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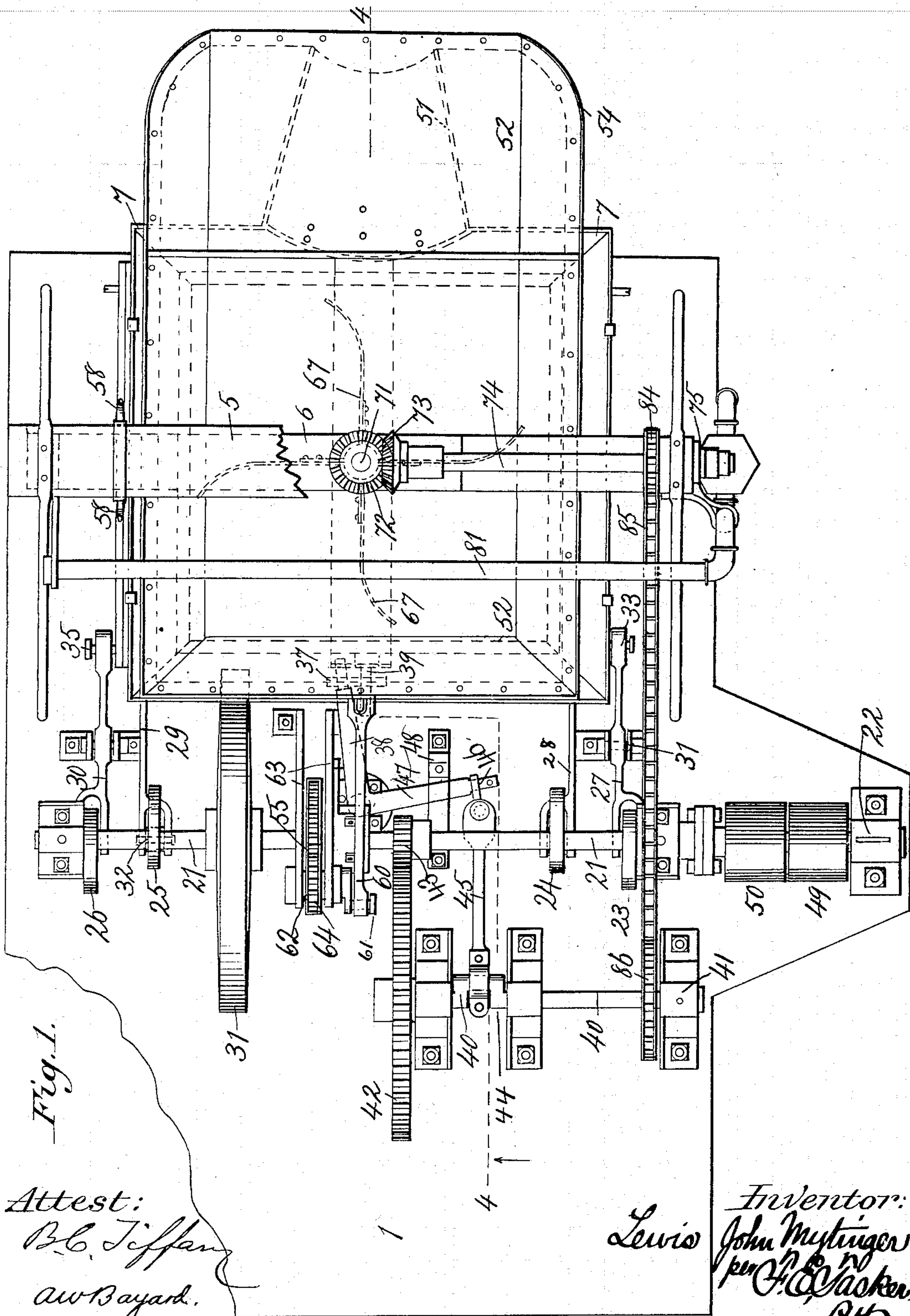
**Patented Dec. 6, 1898.**

L. J. MYTINGER.  
ORE WASHER.

(Application filed June 6, 1896.)

(No Model.)

4 Sheets—Sheet 1.



*Attest:*

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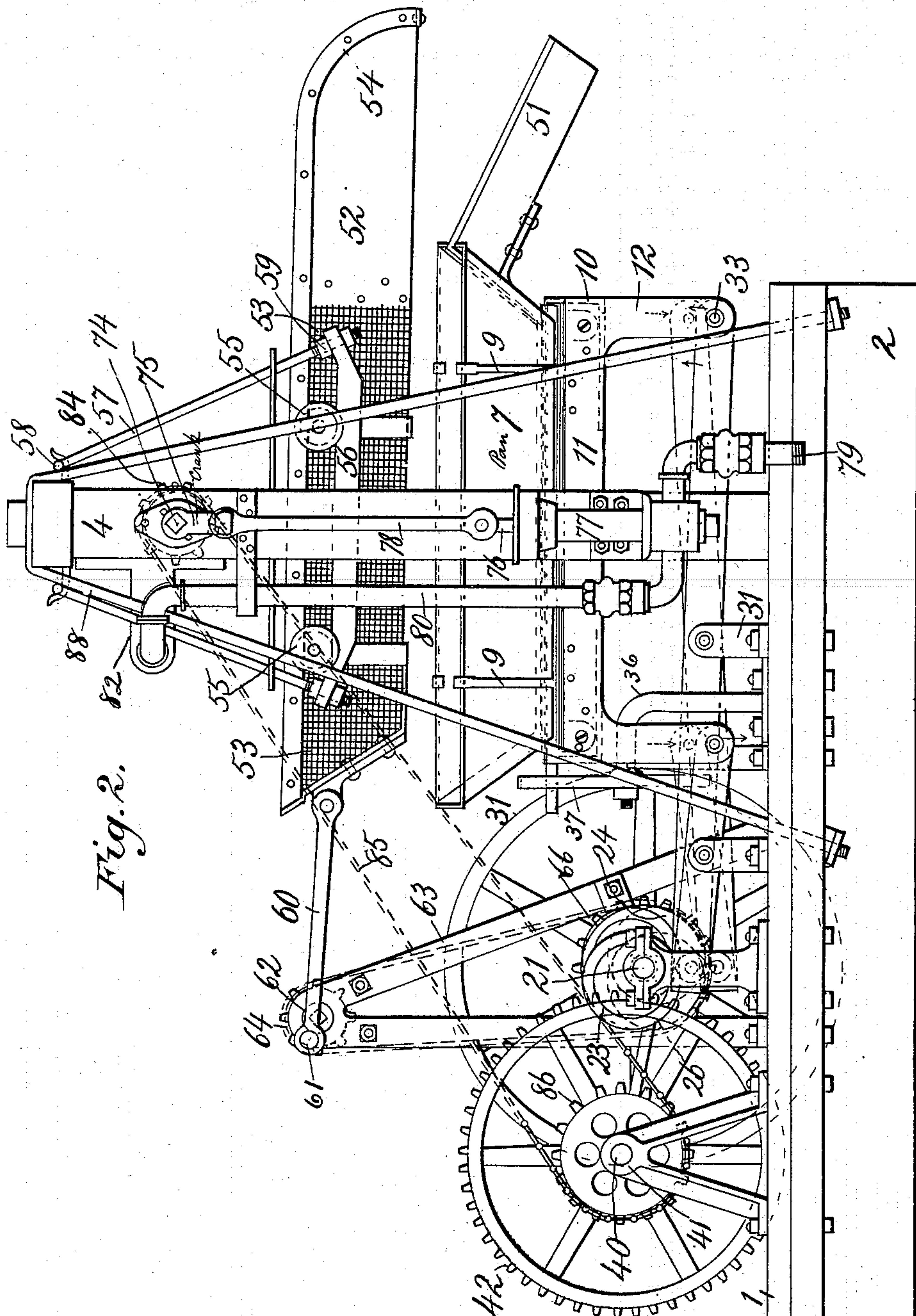
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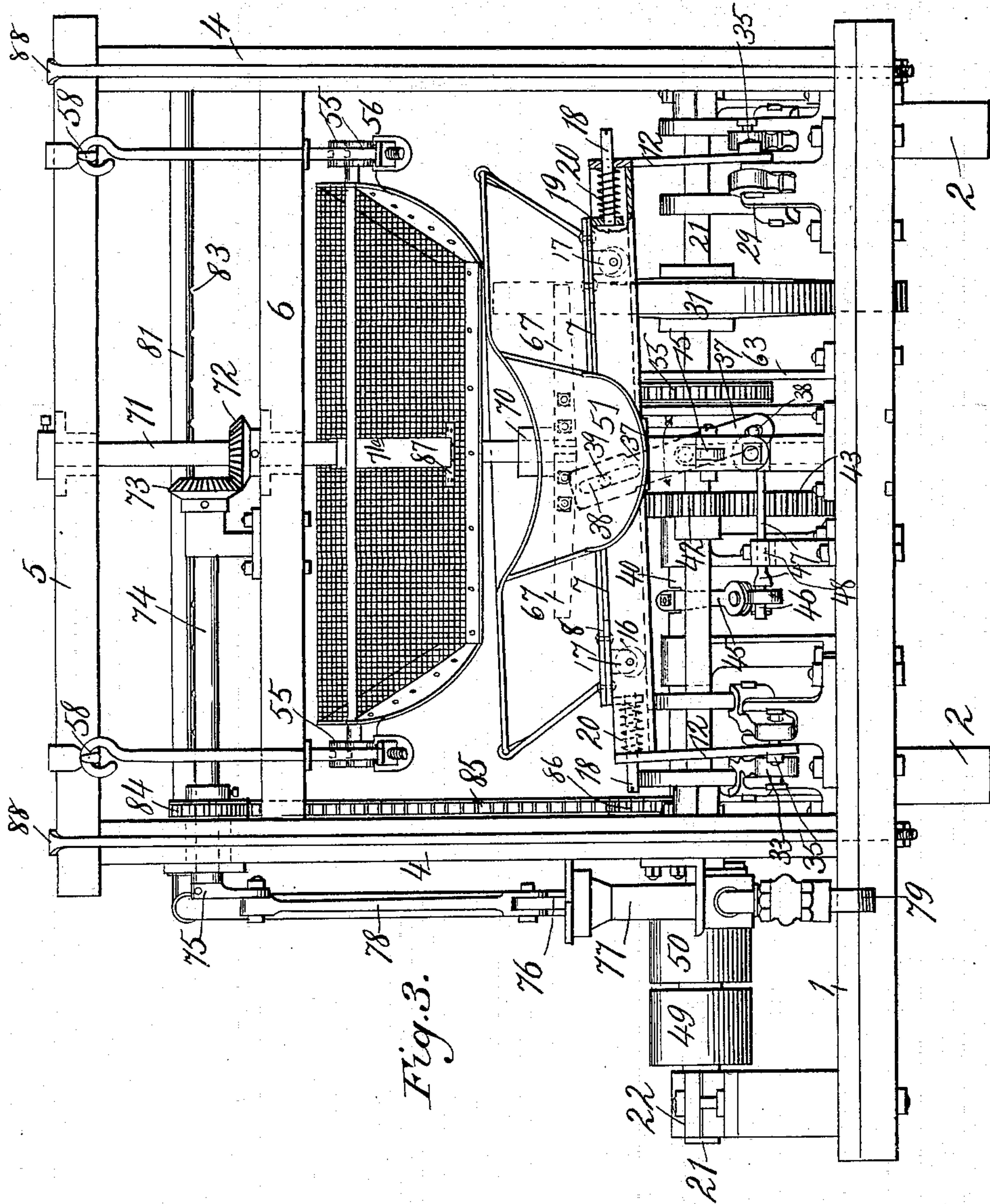
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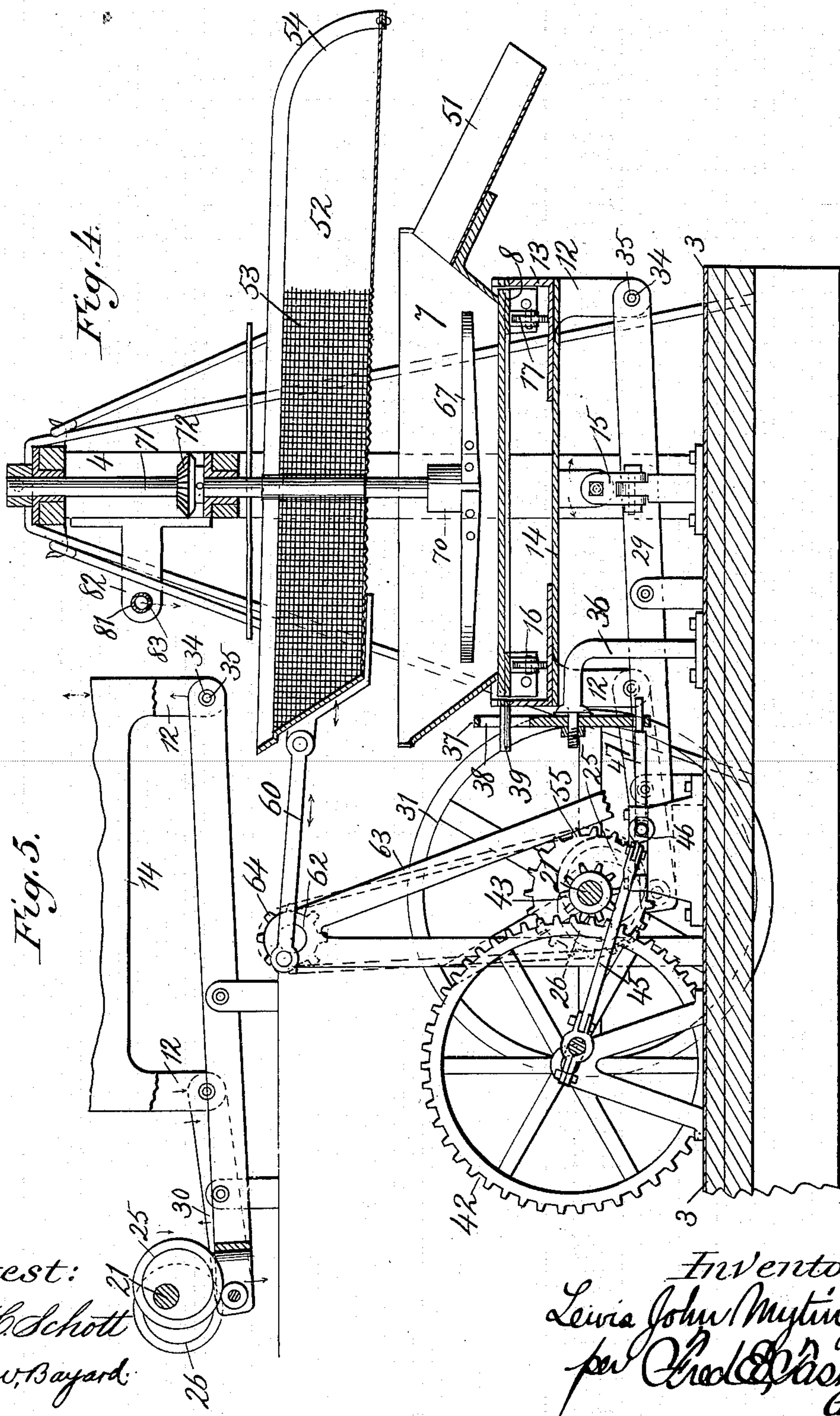
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# UNITED STATES PATENT OFFICE.

LEWIS JOHN MYTINGER, OF SACRAMENTO, CALIFORNIA.

## ORE-WASHER.

SPECIFICATION forming part of Letters Patent No. 615,459, dated December 6, 1898.

Application filed June 6, 1896. Serial No. 594,567. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS JOHN MYTINGER, a citizen of the United States, residing at Sacramento, in the county of Sacramento and State of California, have invented certain new and useful Improvements in Ore-Washers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is the production of an apparatus of the general class known as "ore-washers" of simple and durable construction, of minimum weight, and economical and efficient in operation.

To the accomplishment of the foregoing objects, my invention consists in certain novel apparatus for imparting to a supporting-pan a motion similar to that which the miner imparts to the hand-pan (acknowledged to be the most efficient separating means extant) and in certain other mechanical expedients looking to the production of an apparatus of maximum effectiveness in the separation of what is known as "flour" or "float" gold from tailings or other dross.

Referring to the accompanying drawings, Figure 1 is a top plan view of my complete apparatus with parts of the frame broken away. Fig. 2 is a side elevation. Fig. 3 is an end view thereof. Fig. 4 is a vertical longitudinal section on the line 4 4 of Fig. 1, and Fig. 5 is a detail view of the table-supporting frame-actuating mechanism.

Referring to the figures on the drawings, 1 indicates a platform or bed-plate upon which my apparatus is mounted, and 2 2 indicate supporting-sills.

The bed-plate 1 may be provided with a sheathing 3 of sheet metal and is surmounted by a frame located transversely and near the front end thereof, which frame is composed of side pieces or standards 4, a head-beam 5, supported by the standards 4, and a cross-beam 6, located a suitable distance below the head-beam and secured to the standards by any suitable means.

7 indicates a separating-pan supported within the frame upon a table 8, to which it is secured by straps 9.

10 indicates a table-supporting frame com-

posed of side pieces 11, provided at their opposite ends with depending legs 12, angle-iron end pieces 13, connecting the opposite ends of the side pieces, and a supporting-bar 14, secured to the under sides of the end pieces and supported at its middle by a universal joint 15, carried by the bed-plate 1.

The table 8 is designed to move laterally within the table-supporting frame, and to accommodate this movement with the minimum resistance it is provided with a number of rollers 16, carried in suitable pendent bearings 17.

18 indicates guide-rods secured to depending brackets 19 upon the table 8 and extending through apertures in the side pieces 11 of the table-supporting frame, and 20 20 indicate spiral springs surrounding the rods 18 intermediate of said brackets and side pieces for the purpose of presenting a yielding resistance or cushion to the movement of the table within the frame.

21 indicates a power-shaft journaled in suitable bearings 22, bolted to the bed-plate, and 23, 24, 25, and 26 indicate eccentrics carried by the shaft 21 and set quartering.

27, 28, 29, and 30 indicate levers fulcrumed medially in bearings 31 upon the frame and having their opposite ends provided, respectively, with rollers 32 in contact with the eccentrics and with loose pivotal connections 33 at the lower extremities of the legs 12. The connections 33 are preferably made by providing the extremities of the levers with countersunk steel bushings 34, through which pass elongated pivot-pins 35 of sufficient length to permit of the rocking or rolling of the supporting-frame in the manner hereinafter described.

36 indicates an angular standard bolted to the bed-plate and pivotally supporting a vertically-disposed oscillatory lever 37, provided at its upper end with a slot 38, designed to engage a pin 39, projecting from the table at about the middle of its rear side. It will be observed that the oscillation of this lever will impart a transverse reciprocatory movement to the table within the frame 10, the horizontal flanges of the angle-iron end pieces 13 constituting tracks for the rollers 16 and the springs 20 tending to prevent jarring of the parts.



In order to impart the requisite oscillatory movement to the rock-lever 37, I provide a crank-shaft 40, journaled upon the bed-plate in suitable bearings 41 and located in the rear of and parallel to the shaft 21, being geared thereto through intermeshing pinions 42 and 43 of such varying diameters as to impart a comparatively slow rotatory movement to the shaft 40. To the crank 44 of the shaft 40 is connected a pitman 45, which is connected at its opposite end by a knuckle-joint 46 with one arm of a bell-crank lever 47, the other arm of which engages the lower end of the rock-lever 37.

48 indicates a guide-frame for the arm of the bell-crank lever 47.

49 and 50 indicate, respectively, fixed and loose pulleys upon the shaft 21 for the purpose of applying power to or of idling the shaft.

The mechanism thus far described constitutes an operative whole and would under certain conditions be efficient without the cooperation of other mechanism, and I shall therefore briefly describe the operation of such part of my device as has been included in the foregoing description.

Tailings of a proper grade are fed into the pan 7 from a suitable hopper, and power is applied to the fixed pulley 49 to rotate the shaft 21. The rotation of the eccentrics secured to this shaft will operate to oscillate the levers 27, 28, 29, and 30, which will successively raise the corners of the table-supporting frame and will impart to the pan a motion in all respects similar to the motion which the miner gives to the hand-pan. This movement of the pan is accommodated by the universal joint which indirectly supports it, the loose pivotal connections between the table-supporting frame, actuating-levers, and the legs of said frame permitting of this rolling or rocking motion without a tendency to twist or bend the levers.

It is obvious that the agitation of the material within the pan will thoroughly separate it and will cause the precious metal to gravitate to the bottom of the pan and will cause the dross to pass off by the spout 51 with which the pan is provided at the middle of its front side. In order, however, to increase the effectiveness of the pan as a separating medium, it is desired to impart to it a lateral reciprocatory movement in opposition to its inclination when one side or the other of the supporting-frame is elevated by the levers, and for accomplishing such movement the pan is supported upon a rolling table in the manner described, which latter is caused to move from side to side of the table-supporting frame through the medium of the rock-lever 37, the bell-crank lever 47, pitman 45, and crank-shaft 40, geared to the main power-shaft. Thus it will be seen that a rolling motion is given to the pan and that the same is given a lateral reciprocation so timed that the gravitation of the material to be treated

across the bottom of the pan due to the successive elevation of its corners will be met by a movement of the pan in a direction opposite to the movement of said material, thus precluding the possibility of the massing of the material in the corners of the pan.

Having thus far described my invention in its simplest aspects, I will now proceed to a description of its complete embodiment.

52 indicates a screen-pan provided with a reticulated portion 53 immediately above the pan 7 and with a comparatively wide imperforate throat 54 and supported by rollers 55, suitably journaled to its opposite sides. The rollers 55 are designed to travel upon a pair of detachable tracks 56, carried by eyebolts 57, supported through the hook-and-eye connections 58 by the head-beam 5. The lower ends of the eyebolts are screw-threaded and are provided with nuts 59, which clamp the upper and lower sides of the tracks 56 and constitute means for adjusting the screen-pan vertically or to any desired angle of inclination.

60 indicates a pitman pivotally connected to the rear side of the screen-pan and at its opposite extremity to a crank 61 upon the shaft 62, journaled in a suitable supporting-bracket 63 and carrying a sprocket-wheel 64, connected through a sprocket-chain 65 to a sprocket-wheel 66 of somewhat larger diameter upon the shaft 21. A reciprocatory motion through this mechanism, which I shall designate the "screen-pan-actuating" mechanism, is imparted to the screen-pan in a direction at right angles to the movement of the pan 7.

67 indicates an agitator comprising a number of radiating arms curved in the same direction at their outer extremities and bolted or otherwise secured to a hub 70 at the lower extremity of a compound vertical agitator-shaft 71, provided with a coupling 71<sup>a</sup>. The shaft 71 extends upwardly through the screen-pan and is journaled in the beams 5 and 6 of the frame.

Secured to the shaft 71 immediately above the beam 6 is a beveled gear 72, meshing with a similar gear 73 upon the extremity of a horizontal shaft 74, journaled in suitable bearings upon the frame and provided upon its extremity adjacent to the outside of one of the standards 4 with a crank 75, operatively connected with the piston 76 of a pump 77 by a pitman 78. The pump 77 is preferably bolted to one of the standards slightly above the bed-plate and is connected in the usual manner with a valve-controlled supply-pipe 79 and with a feed-pipe 80, extending upwardly to a point above the screen-pan, where it extends rearwardly and terminates in a horizontal portion 81, secured in brackets 82 upon the rear sides of the standards 4 and having perforations 83 in its under side immediately above the screen-pan.

Power is applied to the shaft 74 to operate the pump and rotate the agitator through a



sprocket-wheel 84, keyed to said shaft and geared through a sprocket-chain 85 to a sprocket-wheel 86 upon the shaft 40.

The screen-pan is slotted at the point where it is pierced by the shaft 71 to permit of its reciprocation, and the shaft is provided with a plate 87, designed to cover the slot.

Suitable means may be employed for strengthening the frame—as, for instance, stay-rods 88, passing over the opposite ends of the head-beam and having their opposite extremities passed through and secured beneath the bed-plate 1.

The structural features of the entire apparatus having been pointed out in detail and their relative movements defined incidentally, it may now be well to indicate the particular utility of the relative movements of the group of elements or devices which directly receive and manipulate the material to effect the novel treatment to which the ore is subjected by my device.

It has been stated that the table-supporting frame is given a gyratory movement and that the table which carries the pan is reciprocated. This obviously produces the same combined gyratory and sifting movement which is imparted to the hand-pan as the miner gyrates it by a peculiar movement of the hands as he sways his arms in a manner familiar to those who have observed the prospector at work. This combined or simultaneous gyratory and sifting movement appears never to have been effected in a mechanically-actuated pan, and to complete the coöperating group the screen moving at right angles to the direction of the reciprocating movement of the pan is provided. It would be impractical to employ a screen the full width of the pan, as the tendency of the particles falling in a direct line would be to pack, and the reciprocation of the pan likewise limits the extent of the screen lengthwise. It will therefore appear obvious that the screen must move at right angles to the movement of the pan-supporting table to accomplish the loose and complete distribution of the material to be treated in a pan having the peculiar movement described, the entire group of elements referred to thus coöperating in a novel manner to effect the desired result.

The operation of my device is as follows: Material containing the flour or float gold is discharged into the screen-pan 52 from a suitable hopper (not illustrated) or in any suitable manner and is gradually fed forward by the reciprocation of the pan, a sufficient quantity of water to induce a proper consistency of the material being supplied by the perforated pipe 81. The metallic particles, together with considerable dross, will fall through the screen 53 into the pan 7, a large percentage of the worthless material being discharged through the throat 54 of the screen-pan. The adjustment of the screen-pan to the desired angle by the mechanism specified is for the purpose of regulating the

speed at which the treated material passes from one end to the other of the screen-pan, it being obvious that material containing a large percentage of clay will require a longer time in the separation of the particles than a like quantity of material containing a large percentage of gravel.

The operation of the pan 7 has been fully described, and it is only necessary to add that the operation of the agitator within the pan constantly opposes the direction of movement of the material caused by the peculiar action of the pan, which is laterally reciprocated and the corners of which are successively elevated and depressed in order to cause the metallic particles to precipitate and to permit of the escape of the dross through the spout 51, the bottom of which is located considerably above the bottom of the pan.

By means of the mechanism hereinbefore described I am enabled to effectively treat tailings of many different grades and am enabled to save a larger per cent. of flour or float gold than has heretofore been possible in a mechanically-actuated apparatus.

Where it is desired to employ the apparatus described in its entirety, with the exception of the screen-pan—as, for instance, where tailings of a high grade are to be treated—it is simply necessary to remove the pitman 60, uncouple the shaft 71, and remove the eyebolts from their securing-hooks. The shaft 71 can then be coupled and the apparatus is ready for use.

I do not desire to limit myself to the details of construction herein shown and described, but reserve the right to change, modify, or vary the same within the scope of my invention, as it is obvious that the peculiar movement of the pan 7, which is perhaps the most important feature of my invention, may be accomplished in a variety of ways, that illustrated being, however, what I now regard as a preferable embodiment of such actuating mechanism.

What I claim is—

1. In an apparatus for the treatment of ores, the combination with a table-supporting frame axially supported upon a universal joint, of means for tilting said frame from various peripheral points in regular rotation, a table carried by the table-supporting frame and movable thereon, and mechanism for actuating the table independently of the table-supporting frame, substantially as specified.

2. In an apparatus for the treatment of ores, the combination with a pan supported axially upon a universal joint, of a plurality of levers connected with the pan at various peripheral points by loose pivotal connections whereby a gyratory movement of the pan is accommodated, and means for imparting an independent oscillatory movement to said pan, substantially as specified.

3. In an apparatus for the treatment of ores, the combination with a gyratory table-supporting frame and reciprocatory pan car-



ried thereby, of a screen above the pan, and means for reciprocating the screen in a direction at right angles to the movement of the pan, substantially as specified.

5 4. In an apparatus for the treatment of ores, the combination with a gyratory table-supporting frame, a series of levers connected with the same, friction-rollers upon the free ends of said levers, eccentrics upon the main  
10 drive-shaft engaging said friction-rollers to oscillate the levers, a reciprocatory pan, a rotary agitator and reciprocatory screen arranged one above the other, and actuating mechanism common to all of said foregoing  
15 elements.

5. In an apparatus for the treatment of ores, the combination with a gyratory table-

supporting frame, a series of levers connected with the same, friction-rollers upon the free ends of said levers, eccentrics upon the main 20 drive-shaft engaging said friction-rollers to oscillate the levers, a reciprocatory pan, a rotary agitator and reciprocatory screen arranged one above the other, a pump for delivering water to the material, and actuating 25 mechanism common to all of said foregoing elements.

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

LEWIS JOHN MYTINGER.

Witnesses:

ANDREW S. LANDER,  
EDWARD H. MAY.