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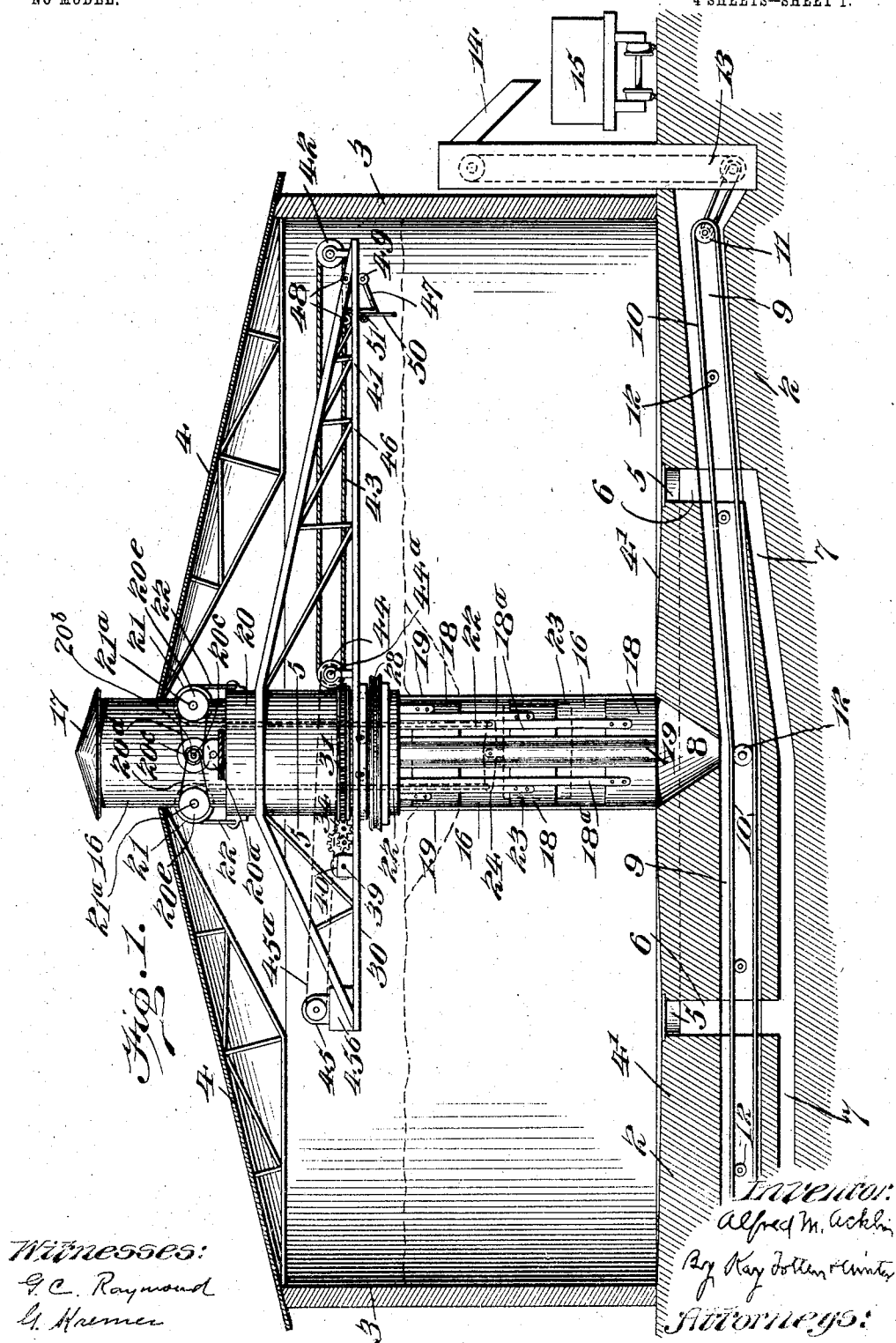
PATENTED OCT. 25, 1904.

A. M. ACKLIN.
COAL STORAGE PLANT.

APPLICATION FILED JULY 20, 1903. RENEWED JULY 29, 1904.

NO MODEL.

4 SHEETS—SHEET 1.



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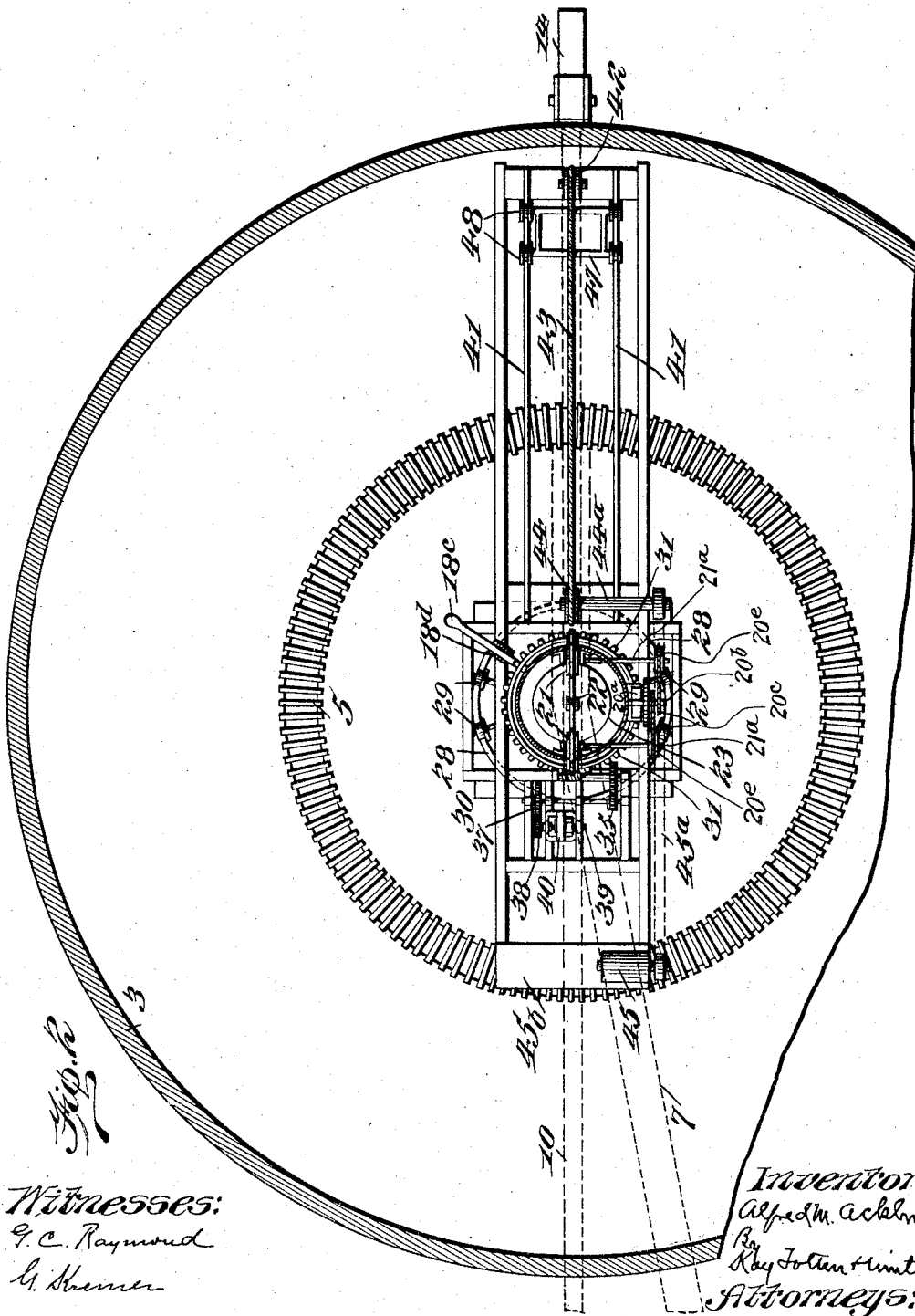
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 3.

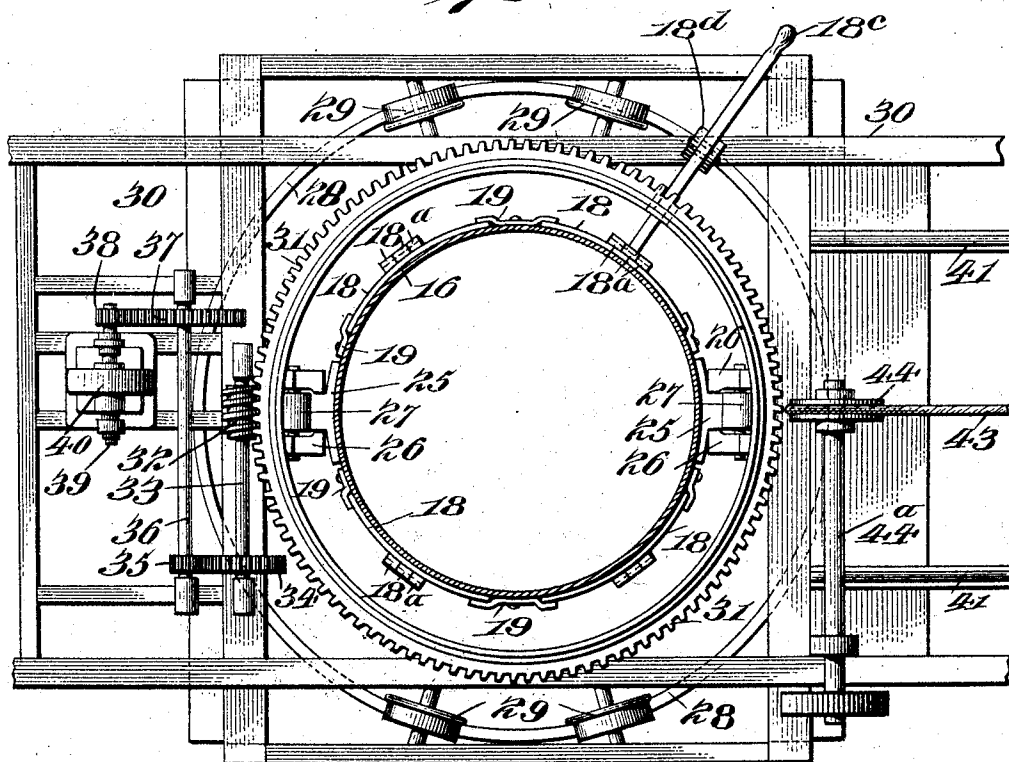
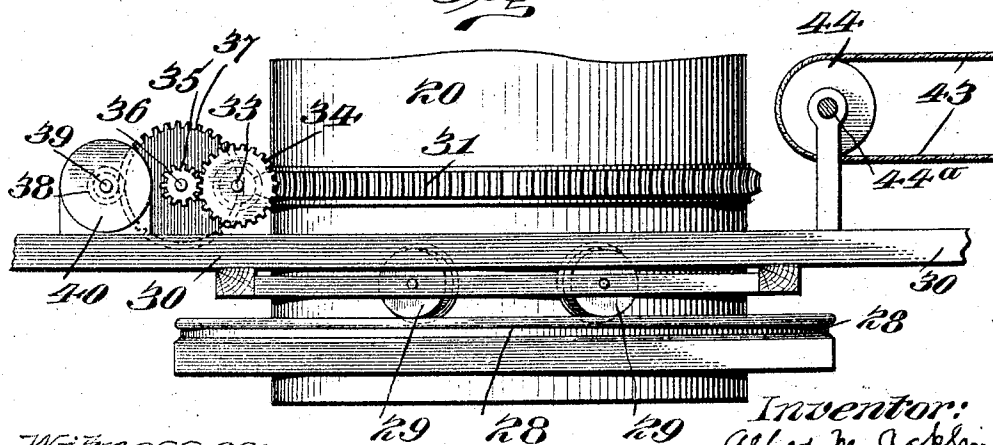


Fig. 4.



Witnesses:

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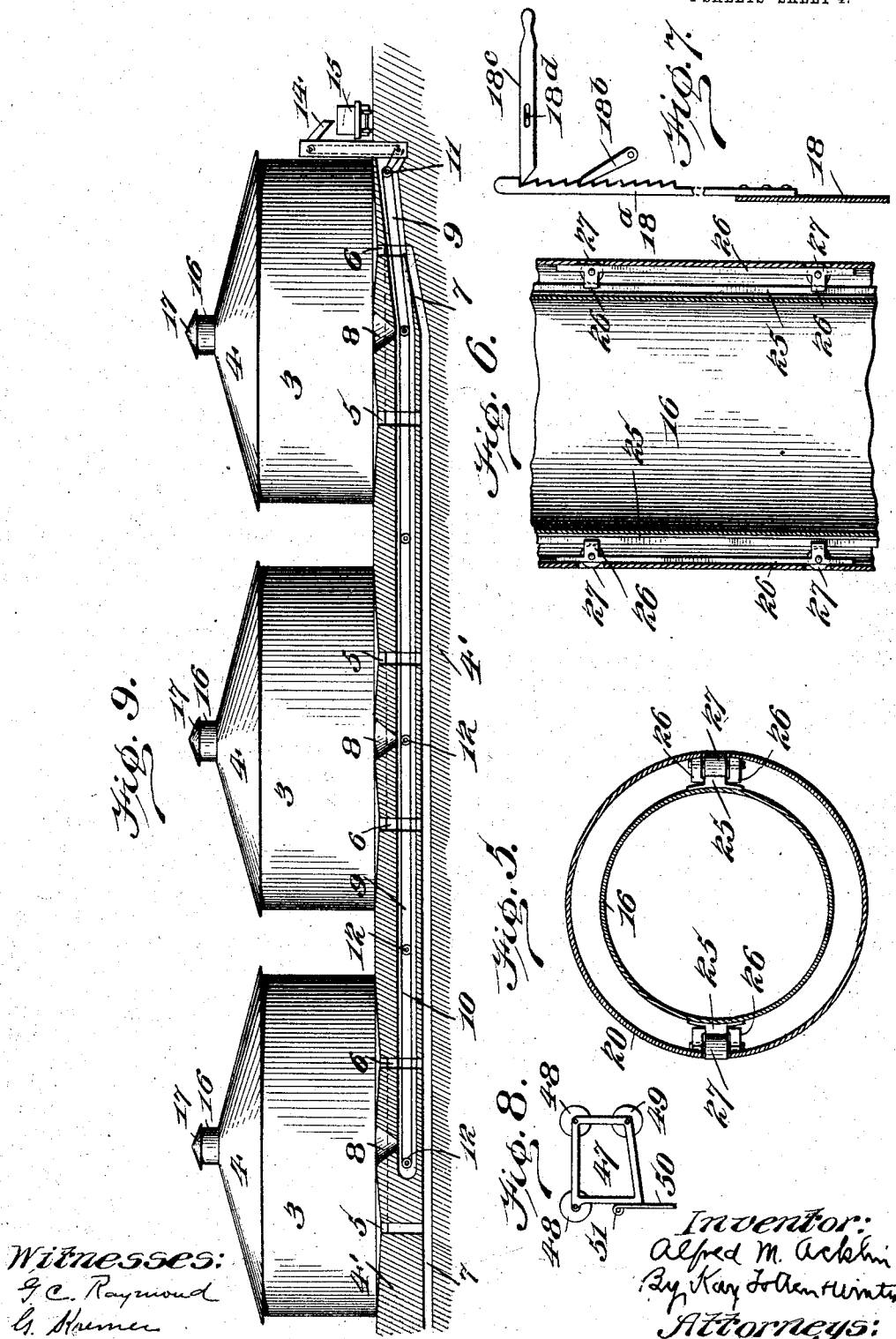
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COAL STORAGE PLANT.

APPLICATION FILED JULY 20, 1903. RENEWED JULY 29, 1904.

NO MODEL.

4 SHEETS--SHEET 4.



UNITED STATES PATENT OFFICE.

ALFRED M. ACKLIN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HEYL & PATTERSON, OF PITTSBURG, PENNSYLVANIA, A COPARTNERSHIP OF PENNSYLVANIA.

COAL-STORAGE PLANT.

SPECIFICATION forming part of Letters Patent No. 772,911, dated October 25, 1904.

Application filed July 20, 1903. Renewed July 29, 1904. Serial No. 218,610. (No model.)

To all whom it may concern:

Be it known that I, ALFRED M. ACKLIN, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Coal-Storage Plants; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a coal or like storage plant, its object being to provide for the storing of coal in large quantities and to provide a simple form of apparatus for the removal of same for loading in the cars or other receptacles.

Referring to the accompanying drawings, Figure 1 is a sectional view of a suitable storage tank or bin, showing the apparatus therein for the removal of the coal and the loading of same into a car. Fig. 2 is a plan view of the apparatus, the tank or bin being shown in section. Fig. 3 is an enlarged plan view of the vertically and horizontally movable frame, partly broken away. Fig. 4 is a side view of same. Fig. 5 is an enlarged section on the line 5 5, Fig. 1. Fig. 6 is a vertical section of the portion of the hollow pillar or support and the surrounding sleeve. Fig. 7 is a detail view of door and lift mechanism. Fig. 8 is an enlarged view of the scraper-carriage removed, and Fig. 9 is a view of a plant embodying three bins or tanks connected up by the same conveying mechanism for carrying the coal or like material to the car.

Like numerals indicate like parts in each of the figures.

In the drawings the numeral 2 designates a suitable foundation for a bin or tank 3, said bin or tank being preferably circular in form and having the roof 4. The floor 4' of the tank may be formed of cement, brick, or other suitable material, according to the material to be contained therein; but as I shall describe my invention in connection with the storing of coal at a washing plant accordingly said floor is provided with the circular grating 5, which fits over the channel 6, which acts with the main channel or gutter 7. The floor 4' is made to slope from the center and from the sides toward the grating, so that all water

contained within the coal will be drained toward the grating 5 and carried off by the channels 6 and 7 to a suitable outlet. Formed within the floor 4' is the outlet 8, arranged, preferably, at or near the center of the bin, said outlet being formed with sloping sides, and beneath said outlet 8 is the tunnel 9, within which travels the endless belt or conveyer 10, said belt or conveyer being mounted on suitable driving-pulleys 11, at each end thereof, and supported at intermediate points by the pulleys 12. The conveyer 10 is adapted to receive the material passing through the outlet 8 and conveys the same to the vertical conveyer or elevator 13, which lifts the coal and deposits it by the chute 14 into the car 15. As any suitable conveying apparatus may be employed and it forms no part of my invention, I have not deemed it necessary to illustrate the same in full.

Located over the opening 8 within the tank or bin 3 is the hollow pillar or support 16, which may form the central support for the roof 4 and which extends up beyond said roof and is provided at the top with the cap 17. The pillar 16 is provided with sliding doors 18, said doors being arranged around said pillar, as shown, at suitable intervals, the plates 19 forming guides for said doors. Three sets of these doors are illustrated, one above the other, and it is apparent that more may be employed, if found desirable. To provide for the raising of said door, each of said doors is provided with the vertical rack-bar 18^a, with which the pawl 18^b engages. A lever 18^c, pivoted at 18^d, has its inner end engaging said rack-bar 18^a, so that by the operation of said lever the door is raised by a jacking movement. Surrounding the pillars 16 is the sleeve 20, said sleeve being supported by the pulleys 21, mounted on suitable shafts 21^a in the pillar 16, the ropes or cables 22 connected to said sleeve 20 and passing up over said pulleys 21. Connected to the cables 22 is the weight 23, which is provided with the equalizing-bar 24, as shown in dotted lines. A motor 20^a is mounted on a suitable support, the motor-shaft being geared up to the shaft 20^b. This shaft 20^b has the sprockets 20^c,

connected up by chains 20^d to the sprocket-wheels 20^e on the shafts 21^a. By this construction the sleeve 20 may be quickly raised or lowered.

5 The sleeve 20 is a non-rotary sleeve and is held from rotation by means of the vertical strips 25 on the outer face of the pillar 16, which engage with the lugs 26 on the inner walls of the sleeve 20. Within the lugs 26 are jour-
10 naled the friction-rollers 27, which bear against the vertical strips 25 on the pillar 16, whereby the sleeve 20 is free to move up and down on said pillar, but is prevented from rotating around same.

15 Secured to the sleeve 20 is the circular track 28, upon which the wheels 29 travel, said wheels being mounted on the frame 30. The frame 30 is adapted to swing or rotate on the sleeve 20, and to provide mechanism for this ac-
20 tion the sleeve 20 is provided with the circular worm-rack 31, with which the worm 32 on the shaft 33 is adapted to engage. This shaft 33 has the gear-wheel 34, meshing with the pinion 35 on the shaft 36. This shaft 36
25 has the gear-wheel 37, meshing with the pinion 38 on the motor-shaft 39 of a suitable motor 40, supported upon the frame 30. By supplying power to the motor it is apparent that through the connections described a rotary
30 motion will be imparted to the frame 30, the wheels 29 thereof traveling around the track 28 on the sleeve 20. The frame 30 projects out toward the walls of the bin to a suitable point, and mounted at the outer end of this
35 projecting portion 41 is the pulley 42, around which the endless cable 43 passes, said cable also passing around the pulley 44 on said frame. A suitable motor 45 is mounted on the opposite end of the frame 41 for driving
40 the endless cable 43. A belt 45^a connects the motor 45 with the shaft 44^a. The motor 45 is preferably mounted on the weight 45^b, so that said motor assists said weight in balancing said frame 30. The outwardly-projecting portion
45 41 of the frame 30 is provided with the track 46, upon which the scraper-carriage 47 is adapted to travel, said carriage having the wheels 48 engaging the upper faces of the rails of said track and the wheels 49 engaging the
50 lower faces of the rails. A hinged or swinging scraper 50 is mounted on the scraper-carriage 47, said scraper being hinged at 51 and being held against backward movement by bearing against the scraper-carriage. As the
55 scraper-carriage moves toward the center of the bin the scraper will be in position to scrape the material toward the center of the bin, but on its return will be free to swing so as to pass over any impediments in its path.

60 When my improved storage plant is in use, where a bin is used the bin 2 will be filled with coal or other material to a considerable height therein. When it is desired to remove any of the coal from the bin, one of the doors 18
65 will be raised and the coal adjacent thereto

will fall through said opening until the coal takes substantially the position indicated in dotted lines, Fig. 1. The motor 45 is put in operation to drive the cable 43, whereupon the scraper-carriage 47, which is secured to
70 the cable 43, will travel toward the center of the bin and the scraper 50 being in proper position with reference to the top of the coal will act to scrape or carry a portion of the coal from the top toward the center of the bin,
75 where it will descend by its own gravity down through the opening 18 into the hollow pillar 16, whence it passes by the outlet 8 onto the conveyer 10 to be carried to the conveyer or elevator 13 and thence by the chute 14 to the
80 car 15. In order to scrape the coal evenly from the top of the pile, the frame 30 is shifted so as to scrape the coal from different points, and accordingly power is transmitted through the motor 40 to the worm-shaft 33, whereby
85 the worm 32 meshing with the worm-rack 31 causes the frame 30 to swing around, and when brought to the proper position the motor 40 is stopped and the motor 45 started up, whereupon the scraper will advance toward
90 the center of the bin and scrape the coal from that section of the bin toward the center. Meanwhile the door 18 in radial line with the position of the frame 41 is opened, so that the coal scraped from that section will pass
95 through the door into the hollow pillar 16, to be conveyed by the conveyer 10 in the manner above set forth. When the scraper has scraped off the upper layer of the coal all around the bin, it will be necessary to lower
100 said scraper in order to bring it into operative position, and for this purpose the sleeve 20 is lowered, carrying with it the frame 30. In order to lower the sleeve 20, power is applied to the motor 20^a, whereupon said
105 sleeve will be lowered, the side rollers 27 thereof traveling on the vertical strips 25 of the pillar 16. When the sleeve has been lowered to the proper distance, the power is shut off from the motor 20^a and the frame 30 may
110 then be swung into proper position and the scraper operated as above set forth. The lowering of the sleeve 20 may make it necessary to use the next lower set or row of doors 18, and these doors are opened in order, ac-
115 cording to the direction of the projecting frame 41. In this manner the coal may be scraped evenly from the top of the pile and discharged from the bin in regular quantities. Any water or moisture contained in the
120 coal will be allowed to settle to the bottom of the tank and pass off through the grate 5, so that the coal contained within the tank is thoroughly drained and is dry and the more easily handled.

125 In Fig. 9 I have illustrated a series of tanks arranged side by side and connected up by a single conveying device, so that any one or more of the tanks may be put in operation and the coal conveyed to the loading-point.
130

By this construction different grades of coal can be kept in different tanks, and by the use of the above-described apparatus the coal from any one tank may be discharged onto the conveyer and loaded on the cars.

It is obvious that my invention may be employed without the use of a bin or where the coal is simply arranged in piles.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a vertically-movable frame supported above said platform, and a traveling scraper on said frame adapted to travel to and from said outlet.

2. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a vertically-movable frame supported above said platform, a traveling scraper carried by said frame, and mechanism for moving said scraper to and from said outlet.

3. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a horizontally-swinging frame supported above said platform, and a traveling scraper on said frame adapted to move to and from said outlet.

4. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a horizontally and vertically movable frame supported above said platform, and a traveling scraper on said frame adapted to move to and from said outlet.

5. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, and a scraper carried by said support and adapted to move to and from said support.

6. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a vertically-movable frame carried by said support, and a scraper on said frame adapted to move to and from said support.

7. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a horizontally-movable frame carried by said support, and a scraper on said frame adapted to move to and from said support.

8. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a horizontally and vertically movable frame carried by said support, and a scraper on said frame adapted to move to and from said support.

9. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet, said support having an opening in its walls, a door con-

trolling said opening, and a scraper carried by said support and adapted to move to and from said opening.

10. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet, said support having a series of openings formed at intervals around the walls of said support, doors controlling said openings, and a scraper carried by said support and adapted to move to and from said openings.

11. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet, said support having two or more sets of openings arranged around the walls of said support one set above the other, doors controlling said openings, and a scraper carried by said support and adapted to move to and from said openings.

12. In a coal, or like, storage plant, a suitable platform having a discharge-outlet in its bottom at or near the center thereof, a hollow support connected to said outlet, a horizontally-movable frame carried by said support and projecting out therefrom, and a scraper carried by said frame and adapted to move to and from said support.

13. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a non-rotary vertically-movable sleeve encircling said support, a horizontally-projecting frame carried by said sleeve, mechanism for imparting a horizontal movement to said frame, and a scraper on said frame adapted to move thereon.

14. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a non-rotary vertically-movable sleeve encircling said support, a horizontally-projecting frame carried by said sleeve, a worm-rack on said sleeve, a worm on said frame engaging said worm-rack, and a scraper on said frame adapted to move back and forth thereon.

15. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a non-rotary vertically-movable sleeve encircling said support, a track encircling said sleeve, a horizontally-projecting frame adapted to travel on said track, mechanism for imparting movement to said frame, and a scraper on said frame adapted to travel back and forth thereon.

16. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a rigid horizontally-projecting frame supported above said platform, an endless traveling cable on said frame, a scraper connected to said cable, and means for reversing the direction of travel of said cable.

17. In a coal, or like, storage plant, a suit-

able platform having a discharge-outlet, a hollow support connected to said outlet and having an opening in its walls, a non-rotary vertically-movable sleeve encircling said support, a horizontally-projecting frame carried by said sleeve, an endless traveling cable on said frame, a carriage on said frame connected to said cable, a scraper on said carriage, and means for reversing the direction of travel of said cable.

18. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a hollow pillar connected to said outlet and having an opening in its walls, a roof supported by said pillar, and means for delivering the coal into said pillar.

19. In a coal or like storage plant, a suitable platform having a discharge outlet, a hollow pillar or support connected to said outlet and having an opening in its walls, a horizontally-movable frame carried by said support and projecting out therefrom, one portion of said frame projecting farther down than the other, and a counterweight on the shorter projection of said frame, and a scraper carried on the longer projection of said frame and adapted to move to and from said support.

20. In a coal or like storage plant, a suitable platform having a discharge-outlet, a hollow support or pillar connected to said outlet, said support having an opening in its walls, a horizontally-movable frame carried by said support, said frame projecting out in both directions from said support and projecting farther in one direction than in the other, a motor mounted on the shorter projection of said frame and acting as a balance-weight, and a scraper carried by the longer projection of said frame and adapted to move to and from said support.

21. In a coal or like storage plant, a suitable platform having a discharge-outlet, a hollow support or pillar connected to said outlet, said support having an opening in its walls, a horizontally-movable frame carried by said sup-

port, said frame projecting out in both directions from said support and projecting farther in one direction than in the other, a weight mounted on the shorter projection of said frame, a motor on said weight, and a scraper carried by the longer projection of said frame and adapted to move to and from said support.

22. In a coal or like storage plant, a suitable platform having a discharge-outlet, a hollow pillar or support connected to said outlet, said support having an opening in its walls, a vertically-movable frame supported by said pillar, a weight connected to said frame and extending down within said pillar, and a scraper carried by said frame and adapted to move to and from said support.

23. In a coal or like storage plant, a suitable platform having a discharge-outlet, a hollow support or pillar connected to said outlet, said support having an opening in its walls, a vertically-movable sleeve encircling said support, a frame carried by said sleeve, a scraper mounted on said frame, pulleys on said support, cables connected to said sleeve and passing over said pulleys, and a weight connected to said cables within said pillar or support.

24. In a coal or like storage plant, a suitable platform having a discharge-outlet, a hollow support or pillar connected to said outlet, said support having an opening in its walls, a vertically-movable sleeve encircling said support, a frame carried by said sleeve, a scraper mounted on said frame, pulleys on said support, cables connected to said sleeve and passing over said pulleys, an equalizing-bar connected to said cables, and a weight connected to said equalizing-bar within said pillar or support.

In testimony whereof I, the said ALFRED M. ACKLIN, have hereunto set my hand.

ALFRED M. ACKLIN.

Witnesses:

ROBERT C. TOTTEN,
G. C. RAYMOND.