No. 781,787. PATENTED FEB. 7, 1905.

F. S. PROUTY.

APPARATUS FOR RECOVERING MINERALS.

APPLICATION FILED JULY 31, 1903.

3 SHEETS—SHEET 1.

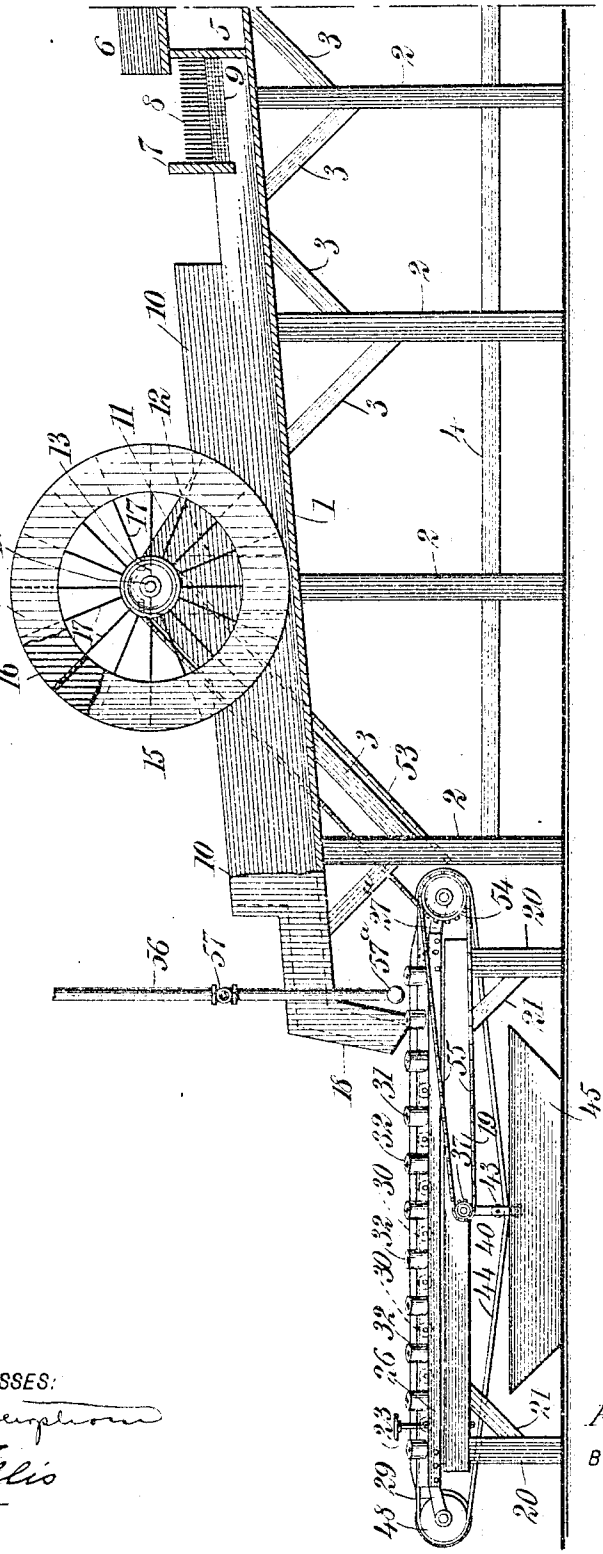


Fig. 1

WITNESSES:

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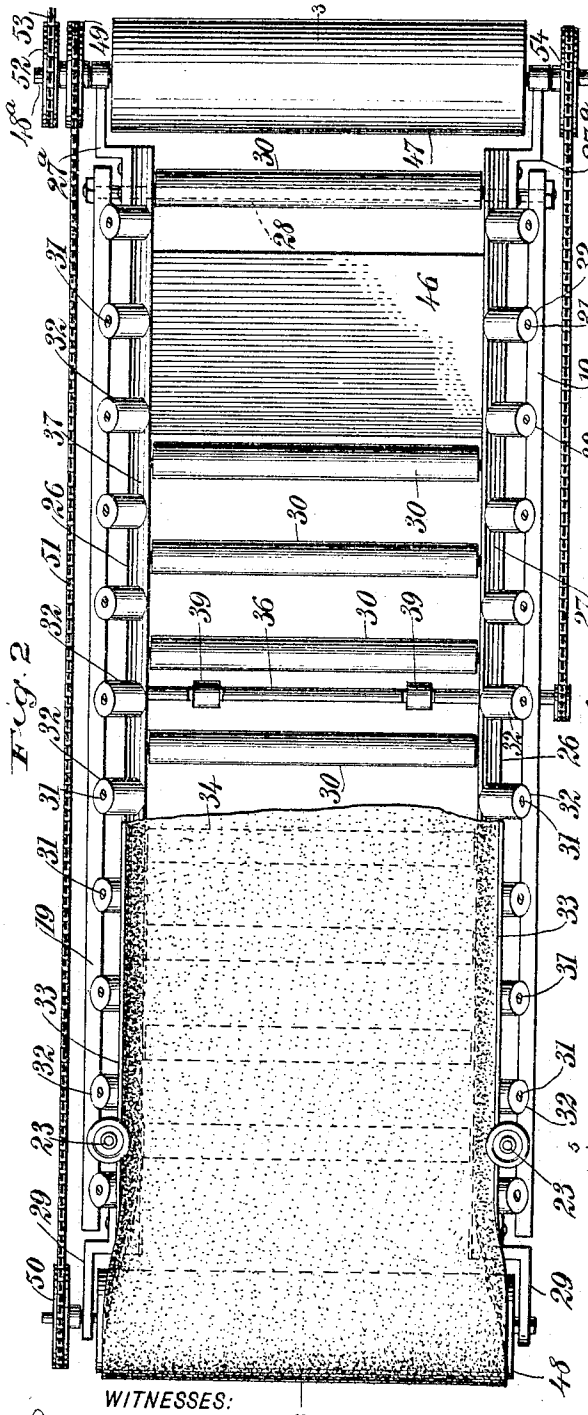


Fig. 2

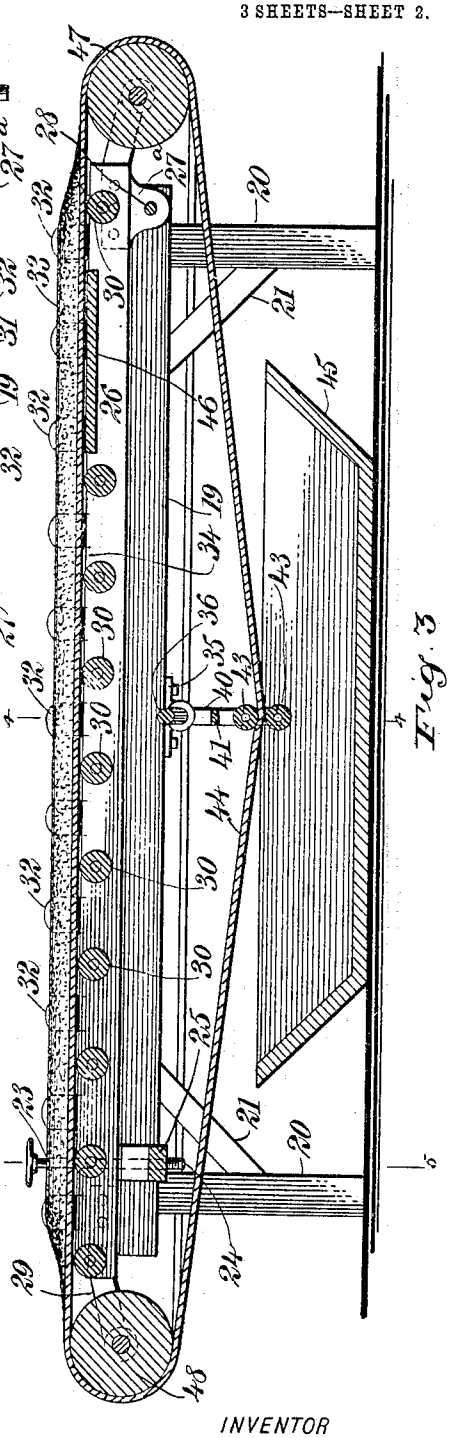


Fig. 3

WITNESSES:

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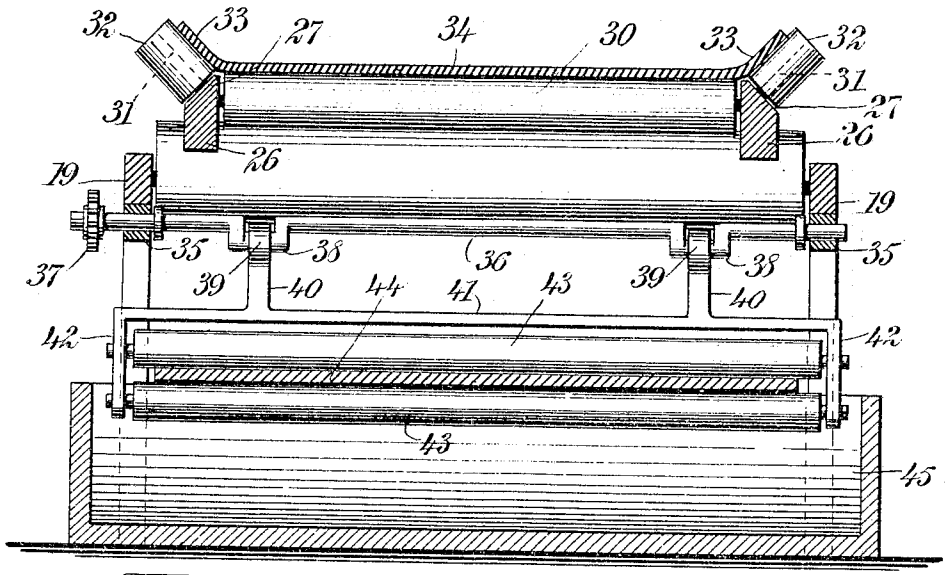


Fig. 4

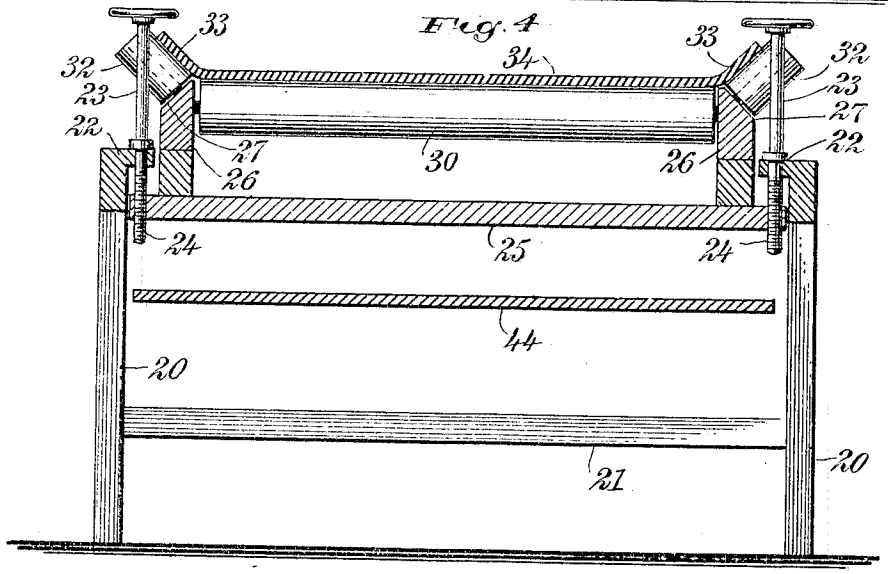


Fig. 5

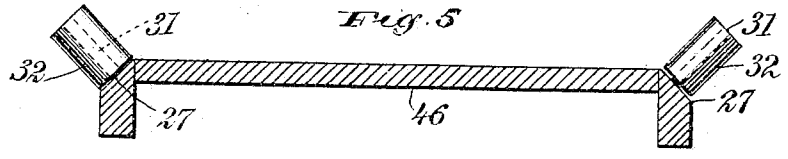


Fig. 6

WITNESSES:

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No. 781,787. Patented February 7, 1905.

UNITED STATES PATENT OFFICE.

FRANCIS S. PROUTY, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR RECOVERING MINERALS.

SPECIFICATION forming part of Letters Patent No. 781,787, dated February 7, 1905.

Application filed July 31, 1903. Serial No. 167,679.

To all whom it may concern:

Be it known that I, FRANCIS S. PROUTY, a citizen of the United States, and a resident of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Apparatus for Recovering Minerals, of which the following is a full, clear, and exact description.

This invention relates to apparatus or means for recovering or separating gold and other minerals in placer and similar mining operations; and it consists, substantially, in the construction, organization, and combinations of parts hereinafter particularly described, and pointed out in the claims.

One of the principal objects of my invention is to effect the recovery or separation of gold and other minerals from the detritus or mixtures of water and earthy matters containing the same without the employment of an amalgamating substance, as quicksilver, for that purpose and also to overcome numerous disadvantages and objections found to exist with other apparatus or means hitherto devised with like objects in view.

A further object of the invention is to provide apparatus or means of this kind which are comparatively simple and inexpensive to construct, besides being easily operated and controlled, as well as effective and reliable in use and possessing the capacity for long and repeated service.

The above and additional objects are attained by means substantially such as are illustrated in the accompanying drawings, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 represents a side elevation, partially broken away, of my improved separating apparatus. Fig. 2 is an enlarged top plan view of part of the apparatus shown in Fig. 1 and illustrating more clearly the construction and operation of the separating bed or table and the auxiliaries thereto. Fig. 3 is a longitudinal sectional view taken substantially in the plane of the broken line 3 3 of Fig. 2. Fig. 4 is an enlarged transverse sectional view taken substantially in the plane of the broken line 4 4 of Fig. 3. Fig. 5 is a similar view taken about on the broken line 5 5 of Fig. 3, and Fig. 6 is also an enlarged transverse sectional view in detail of a part of the separating bed or table.

Reference being had to the accompanying drawings by the designating characters marked thereon, 1 represents a chute or incline, which may be properly supported at any desired height by uprights 2 or in any other way, suitable braces 3 and 4 being employed between said parts for the purpose of strengthening the structure. The upper end 5 of said chute may lead from a sluice 6 or other source of flowing mixture (as water and sand and like substances) laden with gold or other minerals to be recovered or separated, and at this end of the chute, directly beneath the end of the sluice, is a griddle 7, onto which the mixture first falls, said griddle preferably being constituted of an upper coarser section 8 and a lower finer section 9, each section consisting of bars or the like arranged suitable distances apart and permitting passage between them of different grades of the mixture, the grades which are too coarse to pass between the bars of the said upper section falling off at the sides, as is apparent. The said chute or incline 1 is provided with suitable sides 10, as shown, which are preferably of increased height at 11, suitable inner supports 12 being employed in connection with these higher portions for bearings 13 of the shaft 14 of a power-wheel 15, which is preferably of such diameter as to have the peripheral portions thereof come quite close to the upper surface of the chute as the wheel is rotated. Said wheel may be of any desired form, being shown in the present instance as constructed of two rings or disks 16 (moving close to the inner surfaces of the sides of the chute) and a series of connecting buckets or blades 17, preferably radiating from the said shaft, as shown, the outer or free ends thereof extending practically to the edges of the disks, thus to receive the impact of the flowing mineral-laden mixture as the latter passes down the chute from the sluice via the griddle, as already suggested. The lower end of the said chute or incline 1 is provided with a drop-section 18, leading directly to one (the inner) end of the separating-bed of the apparatus,

said bed comprising stationary parallel longitudinal frame portions 19, maintained at a suitable height or elevation by means of standards or uprights 20, having braces 21, said frame portions being formed near the outer end of the separating-bed with inturned or other suitable brackets 22, (see Fig. 5,) through which pass suitable vertical adjusting-screws 23, having their threaded portions 24 working in openings therefor at or near the ends of a transverse strip or bar 25, extending between said frame portions 19 at this point of the latter. The said transverse strip 25 serves to support the free outer end of a movable supplementary frame constructed of duplicate parallel members 26, which are formed for their full lengths with outwardly and downwardly inclined surfaces 27, said members having attached brackets 27^a near their inner ends, which are pivotally supported at or near the inner ends of the stationary frame portions 19 in any suitable manner, as by means of a cross-rod 28, it being noted that substantially similar brackets 29 are attached to the other or outer ends of said parallel members 26. (See Figs. 2 and 3.) Supported between these members 26 are suitable transverse horizontal rollers 30, disposed at suitable distances apart, as shown, while secured in the inclined surfaces 27 of said members are the outwardly and upwardly inclined spindles or shafts 31 of a series of guide-rollers 32, against or upon which move the longitudinal edge or marginal portions 33 of the upper portion of an endless traveling mineral-separating belt 34, as presently explained, the inner surface of the upper part of such belt moving in contact with the surfaces of said transverse rollers 30. (See Figs. 2, 4, and 5.) About midway of the ends of the stationary frame portions 19 suitable bearings 35 are provided for the ends of a transverse shaft 36, having at one end a gear-pinion 37 and formed with double cranks 38, to which are pivotally connected at 39 the vertical branches 40 of a transverse yoke 41 between the downwardly-turned end portions 42, of which are supported, one above the other, the shafts of preferably duplicate rollers 43, between which passes the lower movable portion 44 of the said traveling separating-belt 34, as shown. Beneath said yoke and rollers is located a stationary tank 45 of suitable capacity for containing water into which the gold or other mineral is precipitated when beaten from or dislodged from the interstices of the material of the belt, as hereinafter described. Beneath the upper moving portions of the belt, at near the inner ends of the said members 26 of the movable supplementary frame, is a rigid platform 46, of wood or other suitable hard material, for receiving the initial force of the mineral-containing mixture as it falls or descends onto the belt from the chute.

I have discovered that ordinary jute or like fibrous material possesses a texture admirably adapting the same for catching and retaining therein the mineral particles, and I therefore employ this material for the separating-belt, since the same possesses a heavy nap and when wet and subjected to the friction of the material passing thereover the fibers thereof stand out more firmly and thickly, which greatly adds to the results or gold-saving capacity of the apparatus, as is apparent. Said belt passes around the drums 47 and 48, supported to turn between the pairs of brackets 27^a and 29, respectively, the shaft 48^a of the drum 47 having a gear-wheel 49 connecting with a similar gear-wheel 50 on the corresponding end of the shaft of the drum 48 by means of a sprocket or other gear chain, 51, said shaft 48^a also having thereon another gear-wheel, 52, which is connected with a similar wheel (not shown) on the shaft of the power-wheel 15 by means of a chain or belt 53, it being in this way that the belt is operated. On the other end of shaft 48^a is still another gear-wheel, 54, which is connected to the gear-pinion 37 on crank-shaft 36, also by means of a chain or belt 55. (See Figs. 1 and 2.)

Located in the vicinity of the drop-section 18 of the chute and substantially above the rigid platform 46 is a vertical pipe 56, having a controlling-cock 57 and provided with a horizontal branch 57^a, which may be perforated to spray water upon the separating-bed to prevent banking up of the material at such end of said bed, this water giving to the material a spreading tendency, as will be readily understood.

In operation the power-wheel is driven by the flow of the mineral-laden mass, as already explained, and this mass after passing beneath said wheel passes on and is delivered upon the traveling separating-belt, the mineral particles of the mass being caught or embedded in the material of the belt, also as already mentioned, the said belt being operated from the shaft of the wheel, as indicated. As the successively-moving portions of the belt travel around beneath the rollers 30 of the supplementary frame of the bed the under portions of the belt are beaten against the surface of the water in the tank 45 by the operation of the crank-shaft and its pivoted yoke, and thus are the embedded mineral particles loosened from the material of the belt and deposited in such water, from which they are subsequently recovered in any suitable way. By means of the adjusting devices 23 the outer or free end of the supplementary frame (and belt) may be elevated to any desired height relatively to the other or inner end thereof, accordingly as may be required in operation, as is well understood. While the upper portions of the belt are moving above the rollers 30 of the bed the longitudinal edges thereof are curled or turned up-

wardly, as shown, thus tending to retain the mass of falling material thereon.

While I have herein represented my improvements in a certain preferred embodiment, it will be understood, of course, that I am not limited to the precise details thereof in practice, since immaterial changes therein may be resorted to coming within the scope of my invention.

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

1. An apparatus for collecting minerals comprising a chute, a power-wheel mounted therein, a griddle at the head of the chute, the lower end of the chute being provided with a downwardly-projecting section, an endless traveling belt of fibrous material to which the chute leads, and a rigid platform over which the upper moving portion of the belt passes, the said platform being adapted to receive the initial force of the material falling from the downwardly-extending section of the chute.

2. An apparatus for collecting minerals comprising a chute, a power-wheel mounted therein, an endless traveling belt of fibrous material, means for imparting upward bends to the edges or margins of the upper portions of the belt, a rigid platform located beneath the upper portion of the belt to receive the initial force of the material falling from the chute, a tank of fluid beneath the belt, means for operating the belt from the wheel, means for beating the under portion of the belt against such fluid, said means including a crank-shaft, also operated from the said power-wheel.

3. An apparatus for collecting minerals, comprising a chute, a power-wheel mounted in said chute, an endless traveling belt of fibrous material located beneath the lower end of the chute, means for driving the belt from the wheel, the lower end of the chute being provided with a downwardly-projecting section leading directly to the inner end of the belt, and a rigid platform located beneath the upper moving portion of the belt, to receive the initial force of the material falling from the downwardly-projecting section of the chute.

4. An apparatus for collecting minerals, comprising a chute, a power-wheel mounted therein, an endless traveling belt of fibrous material, drums over which said belt passes, a rigid platform located beneath the upper moving portion of the belt near the inner end, the chute having a downwardly-projecting section, discharging upon said belt above the platform, a vertical water-spray pipe located above the inner part of the belt adjacent to the downwardly-extending section of the chute and above the rigid platform, a tank of fluid beneath the belt, means for operating one of the roller-drums from the wheel, means for beating the under portions of the belt against the fluid in the tank, and a driving connection between the said roller-drum and the said beating means.

5. An apparatus for collecting minerals comprising a stationary frame having parallel longitudinal frame portions provided near their outer ends with inward extensions, vertical adjusting-screws passing through said extensions, a transverse bar extending between said frame portions and in which the threaded portions of the screws work, and a movable supporting-frame supported on said transverse bar and constructed of longitudinal parallel members formed throughout their length with outwardly and downwardly inclined upper surfaces, guide-rollers mounted on said inclined surface, brackets connected with the ends of said parallel members, transverse rollers supported between the said parallel members, a rigid platform extending between said parallel members near the inner end thereof, drums mounted to turn between the pairs of brackets, an endless belt of fibrous material passing around said drums, the inner surface of said belt moving in contact with the surface of said transverse rollers and that of the said platform, and the longitudinal edge or marginal portion of the upper run of said belt moving upon said guide-rollers, and a chute having a downwardly-extending section arranged to discharge the material upon the belt at the said platform.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS S. PROUTY.

Witnesses:
A. A. RUSSELL,
S. S. PROUTY.