

(No Model.)

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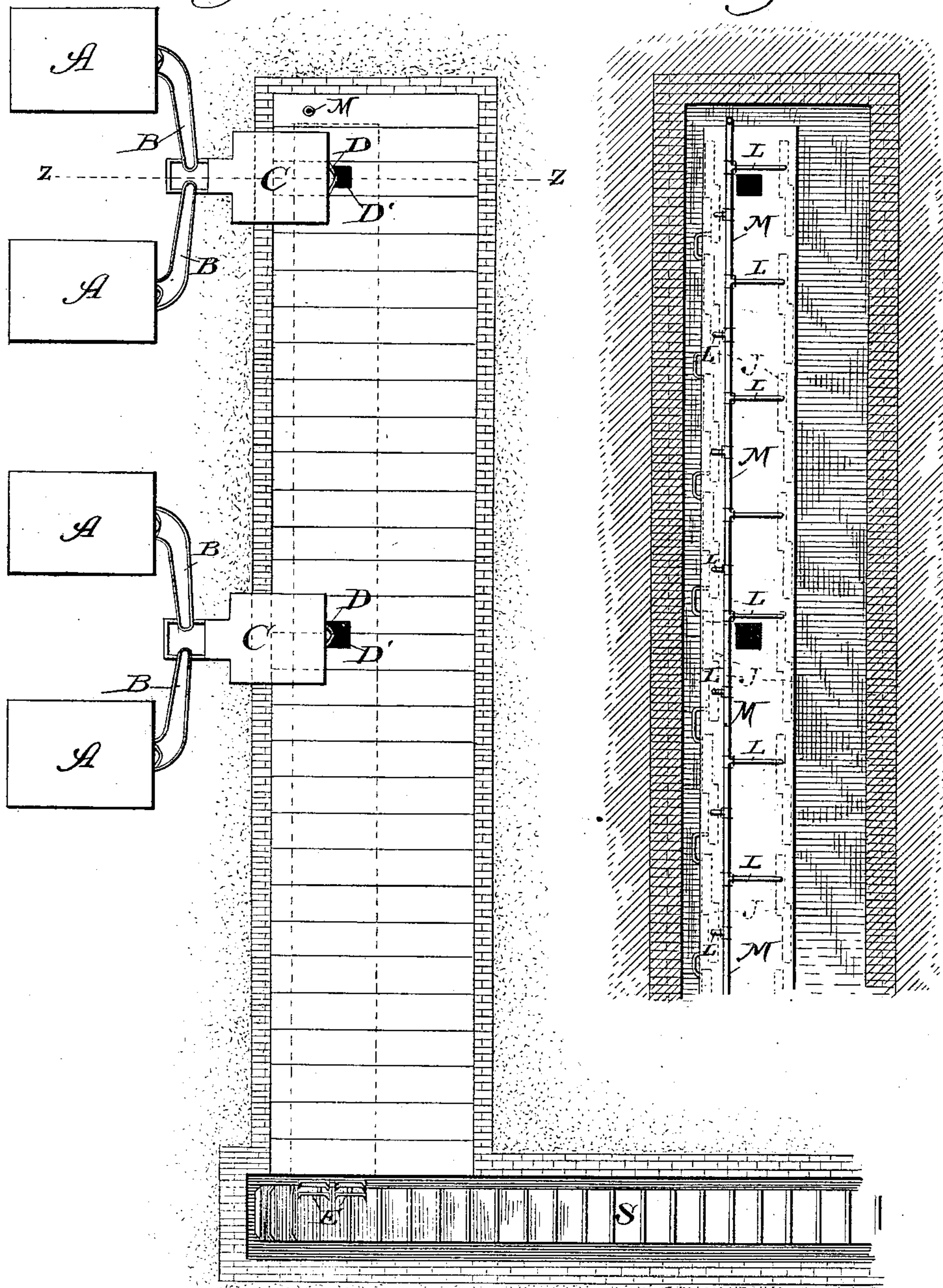
O. B. PECK.
SLAG FURNACE.

No. 379,720.

Patented Mar. 20, 1888.

Fig. 1.

Fig. 2.



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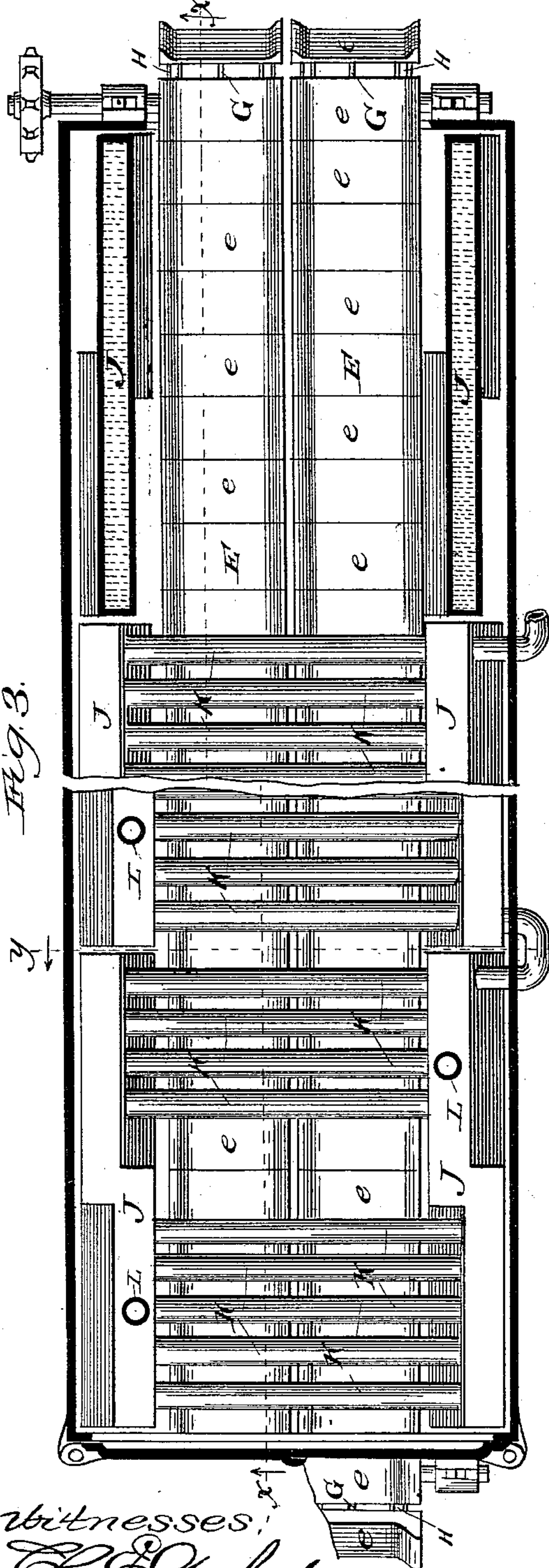
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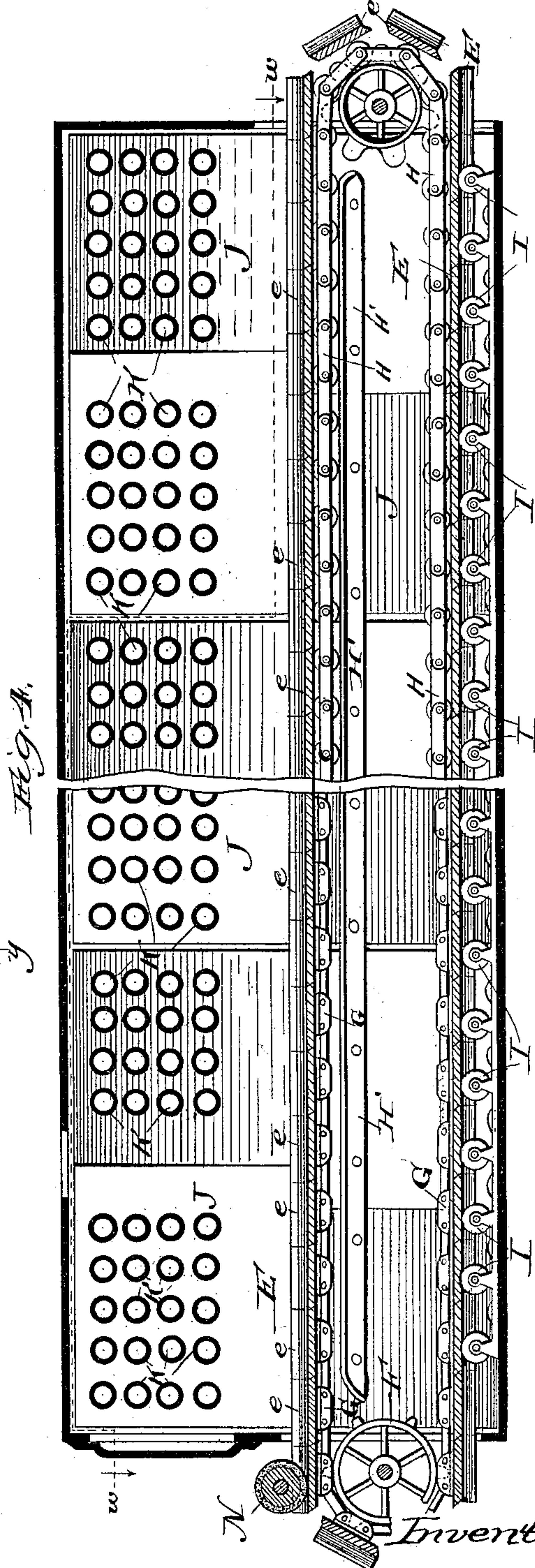
O. B. PECK.
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No. 379,720.

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3 Sheets—Sheet 3.

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Fig. 5.

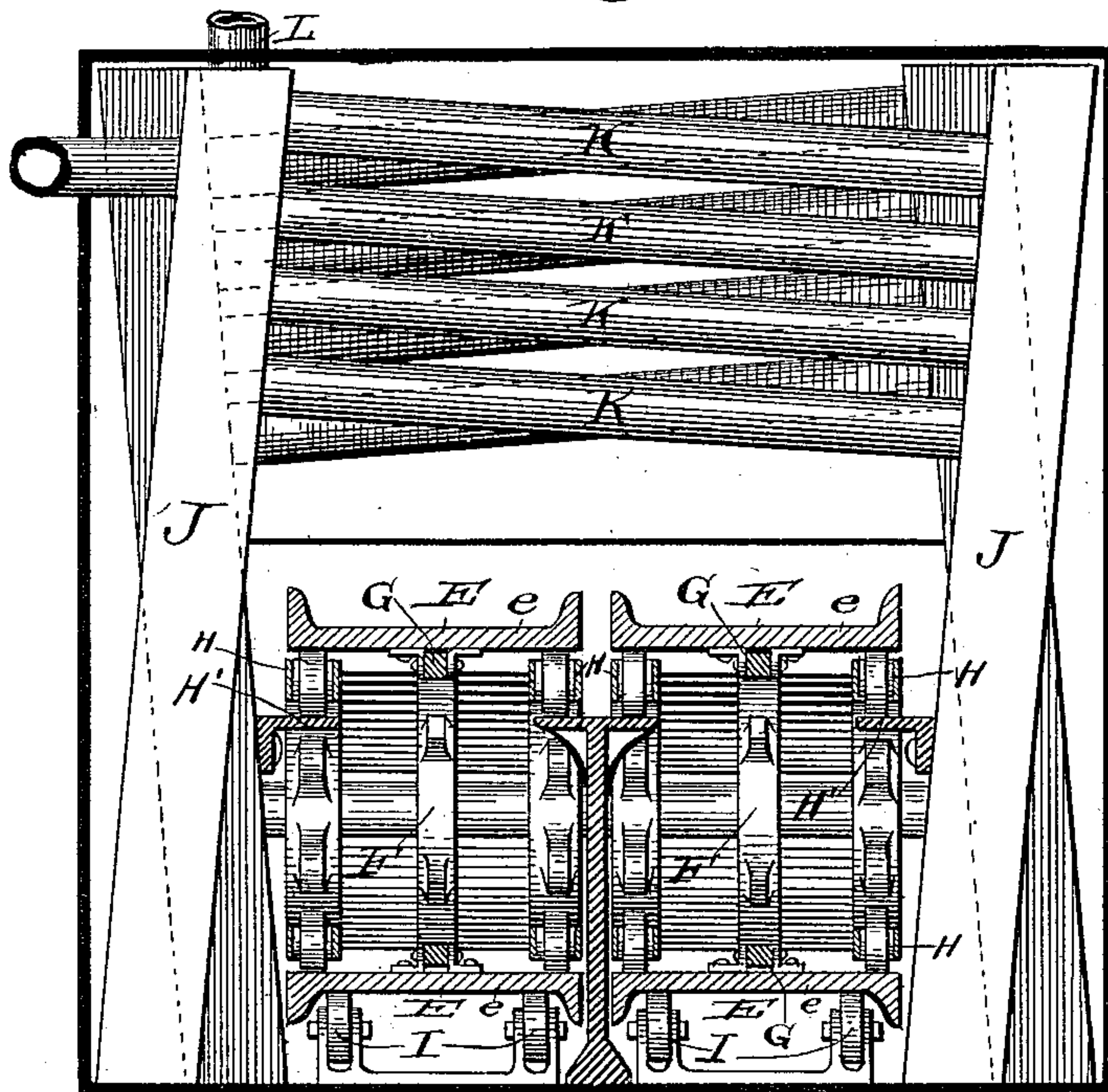


Fig. 7.

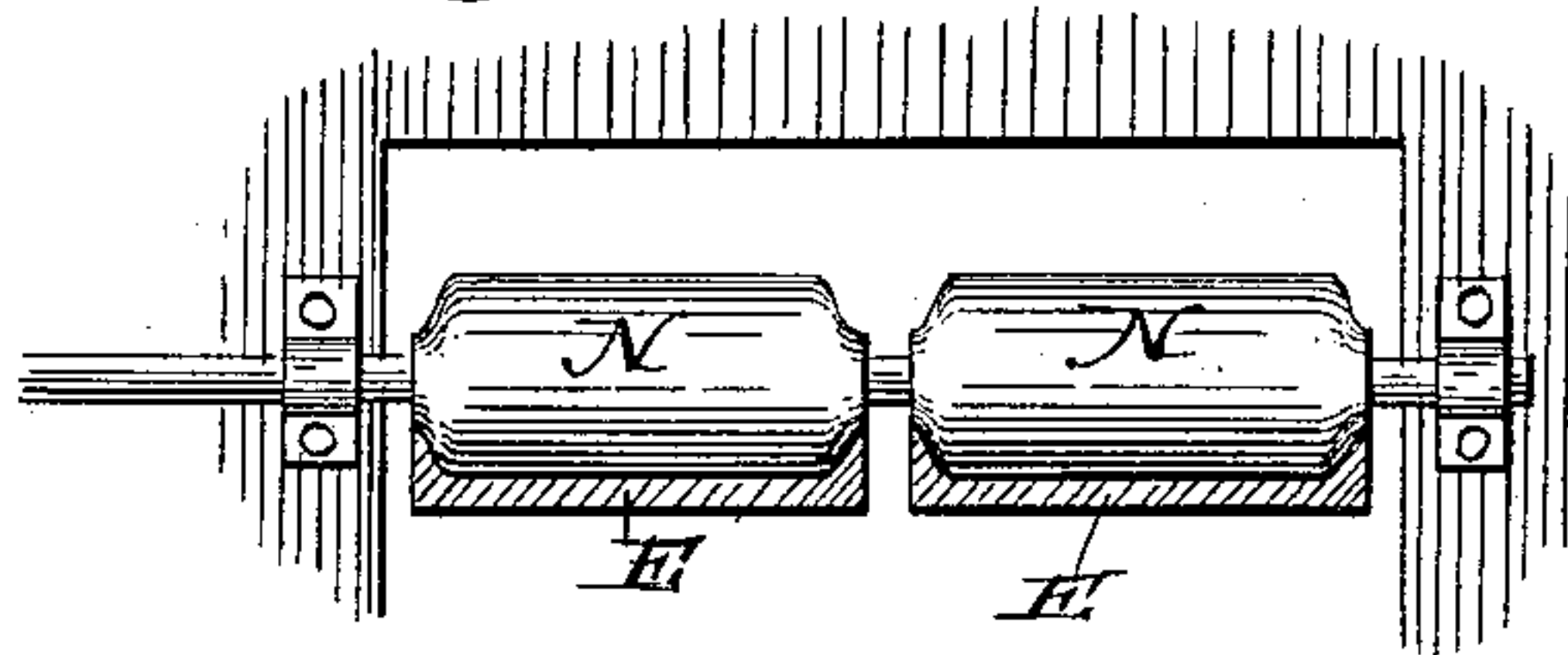
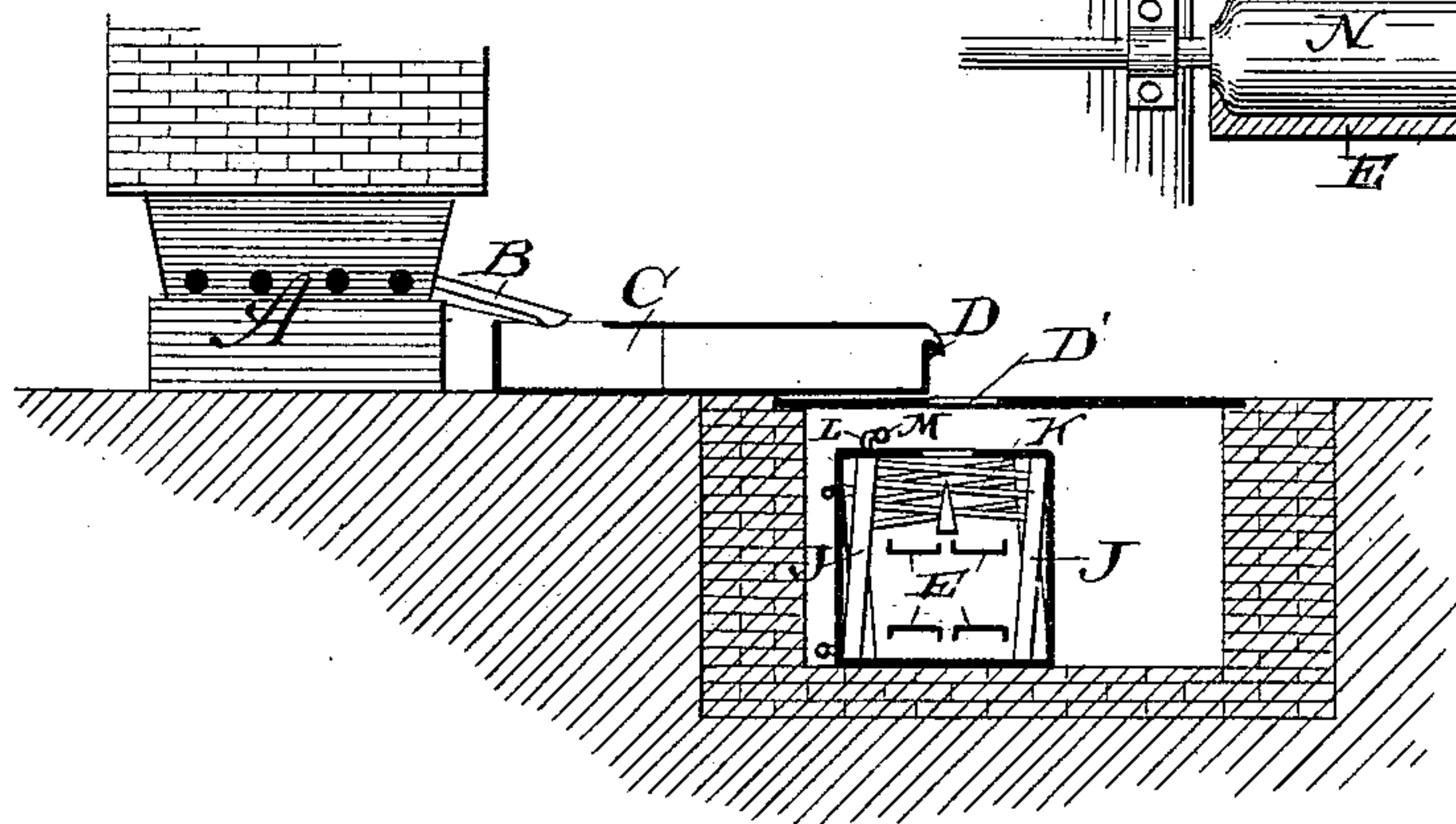


Fig. 6.



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UNITED STATES PATENT OFFICE.

ORRIN B. PECK, OF CHICAGO, ILLINOIS.

SLAG-FURNACE.

SPECIFICATION forming part of Letters Patent No. 379,720, dated March 20, 1888.

Application filed December 6, 1887. Serial No. 257,071. (No model.)

To all whom it may concern:

Be it known that I, ORRIN B. PECK, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful
5 Improvements in Slag-Furnaces, of which the following is a specification.

The object of my invention is to make a furnace in which the heated or molten slag and other material, which is usually allowed to
10 cool about smelting-furnaces without being utilized, may be employed in the generation of steam, and to provide more convenient and economical means for the transportation of such
15 the smelting-furnace to the place of final deposit; and my invention consists in the features and details of construction hereinafter described and claimed.

In my present improvements I have endeavored to make a furnace in which the slag or other material may preferably deliver itself from the smelting-furnace or place where it is heated into the slag-furnace or upon a covered
20 slag-carrier, so that the trouble and expense of intermediate handling or manipulation may
25 be avoided and the best results obtained.

In the drawings, Figure 1 is a top view of my improved slag-furnace, showing particularly the location of the smelting-furnaces and the slag-furnace, the latter being underground and covered up, except a portion at one end.
30 Fig. 2 is a top view of a portion of the slag-furnace with the covering removed. Fig. 3 is a top view of the slag-furnace, and showing the tubular boiler in which water is heated and converted into steam, taken in the line *ww* of Fig. 4.
35 Fig. 4 is a longitudinal vertical section taken in the line *xx* of Fig. 3, with all the boiler-pipes in place. Fig. 5 is an end elevation of the slag-furnace, and showing the steam-generating boiler, taken in the line *yy* of Fig. 3,
40 looking in the direction of the arrows. Fig. 6 is a transverse vertical section taken in the line *zz* of Fig. 1, and Fig. 7 is an end view of the mud roller or mop shown at the left hand of Fig. 4.
45

In the drawings, A A are the locations of smelting-furnaces; B B, troughs by which the slag is carried off; C C, receivers into which the slag is carried; D, a spout or conduit in the receiver, through which the slag flows into the slag-furnace; D', a hole in the cover to admit the slag; E, a traveling slag carrier or
50

apron on which the slag falls from the smelting or slag-producing furnace; F, a sprocket-wheel by which the traveling carrier or apron
55 is carried forward; G, a sprocket-chain; H, a roller-chain on which the movable apron moves as it is carried forward by the sprocket-chain; I I, stationary rollers beneath the sprocket-wheel, on which the traveling apron moves
60 along the under side; J J, the hollow heads of the boiler; K K, the tubes of the boiler, in which the water is heated and converted into steam; L L, the pipes from the hollow heads of the boiler, which carry steam into a common
65 pipe, whence it is conveyed to the cylinder or place of use; M, this common pipe; N, the mud roller or mop, and O a bridge or cover over the boiler and carrier supported independently of them.
70

In making my improved slag furnace and carrier I prefer to locate it beneath the surface of the ground, or under an independently-supported covering or bridge, so that the heated or molten slag from smelting-furnaces may be
75 carried to it either directly or from the receiver, placed between the smelting-furnace and the slag-furnace, and so that it will not afford an obstruction to the surface operations around the base of the smelting-furnace. This
80 trench or excavation should of course be located with reference to the location of the smelting-furnaces.

In Fig. 1 I have shown the location of several smelting-furnaces with my slag-furnace
85 located alongside of the same. I preferably dig a trench of sufficient depth and size to contain the parts, with room to admit of access to the same, and wall it up in any suitable manner. In Fig. 6 I have shown this trench
90 considerably wider than the slag-furnace located therein.

I arrange within the trench or under the bridge O a slag-carrying device, preferably an apron-carrier, E, which is particularly
95 shown in Figs. 3 and 4, and is composed of a series of plates or slats, *e*, made of cast-iron or other suitable material, connected by the link *c*, and resting at its upper or slag-carrying side on the rollers H, supported by the rails H', and
100 at its lower side resting on the rollers I, the whole being supported by a suitable framework or structure which has one or more suitable sprocket-wheels, F F, mounted upon suit-

able journaled shafts at its ends, around which I pass the apron E, thus making a carrying-surface capable of receiving and carrying forward heated or molten slags, and which is adapted to be moved forward and around by the rotation of the shafts and sprocket-wheels E E, the rotation of which may be effected by any convenient motive power. I then arrange a suitable boiler, preferably of a tubular design, as shown especially in Figs. 3, 4, and 5, above the carrier or apron, supported in any convenient way, and provide it with an exterior covering, so that the heat of the slags on the carrier that is radiated up to the boiler will be confined by the covering, and thus be used in heating the water and generating steam in the boiler.

I preferably cover the conveyer and boiler, or entire slag-furnace, with a bridge or covering O, supported independently of the slag-carrying device, and fixed or stationary in relation to them; and while I have especially described and shown a traveling slag-carrying device as an apron, I do not wish to confine myself to this particular design, as I may employ various mechanically-arranged devices having traveling slag-carrying surfaces. It is apparent that any pan or vessel capable of holding hot or molten slags may be passed or caused to travel under or through the heating-chamber of the boiler, and for this reason I wish to cover, broadly, all devices capable of carrying slag in this manner.

As the heated or molten slag from the smelting-furnace flows off, it will fall into the receivers C, where receivers are employed, which will permit the metal that it may contain to sink to the bottom, while the slag will flow out the spout or conduit D and pour down by its own weight through the hole D' in the cover of the slag-furnace onto the traveling apron or other carrying device E. As it flows onto this carrier it will be carried forward by the constant moving forward of the carrying device, so that it will pass beneath the water-pipes of the steam-generating boiler. As it passes on beneath these pipes of the boiler it will radiate its heat, so as to convert the water into steam, and as it reaches the end of the carrier or apron it will be dumped or discharged from it as the sections e pass down around the end of the sprocket-wheel at the farther end of the slag-furnace. To carry off the slag as it is thus discharged, I have arranged a supplemental traveling carrier or apron, S. (Shown in Fig. 1.) This carrier may be constructed and operated in all material respects like the one above described, or in any other convenient manner. As the slag is dumped upon it, it is carried forward, and, if desired, upward, so as to be delivered at the surface of the ground in any proper receptacle to receive it and convey it away, or delivered at any other place of deposit; or, if desired, this supplemental carrying-apron may be dispensed with and cars or other receptacles run in beneath the end of the furnace in proper po-

sition to receive the slag as it is discharged from the traveling carrier or apron E; or this carrier E may be extended to other desired place of deposit for the slags, or, when other designs are supplemented for the one herein particularly described that will admit of it, they may be used to serve the purpose of both the carriers E and S.

If desired, the receivers C may be dispensed with and the slag and other material discharged directly from the smelting-furnace upon the traveling carrier or apron E of the slag-furnace, though I prefer the use of an intermediate receiver, as above described.

When a traveling apron is used, to prevent it from being destroyed or injured by the heat of the slag, and to prevent the slag from adhering to it, I have arranged a mud roller or mop, N, (shown in Figs. 4 and 7,) preferably at the point where the traveling apron begins to enter beneath the pipes of the boiler, and before it reaches the point where the molten slag is poured upon it. This mop or roller is mounted upon a shaft, as shown in Fig. 7, which may be rotated by any convenient motive power. In its rotation it rubs against the surface of the apron and spreads a coating of mud or other suitable material upon it to prevent the slag from adhering thereto. Of course it will be understood that this roller may be supplied with the coating material in any suitable manner, as by permitting a stream of it to constantly flow upon its surface to be spread upon the apron.

My invention is also applicable to other furnaces besides smelting or slag-producing furnaces, and to factories where a large quantity of heated or molten matter capable of heating a boiler and generating steam is now allowed to cool without being utilized for any heating purposes.

What I regard as new, and desire to secure by Letters Patent, is—

1. The combination of a smelting or slag-producing furnace, a steam-generating boiler, one or more traveling slag-carrying devices, as described, and means for conveying the slag from the slag-producing furnace to the said slag-carrying device, substantially as described.

2. The combination of a smelting or slag-producing furnace, a steam-generating boiler, one or more slag-carrying devices, as described, a trench or conduit in which said boiler is located, and means for conveying slag from the smelting-furnace to the slag-carrying vessels, substantially as described.

3. The combination of a smelting or slag-producing furnace, a steam-generating boiler, one or more slag-carrying vessels, a bridge over the same supported independently of such slag-carriers, and spouts or conduits for conveying slags from the smelting-furnace to the said carrying-vessels, substantially as described.

4. The combination of a slag-producing furnace, a traveling slag-carrying device located

in a trench or conduit, a bridge or covering over the same supported independently of the slag-carrier, and spouts or conduits for conveying the slag from the slag-producing furnace to the slag-carrying device, substantially as described.

5 In a slag-furnace, the combination of a smelting or other furnace to produce slag, a receiver into which the molten slag is conveyed, a steam-generating boiler, a traveling slag-carrying device, and means for operating the same, substantially as described.

10 6. In a slag-furnace, the combination of a smelting or other furnace to produce slag, a receiver into which the molten slag is con-

veyed, a steam-generating boiler, a traveling slag-carrying device, means for operating the same, and a trench or conduit containing the conveyer, substantially as described.

7. In a slag-furnace, the combination of a traveling slag-carrying apron, sprocket-wheels to move the apron forward, and a mud roller or mop arranged transverse to the line of motion of the apron and rotating on its surface to coat or cover the same, substantially as described.

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