

(No Model.)

3 Sheets—Sheet 1.

E. W. STEPHENS.

ORE CONCENTRATOR.

No. 329,862.

Patented Nov. 3, 1885.

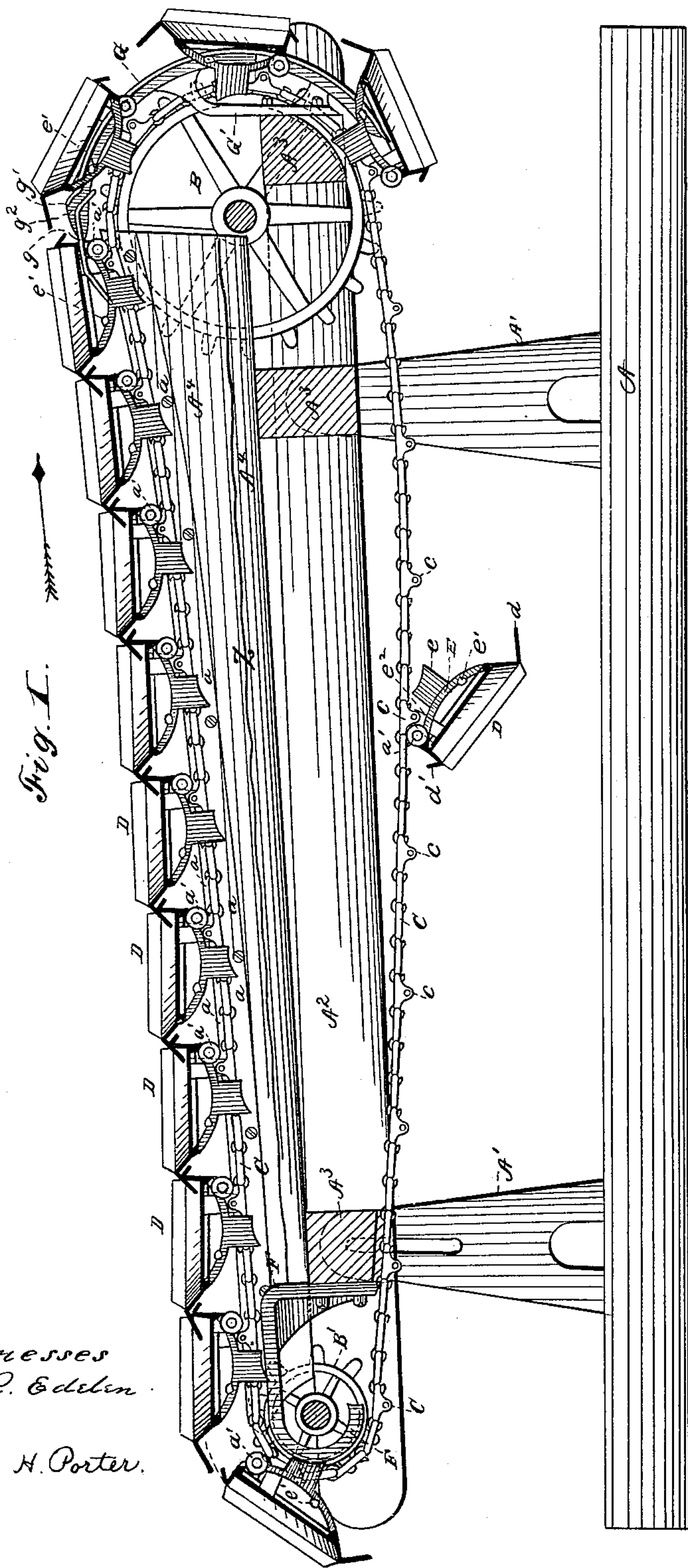


Fig. 1.

Witnesses
W. R. Edelin.

Robt. H. Porter.

Inventor
E. W. Stephens
Per Halluk & Halluk
Att's

(No Model.)

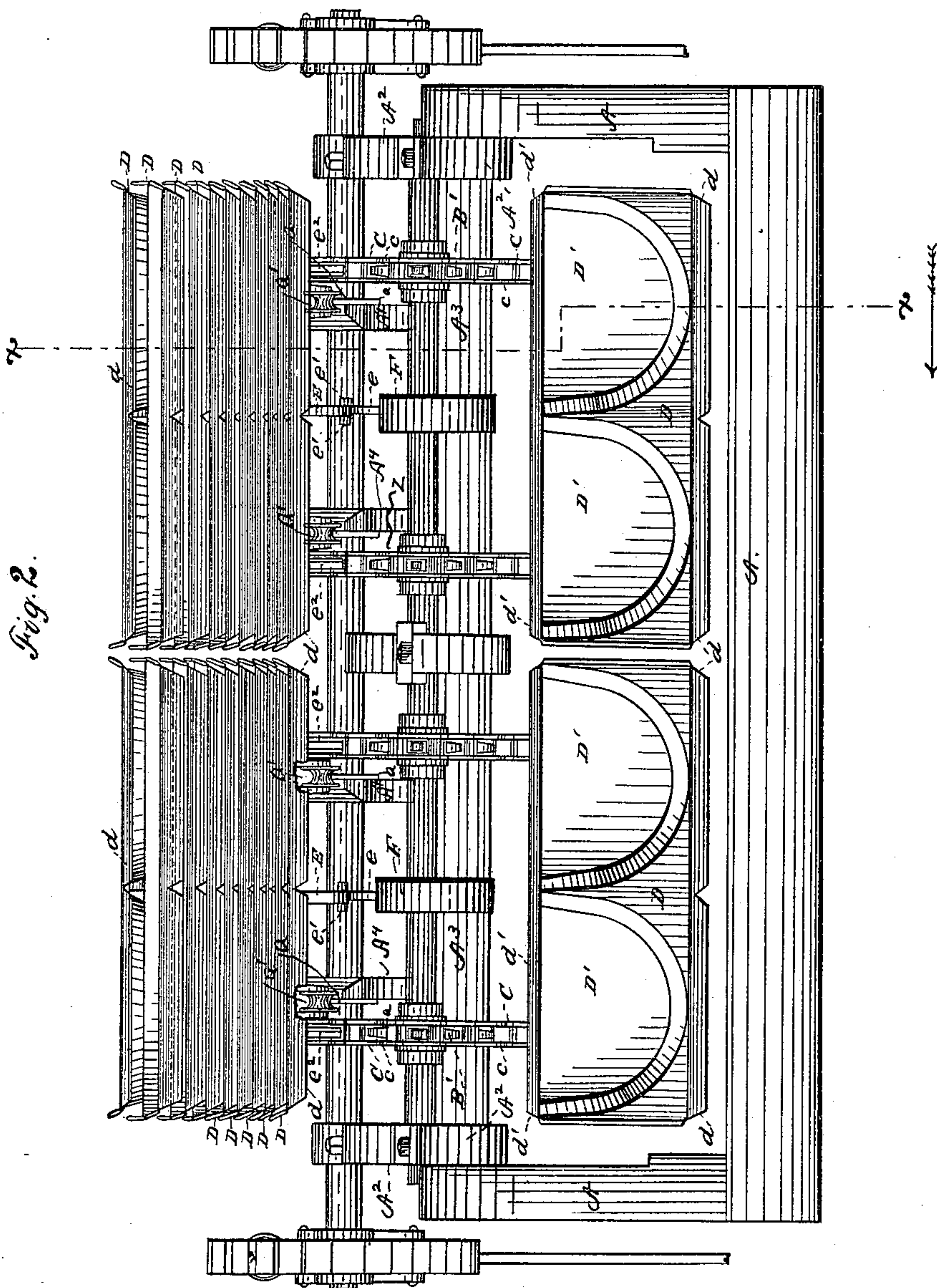
3 Sheets—Sheet 2.

E. W. STEPHENS.

ORE CONCENTRATOR.

No. 329,862.

Patented Nov. 3, 1885.



Witnesses.

W. R. Edlin.

Robt. H. Porter.

Inventor

E. W. Stephens

Per Hallowell Haller

Att'y

(No Model.)

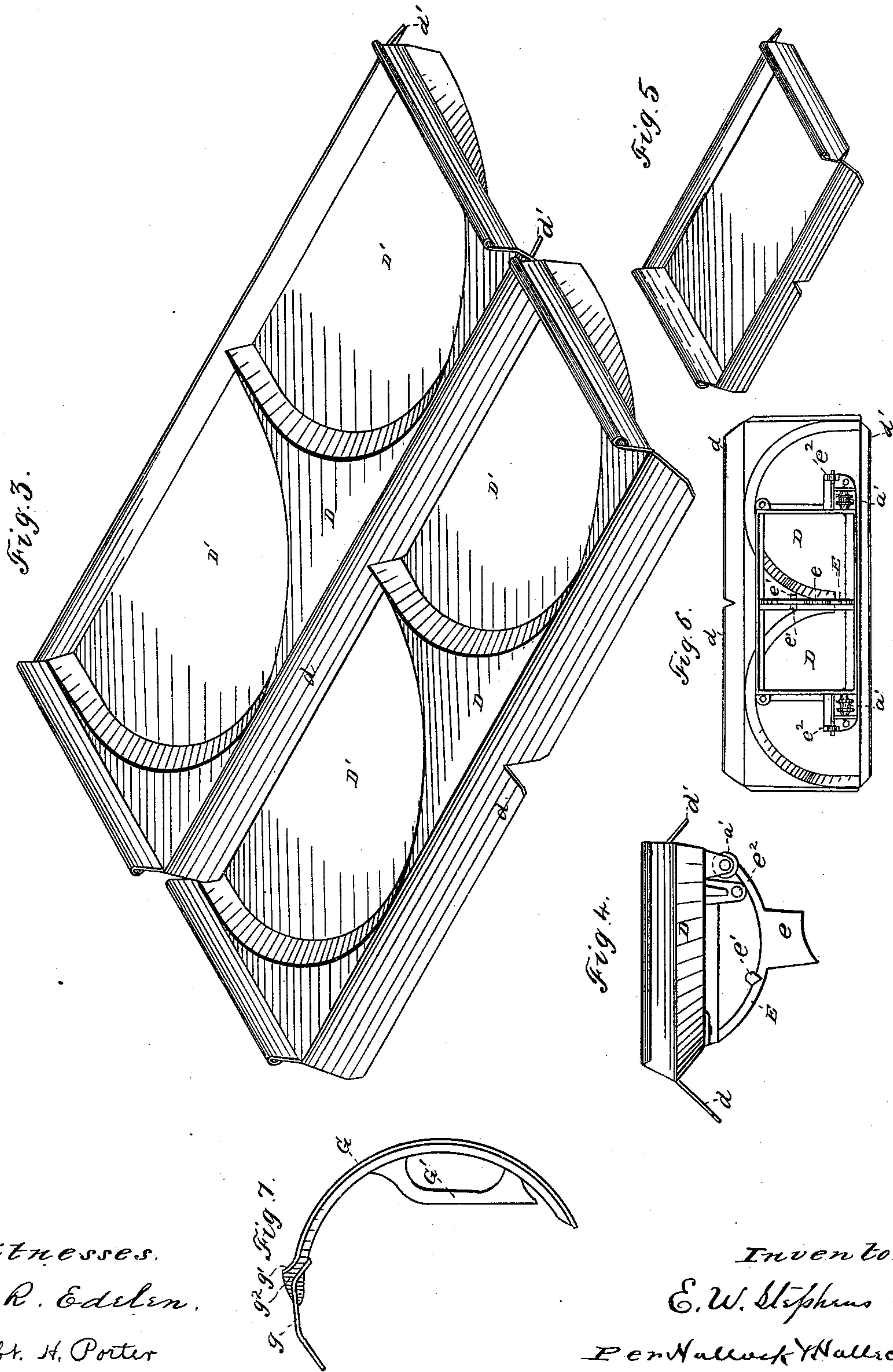
3 Sheets—Sheet 3.

E. W. STEPHENS.

ORE CONCENTRATOR.

No. 329,862.

Patented Nov. 3, 1885.



Witnesses.
W. R. Edelen.
Robt. H. Porter

Inventor
E. W. Stephens
Per Hallett & Hallett
Attys

UNITED STATES PATENT OFFICE.

EDWARD W. STEPHENS, OF ERIE, PENNSYLVANIA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 329,862, dated November 3, 1885.

Application filed July 25, 1884. Renewed October 10, 1885. Serial No. 179,529. (No model.)

To all whom it may concern:

Be it known that I, EDWARD W. STEPHENS, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Ore-Concentrators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of ore-concentrators in which the ore is mingled with water and the ore-bed is so moved as to agitate the mixture, and thus produce a precipitation of the valuable particles; and it consists in certain improvements in the construction of the ore-bed, as will hereinafter be fully described, and pointed out in the claims.

The particular means by which the ore-bed is moved to effect the agitation of the mixture forms no part of this invention, and will not be shown or described.

The ore-bed of this machine consists of a series of pans which are mounted on a conveyer apparatus which moves from the tail to the head end of the machine. The construction of the pans is such that while they are mounted separately, and, when dumped, move independently of each other, they so overlap when in an upright position that overflow from one pan will flow into the pan immediately following it without waste.

The construction of the device is also such that while the pans are passing from the tail end of the machine to the head end they ride upon tracks which are graded up from the tail to the head end of the machine in a gradually-increasing incline, so that the pans as they reach the head end of the machine are so tilted toward the tail end of the machine as to cause an overflow into those following. The tailings are carried from the ore-bed against its upward movement by the flow of water down the incline from pan to pan, while the headings or valuable matter is carried up in the pans and removed therefrom by the dumping of the pans as they turn to pass back to the tail end of the machine.

The accompanying drawings illustrate my device, as follows:

Figure 1 is a vertical longitudinal section taken on the line $x x$ in Fig. 2, the first track-

girder, A^4 , to the left of said line being broken away, as shown by the waving line z , so as to give a face view of the track-bar a on the girder beyond, and also to show the conveyer-chains. In this figure pans D are omitted from the lower part of the conveyer-chains. Fig. 2 is an end elevation taken from the left of Fig. 1, which is the tail end of the machine. In this view pans are omitted at the end to show construction of parts beyond. Fig. 3 is a perspective view of two pans overlapped. Fig. 4 is an end elevation of one of the pans, and shows the iron frame-work which is attached underneath the same. Fig. 6 is a plan view of the bottom of one of the pans, showing the iron frame-work. Fig. 5 is a perspective view showing a large rectangular pan, which may be substituted for the form of pan shown in Fig. 3. Fig. 7 is a side view of the guide G , detached from the machine.

Letters of reference designate parts as follows: $A A' A^2 A^3$, the frame-work; A^4 , the girders on which the tracks a are secured; $B B'$, the sprocket-wheels; C , the conveyer-chains forming the conveyer apparatus; D , the pans, which may be divided into two semi-circular parts, $D' D'$, as shown clearly in Fig. 3, or not, as is shown in Fig. 5; E , an iron frame-work on which the pan D is secured, and by which it is connected with the chains C ; F and G , guides, F being at the tail end of the machine and serving to guide the pans as they pass around the sprocket-wheel B' up onto the tracks a , while G is at the head end of the machine and serves to guide the pans as they leave the tracks and pass down around the sprocket-wheel B .

The letters which designate other parts will appear in the following detailed description of the device.

Whatever shaking or other agitating movement is given to the ore-bed will be given to the frame-work, and as the means for thus agitating the bed form no part of this invention, they are not illustrated.

At each end of the frame-work are placed shafts, on which are mounted the sprocket-wheels $B B'$. The conveyer-chains have no peculiar construction further than to be provided with links c at proper intervals, with ears having bolt-holes, to which the pan-frames are pivotally connected by studs $e^2 e^2$, extending

from said frame. It will be seen from Fig. 2 that each pan-frame is connected with two sprocket-chains—one at each end of the frame. The machine, as shown, is double, there being
5 two separate series of pan sets, making, in fact, two separate ore-beds.

On each of the pan-frames E there is a guide-shoe, *e*, which rides upon the guide F when the pans are passing up around the sprocket-
10 wheels B'. There is also on the said frames E a guide-lug, *e'*, which acts upon the guide G when the pans are passing around the sprocket-wheel B. There are also on the said frames
15 two rollers or wheels, *a' a'*, which run upon the tracks *a a* as the pans are passing from the sprocket-wheels B' to the sprocket-wheels B.

The pans are made of metal, either cast or sheet metal; or they may be made of any other material, such as vulcanized india-rubber, paper, &c. They may be made as shown in Fig.
20 5, or as shown in the other figures. I prefer the construction shown in the other figures, where the pan-body is divided into two semicircular compartments, D' D', for the reason
25 that such a shape is more like a hand-pan, and whatever agitating movement is given to the ore-bed the form of the pan will give a more or less circular or eddying movement to the mixture, which is desirable. The pan-bodies
30 D are provided with lips *d* and *d'*, along their sides. These are for the purpose of interlocking the pan-bodies as they are moving from the tail to the head end of the machine, and thus form a water-shed between them, so that
35 the mixture can flow from one pan to the other without waste.

The tracks *a*, on which the pans run as they go from the tail to the head of the machine, are graded in a gradually-increasing incline
40 from the tail to the head of the machine, as will be seen in Fig. 1, for the purpose of causing the pans to tilt as they approach the head end of the machine, and thus spill the light unprecipitated mixture they contain into the
45 pans following them.

When the pans reach the upper end of the track, the lug *e'* on the frame E on the under side of each pan-body D comes in contact with

a cam-like flange, *g*, on the guide G. This occurs just as the rollers *a'* leave the end of the
50 track, and the flange *g* raises the rear side of the pan and causes its lip *d* to be disengaged from the lip *d'* of the pan following. As the pan proceeds, the lug *e'* passes down a channel,
55 *g''*, between the flanges *g* and *g'*, and then along the under side of the flange *g'*. The object of this is to prevent the pans turning forward on their pivotal connection with the sprocket-
60 chains while they are passing around the sprocket-wheels B. When they have passed around to the lower side, they are released and pass to the tail end of the machine, hanging
65 by their pivotal connections to the chains, as is seen in Fig. 1. If the pans were not thus held when passing around the sprocket-wheels
70 B, the headings which there dump from the pans would be thrown upon the bottom of the preceding pan; but when thus held the dumpings fall free from the pan without obstruction.

If desired, the pans may be coated with quicksilver, so as to produce amalgamation.

What I claim as new is—

1. In an ore-concentrator of the class herein named, the combination, substantially as set
75 forth, of a conveyer apparatus and a series of pan-bodies mounted on said conveyer apparatus independently of each other, each of which is provided with lips *d d'*, and is divided into
80 semicircular compartments D D', for the purposes set forth.

2. In an ore-concentrator of the class herein named, the combination of the following elements: the sprocket-wheels B B', conveyer-
85 chains C, tracks *a*, guides F and G, and pans D, frames E, having studs *e''*, for connecting said pans with the said chains, shoes *e*, for acting on said guide F, rollers *a'*, for acting on
90 said tracks, and lugs *e'*, for acting on said guide G.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD W. STEPHENS.

Witnesses:

JNO. K. HALLOCK,
ROBERT H. PORTER.