

UNITED STATES PATENT OFFICE.

ALEXANDER S. CAMPBELL, OF ORTONVILLE, MINNESOTA.

ORE-SEPARATOR.

No. 913,258.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALEXANDER S. CAMPBELL, citizen of the United States, residing at Ortonville, in the county of Bigstone and State of Minnesota, have invented certain new and useful Improvements in Ore-Separators, of which the following is a specification.

This invention appertains to ore separators of the class utilizing the forces of gravity and centrifugal action, the purpose being economy in the use of water, thereby being of especial advantage in localities where the water supply is limited, although it may be employed to advantage on a larger scale where the supply of water is abundant.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment is shown in the accompanying drawings, in which:

Figure 1 is a vertical central section of an ore separator embodying the invention. Fig. 2 is a horizontal section on the line $x-x$ of Fig. 1.

The separator consists of a pan of circular formation and comparatively shallow and comprising a bottom and sides 1, the bottom having a central opening 2, an upwardly curved portion 3 and an annular groove or channel 4, the latter being adjacent to the inclosing wall or rim 1. The pan may be of metal, such as copper or of any suitable material, and the inner surface of the wall 1 and the upper surface of the bottom are amalgamated and the groove or channel 4 may contain a quantity of mercury. The central opening 2 provides an escape for the sand, slime and tailings which are carried by means of a suitable pipe 4^a to a convenient place of deposit or dump. The pan is mounted upon a suitable framework which consists of legs 5 and a top 6. Set screws 7 are mounted in the top 6 and engage with the bottom of the pan to admit of the latter being leveled so that the mercury in the groove or channel 4 may be of a right depth at every point. The inner wall of the groove or channel 4 slopes

upwardly and towards the center and at its juncture with the sloping portion 3 of the bottom forms an annular hump 8 over which the water, sand, earthy matter and the like pass in a thin sheet, thereby exposing any precious metal to the action of the amalgamated surface of the bottom so as to be taken up thereby.

A hopper 9 is conveniently located above the pan and to one side thereof and its bottom slopes towards the pan so as to direct the ore therein. A trough 10 extends from the hopper and inclines to the horizontal and terminates a short distance from the bottom of the pan to the inner side of the wall thereof. The wall 11 separating the hopper from the trough 10 is vertically adjustable to regulate the size of the discharge 12 formed between the bottom of the hopper and the lower edge of the said movable wall 11, which serves as a cut-off.

A water pipe 13 connects with the pan and extends through the wall thereof a short distance above the bottom and its inner end is deflected laterally, as shown at 14 and terminates in an outlet arranged to deliver the water against the inner side of the wall 1 and approximately tangentially with respect to the pan. A valve 15 provided in the length of the pipe 13 admits of regulating the flow of water. The delivery end of the pipe 14 is arranged in advance of the delivery end of the trough 10 so that the material discharged from the trough 10 is met by a jet of water discharged from the pipe 13, thereby assisting materially in the separation of the ore. The pipe 13 may connect with any source of water supply.

A pipe 16 extends vertically and its upper end is curved and overhangs a side of the trough 9 so as to deliver water thereto and said pipe is provided with a valve 17 for regulating the supply of water. The pipe 16 may connect with any source of supply of water. For convenience and compactness of arrangement the pipes 13 and 16 connect. A pump 18 of any make is provided for supplying water to the pipe 16 and has connection with a trough or box 19, into which the sand, slimes, tailings and the like escaping from the pan, discharge. A pan 20 is arranged within the trough or box 19 and is supported upon blocks or rests 21 so as to elevate its bottom from the bottom of the box. The bottom of the pan 20 is perforated to admit of the water draining from the sand, slimes and the

like, so that the water may be pumped into the pipe 16 and again supplied to the trough 9 and the body of the separator. The pan 20 when filled is lifted from the box 19 and its contents discharged when the pan is replaced in the box to catch the sand, tailings and the like in the manner herein stated.

The ore is supplied to the hopper 9 and is mixed with water discharged in the said hopper from the pipe 16 and flows through the discharge 12 into the trough 10, thence into the separator adjacent to the inner side of the wall 1 and is met by the water discharged from the pipe 14. The ore is separated both by centrifugal action and gravitative force and accumulates in the groove or channel 4, a certain proportion being absorbed by the amalgam applied to the inner surface of the wall 1 and the top surface of the bottom of the pan. The sand, earthy matter and the like, together with water, after passing over the annular hump 8, flow over the curved portion 3 of the bottom, thence out through the discharge opening 2 into the pipe 4^a, and are discharged into the pan 20 arranged within the trough or box 19, the latter receiving the water and the pan 20 catching and retaining the solid matter, which is dumped from time to time, as herein stated. The pump 18 draws the water from the trough or box 19 and supplies the same to the hopper 9 and to the separator.

Having thus described the invention, what is claimed as new is:

1. In an ore separator, the combination of

a circular pan comprising an approximately horizontal bottom and substantially vertical sides, the bottom having a central discharge and an annular channel adjacent to the sides of the pan, means for delivering ore against the inner side of the pan near the top thereof, and means for discharging a jet of water tangentially against the side of the pan across the vertically descending stream of ore to intercept and spread the latter and cause it to travel around the inner side of the pan.

2. In an ore separator, the combination of a circular pan, comprising approximately vertical sides and a substantially horizontal bottom, the latter having a central discharge opening and an annular channel adjacent to the sides of the pan, the central portion of the bottom sloping inward and downward from said annular channel to the discharge opening, a trough extended over the pan and adapted to discharge ore in a thin stream against the vertical side of the pan near the top thereof to admit of the ore descending in a vertical stream, and a pipe for supplying a jet of water arranged to deliver said jet tangentially against the inner side of the pan and across the vertically descending stream of ore.

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

ALEXANDER S. CAMPBELL. [L. s.]

Witnesses:

JOSEPH F. KING,
EARL H. STEPHENS.