

W. T. BATE.
GRATE-BAR.

No. 178,710

Patented June 13, 1876.

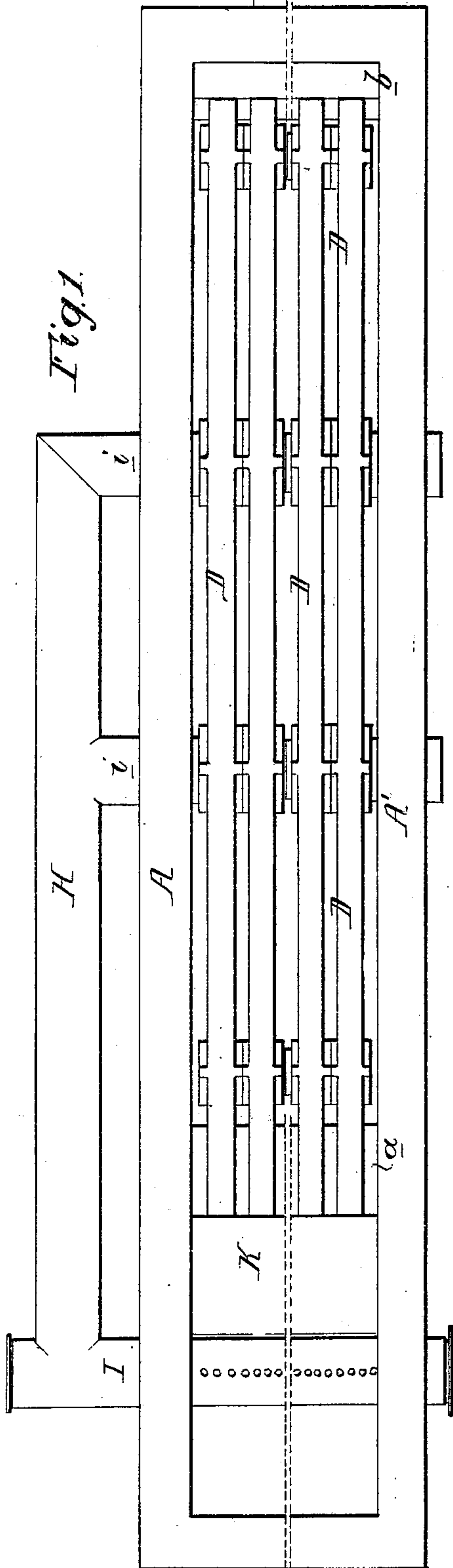


Fig. 1.

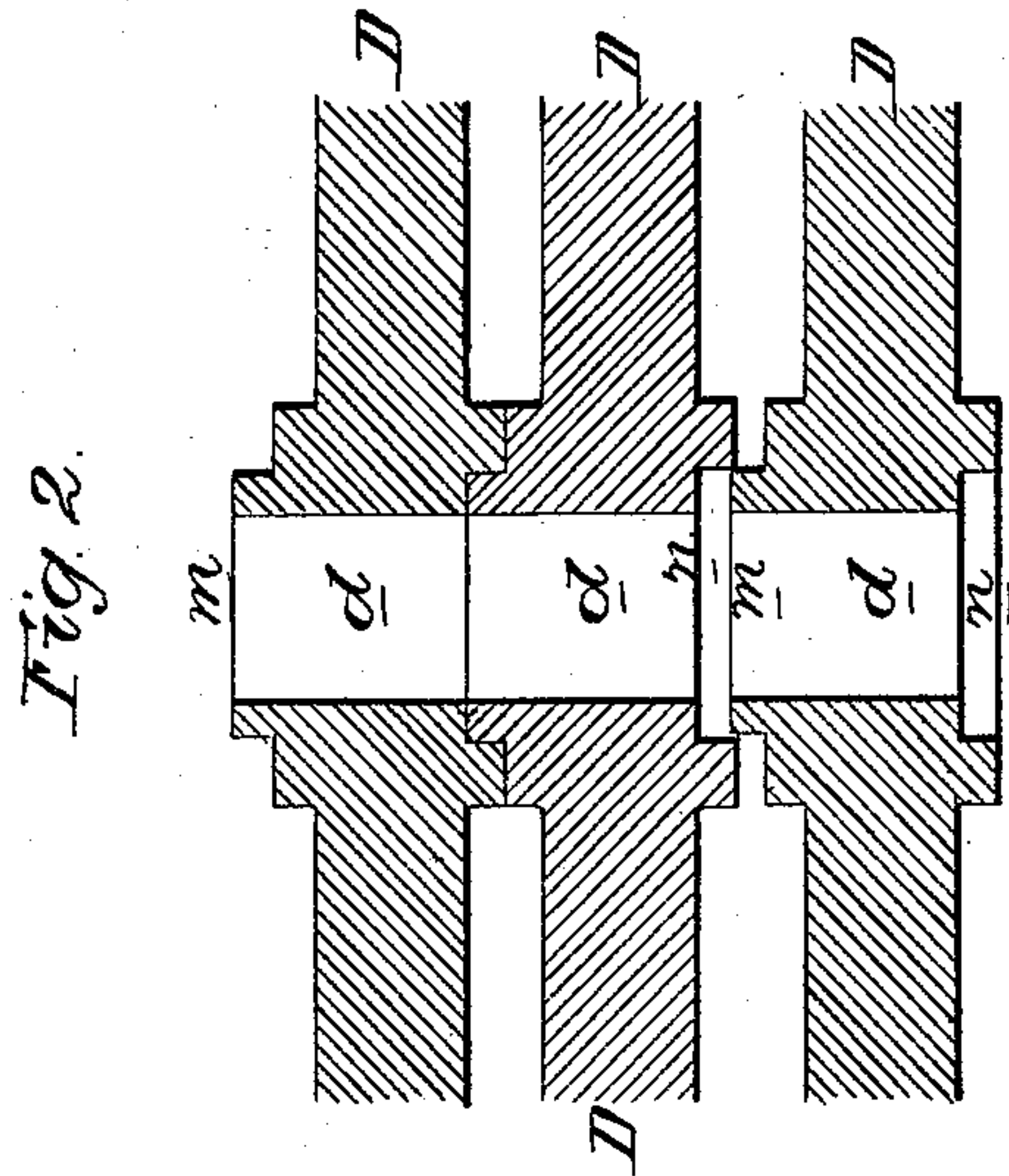


Fig. 2.

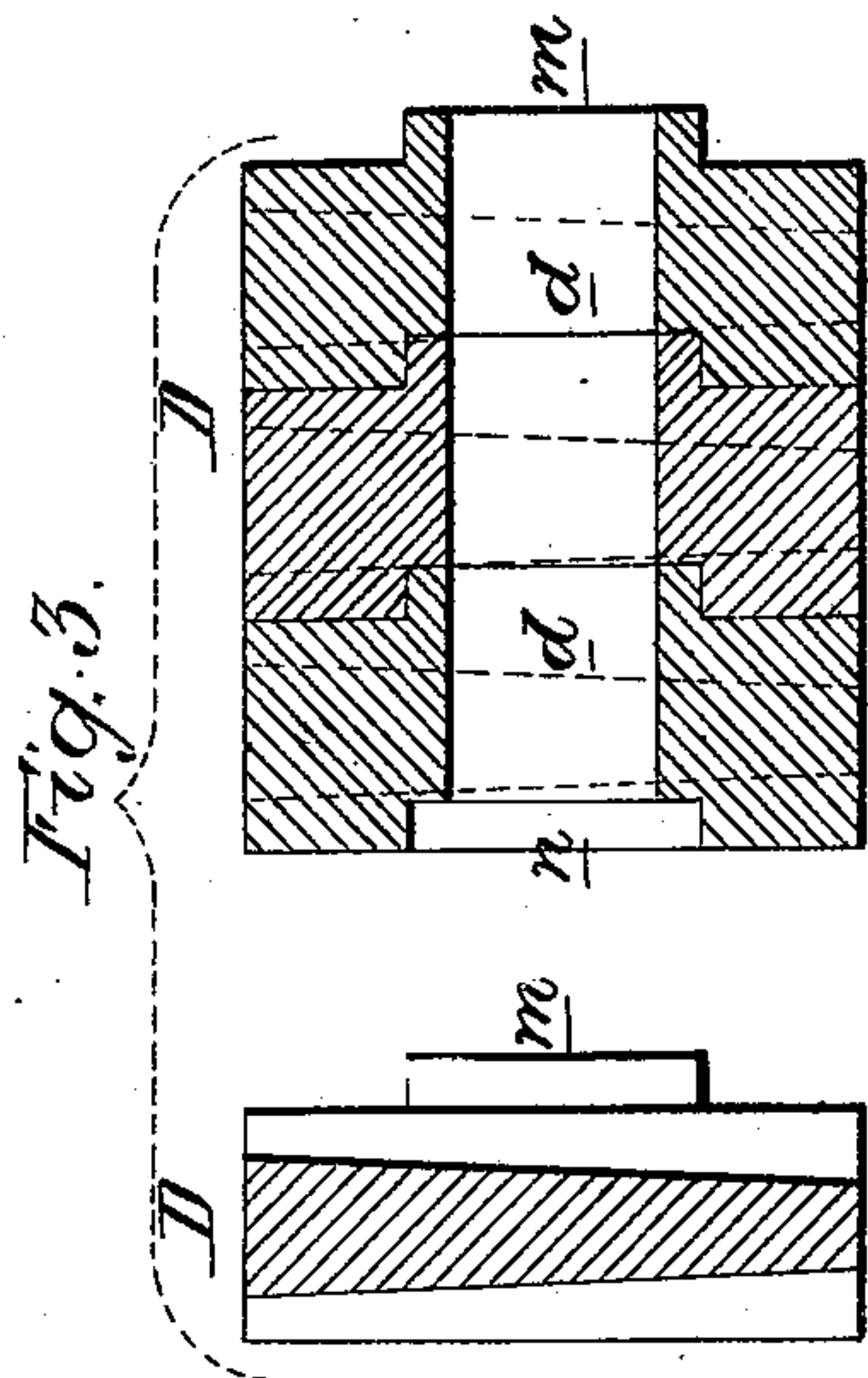


Fig. 3.

Witnesses, *Henry Smith*
John K. Rupert

William T. Bate
by his attorneys
Strom and Orr

UNITED STATES PATENT OFFICE.

WILLIAM T. BATE, OF NORRISTOWN, PENNSYLVANIA.

IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. 178,710, dated June 13, 1876; application filed November 6, 1875.

To all whom it may concern:

Be it known that I, WILLIAM T. BATE, of Norristown, Montgomery county, Pennsylvania, have invented certain Improvements in Grate-Bars, of which the following is a specification:

The objects of my invention are to maintain the grate-bars of a furnace in a comparatively cool condition, and to make them the mediums for heating air prior to its discharge in jets amidst the products of combustion as they pass from the furnace.

These objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a plan view of a furnace for heating a steam-boiler, or for other purposes; Fig. 2, a sectional plan of the grate-bars, drawn to an enlarged scale; and Fig. 3, a vertical section of the bars.

A and A' are the opposite side walls of the furnace; B, the front wall; K, the bridge; and D, the grate-bars, the opposite ends of which rest on suitable bearing-plates built in the walls of the furnace.

The grate-bars D are, preferably, fitted together in the manner best observed in the sectional views, Figs. 2 and 3. In each bar there are transverse openings *d*—four, in the present instance—and on one side of each bar there are as many annular projections, *m*, one projection at each opening. On the opposite side of each bar there is a recess, *n*, of similar shape at each opening *d*, for receiving one of the projections on the adjoining bar. In the present instance, there are but four channels through the bars, but there may be as many more channels as the length of the bars may suggest.

I arrange on the outside of the furnace a

pipe, H, communicating through branches *i i* with one, two, or more of the transverse channels presented by the openings *d* of the bars, and also communicating with the flue at the rear of the fire-place, so that the draft will induce constant currents of cold air to pass from the tubes *h* into and through the said channels of the bars. This air, before it escapes from the channels, must necessarily become heated, and I sometimes avail myself of this heated air to ignite the unconsumed gases as they pass from the furnace into the flues.

In the drawing, for instance, the pipe H communicates with a pipe, I, passing through the opposite side walls of the furnace at the rear of the bridge-wall K, the said pipe I having a number of perforations through which the air, heated by passing through the bars, is projected in jets amidst the products of combustion as they pass the bridge-wall, thereby igniting the unconsumed gases before they pass into the flues of the boiler.

I claim as my invention—

1. A group of the within-described bars, with transverse channel or channels, in combination with a pipe, H, forming a communication between the said channels and the flue or chimney of the furnace.

2. The combination of the transverse channels in the group of bars, the pipe H, and perforated pipe I, situated at or near the bridge-wall K, as and for the purpose described.

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

WILLIAM T. BATE.

Witnesses:

HARRY HOWSON, Jr.

HARRY SMITH.