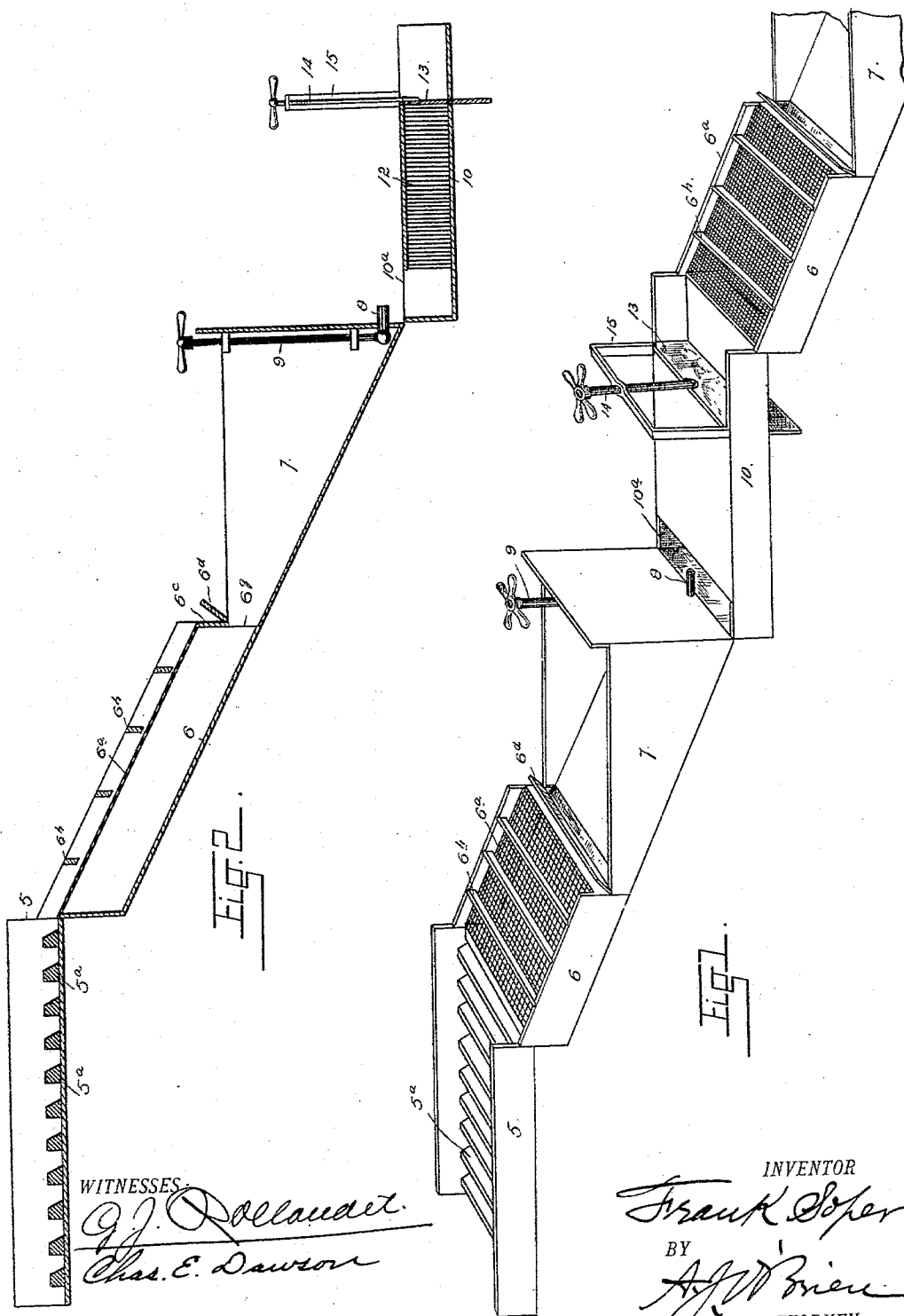


(No Model.)

F. SOPER.
ORE CONCENTRATOR.

No. 552,931.

Patented Jan. 14, 1896.



WITNESSES:

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FRANK SOPER, OF DENVER, COLORADO, ASSIGNOR OF ONE-THIRD TO
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ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 552,931, dated January 14, 1896.

Application filed December 1, 1893. Serial No. 492,565. (No model.)

To all whom it may concern:

Be it known that I, FRANK SOPER, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Ore-Concentrators; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in ore-concentrators; and it consists of the features, arrangements and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a perspective view of my improved construction. Fig. 2 is a central longitudinal section taken through the mechanism.

Similar reference characters indicate corresponding parts or elements of the mechanism in both views.

Let the numeral 5 designate a sluice-box provided with transverse riffles 5^a. To one extremity of the box 5 is attached another box 6, having its bottom downwardly inclined from the extremity adjacent the sluice-box and covered by a screen 6^a of any desired mesh, which occupies a position parallel with the bottom of the box. The lower extremity of the box 6 is partly closed, as shown at 6^b, and provided with an inclined projection 6^c, which forms, in connection with the part 6^b, a V-shaped receptacle for the coarser part of the gangue or waste that is rejected by the screen 6^a. The box is provided with transverse stops 6^d, whose extremities are slipped into grooves formed in those portions of the sides of the box which project above the screen. These stops do not engage the screen, there being a space underneath or between the lower edges and the surface of the screen.

The distance of the stops above the screen varies, that which is uppermost, or nearest the sluice, being farthest from the screen, while

the next one below is nearer, and so on, the lowest, or that farthest from the sluice, being closest to the screen. The function of these stops is to prevent the screens from clogging. They check the flow of the water discharged from the sluice, and this water being suddenly arrested in its course and partly confined between the screen and the stop its force will be expended downward in opening the meshes of the screen, if they have become clogged. Hence by means of this simple expedient the screen is automatically kept cleaned and its meshes free from obstruction. Without these stops the screen is liable to become clogged at any time, in which event all the material from the sluice would be lost, since it would pass over the screen.

The box 6 is provided at its lower extremity with an opening 6^e, through which the material passes to another box 7, having its bottom continuous and upon the same incline as the bottom of the box 6 above. This box is closed at its lower end by a wall of greater height than the side walls and provided with an outlet pipe or nozzle 8, having a valve controlled by a rod 9 projecting upward above the box and shaped at its upper extremity to adapt it for hand use.

Below the box 7, and so located as to receive the material discharged from the nozzle 8, is another box 10 provided with a series of vertical pins 12 irregularly arranged, and extending between the top and bottom of the box, which occupies a horizontal position, the top and bottom being parallel. The box 10 is open at the top, as shown at 10^a, to receive the discharge from the outlet 8 of box 7.

The pins are round in cross-section from top to bottom, and by their form and the construction of the box the water carrying the finer gangue is carried down between them, while the mineral sinks to the bottom of the box.

The box 10 is further provided with a vertically-movable gate 13 controlled by a threaded rod 14 which passes through a correspondingly-threaded opening formed in the supporting-frame 15. The function of this gate is to cause the box to fill evenly from one end to the other with mineral. Hence the gate is raised from time to time to accom-

plish this purpose. Below the box 10 is another box 6 which is exactly the same as that adjoining the sluice 5, except that the screen of the box 6 connected with the box 5 10 is of somewhat finer mesh, for obvious reasons. With this exception, the mechanism below the box 10 is simply a duplication or repetition of that above, and it may be carried to any extent desired.

10 The material to be treated is discharged, together with the necessary quantity of water, into the riffled sluice 5, the object of the riffles being to catch the nuggets or largest parts of the mineral, the balance being discharged upon the screen 6^a of the box 6. The 15 water and the mineral will pass through this screen, while the coarser part of the gangue will pass over the screen into the V-shaped trough at the end of the box.

20 The material which passes through the screen comes in contact with the inclined bottom of the box and passes thence through the opening 6^b into the box 7, which may be called the "overflow-box," since only a small 25 portion of the water which enters the box passes out through the nozzle 8. The greater portion of this water overflows from the box, or passes over the side walls, which are of less height than the end wall thereof, carrying with it the lighter and finer gangue which 30 passed through the screen 6^a, while the mineral settles to the bottom of the box and is drawn off through the nozzle 8, passing thence into the box containing the pins. It is in this 35 box that the mineral is collected and saved. The portion of this box 10 nearest the box 7 would naturally fill first. Hence if it were not for the gate 13 the surface of the mineral in that box would form an incline, highest at the receiving extremity of the box and 40 tapering to nothing at the opposite extremity; and as soon as a small amount of mineral had collected in the box this inclined surface would cause that which entered afterward to 45 pass down this incline and escape, and the box would cease to retain any mineral beyond a certain small amount. To overcome this difficulty, I have provided the box 10 with the gate 13, which may be said to be beyond 50 the pins, since they are all located between the receiving extremity of the box and this gate. The gate 13 passes through the bottom of the box, and when the mineral is first let into the box the upper edge of the 55 gate is on a level with the bottom thereof, but as the mineral begins to collect in the opposite end the gate is raised from time to time, causing the box to fill alike from end to end. Hence the box 10 may be filled with

mineral before it is necessary to clean up or 60 remove its contents.

Having thus described my invention, what I claim is—

1. The combination of the sluice box with transverse riffles; a succeeding steeply inclined screen having graded, transverse stops 65 an open lower end and a transverse trough-shaped receptacle thereat for the coarser gangue; and an open-top overflow box having a steeply inclined bottom continuous with 70 that below the screen, and a valved outlet at its lower end, and having its end wall of greater height than its side walls, whereby lateral overflow of the water carrying lighter impurities is permitted. 75

2. In an ore concentrator the combination of the overflow box open at the top and having an inclined bottom and an outlet for the mineral, of a horizontal box adapted to receive the mineral from the overflow box, and 80 provided with pins and a vertically movable gate passing through the bottom of the box and adapted to be gradually raised from the bottom to the top of the box, substantially as described. 85

3. In an ore concentrator, the combination of the inclined box having the screen, and the graded transverse stops located in suitable proximity to the screen, the box having 90 an overflow and having an inclined bottom on the same inclined plane as the screen box and an outlet nozzle for the mineral, controlled by a suitable valve, and the horizontal box having the pins, and the gate adapted to project below the bottom thereof, whereby 95 the discharge extremity of the box may be gradually closed as the mineral accumulates in the box, substantially as described.

4. In an ore concentrator the combination of the inclined box having a screen and the 100 graded transverse stops located in suitable proximity to the screen, the box having an overflow and having an inclined bottom on the same inclined plane as the screen box and an outlet nozzle for the mineral controlled 105 by a suitable valve, and the horizontal box with pins extending from top to bottom and a gate projecting below the bottom of the box and adapted to be gradually raised as the mineral accumulates in the box, substantially as described. 110

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

FRANK SOPER.

Witnesses:

G. J. ROLLANDET,
CHAS. E. DAWSON.