No. 629,466. Patented July 25, 1899

T. S. QUACKENBUSH.

GOLD MINING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.) 6 Sheets—Sheet 1.

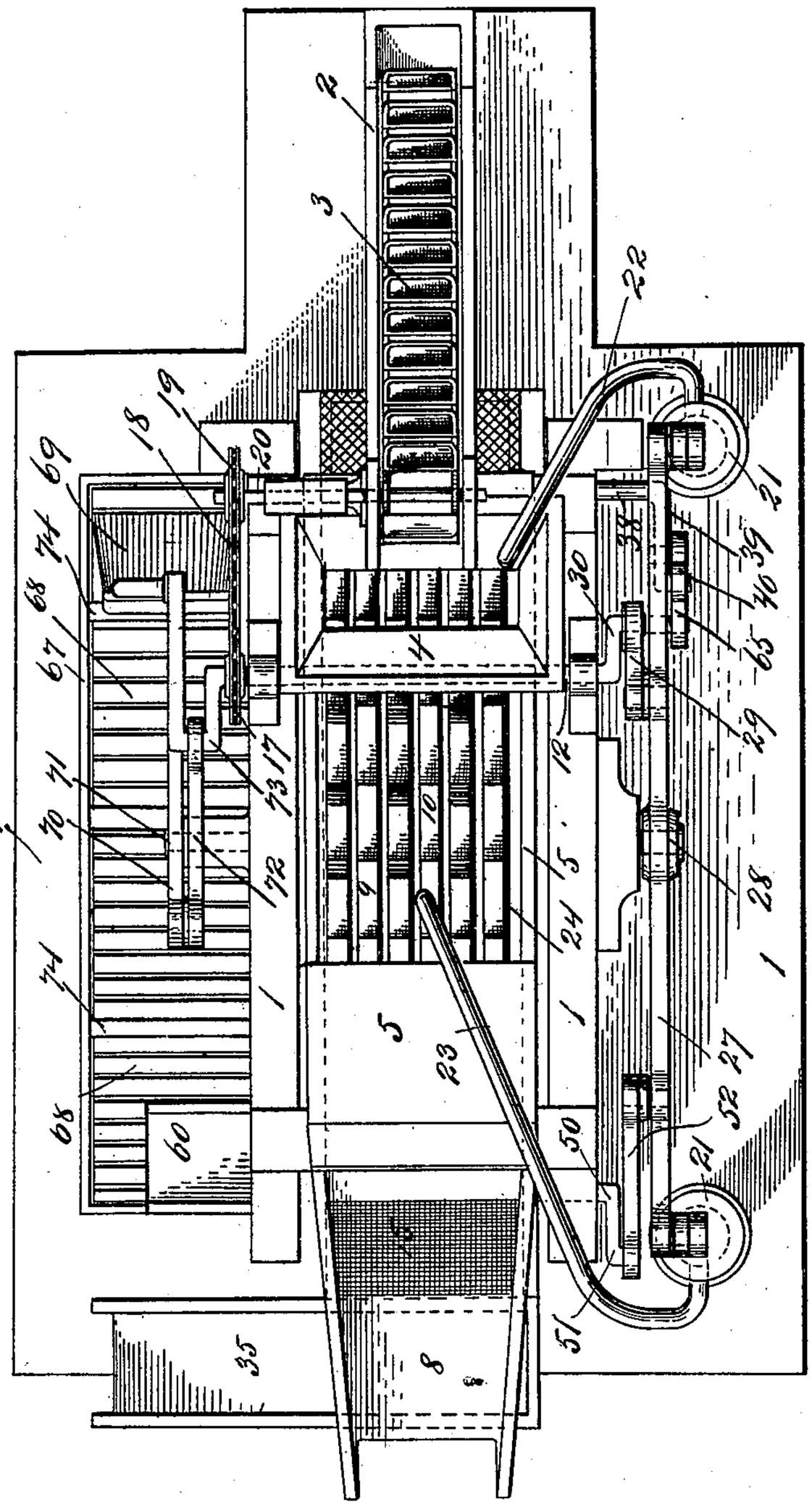


Fig. 1.

WITNESS

L. M. Mullen

M. A. Knowles

INVENTOR

Tyler S. Quackenbush,

BY

Edgar Tate & Co

ATTORNEYS.

No. 629,466.

Patented July 25, 1899.

T. S. QUACKENBUSH.

GOLD MINING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.)

6 Sheets—Sheet 2.

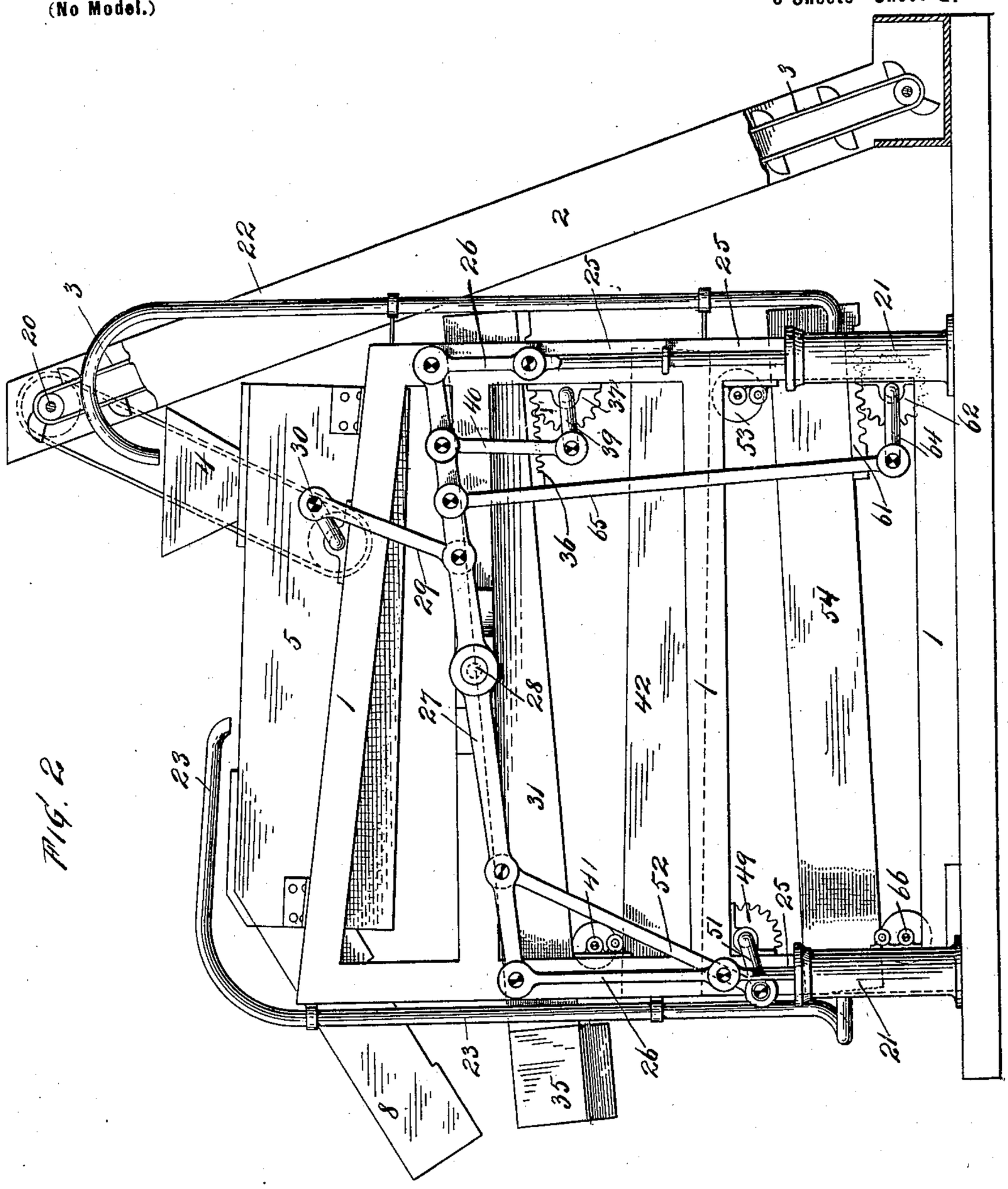


Fig. 2.

WITNESS

L. M. Muller

M. A. Knowles

INVENTOR

Tyler S. Quackenbush,

BY

Edgar Gale & Co

ATTORNEYS

No. 629,466. Patented July 25, 1899.

T. S. QUACKENBUSH.

GOLD MINING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.) 6 Sheets—Sheet 3.

FIG. 3

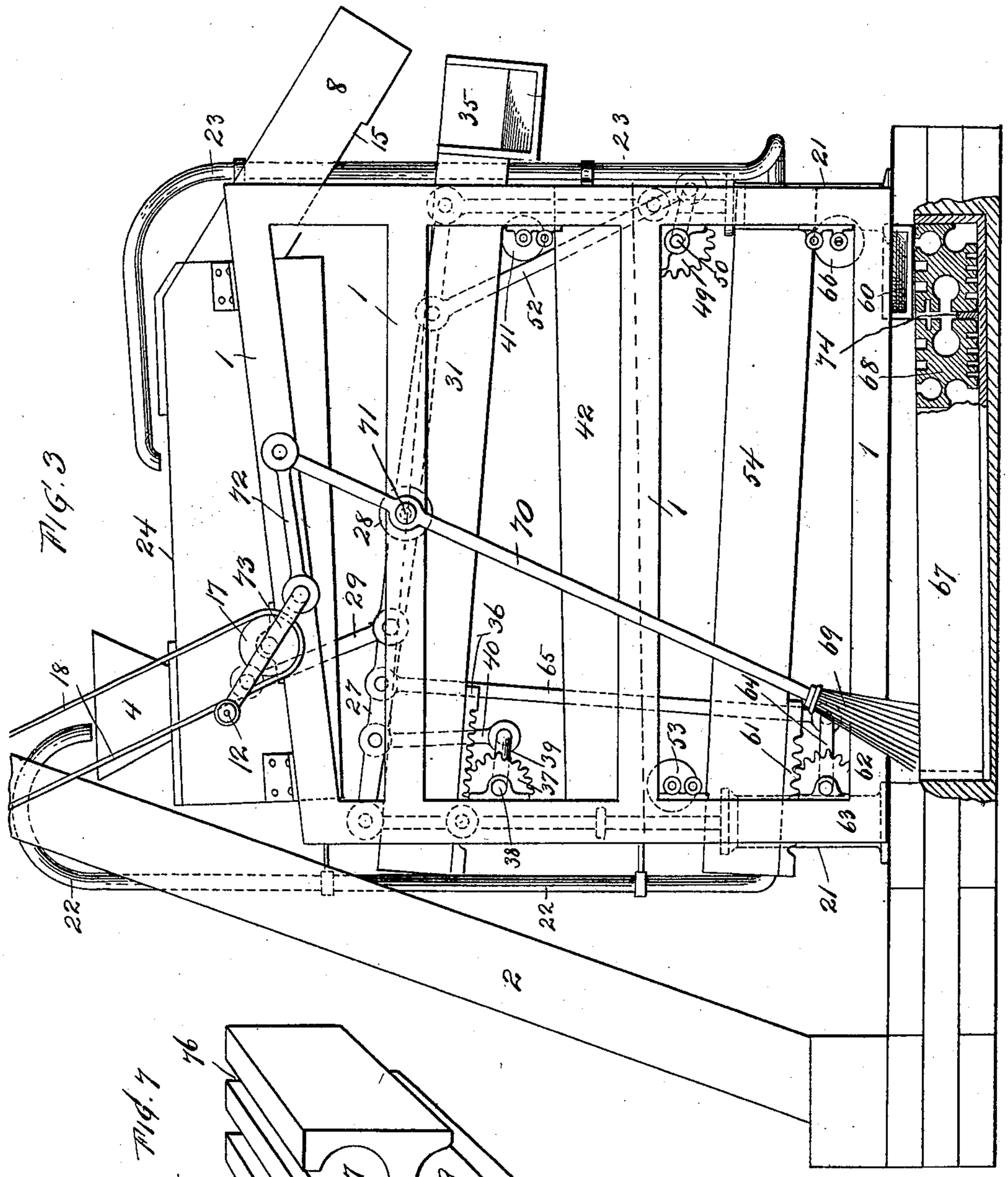
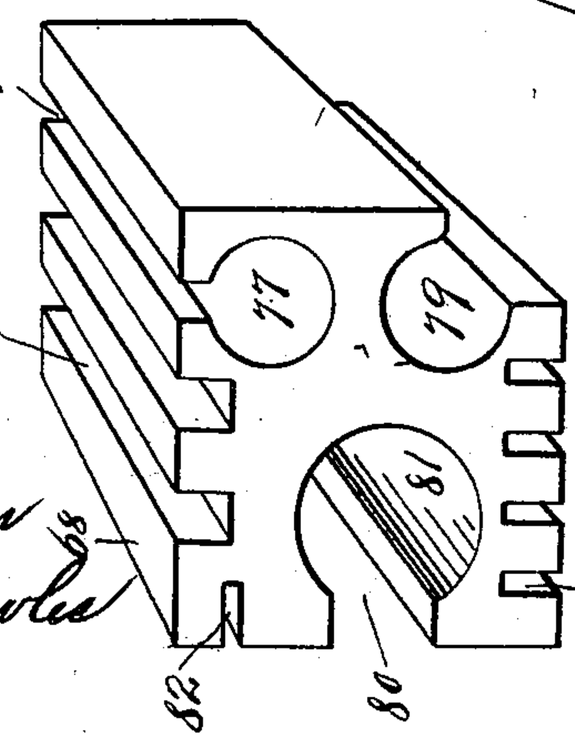


FIG. 1



WITNESS

C. W. Hullen

M. C. Knowles

INVENTOR

Tyler S. Quackenbush

BY

Edgar Tate & Co.

ATTORNEYS

No. 629,466.

Patented July 25, 1899.

T. S. QUACKENBUSH.

GOLD MINING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.)

6 Sheets—Sheet 4.

FIG. 4.

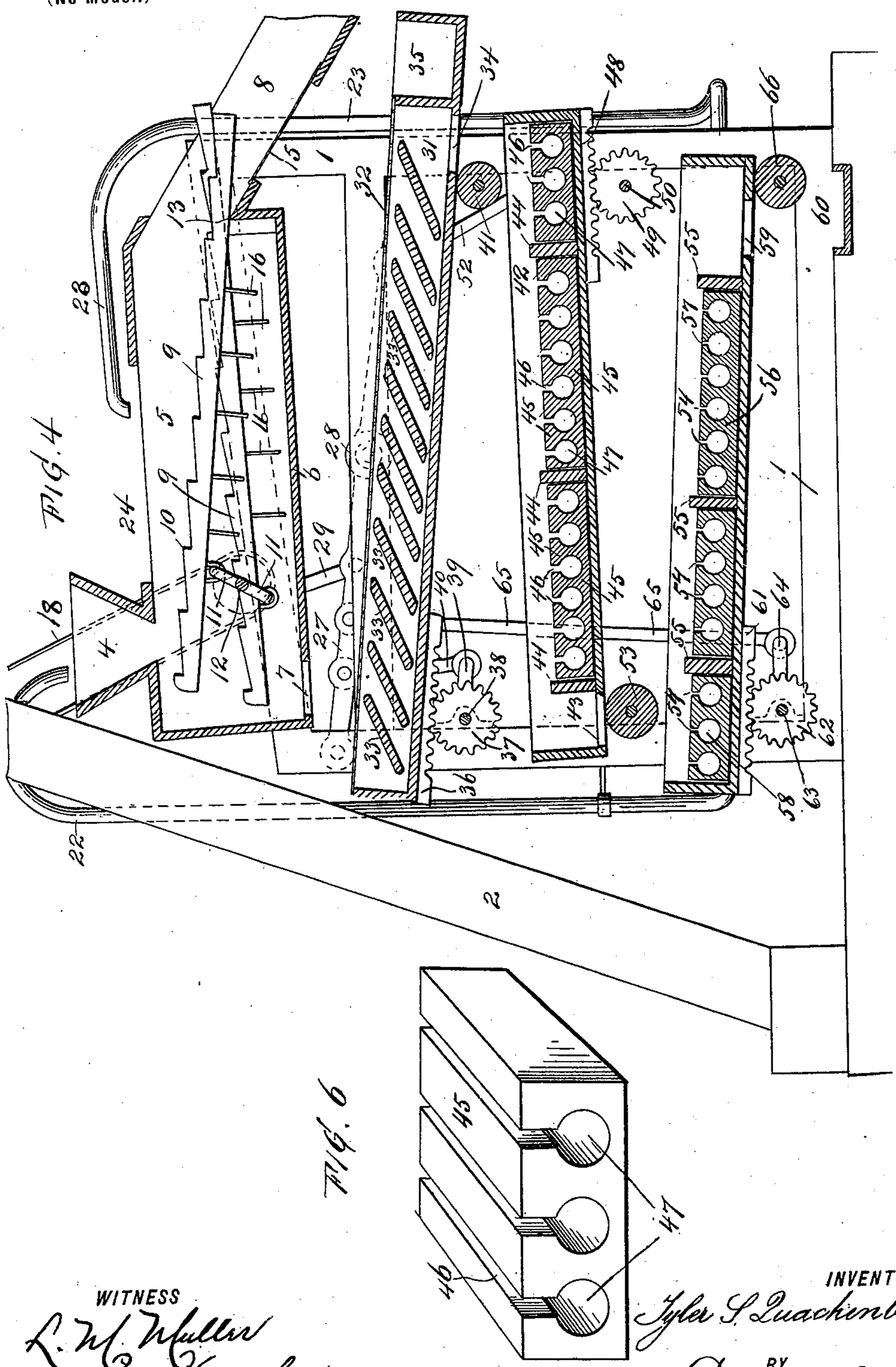


FIG. 6.

WITNESS

L. M. Muller

W. A. Knowles

INVENTOR

Tyler S. Quackenbush,

BY

Edgar Tate & Co

ATTORNEYS

No. 629,466. Patented July 25, 1899.

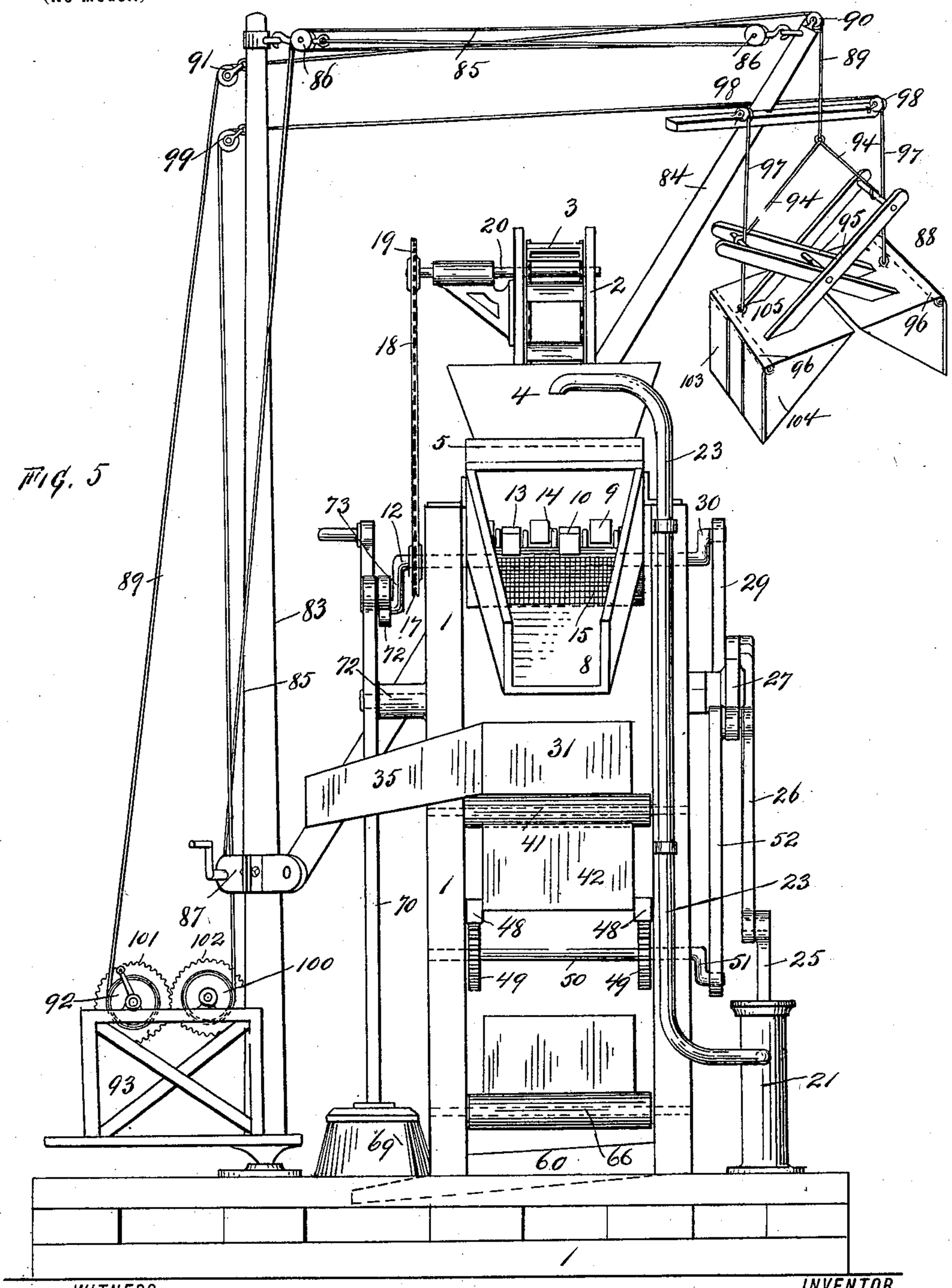
T. S. QUACKENBUSH.

GOLD MINING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.) 6 Sheets—Sheet 5.

FIG. 5



WITNESS

L. M. Muller.

M. A. Knowles.

INVENTOR

Tyler S. Quackenbush,

BY

Edgar Tate & Co.

ATTORNEYS

No. 629,466. Patented July 25, 1899.

T. S. QUACKENBUSH.

GOLD MINING MACHINE.

(Application filed Nov. 26, 1897.)

(No Model.) 6 Sheets—Sheet 6.

FIG. 8

WITNESSES

John Buckler,
C. C. Allen.

INVENTOR

Tyler S. Quackenbush,

BY

Edgar Tate & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

TYLER S. QUACKENBUSH, OF NEW YORK, N. Y.

GOLD-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 629,466, dated July 25, 1899.

Application filed November 26, 1897. Serial No. 659,928. (No model.)

To all whom it may concern:

Be it known that I, TYLER S. QUACKENBUSH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gold-Mining Machines, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to machines for treating ores; and it has for its object to provide an improved machine of this character which will be compact in construction and enable the rapid and effective treatment of the ores.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by the same numerals of reference in each of the views, and in which—

Figure 1 is a top or plan view of the machine embodying my improvements. Fig. 2 is a side elevation. Fig. 3 is a side elevation of the side opposite that shown in Fig. 2. Fig. 4 is a vertical longitudinal sectional view. Fig. 5 is a rear end elevation showing also an improved scraper or dredging apparatus as used in connection with my improved machine. Fig. 6 is a detail perspective view of one of the removable recessed blocks comprised in the concentrating and scouring mechanism. Fig. 7 is a detail perspective view of one of the removable recessed blocks comprised in the tailings mechanism; Fig. 8, a sectional side elevation of a machine embodying my invention, showing the parts assembled.

In the drawings forming part of this specification, 1 designates a suitable framework, upon and within which the various operating mechanisms are mounted. The front end of the framework is provided with an inclined elevator 2, which may comprise a bucket-belt 3, adapted to convey the ore to and deposit it in a hopper 4 at the top of the machine. Beneath this hopper is arranged a separator mechanism which comprises a longitudinally-mounted box 5, carried by the framework 1 and having a forwardly-inclined bottom 6, leading to a bottom opening 7, through which the separated ore is adapted to pass.

The hopper 4 is arranged at the front end of the box 5, and from the rear end of the latter extends a downwardly-inclined chute 8, which receives and discharges the rock and large pieces in the operation of the separator. Within the box 5 is arranged a series of parallel longitudinal reciprocating rack-bars 9, having toothed or serrated upper edges, as at 10. These rack-bars are pivotally connected with and mounted, respectively and alternately, upon oppositely-projecting cranks, as at 11 11, upon a transverse crank-shaft 12, arranged in bearings at the front portion of the box 5, while the rear free ends of said rack-bars slide upon the top edge of the bottom of the chute 8, as shown at 13, and may be guided by pins 14, projecting from said edge.

The chute 8 is preferably provided with a screen-bottom 15 at a point below the terminal rear ends of the rack-bars 9, so that any finer particles carried to the chute by the rack-bars may be deposited to the mechanism below.

It will be understood that by revolution of the shaft 12 the rack-bars have a longitudinal reciprocatory movement, and at the same time their front ends have an upward and downward movement in a circular plane, which operation serves to effectively feed and carry the rock and larger pieces over the rack-bars to the chute 8, while the finer particles pass between the rack-bars and over the forwardly-inclined bottom 6 of the box 5 to the discharge-opening 7, to facilitate which latter operation the rack-bars are provided on their bottom edges with projecting pins or fingers 16.

It will be understood that the ore is fed from the hopper 4 directly upon the front ends of the rack-bars. The crank-shaft 12 forms the main operating-shaft of the machine and is journaled upon the framework 1 and may be provided with a sprocket or other suitable driving wheel 17, connected by a chain 18 with a similar drive-wheel 19 upon the top shaft 20 of the bucket-belt 3, (see Figs. 1 and 5,) by which connection the elevator mechanism is operated. The main shaft 12 may be operated in any suitable or desired manner by the application of any adapted power.

At one side of the machine and at the front

and rear ends, respectively, are provided two pumps 21 21, from the front one of which extends a discharge-pipe 22 to the hopper 4, while from the rear pump a similar discharge-pipe 23 may extend to a point above a top opening 24 in the separator box or frame 5. By means of these pumps and discharge-pipes water is fed to the separating mechanism, and from thence passes downwardly throughout the other mechanism, as will be fully understood.

It will be understood that I may employ any suitable pump mechanism adapted for drawing or dredging sand or soil directly from the bottom of a river-bed or stream and operating to deliver the same through the pipes 22 and 23 to the separator mechanism.

The pump-plungers 25 are connected by connecting-rods 26 with the respective ends of a walking-beam or lever 27, longitudinally arranged and fulcrumed, as at 28, to the framework 1 and connected at a point at one side of its fulcrum by a connecting-rod 29 with a crank 30 upon the end of the main shaft 12. The pump mechanism is thus operated by the main shaft.

Beneath the separator-box 5 is arranged the riffle-screen, which comprises a rearwardly-inclined boxing 31, having a screen-top 32 of suitable mesh upon which the ore is delivered from the bottom opening 7 of the separator-box 5.

Beneath the screen-top 32 is arranged a series of forwardly and downwardly inclined riffle-boards 33, which are arranged transversely in parallel position. At the lower rear end of the inclined riffle box or casing 31 is provided a discharge-opening 34, through which the smaller particles separated by the riffle will pass to the mechanism beneath, while the larger particles will travel from the top screen 32 and be deposited from the same into an end chute 35, transversely arranged upon the riffle-box and adapted to discharge at any desired point at the side of the machine.

The riffle box or casing reciprocates longitudinally, this operation being secured by means of geared racks 36, arranged upon its bottom at the front end and meshing with pinions 37 upon a transverse shaft 38, mounted in bearings upon the front portion of the framework and having a crank end 39, connected by a connecting-rod 40 with one end of the main walking-beam or lever 27, the relative construction and arrangement being such that the pinions 37 have only a partial revolution, by which the reciprocating movement is effected. The lower rear end of the riffle box or casing is supported upon a roller 41, transversely mounted and bearing upon the framework. The bearings of this roller may be adjustable, if desired, by having their bearing-plates provided with a plurality of bearings in a vertical plane, as shown in the drawings, or in other any suitable or adapted manner.

Beneath the riffle mechanism is arranged a concentrating and scouring mechanism, which comprises a box or casing 42, which is inclined in reverse relation to the riffle mechanism—that is to say, it inclines forwardly from the rear end. This box or casing 42 is longitudinally arranged and mounted within the framework and is provided at its lower front end with a bottom opening 43, adapted to discharge the larger particles, separated by the operation of concentrating or scouring, to the mechanism beneath. The box 42 is divided by a series of transverse partitions 44, between which are seated removable blocks 45, the top surface of said blocks being preferably a short distance below the top of the partitions 44, so that the water "swishes" over the top surface of said blocks between the partitions during the reciprocatory operation of the box or casing 42. The transverse partitions 44 are of less height than the depth of the box, so that a continuous movement of the ore and water from end to end of the box is permitted. The removable blocks 45 are provided with a series of transverse slots 46, intersecting at their bottom a transverse recess or compartment 47, which is preferably of cylindrical form. By means of this improved construction and arrangement the smaller particles will pass through the slots 46 to and be deposited in the recesses or compartments 47, while the larger particles will pass over the top surface of the concentrating-blocks and over the intervening partitions 44 and pass off at the bottom opening 43.

The concentrating and scouring box or casing is mounted in a manner corresponding to the riffle mechanism by means of rack-bars 48 upon its bottom, at the rear end, meshing with pinions 49 upon a transverse shaft 50, having bearings in the framework 1 and provided with an end crank 51, connected by a connecting-rod 52 with the main walking-beam or lever 27 on the opposite side of the fulcrum of the latter from the connecting-rod 40, which extends to the riffle mechanism. It will thus be noted that the reciprocating and concentrating boxes or cases have a simultaneous, but reverse, movement. The lower front end of the concentrator box or casing 42 is supported by a roller 53, transversely mounted and bearing upon the framework 1, the bearings of this roller being adjustable, if desired, in the same manner as the roller 41 or in any other suitable or adapted manner.

Beneath the concentrating mechanism is arranged an amalgamator or accumulator, which corresponds in general construction to the concentrator mechanism, having a similar box or casing 54, divided by transverse partitions 55, between which are arranged removable blocks 56, having transverse slots 57, leading to the transverse recesses or compartments 58. The blocks 56, however, have narrower slots 57 than the slots in the blocks 42, so that the accumulator serves to accumu-

late finer particles in its recesses or compartments 58.

The accumulator box or casing 54 is reversely mounted with relation to the concentrator-casing 42—that is to say, it is inclined downwardly from front to rear—and is provided with a bottom opening 59 at its lower rear end, from which the larger particles from the accumulator are discharged to a chute or sluiceway 60, transversely arranged at the base of the framework 1, at the rear end of the latter. The accumulator box or casing 54 is likewise longitudinally arranged and adapted to reciprocate, it being provided at its front end, at the bottom, with rack-bars 61, meshing with pinions 62 upon a transverse shaft 63, bearing in the framework 1 and provided with a crank-arm 64, connected by a connecting-rod 65 with the main walking-beam or lever 27. The connecting-rod 65 is arranged at the same side of the fulcrum of the walking-beam as the connecting-rod 40 of the riffle mechanism, and is therefore on the side of said fulcrum opposite from the connecting-rod 52 of the concentrator mechanism, by which arrangement the accumulator has a simultaneous, but reverse, operation with relation to the concentrator mechanism. The lower rear end of the accumulator box or casing is supported upon a roller 66, transversely mounted and bearing in the framework 1, said bearings being adjustable, if desired, like rollers 41 and 53 or in any other adapted manner.

The process of amalgamation may be effectively carried out in either or both of the concentrator-boxes 42 and the accumulator-boxes 54, the quicksilver being readily retained within the slotted and recessed blocks and between the intervening partitions.

The chute or sluiceway 60 extends laterally a short distance at the side of the machine and projects over the end of a tailings-box 67, which is longitudinally arranged in fixed position at the base of the framework.

From the foregoing description it will be understood that the separator, riffle, concentrator, and accumulator mechanisms have a simultaneous, but reverse, operation with relation to each other, so that the ore passes in a continuous movement successively through the various mechanisms, and that said mechanisms are all operated by connection with the longitudinally-arranged walking-beam or lever, which latter operates the pumps and is in turn operated by the main shaft 12, a simple and positive action of the mechanisms being thus insured.

The tailings-box 67 is preferably inclined from the chute 60 toward the front of the machine. The tailings-box comprises a casing in which are mounted slotted and recessed blocks 68. The blocks are placed in transverse parallel position and preferably correspond in height to the box or casing, so that their top surfaces are on a plane with the top of the tailings-box and form an unobstructed surface, over which will travel a reciprocating brush 69, carried upon an upwardly-extending lever 70, fulcrumed, as at 71, to the framework 1 and having its top end connected by a connecting-rod 72 with a crank 73 upon the main shaft 12. The brush will thus travel back and forth over the top surface of the series of blocks 68. These blocks are removable from the tailings-box and are separated when in position by short transverse partitions 74.

The transverse slots and recesses or compartments in the blocks 68 are formed of various sizes and are respectively arranged according to size on the different sides of the blocks, whereby the exposed top surface of the blocks when in position in the tailings-box may be varied according to the fineness and character of the soil which is being treated.

In the divers constructions of the faces of the removable blocks 68 I preferably provide one of the faces with a series of transverse parallel rectangular grooves 75, at one end of which series is provided a transverse slot 76, leading to an interior transverse recess or compartment 77, which is preferably of cylindrical contour. The opposite surface of the blocks will be provided with a similar series of transverse parallel rectangular grooves, as at 78, except that these grooves 78 will be of smaller diameter than the grooves 75, and at the end of this series of smaller-diameter grooves a segmental transverse compartment or recess 79 may be formed in the edge of the block.

In the faces of the blocks 68, which are adapted to come into opposite position when the blocks are placed in the tailings-box, I preferably provide a broad transverse slot 80, leading to a transverse cylindrical recess or compartment 81, and these opposing faces of the blocks may also be further provided with transverse rectangular grooves, as at 82.

It will be understood that by reason of the improved construction and arrangement as just described and the variable sizes and relative arrangement of the grooves and slots and compartments in the different surfaces of the blocks the position of the latter in the tailings-box may be varied to bring different sides of the blocks into exposed position at the top of the tailings-box, whereby a thorough and effective operation may be secured under all conditions and circumstances.

In Fig. 5 I have illustrated the scraper or dredger by which the ore may be fed to the hopper 4 independently of the elevator mechanism 2. In this mechanism a vertical pole or upright 83 is pivotally mounted at one side of the machine and carries a pivoted crane 84, the movement and inclination of the crane being controlled by a cable 85, connecting the crane and pole 83 and passing over suitable pulleys 86 86 downwardly to a windlass 87, mounted at the base of the pole. The scraper or dredger 88 is suspended from the crane by means of a cable 89, passing over

a pulley 90 at the top end of the crane and from thence over a pulley 91 at the top of the pole 83 and from thence downwardly to a windlass 92, arranged in a frame 93 at the base of the pole. The cable 89 is operated to lift or elevate the scraper 88, and it is provided with divergent ends 94 94, respectively secured to pivoted cross-trees 95, which respectively carry the two sections 96 96 of the scraper. To provide for opening the scraper-sections 96, cables 97 97 are secured to said sections and from thence pass upwardly over pulleys 98, mounted upon the crane, and from thence rearwardly to a pulley 99 at the top of the pole and from thence downwardly to a suitable windlass 100, mounted in the frame 93. The windlass 92 is provided with a gear 101, meshing with a similar gear 102 upon the windlass 100, so that in the operation the windlasses move reversely, and therefore reversely operate the respective cables 89 and 97. The outer walls or sides of the scraper-sections 96 are formed of separate pieces, as at 103, which are spring-hinged, as at 104, to the top plates 105 of the scraper-section, by which construction and arrangement the plates 105 will "give" against the pressure of large rocks in the operation of dredging.

The operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains.

The machine is exceedingly compact in construction and at the same time combines a complete mechanism for effectively reducing the ore to any desired degree of fineness.

The machine provides in one simultaneously-operating mechanism a separator, riffle, concentrator, scourer, amalgamator, and accumulator.

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

1. In a machine for treating ores, a separating mechanism comprising a box or casing having an inclined bottom and carrying rack-bars arranged in longitudinal parallel position, and a transverse shaft having oppositely-projecting cranks connected to the respective rack-bars, said rack-bars being provided with pins or fingers projecting from their lower edges with respect to the inclined bottom and having their free ends opposite the carrying-cranks provided with a smooth or unobstructed bottom edge which slides over and is supported upon the edge of the upper end of the box or casing on a plane above the inclined bottom of the latter, whereby the rack of the top edge of the bars feeds from the upper end of the casing and the projecting bottom fingers feed in a reverse direction downwardly to the lower end of the inclined bottom of the casing, substantially as set forth.

2. In a machine for treating ores, a separator mechanism comprising a box or casing having an inclined bottom leading to a bottom opening at the front end and provided at its rear end with a chute, rack-bars arranged in longitudinal parallel position within the casing and having their free ends provided with a smooth or unobstructed bottom edge which slides over and is supported upon the top edge of the chute-bottom on a plane above the inclined bottom of the casing, and a transverse shaft having oppositely-projecting cranks connected to the respective rack-bars at the front portion of the latter, said rack-bars carrying pins or fingers projecting at their bottom edges with relation to the inclined bottom and in the space beneath the plane of the supporting top edge of the chute, whereby the rack of the top edge of the bars feeds onto the chute at the rear end of the casing and the projecting bottom fingers feed in a reverse direction downwardly to the opening at the lower front end of the inclined bottom of the casing, substantially as set forth.

3. As an improvement in means for treating ores, a block adapted to be mounted in operative position and provided in its respective faces with slots extending inwardly to interior compartments and with auxiliary recesses or slots, said slots and auxiliary recesses and compartments being of varying sizes or diameter on the different faces, whereby different faces of the block may be exposed for operation, substantially as and for the purpose set forth.

4. As an improvement in means for treating ores, a reversible block adapted to be mounted in position with an exposed face, the different faces of said block being respectively provided with slots or throats forming an extended relatively narrow passage leading inwardly to interior compartments, substantially as set forth.

5. A machine for treating ores constructed as herein described, and comprising a frame, a separator-box mounted in the top thereof, a riffle-box mounted below said separator-box, a concentrating and scouring box mounted below the riffle-box, and an amalgamator and accumulator box mounted below said concentrating and scouring box, said boxes being inclined alternately in opposite directions, means for discharging ore and water into the separator-box and for conveying the same from one of said boxes into the other, said machine being also provided at the bottom thereof with a tailings-box in communication with the amalgamator and accumulator box, said tailings-box being provided with detachable blocks arranged transversely thereof, and provided with open chambers formed longitudinally therein and with slots or grooves in the top and bottom and side thereof, some of said slots or grooves being in communication with said chambers, and a brush or broom supported over said tailings-box and adapted to be swung back and forth over the blocks therein, substantially as shown and described.

6. A machine for treating ores constructed as herein described, and comprising an upright frame, a separator-box mounted in the

top thereof and downwardly and forwardly inclined, said separator-box being provided at its rear end with a discharge-chute, means for conveying the water and the ore to be treated into said separator-box, a crank-shaft mounted in said separator-box, and rack-bars mounted longitudinally of said separator-box and centrally thereof, said rack-bars being pivotally connected with the cranks of said shaft, and being adapted to be moved thereby longitudinally of said box, and the front ends thereof to be raised and lowered, said rack-bars being also provided on their under sides with downwardly-directed projections, and said frame being also provided below said separator-box with a riffle-box, a concentrating and scouring box, and an amalgamator and accumulator box, said boxes being alternately inclined in opposite directions, means for conveying the ore and water from one of said boxes into the other and means for agitating all of the boxes below the separator-box, said machine being also provided at the bottom thereof with a tailings-box into which the ore and water is discharged from the amalgamator and accumulator box, said tailings-box being provided with detachable blocks in the top, bottom and sides of which are grooves and a pivotally-supported broom or brush which is adapted to be moved longitudinally of said tailings-box and over the upper surface of said blocks, substantially as shown and described.

7. A machine for treating ores constructed as herein described and comprising an upright frame, a separator-box mounted in the top thereof, a riffle-box below the separator-box, a concentrating and scouring box below the riffle-box, an amalgamator and accumulator box below the concentrating and scouring box, an elevator at the front end of the frame for raising the ore to be treated and discharging the same into the separator-box, pumps at one side of said frame provided with pipes for discharging water into the separator-box, devices for operating said pumps, racks connected with the under side of the upper end of each of the boxes except the separator-box, shafts mounted below said racks, pinions or ratchet-wheels mounted on said shafts and operating in connection with said racks and devices connected with the pumping mechanism for operating said shafts whereby all of the boxes below the separator-box are agitated, and means for conveying the ore and water from the separator-box into each of the other boxes alternately, and said frame being also provided below the accumulator and amalgamator box with a tailings-box having detachable slotted or grooved blocks mounted therein which are of less height than the sides of said box, and a broom or brush pivotally supported over said tailings-box and adapted to be swung back and forth over said blocks, substantially as shown and described.

8. A machine for treating ores constructed as herein described, comprising a frame, a separator-box mounted in the top thereof, a riffle-box mounted below said separator-box, a concentrating and scouring box mounted below the riffle-box, an amalgamator and accumulator box mounted below said concentrating and scouring box, said boxes being inclined alternately in opposite directions, means for discharging ore and water into the separator-box and for conveying the same from one of said boxes into the other, said machine being also provided at the bottom thereof with a tailings-box in communication with the amalgamator and accumulator box, said tailings-box being provided with detachable blocks arranged transversely thereof, and provided with open chambers formed longitudinally therein and with slots or grooves in the top and bottom and side thereof, some of said slots or grooves being in communication with said chambers, substantially as shown and described.

9. A machine for treating ores, constructed as herein described, and comprising an upright frame, a separator-box mounted in the top thereof and downwardly and forwardly inclined, said separator-box being provided at its rear end with a discharge-chute, means for conveying water and ore to be treated into said separator-box, a crank-shaft mounted in said separator-box, rack-bars mounted in and longitudinally of said separator-box, said rack-bars being pivotally connected with the cranks of said shaft, and being adapted to be moved thereby longitudinally of said box, and the front ends thereof to be raised and lowered, said rack-bars being also provided on their under sides with downwardly-directed projections, and said frame being also provided below said separator-box with a riffle-box, concentrating and scouring boxes and an amalgamator and accumulator box, said boxes being alternately inclined in opposite directions, means for conveying ore and water from one of said boxes into the other, and means for agitating two of said boxes below the separator-box, and said machine being also provided at the bottom thereof with a tailings-box in which the ore and water is discharged from the amalgamator and accumulator box, said tailings-box being provided with detachable blocks, the top and bottom and sides of which are provided with grooves, substantially as shown and described.

10. A machine for treating ores, constructed as herein described, and comprising an upright frame, a separator-box mounted in the top thereof, a riffle-box below the separator-box, concentrating and scouring boxes below the riffle-box, an amalgamator and accumulator box below the concentrating and scouring box, an elevator at the front end of the frame for raising the ore to be treated and discharging the same into the separator-box, pumps at one side of said frame provided with pipes for discharging water into the separator-box, devices for operating said pumps, racks connected with the under side of the

upper end of each of the boxes except the separator-box, shafts below said racks, pinions or ratchet-wheels mounted on said shafts and operating in connection with said racks, and devices connected with the pumping mechanism for operating said shafts, whereby all of the boxes below the separator-box are agitated, and means for conveying the ore and water from the separator-box into each of the other boxes alternately, said frame being also provided below the accumulator and amalgamator box with a tailings-box having detachable blocks provided with grooves in the top, bottom and sides thereof mounted therein which are of less height than the sides of said box, substantially as shown and described.

In testimony that I claim the forgoing as my invention I have signed my name, in presence of the subscribing witnesses, this 20th day of November, 1897.

TYLER S. QUACKENBUSH.

Witnesses:
L. M. MULLER,
M. A. KNOWLES.