

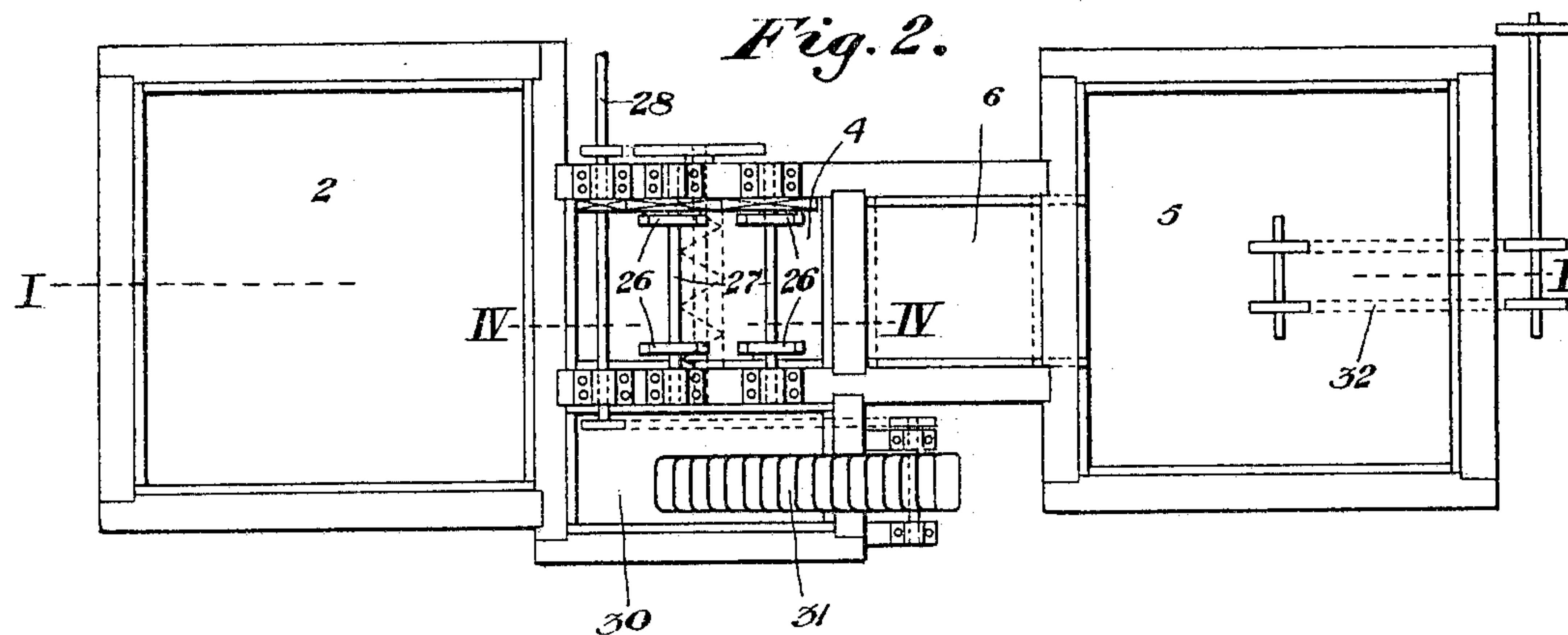
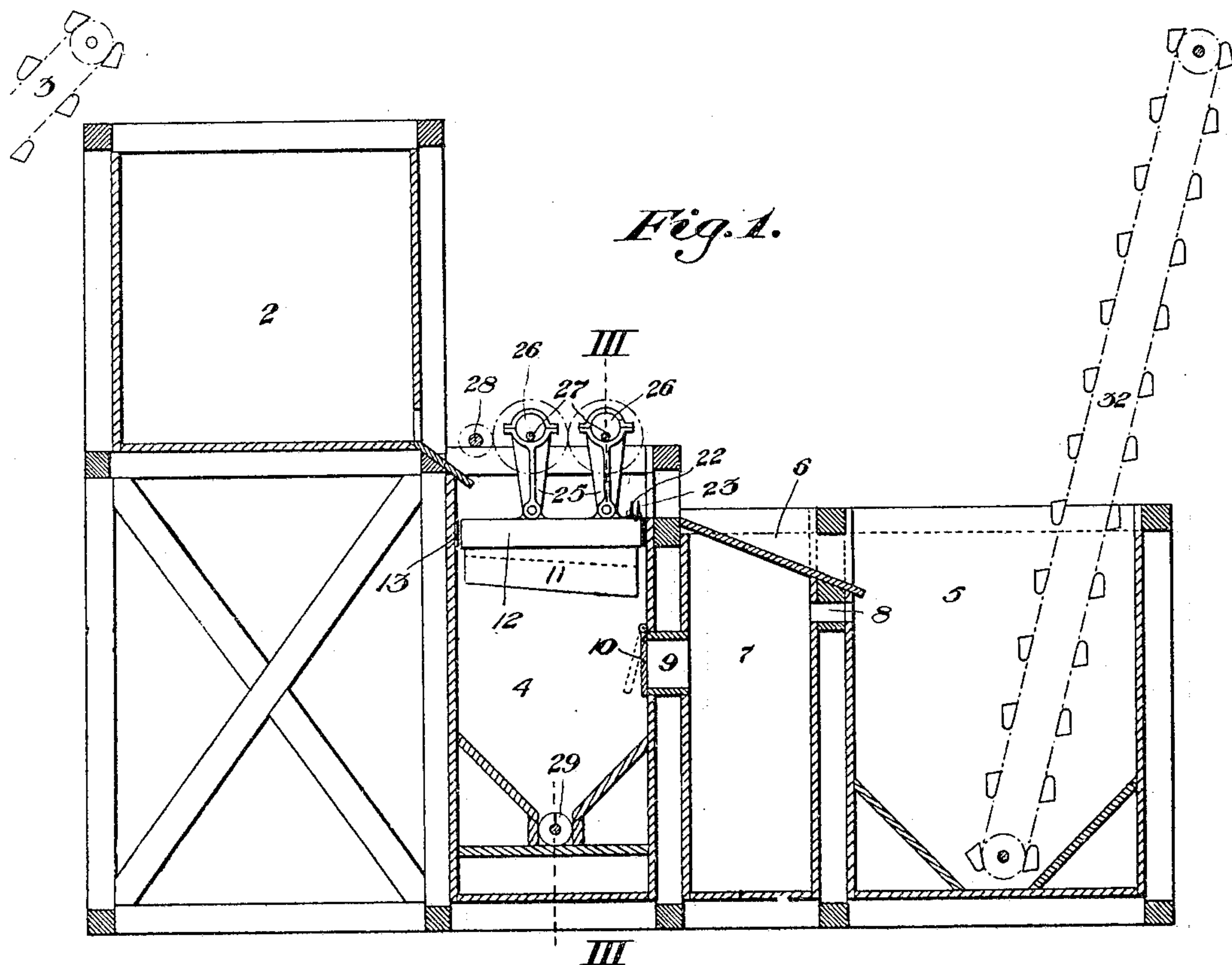
No. 801,803.

PATENTED OCT. 10, 1905.

R. L. MARTIN, JR.
COAL WASHING APPARATUS.

APPLICATION FILED FEB. 11, 1905.

2 SHEETS—SHEET 1.



Witnesses:

E. R. Rodd.

Chas. S. Rpley

Inventor:

Robert L. Martin Jr.

by C. M. Clarke
his attorney

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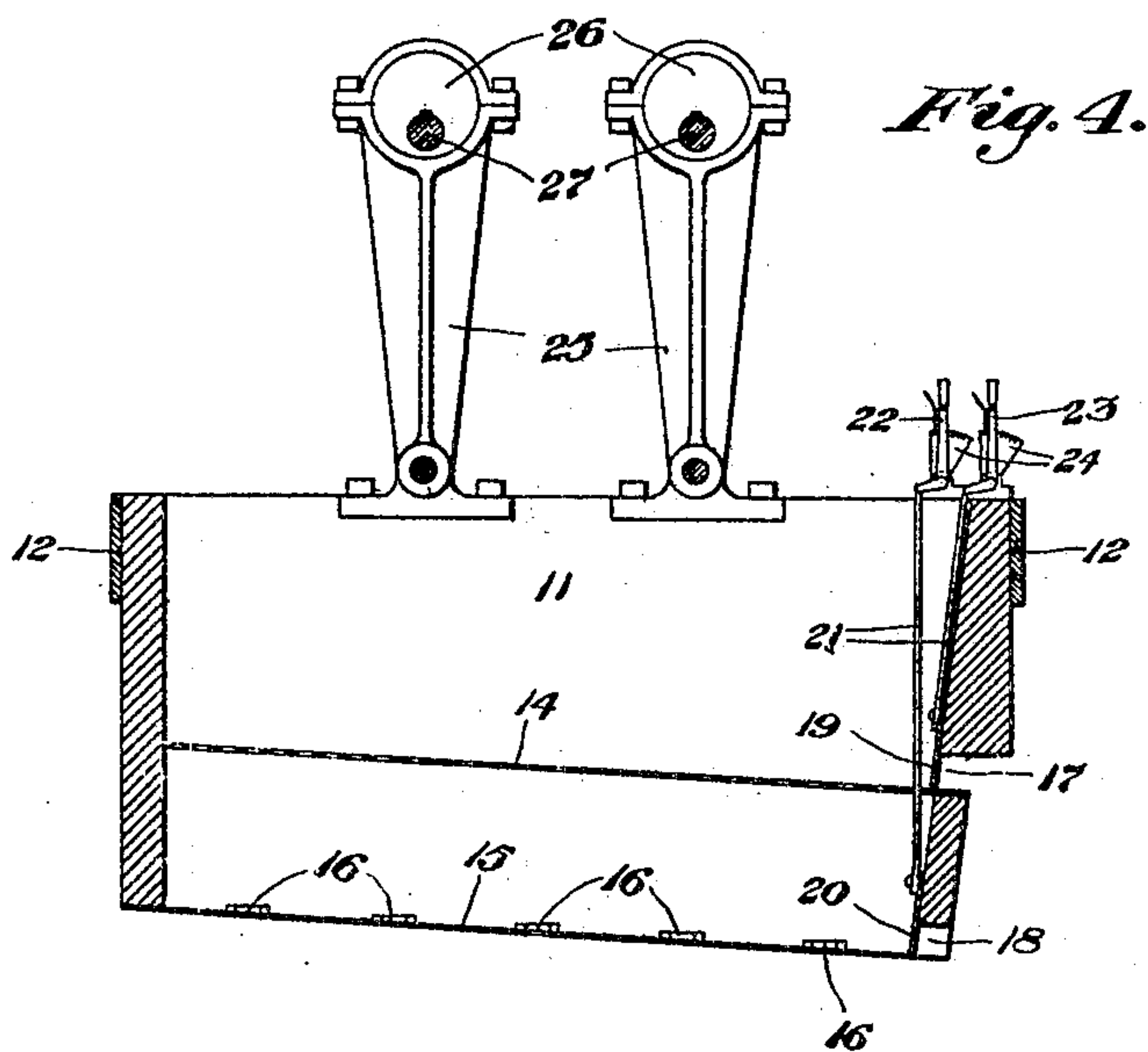
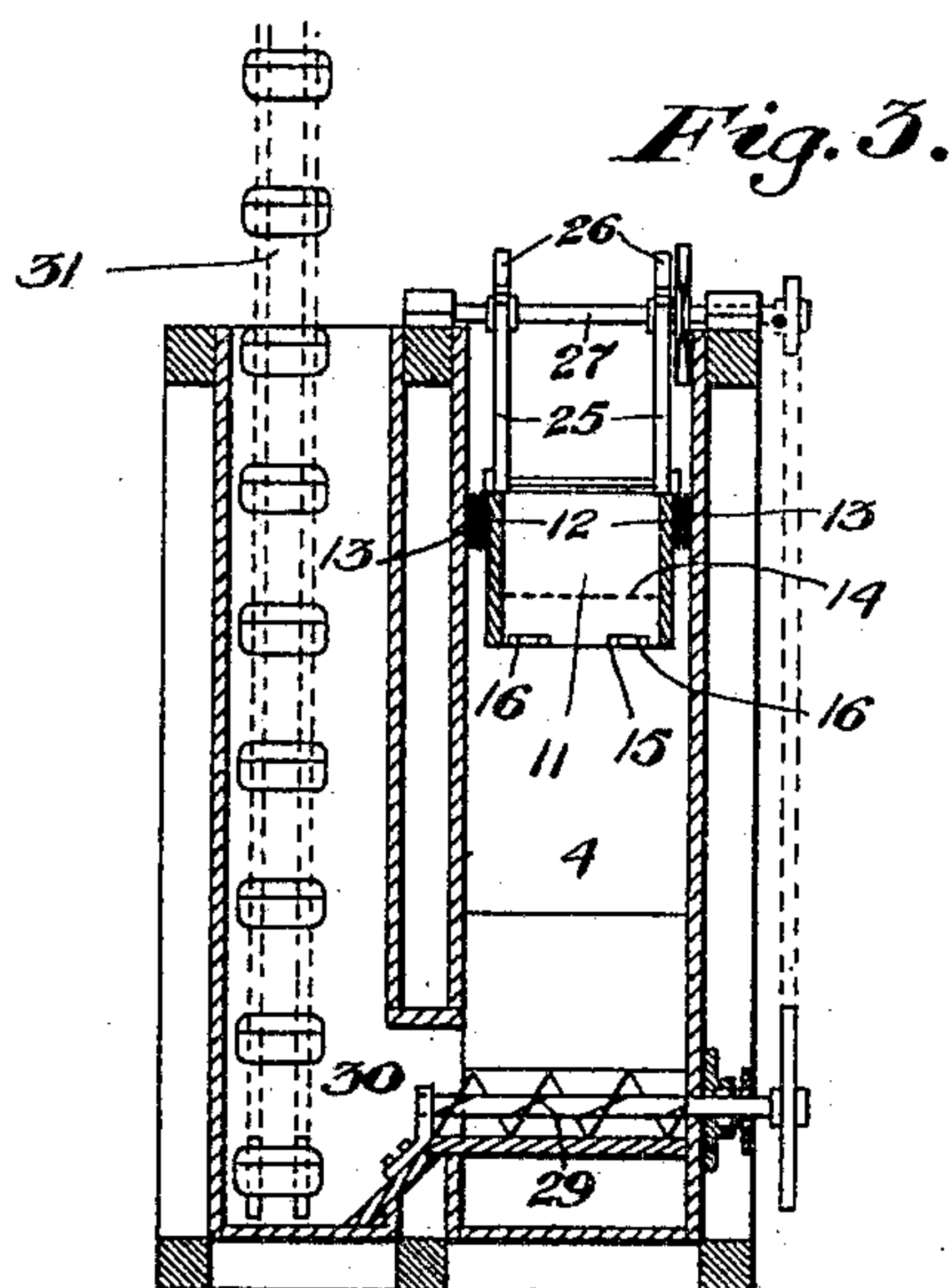


Fig. 5.

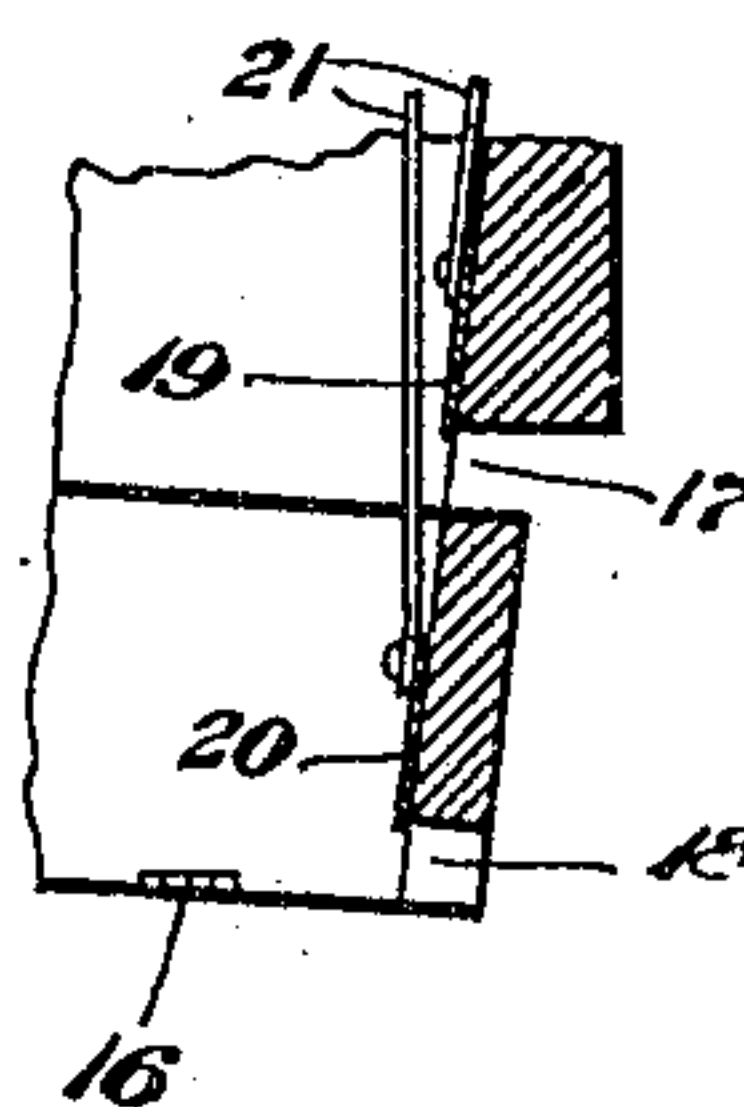
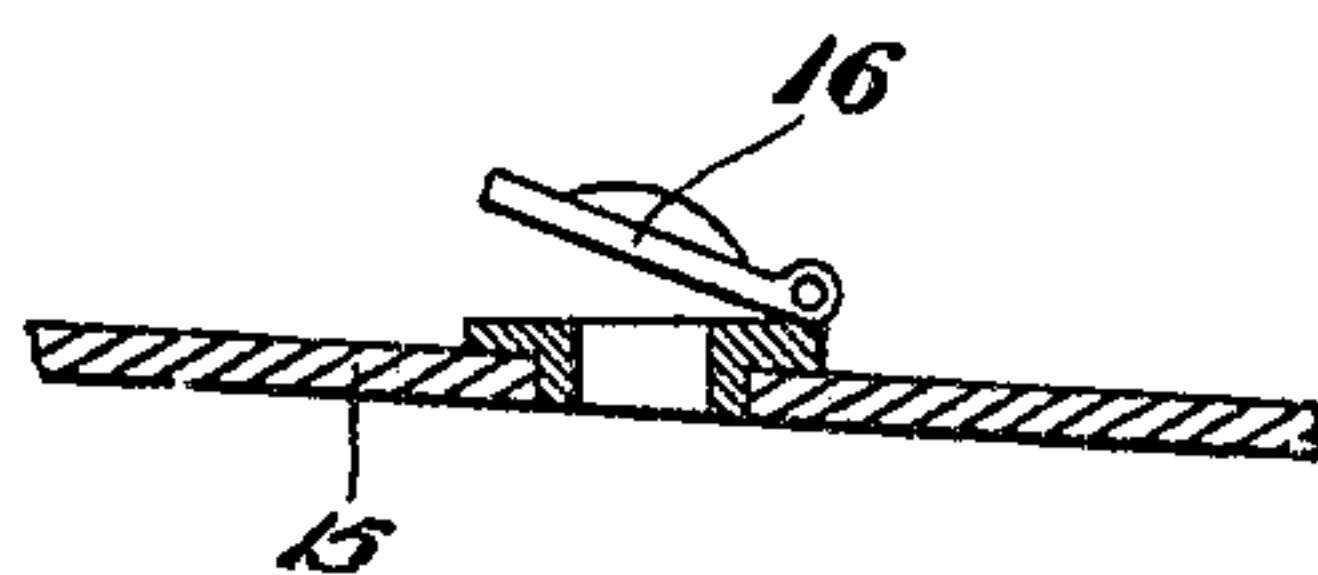


Fig. 6.



Witnesses:

E. R. Todd.

Chas. S. Spley.

Inventor:

Robert L. Martin Jr.

by C. M. Clarke
his Attorney

UNITED STATES PATENT OFFICE.

ROBERT L. MARTIN, JR., OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO
PITTSBURGH COAL WASHER COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COAL-WASHING APPARATUS.

No. 801,803.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed February 11, 1905. Serial No. 245,250.

To all whom it may concern:

Be it known that I, ROBERT L. MARTIN, Jr., a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Washing Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a vertical longitudinal sectional view through my improved coal-washing apparatus indicated by the line I I of Fig. 2. Fig. 2 is a plan view of the apparatus. Fig. 3 is a vertical cross-sectional view on the line III III of Fig. 1. Fig. 4 is an enlarged vertical detail view of the jig on the line IV IV of Fig. 2. Fig. 5 is a partial similar view showing the discharge-gates raised. Fig. 6 is a vertical sectional detail view of one of the valves of the jig, showing it opened.

My invention refers to improvements in coal or ore washing machinery or apparatus, and relates to a construction whereby a constant circulation and supply of water is furnished to the jig-tank and various other parts of the apparatus, to an improved arrangement of the various tanks and bins, elevators, conveyers, &c., and also to an improved construction of reciprocating jig, whereby the burden of coal is supported in such a manner as to permit a free circulation of water there-through, so as to separate it by buoyancy or flotation from the slate, sulfur, and other impurities, together with other features of improvement, which shall be more fully hereinafter set forth.

Referring now to the drawings illustrating the invention, 2 represents a dry coal-bin, to which coal may be delivered by any suitable means, as an elevator 3, said bin being arranged at a sufficient elevation to deliver the coal to the jig by gravity. Adjacent to the coal-bin 2 is located the jig-tank 4, beyond which is the settling-tank 5, arranged to receive the washed coal carried over by the water through an intervening channel 6, preferably inclined downwardly toward the settling-tank 5, as shown and as commonly arranged in similar apparatus. Between the jig-tank 4 and settling-tank 5 I preferably locate an intervening overflow-tank 7, into which the water flows from the settling-tank through an intervening opening 8, while a similar opening 9 communicates from the overflow-tank to the jig-tank 4. At the inner side of this opening 9

is a flap-valve 10, arranged to open inwardly to permit an inflow of water to the jig-tank upon upward motion of the jig, but to close against said opening, preventing the return of the water upon downward travel of the jig, thereby retaining the water in the jig-tank and causing it to pass upwardly through the bottom of the jig as it descends.

11 is the jig, consisting of a rectangular framework of any suitable construction, preferably provided with a surrounding bearing-plate 12 at its upper portion, arranged to make a snug practically water-tight fit within a corresponding surrounding bearing 13, located in the interior of the upper portion of the jig-tank, as shown in Fig. 1. Extending across the lower portion of the jig is an inclined primary floor or bottom 14, of perforated metal, woven wire, or other suitable construction having sufficient strength to sustain the body of coal contained in the jig, provided with a series of perforations or openings adapted to permit a free copious upward circulation of the water as the jig descends. Below said primary bottom 14 is a secondary bottom 15, preferably made of sheet metal and also inclined downwardly toward one side or end of the jig, as is bottom 14. The secondary bottom 15 is provided with a plurality of inwardly-opening valves 16 of any suitable construction adapted to open upon downward movement of the jig to allow an inflow of water and to become seated as the jig rises, so as to provide for an upwardly-traveling circulation of water through the body of coal and also to create a suction through the valve-controlled opening 9 to produce an inflowing current to the jig-tank. At the lower side or end of the primary bottom 14 and secondary bottom 15 are located openings 17 and 18, respectively, which openings are closed by gates or valves 19 20, separately connected by suitable connecting-rods 21 with independent operating-levers 22 23, mounted at the upper edge of the jig and preferably provided with notched segments 24 and suitable locking-latches, whereby the gates 19 and 20 may be set at varying heights or positively held entirely open or closed, as desired. These gates and the facility of their manipulation are important and useful features of the jig, permitting the accumulations of the slate, sulfur, &c., to be drawn off from time to time from the primary bottom 14 and also providing for the discharge of the accumulations of sludge and fine matter settling upon the floor 15.

The jig is reciprocated by means of connecting-rods or pitmen 25, mounted upon eccentrics or cams 26 and shafts 27, geared together, as shown in Fig. 2, and actuated by any suitable driving mechanism, as a power-shaft 28. By this means the jig is vertically reciprocated, and as the coal is discharged downwardly into it from the bin 2 the operation of the jig will separate the lighter coal from the heavier impurities, the coal passing over into the settling-tank by the buoyant action of the upwardly-traveling water, the heavier impurities settling to the bottom 14 of the jig and from thence downwardly through the jig-tank into its lower portion, from whence such waste matter is removed by a screw conveyer 29 into an adjacent slate-bin 30, an elevator 31 being provided to empty said slate-bin. If preferred, the lower floor of the jig-tank may be merely inclined toward the slate-bin 30, so as to deliver thereinto by gravity.

The washed coal is removed from the settling-tank 5 by an elevator 32 to any suitable point of discharge, and as thus arranged provision is made for continuous operation, the various tanks and reciprocating jig providing a regurgitating system for the water.

The operation will be readily understood from the foregoing description, and the apparatus is well adapted to thoroughly wash the coal and separate it from its impurities, being capable of practically automatic operation with very little attention and being capable of a large output of washed coal.

Various changes and modifications may be made in the design, proportions, or various details of the construction by the skilled mechanic without departing from my invention; but all such changes are to be considered as within the scope of the following claims.

What I claim is—

1. In a coal or ore washer, the combination with a tank adapted to contain water, of a jig fitting snugly therein, and provided with suction-valves in the bottom thereof, means for reciprocating said jig in said tank, and a regurgitating system for conveying the water pumped up by said jig back to said tank, substantially as described.

2. An apparatus for washing coal or ore comprising a tank adapted to contain water, a jig fitting snugly in said tank and provided with a series of passages and with valves opening inward normally closing said passages, means for reciprocating said jig, and means for carrying the water discharged from said jig back to said tank, substantially as described.

3. In a coal or ore washer, the combination with a tank, of a jig fitting snugly therein, and provided with suction-valves in the bottom thereof, means for reciprocating said jig in a vertical direction, means for filling the tank containing said jig with water, and a re-

gurgitating system for conveying the water pumped up by said jig back to the tank below said jig, substantially as described.

4. An apparatus for washing coal or ore comprising a tank adapted to contain water, a jig fitting snugly in said tank and provided with a series of passages and valves opening inward normally closing said passages, means for reciprocating said jig in a vertical direction, and means for carrying the water discharged from said jig back to the tank below said jig, substantially as set forth.

5. In a coal or ore washer, the combination with a tank, of a jig fitting snugly therein, and provided with an inclined perforated inner bottom, and an outer bottom having openings therein with suction-valves normally closing said openings, means for reciprocating said jig in a vertical direction, means for filling the tank containing said jig with water, and a regurgitating system for conveying the water pumped up by said jig back to the tank below said jig, substantially as described.

6. An apparatus for washing coal or ore comprising a tank adapted to contain water, a jig fitting snugly in said tank and provided with a series of valve-passages and flap-valves opening inward, means for reciprocating said jig in a vertical direction, and means for carrying the water discharged from said jig back to the tank below said jig, substantially as set forth.

7. In a coal or ore washer, the combination with a tank, of a jig fitting snugly in said tank and provided with openings in the bottom thereof, and valves opening inward and controlling said openings, with means for protecting said valves from the weight of the ore, an overflow-chute at one side of said jig, means for moving said jig up and down, a supply-tank for water receiving the overflow from said jig, and a suction-valve permitting the flow of water from said supply-tank to the jig-tank, substantially as described.

8. In a coal or ore washer, the combination with a tank, of a jig fitting snugly in said tank and provided with openings in the bottom thereof, and valves opening inward and controlling said openings with means for protecting said valves from the weight of the ore, an overflow-chute at one side of said jig, means for moving said jig up and down, a screw conveyer below said jig, a supply-tank for water receiving the overflow from said jig, and a suction-valve permitting the flow of water from said supply-tank to the jig-tank, substantially as described.

9. In a coal or ore washer, the combination with a tank, of a jig fitting snugly therein, and provided with an inclined perforated inner bottom, with an opening at one side thereof, a conveyer below said opening, the said jig having also an outer bottom with suction-valves therein, means for reciprocating said jig, means for filling the tank containing said

jig with water, and a regurgitating system for conveying the water pumped up by said jig back to the tank below said jig, substantially as described.

5 10. An apparatus for washing coal or ore comprising a tank containing water, a jig fitting snugly in said tank and provided with an inclined perforated inner bottom, with an opening at one side thereof, a conveyer below
10 said opening, the said jig having also an outer bottom with suction-valves therein, means for reciprocating said jig in a vertical direction, and means for carrying the water discharged from said jig back to the tank below said jig,
15 substantially as described.

11. A coal-washing jig comprising a reciprocable framework provided with a primary bottom of perforated material and a secondary bottom provided with upwardly-opening
20 valves, substantially as set forth.

12. The combination with a jig-tank, of a jig comprising a framework provided with a primary bottom of perforated material, a secondary bottom provided with upwardly-opening
25 valves, and means for reciprocating said framework, substantially as set forth.

13. A coal-washing jig comprising a reciprocable framework provided with a primary bottom of perforated material, a lateral discharge-gate for said bottom, and a secondary
30 bottom having upwardly-opening valves, substantially as set forth.

14. A coal-washing jig comprising a reciprocable framework provided with a primary
35 bottom of perforated material, and a secondary bottom having upwardly-opening valves and a lateral discharge-gate, substantially as set forth.

15. A coal-washing jig comprising a reciprocable framework provided with a primary
40 bottom of perforated material, and a secondary bottom having upwardly-opening valves, with lateral discharge-gates for said primary and secondary bottoms, substantially as set
45 forth.

16. A coal-washing jig comprising a framework provided with a primary bottom of perforated material and a secondary bottom having upwardly-opening valves, discharge-gates
50 for said primary and secondary bottoms, and means for adjusting the discharge-gates to different positions, substantially as set forth.

17. In a coal-washing apparatus, the combination of a bin, a jig-tank adjacent thereto,

an intervening inclined chute leading from 55 the bin to the jig-tank, a reciprocating jig mounted in the jig-tank below said chute, an independent settling-tank adapted to receive the washed coal from the jig, an intervening
60 inclined chute, an overflow-tank located between the settling-tank and the jig-tank, and a washed-coal elevator arranged to convey the washed coal from the settling-tank, substantially as set forth.

18. In a coal-washing apparatus, the combination of a bin a jig-tank adjacent to the
65 bin, an intervening inclined chute, a reciprocating jig arranged in the upper portion of the jig-tank beneath said chute, an independent settling-tank, an inclined chute arranged
70 to deliver the washed coal from the jig to said settling-tank, a washed-coal elevator arranged to convey the washed coal from the settling-tank, an overflow-tank located between the settling-tank and the jig-tank with
75 communicating passages to establish a circulation of water from the settling-tank to the overflow-tank and thence to the jig-tank, with means for preventing the backflow of the water from the jig-tank to the overflow-tank
80 upon downward movement of the jig, substantially as set forth.

19. In a coal-washing apparatus, the combination of a bin, a jig-tank adjacent to the
85 bin, an intervening inclined chute, a reciprocating jig arranged in the upper portion of the jig-tank beneath said chute, provided with a valve-controlled bottom and an upper perforated coal-supporting screen, an independent settling-tank, an inclined chute arranged
90 to deliver the washed coal from the jig to said settling-tank, a washed-coal elevator arranged to convey the washed coal from the settling-tank, an overflow-tank located between the settling-tank and the jig-tank with communicating passages arranged to establish a circulation of water from the settling-tank to the overflow-tank and thence to the jig-tank, with means for preventing backflow of the water from the jig-tank to the overflow-tank upon
100 downward movement of the jig, substantially as set forth.

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

ROBERT L. MARTIN, JR.

Witnesses:

J. F. McKenna,

C. M. Clarke.