

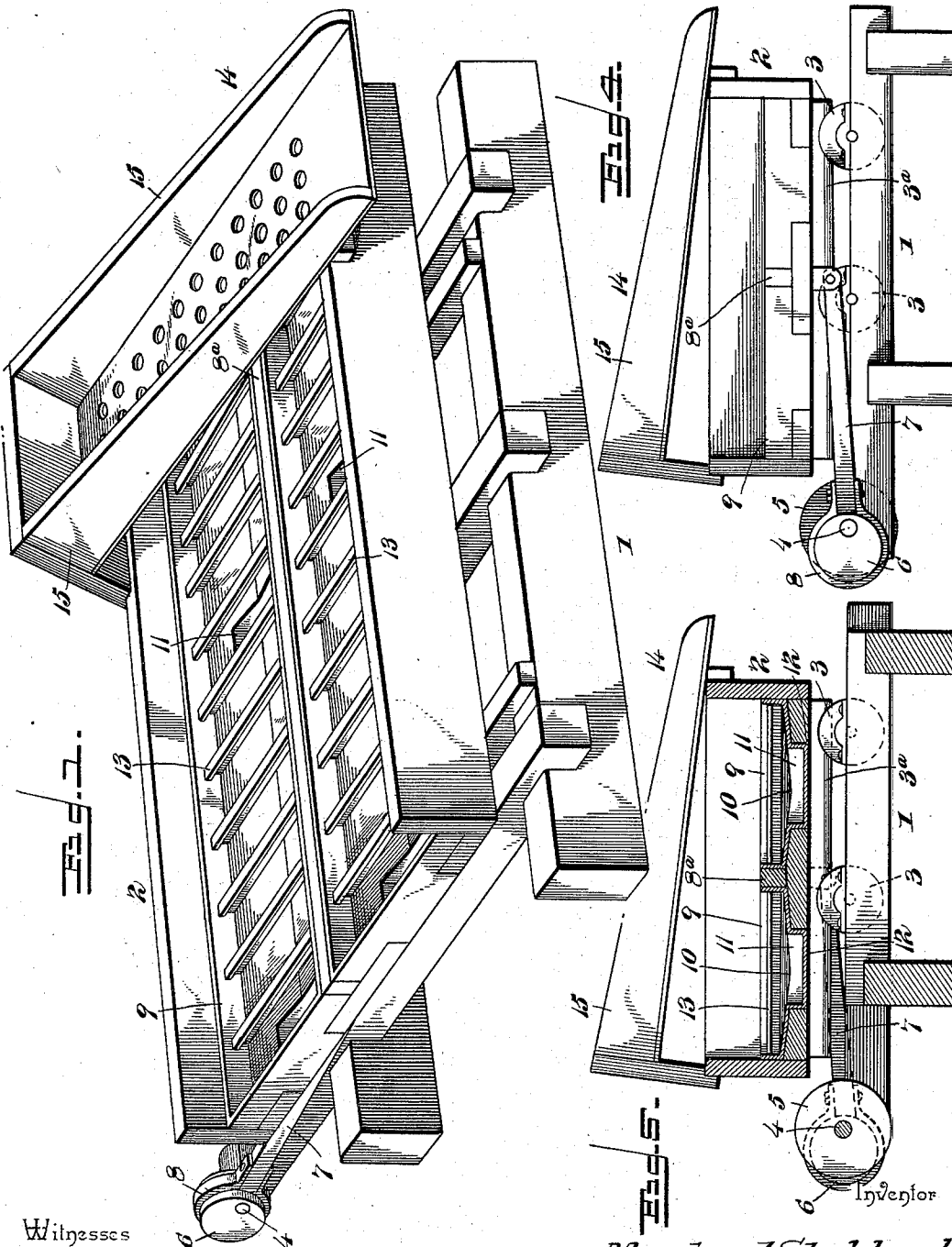
(No Model.)

2 Sheets—Sheet 1.

M. STODDARD.
ORE CONCENTRATOR.

No. 565,812.

Patented Aug. 11, 1896.



Witnesses

E. S. Stewart,
R. M. Smith

By *his* Attorneys,

Merchant Stoddard

Cash & Co.

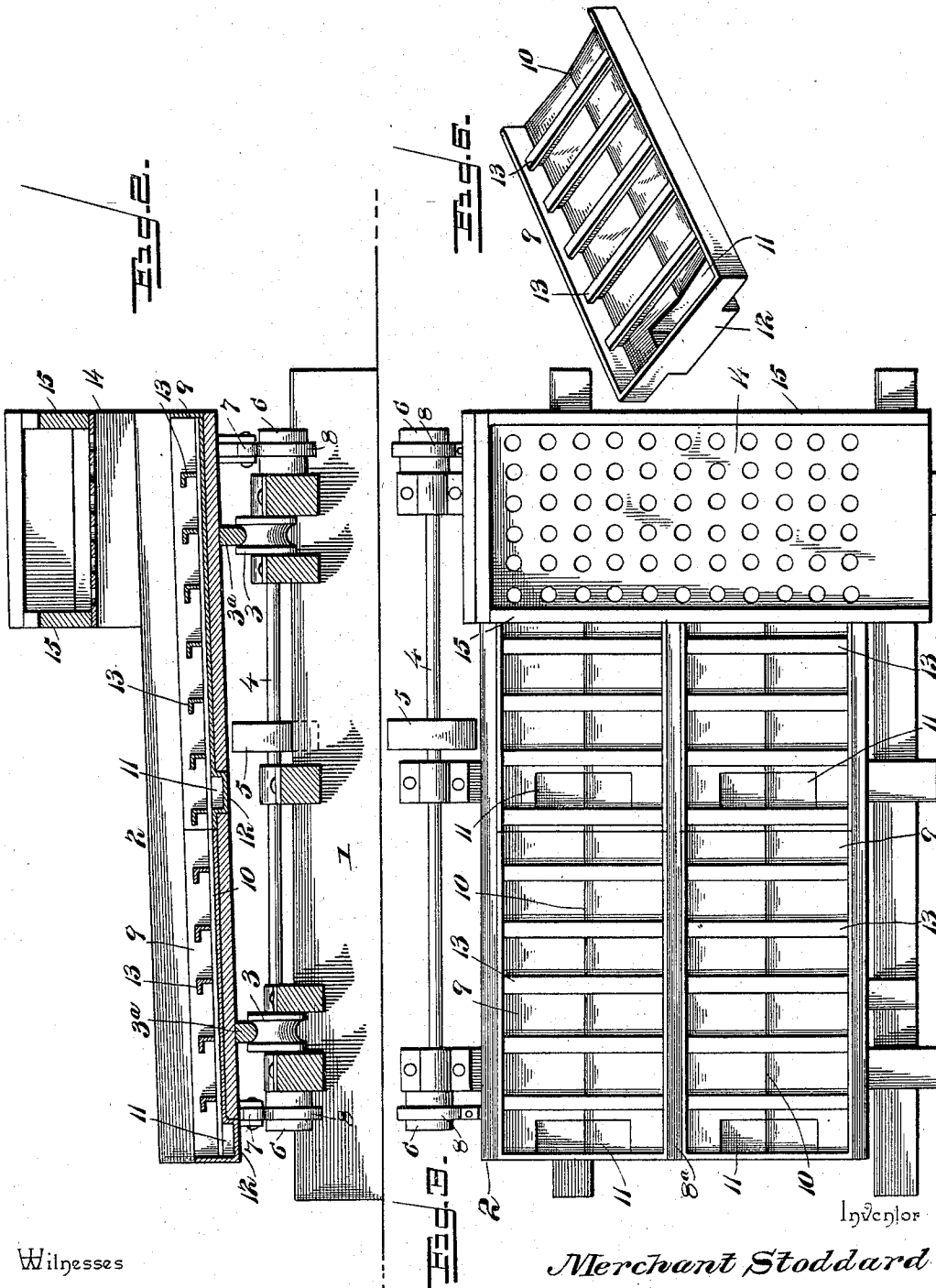
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C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

MERCHANT STODDARD, OF FARMINGTON, IOWA, ASSIGNOR OF ONE-HALF
TO CHARLES H. SCOTT, OF SAME PLACE.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 565,812, dated August 11, 1896.

Application filed September 25, 1895. Serial No. 563,650. (No model.)

To all whom it may concern:

Be it known that I, MERCHANT STODDARD, a citizen of the United States, residing at Farmington, in the county of Van Buren and State of Iowa, have invented a new and useful Ore-Concentrator, of which the following is a specification.

This invention relates to an improvement in ore concentrators or amalgamators, and has for its object to simplify and improve the construction of devices of this nature with a view to obtaining one in which provision is made for saving the finest float-gold, for scouring particles of quartz and removing the mineral coating therefrom, and for saving and separating the precious metals from the tailings of the quartz-mill.

To this end the invention contemplates the use, in connection with a vibratory or shaking concentrator trough or table, of a series of removable riffle-pans of novel construction, in which the separated ore is conducted to and deposited in a pocket arranged beneath and connected to the bottom of each riffle-pan.

The invention further consists in certain novel features and details of construction and arrangement of parts, as hereinafter fully described, illustrated in the drawings, and finally embodied in the claim.

In the accompanying drawings, Figure 1 is a perspective view of an improved ore-concentrator constructed in accordance with this invention. Fig. 2 is a vertical longitudinal section through the same. Fig. 3 is a plan view thereof. Fig. 4 is an end elevation showing the manner of imparting a transverse reciprocating movement to the concentrating-trough. Fig. 5 is a transverse vertical section through the machine, showing also the cross-sectional shape of the riffle-pans. Fig. 6 is an enlarged detail perspective view of one of the riffle pans or sections.

Similar numerals of reference designate corresponding parts in the several figures of the drawings.

In some sections of the country, for instance, on the Platte river in Colorado, the gold taken from the river is almost invariably coated with iron or other mineral deposit, so that the precious metal cannot be separated

from the particles of earthy matter by bringing them in contact with a body of mercury and forming an amalgam. The ordinary sluice-boxes in common use have been found practically useless in handling this ore, for the reason that the gold would not be taken up by the quicksilver and for the additional reason that said gold was so fine that it would be swept on and away with the water without gravitating to the bottom of the sluice-boxes. In order to overcome the difficulties just referred to, this invention contemplates imparting to the concentrating trough or table a rapid and short lateral reciprocation and in providing a series of riffle pans or sections of novel construction, which are placed within said trough and formed in such manner that when such reciprocating motion is imparted to the trough the sand, water, and ore deposit will be thoroughly agitated and given an approximately circular or rotary motion between adjacent riffles or cleats, thereby effecting a gravitation of the heavier particles of the auriferous earth to the bottom of said pans or sections. The quartz or earthy particles containing the precious metal are thus subjected to a violent agitation and the coating or deposit of iron referred to is scoured therefrom in such manner as to expose the metal to the action of the quicksilver.

Referring now to the accompanying drawings, 1 designates a suitable elongated supporting-frame forming a guiding-base upon which the ore-concentrating trough 2 is mounted. This base-frame comprises, essentially, two longitudinal beams arranged in parallelism and a series of transverse bars connecting said beams at their upper edges, as shown. Between the end transverse timbers and the timbers lying next adjacent and parallel thereto are arranged guiding and antifriction rollers 3, the spindles of which have their bearings in the transverse timbers just referred to. These rollers are arranged at the front and rear of the base-frame or adjacent to the longitudinal timbers thereof, as shown in the cross-sectional view, and are formed with peripheral grooves which are adapted to receive depending ribs or rails 3^a, secured to the bottom of the concentrator-

trough 2. The concentrating-trough is thus loosely mounted upon the base-frame and capable of being reciprocated transversely, and such movement is imparted thereto by means of a longitudinally-disposed driving-shaft 4, having secured thereto intermediate its ends a driving-pulley 5, adapted to receive a driven belt or band from any suitable motor, preferably the same motor which drives the elevator, by means of which the pulverized ore, &c., is lifted and deposited upon the sieve or screen hereinafter referred to. To the opposite ends of the driving-shaft 4 are secured grooved eccentrics 6, from which connecting-rods 7 extend inward and attach pivotally to the ends of the concentrator-trough, the outer ends of said rods having straps 8, which pass around the eccentrics in the grooves therein. By this means a rapid reciprocation is imparted to the trough 2 for the purpose of agitating the material contained therein.

The trough 2 is divided into two compartments or gutters by a central longitudinal partition or rib 8^a, and within said gutters are arranged riffle-pans 9. These pans may be made of any desired length and correspond in width to the interior transverse measurement of the trough-gutters, so that they will fit snugly therein and be properly confined in place during the agitation of the trough, the number of these pans or sections being limited only by the length of the trough 2. Each of said pans or sections is in the form of a shallow rectangular tray, which is preferably formed from sheet metal. The bottom of the pan is depressed centrally and longitudinally, or made slightly V-shaped, so as to form a longitudinal valley or gutter 10, by means of which the concentrated ore is conveyed to the lower end of the pan or tray. At such lower end each of the riffle-pans is provided with an aperture 11 through its bottom through which the ore may drop into a cup or pocket 12, secured to the under side of said pan. This pocket rests in an aperture formed therefor in the bottom of the concentrator-trough 2.

13 designates a series of transversely-disposed riffles or cleats which are made substantially L-shaped in cross-section and arranged at suitable intervals longitudinally of the pan. The particular shape of these riffles affords an overhanging ledge or flange and materially assists in the proper agitation of the sand, water, &c., contained between the adjacent riffles or cleats. The bottom edges of said riffles are elevated slightly above the bottom of the tray or pan, as shown, so that sufficient space is left to permit the longitudinal passage of the concentrated ore. The sections or pans thus constructed may be readily removed from the shaking-trough and emptied and replaced whenever necessary.

Superposed above one of the projecting ends of the shaking concentrator-trough and connected therewith is a transversely-inclin-

ing sieve or screen 14, formed, preferably, from perforate sheet metal and provided upon three of its sides with vertically-extending guards or fenders 15, the lower end of said screen being left unobstructed to permit the escape of water and the larger particles of quartz therefrom. This screen may be removed when necessary.

In the operation of the device the crushed or pulverized ore is deposited by the elevator upon the inclined sieve or screen 14 simultaneously with a stream of water. The particles of ore of the proper size pass through the screen and fall between the riffles or cleats of the pans or sections 9, and by reason of the receiving end of the trough 2 being located at a higher elevation than the discharge end the material deposited therein gradually works its way toward such discharge end. Owing to the short and rapid vibration of the concentrator-trough and the riffle-pans therein a thorough and violent agitation is imparted to the water, &c., thus effecting a corresponding agitation of the pulverized ore and the consequent gravitation of the heavier particles containing the precious metal to the bottom of the pans. During the agitation the iron or other mineral deposit is scoured from the particles of ore, and upon the descent of such particles to the bottom of the pans the metal is gathered by the quicksilver, with which such bottom is covered, and finally finds its way through the longitudinal valleys or gutters 10 into the receiving-pockets 11, from which it may be conveniently removed when desired. At the same time the greater mass of sand and quartz which is free from the precious metal, by reason of its lighter specific gravity, is retained between the riffles or cleats 13, from whence it may be removed after the gold has been separated therefrom and passed into the pockets 11.

From the foregoing description it will be seen that the concentrating-trough operates in a perfectly level and horizontal plane and such motion, together with the particular form of the riffles, results in imparting the desired agitation of the contents of the riffle-pans. It will be apparent that more than two rows of riffle-pans may be employed, according to the capacity which it is desired to give the concentrator. The apparatus above described has been found very efficient in use after a long practical test and will effect a saving of the finest float-gold, and such metal as is found in the tailings from the quartz-mill, which would otherwise be lost. The apparatus is very simple and inexpensive in construction, may be manufactured at slight cost, and the feature of the removable riffle pans or sections adds materially to the convenience and portability of the device as a whole.

Changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

5 In an ore-concentrator, a riffle-pan comprising a rectangular tray having an imperforate bottom which is centrally and longitudinally depressed to form a V-shaped gutter, a series of transversely-disposed riffles located in the bottom of the pan, the bottom
10 edges of the riffles being separated from the bottom of the pan by intervening V-shaped spaces, and a pendent extension of the pan

forming a pocket or receptacle which is arranged centrally of one end of the pan and at the terminus of the V-shaped gutter, substantially as and for the purpose described. 15

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

MERCHANT STODDARD.

Witnesses:

J. W. MILLER,
T. W. MCCRARY.