

(No Model.)

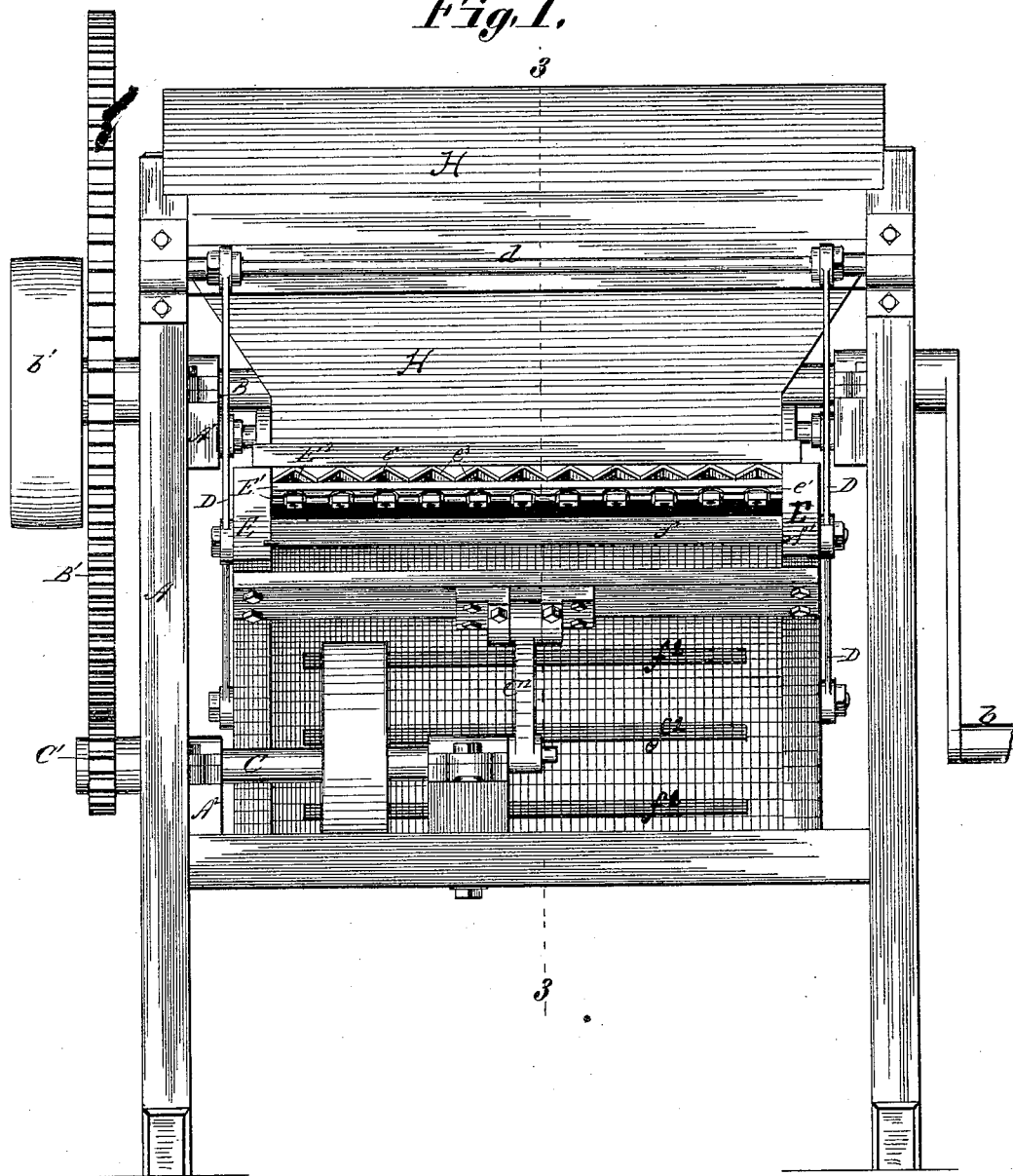
3 Sheets—Sheet 1.

W. L. CARD.
SCREEN.

No. 347,870.

Patented Aug. 24, 1886.

Fig. 1.



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Atty

(No Model.)

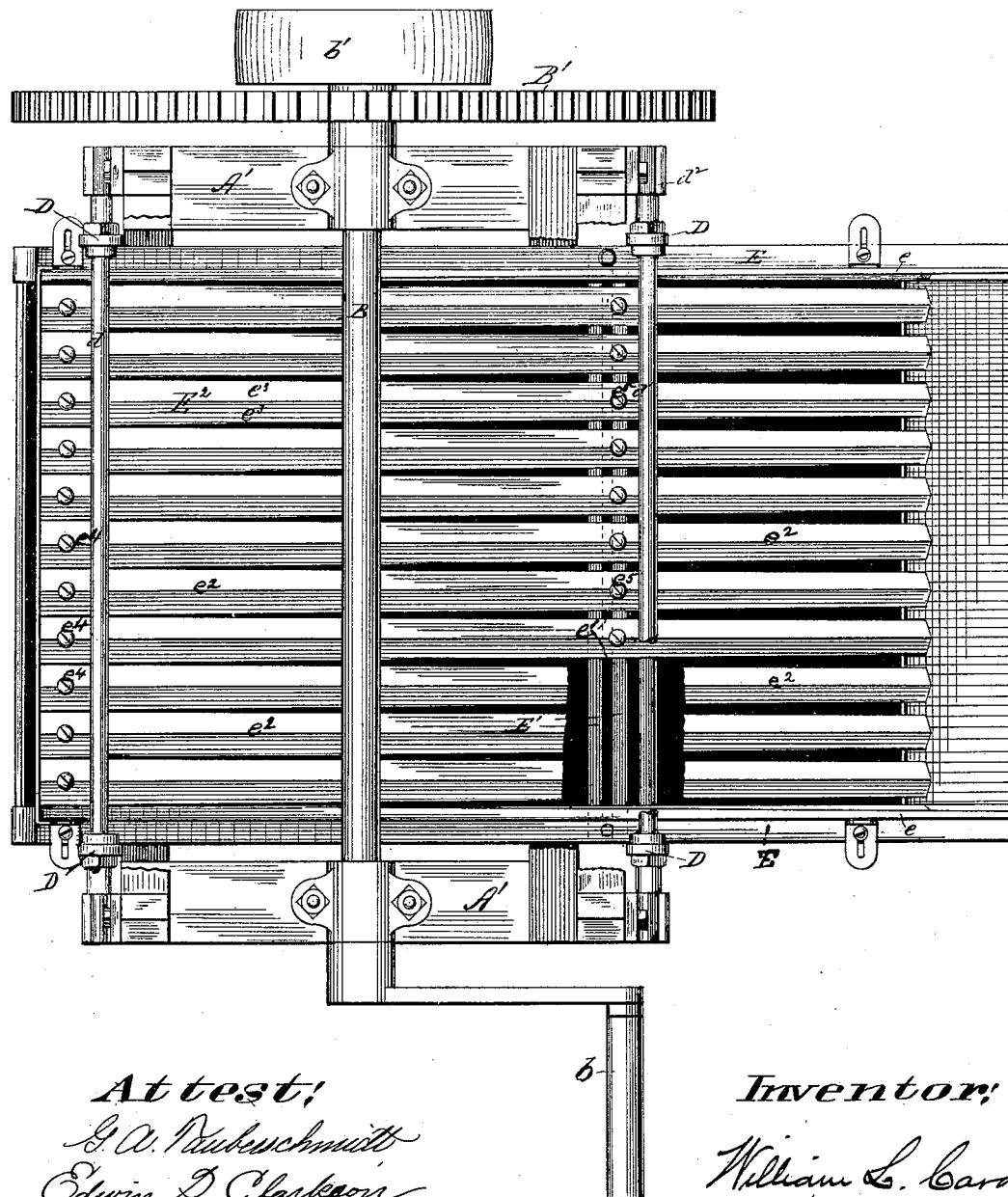
3 Sheets—Sheet 2.

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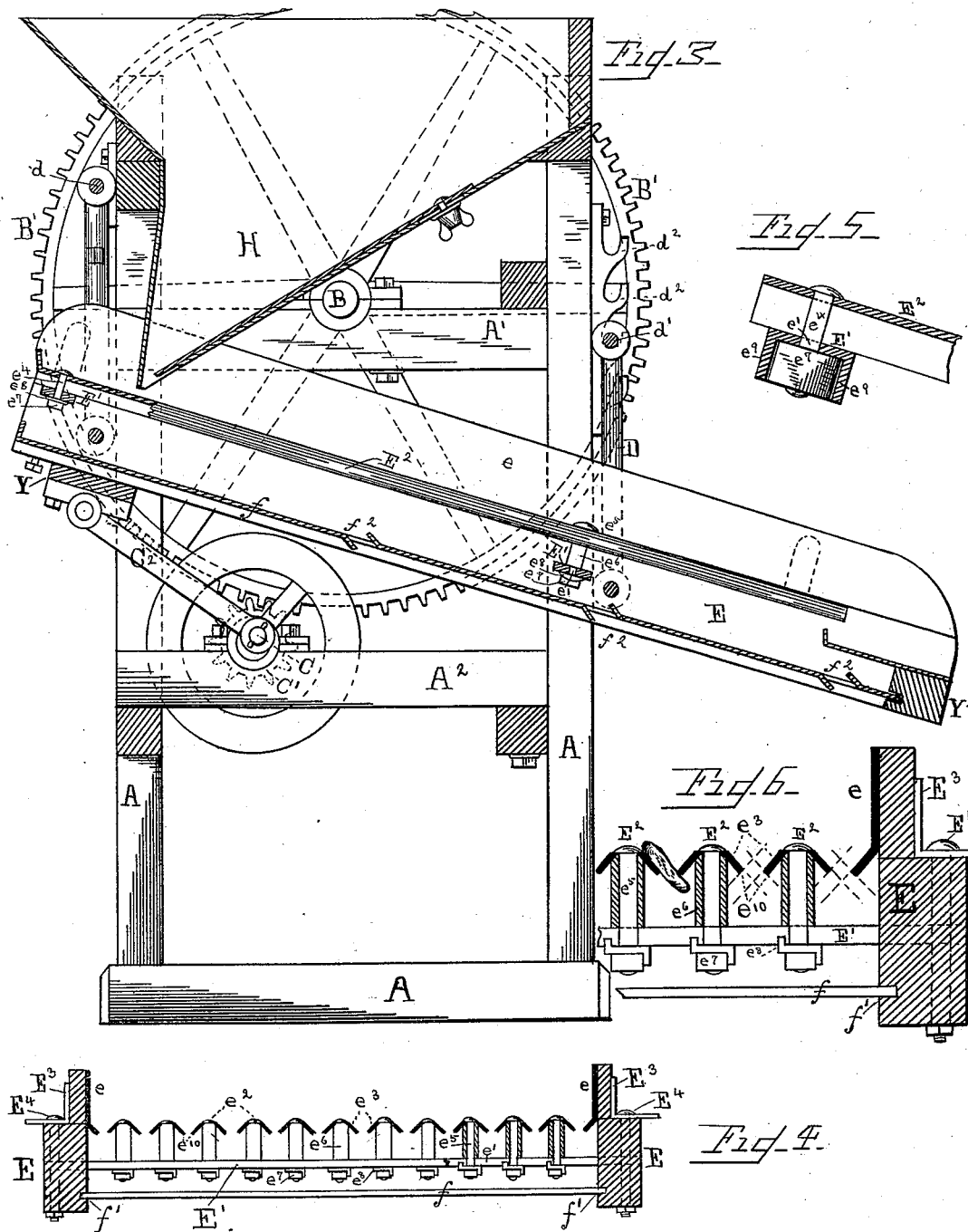
Fig. 2.



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Patented Aug. 24, 1886.



Witnesses

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Inventor

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UNITED STATES PATENT OFFICE.

WILLIAM L. CARD, OF LA CROSSE, WISCONSIN, ASSIGNOR TO THE TIERRA SECA MINING COMPANY.

SCREEN.

SPECIFICATION forming part of Letters Patent No. 347,870, dated August 24, 1886.

Application filed March 29, 1886. Serial No. 197,091. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. CARD, a citizen of the United States, residing at La Crosse, in the county of La Crosse and State of Wisconsin, have invented certain new and useful Improvements in Screens; and I hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to apply the invention.

This invention relates to that class of screens by means of which the material being separated may be graded into sizes.

In the drawings accompanying this specification, Figure 1 is an end elevation of my improved screen, looking toward the front or receiving end. Fig. 2 is a plan view thereof, the feeding-hopper being removed and some of the screen-bars being broken away. Fig. 3 is a vertical section thereof, taken on the line 3-3, Fig. 1. Fig. 4 is a transverse section of the screen. Fig. 5 is a sectional detail view illustrating one form of supporting-rail for the screen-bars; and Fig. 6 is an enlarged detail view of three adjacent bars, E², showing how flake gold and like flat thin substances are enabled to pass through the screen.

Like letters refer to like parts wherever they occur.

Various elements or the whole of my improved screen, when properly adjusted for the special work, may be used with advantage in separating or grading materials differing greatly in form and general characteristics, among which may be mentioned shot, coal, coffee, and other seeds, small fruits, nuts, &c. The mechanism, however, has been organized with special reference to the separation and grading of auriferous earth or sand obtained in placer mining, and I will confine my description chiefly to its use in that connection.

The mechanism embodying my improvements is mounted upon a stout frame, A, to the uprights or standards of which are secured, at suitable heights, upper and lower horizontal side pieces, A' and A². The driving-shaft B is journaled in bearings secured to the upper side pieces, A', and keyed to this shaft is a large cog-wheel, B', meshing with a pinion, C', keyed upon a crank-shaft, C, which is journaled in bearings secured to the lower

side pieces, A². The shaft B is fitted with a hand-crank, b, and a band-pulley, b', in order that it may be actuated either by hand or power.

The screen or separator frame is swung within the frame A from the lower ends of links D, the upper ends of which are secured to rock-shafts d and d', respectively journaled in bearings fixed to the front and rear uprights or standards of frame A.

It is desirable that the inclination or slant of the screen from the head to the tail end may be changed to more perfectly adapt it for screening or grading of different materials, and while this end may be attained in many ways, I have illustrated in Fig. 3 simple and effective means for accomplishing the purpose. This means consists, as shown, of a vertical series of bearings, d², secured to the standards of the frame A, in any pair of which bearings the rock-shaft d' may be journaled.

To give the screen a regular oscillating motion, I connect it by means of pitman C² with a crank of shaft C.

The screen-frame is composed of the side pieces, E, connected by transverse bars E', which support the screen bars or fingers E². Additional cross-pieces, Y Y', may be used, if desired, to strengthen the screen. These supporting-bars E', I prefer to arrange in pairs, as shown in Figs. 2, 3, and 4, with a narrow space, e', between them, to permit of the lateral adjustment of the bolts e⁴ and e⁵, which connect the screen-bars E² with said supporting-bars, though in lieu of the double bars E' single bars may be used having longitudinal slots to admit of such adjustment of bolts e⁴ and e⁵. The screen-bars E² extend from end to end of the screen, and may be of any cross-sectional contour, provided the upper or working surface be given a downward slope, e³, on either side of a longitudinal ridge, e², as illustrated in Figs. 1 to 4, inclusive. These bars E² are secured at the head end directly to the supporting-bars E' of the screen-frame by bolts e⁴, passing through the screen-bars E² and between the pairs of supporting-bars E', while at the tail end I prefer that the lower outer edges of the screen-bars shall not rest directly upon the supporting-bars, as otherwise should a large piece of material in traversing the

screen protrude through the screening or grading space between two bars it would come in contact with the supporting-bars E' and be liable to lodge there and choke or clog the screening space or opening. I therefore connect the screen-bars to the supporting-bar by stay-bolts or ordinary screw-bolts, e' , passing through sleeves e'' , which latter support the screen-bars above the supporting-bars.

10 The screen-bars E^2 are so adjusted at the head of the screen that their edges nearly meet, the slight space between them gradually increasing in width toward the tail end of the screen. This end may be attained in various ways—as, for instance, the blanks from which the bars are made may be tapered from end to end; or blanks having parallel edges may be bent to give the working-surfaces e^3 a steeper slope at the tail end than at the head end; or 20 parallel edged bars may be bent evenly throughout their length and arranged fan-shape upon the supporting-bars. Upon the side rails, E , of the screen-frame are mounted half screen-bars e , the lower edges of which terminate abreast of or in the same plane as the lower edges of said adjacent bars E^2 , as shown in Fig. 4. It will be noted that as the lower edges of the screen-bars E^2 are all in the same horizontal plane, and with their edges e^{10} cut at right angles to their surfaces, a plane 30 extended from the edge of any one bar E^2 will be parallel to the inclined face e^3 of the adjacent bar, so that any thin flat substance resting on the inclined face e^3 of the adjacent bar will not be arrested by the lower edge of the first-named bar, but will pass through, as is indicated in dotted lines, Fig. 6. The side rails, E , to which said half screen-bars e are secured, are rendered laterally adjustable by means of 40 slotted angle-irons E^3 and set-screws E^4 .

The lower ends of the screw-bolts e' and e'' are provided with nuts e' , and to prevent the loosening of these nuts and the accidental displacement of the screen-bars E^2 , I interpose a locking-plate, e^8 , between the nuts and the supporting-bars E' , one end of said locking-plate e^8 being turned upward between the bars E' , and the other end downward against one of the faces of the nuts. In the modification 50 shown in Fig. 6 I avoid the necessity of a locking-plate, e^8 , as the transverse supporting-bars E' are constructed of angle-iron, and the nuts e' will be held tightly between the downwardly-extending wings e^9 of said bars. In this case the bolts of course would have to be 55 screwed into the nuts from above, or the wings e^9 notched and bent outwardly to admit of the turning the nuts upon the bolts, and again bent downward to lock the nuts. By loosening these nuts e' the screen-bars E^2 may be adjusted laterally to increase or decrease the width of the spaces between the bars, and thus fit the screen for the grading of different materials. The bars e may also be adjusted 65 laterally to suit the character of the material to be operated upon.

It is to be understood that in the lateral adjustment of the screen-bars the gradually-increasing width of the slots from head to tail is to be preserved. 70

The hopper H is supported by the frame A , and distributes material across the screen at the head end, as is usual in such structures.

The side rails, E , of the screen-frame are provided, at points below the transverse supporting-bars E' , with grooves or ways f' , to support and guide a grading-tray, f , having in the instance illustrated three discharge-openings, f^2 , through which the graded material falls into any suitable conveyer or receptacle. It is apparent that if the tray f is adjusted in its grooves or ways f' toward the head of the screen the material discharged from the openings f^2 will be of a finer grade than if the tray is pushed down toward the tail, and it also follows that if, in addition to adjusting the tray down toward the tail of the screen, as shown in Fig. 3, the bars E^2 are spread so as to increase the width of the slots at the tail of the screen, very much coarser grades of material can be obtained, and vice versa. 85 90

In operation the driving-shaft B will impart motion to shaft C and cause a reciprocating movement of the screen. Material fed from the hopper will fall upon the screen at the head end and tend to slide down the inclined faces e^3 of the screen-bars to the screening and grading spaces between them. 95

In the auriferous earths obtained from the placer mines of Mexico and the southwestern portion of the United States a large percentage of the gold is of a flat form. I have taken the advantage of this peculiar formation of the gold particles in constructing a screen for grading auriferous earths by forming the lower edges of the screen-bars to terminate in a plane parallel with the inclined surfaces e^3 of the next adjacent bars. (See Fig. 6.) Hence these flattened particles pass readily through the screening-spaces at a point where a rounded grain of sand or gravel of less bulk will not pass, but be carried farther down the screen and be discharged at the tail end, while "flake gold" will pass through the screen with the fine material near the head end. 100 105 110 115

A screen embodying the peculiarities of construction hereinbefore described presents a twofold advantage, inasmuch as the inclined working-surface e^3 of the screen-bars force all material fed to the screen to traverse the grooves or channels between the crowns of adjacent bars, thus preventing fine material from being carried over the tail end of the screen, and as the screening slots or spaces between the bars diverge from head to tail the particles of material will pass through said spaces in progressive order, according to size, thus providing for the simultaneous screening and grading of the material indefinitely, as both the diverging spaces between the screen-bars and the sliding tray f can be 120 125 130

adjusted independently of each other, and also relatively to each other, and as a result any number of grades of material or any ranges of size in a single given grade may be secured.

5 Having thus described the nature, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

10 1. The combination of the screen-frame, provided with transverse supporting-bars, and screen-bars adjustably secured above and out of contact with said supporting-bars at the tail end of the screen, substantially as and for the purposes specified.

15 2. A screen-frame provided with transverse supporting-bars arranged in pairs underneath the screen-bars, and with spaces between them, in combination with screen-bars, and with connecting-bolts passing through the
20 spaces between the pairs of supporting-bars, whereby the screen-bars are held above and out of contact with the supporting-bars, and may be adjusted laterally upon the supporting-bars, substantially as and for the purposes
25 specified.

30 3. A screen-frame provided with transverse supporting-bars arranged in pairs, in combination with the screen-bars adjustably secured upon and above the supporting-bars, and the independent laterally-adjustable side half-bars secured to the side rails of the frame, substantially as and for the purposes specified.

4. The combination of the screen-frame, transverse supporting-bars, screen-bars secured at the head end of the screen directly to the transverse bars, and stay-bolts which support the screen-bars above the supporting or transverse bars at the tail of the screen substantially as and for the purposes specified. 35

5. The combination, with a screen having bars arranged to form slots increasing in width from head to tail, of a tray provided with discharge-openings and supported in ways carried in the side rails of the screen, substantially as and for the purposes specified. 40

6. The combination, with a screen having laterally-adjustable screen-bars, of a longitudinally-adjustable tray having discharge-openings, substantially as and for the purposes specified. 45

7. The combination, with a screen having bars arranged to form slots which increase in width from head to tail, of a longitudinally-adjustable tray having discharge-openings, substantially as and for the purposes specified. 50

In testimony whereof I affix my signature, in presence of two witnesses, this 20th day of March, 1886. 55

WILLIAM L. CARD.

Witnesses:

ALBERT BLAIR,
GEO. WALKER.