting may be formed at an angle to its axis, so that the same effect is produced at its forward end—*i. e.*, the gradual merging of its bearing-surface into the wall of the tube. As shown in Figs. 6 and 7, the opening through the castings may be made slightly larger than the external diameter of the pipe 1, so as to permit of the shoes 3^b being slipped over the pipes.

It will be readily understood by those skilled in the art that by increasing the distance of the billet-bearing surface from the cooling medium the portion of the billet in contact with such bearing-surface can be heated to a proportionally higher degree and that without any material injury to the billet-support.

Our improvement can be applied to an arrangement of plant where the tubes are kept cool or protected from injury by the circulation of water in one direction, as shown in

Figs. 2, 4, and 6, and also to an arrangement where the supply-pipe 4 is arranged within the supporting pipe or rail and the cooling medium is discharged into the latter at its rear end and flows back and is discharged at its front end.

We claim herein as our invention—

1. In combination with the water-cooled pipes forming supports for billets while being moved through a heating-furnace, a metal shoe or auxiliary support fixedly secured only above and longitudinally of each such pipe, and of suitable thickness substantially as described, whereby such shoe or auxiliary support while protected by the cooling action of the water below, as against the destructive action of the furnace heat, will also protect the ingot or billet resting thereon as against the cooling action of the water.

2. A heating-furnace having in combination hollow rails or pipes for the support of billets, &c., means for effecting the circulation of a cooling medium through said pipes or rails and ribs secured on said pipes forming shoes or auxiliary supports for the billets, substantially as set forth.

In testimony whereof we have hereunto set our hands.

ALEXANDER LAUGHLIN.
CADWALLADER EVANS.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.