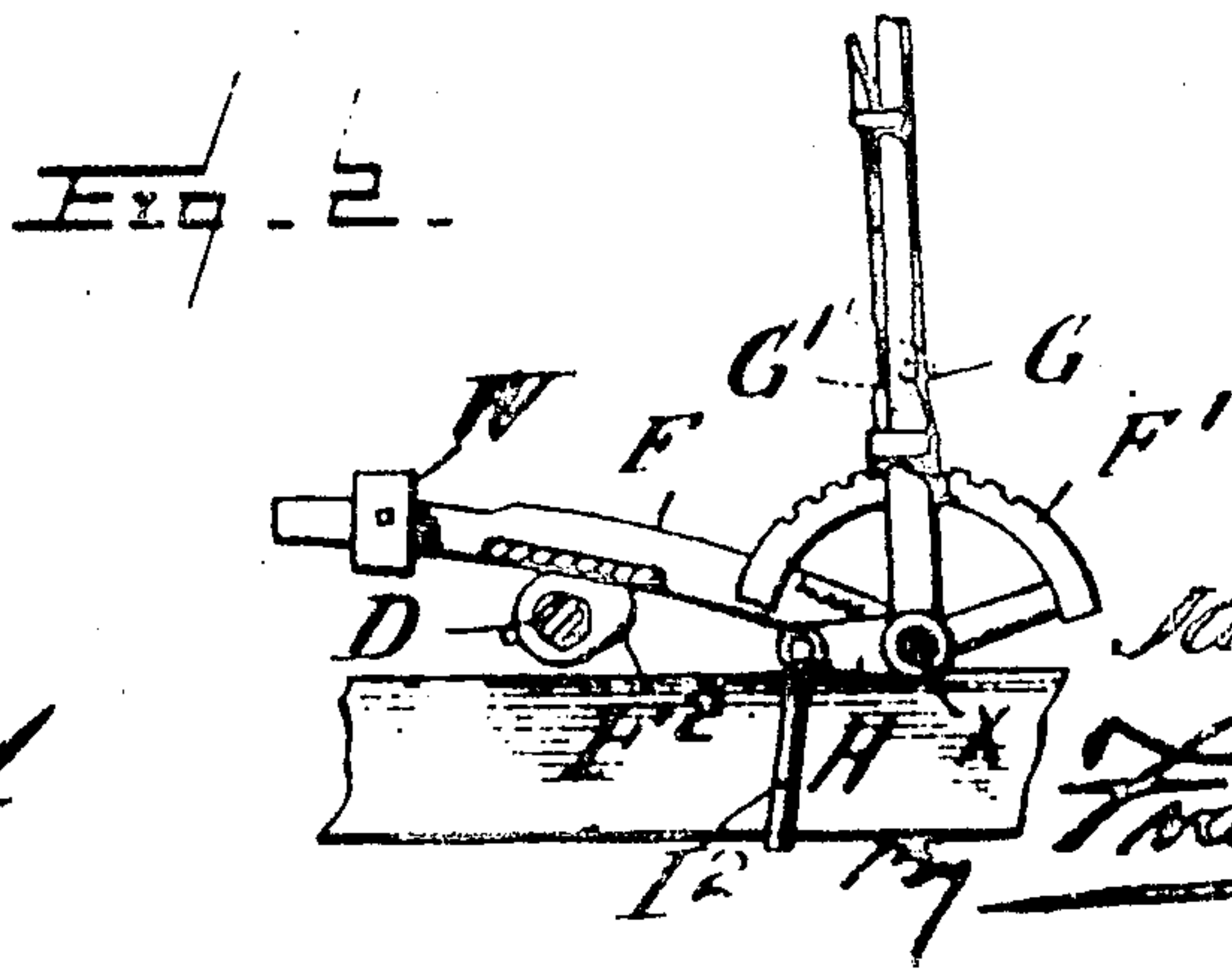
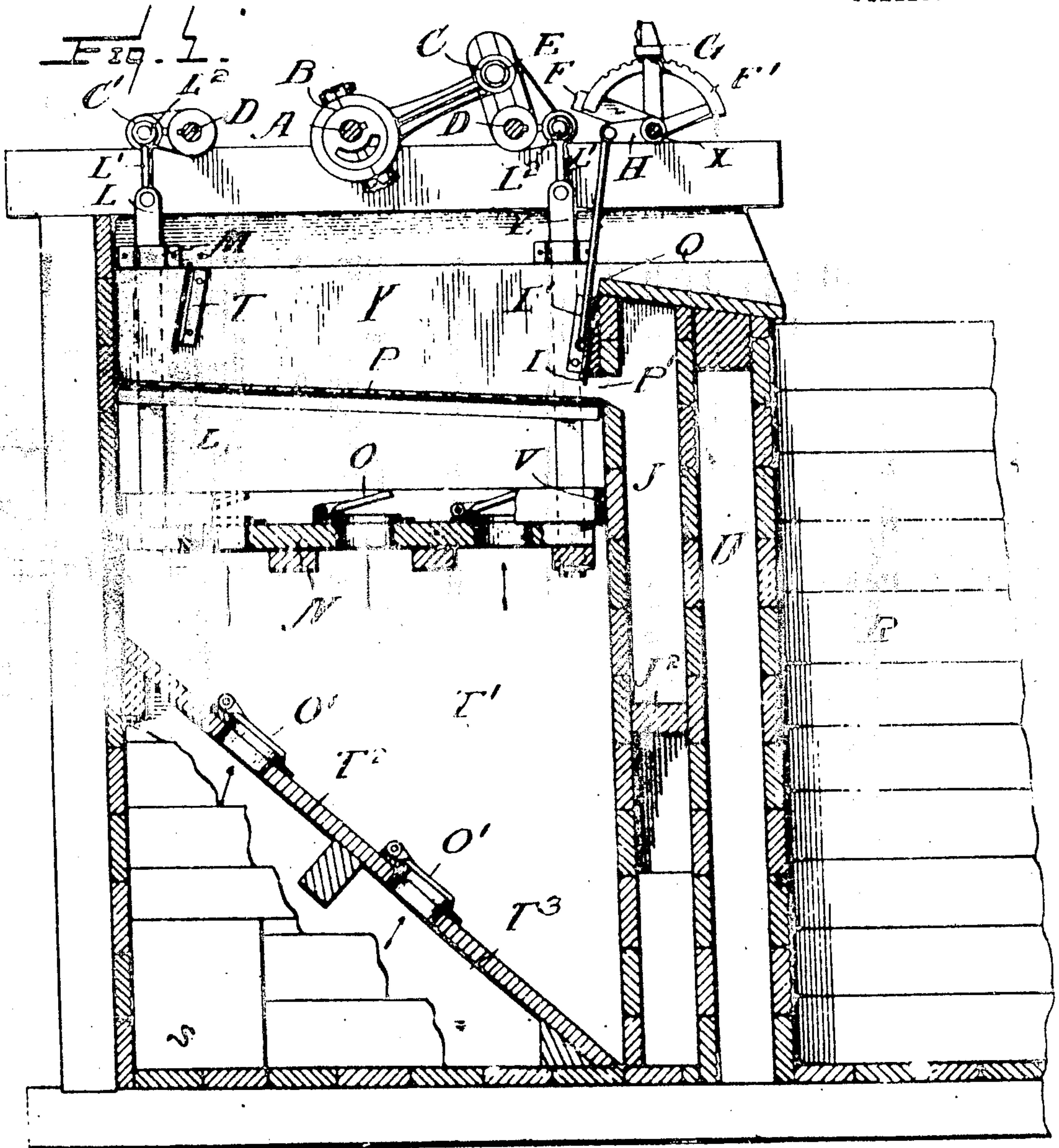


J. A. MONTGOMERY.
COAL WASHING MACHINE.
APPLICATION FILED JAN. 28, 1910.

954,986.

Patented Apr. 12, 1910

3 SHEETS-SHEET 1.



WITNESSES:
W. F. Dyer.
A. L. Hough

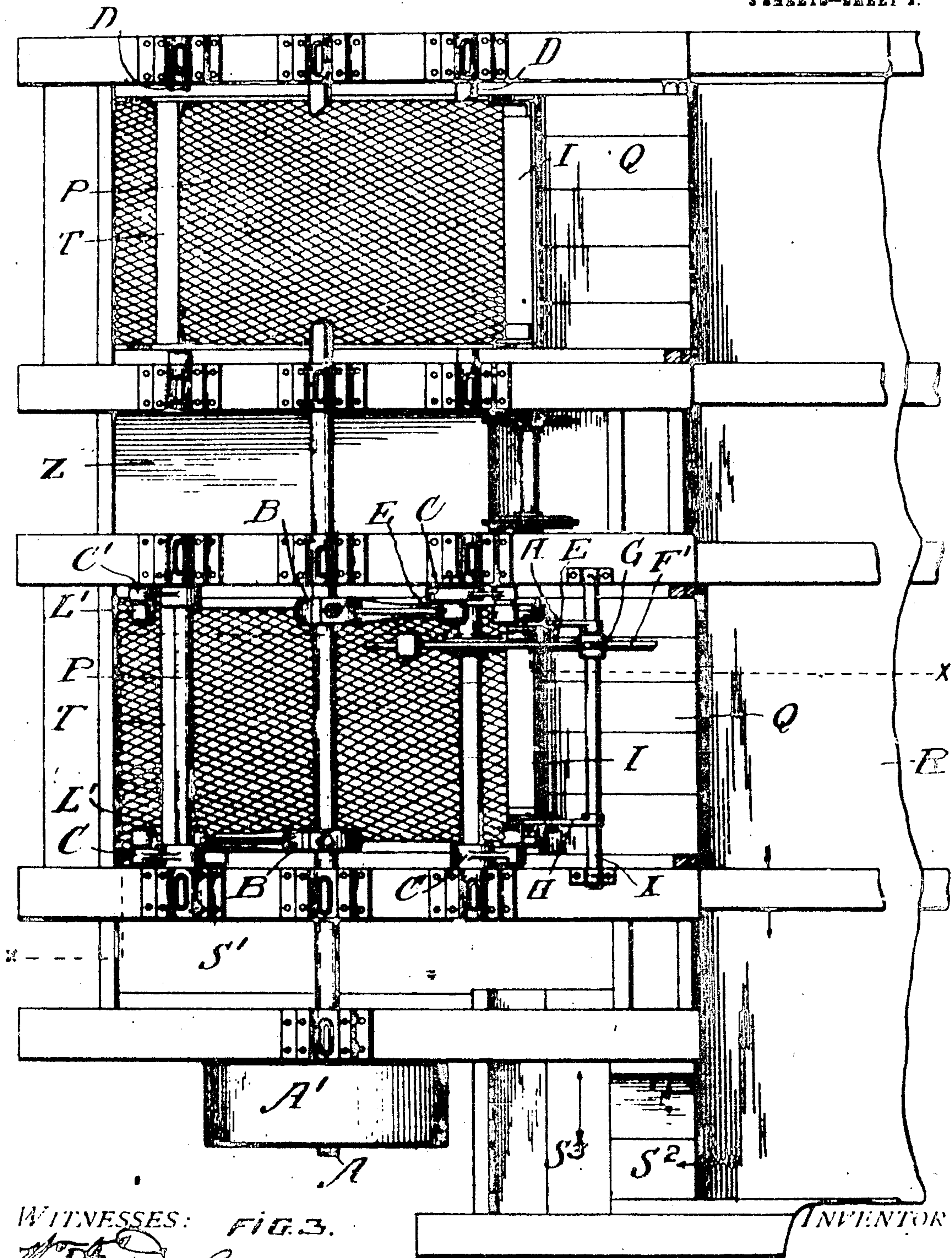
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3 SHEETS—SHEET 2.



WITNESSES: FIG. 3.

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INVENTOR

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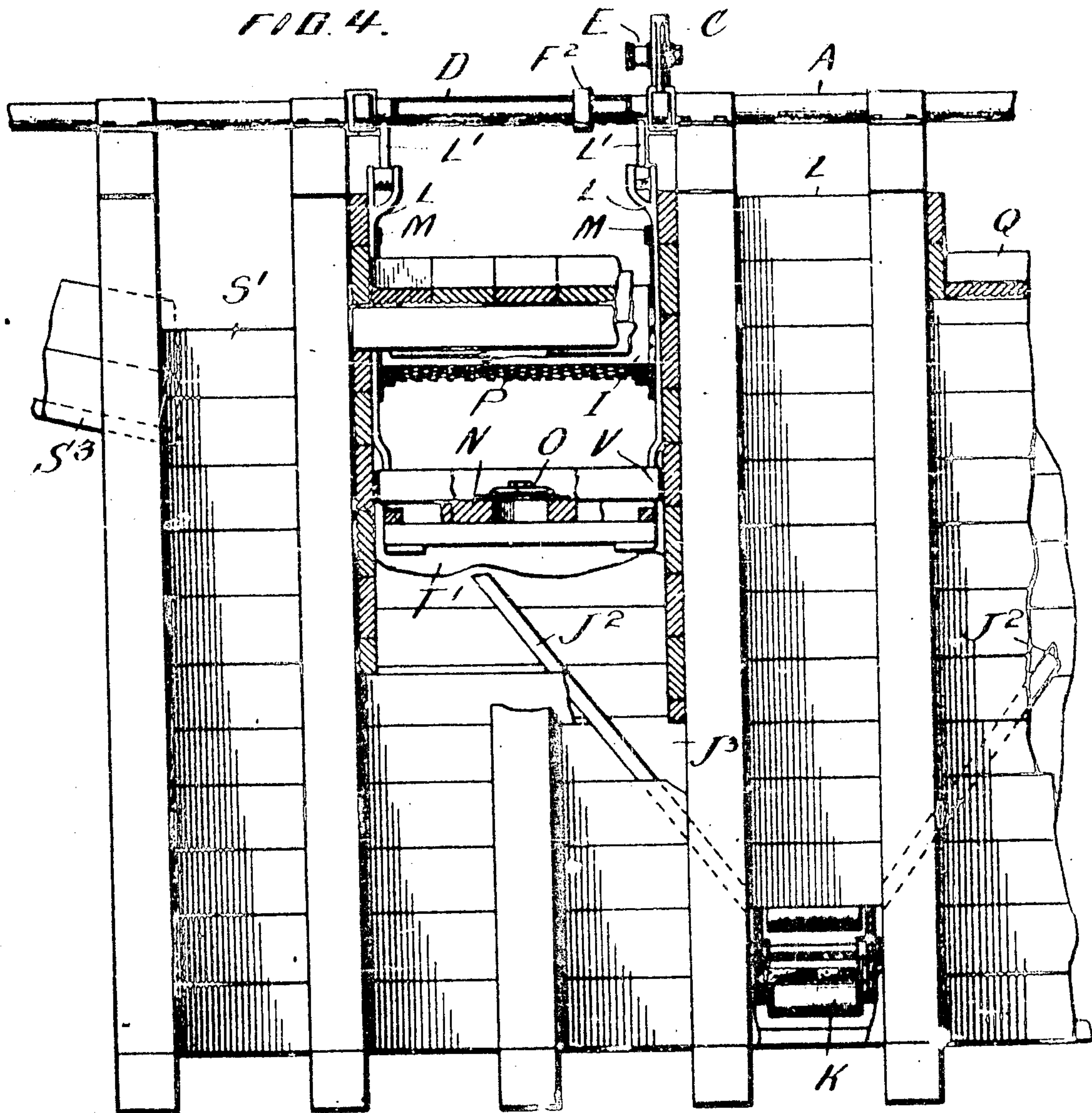
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JAMES ALEXANDER MONTGOMERY, OF BIRMINGHAM, ALABAMA.

COAL-WASHING MACHINE.

954,986.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed January 28, 1910. Serial No. 540,375.

To all whom it may concern:

Be it known that I, JAMES A. MONTGOMERY, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Coal-Washing Machines; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in an apparatus for the washing of coal by jigs.

One object of my invention consists in the provision of an inclined stationary screen across the jig tank which receives the coal to be washed and has disposed beneath it a reciprocating plunger carrying flap valves which operate to force the water up through the screen without permitting the water to wash over the sides of the screen as is the case where the screen and plunger move together.

A further object of my invention is to so arrange the screen that the slate discharged therefrom does not fall into the jig tank but is discharged into a separate compartment, by which means the water in the jig is kept much freer from slate and dirt and the per cent. of wash in the washed coal materially reduced.

A still further object of my invention is to provide an oscillatory slate valve which controls the slate port at the lower edge of the inclined screen, said valve being adjustable so as to vary the opening of the port without changing the length of stroke which it derives from the operating mechanism which reciprocates the plunger.

My invention comprises the details of construction and arrangement of parts hereinafter more fully described and illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical sectional elevation along the line $x-x$ of Fig. 3, only sufficient of the side wall of the supply tank being shown to illustrate the port through which the water flows beneath the jig tank. Fig. 2 is a detail view of the cam operating mechanism for the slate gate. Fig. 3 is a top plan view of the washer complete, the settling tank being broken away and the slate

elevator removed. Fig. 4 is a front view showing the washer with the settling tank broken away to give an end view of one jig and showing the slate elevator.

Similar reference characters refer to similar parts throughout the drawings.

According to my invention as illustrated, I provide a washer having at one side a settling tank R which receives through inclined chutes Q the coal washed from the two jigs Y. These jigs are separated by a slate tank Z having an inclined bottom and provided with a slate elevator K of ordinary construction. The jigs each comprise a rectangular tank T' provided with an inclined bottom T² having a plurality of ports controlled by inlet flap valves O' which open inwardly from the water supply reservoir T³ disposed below the partition T² and supplied with water through a port S leading from the main supply tank S' to which the water flows from the settling tank R, as indicated by the arrows in Fig. 3, down chutes S² and S³. The division side walls of the two jig tanks and of the slate tank, beneath their inclined bottoms, are provided with ports similar to S so that a full supply of water from the tank S' is maintained under the bottoms T², the end wall of the last jig tank being closed to prevent any escape of the water except through the ports controlled by the valves O'.

To provide for the most effective agitation of the coal for washing purposes, I provide across the top of each of the jig tanks an inclined screen P' which, at its lower end, leads to a slate port P'. This screen is rigidly mounted stationary in the tank and the coal is discharged thereon at the upper end thereof by a chute (not shown), which delivers the coal against a baffle plate T. To properly agitate the coal so as to effect the desired separation of the coal from the slate, I provide beneath the screen P a plunger N which fits substantially tight in the tank and moves in contact with friction plates V secured to the side walls of the tank. This plunger is provided with a series of ports closed by upwardly opening water inlet valves O suitably pivoted thereto.

At or near each corner I provide a rod L which passes up beside the screen and through suitable guides M and is connected by a link L' to a stud L² on cranks C and C'. The cranks C and C' are mounted at

opposite ends of each of two parallel shafts D suitably mounted in journal bearings on the upper timbers of the washer, the cranks C' having adjustable studs E to which are
 5 connected eccentric rods operated by eccentrics B keyed to a main power shaft A suitably mounted in bearings and extending over both jig tanks and adapted to receive power from any suitable source of supply.
 10 The reverse disposition of the cranks C and of their respective eccentrics B is such as to cause the several cranks to simultaneously lift the rods L to oscillate the plunger N, which acts on its down stroke to cause the
 15 valves O to open and take in above the plunger a supply of water from the tank T', which water on the up stroke is forced through the screen P, causing an agitation of the coal and slate and effectively separating it so that the coal washes over the chutes
 20 Q with the surplus water and falls into the settling tank, while the slate works itself toward the slate port P', from whence it passes along the inclined slate bottoms J' of the tank J to the bottom end of the slate
 25 tank Z, where it is taken up by the elevator K and disposed of in the usual manner. The up stroke of the plunger N acts by suction to open the valves O' and draw in a
 30 supply of water from beneath the bottom T', while the surplus water from the settling tank R returns in the manner described beneath the bottoms T' of the jig tanks, thus maintaining a complete gravity circulation.
 35 The coal delivered to the settling tank R is removed therefrom in the usual manner. To secure the best results in the separation, it is advisable to provide an oscillating gate valve I for the slate port, which valve I
 40 term the slate valve and which is mounted in suitable guides I' and connected by two rods I'' to cranks II keyed to the shaft X on which the slate gate lever G is also rigidly fixed. The lever G carries a dog G', by
 45 means of which it engages in one or the other of the notches of a segment F', which is loosely mounted on the shaft and connected to a lever F which carries a weight at its outer end and at an intermediate point
 50 rests upon a cam F'' mounted upon the adjacent shaft D. As the shaft D is oscillated through the eccentric mechanism described, the cam F'' will raise and lower the lever F and, through the connection of the seg-
 55 ment and dog, the lever G and arm II will be raised and lowered in synchronism with the movements of the plunger so that the slate gate will move downwardly with the down stroke of the plunger and will lift with

the up stroke of the plunger, thus vibrating 30 movement of the gate acting to greatly facilitate the discharge of different sized lumps of slate through said port. By moving the dog G' into engagement with different notches in the segment F', the relative
 35 oscillatory position of the slate gate I, with relation to the port P' can be adjusted to suit varying conditions.

According to my construction it will be evident that there is no chance for the water 70 from the tank T' to wash over the screen and deposit the dirt and slate on the coal as it washes over the chute Q, which is the case in all constructions where the screen is oscillated in the jig tank. Also the water 75 which washes the coal is maintained much cleaner by preventing any direct discharge of the slate thereinto.

What I claim to be new is:—

In a coal washing apparatus, the combina- 80 tion of a tank having an inclined bottom with valve-regulated openings therein and divided into compartments, screens mounted in each compartment at inclinations, the wall of each compartment having an exit opening 85 adjacent to the lower end of each screen and each opening into a narrow compartment having a V-shaped bottom with an opening at its lower end, a conveyer movable in said opening, a plunger having valve-regulated 90 openings therein and mounted one underneath each of said screens, friction strips upon the walls of the compartments adjacent to said plunger, a driving shaft journaled in suitable bearings in the frame, counter 95 shafts, crank arms terminating in eyes fixed to the latter, bars fastened to said plungers and having their upper ends bifurcated and adapted to receive the eyes at the ends of said crank arms, pins passing through reg- 100 istering apertures in said arms and eyes, a rock shaft, a slide mounted over each screen and adjacent to each exit opening, pivotal link connections between the rock shafts and said slides, means for automatically rocking 105 said shaft, a crank arm fixed to one of said counter shafts and having an elongated slot therein, an eccentric disk fixed to the driving shaft, an eccentric strip mounted about said eccentric and having an arm adjustably 110 held in said slot of the crank arm.

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

JAMES ALEXANDER MONTGOMERY.

Witnesses:

WILLIAM E. HEATON,
 Mrs. ROBT. P. FARISS.