

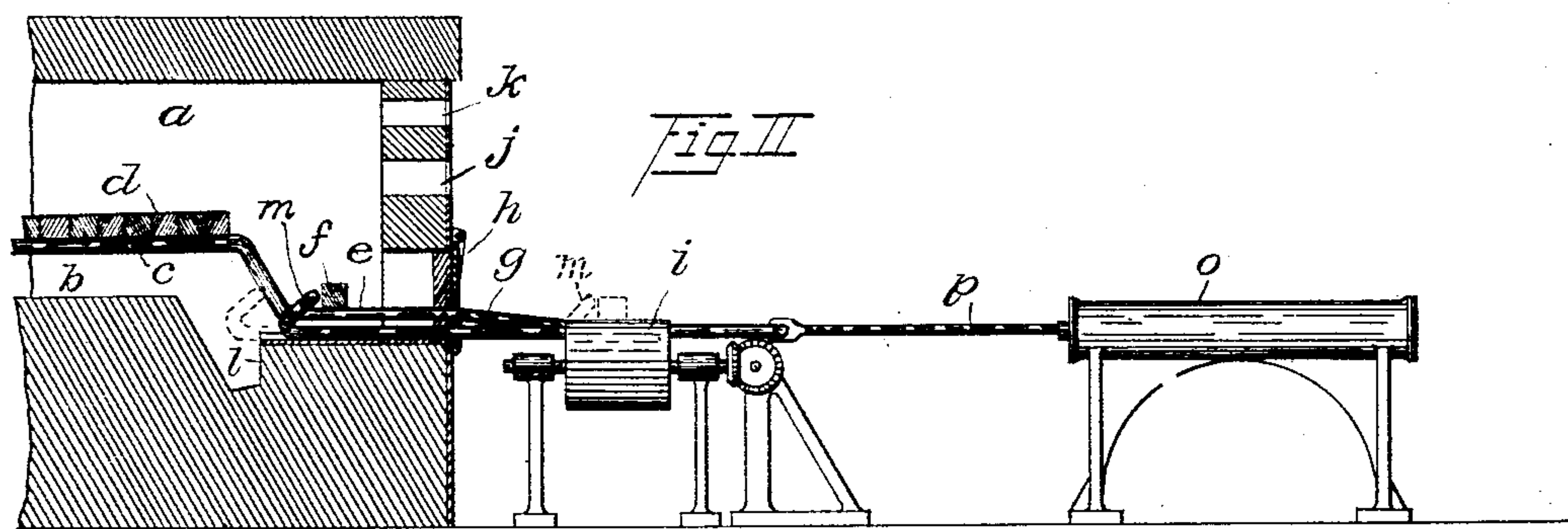
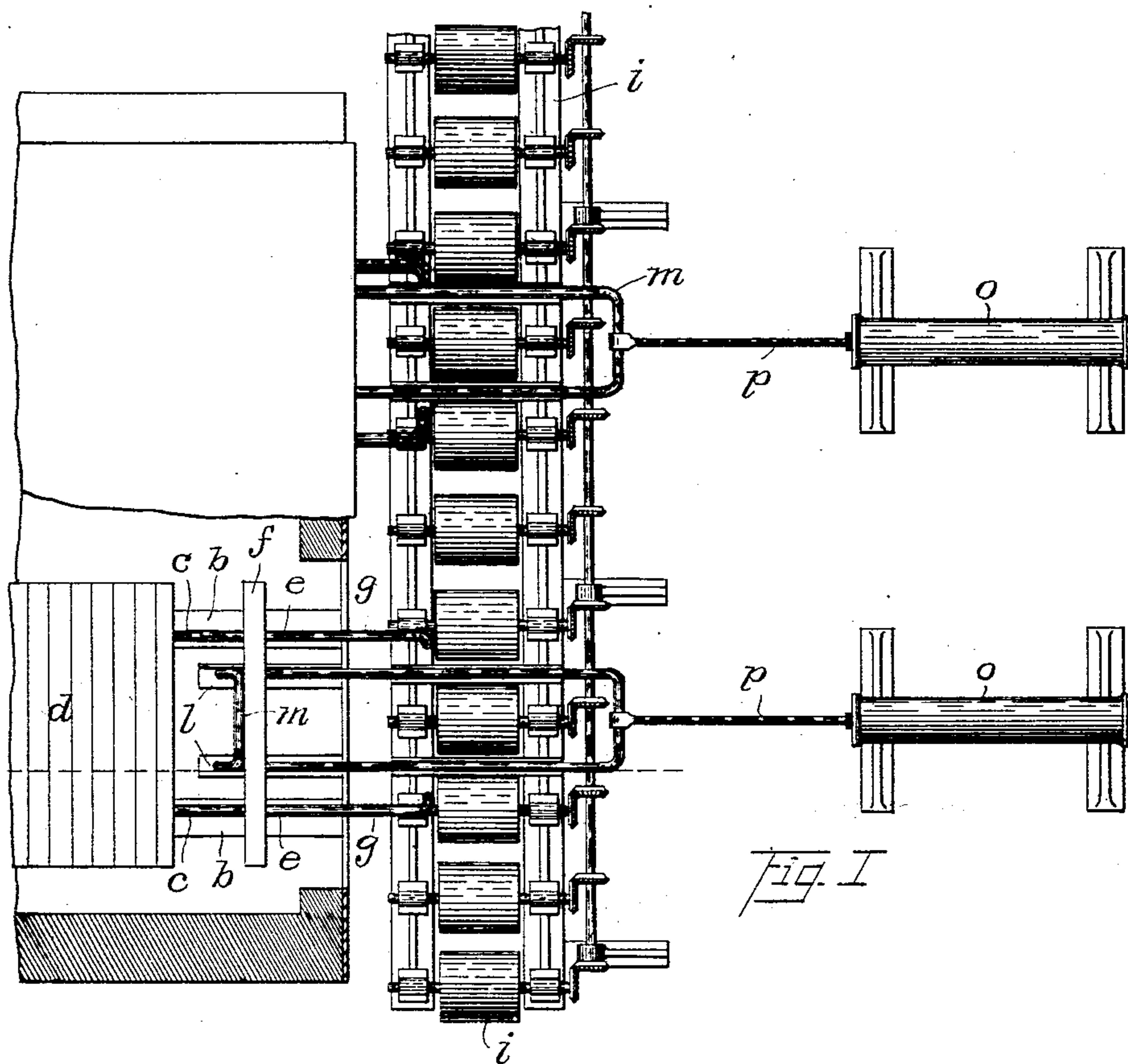
No. 751,720.

PATENTED FEB. 9, 1904.

C. I. DAILEY.  
DISCHARGING DEVICE FOR FURNACES.

APPLICATION FILED FEB. 10, 1902.

NO MODEL.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

CHARLES I. DAILEY, OF CLEVELAND, OHIO.

## DISCHARGING DEVICE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 751,720, dated February 9, 1904.

Application filed February 10, 1902. Serial No. 93,342. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES I. DAILEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Discharging Devices for Furnaces, of which the following is a specification.

This invention relates to heating-furnaces, and especially to what are known as "continuous-heating" furnaces, wherein articles to be heated—such as billets, ingots, blooms, or bars of metal or other material—are inserted into the cooler charging end of the furnace and forced with a broadside movement in continuous rows toward the hotter delivery end.

The object of my invention is to provide improved means for discharging said heated billets or other articles from the furnace singly or in groups expeditiously, so as to prevent radiation of heat both from the said billets and from the furnace, also to provide such discharging means as may be employed in connection with a separating-hearth within and a conveyer without the furnace and to reduce the manual labor heretofore required in the efficient operation of such furnaces.

In my application for patent on improved heating-furnaces filed herewith a swinging ejector is shown and described operating in connection with an inclined plane; but the discharging device herein disclosed does not require such inclined plane, and is therefore more positive in its action, besides being better adapted to furnaces having a low bed.

In the accompanying drawings, forming a part of this specification, I have illustrated the invention as applied to a continuous-heating furnace for steel billets, in which—

Figure I is a plan view showing the delivery end of a furnace having the roof of one side broken away; and Fig. II is a side elevation, the furnace being shown in section on line II II of Fig. I.

The delivery end only of the furnace is shown in the drawings, the opposite or charging end being of the well-known or any suitable construction. In the practice of the invention the side walls, roof, and bed of the

furnace inclosing a heating-chamber (indicated by the reference-letter *a*) may also be constructed in any of the usual designs found suitable to the purpose, and the invention is applicable to furnaces designed to carry either a single row or a plurality of rows of billets.

Resting upon suitable supporting-piers *b b*, elevated somewhat above the floor of the heating-chamber of the furnace, is a longitudinal track *c c*, upon which the row of billets *d* is supported and pushed along in the direction indicated by the arrows by any of the well-known means—such, for example, as a hydraulic cylinder and pushing-plate (not shown) located opposite to the entrance-door of the furnace. The ways *c c* of the said track are preferably constructed of metal tubes, through which a circulation of cooling fluid may be maintained in order to protect them from the intense heat. Parallel offsets are made in the ways *c c*, forming a separating-hearth, so that one or more billets, as *f*, may become separated from the advancing row by gravity and slide down upon the level sections *e* of said ways, as plainly shown in Fig. II. From the separating-hearth *e* the said ways are continued horizontally out through the discharge-door *h* of the furnace to a conveyer *i*, thus forming a discharging-section *g*.

In the furnace shown herein gas is supplied through the ports at *j* and air through the openings *k*; but the fuel used, whether gas, oil, or coal, depends upon the local supply and economical conditions, so that the design and proportion of the furnace must necessarily vary in different installations. However, in all such furnaces the fuel is burned at the delivery end and the products of combustion carried out of the heating-chamber at or near the charging end, and therefore the hottest portion of said chamber is near the delivery end and in the region of the separating-hearth *e*.

Supported and guided upon suitable beds *l* in the floor of the furnace and also upon the conveyer *i* is a sliding extractor *m*, consisting of an approximately rectangular frame having its furnace end bent upward in the form of a hook. Said extractor *m* is preferably constructed of heavy pipe bent to the proper shape or cast hollow of metal, so that cooling liquid



may be circulated through it to protect it from the heat of the furnace. The reciprocation of the extractor may be accomplished by any suitable means, such as a cylinder *o* and piston and rod *p*, as shown, which is the operative means preferred for discharging heavy billets, &c. In the drawings the extractor is shown at a point in its outward travel having encountered a billet *f* lying upon the hearth *e*; but in its normal or inner position of rest it is extended into the furnace until its hooked end lies beyond the hearth *e* and its position at the outer end of its stroke is at the conveyer *i*, as indicated by the dotted lines in Fig. II.

In the operation of the apparatus the articles to be heated, such as billets *d*, are inserted and pushed along from the cooler charging end toward the hotter discharging end of the furnace, gradually absorbing heat as they advance until one or more billets fall upon the separating-hearth *e*, where said billet may remain any desired length of time, becoming uniformly heated throughout. Meanwhile the extractor rests at the inner end of its stroke; but when it is reciprocated outward its hooked end engages the billet or billets lying upon the hearth *e* and draws said billet out over the discharging-section *g* through the discharge-door of the furnace and onto the conveyer *i*, which carries the billet off to receive further treatment, while the extractor is returned into the furnace to its normal position. Thus is the billet quickly discharged at the will of the operator and the manual labor required greatly reduced.

Having described the operation and preferred construction of my invention as above, what I claim as new, and desire to secure by Letters Patent, is—

1. In a heating-furnace, the combination with a heating-chamber and means for inserting and advancing a row of billets or other articles to be heated upon a suitable track therein, of an offset in said track forming a hearth located in the hotter end of the heating-chamber for separating by gravity and holding one or more of said billets from said row, and a sliding extractor provided with a hook-shaped end adapted to draw said separated billet or billets sidewise from said hearth and discharge the same from the furnace, substantially as set forth.

2. In a heating-furnace, the combination with a heating-chamber and means for inserting and advancing a row of billets or other articles to be heated upon a suitable track therein, of an offset in said track forming a hearth located in the hotter end of the heating-chamber for separating by gravity and holding one or more of the said billets from said row, a horizontal extension of said track passing from said hearth through the discharge-door of the furnace, and a sliding extractor comprising a frame provided with a hook-shaped end resting normally between the ways of said track under the advancing end of said row of billets and adapted to draw billets from said hearth, suitable supports and guides for said frame, and means for sliding said frame into and out of the furnace, substantially as set forth.

In testimony whereof I affix my signature, in the presence of two subscribing witnesses, at New Haven, Connecticut, February 6, 1902.

CHARLES I. DAILEY.

Witnesses:

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WM. A. WRIGHT.