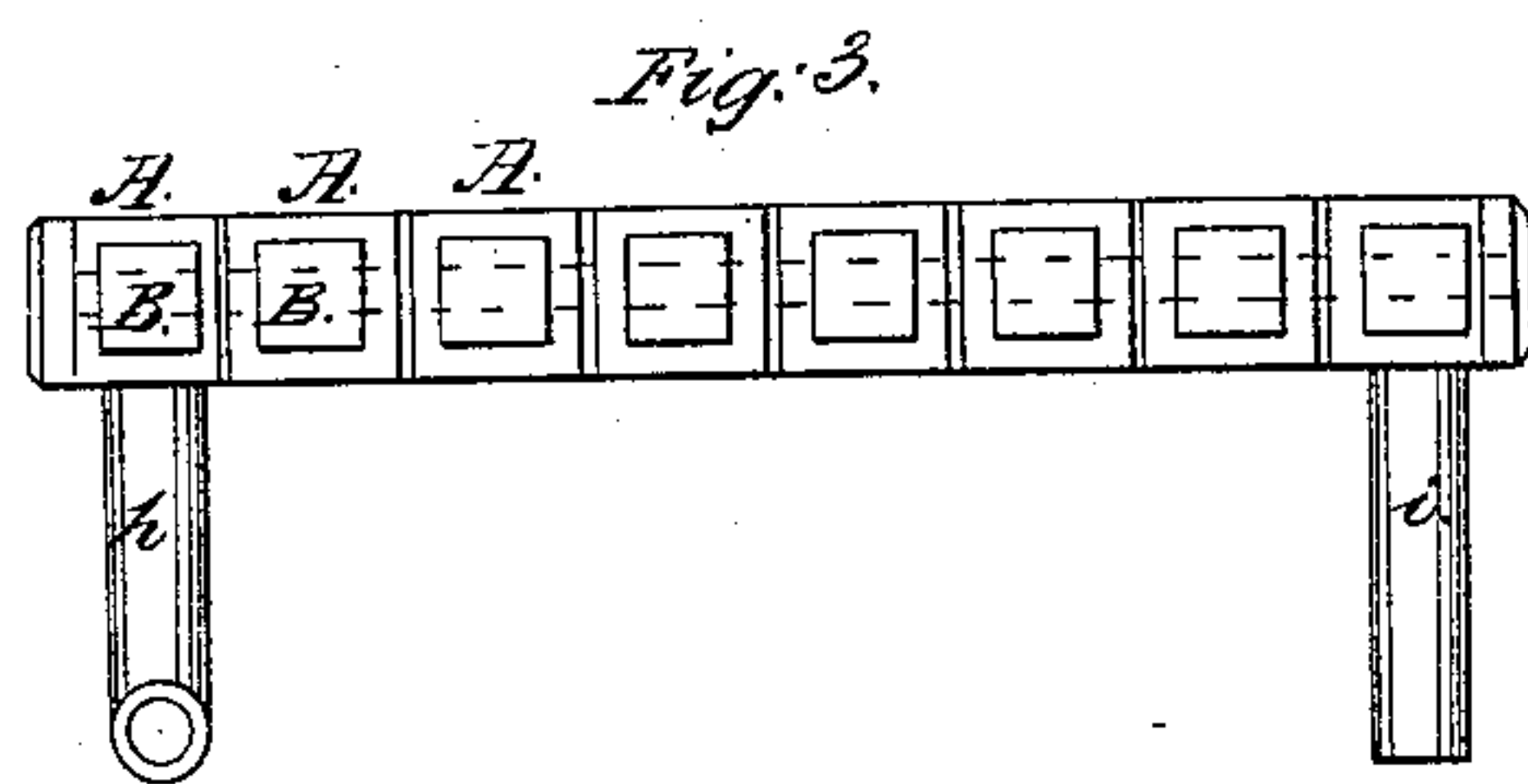
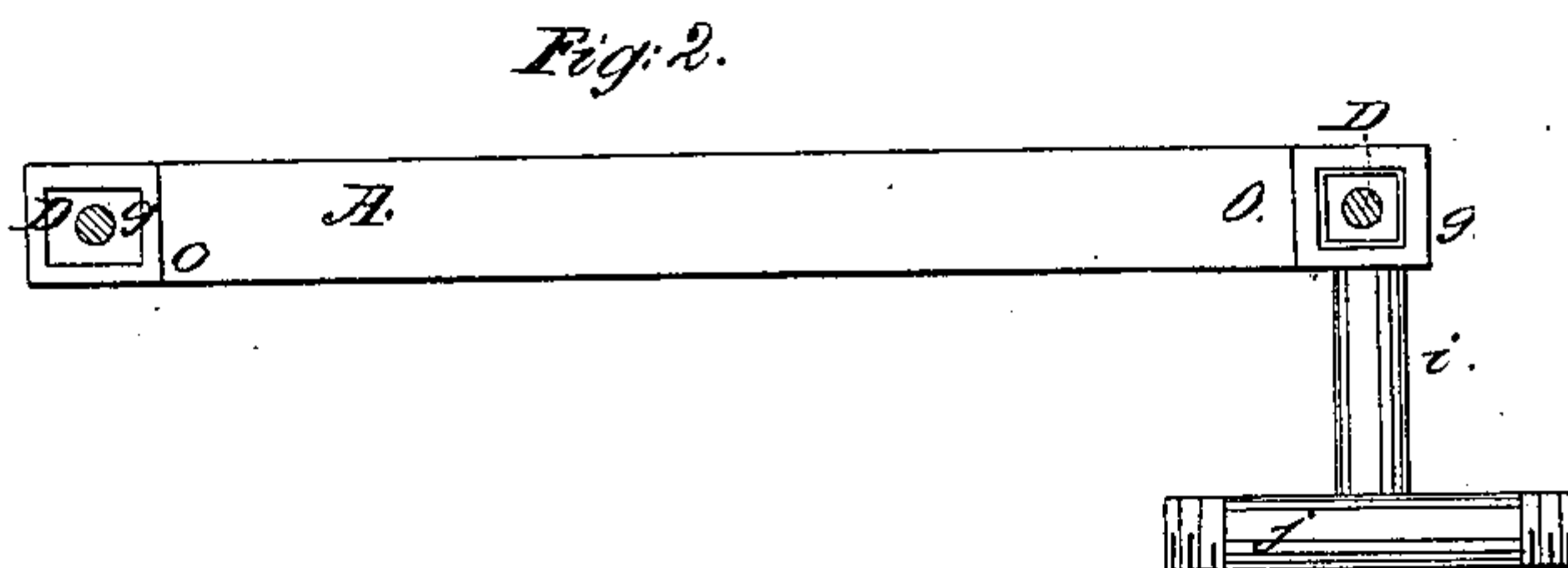
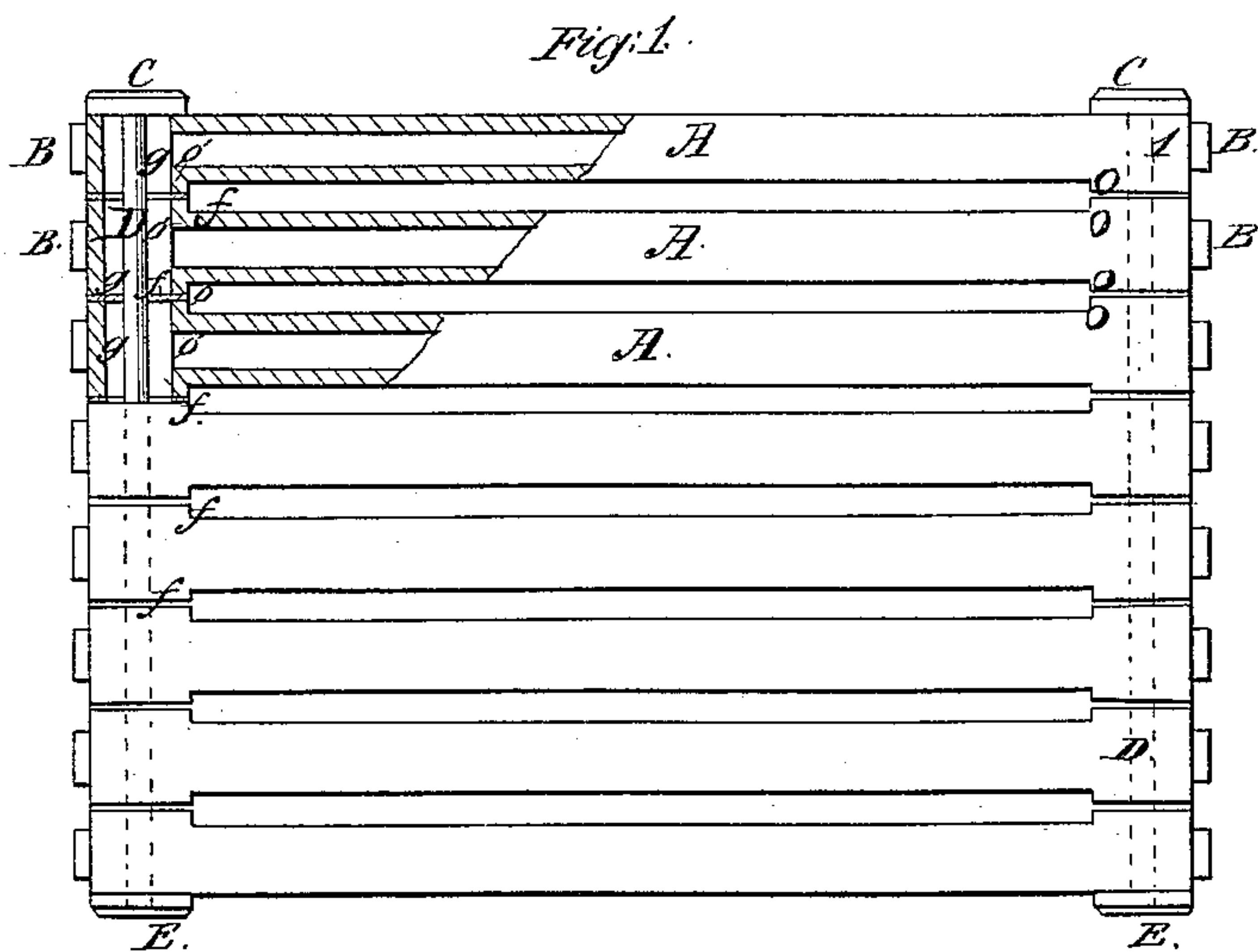


G. S. Merins,
Furnace-Grate Bar.
N^o 52,189. Patented Jan. 23, 1866.



Witnesses:

Wm. A. Livingston
Wm. Brewin

Inventor:

G. S. Merins
per
Mumford & Co.
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UNITED STATES PATENT OFFICE.

G. S. NEVINS, OF BUSHNELL, ILLINOIS.

IMPROVEMENT IN HOLLOW GRATE-BARS FOR FURNACES.

Specification forming part of Letters Patent No. 52,189, dated January 23, 1866.

To all whom it may concern:

Be it known that I, G. S. NEVINS, of Bushnell, in the county of McDonough and State of Illinois, have invented a new and useful Improvement in Grate-Bars; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of a furnace-grate made according to my invention. Fig. 2 is a detailed side view of one of the bars which form the grate, showing also the pipes which connect the grate with a water-tank or other source of supply and with the boiler. Fig. 3 is an end view of the grate.

The object of this invention is to construct furnace-grates for steam-boilers so that the several bars will be preserved from being burned and warped by heat of the fire and at the same time the feed-water for the boiler be made warm; and it consists in a peculiar and novel method of constructing hollow grate-bars for that purpose.

The letters A designate hollow grate-bars, eight of them being in this example laid side by side, so as to form surface enough for a grate. Their ends are cast hollow, as indicated by the letter *g*, so that when they are laid together their ends form a tube which crosses the ends of the tubes made through the bars lengthwise. The bars have each flanges O on their sides at their ends, which surround the openings *g* through their ends, and which flanges serve to separate the several bars laterally one from the other to form the necessary interspaces for the supply of air to the fire. When the bars are in place these flanges touch each other edge to edge, as seen in Fig. 1. Each joint made by these flanges is provided with a gasket, *f*, preferably of copper. Each alternate gasket is a solid plate, except that it is perforated to receive the binding-rod D, and serves to separate adjacent hollow spaces *g* in the ends of the bars from each other. The other gaskets are open, being made in shape and size to be counterparts of the continuous flanges O aforesaid, so that the hollow spaces *g* in the ends of the bars

which they are applied to are not separated, but are allowed to communicate with each other, as shown in Fig. 1. Each end of the grate is constructed in this manner.

The several bars that form a grate are connected by rods D, one for each end, which extend from one side to the other through all the hollow spaces *g* and through those gaskets *f* which separate some of the spaces. The rod has a head, C, which closes the space *g* of the outside bar on one side, and its end, which protrudes on the opposite side of the grate, is secured by a nut, E, screwed onto it. The joints made by the head C and nut E are to be properly packed, so as to be steam-tight. The extremities of the bars are made open and are closed by screw-plugs B, so that sediment can be removed from the bars whenever it is desired so to do.

The bars are supplied with water through a supply-pipe, *h*, which leads from the bottom of any suitable reservoir, (not shown) and after running through all the bars is led to the boiler through pipes *i* and *j*. A force-pump may be connected with one end of pipe *j* to force the water into the boiler, and the other end of pipe *j* is connected to the top of the same reservoir from which pipe *h* is supplied. It is evident that the water, which will fill the bar while the reservoir is kept supplied, will keep the bars cool and prevent cinders from welding to and warping and burning up the bars, and that such water will be thoroughly heated before reaching the boiler. It will be observed, also, that by this method of construction the bars are allowed to expand and contract without breaking their joints. The course of the water, if the supply-pipe *h* is connected with that bar and corner of the grate marked with the numeral 1, will be first through the length of that bar to the space *g* at its left-hand end, (observing Fig. 1,) thence into the space *g* of the next bar and through its length to its end, where it will pass into the third bar, and so on through the whole congeries, the water being permitted to flow freely and to fill all the bars, and thereby prevent the collection of steam in the ends of the bars and obviating the difficulty of their blowing empty when the steam escapes into the reservoir. The feed-pipe *j* is conducted from one of its

ends to the top of the reservoir, so that the hot water and steam which do not pass into the boiler are allowed to run into the reservoir, whereby back pressure on the water in the supply-pipe *h* is avoided, and the bars are not allowed to become filled with steam.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In furnace and other grates, securing the ends of their bars together by means of rods passing through hollow spaces made through said bars, so as to allow the bars to expand and contract without breaking their joints, substantially as shown.

2. In tubular grates, placing a copper gas-

ket between adjacent bars, each alternate gasket fitting close about the rod which connects the bars to each other, so as to form a continuous water-course, substantially as shown.

3. Connecting the discharging-pipe *i* of the grate with the top of the water-reservoir, from which the hollow bars of the grate are supplied with water, so that steam and hot water may pass over into the reservoir without obstruction, preventing the bars from becoming filled with steam and being blown empty, substantially as set forth.

G. S. NEVINS.

Witnesses:

ROBERT S. RANDALL,
J. T. SANDERS.