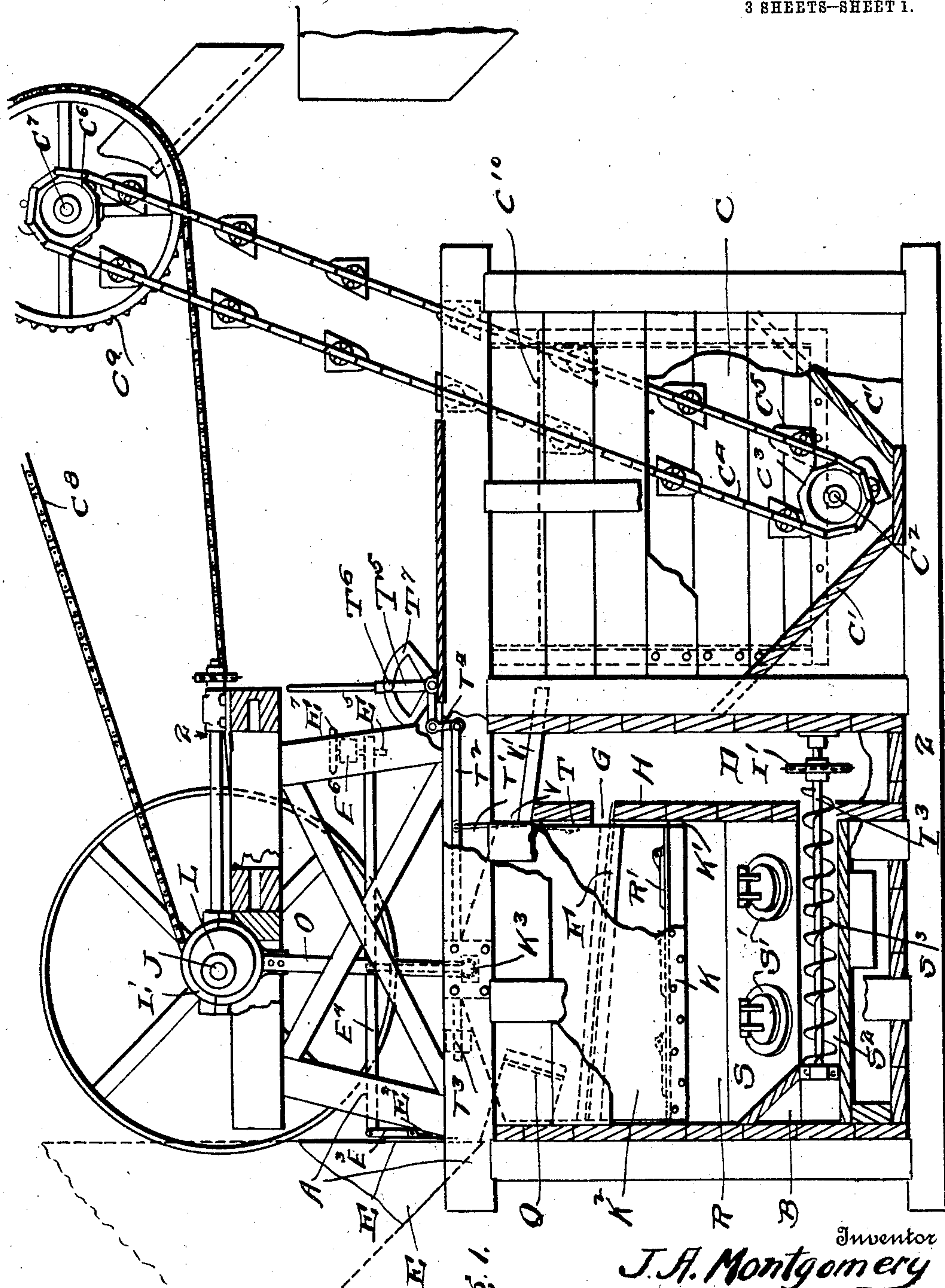


J. A. MONTGOMERY.
 COAL WASHING APPARATUS.
 APPLICATION FILED JAN. 16, 1911.

998,373.

Patented July 18, 1911.

3 SHEETS-SHEET 1.



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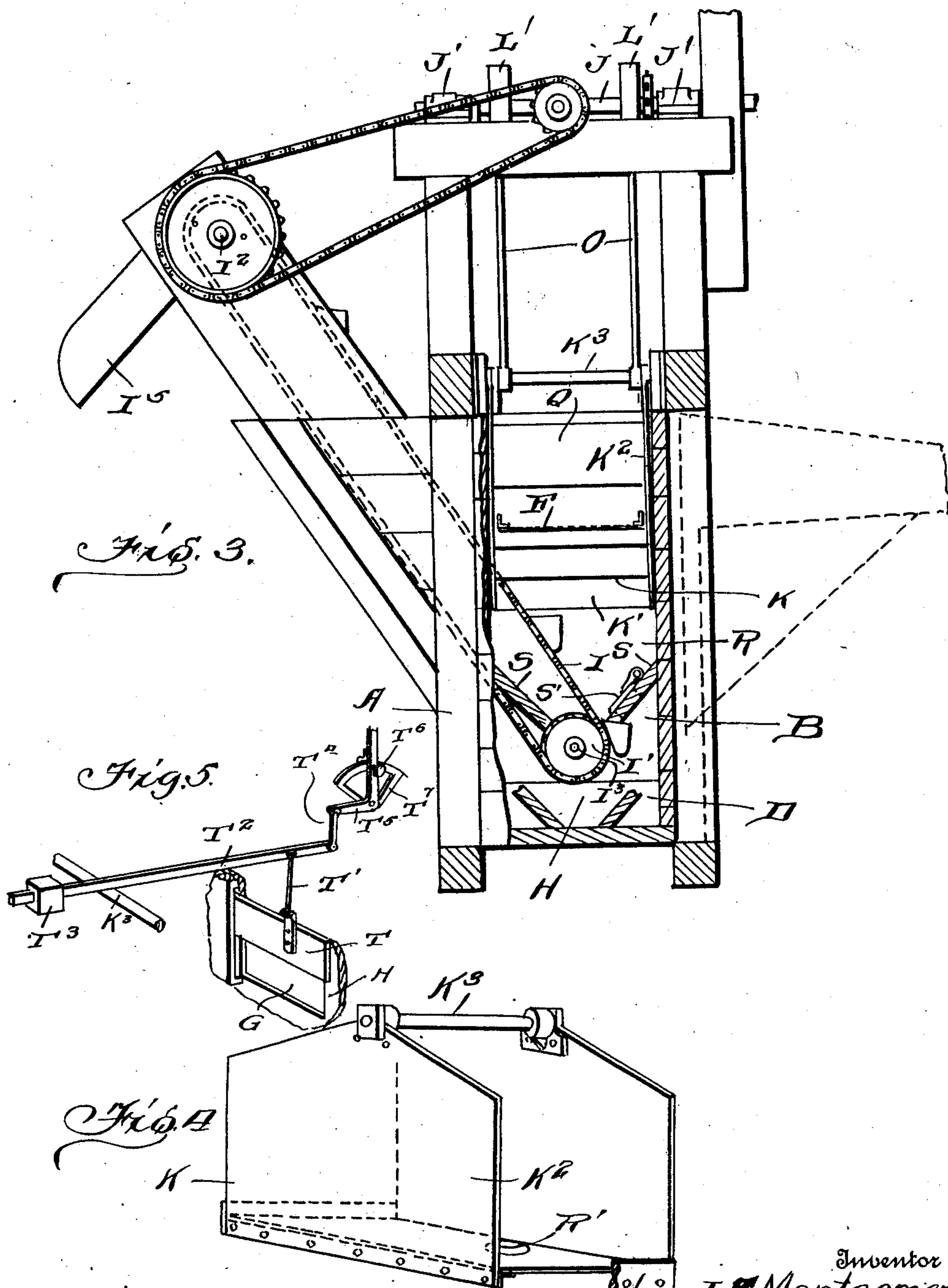
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UNITED STATES PATENT OFFICE.

JAMES A. MONTGOMERY, OF BIRMINGHAM, ALABAMA, ASSIGNOR TO MONTGOMERY COAL WASHING & MANUFACTURING COMPANY, A CORPORATION.

COAL-WASHING APPARATUS.

998,373.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed January 16, 1911. Serial No. 602,899.

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 Apparatus; 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 and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in coal washing apparatus and the object in view is to produce a simple and efficient apparatus designed to meet the requirements of small coal operators and consists in various details of construction and combinations and arrangements of parts which will be hereinafter fully described and then specifically defined in the appended claim.

I illustrate my invention in the accompanying drawings, in which:—

Figure 1 is a side elevation of improved coal washing apparatus, parts being broken away to better illustrate details of construction of the invention. Fig. 2 is a plan view, portions of the apparatus being removed. Fig. 3 is a vertical sectional view through Fig. 1, and Fig. 4 is an enlarged detail view of a plunger. Fig. 5 is a detail view of a part of the invention.

Reference now being had to the details of the drawings, by letter, A designates the frame of the apparatus which has two compartments B and C with an intervening chamber D. A coal bin E is mounted at any suitable location and has an exit opening E' positioned adjacent to the upper end of the compartment B and affording means whereby the raw coal may be admitted to the compartment B and its feed regulated by means of the gate E² which is connected by a link E³ with the tilting lever E⁴ which in turn is engaged by an adjusting screw E⁵ mounted in a suitable bearing E⁶ and which screw has a hand wheel E⁷, affording means for turning the screw to raise and lower the gate.

Mounted within the compartment B is a fixed screen F, which is disposed at an in-

clination and adjacent to its lower end is a passageway G through the partition H, affording means whereby slate which is heavier than the coal and which settles upon the screen may make exit into the chamber D from which it may be elevated by means of the endless carrier I passing about the sprocket wheels I' and I², the former of which sprocket wheels is fixed to the shaft I³.

Mounted within the compartment B is a plunger K, an enlarged detail perspective view of which is shown in Fig. 4 of the drawings, and which has at its ends friction plates K' and side walls K² with open ends and top. A shaft K³ is mounted in suitable bearings in the side walls K³ and the bottom of said plunger is adapted to conform to the area of the chamber B within which it is designed to have a vertical reciprocating movement. It will be noted that the side walls K² of said plunger form the side walls of the compartment on either side of the screen and to that portion of the compartment which contains the coal and slate. Each of said walls has a movement in a space intermediate the screen and the side walls of the compartment B. A driving shaft, designated by letter J, is mounted in suitable bearings J' upon the frame of the apparatus and an eccentric wheel L is fixed to the shaft J and is adapted to actuate the eccentric strap L' to which the pitmen O are fastened, the lower ends of which are journaled upon the shaft K³, thus serving as a means for giving a reciprocating movement to the plunger as the shaft J is rotated. A deflecting member Q is fixed in the compartment above the screen and disposed at an inclination and in front of the exit end of the bin E and serves to deflect the coal and slate as it is introduced into the compartment against the screen below.

Immediately below the plunger is a compartment R adapted to contain water to be raised by the plunger through the screen for the purpose of separating the coal from the slate and the valve apparatus R' in the bottom of the plunger allows the water to pass into the compartment K above the plunger as the latter is moved downward, said valves closing upon the upper throw of the plunger. The bottom of the water containing compartment R has double inclines S in which are valves S' opening upward to allow water beneath the double inclined

bottom of the compartment R to pass above the same when the plunger is raised. In the bottom of the compartment having the inclined bottom is a trough S^2 in which the shaft I^3 is journaled and which has a worm S^3 thereon, serving as means for causing any settlings which may accumulate in said trough to be fed through the wall H into the compartment B and be elevated by the carrier I to and emptied into the chute I^5 .

In order to control the exit opening G for the passage of the slate as it leaves the screen, a gate T is provided which is connected by means of a rod T^1 with the lever T^2 which in turn is pivotally connected to the link T^4 . An angle lever T^5 has its short arm pivotally connected with the link T^4 and a pawl T^6 carried by said lever is designed to engage teeth of the segment T^7 . Said lever T^2 extends over the shaft K^3 and has a counterbalance weight T^3 thereon. As the pitman O raises the shaft K^3 , the latter will contact with the lever T^2 and cause the same to tilt and the gate to open, the counter-balance serving to close the gate as the plunger lowers.

The compartment C has an inclined bottom C^1 and a shaft C^2 is journaled therein upon which is a sprocket wheel C^3 about which the endless sprocket chain C^4 passes, having the buckets C^5 , and C^6 is a sprocket wheel fixed to the shaft C^7 and over which the carrier C^4 travels. A driving chain C^8 passes about the sprocket wheel C^9 on the shaft C^7 and one on the driving shaft J.

A slight distance above the exit opening G is an overflow passageway V with an inclined trough V^1 leading therefrom which bridges the compartment D and opens into the compartment C and affords means whereby the coal, which is lighter than the slate and which has been moved by the upward movement of the plunger, is allowed to pass into the compartment C in which water is contained. The compartment C overflows at C^{10} and the water is adapted to pass into the trough C^{11} , shown in top plan view, and conveyed back to the space underneath the compartment having the inclined bottom R, affording a supply of water to be utilized in washing the coal.

The operation of my apparatus will be readily understood and is as follows:—The

coal is fed by gravity from the bin on to the screen and, as the shaft J is rotated, the plunger will cause water above the same to be raised up through the screen, thus raising the coal and allowing the slate which is heavier than the latter to settle upon the screen. As the coal is raised by the water, it will make exit through the trough V, being raised by the water therefrom into the compartment C. The slate will make exit through the opening G and into the compartment D from which it will be raised by the endless conveyer I and dumped into the trough I^5 . As the plunger is raised by the eccentric upon the shaft J, the suction formed underneath the plunger will cause the valves S^1 to unseat and allow the water flowing from the compartment C to pass into the space above the bottom S and the plunger. On the downward throw of the plunger, the valves S^1 will be seated and the valves in the plunger opened, allowing water to pass through the plunger into the space intermediate the same and the screen. It will thus be seen that a constant supply of water will be utilized for washing the coal and afterward reused. The slate and the coal will, by the conveyers, be carried away in different directions, as will be readily understood.

What I claim to be new is:—

A coal washing apparatus having a screen mounted therein dividing the apparatus into compartments and having spaces intervening between the opposite edges thereof and the side walls of the apparatus, a plunger with open ends and flanges at the ends of the bottom and extending above the upper surface thereof, said plunger having parallel walls upon opposite sides thereof extending its entire length and adapted to move through said spaces intermediate the edges of the screen and the side walls of the apparatus and form side walls to the compartment above the screen at all times, and means for vertically reciprocating the plunger.

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

JAMES A. MONTGOMERY.

Witnesses:

Mrs. ROBT. P. FARISS,
ANNIE L. PEACE.