

No. 803,407.

PATENTED OCT. 31, 1905.

R. DICK.
COAL WASHING APPARATUS.
APPLICATION FILED JAN. 26, 1905.

Fig. 1.

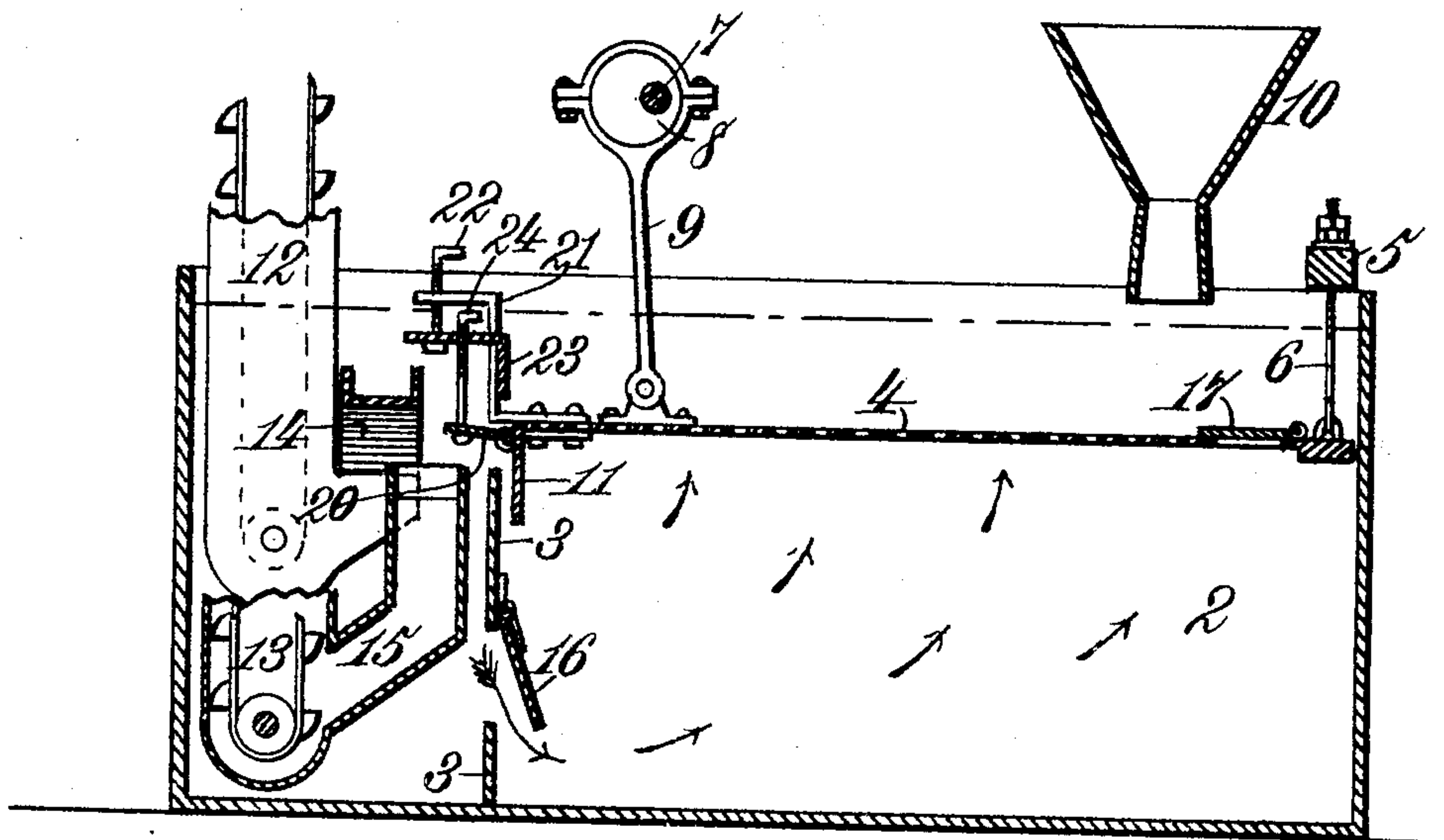
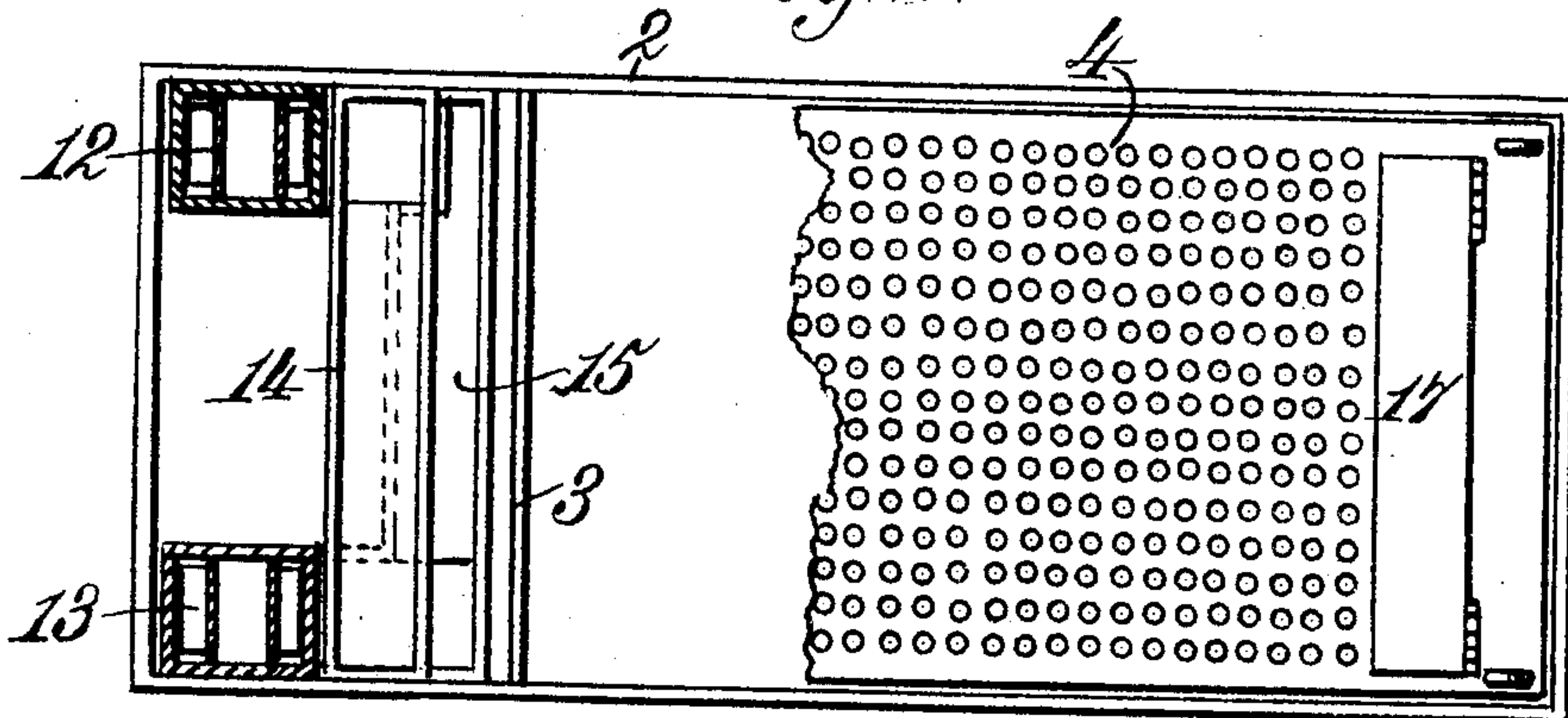


Fig. 2.



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UNITED STATES PATENT OFFICE

ROBERT DICK, OF CARTERVILLE, ILLINOIS.

COAL-WASHING APPARATUS.

No. 803,407.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed January 26, 1905. Serial No. 242,774.

To all whom it may concern:

Be it known that I, ROBERT DICK, a citizen of the United States, residing at Carterville, in the county of Williamson and State of Illinois, have invented new and useful Improvements in Coal-Washing Apparatus, of which the following is a specification.

This invention relates to a coal-washing apparatus, the object of the invention being to provide an effective apparatus of this character which will not only thoroughly scour or wash the coal free from impurities, but will also cause the separation of slate and like foreign matter from the coal.

I have selected for illustration in the accompanying drawings, forming a part of this specification, one simple adaptation of the apparatus, which I will set forth in detail in the following description; but I wish to state at this point that I do not limit myself to the disclosure thus made, for certain variations may be adopted as to a number of points within the scope of my claims succeeding said description.

While I have referred to my invention as a "coal-washing apparatus," this should not be considered as a limitation, for the reason that the apparatus can be employed with equal advantage for scouring or washing other substances than coal and separating the undesirable or refuse matter therefrom.

Referring to the drawings, Figure 1 is a longitudinal sectional elevation of a coal-washing apparatus involving my invention. Fig. 2 is a horizontal sectional top plan view of said apparatus.

Like characters refer to like parts in the different views.

The apparatus includes in its make-up a tank or box, as 2, which may be wholly of wood or metal or made partly from both materials, as occasion may dictate. The tank or box 2 is represented as being rectangular and is adapted in practice to be filled with water, the latter being supplied to the box in any convenient way, the same applying to the disposition of the waste or dirty water. The outlet for the waste water, however, should be of such a nature that the level of the water in the tank or box will be above the vibratory screen located therein and hereinafter more particularly described. In Fig. 1 I have illustrated by dotted lines the level of the water.

Interiorly of the tank or box is a vertical wall 3, located nearer one end wall, or the front end wall, of the tank or box than the rear end

wall thereof. The upper edge of the wall 3 extends short of or is located in a plane below the upper edge of the tank or box for a reason that will hereinafter appear. Said wall, which extends from side to side of the box or tank, divides the latter into two chambers or compartments, one, as will be evident, larger than the other and constituting the main chamber or compartment, while the other constitutes the auxiliary chamber or compartment, and in the latter are mounted the receiving ends of elevators, hereinafter more particularly described, for the coal and slate.

Constituting the top of the main chamber or compartment of the tank is a screen, as 4, which may be made of woven wire or any other desirable material. Extending across the top of the tank or box 2, at the rear thereof, is a beam 5, from which depend the hangers 6, the lower ends of which are hingedly connected to the screen 4, on the upper side and near the rear end thereof, so that an up-and-down vibratory motion can be through suitable mechanism imparted to said screen. The means illustrated for imparting such vibratory or oscillatory motion to the screen will be now set forth. Suitably supported above the screen and to the rear of its forward or delivery end is a transverse shaft 7, adapted in practice to be driven in any convenient way at a comparatively high velocity, so that the vibration of the screen will be rapid to insure the separation of the slate from the coal supplied to the screen. The shaft 7 is provided with eccentrics, each designated by 8 and operatively connected by pitmen or connecting-rods 9 with the screen. It therefore follows that when the shaft 7 is driven the screen will be vibrated in a vertical direction.

At the rear end of the tank and above the screen is illustrated a hopper 10, into which the coal containing slate and other foreign matter is delivered in some desirable way, the coal passing from the spout of the hopper onto the upper side of the screen 4, near the rear end of the latter. Depending from the under side of the screen, near the lip or discharge end thereof, is a flange 11, which upon the vibration of the screen is contiguous to what might be considered the inner face of the wall 3. The casings of elevators, as 12 and 13, extend downward into the forward or auxiliary compartment of the tank or box 2, the elevator 12 being for coal, while the elevator 13 is for slate. The coal-elevator is adapted to deliver the coal into bins, (not illustrated,) while the

slate may be disposed of in any desirable way. I have not deemed it necessary to illustrate any driving mechanism for the two elevators, as the same forms no part of the invention.

5 Leading from the entering end of the elevator-boxes are downwardly-inclined chutes 14 and 15, respectively, what might be considered the bottoms of the said chutes being inclined toward the corresponding ends of the casings for the elevators, in which are located
10 openings for the coal and slate to be taken up by the buckets of the two elevators. The receiving end of the coal-receiving chute 14 is located above that of the slate-receiving chute
15 15 for a purpose that will hereinafter appear.

In the main chamber of the tank and pivotally carried by the wall 3 is a flap-valve 16, controlling an opening in said wall, the valve closing outward against the opening and being
20 opened by the pressure of water thereagainst passing from the auxiliary into the main chamber. A second flap-valve is represented at 17 as hingedly carried by the upper side of the vibratory screen 4, near the rear
25 end thereof, the said valve opening upward by water-pressure passing through the opening said valve controls in said screen, upward from the main chamber.

Motion being imparted to the screen 4, coal
30 being supplied to the upper side thereof, and water being in the tank to the level indicated, the mass of material on the screen will be advanced toward the delivery end thereof, due to the vibration of said screen, assisted by the
35 pressure of the water flowing through the opening controlled by the valve 17, it being understood that as the screen is vibrated the water will be caused to circulate through the two chambers. As the mass supported upon
40 the screen is advanced the slate therein, being heavier than the coal, will work toward the bottom of said mass. When the mass reaches the delivery end of the screen, the coal being superimposed upon the slate will pass into the
45 coal-receiving chute 14, the receiving end of which, it will be remembered, is located above that of the chute 15. The slate at the lip of the screen will fall into the chute 15. Traveling down the two chutes the coal and slate
50 are respectively received by the elevators 12 and 13 and lifted out of the tank.

By the arrangement of valves 16 and 17 I maintain a positive circulation of water through the tank which is used to wash the
55 impurities from the coal and also aid in feeding the mass sustained upon the screen in a forward direction, the feed being assisted by the vibration of the screen.

The coal after treatment by the apparatus
60 will be thoroughly clean and free of all objectionable substances. The dirt and like foreign matter washed from the coal will pass from the tank or box 2 with the waste water.

I provide means coöperative with the screen
65 and regulable to adapt the apparatus to the

sizes of coal and slate separated therefrom. The means illustrated for this purpose will now be set forth.

The discharge end or lip of the screen is designated by 20 and is pivoted to the body 70 of the screen so that it can be raised or lowered to adapt the screen to the sizes of the slate. The means shown for effecting the adjustment of the lip will be hereinafter described. 75

Rising above the screen, and at opposite sides thereof, are uprights 21, the bases or feet of which are fastened in some suitable way to the body of the screen. The uprights 21 have overhanging heads having threaded holes to
80 be engaged by the adjusting-screws 22, connected at their lower ends to the horizontal flange of a gate 23, angular in cross-section and vertically guided by the shanks thereof. It will be understood that the coal passes over
85 the upper side of the gate and that the slate passes between the lower edge of the gate and the body of the screen. To adapt the gate to the particular grade of coal being jigged, it will be vertically adjusted, and this result can
90 be accomplished by the manipulation of the screws 22, the latter having cranked upper ends to insure their ready rotation. Through the horizontal portion or flange of the gate a
95 screw 24 is tapped, being connected at its lower end with the lip or flap 20. By operating the screw 24 said lip or flap can be adjusted to meet the particular conditions.

Having thus described the invention, what I claim is— 100

1. In a coal-washer, a water-containing tank, a wall dividing the same into a plurality of chambers, a vibratory screen over one of the chambers and arranged on its movement to positively circulate the water through the
105 chambers, separate devices in the other chamber to receive the coal and slate discharged from the screen, and valves carried by the screen and wall respectively for controlling the circuitous flow of water in the tank. 110

2. In a coal-washer, a water-containing tank, a wall dividing the tank interiorly into main and auxiliary chambers, said wall having a valve opening into the main chamber, a vibratory screen over one of the chambers, arranged
115 on its vibration to cause a positive circulation of the water through the chambers and through the perforations of the screen, the said screen having a valve adapted to open away from the main chamber the screen being
120 adapted, on its motion, to cause the travel of the slate and coal in superimposed relation toward the front end thereof, and separate devices in the auxiliary chamber of the tank, one in front of the other, the front device being
125 adapted to receive the coal and the rear one the slate passing from the front end of the screen.

3. In a coal-washer, a water-containing tank, a wall extending from side to side of the tank 130

and from the bottom toward and short of the upper edge thereof, a valve carried by the inner side of the wall, the latter having an opening controlled by the valve, a vibratory screen hingedly mounted to the rear of the tank above the lower edge thereof, having a downwardly-extending flange contiguous to the inner face of the wall, and a valve near its rear, controlling an opening therein, mechanism for vibrating said screen, elevators for coal and slate extending into the forward side of the tank, chutes for the coal and slate leading to the casings of the elevators, the receiving end of the coal-receiving chute being located above the corresponding end of the slate-receiving chute.

4. In a coal-washer, a water-containing tank, a wall extending from side to side of the tank

and from the bottom toward and short of the upper edge thereof, a valve carried by the inner side of the wall, the latter having an opening controlled by the valve, a vibratory screen hingedly mounted to the rear of the tank and above the lower edge thereof, a valve on the upper side of the screen controlling an opening therein, mechanism for imparting an up-and-down movement to the screen, and means for receiving the slate and coal falling from the delivery end of the screen.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT DICK.

Witnesses:

M. W. SIZEMORE,
CLEVE SANDEFER.