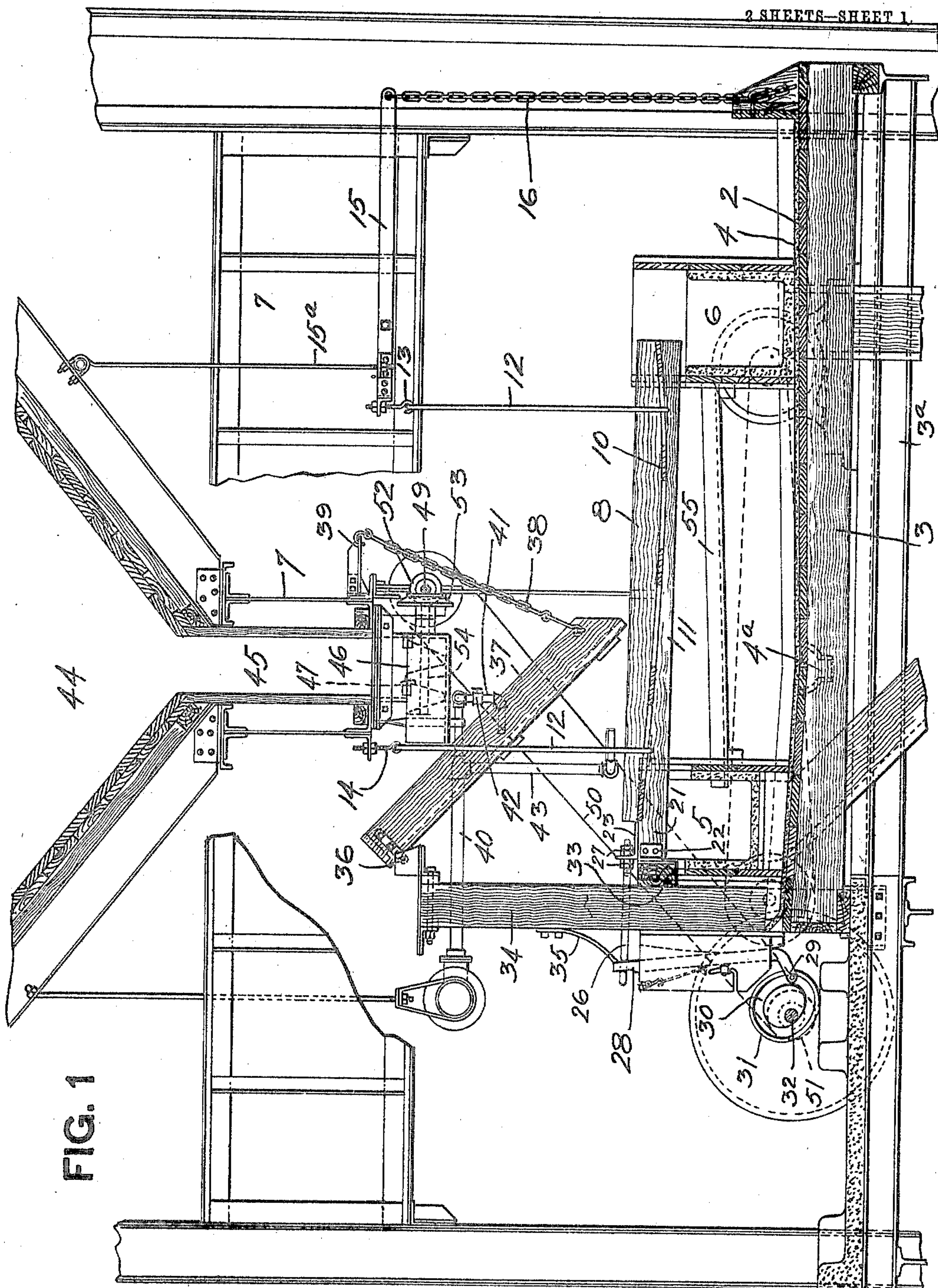


No. 811,609.

PATENTED FEB. 6, 1906.

W. E. WINN.
COAL AND LIKE WASHER.
APPLICATION FILED FEB. 18, 1906.

2 SHEETS--SHEET 1



WITNESSES.

J. B. Keller
Robert C. Zottner

INVENTOR.

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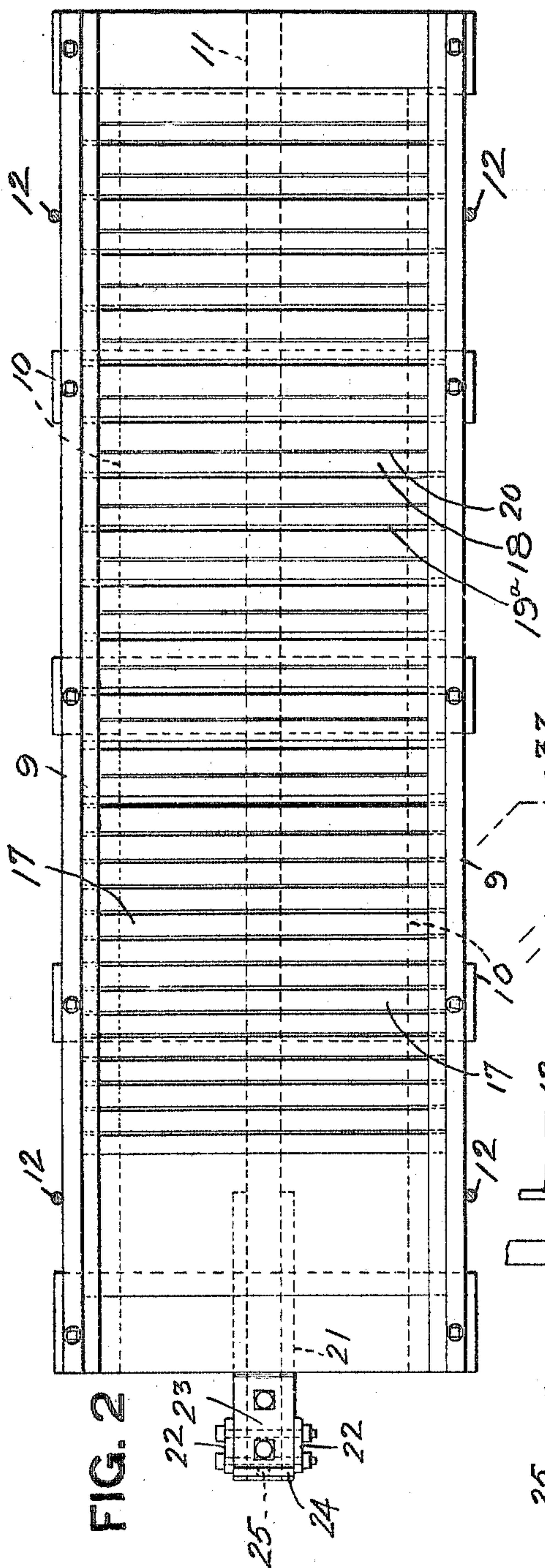


FIG. 2

WITNESSES.

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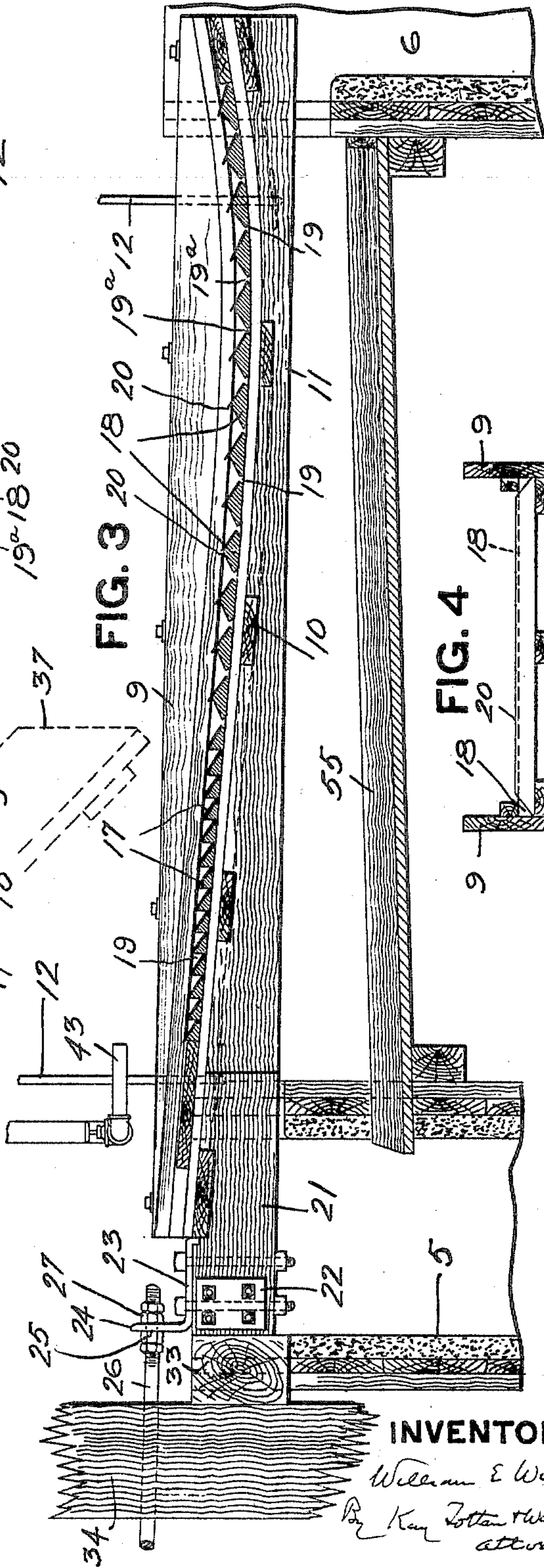


FIG. 3

FIG. 4

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UNITED STATES PATENT OFFICE.

WILLIAM E. WINN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HEYL & PATTERSON, INC., OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COAL AND LIKE WASHER.

No. 811,609.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed February 18, 1905. Serial No. 246,284.

To all whom it may concern:

Be it known that I, WILLIAM E. WINN, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Coal and Like Washers; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to coal and like washers, its object being to provide a washer in which there shall be under all conditions a rapid and thorough separation of the foreign matters or impurities—such as slate, pyrites, bone-coal, fire-clay, &c.—which it is essential to wash out of coal to be used for coking purposes.

To these ends my invention comprises, generally stated, a suitable pan or receptacle to receive the coal and water, with means for jolting or jarring said pan, and a series of riffles forming the bottom of said pan with intervening spaces, the spaces gradually diminishing in size toward the tail end of the pan.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view of my improved washer, partly in section and showing a portion of the framework broken away. Fig. 2 is an enlarged plan view of the pan. Fig. 3 is an enlarged longitudinal section, and Fig. 4 is a cross-section.

Like numerals indicate like parts in each of the figures.

In the drawings the numeral 2 designates a suitable base or platform supported by the joists or beams 3 on the substructure 3^a. This platform 2 may be covered with a coating of asphalt 4 and slopes toward the drain 4^a. Located at one end of the platform 2, or what is termed the "head" of the machine, is the refuse-box 5, which is adapted to receive the heavy and larger impurities separated from the coal, as hereinafter set forth. At the opposite end of the platform, or the tail end of the washer, is the coal-receiving box 6, which is adapted to receive the washed coal as it is delivered from the tail end of the washer. Suspended from the upper framework 7 is the table or pan 8, said pan being made up of the side pieces 9. Supported upon the bottom frame 10 is the keel 11. Connected to the frame 10 are the rods 12, by

means of which the pan 8 is suspended, the upper ends of said rods being connected to the hooked bolts 13 and 14, supported by the framework 7. The bolt 13 is connected to the lever 15, fulcrumed at the lower end of the rod 15^a, whereby the incline of the pan 8 may be varied as may be desired, according as the materials to be washed may vary. A chain 16 is connected to the lever 15, by means of which said lever may be operated.

The pan 8 has but a single bottom, and this is made up of the cross-riffles 17 and 18. The riffles 17 are arranged close up to each other without any intervening spaces; but owing to the inclined faces of said riffles when they are arranged in this manner a space or pocket 19 is formed by each riffle. These riffles 17 are located at the head of the pan and extend a suitable distance along the bottom of the pan toward the tail, the number of them to vary according to the length of the pan as well as to the composition of the material to be washed.

The riffles 18 are preferably double inclined, as illustrated, and have intervening spaces 19^a between them, the spaces gradually decreasing in size as they approach the tail end of the pan. These riffles 18 extend from the zone of very fine impurities to the tail end of the machine, and the exact point at which this zone may begin varies in different grades of coal, and this can only be determined by experience. Secured to one of the inclined faces of the riffles 18 are the metal wearing-plates 20, which act to relieve the wear on the faces of the wooden riffles. These plates 20 are made to project beyond the inclined face of the riffle, so as to allow for their wearing away along their edges, which occurs in the operation of the washer.

The ends of the pan 8 project into the boxes 5 and 6 at each end of said pan, and the head 21 of the keel 11 is provided with the strengthening-plates, which are bolted to said keel, and to the upper side of said head-block is screwed the flange-plate 23. The flange 24 has the opening 25 therein, through which passes the rod 26, said rod being secured to the flange 23 by means of the nuts 27. The opposite end of the rod 26 is engaged by the lever 28. This lever at its opposite end has the roller 29, which engages the groove 30 in the eccentric 31, mounted on the shaft 32. By this construction an oscillating movement

is imparted to the rod 26, which is imparted therefrom to the pan 8. The bumper 33 is bolted to the upright beam 34 to receive the shock of the head 21. A spring 35 is secured
 5 to the beam 34; the opposite end of said spring engaging the lever 28. This spring acts when the pan has reached the limit of its upward stroke to assist in advancing the pan toward the bumper and helps to overcome
 10 the dead-point in the rotation of the eccentric.

Hinged to the upper end of the beam 34 at 36 is the chute 37, which is adapted to direct the coal and water into the pan 8. The slant
 15 of this chute 37 may be varied by means of the chain 38, connected at the forward end of said chute and secured at 39 to the frame 7. This chute 37 may be of any suitable construction, and in order to mix the coal and
 20 water introduced thereto the said chute may be provided with suitable baffles or other devices for retarding the flow of the coal until the water has thoroughly impregnated the same. The water-pipe 40, leading from a
 25 suitable source of supply, has the branch 41, which introduces the water into the chute 37, controlled by the valve 42, while the branch 43 supplies water directly to the pan 8 at the head thereof.

30 Supported by the framework at the upper end thereof is the bin 44, which is adapted to receive the coal from the breakers or crushers. This bin has the sloping sides, by means of which the coal travels to the central opening 45, where it passes down into the receptacle 46, which has within it the spiral conveyer 47, which feeds the coal from the receptacle 46 and discharges it into the chute 37.

Any suitable form of mechanism may be
 40 employed for driving the spiral conveyer 47. That shown consists of the shaft 49, driven by a belt 50 from a pulley 51 on the shaft 32. A bevel-pinion 52 meshes with the bevel 53 on the shaft 54 of the conveyer.

45 When my improved washer is in use, the crushed coal, with all its impurities—such as slate, pyrites, bone-coal, and fire-clay—is discharged from the chute 37 into the pan 8, the coal having been mixed with a suitable supply of water on entering the chute 37. Water is further supplied to the pan by the pipe 43. The water and coal collect within the pan 8, and the pan is then oscillated, by means of the connection of the rod 26, through the intermediate connections with the eccentric 31,
 55 and the said pan swings back and forth and is jarred and jolted each time the head-block 32 comes in contact with the bumper 33, which acts to disturb and shake up the contents of the pan. As in all washers of this character in which the separation of impurities is obtained through the jarring action and by flotation, the lighter materials, or the pure coal, will be carried on the top and
 60 will be carried by the water to the rear or tail

end of the pan and discharged from the end thereof to the receiving-box 6. It will be found in operation that the particles of slate and other impurities of greater density will be by the jolting action carried toward the
 70 end and discharged therefrom into the refuse-box 5. The constant jarring will tend to advance the impurities of less density in the pockets 19 of the riffles 17 toward the head, as there is no way of escape for these impurities between the riffles, and they will be carried gradually toward and discharged in and deposited into the refuse-box 5. The impurities of lesser density, however, will advance
 75 by flotation toward the tail end of the pan, and by reason of their density being greater than the coal they will collect within the pockets 19^a, formed by the riffles 18, and by the jarring action these impurities will be jolted and jarred, so as to gradually pass between the riffles into the inclined chute 55,
 80 whence they are carried to a receptacle 5. The coal mixed therewith is carried by flotation to the tail end and deposited into the box 6. As stated, the impurities become
 85 less dense toward the tail end of the machine, and as a consequence the riffles 18 are spaced closer together as the riffles approach the tail end of the pan. The amount of space between the riffles 18, as stated, may vary according to the quality of the coal being treated, so that I do not limit myself to any particular distance between the riffles, except that the space between the riffles gradually decreases toward the tail end. The impurities
 90 of lesser densities will fill up the pockets 19^a between the riffles 18 and so tend to retard the escape of the water, so that the water is held within the pan and only escapes in small quantities through the intervening
 95 spaces of the riffles. By this construction I am able to dispense with any further bottom to the pan to form the water-chamber below the riffles in order to hold sufficient water for the proper washing of the coal. Where such a water-chamber is employed, the water is liable to spurt up, due to the jarring action, and force the impurities collected between the riffles up into the pure coal, and the impurities are liable to be carried with the coal to the coal-receiving box. By my invention, however, there is no danger of such action of the water, as the water is all contained by the single bottom of the pan, all of which is claimed in the application
 100 filed by me of even date herewith, Serial No. 246,283. The more rapidly the impurities can be carried through the spaced riffles the less danger there is of the impurities being carried over the tail end with the clean coal. The farther away from the tail end of the machine the less liability of the impurities being carried to the tail end of the machine. Consequently it is not found necessary in treating some coals to have any spaces between
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the riffles, as indicated by the riffles 17. As the pockets are kept about full of the fine stuff, the travel of the large and first-grade of impurities is over the riffles toward the head, being conveyed thereto by the bumping action, while the coal travels by flotation above the riffles toward the tail end, whence it is deposited into the washed-coal box. The reciprocation of the table keeps the entire mass of materials in suspension in the water and, together with the inclination of the pan, allows the coal and impurities of lesser density to pass toward the tail end, and during this passage the impurities settle in the riffle-pockets, while the coal is held in suspension and passes off at the tail end of pan. The constant jarring of the pan tends to break up any packs in the riffle-pockets, while at the same time it separates any coal collected in the pockets and gives it an opportunity to escape to the top of the water to be carried along with the good coal.

What I claim is—

1. In a coal or like washer, the combination of a suitable pan, a series of riffles forming the bottom of said pan with intervening spaces gradually diminishing in size toward the tail end of said pan, and means for oscillating and imparting a percussive action to said pan.

2. In a coal or like washer, the combination

of a suitable pan, a series of riffles forming the bottom of said pan with intervening spaces within the zone of fine impurities, said spaces gradually diminishing in size toward the tail end of said pan, and means for oscillating and imparting a percussive action to said pan.

3. In a coal or like washer, the combination of a suitable pan, riffles forming the bottom of said pan, the riffles at the head of said pan having no intervening spaces, the riffles toward the tail end having intervening spaces gradually diminishing toward the tail end, and means for oscillating and imparting a percussive action to said pan.

4. In a coal or like washer, the combination of a suitable pan, riffles forming the bottom of said pan, the riffles at the head of said pan having no intervening spaces and with single inclined faces, the riffles at the tail of said pan having double inclined faces with intervening spaces gradually diminishing toward the tail end, and means for oscillating and imparting a percussive action to said pan.

In testimony whereof I, the said WILLIAM E. WINN, have hereunto set my hand.

WILLIAM E. WINN.

Witnesses:

ROBERT C. TOTTEN,
G. KREMER.