F. W. LOVELL.

COAL HANDLING PLANT.

APPLICATION FILED SEPT. 20, 1911.

1,028,235.

Patented June 4, 1912.

6 SHEETS—SHEET 1.

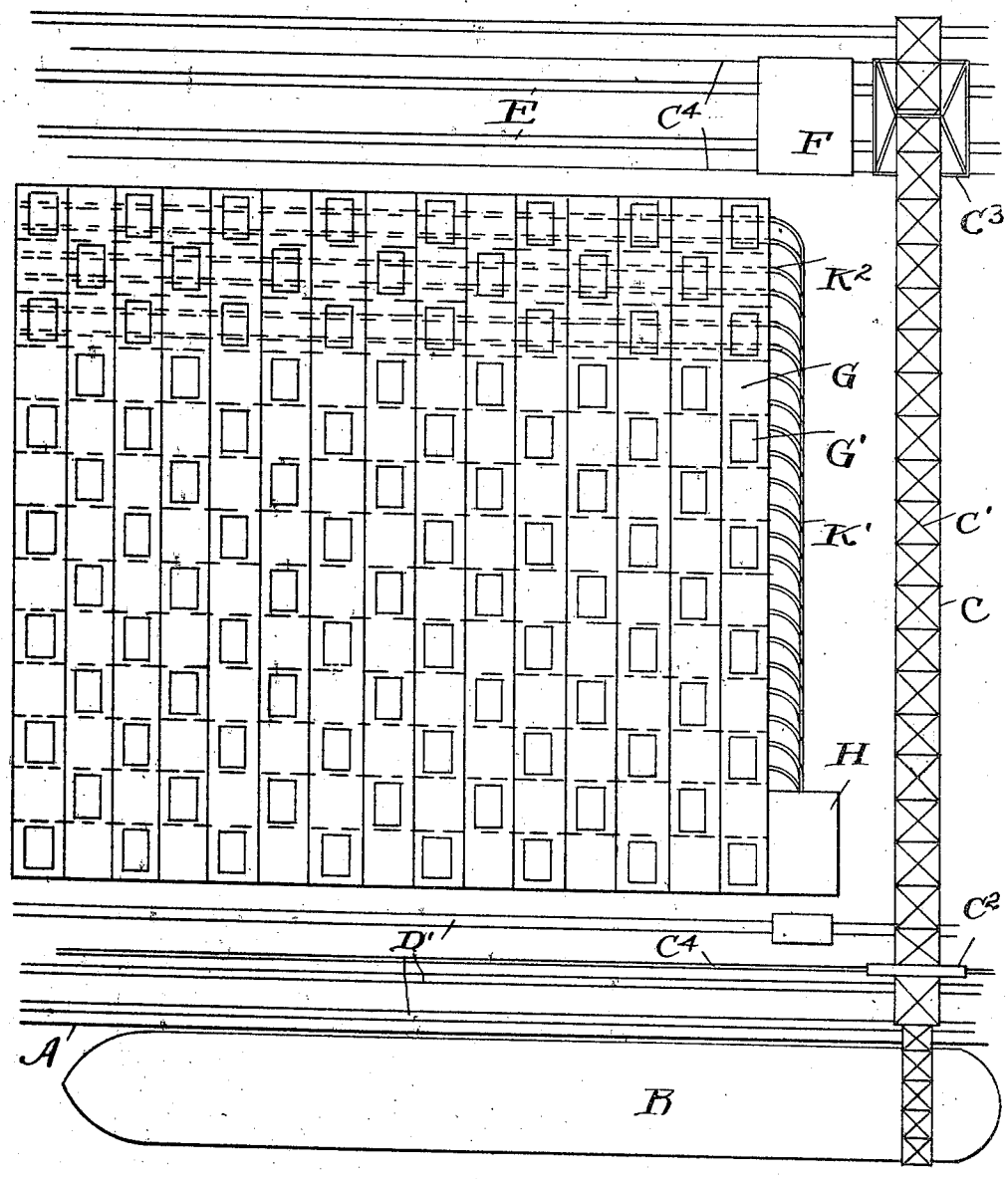

Fig. 1.

Witnesses.
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6 SHEETS—SHEET 2.

Fig. 2.

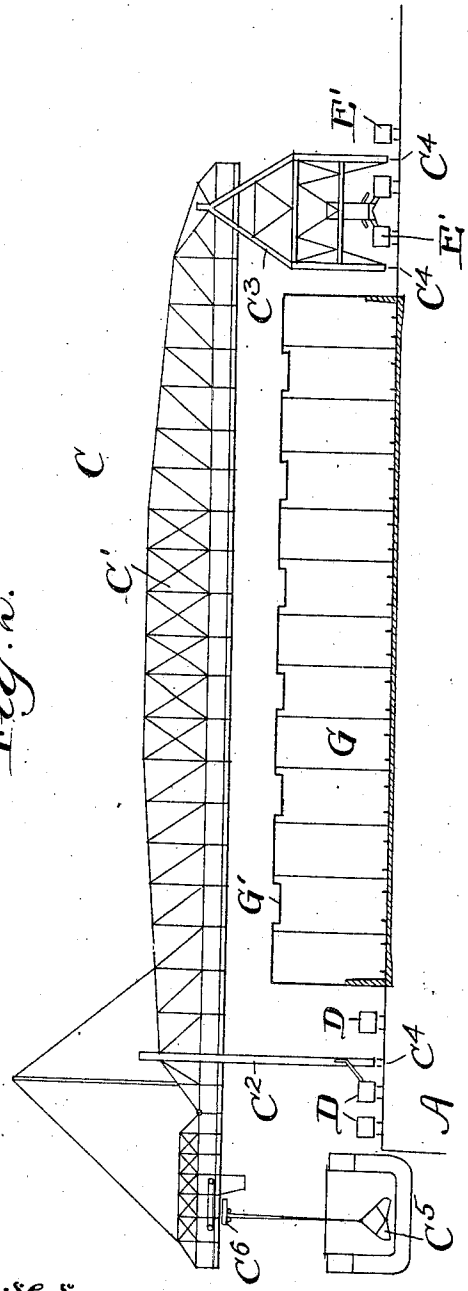
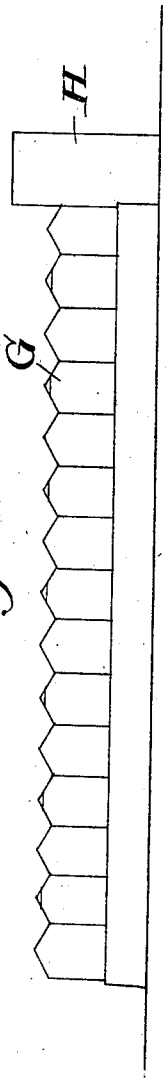


Fig. 3.



Witnesses.
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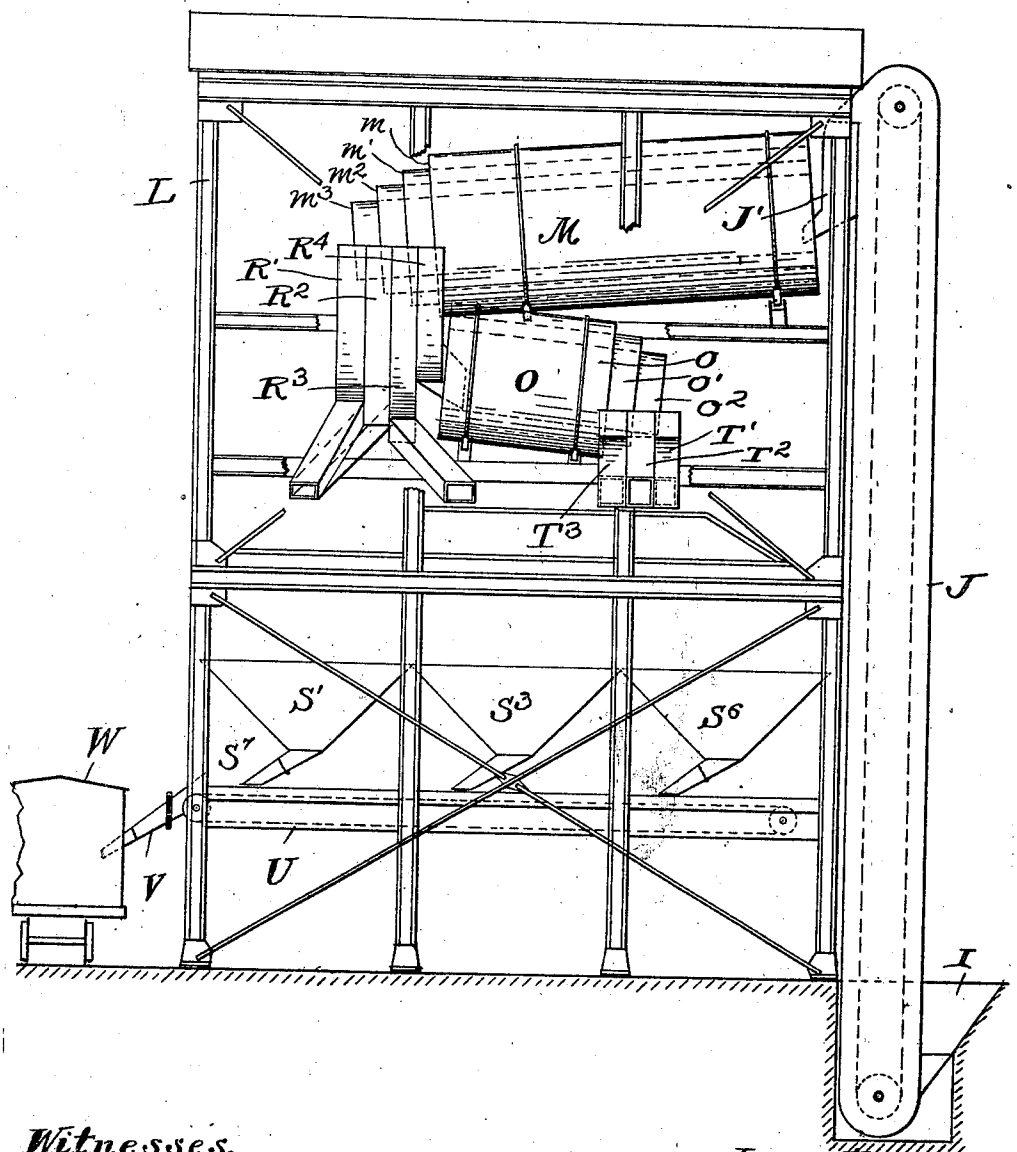
6 SHEETS—SHEET 3.

Fig. 4.



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6 SHEETS—SHEET 4.

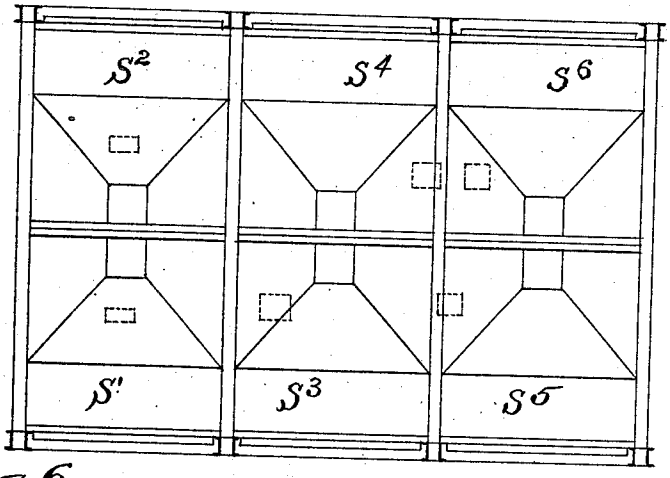

Fig. 6.

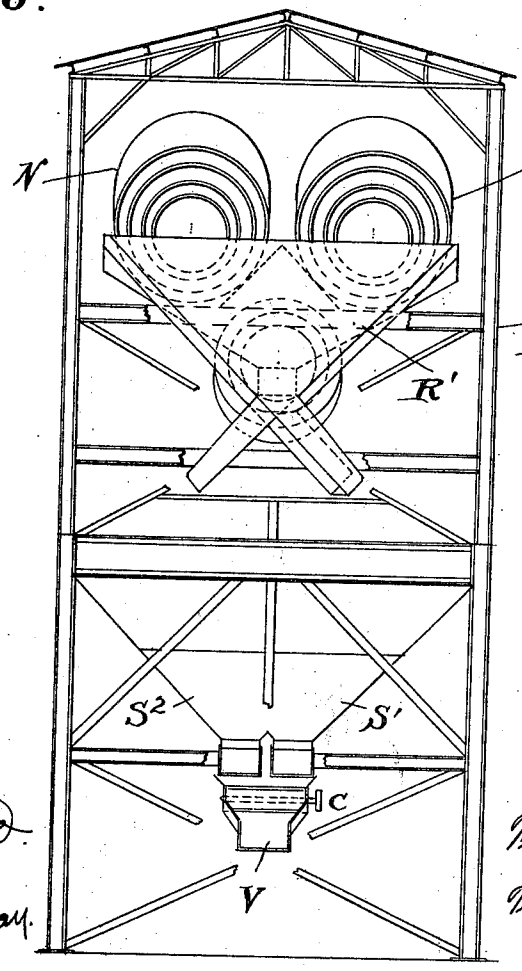

Fig. 5.

Witnesses.
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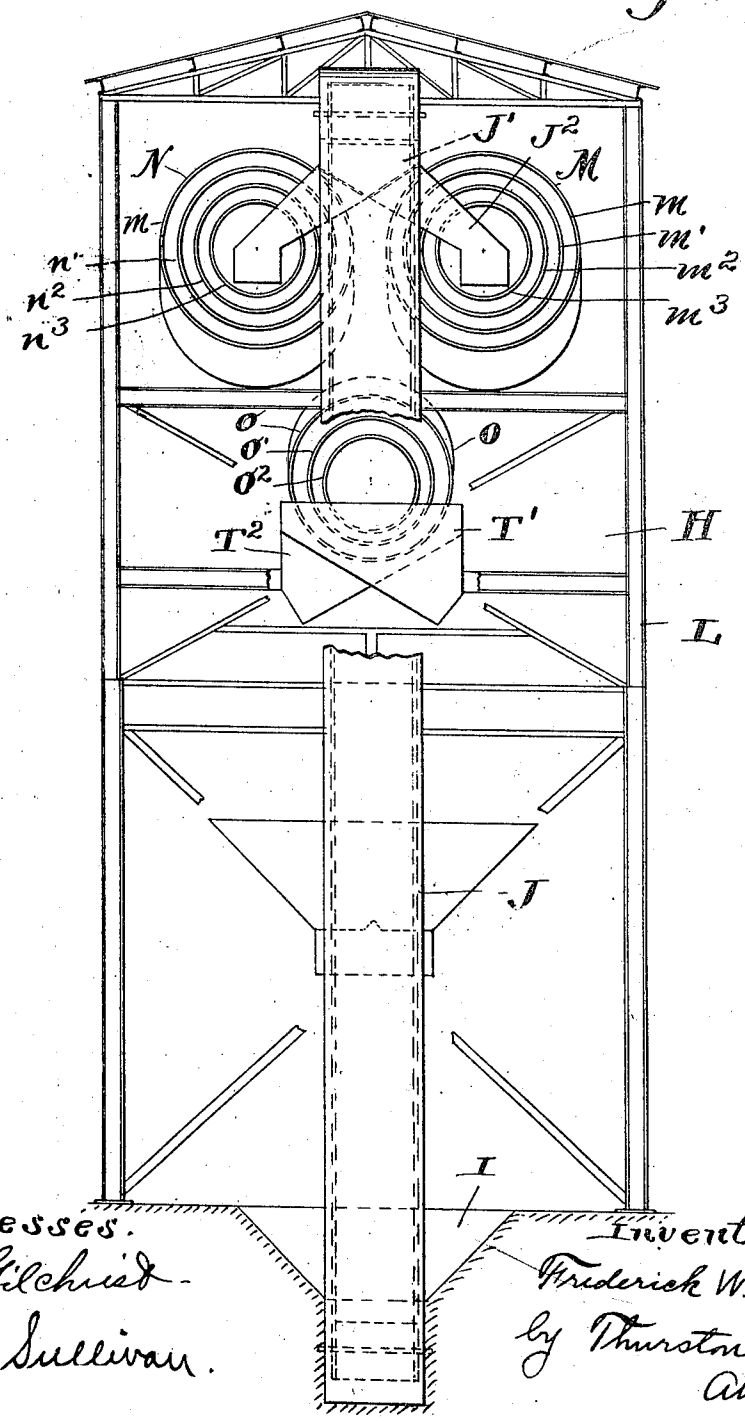
6 SHEETS—SHEET 5.

Fig. 7.



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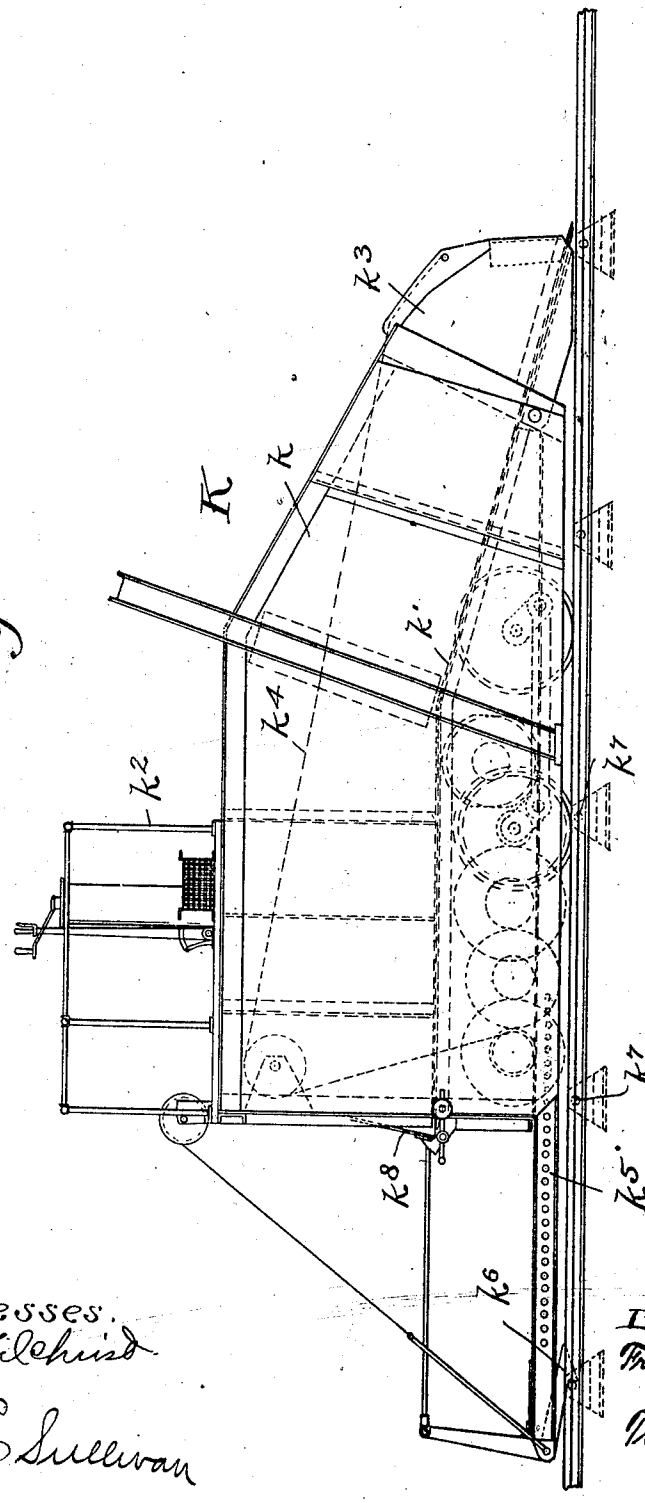
6 SHEETS—SHEET 6.

Fig. 8.



Witnesses.
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UNITED STATES PATENT OFFICE.

FREDERICK W. LOVELL, OF CLEVELAND, OHIO, ASSIGNOR TO THE McMYLER INTERSTATE COMPANY, OF BEDFORD, OHIO, A CORPORATION OF OHIO.

COAL-HANDLING PLANT.

1,028,235. Specification of Letters Patent. Patented June 4, 1912.

Application filed September 20, 1911. Serial No. 650,397.

To all whom it may concern:

Be it known that I, FREDERICK W. LOVELL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Coal-Handling Plants, of which the following is a full, clear, and exact description.

The present invention relates to a coal handling plant adapted especially for use in a locality to which coal is brought from a distance, generally in large quantities, and stored for future use or sale.

The main object of the present invention is to provide a coal storage plant wherein coal can be stored and later reclaimed much more effectively, with less damage to the coal, and with the expenditure of less time and labor than has been possible heretofore.

Further, the invention aims to provide a coal handling plant or system including a storage inclosure designed to receive and hold large quantities of coal and an apparatus for grading and delivering graded coal, together with conveying means for transporting the coal to various parts of the inclosure, and additional conveying means for transporting the coal from any part of the inclosure to the coal grading and delivering apparatus, the whole being so designed and arranged that coal can be handled in a very economical manner, as regards length of haulage and expenditure of time and labor, and with very little injury to the coal.

The above and other objects are accomplished by my invention which may be briefly summarized as consisting in certain novel combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the drawings wherein I have shown one embodiment of my invention, Figure 1 is a plan view of a coal handling plant constructed and arranged in accordance with the preferred form of my invention; Fig. 2 is a partial side elevation and a partial sectional view through the same; Fig. 3 is a side view of a storage inclosure and screening tower, arranged adjacent the storage inclosure; Fig. 4 is an enlarged side view of the screening tower with parts broken away; Fig. 5 is an end view of the same looking toward the right of Fig. 4; Fig. 6 is a horizontal sectional view through the screening tower, showing in plan the arrangement of several hoppers for receiving graded coal from the rotary screens of the tower; Fig. 7 is an end view of the tower looking toward the left of Fig. 4; and Fig. 8 is a side view of a self-loading car which is employed in reclaiming the stored coal, and in this case is adapted to convey coal from the inclosure to the screening tower.

The coal handling plant constructed in accordance with my invention is, as here shown, arranged upon a dock A, to which coal may be brought in large quantities by vessels, one of which is indicated at B. The coal is unloaded from the vessels and stored on the dock or transported to cars, by means of an unloader C, which, except for one or two features, is of well known and standard construction. This unloader includes in this case a bridge C' which is supported on towers C^2 and C^3 mounted on wheels adapted to run along tower tracks C^4. The unloader also includes a bucket C^5 and a trolley C^6, both of which may be of the usual construction. Ungraded coal may be loaded directly into cars D adapted to run along loading tracks D' arranged in proximity to the tracks C^4 for bridge tower C^2. Between and along the tracks for tower C^3 are additional loading tracks E along which may be run cars E' adapted to be loaded with coal conveyed by the bucket either from the vessel or from a storage pile on the dock. Preferebly the tower C^3 is provided with screens (not shown) and suitable discharge chutes by means of which the coal may be screened and the desired grades or sizes loaded into the cars E'. A screening tower F is shown alongside the tower C^3 and this tower F may be provided with suitable screens, and elevating means, by means of which the screenings or smaller pieces of coal which passed through the screens of tower C^3 may be raised to the top of tower F and again screened.

The major portion of the coal unloaded from the vessels is usually dumped in one or more huge piles on the dock. This is satisfactory for bituminous coal, but objectionable for anthracite, and accordingly, I prefer to provide on the dock a storage inclosure G, adapted especially for anthracite coal and have provided effective means for storing the coal or for introducing the same into

different parts of the inclosure, and, in addition, have provided novel and very satisfactory means for reclaiming the coal or for withdrawing it from any part of the inclosure. The inclosure G is arranged on the dock between the two innermost loading tracks, and along the line of travel of the bridge, so that the latter may pass over the same. The lateral dimensions of the inclosure are quite large so as to provide very great capacity. In fact, for the uses for which this particular plant is designed, the capacity is in excess of one-hundred thousand tons. The height of the inclosure is, however, relatively small, so that the bucket supported by the bridge will have sufficient clearance when swinging over the same. In order that the coal may be properly introduced into an inclosure of this type, and in order that all parts may be supplied with coal and filled to capacity, if desired, I arrange for introducing the coal at a large number of points in the top of the inclosure. Accordingly, I provide in the top a large number of hatches G′, each of sufficient size to accommodate and to permit the passage therethrough of a bucket load. These hatches are preferably provided with hatch covers, not here shown, which may be arranged for sliding movement so as to uncover a hatch opening until sufficient coal has been admitted therethrough, and then to close the opening. These hatches, it will be seen, are arranged in longitudinal and transverse rows, and are sufficiently close together to admit of the entire inclosure being filled or charged with coal evenly and to full capacity.

At a suitable locality, preferably adjacent the inclosure is a screening tower H, or, as hereinafter referred to, an apparatus for grading and delivering graded coal which is reclaimed or taken from the inclosure after the latter has been filled or partially filled in the manner previously stated. To convey the coal from the inclosure to the tower H, I preferably employ a self loading car, such as shown at K in Fig. 8, and have provided for the car a track K′ which extends from the tower along the front of the inclosure, as indicated in Fig. 1, and from the track K′ I provide branches K^2 which extend into various parts of the inclosure. As here shown, two of these branches extend from the front of the inclosure to the rear thereof beneath each longitudinal row of hatches. Consequently, when the coal is dumped into the inclosure, it will fall directly onto the track branches K^2 in a manner such that the coal can be reclaimed by a self-loading car. The car itself may be of any suitable construction, but I prefer to provide a car which is propelled electrically and will scoop up a load when moving forwardly along one of the track branches K^2. After the car is loaded, it is shifted to the tower H, and the load may be dumped in any suitable manner,—in this case by tilting or inclining the car, so that the load may slide into a pit I adjacent the lower end of an elevator J, forming a part of the tower or grading and delivering apparatus H. In this manner the coal can be removed from all parts of the inclosure.

The self-loading car K shown in Fig. 8 is preferably driven by one or more electric motors, and includes a body k and a floor k', beneath which the motors and gearing for driving the car and operating other parts are located, as shown by dotted lines. At the top of the car body is the operator's station k^2, in which is located the controller, levers and other operating parts. The forward portion of the floor car k' inclines downwardly as shown, and at the front, the car body is provided with a combined scoop and gate k^3 which is designed to be lowered to the position shown in the drawing when the car is being filled, and then to be swung upwardly to prevent the coal from dropping from the forward end when the load is being conveyed to the screening tower, or other locality. This gate may be raised by the motor by disconnecting the latter from the driving wheels, and connecting it through a train of gearing to a drum, which receives a cable k^4, the forward end of which is connected to the gate. The car may be filled by driving it into the storage pile by the developed driving power, but in case sufficient power can not develop by the motors to effectively fill the car in this manner, the cars may be forced into the storage pile so as to receive a load, by connecting the motor or motors to a gear arranged to engage with a sliding rack k^5 which is carried by the car and is designed to be temporarily fastened by means of a catch k^6 at the rear end of the rack, to one of a series of fixed pins k^7 arranged at intervals along each of the track branches. To move the car into the body of coal, so as to cause the car to receive a load, the rack when in its inner position will be attached to one of the abutment pins k^7 by means of the latch k^6, and thence by the gear operating on the rack, the car will be propelled forwardly relative to the rack which is thus held stationary. The car is provided at the rear with one or more discharge doors k^8 through which the load may be discharged. To discharge the coal, the car is preferably run upon a tilting platform, (not shown), which is intended to tilt the car so that the load will be discharged when the doors k^8 are unlatched, and then automatically return to normal or horizontal position.

The tower H, the construction of which may be varied considerably, includes in this instance a suitable frame structure L, near

the top of which are arranged three sets of rotary screens M, N and O,—the sets M and N being in line with each other and on opposite sides of the center line of the tower, and the set O being beneath the sets M and N and in the center line of the tower. The sets of screens are supported on rollers at a slight inclination, and may be rotated in any suitable manner and at any desired speed. The screen M includes an outer imperforate cylindrical casing m, and three concentric screens m', m^2, and m^3, which project outwardly beyond the casing different amounts, the innermost screen projecting from the casing the greatest distance. In a similar manner, the set N includes a cylindrical casing n, and three concentric screens n', n^2 and n^3, which are arranged in a manner similar to that of the screens and casing of the set M. The innermost screens of both sets M and N receive coal from the elevator J, which, at its upper end, is provided with a discharge chute J′ having two spouts J^2, each of which is designed to direct coal into one of the screens. Beneath the outer projecting ends of the several screens and screen casings are hoppers or receivers R′, R^2, R^3, and R^4,—the first of which receives the largest size of coal, namely, so-called egg coal; the second, stove coal; the third, nut coal; and the fourth receives from the imperforate casings m and n, the dust and smaller pieces which are passed through three screens of each set. The graded coal passes from the receivers R′, R^2, R^3, through discharge spouts into hoppers S′, S^2, and S^3 and the coal which passes into the receiver R^4 is discharged by means of a suitable spout into the innermost screen of the lower set O, which consists of an imperforate outer casing o and two concentric screens o' and o^2, which project outwardly from the casing o different distances, as shown clearly in Fig. 4. The coal which enters the inner screen o^2 is then again screened and graded,—pea coal, buckwheat coal and dust passing into the receivers T′, T^2 and T^3, and then into hoppers S^4, S^5 and S^6, the hoppers S′ to S^6 being arranged in the manner shown in Figs. 4, 5 and 6. These various hoppers are provided near the center plane of the tower with discharge spouts S^7, the passage of coal through each of which may be controlled manually so that the desired grade or size of coal can be obtained any time. These spouts are adapted to discharge the coal onto one or more substantially horizontal endless conveyers U having a discharge chute V by which the coal can be discharged into cars W or other suitable coal receiving members.

While I prefer to employ the inclosure for the stored coal, under some circumstances, the inclosure may be done away with, in which case the coal will be dumped directly on the storage tracks and will be thus stored in a huge pile in the open.

Having thus described my invention, what I claim is:

1. In a coal storage plant, one or more tracks, coal conveying means for causing coal to be discharged and stored on said tracks, and a self loading car adapted to travel along said tracks for reclaiming the coal and for conveying the same to a desired point.

2. In a coal handling plant, a plurality of storage tracks on which coal is adapted to be dumped, a screening tower in proximity to the tracks, coal conveying and discharging means for causing coal to be discharged and stored on said tracks, and a self loading car adapted to travel along said tracks to receive a load and convey the same to the screening tower.

3. In a coal handling plant, a plurality of storage tracks on which coal is adapted to be dumped, a conveyer including a bridge arranged to travel over said tracks, and a coal carrying and dumping member adapted to move along said bridge, whereby coal may be dumped at any point on said tracks, and a self loading car adapted to travel along the tracks for reclaiming the coal and for conveying the same to a desired point.

4. In a coal handling plant, a plurality of storage tracks on which coal is adapted to be dumped, a conveyer including a traveling bridge adapted to pass over said tracks, and a coal carrying and discharging member adapted to move along said bridge, whereby coal may be dumped at any point on the tracks; a screening tower arranged in proximity to the tracks, and a self-loading car adapted to travel along the tracks so as to receive a load and to convey the same to the screening tower.

5. In a coal handling plant, an inclosure for the storage of coal, an apparatus for grading and delivering graded coal, a track extending from the said apparatus and having a number of branches extending into different parts of the inclosure, and a car adapted to travel along said track and its branches to convey coal from various parts of the inclosure to the grading and delivery apparatus.

6. In a coal handling plant, an inclosure for the storage of coal, an apparatus for grading and delivering graded coal, a track extending from said apparatus and having a plurality of branches entering said inclosure and extending to various parts thereof, a car adapted to travel along the track and its branches and to convey coal to the grading and delivery apparatus, and means for dumping coal into said inclosure onto and along the various track branches.

7. In a coal handling plant, an inclosure for the storage of coal, an apparatus ad-

jacent the inclosure for grading and delivering graded coal, a track extending from said apparatus and having a plurality of branches entering said inclosure and extending to various parts thereof, a self loading car adapted to travel along the track and its branches and to convey coal to the grading and delivery apparatus, and means for dumping coal into said inclosure onto and along the various track branches.

8. In a coal handling plant, an inclosure for the storage of coal provided at the top with a plurality of hatches, an apparatus for grading and delivering graded coal, a track between said apparatus and the inclosure and having a plurality of branches entering into and extending to different parts of the inclosure beneath the hatches, a car adapted to travel along said track and its branches and to convey coal from various parts of the inclosure to the grading and delivery apparatus, and a conveyer for conveying coal from an outside source to said storage inclosure and for inserting the same in any of said hatches.

9. In a coal handling plant, an inclosure for the storage of coal provided at the top with a plurality of hatches arranged in rows, a conveyer including a traveling member adapted to transfer coal from an outside source to said storage inclosure and to insert the same in any of said hatches, an apparatus arranged adjacent the inclosure for grading and delivering graded coal, a track extending from said apparatus and having a plurality of branches entering said inclosure to and beneath the different hatches, and a self-loading car adapted to travel along said track and its branches and to convey the coal from the inclosure to the grading and delivering apparatus.

10. In a coal handling plant, an inclosure for the storage of coal, provided at the top with rows of hatches, an unloader including a traveling bridge adapted to pass over said inclosure and adapted to transfer coal from an outside source to said inclosure and to insert the same in any of said hatches, an apparatus arranged adjacent the inclosure for grading and delivering graded coal, a track extending from the said apparatus and having a plurality of branches entering said inclosure and extending beneath rows of the hatches, a self-loading car adapted to travel along said track and its branches and to convey the coal from the inclosure to the grading and delivery apparatus.

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

FREDERICK W. LOVELL.

Witnesses:

H. R. SULLIVAN,

A. F. KWIS.