(No Model.)

R. D. WOODWARD & W. C. BROWN.

CONCENTRATOR.

No. 566,834. Patented Sept. 1, 1896.

Fig. 1.

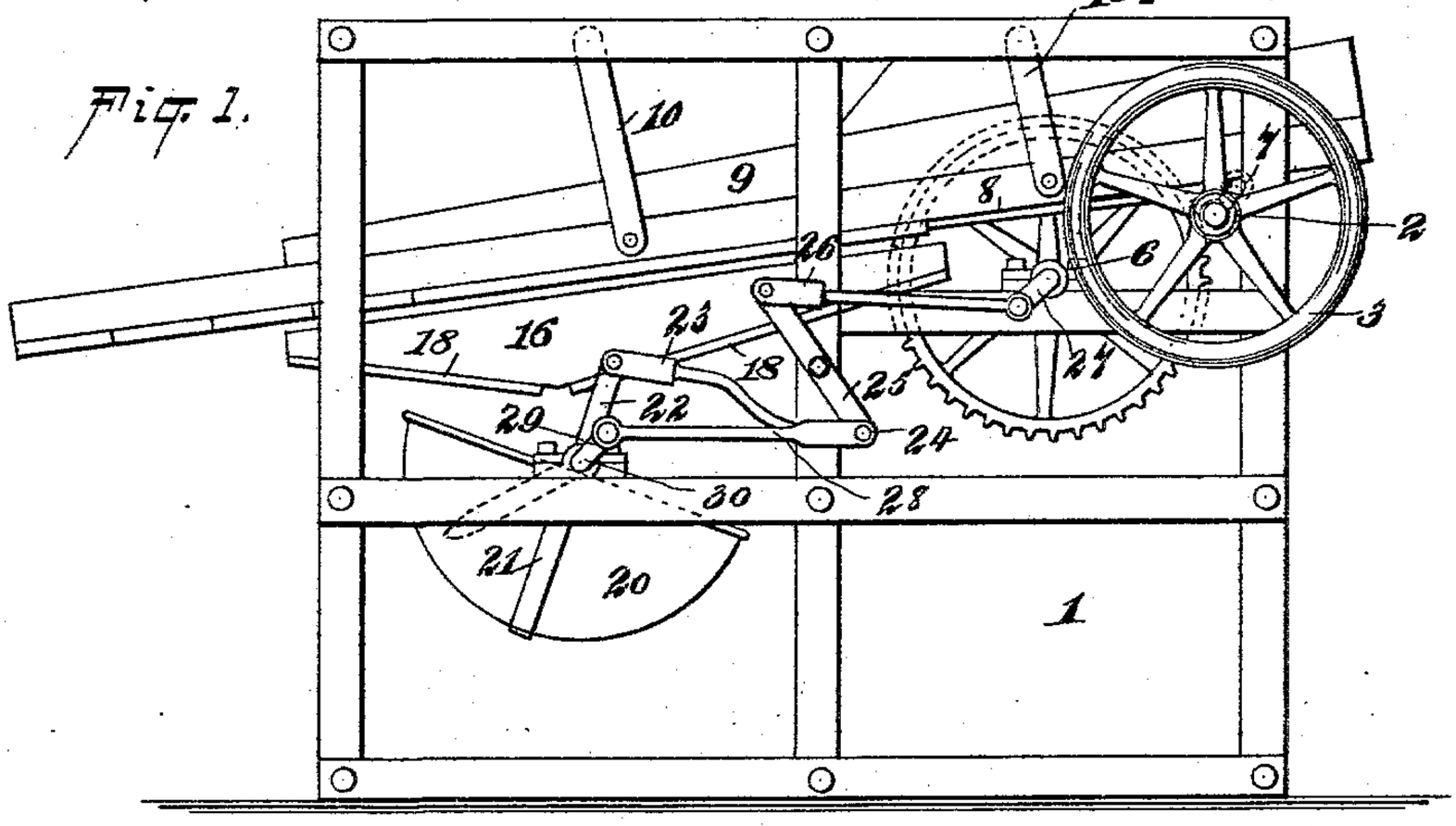


Fig. 2.

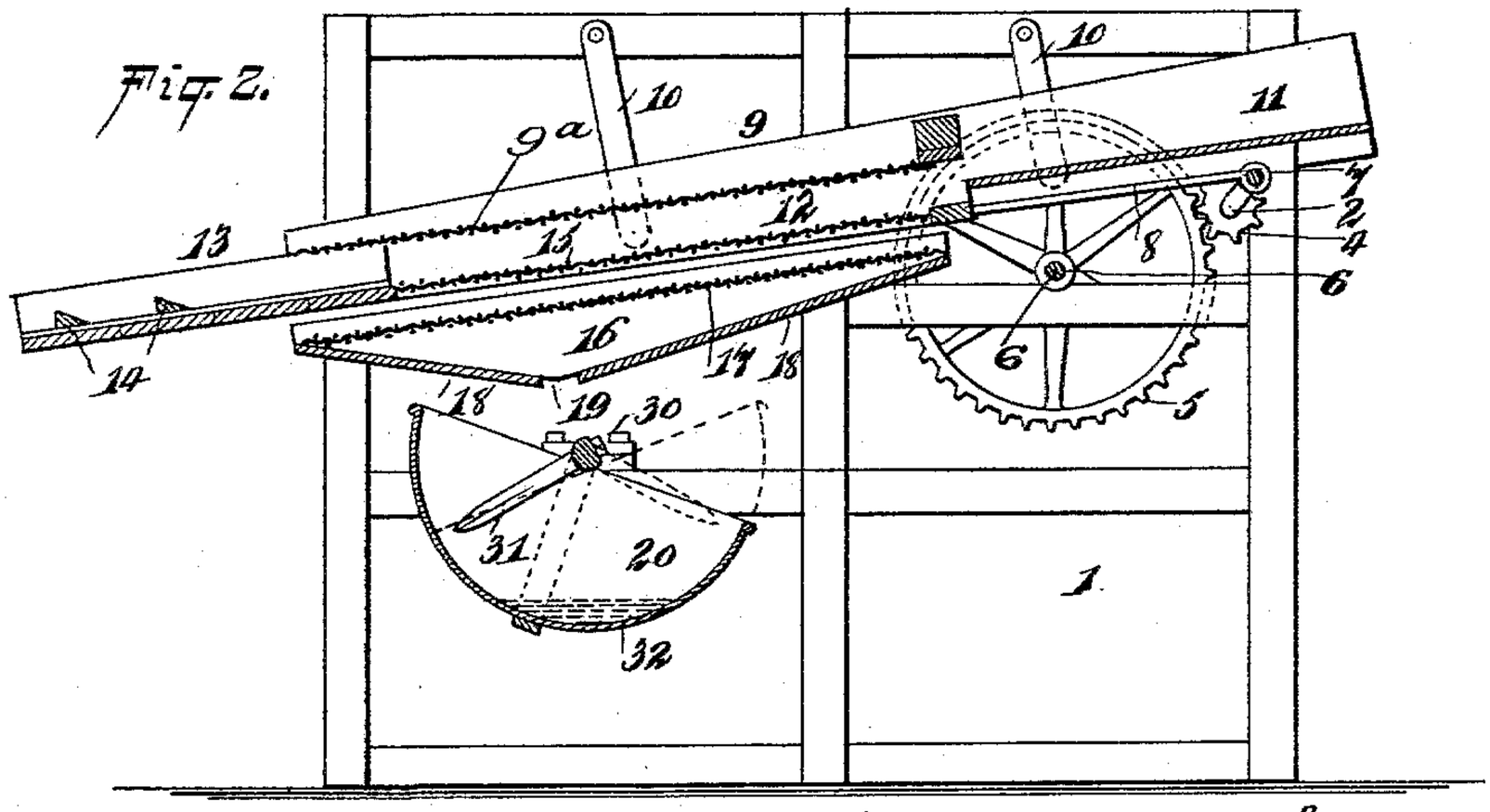
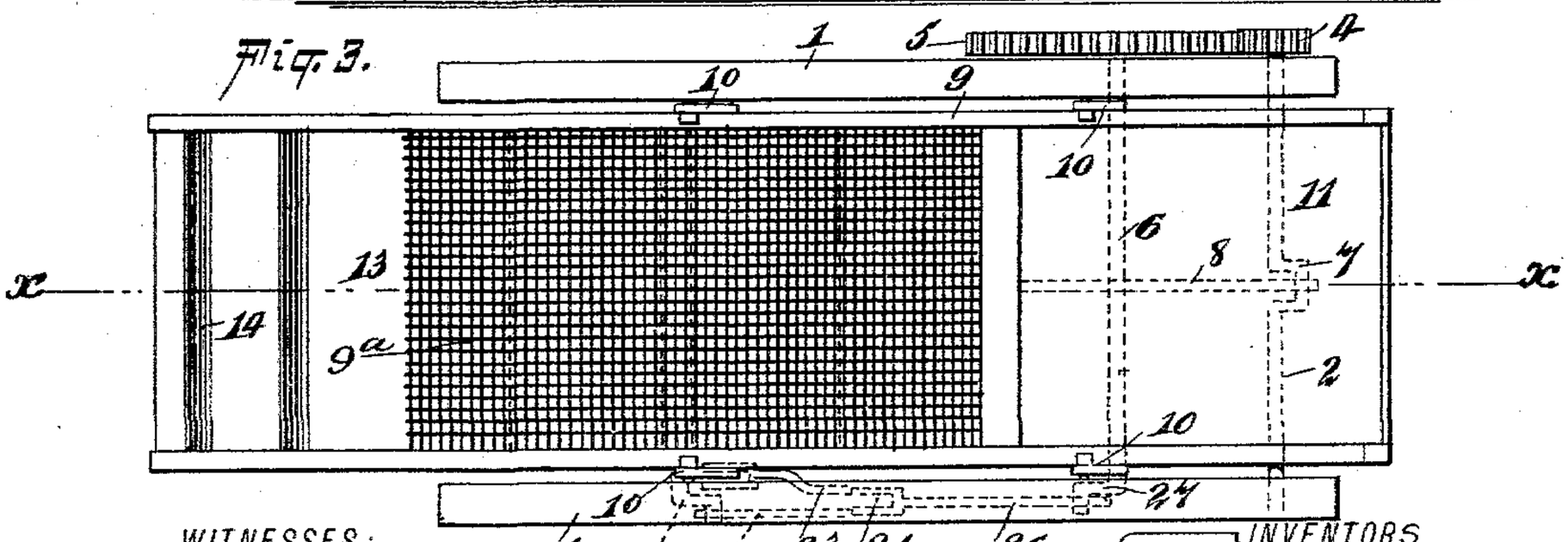


Fig. 3.



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REUBEN D. WOODWARD AND WILLARD C. BROWN, OF LEADVILLE, COLORADO.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 566,834, dated September 1, 1896.

Application filed October 29, 1895. Serial No. 567,310. (No model.)

To all whom it may concern:

Be it known that we, REUBEN DARWIN WOODWARD and WILLARD CHILD BROWN, of Leadville, in the county of Lake and State of Colorado, have invented certain new and useful Improvements in Concentrators, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in that class of devices commonly known as "concentrators," which are employed for separating gold and other precious metals in a free state from sand, gravel, ores, &c., wherein they are contained; and the object of the invention is to provide a device of this character of a simple and inexpensive construction, adapted to be operated by light power, and requiring a minimum volume of water in working.

The invention consists in a frame, a shaking-trough arranged therein and provided with one or more screens to separate the larger stones, &c., from the material under treatment, a hopper under said trough and arranged to receive the finer particles discharged therefrom, and a rocking amalgam-holder arranged beneath the hopper in position to receive the material discharged therefrom.

The invention also contemplates certain novel features of the construction, combination, and arrangement of the various parts of the device, whereby certain important advantages are attained and the device is made simpler, cheaper, and otherwise better adapted and more convenient for use than various other similar devices heretofore employed, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a concentrator constructed in accordance with our invention. Fig. 2 is a vertical section taken longitudinally through the same in the plane indicated by the line *x x* in Fig. 3, and Fig. 3 is a plan view of the concentrator.

In the views, 1 represents the frame of the device, which may be of any construction, and 2 represents the driving-shaft, journaled transversely of one end thereof, and provided with a hand-wheel 3, whereby it may be operated by hand-power. On the end of shaft 2 is a pinion 4, meshing with a spur-gear 5 on a transverse shaft 6, also extending transversely across the frame. At about the center of the frame the shaft 2 is provided with a crank 7, to which is coupled a connecting-rod 8, connected at its forward end to the reciprocating trough 9, held in an inclined position in the frame by means of links 10 at opposite sides of its ends, and the upper or receiving end 11 of said trough is imperforate, so as to receive the water and material to be concentrated, while the middle portion of the trough is provided with an opening 12 in its bottom. The lower end portion 13 of the trough 19 is also imperforate, and is provided with pockets 14 to retain nuggets which may be too large to pass through a screen 15, extending across the open central portion 12 of the bottom of the trough. Below the open central portion 12 of the trough-bottom is arranged a hopper 16, covered by a screen 17, and having its bottom 18 formed in two sections inclined downward toward the center of the hopper, as clearly shown in the drawings, and separated to form an opening 19, arranged over a rocking receiver or pan 20, held on a strap 21, one end of which is extended above the bucket to form an arm 22, as shown in Fig. 1.

The arm 22 of strap 21 is connected to a bent rod 23, pivoted at 24 to the lower end of a lever 25, fulcrumed in the frame 1 of the machine and coupled at its upper end to a connecting-rod 26, the opposite end of which is connected to a crank 27 at one end of the shaft 6. The bucket or receiver 20 is mounted to rock or swing pivotally on a rock-shaft 30, journaled at its opposite ends in the frame and having a series of knives 31, arranged to play in the interior of the bucket or receiver. The rock-shaft 30 is provided with a crank 29 at its end, of less ~~throw~~ than the crank formed by the end 22 of strap 21 and coupled by a rod 28 to the lever 25.

In operation the water is admitted at the receiving end 11 of trough 9, and the aurifer-

ous sand, gravel, &c., is shoveled into said trough, so as to fall, by preference, on an upper screen 9^a, arranged therein above the screen 15. The trough being reciprocated, through its connection with the driving-shaft, causes the large stones, &c., to roll down and out at the discharging end 13 of trough 9, any nuggets which may be carried thereby being retained in the pockets 14. The fine particles pass through the screen 9^a and fall on the screen 15, where they are washed by the water down through said screen into the hopper 16, from which they are discharged into the receiver or bucket 20, which has a rocking movement imparted to it and holds in its bottom a quantity of mercury, as indicated at 32 in the drawings. The mass of moist material in said bucket is rocked and stirred by means of the knives 31, so that the fine particles and flakes of gold therein settle down in contact with the mercury, the sand, &c., falling over the edges of the bucket as the same is rocked.

The device, constructed as above described, is of an exceedingly simple and inexpensive nature and is adapted to be operated by very light power and requires but a few inches of water for successful working. It will be also understood that the device is susceptible of considerable modification without material departure from the principles and spirit of our invention, and for this reason we do not wish to be understood as limiting ourselves to the exact form of the parts herein set forth.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a concentrator, the combination with a frame sieve devices and means for operating the sieve devices, of a rock-shaft having a crank at one end, a pan loosely mounted on said rock-shaft and below the same, an arm rigid with the pan and projecting upwardly therefrom, the length of the arm being increased over that of the crank, agitator-knives carried on the rock-shaft and within the pan, a link pivotally connected to the arm, a second link pivotally connected to the crank, and means for driving said links, the said links having a uniform movement imparted to them, substantially as described.

2. In a concentrator, the combination with a frame sieve devices and means for operating the sieve devices, of a rock-shaft having a crank, an oscillating pan having the rock-shaft for its axis, a strap embracing the pan and having one end extended upwardly to form an arm, the length of which is increased over that of the crank, agitator-knives secured to the rock-shaft and within the pan, a link connected to the crank, a second link connected to the arm, and means for driving the links, the said means imparting a uniform movement to the links, substantially as described.

3. The combination with a frame, of a shaft rockably mounted therein, a bucket mounted to swing on said shaft, the shaft extending across the bucket, a knife fixed to the shaft and movable within the bucket, an arm fixed to the bucket, a crank on the shaft, the arm and crank being of different lengths, a link connected to the arm, a second link connected to the crank, and means for driving the links with a uniform movement, substantially as described.

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