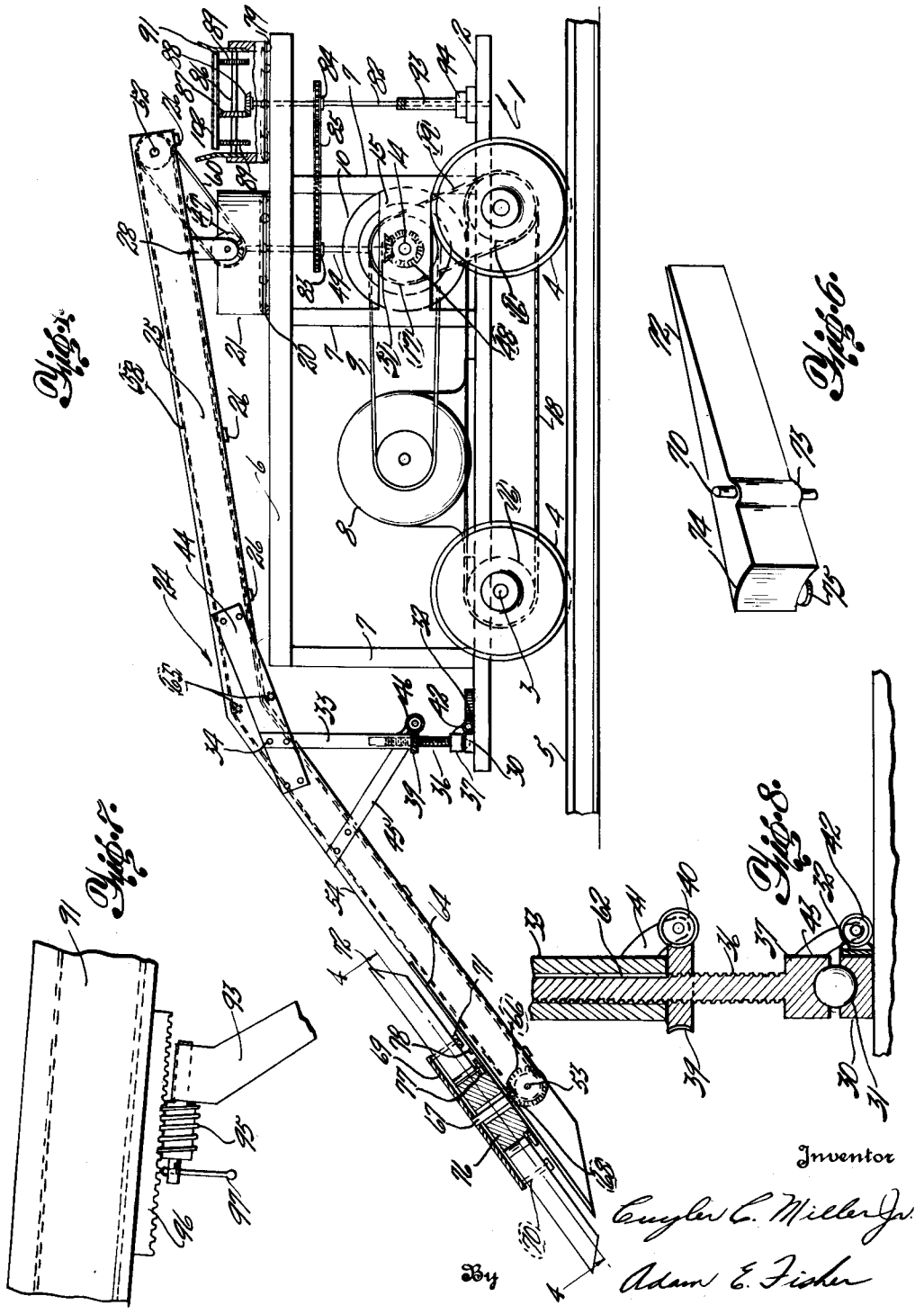
May 19, 1931. C. C. MILLER, JR 1,805,951

COAL LOADING MACHINE

Filed Jan. 18, 1930 3 Sheets-Sheet 1



Inventor

Chrysler C. Miller Jr.

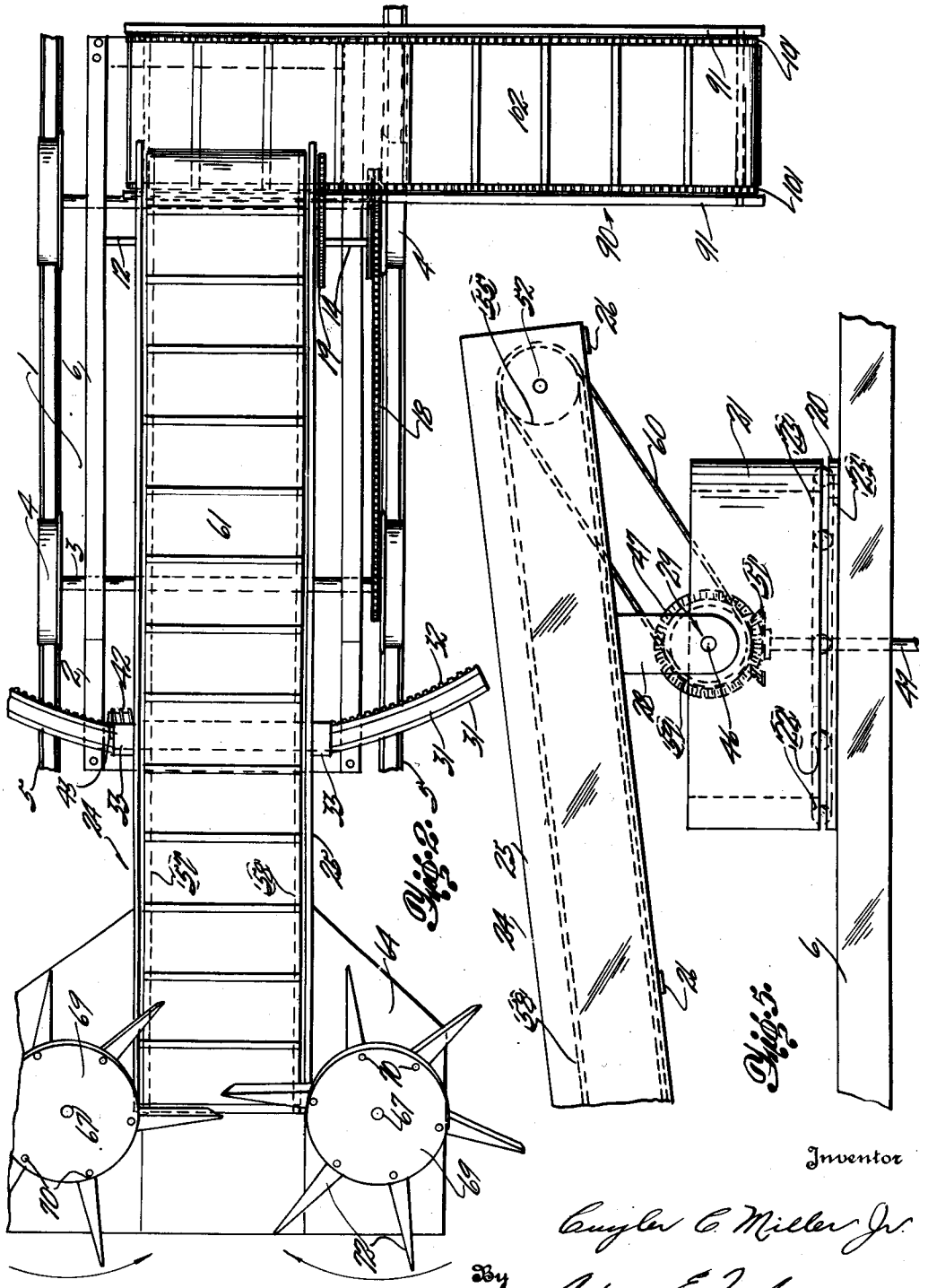
By Adam E. Fisher

Attorney

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COAL LOADING MACHINE

Filed Jan. 18, 1930 3 Sheets-Sheet 2



Inventor

Cuyler C. Miller Jr.

By Adam E. Fisher

Attorney

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COAL LOADING MACHINE

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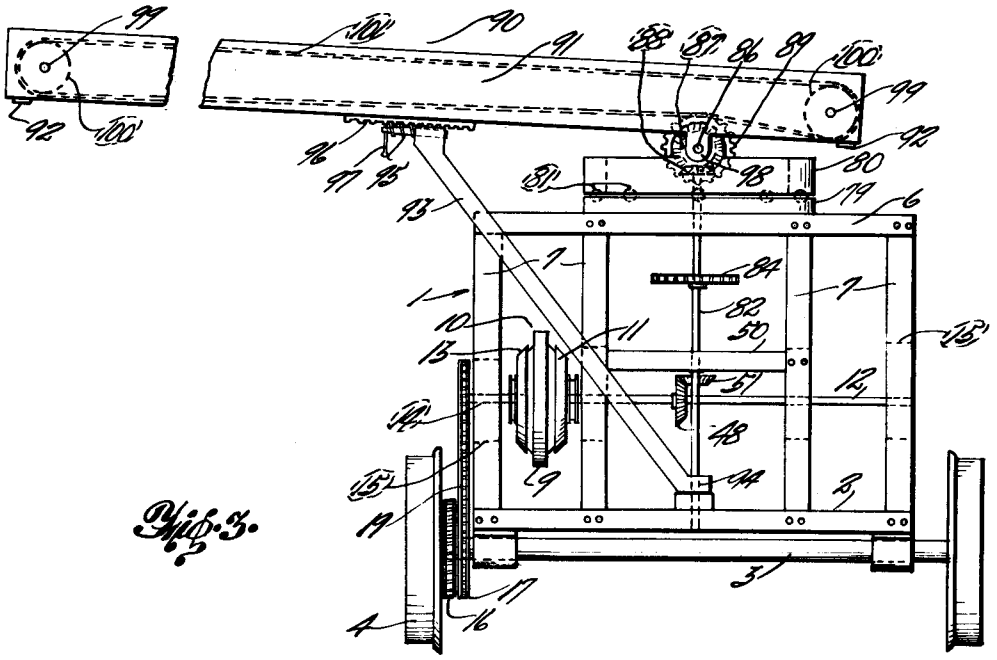


Fig. 3.

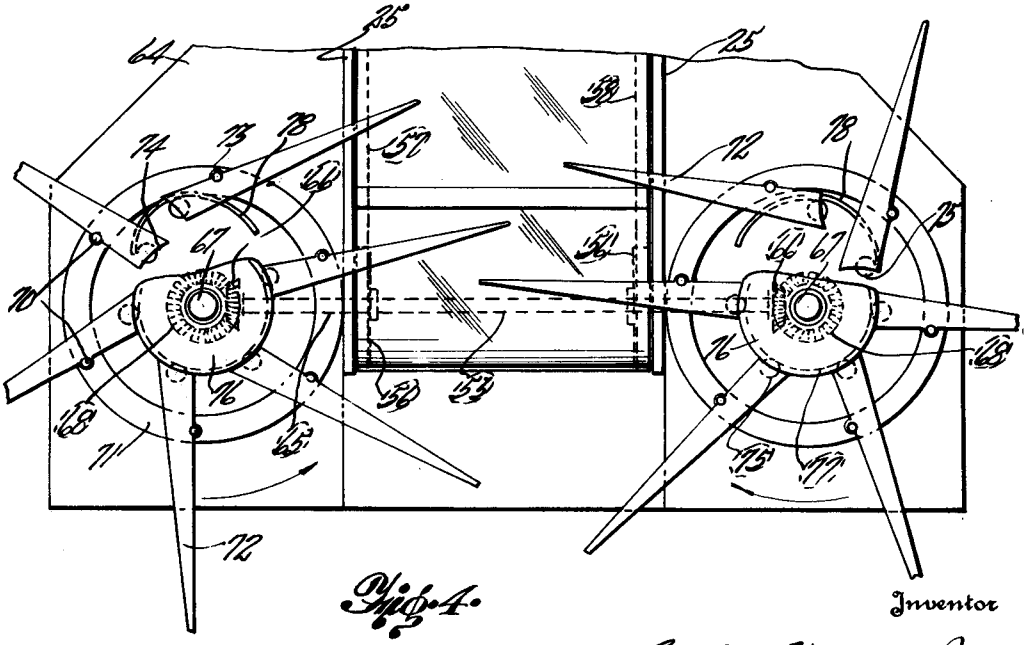


Fig. 4.

Inventor

Cuyler C. Miller Jr.

By Adam E. Fisher

Attorney

Patented May 19, 1931 1,805,951

UNITED STATES PATENT OFFICE

CUYLER C. MILLER, JR., OF GILLESPIE, ILLINOIS

COAL LOADING MACHINE

Application filed January 18, 1930. Serial No. 421,647.

This invention is a coal loading machine for employment in mines for the purpose of transferring the coal to a mine car or other suitable conveyor after the coal has been broken from the vein in a loose or shattered condition.

The main object of the invention is to provide a coal loading machine which will rapidly and economically load the coal in the cars or conveyors with but a minimum of manual operations.

Another object is to provide a coal loading machine including gathering and delivering conveyors each of which is separately adjustable in both horizontal and vertical planes to facilitate the gathering of the coal and its delivery to the mine cars.

Another object is to provide a coal loading machine including a coal gathering means for efficiently and rapidly dragging the coal from the mine bottom on to the gathering conveyor from whence it may be delivered to the mine car.

A further object is to provide a coal loading machine of the character set forth in a simple, efficient and durable form.

The foregoing and other objects together with means whereby the same may be carried into effect will best be understood from the following description of a preferred embodiment of the invention taken in connection with the accompanying drawings wherein:

Figure 1 is a side view of the machine.

Figure 2 is a plan view thereof.

Figure 3 is an enlarged rear end view thereof.

Figure 4 is an enlarged plan view of the coal gathering mechanism and the end of the gathering conveyor.

Figure 5 is an enlarged side view of the rear end of the gathering conveyor and its supporting means.

Figure 6 is a perspective view of one of the coal gathering arms.

Figure 7 is an enlarged detail side view of the adjusting means for the delivering conveyor.

Figure 8 is an enlarged sectional detail view of the adjustable supporting means for the gathering conveyor.

In carrying out the invention I provide a carriage 1 comprising a base 2 beneath which are journaled the axles 3 carrying the wheels 4 by means of which the carriage may travel upon the rails 5 of the conventional track system of the mine. An upper deck or frame 6 is supported above the base 2 by posts 7 and one end of this deck or frame 6 terminates short of an alignment with the end of the base 2, this end of the carriage being hereinafter referred to as the forward end. A motor 8 of conventional form is mounted on the base 2 and belted as shown at 9 to a conventional double disk clutch 10 one side 11 of which drives the conveyor drive shaft 12 and the other side 13 of which drives the propelling shaft 14. The shafts 12 and 14 are journaled in the plates 15 extended between the posts 7 as shown. Sprockets 16 are connected to the axles 3 on one side of the carriage 1 and similar sprockets 17 are mounted on one of the axles and on the outer end of the propelling shaft 14. A sprocket chain 18 is trained over the sprockets 16 and another chain 19 is trained over the sprockets 17 so that the carriage may be propelled over the mine tracks by the motor 8. It is obvious that by virtue of the double clutch 10 the propelling shaft 14 alone may be rotated by the motor while the conveyor shaft 12 remains idle so that the loader may be moved from place to place without operating the conveyors.

A circular race 20 is mounted upon the deck 6 over the conveyor drive shaft 12 and an annular carrier 21 is rotatably mounted on this race, the said carrier running on balls 22 which are seated in grooves 23 provided in the adjacent faces of the race and carrier as shown. The gathering conveyor designated generally at 24 comprises elongated spaced side pieces 25 which are secured together by cross pieces 26 along their undersides. Pivot lugs 28 are depended from these side pieces 25 adjacent their rearwardly disposed ends and are pivotally attached at 29 to the carrier 21 at diametrically opposite points thereon. An arcuate race 30 is se-

cured in a horizontal position to the forward end of the base 2 and has a groove 31 in its upper surface and a rack 32 formed along its inner edge. Supporting legs 33 are secured at 34 to the side pieces 25 and have axially extended sockets 35 at their lower ends. Threaded studs 36 are slidably keyed at 62 in the sockets 35 and have enlarged feet 37 which carry the balls or other bearings 38 at their lower ends which are adapted to play in the groove 31 in the race 30. Gears 39 are threaded on the studs 38 at the lower end of the legs 33. Worms 40 are journaled in brackets 41 extended from the lower ends of the legs 33 and mesh with the aforesaid gears 39 in such manner that the conveyor 24 may be adjusted vertically by turning these worms 40, the side pieces 25 swinging on the pivots 29. A worm 42 is journaled in a bracket 43 carried by one of the legs 33 and meshes with the rack 32 in such manner that the conveyor may be adjusted in a horizontal plane by turning this worm the conveyor in this case turning on the race 20. The aforesaid worms 40 and 42 may be provided with any suitable turning handles (not shown) extended out to the side of the machine as will be understood. The side pieces 25 and the legs 33 are braced by the bracing members 44 and 45 in the manner shown.

A shaft 46 is journaled diametrically through the carrier 21 and serves as the pivots 29 for the side pieces 25 and a beveled gear 47 is fixed to this shaft intermediate its ends. A similar beveled gear 48 is fixed on the conveyor drive shaft 12. A vertical shaft 49 is journaled in the deck 6 and in a horizontal plate 50 mounted between the posts 7 and carries beveled gears 51 at either end which mesh with the aforesaid gears 47 and 48 so that said shaft 46 will be driven by the conveyor drive shaft 12. A sprocket shaft 52 is journaled between the rear ends of the side pieces 25 of the conveyor 24 and a similar sprocket shaft 53 is journaled between the forward ends of the said side pieces. It will be noted that the forward portions 54 of the side pieces 25 are bent angularly downward from their remaining portions to bring the forward end of the conveyor into proximity with the surface from which the coal is to be gathered. Sprockets 55 are secured to the rear shaft 52 near the side pieces 25 and similar sprockets 56 are secured to the forward shaft 53 also adjacent the said side pieces. Sprocket chains 57 and 58 are trained over the said sprockets 55 and 56 and are driven by the former, a sprocket wheel 59 being mounted upon the shafts 46 and 52 and connected by a sprocket chain 60 for this purpose. The sprocket chains 57 and 58 carry a conveyor belt 61 of conventional form upon which the coal will be drawn upward when placed upon the forward end of the conveyor by a means to be described. Rollers 63 support both the upper and lower layers of the conveyor belt 61 where the side pieces 25 are bent downward as shown.

The forward end of the conveyor 24 is provided with a laterally and forwardly extended apron 64 and the forward shaft 53 carrying the conveyor belt is extended out beneath this apron 64 as at 65 and provided with beveled gears 66 at its ends. Short stub shafts 67 are journaled through the apron 64 and provided with beveled gears 68 at their lower ends which mesh with the aforesaid gears 66 so that the said stub shafts 67 will be rotated when the conveyor belt 61 is in motion. Circular plates 69 are fixed upon the upper ends of the stub shafts 67 and carry a plurality of radially spaced depending hinge pins 70. A ring 71 is secured to the lower ends of the pins 70 to turn therewith. A plurality of coal gathering arms 72 are provided, the same being substantially wedge shaped in plan and having bearings 73 to receive the aforesaid hinge pins 70 by means of which the said arms are carried by the plates 69. The inner or butt ends of the gathering arms 72 are concaved as at 74 and have small rollers 75 journaled upon their lower surfaces as shown. Cams 76 are fixed upon the apron 64 in concentricity with the aforesaid stub shafts 67 which extend therethrough and these cams are substantially semicircular in plan with their convexed or curved peripheries turned forwardly as shown. Grooves 77 are provided in the undersides of the peripheries of the cams 76. As will be clearly evident from the drawing the arms 72 will be held rigidly extended during that portion of their travel in which they are in position to engage coal upon the surface of the mine, the rollers 75 running in the grooves 77 and cooperating with the engagement of the concaved butts 74 of the arms with the periphery of the cams 76 for this purpose. When each arm 72 reaches a point where it has drawn its load of coal entirely onto the conveyor belt 61 and otherwise would tend to drag it off the side of the belt, the said arm is released and allowed to swing free due to its disengagement with the cams. Arcuate guide strips 78 are provided upon the upper face of the apron 64 rearwardly of the cams 76 and are so shaped and disposed that they will be engaged by the rollers 75 of the arms 72 to draw the same around into the correct position to engage the cams 76 after they have been released therefrom as will be understood.

A circular race 79 similar to the race 20 is secured on the deck 6 adjacent its rear end and an annular carrier 80 is rotatably mounted thereon on the ball bearings 81 in the manner hereinbefore set forth. A

drive shaft 82 is journaled vertically through the base 2 and deck 6 and extends upwardly through the said race 79. Sprockets 83 and 84 are fixed upon the shafts 49 and 82 in horizontal alignment and a sprocket chain 85 is trained over these sprockets. A shaft 86 is journaled diametrically through the carrier 80 and carries a beveled gear 87 intermediate its ends, which gear meshes with a similar gear 88 upon the upper end of the shaft 82. Sprockets 89 are mounted on the said shaft 86 adjacent its ends and within the carrier 80. The delivering conveyor 90 comprises side pieces 91 which are secured together by cross pieces 92 and which are pivotally attached to the carrier 80 by the pivot lugs 98 engaging the shaft 86. A supporting arm 93 is loosely mounted at 94 on the lower portion of the drive shaft 82 and extends angularly upward therefrom. A worm 95 is journaled in the upper end of this arm 93 and meshes with a rack 96 carried by the conveyor 90 in such manner that the height of the outer end of the said conveyor may be adjusted by turning the said worm. A sliding pin or handle 97 is provided in the worm for this purpose. Sprocket shafts 99 are journaled through the side pieces 91 at each end of the conveyor 90 and sprocket wheels 100 are mounted on these shafts adjacent the said side pieces 91. Sprocket chains 101 are trained over the said sprocket wheels 100 and carry the conventional conveyor belt 102 similar to the aforementioned conveyor belt 61. As will be noted in Figure 3 the lower layers or laps of the sprocket chains 101 are trained over the sprockets 89 on the shaft 86 and are driven thereby. It will be noted that the inner end of the delivering conveyor 90 is disposed beneath the rear end of the gathering conveyor 24 so that the coal from the said gathering conveyor will be deposited on the said delivering conveyor.

The operation of the machine will be clearly evident from the foregoing description, the gathering arms 72 drawing the coal onto the gathering conveyor 24 which deposits it on the delivering conveyor 90 from whence it is delivered to a mine car or other suitable conveyance or receptacle. Since both the gathering and delivering conveyors are adjustable laterally and vertically the machine may be adapted for use under any conditions.

While I have herein set forth a certain preferred embodiment of my invention it is understood that I may vary from the same in minor structural details, not departing from the spirit of the invention and within the scope of the appended claims.

I claim:

1. In a device of the class described, a carriage, a race mounted thereon, a carrier rotatably mounted in the race, a gathering conveyor pivotally attached to the said carrier, means for supporting and maintaining the said conveyor in any adjusted position, another race mounted on the carriage, a carrier rotatably mounted in this race, a delivery conveyor pivotally attached to the said carrier and means for supporting this conveyor in any adjusted position.

2. In a device of the class described, a carriage, a gathering conveyor rotatably and pivotally mounted on the carriage by its rear end, an arcuate race upon the forward portion of the carriage, supporting legs upon the said gathering conveyor adapted to play in the said race, means for adjusting the length of the said legs, a rotating coal gathering mechanism upon the forward end of the said gathering conveyor and a delivering conveyor rotatably and pivotally mounted on the said carriage adjacent the rear end of the gathering conveyor.

3. In a coal gathering mechanism, in combination with a conveyor, including an extended apron at its end and a rotating sprocket shaft, gears upon the ends of the said sprocket shaft, stub shafts journaled in the said apron, gears upon the said stub shafts in mesh with the said gears upon the sprocket shaft, circular plates carried by the said stub shafts, gathering arms fulcrumed on the said plates, semicircular cams fixed on the said apron, the inner ends of the said gathering arms being concaved to engage the curved periphery of the said cam during a part of the rotation of the said circular plates whereby the said arms will be held rigidly extended, rollers journaled in the inner ends of the said gathering arms, and arcuate strips secured on the said apron and adapted to engage the said rollers to swing the arms into position to again engage the said cams after having been released therefrom by the rotation of the said circular plates.

4. In a device of the class described, a carriage, a race mounted on the carriage, a carrier rotatably mounted on the race, a gathering conveyor pivotally mounted at its inner end on the said carrier, another race mounted on the carriage, a carrier mounted in this race and a delivery conveyor pivotally mounted at its inner end on the said carrier and means for adjusting the said gathering and delivery conveyors in a vertical plane.

5. In a device of the class described, a carriage, a gathering conveyor rotatably and pivotally mounted on the carriage by its rear end, an arcuate race upon the forward portion of the carriage, supporting legs upon the said gathering conveyor adapted to play in the said race, means for adjusting the length of the said legs, a rotating coal gathering mechanism upon the forward end of the said gathering conveyor and a deliver-

ing conveyor rotatably and pivotally mounted on the said carriage adjacent the rear end of the gathering conveyor, and means for raising and lowering the free end of the said delivery conveyor.

6. In a device of the class described, a carriage, a gathering conveyor rotatably and pivotally mounted by its rear end on the said carriage, an arcuate race mounted on the forward portion of the said carriage beneath the conveyor, supporting legs secured to the conveyor and having sockets in their lower ends, threaded studs slidably keyed in the said sockets, feet on the lower ends of the said studs adapted to play over the said arcuate race, gears threaded on the said studs adapted to play over the said arcuate race, gears threaded on the said studs and adapted to bear on the ends of the said legs, gears carried by the said legs and meshing with the gears on the said studs, a rack on the said arcuate race, and a gear carried by one of the feet of the said threaded studs and meshing with the rack on the race.

In testimony whereof I affix my signature.

CUYLER C. MILLER, JR.