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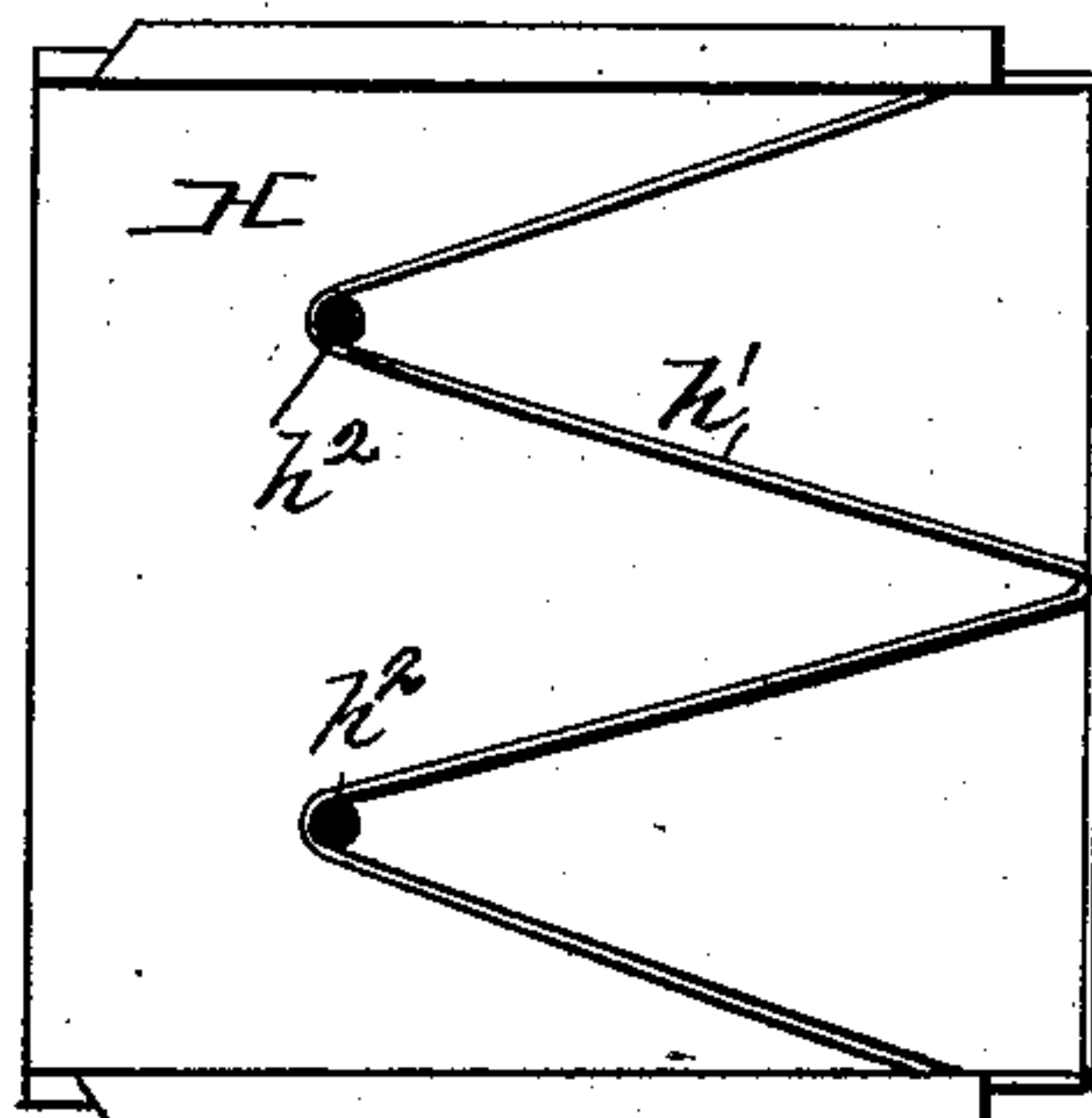
## ORE CONCENTRATOR.

Patented Jan. 24, 1888.



Witnesses

Jos. A. Ryan  
 E. G. Siggers



By their Attorneys,

Inventors

Orrin Campbell  
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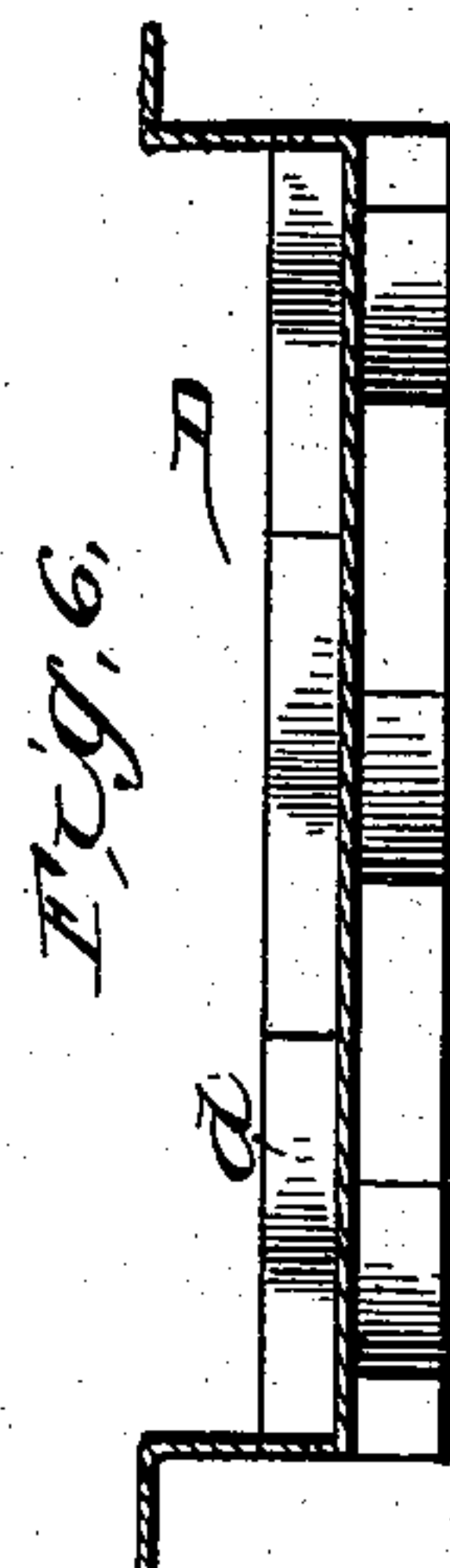
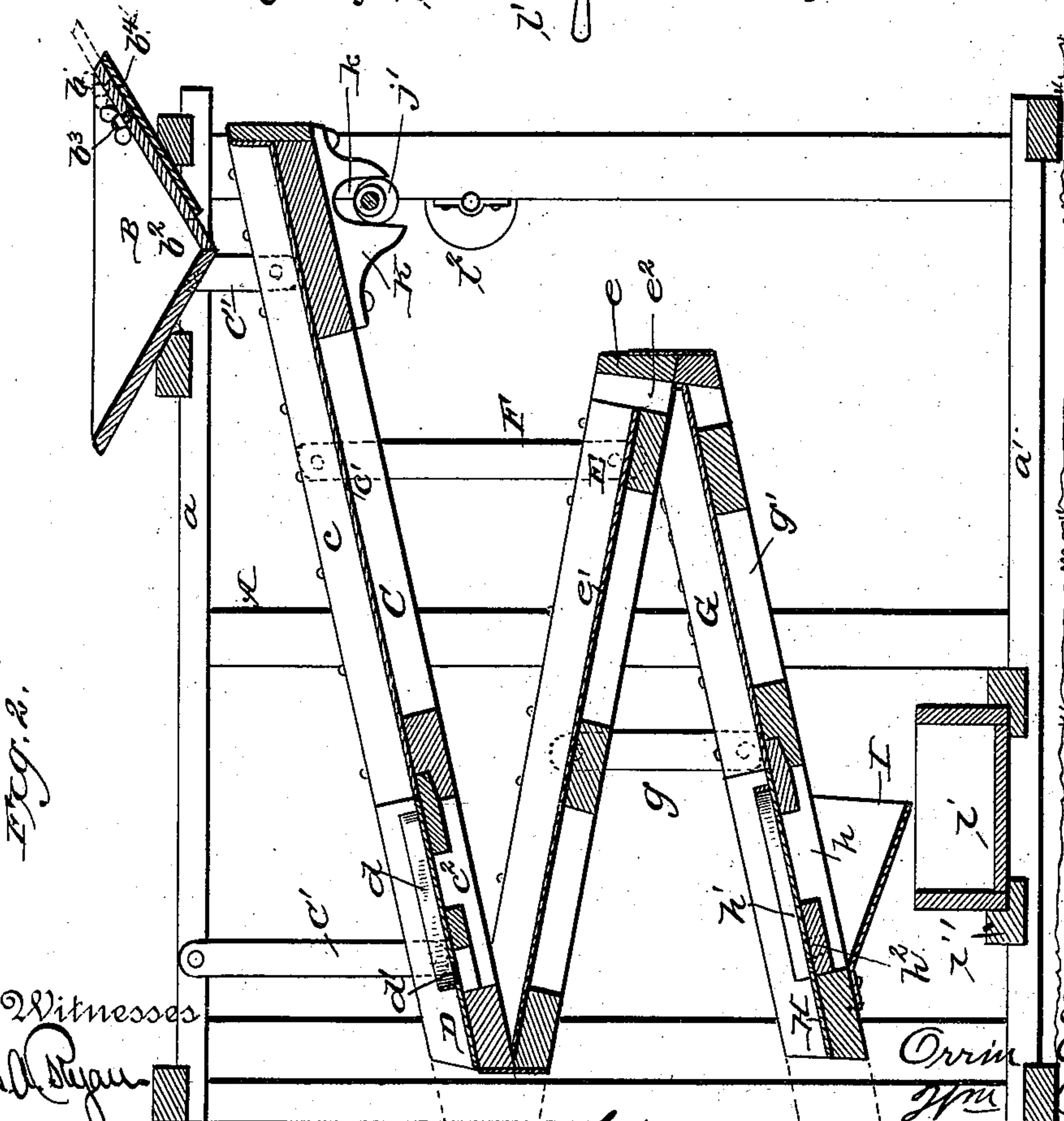
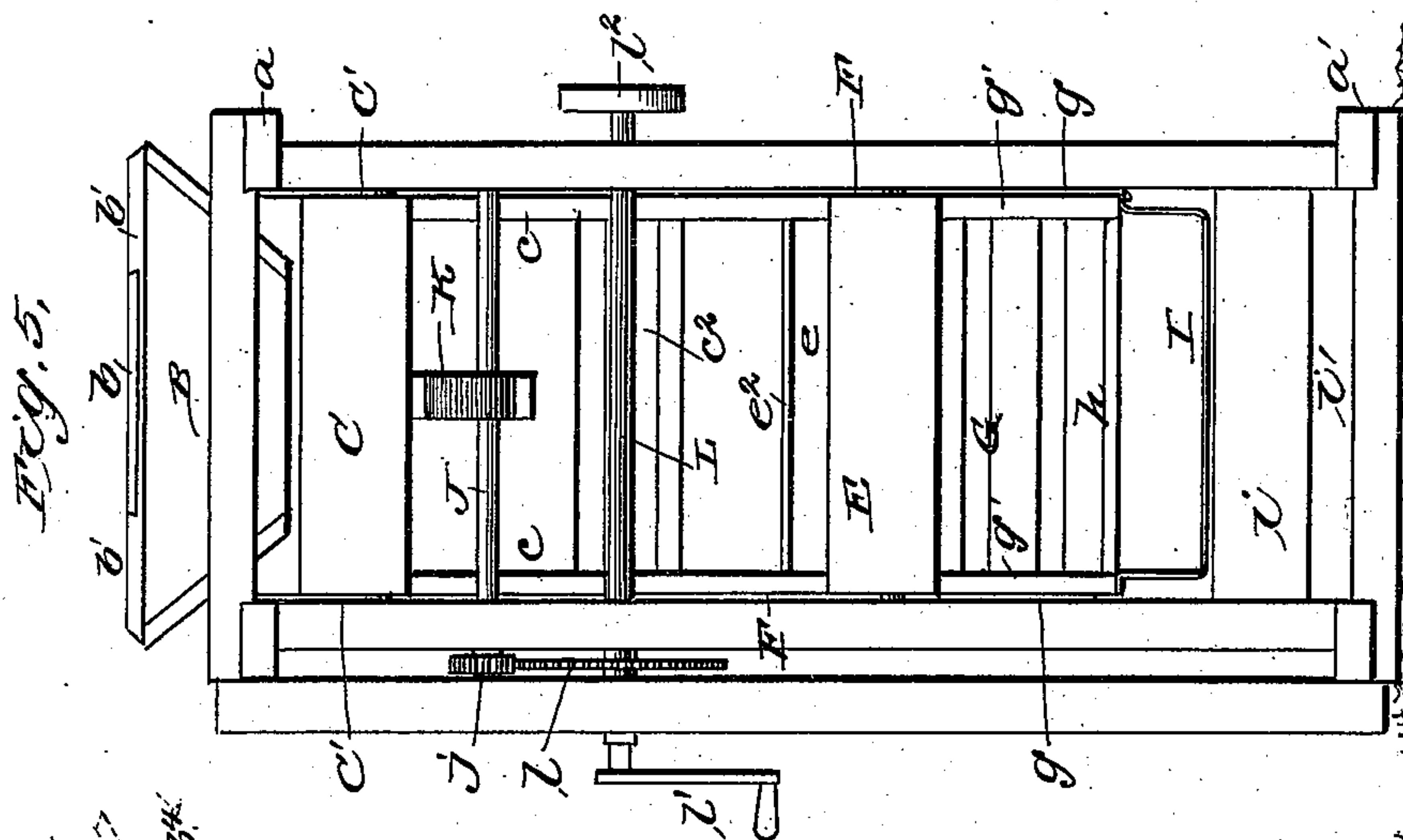
(No Model.)

2 Sheets—Sheet 2.

O. CAMPBELL & W. PEET.  
ORE CONCENTRATOR.

No. 376,853.

Patented Jan. 24, 1888.



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# UNITED STATES PATENT OFFICE.

ORIN CAMPBELL AND WILLIAM PEET, OF LAWRENCE, KANSAS.

## ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 376,853, dated January 24, 1888.

Application filed March 25, 1887. Serial No. 232,422. (No model.)

*To all whom it may concern:*

Be it known that we, ORIN CAMPBELL and WILLIAM PEET, citizens of the United States, residing at Lawrence, in the county of Douglas and State of Kansas, have invented a new and useful Improvement in Ore-Concentrators, of which the following is a specification.

Our invention relates to improvements in ore-concentrators, and is designed more especially to separate particles of gold or other heavy or precious metals from the sand and earth with which gold, particularly, is associated in surface-diggings or mines.

The invention consists in the construction and arrangement of the chutes down which the mixed metal and sand or earth descend, and of the mechanism for actuating said chutes, as hereinafter described, embraced in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of an ore-concentrator embodying our invention. Fig. 2 represents a vertical section of the same on the line  $x x$  of Fig. 3. Fig. 3 represents a plan view of the machine, showing the upper chute. Fig. 4 represents a plan view of the lower shoe. Fig. 5 represents a front end view of the machine. Fig. 6 is a detailed transverse sectional view of the shoe D.

Referring to the drawings by letter, A designates the frame of the machine, of general rectangular shape, and composed of the horizontal top and bottom beams,  $a$  and  $a'$ , respectively, and the vertical end and side beams connecting the same.

B is the hopper secured to the front upper end of the frame, and provided on its front side with the door  $b$ , having its side edges beveled so as to fit into and be retained by the correspondingly-beveled edges of the side pieces,  $b'$   $b'$ .

The door may be held open at any point, so as to enlarge or diminish the feed-opening  $b^2$ , by means of the adjusting-screw  $b^3$ , which passes through a threaded opening in the door and impinges on the board  $b^4$  below.

C is the highest chute, hung from the top beams,  $a$ , of the main frame by the metal spring-straps  $C'$   $C'$ , pivoted at their upper ends to the beams  $a$  and at their lower ends upon the side strips,  $c$ , of the chute. The chute C has a floor,  $c'$ , consisting of metal plate, to pre-

vent wear and tear, the side parts of which floor are bent up against the side strips,  $c$ , and then bent down and secured to the edges of said strips. The chute is open or has no strip at its lower end, so that there is free discharge of refuse therefrom. The lower part of the floor of the chute is cut away, forming a rectangular opening,  $c^2$ , over which a detachable plate-metal shoe, D, fits. The said shoe is similar to the metal floor of the chute, and has its side portions similarly turned up against the side strips,  $c$ , and again bent outwardly to rest upon the upper edges of said strips. The shoe is provided with the V-shaped riffles  $d$ , which run transversely across it and have their upper ends joined together or to the sides of the chute, so that nothing can pass down the latter and escape the riffles.

$d'$   $d'$  are openings through the floor of the shoe, just within the points of the riffles, and of proper size to allow grains of metal to escape through them.

E is a chute inclined in the opposite direction to the chute C, the upper end of which is immediately below the hopper. The upper end of the chute E is secured to the lower or discharge end of the chute C, and its lower end is closed with a transverse strip,  $e$ . The floor  $e'$  of the chute E is similar to that of the chute C, and is cut away at its lower end to make a discharge-opening,  $e^2$ , just above the strip  $e$ .

F F are vertical spring-straps similar to the straps  $C'$ , and have their upper and lower ends pivoted, respectively, upon the side strips of the upper chute and of the chute E near its lower end.

G is a chute similar to the chute C, having its higher end secured to the lower end of the chute E, inclining downward, thence to the front end of the machine, and suspended from the chute E by the vertical spring-straps  $g$ , which have their upper and lower ends respectively pivoted on the side strips of the chute E and the similar strips  $g'$  of the chute G.

H is a detachable shoe similar to the shoe D, and covering an opening,  $h$ , in the lower part of the floor of the chute G. The shoe H is provided with closed V-shaped riffles  $h'$ , similar to but having larger angles than the riffles  $d$ , as there is less refuse to separate in the chute G.



$h^2$   $h^2$  are openings through the shoe within the points of the riffles  $h$ . (See Fig. 4.) The lower end of the shoe  $G$  is open for the discharge of refuse.

5 I is a short spout or chute below the opening  $h$ , having its sides secured to the side strips,  $g'$ , and inclined downward forwardly to discharge into the drawer  $i$ , which slides in the transverse ways  $i'$ , secured to the lower  
10 beams,  $a'$ , of the main frame.

The following is the actuating mechanism of the chutes.

J is a transverse shaft journaled in bearings secured to the vertical beams of the main  
15 frame, below the hopper, and carrying a pinion,  $j$ , outside of one bearing and an eccentric cam-disk,  $j'$ , centrally between its bearings. The said cam-disk rests and fits in a notch,  $k$ , in a block,  $K$ , secured to a transverse beam  
20 under the upper end of the floor of the chute  $C$ .

L is a transverse shaft turning in bearings secured to the vertical beams of the main frame below the shaft  $J$ , and having secured upon it a gear-wheel,  $l$ , which meshes with the pinion  
25  $j$ . One of the extended ends of the shaft  $L$  is squared to receive a crank-handle,  $l'$ , by which the said shaft is rotated by hand, and the other end has secured upon it a pulley,  $l''$ , by means of which and a proper belt the machine may be actuated by an engine. The  
30 material is fed into the hopper dry, from which it is permitted to descend in proper quantities to the chute  $C$ , which, together with the connected lower chutes, receives a longitudinal vibration from the mechanism caused by the  
35 rotation of the cam-disk in the notch. This vibration slides the material down the chute  $C$  and causes the particles of metal—such as gold—to sink, through gravity, to the bottom  
40 of the moving mass; hence the said particles are caught by the riffles  $d$  and directed through the openings  $d'$ , while the bulk of the sand, earth, and other refuse passes over the riffles and out of the lower end of the chute.

45 From the chute  $C$  the particles of metal mixed with less refuse pass down the chute  $E$ ,

which is merely a transferring-chute, into the chute  $G$ , down which the material passes and is still further concentrated by the riffles  $h'$ . The particles then pass through the openings  
50  $h^2$ , and, mixed with much less refuse, flow down the chute or spout  $I$  into the receiving-drawer  $i$ . Other chutes with similar riffles may be added, the material receiving one degree more of concentration from each.

By the described construction is formed a simple, compact, and effective machine for concentrating ore by the dry method.

Having thus described our invention, we claim—

1. The combination of the hopper and the actuating mechanism with the communicating chutes provided with plate-metal bottoms having the V-shaped closed riffles and the openings within the points or angles of said riffles,  
65 each chute having riffles made on a wider angle than the one above, so as to decrease the number of riffles and floor-openings from above downward, substantially as described.

2. The combination of the main frame having the hopper, the shaft  $L$ , gear-wheel  $l$  on said shaft, and the shaft  $J$ , carrying the pinion  $j$  and the cam-disk  $j'$ , with the chute  $C$ , provided with the metal floor  $c'$ , the plate  $D$ , having the riffles  $d$  and the openings  $d'$ , the  
75 blocks  $K$ , having a notch,  $k$ , to engage the cam-disk, the straps  $C'$ , supporting said chute, the chute  $E$ , secured to and inclining in a different direction from the chute  $C$ , the chute  $G$ , parallel to the chute  $C'$ , and provided with the  
80 plate  $H$ , having the riffles  $h'$  and openings  $h^2$ , and the spout or chute  $I$ , secured to chute  $G$  below chute  $H$ , substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures  
85 in presence of two witnesses.

ORIN CAMPBELL.  
WILLIAM PEET.

Witnesses:

GEO. B. EDGAR,  
GEO. B. EDGAR, JR.