This invention relates to cuttings-conveyor mechanism, and more particularly to improvements in cuttings-conveyor mechanism adapted to use with a coal cutting machine of the endless cutter chain type whereby the cuttings brought back from the kerf by the cutter chain are effectually removed from adjacency to the machine.

In the cutting of coal by the use of a coal cutting machine of the endless cutter chain type, the relatively fine cuttings created by the cutter chain during the kerf cutting operation are piled up around the machine at the rear end of the cutter bar. It has been found that due to the continual churning of the cuttings by the rapidly circulating cutter chain, the power consumed in the cutting operation was considerably increased and further appreciably increased the wear of the cutter bits and the parts which compose the cutter chain and cutter bar, resulting in a substantial increase in maintenance cost of the various cutting members, in the time occupied in the changing of cutter bits, and in the cost of bit sharpening and replacement. Heretofore it has been almost universal practice to shovel manually the piled up cuttings away from the machine to reduce, to some extent, such continual churning of the cuttings, a very arduous task with many attendant dangers from falls of roof and sides. Also, the piled up cuttings at the rear end of the machine hinder the proper setting of roof props, and the cuttings must be laboriously shoveled away from the trailing end of the machine before the roof props can be set close to the coal face.

An object of this invention is to provide an improved cuttings-conveyor mechanism adapted for attachment to a conventional coal cutting machine whereby the cuttings created by the cutter chain during the kerf cutting operation are mechanically conveyed away from the machine, thereby eliminating, to a substantial extent, the laborious task of shoveling away the cuttings by hand. A further object is to provide an improved cuttings-conveyor mechanism adapted for attachment to a coal cutting machine whereby the cuttings are mechanically removed from adjacency to the machine and conveyed to a convenient point of disposal. Still another object is to provide an improved cuttings-conveyor mechanism embodying conveying mechanism arranged at the trailing side of the cutter bar and having its cuttings receiving portion disposed in adjacency to the return run of the cutter chain whereby the cuttings are effectually removed from the rear end of the machine. A still further object is to provide an improved cuttings-handling attachment for a conventional coal cutting machine whereby the cuttings created by the cutter chain during the kerf cutting operation are mechanically removed from adjacency to the machine, thereby substantially eliminating the very arduous task, with its attendant dangers, of manually shoveling away the cuttings. Yet another object is to provide an improved cuttings-handling mechanism adapted for attachment to the rear end of a longwall coal cutting machine at the trailing side of the cutter bar for removing the cuttings from adjacency to the cutter chain. A still further object is to provide an improved cuttings-handling mechanism adapted for attachment to a conventional coal cutting machine and driven through elements of the cutter chain driving means of the machine. Still another object is to provide an improved cuttings-conveyor mechanism arranged at the rear end of a coal cutting machine at the trailing side of the cutter bar for moving the cuttings away from the return run of the cutter chain and for elevating the cuttings to a convenient point of discharge. A still further object is to provide an improved cuttings-conveyor mechanism wherein a rotary conveyor device or gatherer arranged on an upright axis and having its receiving portion moving in a circular path in adjacency to the return run of the cutter chain, is employed for clearing away the cuttings from adjacency to the cutter chain and for elevating the cuttings to a suitable point of discharge. A still further object is to provide an improved cuttings-handling mechanism which is compact in design and simple in structure, and which may be readily attached to a conventional coal cutting machine. Other objects and advantages of the invention will, however, hereinafter more fully appear.

This application is a continuation of my pending application Ser. No. 351,094 filed January 16, 1939, now abandoned.

In the accompanying drawings there are shown for purposes of illustration several embodiments which the invention may assume in practice. In these drawings:

Fig. 1 is a plan view of a coal cutting machine with which an illustrative embodiment of the improved cuttings-conveyor mechanism is associated.

Fig. 2 is a side elevational view of the coal cutting machine and the associated cuttings-conveyor mechanism shown in Fig. 1.

Fig. 3 is an enlarged vertical sectional view taken substantially on line 3—3 of Fig. 1.
Fig. 4 is a horizontal sectional view taken substantially on line 4—4 of Figs. 2 and 3. Fig. 5 is a detail vertical sectional view taken on line 5—5 of Fig. 3.

Fig. 6 is a view similar to Fig. 3, showing another illustrative embodiment of the invention.

Fig. 7 is a horizontal sectional view taken substantially on line 7—7 of Fig. 6.

Fig. 8 is an enlarged detail sectional view taken in the plane of Fig. 6, showing a portion of the driving means for the conveyer mechanism.

Fig. 9 is a view similar to Figs. 4 and 7, illustrating still another illustrative embodiment of the invention.

Fig. 10 is a view similar to Figs. 3 and 6, illustrating yet another embodiment of the invention.

Fig. 11 is a horizontal sectional view taken substantially on lines 11—11 of Fig. 10.

Fig. 12 is a detail cross sectional view taken on line 12—12 of Fig. 10.

Fig. 13 is a fragmentary plan view of the cuttings-conveying mechanism shown in Figs. 10, 11 and 12, showing a portion of the conveyer driving means.

This invention, in its several embodiments, is shown associated with a coal cutting machine of the flexibly fed, longwall type having a pivoted cutter-chain-carrying cutter bar disposable in a right angle position with respect to the machine frame during the kerf cutting operation, and in each embodiment of the invention the improved cuttings-conveying mechanism is operative to remove the cuttings from adjacency to the cutter chain and convey the cuttings to a convenient point of disposal. While the invention is shown embodied in a longwall coal cutting machine, it will be evident that the same may be associated with the kerf cutting mechanism of coal cutting machines of various other types without departing from the spirit of the invention.

The coal mining machine disclosed herein is generally illustrated at 1 and for illustrative purposes may be similar in character to that disclosed in a copending application of one Dwight R. Richards, Serial No. 172,954, filed Nov. 5, 1937, now matured into Patent No. 2,883,049, granted November 15, 1949. The mining machine comprises a low compact machine frame 2 of generally rectangular shape, having a plane bottom surface 3 adapted to rest upon and slide in any direction over the mine floor. The machine frame comprises a central motor frame section 4, a front feed frame section 5 and a rear cutter frame section 6, the frame sections being secured together to form a rigid unitary machine frame. Carried by the front feed frame section 5 is a horizontal feed drum 7 with which a feed cable 8 cooperates in the feeding of the machine. Pivotally mounted on the cutter frame section 6 at the rear end of the machine frame for horizontal swinging movement on a vertical axis, as at 9, is an elongated horizontal plane cutter bar 10 having guides for circulation about its margin an endless cutter-bit-carrying cutter chain 11, as fully described in the copending applicationabove referred to, the feed cable is attachable to the cutter bar to effect swinging of the cutter bar about its pivot, and the cutter bar may be locked in a right angle position at the side of the machine frame, as shown in Fig. 1, or in a position extending lengthwise of the machine frame, being means of a control device as shown in Fig. 3, secured to the rear end of the motor power shaft 12 is a bevel gear 13 meshing with a bevel gear 14, the latter in turn driving a spur gear 15. The spur gear 15 meshes with a spur gear 16 connectible by a conventional sliding clutch 17 to a vertical shaft 18. Suitably secured to the lower end of the shaft 18 is a cutter chain drive sprocket 19 which engages and drives the endless cutter chain carried upon a cutter bar 20 mounted on a hanger frame 20 journalled in bearing sleeves supported by a cylindrical bearing support 21 formed on the cutter frame section 6, and the cutter bar lock is located at 22 and is engageable with suitable appropriately located locking receives 23 in the hanger frame 20. Extending transversely across the lower portion of the cutter frame section 6 is a cuttings-receiving chamber 24 within which the rearward portion of the cutter bar is arranged. The bottom of the chamber is closed by a bottom plate 25 providing the bottom surface of the cutter frame section 6. From the foregoing, it is evident that when the sliding clutch 17 is connected, the cutter chain may be rapidly circulated about the margin of the cutter bar through the bevel gearing 13, 14, 16 and gearing 18 of the shaft 18. As fully described in the copending application mentioned above, during the cutting operation the cutter bar may be swung by the feed cable 8 from a position extending longitudinally of the machine frame to the right angle position shown in Fig. 1 and locked in such right angle position by the lock 22, it being understood that during the swinging movement of the cutter bar the cuttings-conveying mechanism, generally designated 26, is detached from the coal cutting machine. When the swinging movement of the cutter bar is completed and the cutter bar is sumped beneath the coal, in the manner well known to those skilled in the art, the feed cable may be detached from the cutter bar and extended, as indicated in full lines in Fig. 1, in a direction longitudinally of the forward end of the machine frame and connected at its free end to an anchor jack located in adjacency to the coal face in advance of the coal cutting machine.

The cuttings-conveying mechanism 26 is then attached to the rear end of the coal cutting machine at the trailing side of the cutter bar in the manner shown in Fig. 2, and the feed cable is wound in by the feed drum the coal cutting machine is fed bodily in a forward direction along the coal face in parallelism with the latter to cut a horizontal kerf in the coal, and during the kerf cutting operation the relatively fine cuttings created by the cutters of the cutter chain are removed by the cuttings-conveying mechanism from the path of the cutter chain and mechanically conveyed away from the machine to a convenient point of disposal, as will later be explained. As the mode of operation of the coal cutting machine disclosed herein has been fully described in the above mentioned copending Richards application and is well known to those skilled in the art, further description thereof is herein unnecessary.

In the illustrative embodiment of the invention disclosed in Figs. 1 to 5, inclusive, the improved cuttings-conveying mechanism 26 comprises a casing 27 attachable to the rear end of the coal cutting machine, within the lateral limits of the machine frame, by releasable pins 26 insertible in registering openings in cooperating lugs 29 and 30 formed respectively on the casing 27 and the rearward end portion of the machine frame. It is obvious that various forms of releasable attaching means may be provided whereby the cuttings-handling mechanism
may be readily attached to and detached from the coal cutting machine and, in certain instances, the casing 27 may be pivotally mounted on the machine frame for swinging movement, thereby to enable movement of the conveyor mechanism into an out-of-the-way position to facilitate changing of the cutter bars and further to enable swinging of the cutter bar beneath the same in an obvious manner. In this illustrative construction, the casing 27 has a detachable bottom plate 31 having a plane bottom surface 32 arranged substantially flush with the bottom of the machine frame, and formed in the bottom part of the casing 27 is a horizontal chamber 33 opening at its inner side into the cuttings-receiving chamber 24 of the cutter frame section 6 of the mining machine. Communicating with and extending upwardly from the bottom chamber 33 is a vertical chamber 34 in turn communicating at its upper end with a horizontal chamber 35 formed within a swivelled frame 36 mounted on the top of the casing 27. Arranged in the chambers 33 and 35 is a vertical gathering and elevating conveyor 37, herein of the spiral conveyer type, mounted for rotation about a vertical axis. This spiral conveyer has on its bottom vane a laterally extending cuttings-receiving or gathering portion 38 lying in close adjacency to the top surface of the casing bottom plate 31, and extending helically inwardly and upwardly from the receiving or gathering portion 38 at the outer edge of the bottom vane, is an upstanding flange 39 for retaining the cuttings on the receiving portion of the conveyer as the conveyer is rapidly rotated about its axis, this flange extending helically upwardly and terminating within the circular wall of the lower portion of the vertical chamber 34. As the conveyer rotates, this receiving or gathering portion 38 moves through the rearward portion of the cuttings-receiving chamber 24 in close adjacency to the return run of the cutter chain 11 and moves the cuttings in adjacency to the cutter chain rearwardly within the chamber 33 and elevates the same upwardly through the chamber 34 to a convenient point of disposal, as later explained. The spiral conveyer 37 has a tubular shaft portion 40 mounted on and keyed to a vertical shaft 41 herein suitably journalled within bearings supported by the casing bottom plate 31 and the swivelled frame 36, as clearly shown in Fig. 3. The spiral conveyer may be driven through elements of the cutter chain driving means and, in this instance, the chain sprocket drive shaft 15 has keyed thereto at its upper end a chain sprocket 42 connected by an endless drive chain 43, overlying the top of the cutter frame section, to a chain sprocket 44 keyed to the upper end of the shaft 41, so that whenever the cutter chain is driven the spiral conveyer 37 is driven in the same direction therewith, and, as a result the receiving or gathering portion 38 of the spiral conveyer moves in adjacency to the return run of the cutter chain in a direction opposite to the direction of movement of the return run of the cutter chain thereby to enable the receiving or gathering portion 38 to effectively scoop up the cuttings and move them rearwardly from the cuttings-receiving chamber 24. As the cuttings are moved from adjacency to the chain and from the cuttings-receiving chamber 24 into the chamber 33, they are elevated by the spiral conveyer vanes upwardly through the vertical chamber 34 and are discharged at its upper end within the chamber 35 of the swivelled frame 36. In this construction, the swivelled frame 36 has a lateral discharge openings 45 communicating with the chamber 35 so that as the spiral conveyer discharges the cuttings within the chamber 35, the cuttings are displaced laterally through the discharge opening 45. Mounted on the swivelled frame 36 and associated with the spiral conveyer is a conveyer mechanism 46 for receiving the cuttings discharged through the discharge opening 45 and for conveying the cuttings laterally from the machine. The conveying mechanism 46 herein includes an endless conveyer belt 47 having its receiving portion disposed in adjacency to the discharge opening 45 and guided for travel in gudeways on a conveyer frame 48. This conveyer frame is pivotally mounted at 49 on the swivelled frame 36 for swinging movement in a vertical direction with respect thereto, thereby to enable the discharge end 50 thereof to be adjusted into different elevated positions with respect to the mine floor. The conveyer frame 48 is supported in adjusted position by an adjustable tie bolt 51 connected at 52 to the bottom portion of the conveyer frame and at 53 to a cross bolt 54 supported by depending lugs 55 herein formed integral with the swivelled frame 36 for adjusting the length of this connection 51, the conveyer frame may be swung in a vertical direction about its pivot. The swivelled frame 36 is mounted within a vertical bore 56 within the upper portion of the casing 27 and is retained in position within this bore by means of retaining elements 57 projecting within an annular groove 58 formed on the exterior of the swivelled frame. It will thus be seen that by swinging the frame 36 about its swivel mounting on the casing 27, the conveyer mechanism 46 may be moved into different angular positions relative to the casing about an axis coincident with the axis of rotation of the spiral conveyer 37, thereby to enable the conveyer mechanism 46 to discharge the cuttings either longitudinally or laterally of the mining machine, in an obvious manner. The conveyer belt 47 is driven from the conveyer drive shaft 41 through a bevel gear 59 keyed to the shaft 41 and meshing with a bevel gear 60 keyed to a horizontal shaft 61, the latter herein jour- nalled within bearings supported by the swivelled frame 36. Keyed to and driven by the shaft 81 is a chain sprocket 62 connected by a chainless drive chain 63 to a chain sprocket 64, the latter in turn keyed to a drive shaft 65 to which a conveyer belt drive roll 66 is secured. Secured to the conveyer casing 27 is a vertical baffle-like deflector 67 for directing the cuttings from the path of the return run of the cutter chain toward the receiving opening of the chamber 33. The chain and sprocket connections 42, 43, 44, through which the cuttings-conveyor mechanism is driven, are suitably enclosed within detachable housings 68 and 69, while the chain and sprocket drive connections 67, 63, 64 for the belt conveyer 47 are enclosed within a housing 70. The housings 68 and 69 may be readily detached from the cutter frame section of the mining machine so that the drive chain 43 may be removed from engagement with the drive sprocket 44, thereby to enable detachment of the cuttings-conveyor mechanism from the coal cutting machine. It will be evident that instead of the chain and sprocket driving connections 42, 43, 44, the spiral conveyer 37 and the conveyer mechanism 46 may be driven through various other forms of drives, as for instance, through spur gearing meshing with and driven by the gear 16 of the cutter chain driving means, so that detachment of the cut-
tings-conveyor mechanism from the mining machine may be even more easily effected simply by moving the gears out of mesh.

Operating in conjunction with the cuttings-conveyor mechanism is an impeller 71, herein arranged in the cuttings-receiving chamber 24 directly beneath the cutter chain drive sprocket 19 and, in this instance, having its hub secured to and driven by the cutter chain drive sprocket. This impeller 71 is therefore rotatable about an axis coinciding with the axis of rotation of the cutter chain drive sprocket 19 and rotates at the same angular speed therewith so that as the cutter chain is rapidly circulated about the margin of the cutter bar, the impeller is simultaneously rapidly rotated and, as a result, the cuttings brought back from the kerf by the cutter chain are thrown laterally from beneath the cutter chain, thereby facilitating removal of the cuttings from the cuttings-receiving chamber 24 by the gathering and elevating conveyer 37.

To direct the cuttings toward the conveyor chamber 33, the outer side of the cuttings-receiving chamber 24 of the cutter frame section 6 of the mining machine, i.e., the side thereof remote from the coal face, is closed by a vertical cover plate 72 of sheet metal, and this plate is hinged at one end at 73 and has a releasable locking pin 14 at its other end whereby the cover plate may be swung laterally to obtain access to the rearward portion of the cutter chain, thereby to facilitate changing of the cutter bits.

As the cutter chain 11 rapidly circulates about the margin of the cutter bar 10 during the kerf cutting operation, the relatively fine cuttings created by the cutter bits are brought back from the kerf by the cutter chain into the cuttings-receiving chamber 24 and the cuttings move in the path of the arrows shown in Fig. 4. As the cuttings are moved through the chamber 24 by the cutter chain they are, to some extent, thrown by centrifugal action, aided by the impeller 71, into the chamber 33 of the cuttings-conveyor mechanism while at the same time the receiving or gathering portion 38 of the gathering and elevating conveyer 37 lying close to the top surface of the bottom plate 77 for removing the cuttings from the cutter chain. The cuttings are then discharged from the chamber 33 upwardly through the vertical cutter frame 6 into the chamber 34 of the vertical discharge sprocket 35 in the swivel frame 36, and the cuttings are discharged from the chamber 35 through the lateral discharge opening 45 onto the conveyer belt 47 whereby the cuttings are conveyed away from the machine to a suitable point of disposal. When the conveyer mechanism 36 is in a position extending longitudinally of the machine frame, the cuttings are discharged in the path of the machine at the trailing side of the machine, while when the conveyer is in a laterally located position, as shown in Fig. 1, the cuttings are conveyed laterally of the machine past the line of the roof props at the side of the machine remote from the coal face, and if desired, the belt conveyer may discharge onto a face conveyer laid on the mine floor at the outer side of the roof props, in a manner well known to those skilled in the art.

In Figs. 6, 7, and 8 another illustrative embodiment of the invention is disclosed. In this construction, a casing 75 is attachable to the rear end of the machine frame by releasable pins 76 insertible in registering apertures in lugs formed respectively on the casing 75 and the cutter frame section 6, in a manner similar to that described above. The casing 75 has a detachable bottom plate 77 having its bottom face 78 arranged substantially flush with the bottom of the machine frame. The casing 75 has a vertical bore 79 in which is journaled a rotary hollow cylinder or tubular member 80 in which is arranged a vertical spiral elevating conveyer 81. In a manner similar to the formation of the conveyer 81 described above, keyed to the upper end of the drive shaft 82 of the cutter chain drive sprocket is a chain sprocket 83 connected by an endless drive chain 85, overlying the cutter frame section, to a chain sprocket 84 in turn keyed to a vertical drive shaft 86 of the spiral conveyer 81. Communicating with this rotary tubular member 80, near the lower end thereof, are helical vanes or blades 88 of the scoop-like form, herein three in number, having receiving or gathering portions 87 lying close to the top surface of the bottom plate 71 for removing the cuttings from adjacency to the return run of the cutter chain and rearwardly from the cuttings-receiving chamber 24. The bottoms 88 of these helical portions are upwardly spirally inclined from their receiving or gathering portions and discharge inwardly within openings 89 formed in the walls of the member 80, so that as the cuttings are received by these helical vanes they are moved upwardly along the inclined bottoms 88 and through the openings 89 into a vertical chamber 90 in which the spiral conveyer 81 is arranged so that the spiral conveyer receives the cuttings discharged through the openings 89 and moves the cuttings upwardly to discharge into a horizontal chamber 91 formed in the upper portion of the casing 75. The cuttings are discharged from the chamber 91 through a discharge opening 92 communicating with a discharge chute 93 arranged at the trailing side of the machine so that the cuttings are discharged in the path of the machine. The rotary member 86 is driven from the conveyer drive shaft 85 through a gear 84 keyed to the lower end of the shaft 85 and meshing with planet gears 88 in turn meshing with a large stationary internal gear 86 secured to the casing bottom plate 71. The planet gears are journaled on bearing sleeves supported by stub shafts 97 secured to a horizontal partition 98 formed integral with the rotary member 86. The rotary member 86 is journaled at its lower end within a bearing sleeve 99 surrounding and supported by an annulus 100 on which the teeth of the internal gear 86 are formed. The receiving or gathering portions 87 of the rotary gatherer move within a chamber 101 formed in the lower portion of the casing 75 and communicating at its inner side at 102 with the cuttings-receiving chamber 24. The vertical screw conveyer 81 is driven through the chain and sprocket connection 82, 83, 84 in the same direction as the cutter chain, and the rotary member 80 of the rotary gatherer is driven through the planetary gearing from the shaft 85 at a reduced speed but also in the same direction as the cutter chain so that the receiving or gathering portions 87 of the rotary gatherer move in a direction opposite to the direction of movement of the return run of the cutter chain. As the cutter chain rapidly circulates about the margin of the cutter bar during the kerf cutting operation, the cuttings created by the cutter chain are brought back from the kerf by the cutter chain into the cuttings-receiving chamber 24 and as the cuttings are moved through the chamber they are, to some extent,
thrown rearwardly by centrifugal action into the chamber 101 of the rotary gatherer, and as the receiving or gathering portions 87 on the rotary gatherer move through the chamber 24 in adjacency to the return run of the cutter chain, they move the cuttings rearwardly from the chamber 24 and discharge the cuttings upwardly and inwardly through the openings 89 onto the screw conveyer 81. The screw conveyer moves the cuttings upwardly through the chamber 90 in the rotary member 88 and discharges the cuttings at its upper end within the chamber 91, the cuttings being discharged from the chamber 91 through the lateral discharge opening 92 into the discharge chute 93. If desired, an endless belt conveyer mechanism may be associated with the discharge chute 93 for receiving the cuttings as they are discharged therefrom and to convey the cuttings laterally of the machine past the line of roof props remote from the coal face. As in the form of the invention above described, the rotary impeller 71 moves the cuttings outwardly from beneath the cutter chain toward the rotary gatherer, thereby to facilitate the gathering operation, and to facilitate the gathering apparatus.

In Fig. 9 another illustrative embodiment of the invention is disclosed. In this illustrative construction, the vertical conveyer is driven through a chain and sprocket connection from the cutter chain drive shaft 18, in a manner similar to that shown in Figs. 3 and 6, and therefore this driving connection is not disclosed herein. As shown, a conveyor casing 105 is attached to the rear end of the machine frame of the mining machine, and formed in this casing is a transverse number of spiral conveyers 114, respectively keyable to the upper end of the vertical conveyer 105 and 106 with the cuttings-receiving chamber 24. Arranged in this chamber 106 are spiral conveyers 109 and 110, herein having spiral vanes of opposite inclination. These spiral conveyers are fixed to a transversely extending horizontal shaft 111, herein suitably journeled within the conveyor casing. Opening rearwardly from the chamber 106 at a point midway between the conveyers is a discharge opening 112. If desired, this discharge opening may discharge directly at the rear side of the casing, but, in this instance, this discharge opening communicates with a vertical chamber 113 in which a vertical spiral elevating conveyer 114 is arranged. This spiral conveyer 114 is keyed to a vertical drive shaft 115 suitably journeled within the conveyer casing, and keyd to and driven by this shaft is a bevel gear 117 meshing with a bevel gear 117 keyed to a horizontal drive shaft 118. The shaft 118 is suitably journeled within the conveyer casing and has keyd thereto and drives a chain sprocket 119 connected by an endless drive chain 120 to a chain sprocket 121 keyable to the horizontal drive shaft 111. As the oppositely acting spiral conveyers 109, 110 are driven, the cuttings are removed from adjacency to the return run of the cutter chain through the openings 107, 108 into the transverse chamber 106, and the oppositely acting spiral conveyers move the cuttings inwardly in opposite directions and discharge the cuttings through the centrally located discharge opening 112 into the chamber 113 of the spiral elevating conveyer 114. The spiral conveyer 114 receives the cuttings and elevates the same to the side of the machine floor at a point opposite the latter to a convenient point of disposal remote from the machine, preferably in a lateral direction to the side of the prop line remote from the coal face.

As a result of this invention it will be noted that an improved cuttings-conveying mechanism is provided adapted for attachment to a conventional coal cutting machine for effectively removing the cuttings from adjacency to the cutter chain. It will further be evident that by removing the cuttings from adjacency to the cutter chain, free cutting with binder is obtained. As the binder cut of the cuttings is attained, thereby appreciably increasing cutter bit life and decreasing the wear and tear on all the parts which compose the
cutter chain and cutter bar, resulting in the reduction of maintenance cost of the various cutter parts and lessening the time occupied in the changing of the cutter bits, and reducing the cost of sharpening of the bits and bit replacement. It will further be evident that by the provision of the cuttings-conveyor mechanism whereby the cuttings created by the cutter chain during the kerf cutting operation are mechanically conveyed away from the mining machine, the laborious task, with its attendant dangers, of shoveling away the cuttings by hand is, to a substantial extent, eliminated. It will also be noted that by the provision of the cuttings-handling mechanism arranged at the trailing side of the cutter bar and having its receiving portion arranged in adjacency to the return run of the cutter chain, the cuttings are effectively mechanically removed from the machine. Other uses and advantages of the invention will be clearly apparent to those skilled in the art.

While there are in this application specifically described several embodiments in which the invention may assume in practice, it will be understood that these embodiments of the same are shown for purposes of illustration and that the invention may be further modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A cuttings-conveyor mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means having a cuttings-moving portion so constructed and arranged as to be adapted to move horizontally in close adjacency to the return run of the cutter chain at the trailing side of the cutter bar, and casing means at least partially enclosing said conveying means for confining the cuttings therein during elevation of the cuttings, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening through which said cuttings-moving portion is arranged to extend into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter bar through said intake opening into the casing means.

2. A cuttings-conveyor mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means comprising a rotary elevator arranged on a substantially vertical axis and said conveying means having a cuttings-moving portion so constructed and arranged as to be adapted to move horizontally in close adjacency to the return run of the cutter chain at the trailing side of the cutter bar, and casing means at least partially enclosing said conveying means for confining the cuttings on said rotary elevator during elevation of the cuttings, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening through which said cuttings-moving portion is arranged to extend into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening into the casing means.
tings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means comprising a rotary gatherer arranged on a substantially vertical axis and having a cuttings-gathering portion so constructed and arranged horizontally in close adjacency to the return run of the cutter chain at the trailing side of the cutter bar, said conveying means also including a cooperating elevating conveyer coaxial with said rotary gatherer, and casing means at least partially enclosing said conveying means for confining the cuttings on said elevating conveyer during elevation of the cuttings, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening, said cuttings-gathering portion arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening into the casing means. 10

6. A cuttings-conveyer mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means comprising a rotary gatherer arranged on a substantially vertical axis and having a cuttings-gathering portion so constructed and arranged as to be adapted to move horizontally in close adjacency to the return run of the cutter chain at the trailing side of the cutter bar, said conveying means also including a cooperating elevating conveyer coaxial with and rotatable relative to said rotary gatherer, and casing means surrounding the conveying means, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening and a top discharge opening, said cuttings-gathering portion arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening into the casing means, said elevating conveyer receiving the cuttings from said rotary gatherer and moving the cuttings upwardly through the casing means towards said top discharging opening.

7. A cuttings-conveyer mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to convey the cuttings away from the cutter chain to a suitable point of disposal, said conveying means comprising a rotary gatherer arranged on a substantially vertical axis and having a cuttings-receiving and gathering portion so constructed and arranged as to be adapted to move in horizontal planes in close adjacency to the return run of the cutter chain, and casing means at least partially enclosing said conveying means for confining the cuttings on said conveying means during operation thereof, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening, said cuttings-receiving and gathering portion arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening onto said elevators.

8. A cuttings-conveyer mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means comprising a rotary gatherer arranged on a substantially vertical axis and having a scooplike cuttings-receiving and gathering portion so constructed and arranged as to be adapted to move horizontally in close adjacency to the return run of the cutter chain at the trailing side of the cutter bar, said conveying means also including a cooperating cuttings-elevator for receiving the cuttings discharged from said rotary gatherer and moving the cuttings vertically upwards, and casing means at least partially enclosing said conveying means for confining the cuttings on said elevators during elevation of the cuttings, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening, said cuttings-receiving and gathering portion arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening onto said elevators.

9. A cuttings-conveyer mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means comprising a rotary gatherer arranged on a substantially vertical axis and having a scooplike cuttings-receiving and gathering portion so constructed and arranged as to be adapted to move horizontally in close adjacency to the return run of the cutter chain, and casing means at least partially enclosing said conveying means for confining the cuttings on said conveying means during operation thereof, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening, said cuttings-receiving and gathering portion arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening into the casing means, said conveyer receiving the cuttings from said gathering means and moving the cuttings upwardly through said casing means towards said top discharge opening, and conveying means for receiving the cuttings from the latter and for elevating the cuttings to said point of discharge, casing means at least partially enclosing said conveying and gathering means at the points where gathering and elevation take place, said casing means adapted for attachment to a coal cutting machine and having a bottom intake opening and a top discharge opening, said cuttings-gathering portion arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening into the casing means, said conveyer receiving the cuttings from said gathering means and moving the cuttings upwardly through said casing means towards said top discharge opening, and conveying means for receiving the cuttings discharged from said top discharge opening and adapted to move the cuttings radially laterally to the coal cutting machine to discharge at the side of the latter remote from the coal face which is being cut.

10. In a cuttings-conveyer mechanism adapted for association with a coal cutting machine of
the kind having an endless circulating cutter chain, a rotary gatherer and elevator device arranged to revolve on a substantially vertical axis and comprising relatively rotatable, coaxially arranged, gathering and elevating conveyers, said gathering conveyer having a cuttings-gathering portion so constructed and arranged as to be adapted to move in horizontal planes in closed adjacency to the return run of the cutter chain, and said gathering conveyer acting to move the cuttings horizontally away from the cutter chain onto said elevating conveyer and said elevating conveyer receiving the cuttings from said gathering conveyer and acting vertically to elevate the cuttings above the level of the cutter chain.

11. A cuttings-conveyor mechanism adapted for association with a coal cutting machine of the kind having a cutter bar carrying an endless circulating cutter chain, comprising, in combination, conveying means adapted to move the cuttings from the neighborhood of the cutter chain and to elevate the cuttings above the level of the cutter chain to a suitable point of disposal, said conveying means having a cuttings-moving portion and a cuttings-elevating portion, said portions being disposed in a common transverse zone in close adjacency to the machine, said cuttings-moving portion being so constructed and arranged as to be adapted to move horizontally in close adjacency to the return run of the cutter chain at the trailing side of the cutter bar, and casing means adapted for attachment to the machine and at least partially enclosing said conveying means for confining the cuttings on said cuttings-elevating portion during elevation of the cuttings within the casing means, said casing means having a bottom intake opening and a top discharge opening, said cuttings-moving portion being arranged to extend through said intake opening into adjacency to the cutter chain and to operate to move the cuttings horizontally away from the cutter chain through said intake opening into the casing means, said elevating portion receiving the cuttings from said cuttings-moving portion and moving the cuttings upwardly within said casing means toward said discharge opening.

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