

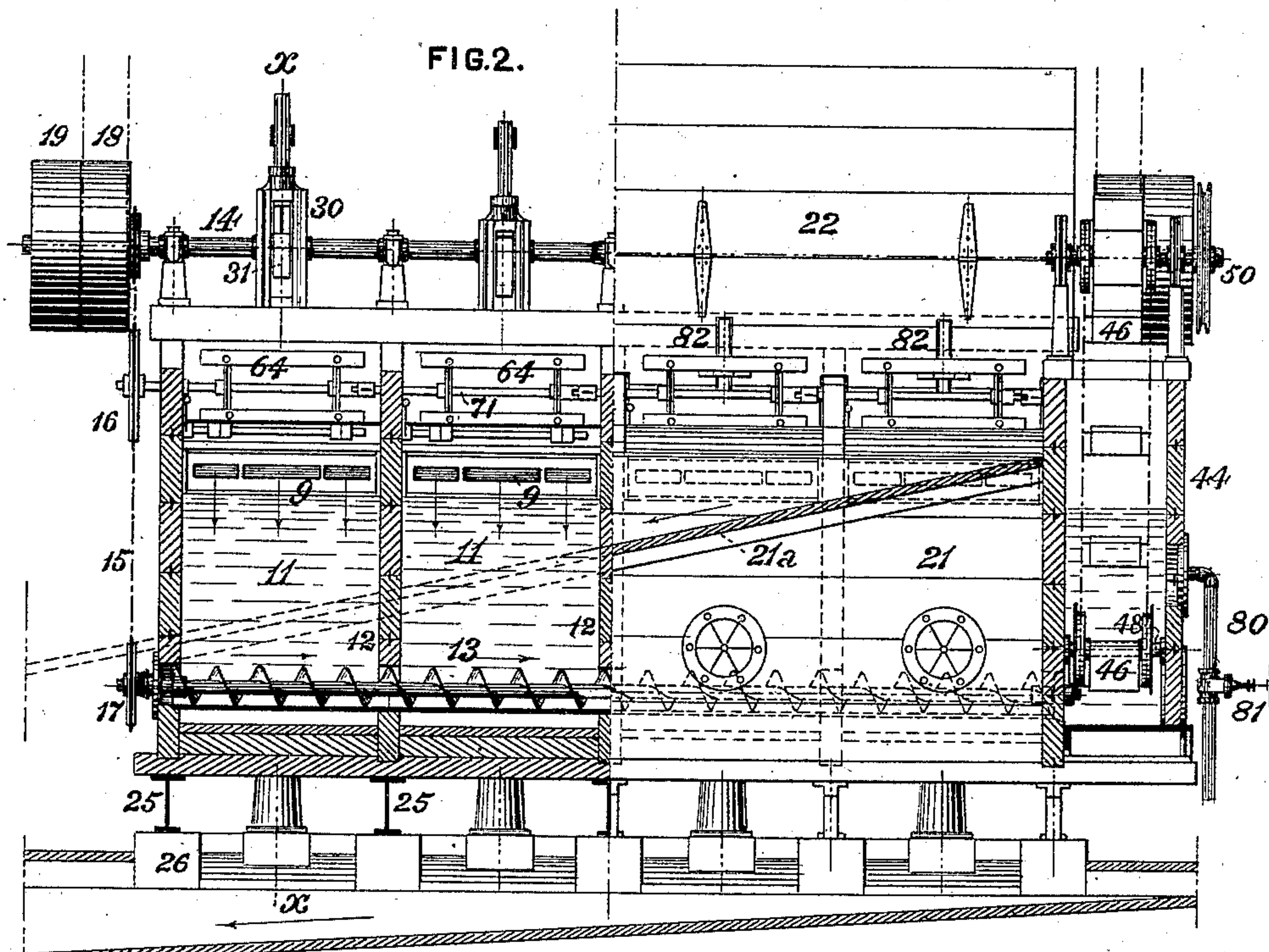
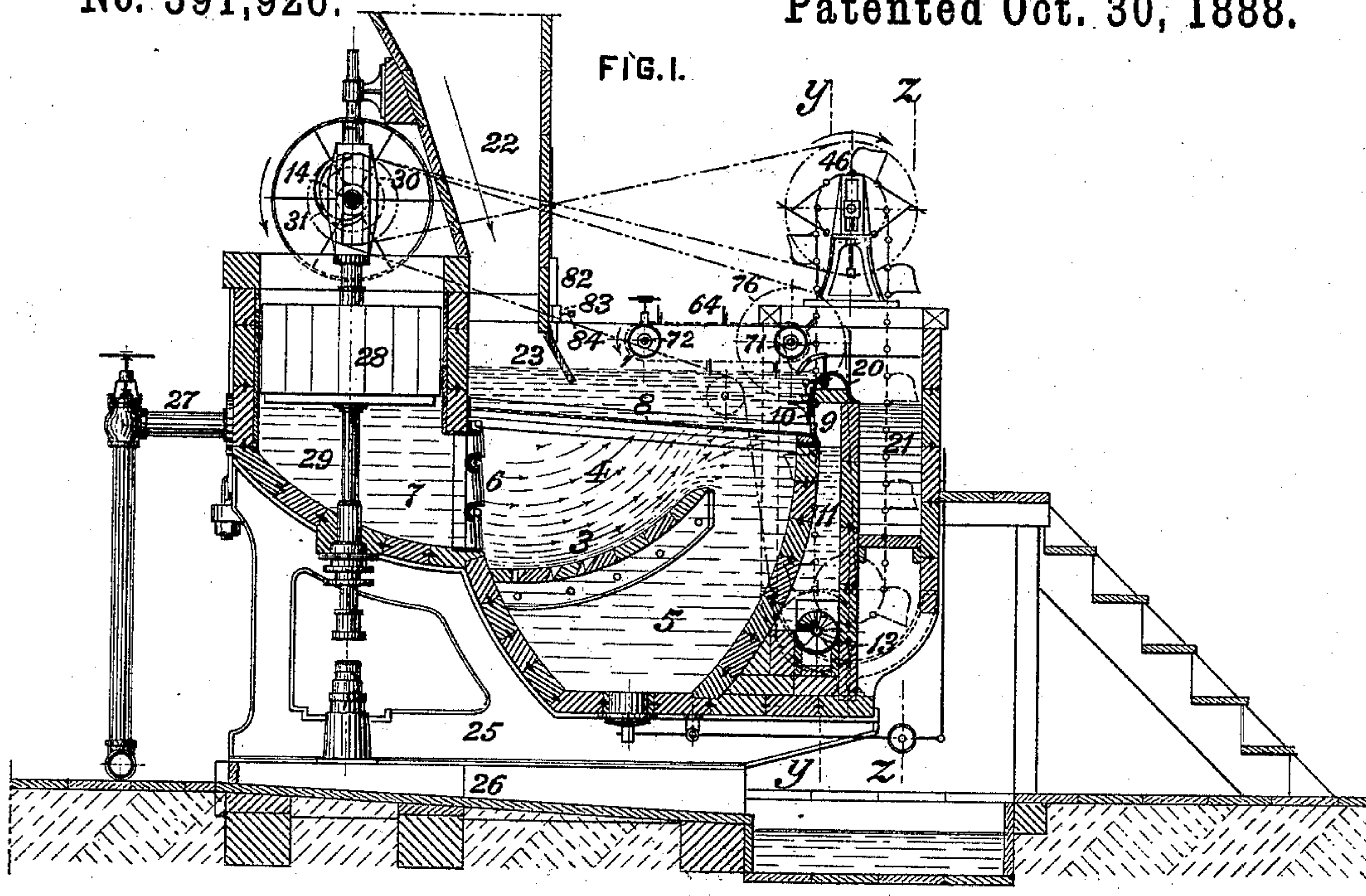
(No Model.)

3 Sheets—Sheet 1.

S. STUTZ.
COAL WASHER.

No. 391,926.

Patented Oct. 30, 1888.



WITNESSES:

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(No Model.)

3 Sheets—Sheet 2.

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FIG. 3.

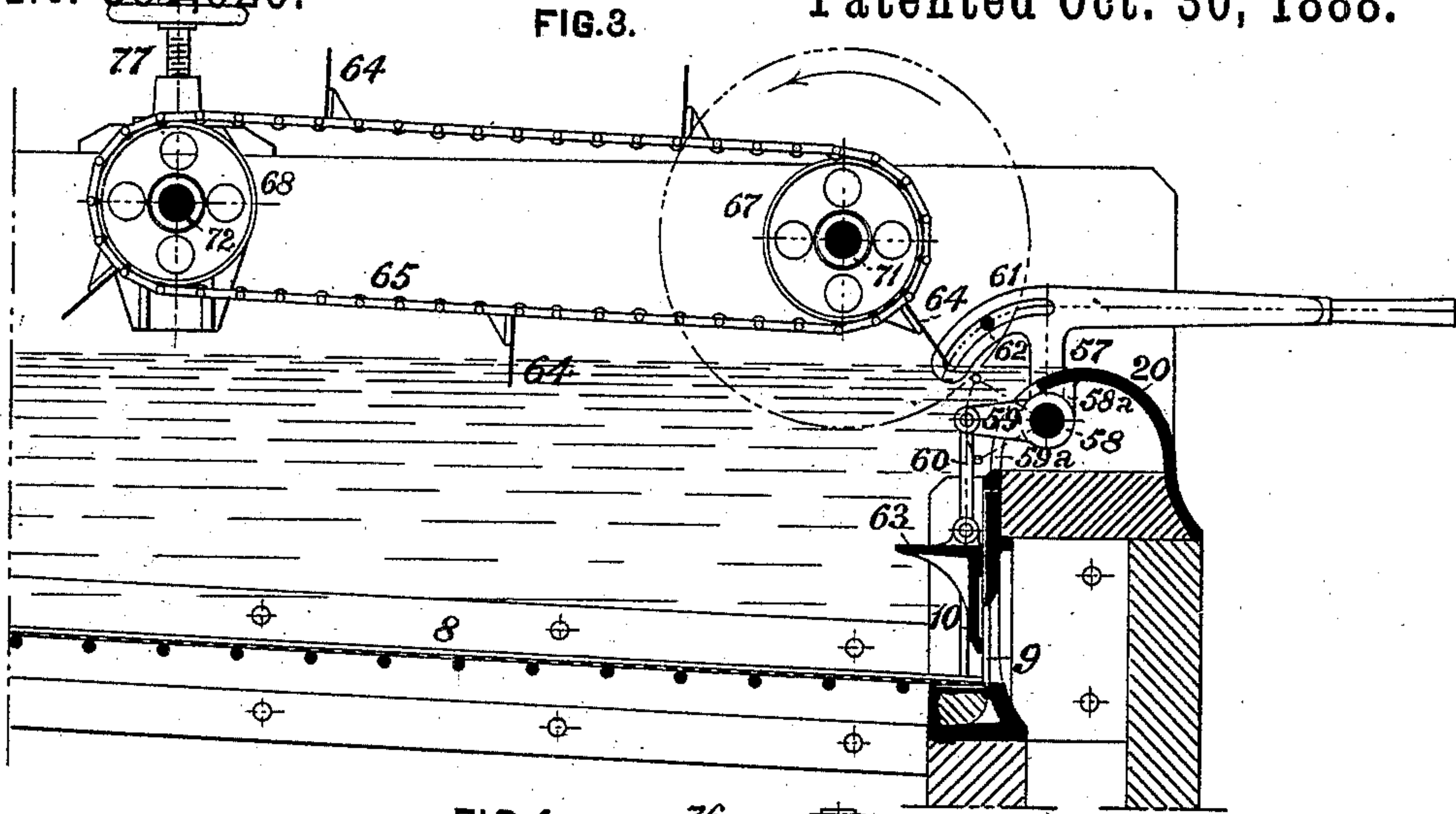
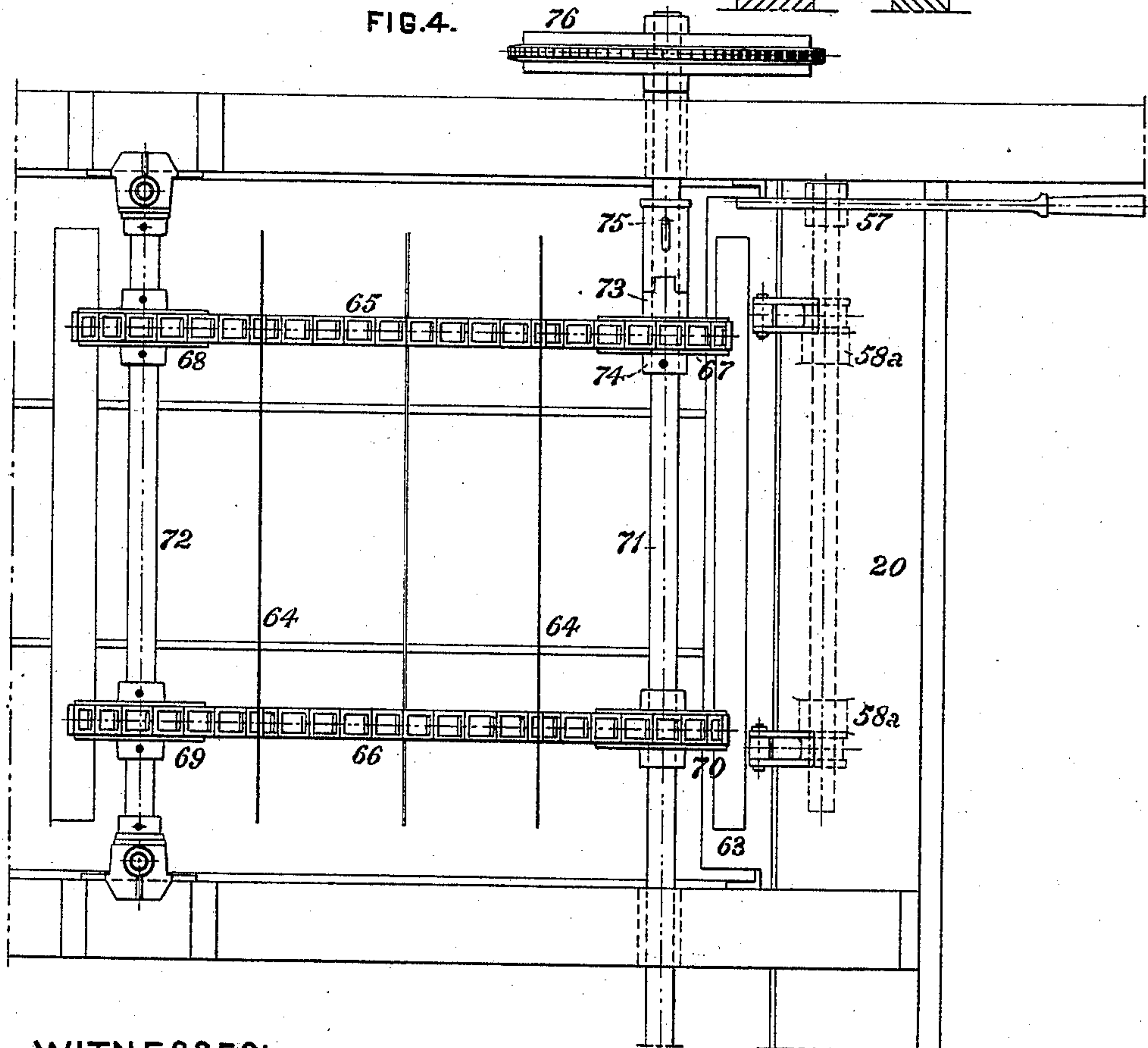


FIG. 4.



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FIG. 5.

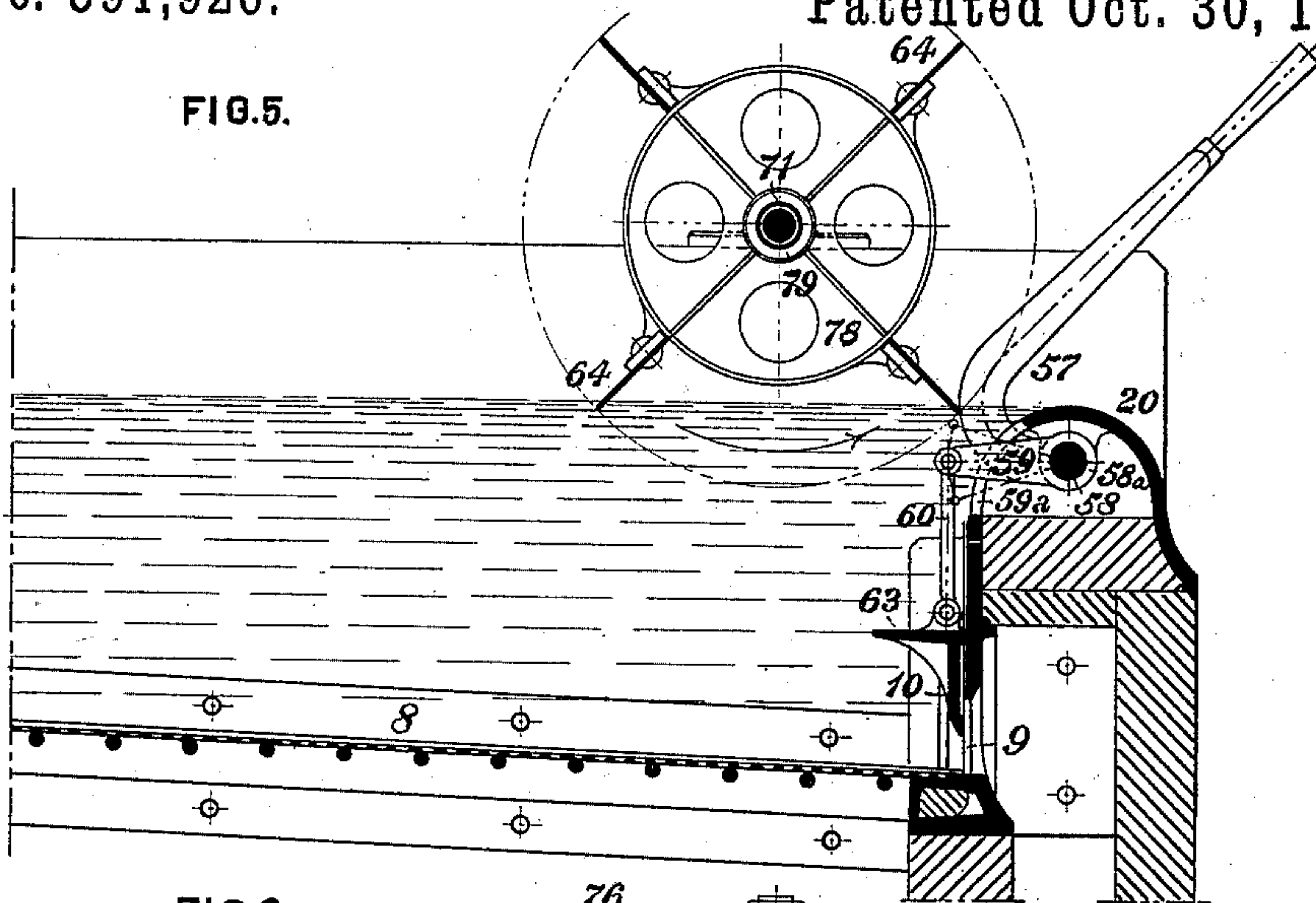
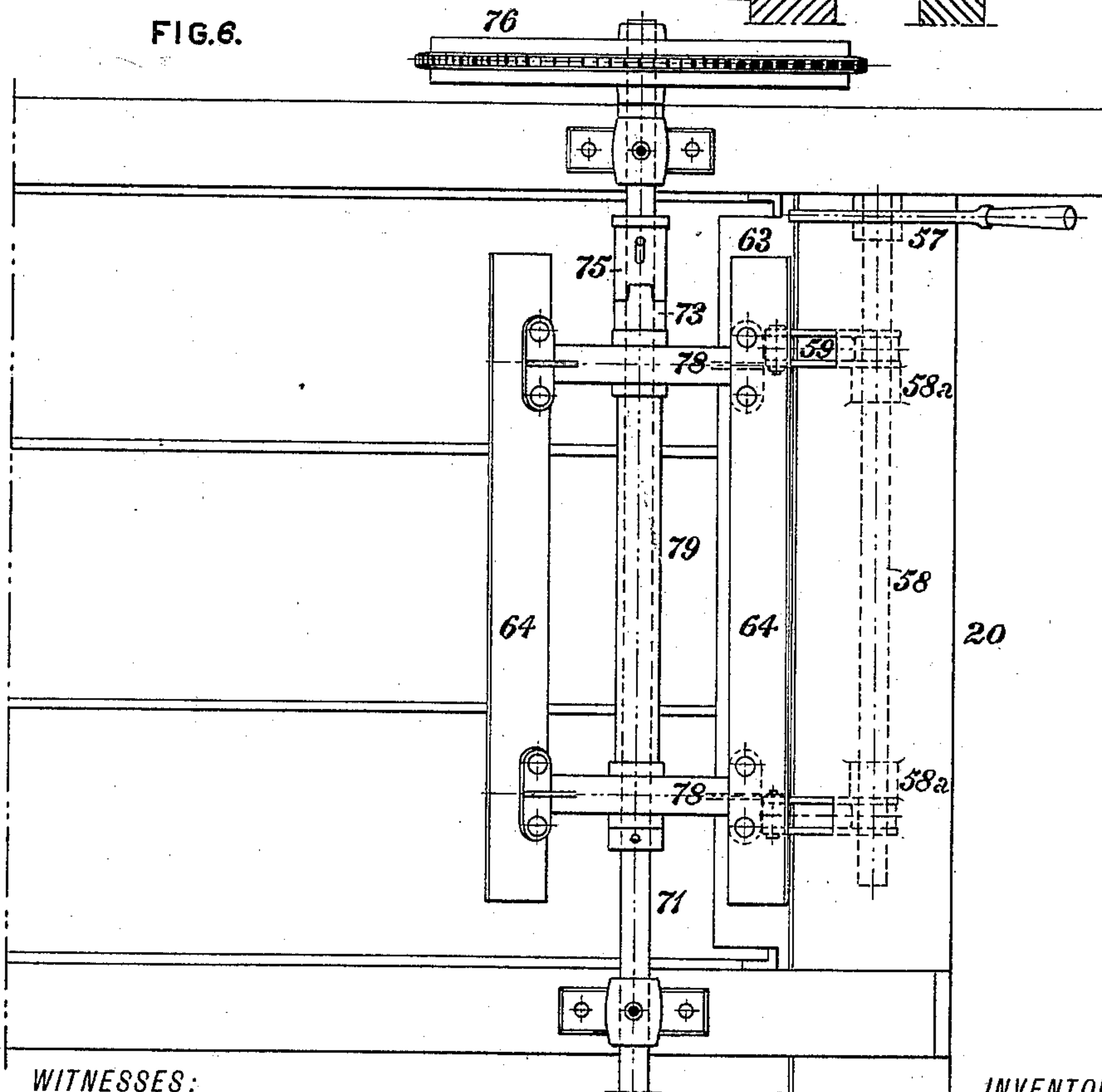


FIG. 6.



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UNITED STATES PATENT OFFICE.

SEBASTIAN STUTZ, OF PITTSBURG, PENNSYLVANIA.

COAL-WASHER.

SPECIFICATION forming part of Letters Patent No. 391,926, dated October 30, 1888.

Application filed September 6, 1887. Serial No. 218,931. (No model.)

To all whom it may concern:

Be it known that I, SEBASTIAN STUTZ, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Coal-Washers, of which improvements the following is a specification.

My present invention is an improvement upon that for which Letters Patent of the United States No. 324,341 were granted and issued to me under date of August 11, 1885; and its object is to afford effective and desirable means for operating the slate-valves without obstructing the passage of the washed coal over the delivery-bridge or interfering with the scraper, preventing the escape of coal through the slate-delivery passages when the valves thereof are raised unusually high, ascertaining the level and the condition of impurities in the separating-chamber above the screen, regulating and facilitating the withdrawal of impurities from the screen into the slate-chamber, and regulating as desired the supply of raw coal from the feed-chute to the separating-chamber.

The improvements claimed consist in certain novel devices and combinations, hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical transverse section through a coal-washing machine embodying my invention at the line *x x* of Fig. 2; Fig. 2, a vertical longitudinal section through the same, the left-hand portion of the figure being taken at the line *y y* and the right-hand portion at the line *z z* of Fig. 1; Fig. 3, a transverse section, on an enlarged scale, through the delivery-bridge and upper portion of the separating-box, illustrating the coal-scraper; Fig. 4, a plan or top view of the same; Fig. 5, a section of similar character to Fig. 3, but illustrating a modification of the coal-scraper; and Fig. 6, a plan or top view of the same.

The machine in which my invention is herein illustrated as applied being in general structure and except as to the specific features of my present improvements substantially similar to that set forth in my Letters Patent No. 324,341, before referred to, need not be described in detail or with greater particular-

ity than will suffice to intelligently explain the construction and operation of the novel features with which the structure of said patent is supplemental under my present invention. In the instance shown the separator box or chest contains four compartments, each divided by a curved partition, 3, into an upper separating or sieve chamber, 4, and a lower dead-water or sediment chamber, 5. The separating-chambers 4 communicate by lateral openings governed by valves 6 with piston-chambers 7 on the rear side of the compartments. A sieve or screen, 8, extends across each compartment above the openings of the valves 6, and a series of slate-openings, 9, governed by valves 10, establish communication between the spaces above the sieves and slate-compartments 11, adjoining the front of the separating-box. The coal to be washed is supplied to each of the separating-chambers by a chute or feed-channel, 22, having a hinged gate-board, 23, at bottom provided with a regulating-bolt, 82, to be hereinafter described, in order to bring the coal supplied near to the sieve 8 before reaching the delivery dam or bridge.

The slate-compartments 11 are separated by vertical partitions 12, open at bottom to provide thereat a chamber common to all the compartments, and a horizontal screw-conveyer, 13, is mounted in suitable bearings in this chamber, and is rotated from the driving-shaft 14 of the machine, which is provided with tight and loose pulleys 18 19, for the reception of a belt from a pulley on the shaft of any suitable prime mover. The driving-belt 15 of the conveyer passes around a pulley, 16, on the driving-shaft of the scraper and a pulley, 17, on the conveyer-shaft. The washed coal is delivered from the separating-box over the top of a delivery-dam or horizontal bridge-piece, 20, extending along the front of the separating-box above the slate-openings 9, the coal passing over the top of said dam into a coal-delivery compartment, 21, common to all the compartments of the separating-box and extending longitudinally in front of the slate-compartments 11. The washed coal delivered over the dam 20 from the several compartments passes down an inclined partition, 21^a, in the coal-delivery compartment to a point near the bottom thereof, whence it may be re-

moved by an elevator or conveyer or otherwise.

The separating-box and piston-chambers rest on standards 25, fixed to suitable foundation-timbers, 26. Water is supplied to the separator-box through pipes 27, leading into the piston-chambers 7, and is forced through the coal upon the sieve 8 by the movements of pistons 28, fitting in the piston-chambers. The pistons 28 are secured upon piston-rods 29, which are reciprocated through cams 31 and cam-yokes 30 from the driving-shaft 14. The separated impurities passing through the openings 9 into the slate-compartments 11 are carried therefrom by the conveyer 13 into an elevator-casing, 44, located adjacent to one end of the separator-box, and are thence delivered to a chute or other desired avenue of discharge by a vertical elevator composed of a pair of endless chains carrying elevator-buckets 46 and passing around sprocket-wheels fixed upon shafts 48 and 50, journaled adjacent to the bottom and the top of the casing, respectively, the upper sprocket-wheels being provided with discharge-plates to effect the proper delivery of the material into a chute or receiver.

So far as hereinbefore described the machine accords in all substantial particulars with that of my Letters Patent No. 324,341 aforesaid. The improvements comprehended within my present invention, as applied in a structure of such general character, are as follows:

The delivery-bridge 20 is, by preference, formed of a metal plate of a semi-cylindrical form at top when fixed in position on the front of the separating-box, and having free internal space for the location of a valve-operating shaft, 58, journaled in bearings cast or connected to the delivery bridge 20. Said bridge 20 is provided with slots for the passage of levers 59 and 57, so arranged and located that the tops of the slots remain below the summit of the bridge, preventing the water in the sieve-chamber finding an escape below that level. The levers 59 reach through the slots into the sieve-chamber, and by means of the links 60 are connected to the slate-valve 10, while the valve-operating lever 57, located at the end of the bridge 20, also reaches into the sieve-chamber, and over the delivery-bridge by means of its angular shape, as shown in Figs. 1 and 3, or the curved shape, as shown in Fig. 5, the object of this arrangement being to get the levers 59, with their links 60, below the top of the bridge, and thus provide an unobstructed passage for the washed coal and the sweep of the scraper, the blades of which are made in one piece, in length nearly equal to the full width of the sieve-chamber, thus avoiding the necessity for division of the scraper-blades, which has heretofore been the case. The slate-valve 10 is provided with a horizontal or nearly horizontal projection, 63, reaching inwardly over the sieve, the slate-valve, with its projection, sliding up and down the side of the

delivery-bridge 20. The object of this projection or extension 63 is to prevent the top layers of the coal from suddenly sinking down and escaping through the slate-valve opening when the valve is opened to a considerable extent.

To admit of properly delivering the washed coal from the sieve over the delivery-bridges without the use of more water than is necessary for the separation, and of affording ready access, as required, to the material resting upon the sieves, so that the quantity and character of the body of impurities which tends to collect at and adjacent to the slate openings may be readily determined by the attendant from time to time, I provide a coal-scraper, which is adapted to be connected with and disconnected from its driving mechanism, as required, either to remove the coal or to enable the operator to obtain access to the foreign matters on the sieves.

Referring more particularly to Figs. 3 and 4, the coal-scrappers are formed of a series of blades, 64, which are secured parallel one to the other to pairs of endless chains 65 66, each scraper being arranged in the upper portion of one of the sieve-chambers, and adapted to be moved so that the blades on the lower sides of the endless chains shall move toward the delivery-bridge 20. The chains 65 66 pass around sprocket-wheels 67 68 69 70, the wheels 67 and 70 being mounted loosely upon a shaft, 71, journaled in bearings near the top of the sieve-chamber and adjacent to the delivery-bridge 20, and the wheels 68 and 69 being fixed upon a shaft, 72, the bearings of which are located at a suitable distance from those of the shaft 71, in the direction of the feed-chute, to maintain the requisite tightness of the chains. A clutch-section, 73, is formed on one side of the wheel 67, which is held in position longitudinally upon its shaft 71 by a collar, 74, fixed thereon, and a sliding clutch, 75, fitted to rotate with the shaft 71 while having the capacity of movement endwise thereon, as by means of a slot and key or feather, is adapted to be moved into or out of engagement with the clutch-section 73. The shaft 71 carries a driving-pulley, 76, to which rotation is imparted in any suitable manner from the driving shaft 14 of the machine, the driving-belt 15 of the slate-conveyer, in this instance, serving conveniently for the purpose. The bearings of the shaft 72 are fitted adjustably in the separator-box, and may be raised and lowered to vary the position of the scraper-blades 64 relatively to the water-level therein by the adjusting-screws 77. In the position shown in Fig. 3, the clutch 75 being engaged with the clutch-section 73, the rotation of the shaft 71 will be imparted to the sprocket-wheel 67, and thence through the endless chain 65 and wheel 68 to the shaft 72, and wheels 69 and 70, moving, as required, the scraper-blades 64, on the lower sides of the endless chains, in the direction of the delivery-bridge. Upon the

disconnection of the clutch 75 from the clutch-section 73, the rotation of the shaft 71 will cease to impart movement to the endless chains and scraper-blades, so that the operator may obtain the desired access to the material on the sieve without necessitating the stoppage of the other moving parts of the machine, as has heretofore been the case. The scrapers of all the several sieve-chambers are actuated by a single driving-shaft, 71, as shown in Fig. 2; but any one or more may be stopped when desired, as above explained, without involving the stoppage of the remainder, or of other members of the machine.

A modified form of coal-scraper is shown in Figs. 5 and 6, the same consisting of a series of blades, 64, secured by radial arms 78 to a sleeve or tubular hub, 79, fitting freely upon the driving-shaft 71. The latter carries a sliding clutch, 75, similar to that before described, which is adapted to be engaged with or disengaged from a corresponding clutch-section, 73, on the adjacent end of the sleeve, so that the scraper may be operated or held stationary, as in the first-described instance, which is deemed by me the preferable construction in view of the greater length of traverse of the scraper-blades which it renders admissible.

In order to regulate and facilitate the discharge of impurities from the sieves into the slate-chambers 11, I provide means whereby the water-level in the latter may be kept always below the slate-valve opening, so as to induce a current from the sieve-chambers into the slate chambers, which will carry with it the impurities deposited on the sieves near the valve-openings. To this end an escape-pipe, 80, which is preferably provided with a regulating-valve, 81, but which may be of determined capacity and open, is connected to one of the series of slate-chambers 11, or to the slate-elevator chamber 44, which communicates therewith at any convenient point above its bottom. By proper manipulation of the regulating-valve the water-level in the sieve-chambers may be maintained so as to afford a discharge over the delivery-bridge, as required in normal operation, or may be lowered when desired to draw off impurities through the slate-openings 9.

The escape pipe and valve above described are adapted to the further useful function of preventing the escape of small particles of coal which would ordinarily tend to be carried away by the waste water. The quantity of water required in the operation of cleaning or separating coal and impurities being wholly dependent upon and governed by the percentage and character of the latter, it is generally necessary to employ a greater quantity of water than that which would be required merely for the delivery of the washed coal from the top of the layer. Coal and water are thus run together to an elevator-casing or other receptacle, whence the coal is carried away by the elevator or otherwise, and the water, being

allowed to flow off at a certain height, frequently carries with it a considerable percentage of fine coal. By the provision of the escape-pipe and regulating-valve the surplus water, instead of passing over the delivery-bridge 20, is discharged through the slate-valve openings 9 and escape-pipe 80, and the waste of coal above indicated is avoided.

To enable desired adjustments of the hinged gate-board 23 of the feed-channel 22 to be readily effected without interference with the coal-scraper or curtailment of its length, I provide the same with a regulating-bolt, 82, which is beveled or inclined at its lower end to fit against the outer face of the gate-board 23, and is fitted to slide vertically in a guide, 83, fixed to the feed-channel. The bolt 82 may be raised or lowered to admit of the desired variation of position of the gate-board, and is retained as adjusted by a clamping-screw, 84, engaging the guide 83.

I claim herein as my invention—

1. In a coal-washer, the combination of a separating-chamber, a delivery-opening for slate, a delivery-bridge, a valve-operating shaft mounted in bearings below the top and inside of the delivery-bridge, and a slate valve coupled to said shaft sliding up and down on the outside of the delivery-bridge, governing a slate-delivery opening, substantially as set forth.

2. In a coal-washer, the combination of a separating-chamber, a delivery-opening for slate, a delivery-bridge, a valve-operating shaft mounted in bearings underneath the top and inside of the delivery-bridge, a series of levers mounted upon said shaft, and a slate-valve connected to said levers, governing a slate-delivery opening, substantially as set forth.

3. In a coal-washer, a delivery-bridge having a series of slots on its side toward the sieve for the passage and movements of a series of valve-operating levers, in combination with a slate-valve located on the outside near the sieve of said bridge and governing a slate-delivery opening, substantially as set forth.

4. In a coal-washer, the combination of a separating-chamber having a slate-delivery opening on one of its sides, a delivery-bridge located above said opening, and a slate-valve provided with a horizontal or nearly horizontal guard projecting inwardly over the sieve, governing the slate-delivery opening, substantially as and for the purposes set forth and described.

5. In combination with a coal or ore washing machine, a scraper formed by one or more endless chains having a series of blades fastened thereto and moving over a series of tight and loose wheels, one or more of which are provided with a clutch or interlocking mechanism, by which the scraper may be drawn out of motion or stopped without interfering with the movement of the machine, substantially as described, and for the purpose set forth.

6. In combination with a coal or ore washer, a scraper formed by one or more wheels

mounted loose upon their shaft, and having a series of blades fastened thereto, the wheel or wheels being provided with a clutch or interlocking mechanism, by which the scraper may
5 be drawn out of motion or stopped without interfering with the movement of the machine, substantially as and for the purposes set forth and described.

7. A coal or ore washer consisting of one or
10 more separating - chambers provided with scrapers having a clutch or interlocking mechanism, and receiving movement from a common driving-shaft, whereby one or all of the scrapers may be drawn out of motion or
15 stopped without interfering with the movement of the machine, substantially as set forth and described.

8. In a coal-washer, the combination of one or a series of separating-chambers, one or a series of communicating slate-chambers, an
20 elevator chamber or casing into which the slate is delivered, and a water-escape pipe connected with said elevator-casing or slate-chamber controlling the water-level of said chamber below the slate valve opening, substantially as
25 described.

In testimony whereof I have hereunto set my hand.

SEBASTIAN STUTZ.

Witnesses:

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R. H. WHITTLESEY.