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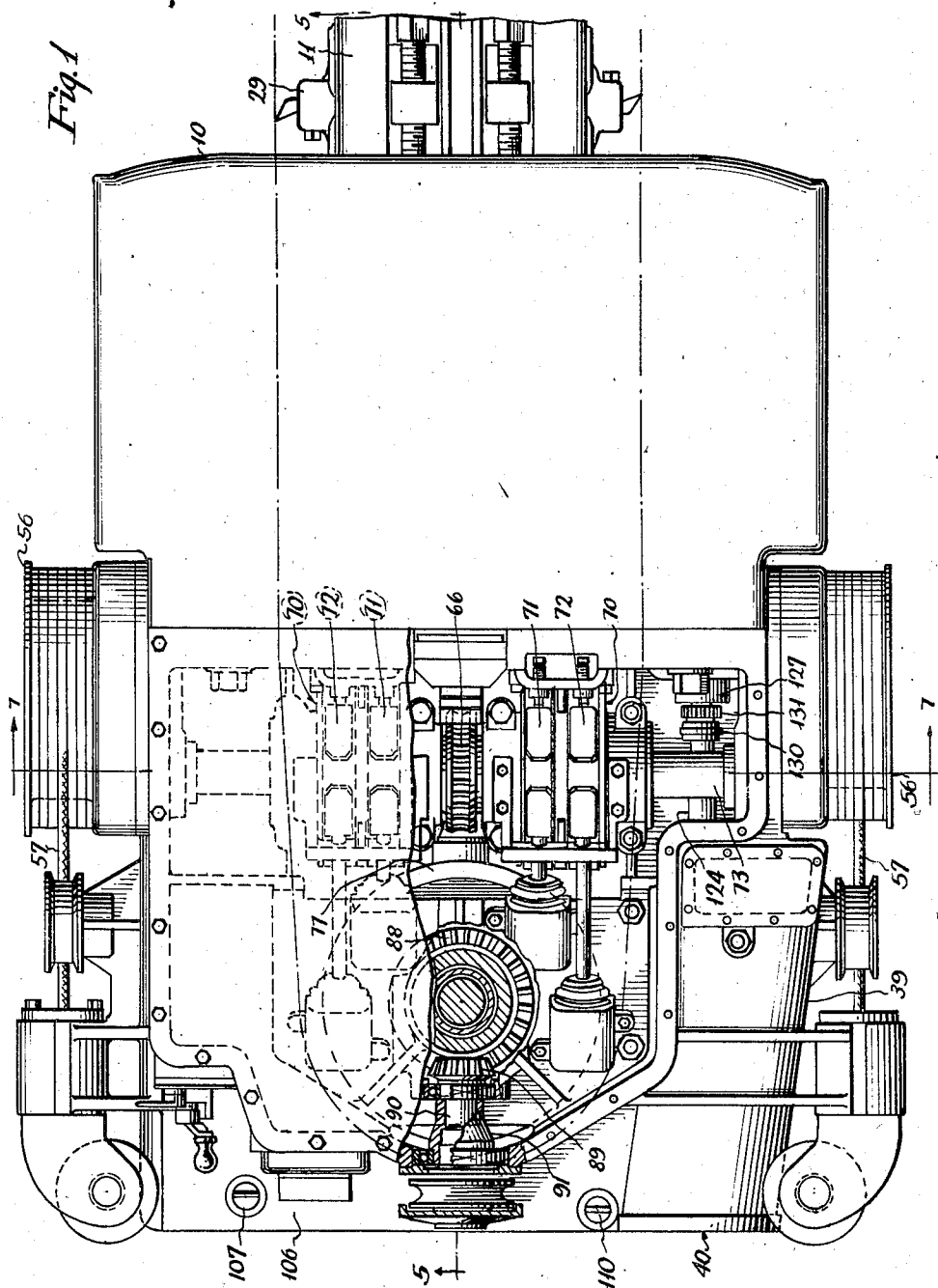
F. A. LINDGREN

2,429,323

KERF-CUTTING MACHINE

Filed June 30, 1945

6 Sheets-Sheet 1



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KERF-CUTTING MACHINE

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6 Sheets-Sheet 2

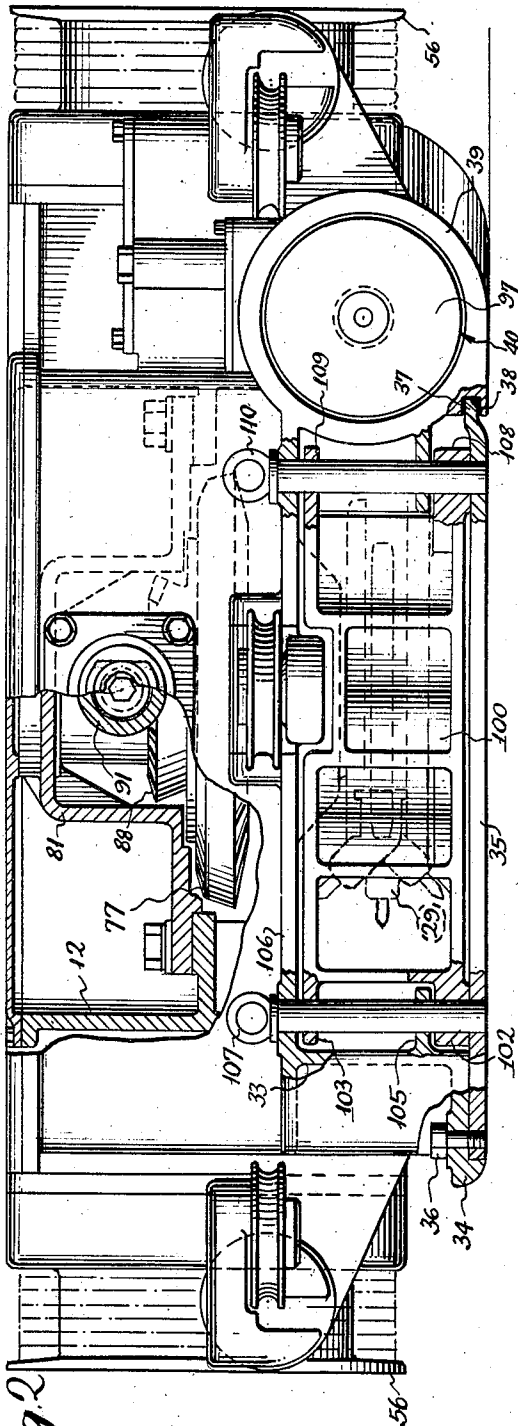


Fig. 2

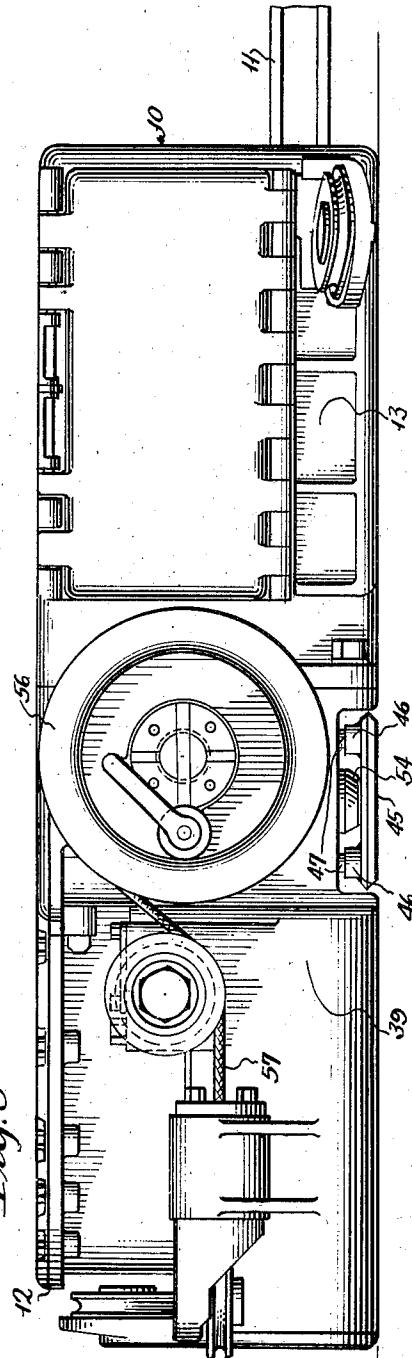


Fig. 3

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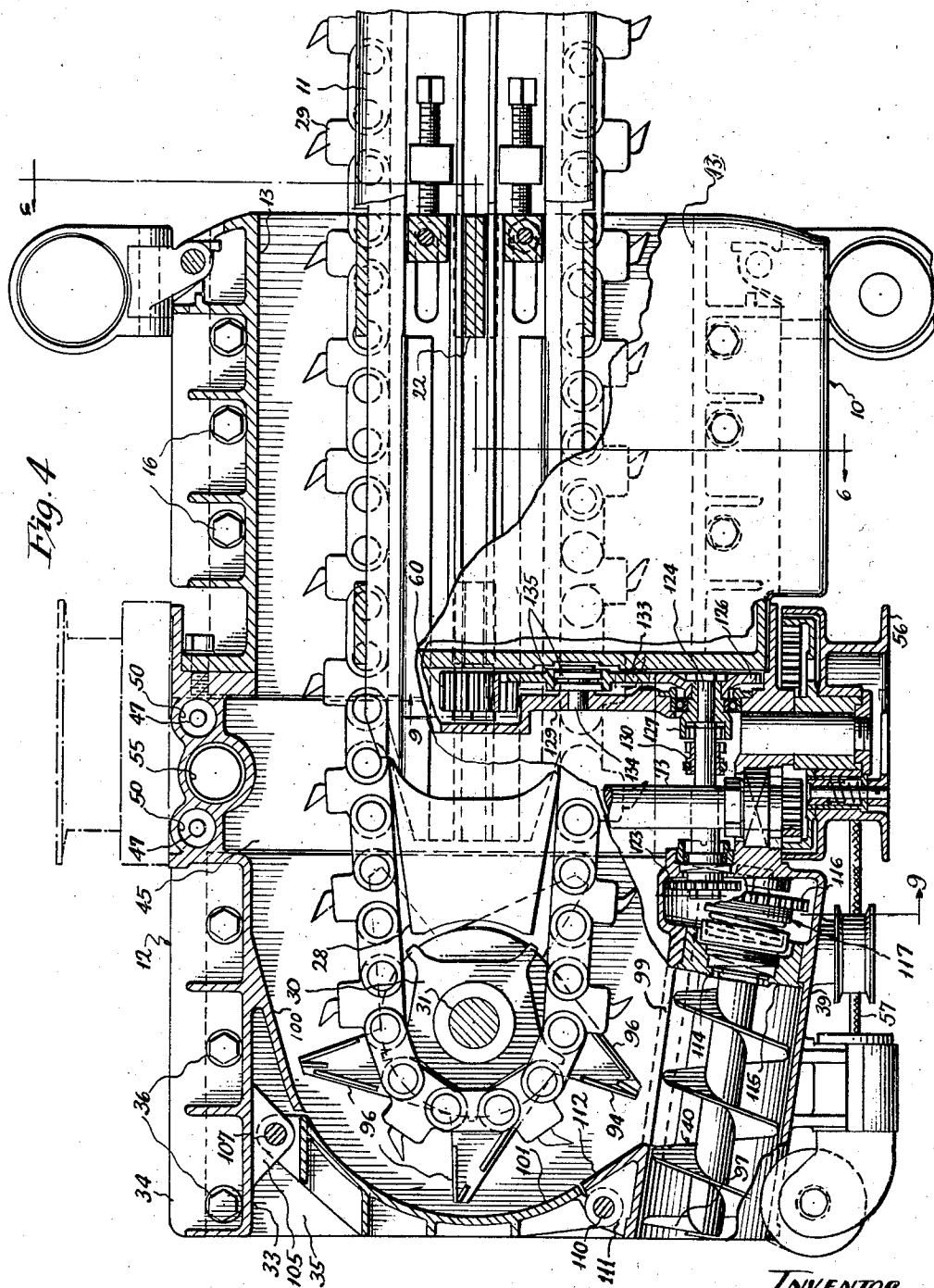
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6 Sheets-Sheet 3



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6 Sheets-Sheet 4

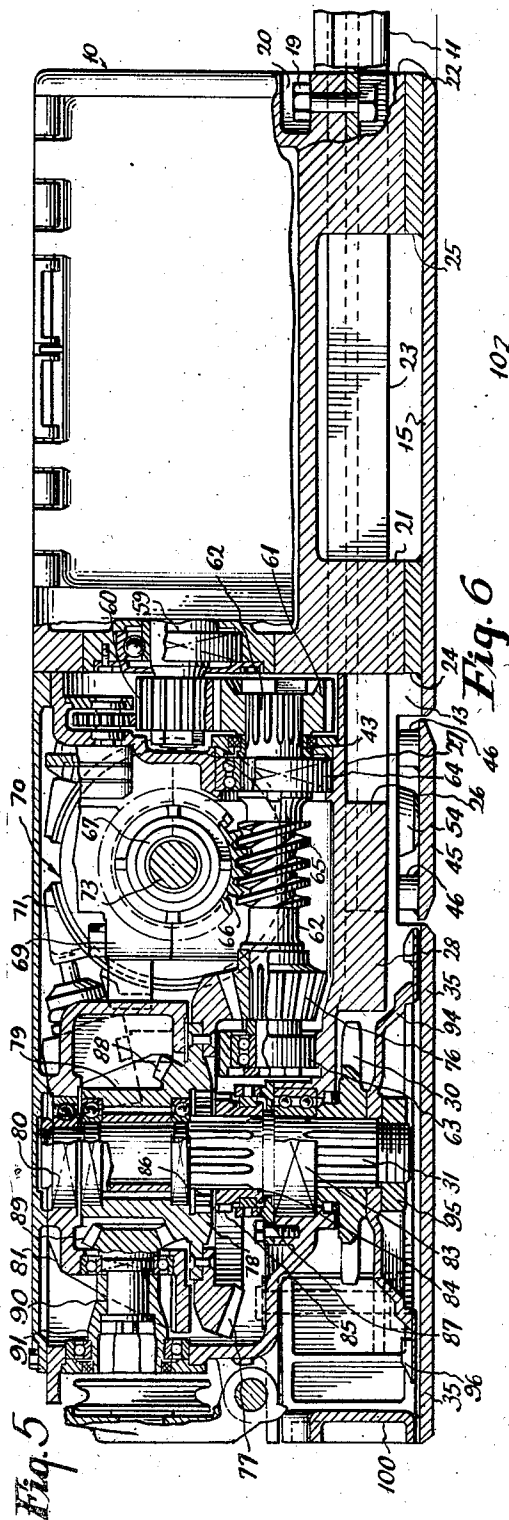
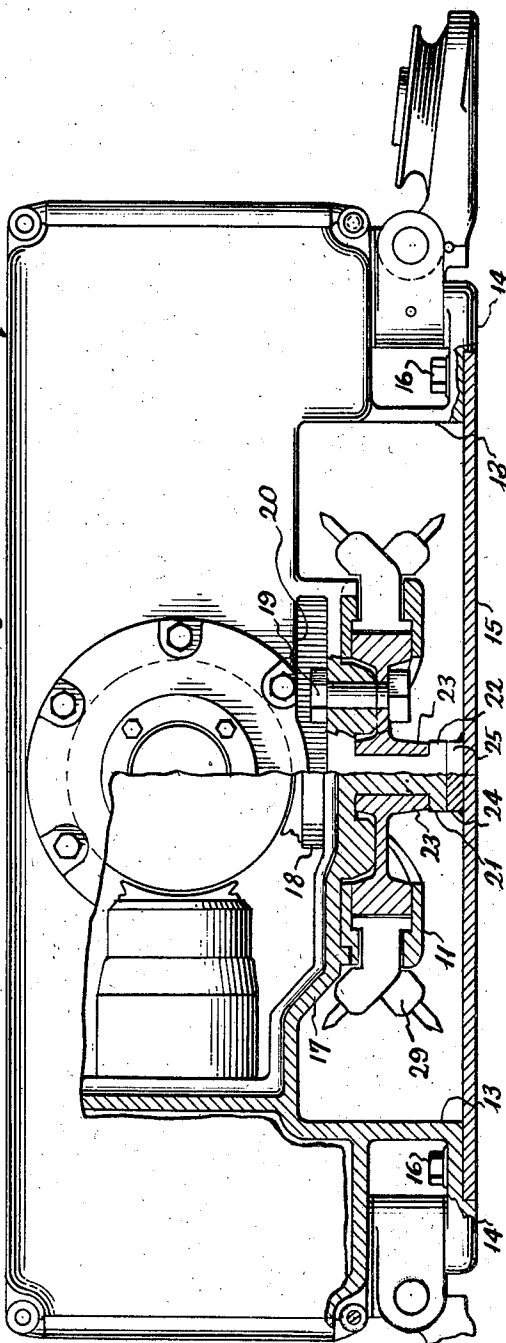


Fig. 6



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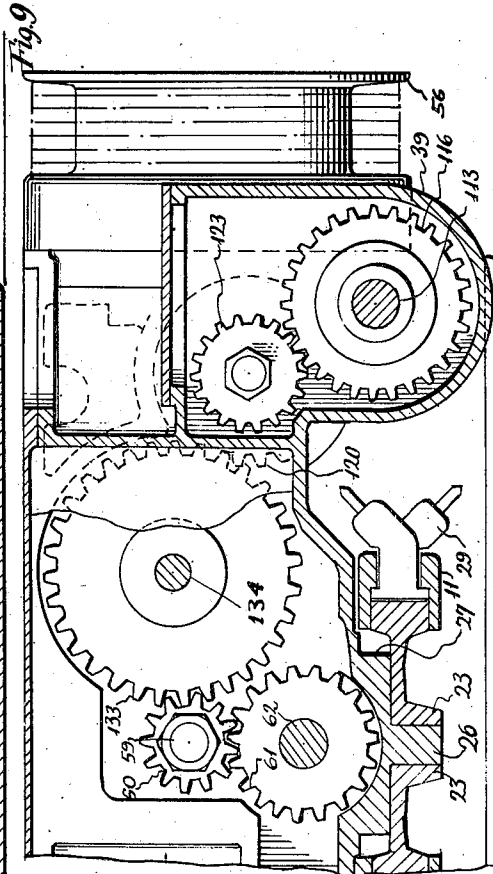
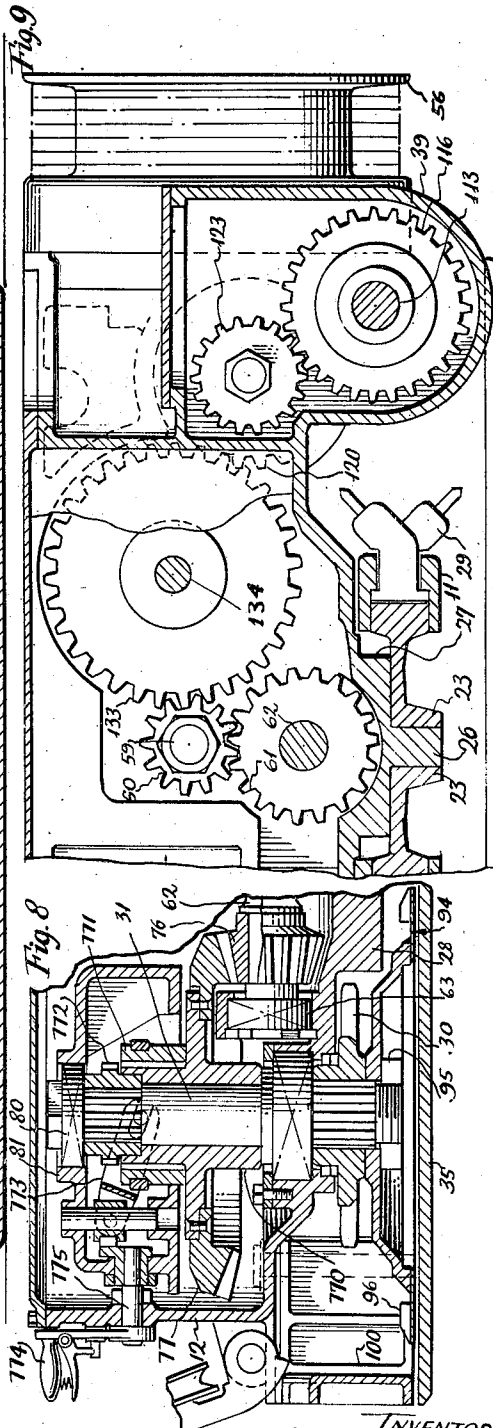
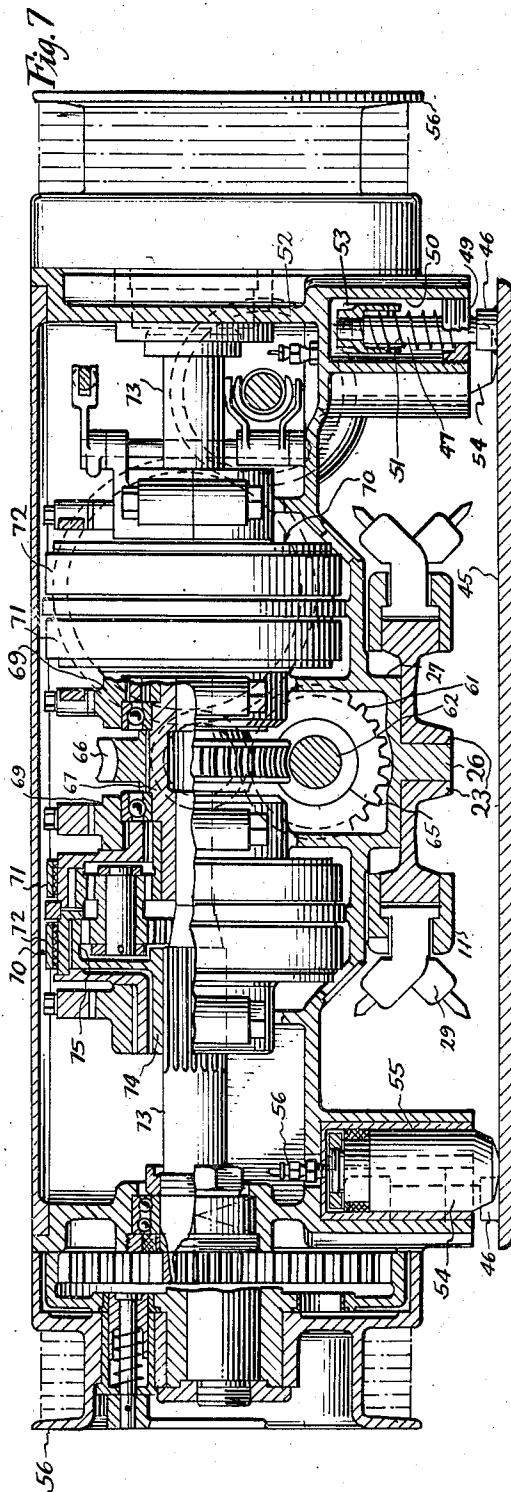
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KERF-CUTTING MACHINE

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6 Sheets-Sheet 5



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KERF-CUTTING MACHINE

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6 Sheets-Sheet 6

Fig. 10

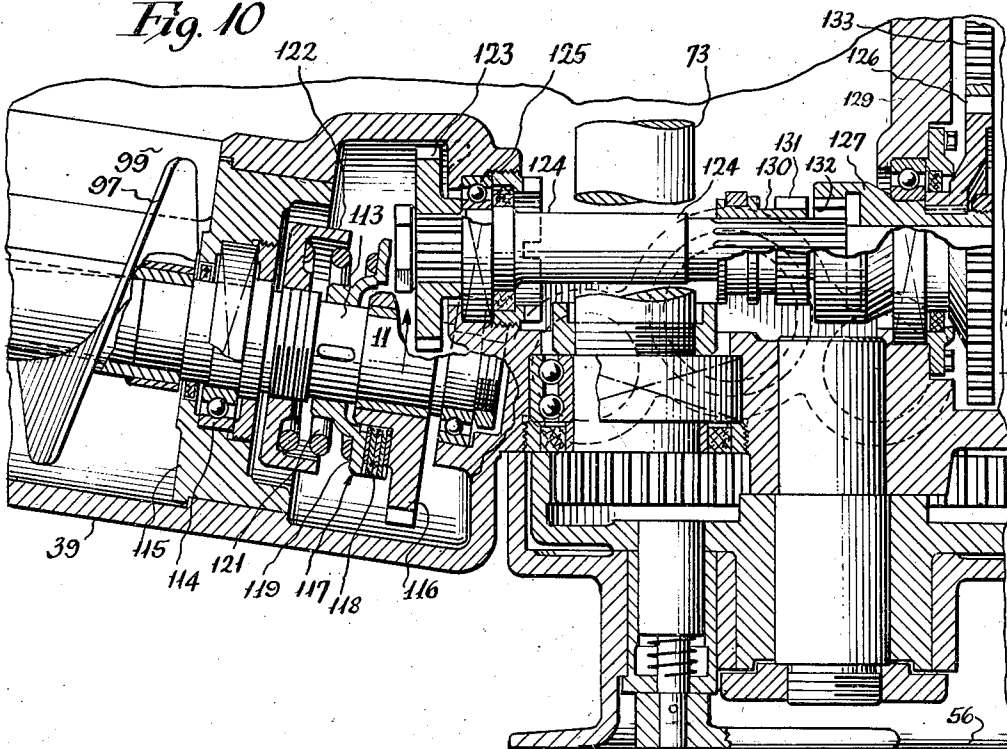
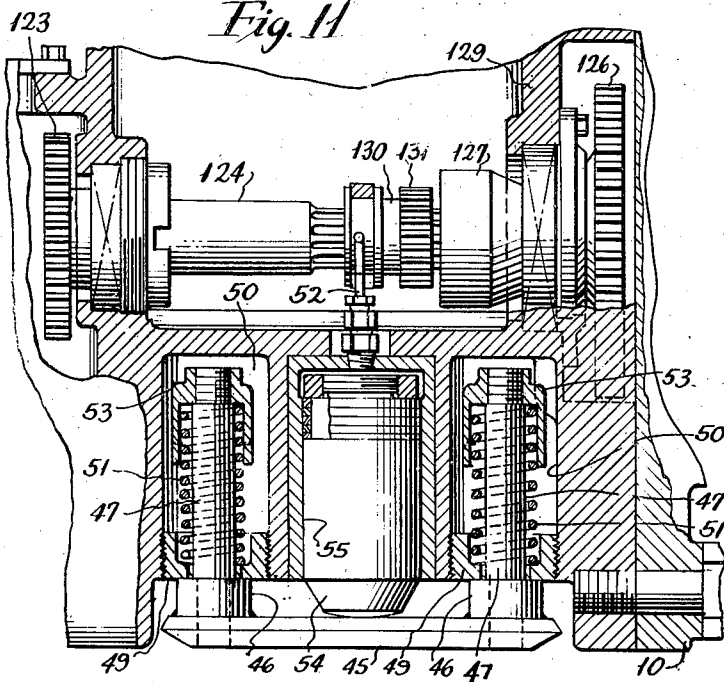


Fig. 11



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UNITED STATES PATENT OFFICE

2,429,323

KERF-CUTTING MACHINE

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Application June 30, 1945, Serial No. 602,565

13 Claims. (Cl. 262—30)

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This invention relates to improvements in kerf-cutting machines of the room and pillar type particularly adapted for use in thin seams of coal.

The principal objects of my invention are to provide a new and improved kerf-cutting machine of a low overall height, which is adapted to discharge the cuttings from the rear of the machine and is compactly arranged in both longitudinal and vertical dimensions.

A more specific object of my invention is to provide a low vein kerf-cutting machine having a novel and efficient gearing arrangement reducing the height of the machine over former kerf-cutting machines of this type, without sacrificing the efficiency of the machine or strength and accessibility of the drive gearing therefor.

A further object of my invention is to provide a new and improved kerf-cutting machine of a low overall height having a novel form and arrangement of cuttings discharge conveyer incorporated as a part of the machine.

This application is a continuation in part of an application Serial No. 525,927, filed by me on March 10, 1944.

These and other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a top plan view of a kerf-cutting machine constructed in accordance with my invention, with certain parts of the gear cover broken away and certain other parts shown in horizontal section;

Figure 2 is an enlarged rear end view of the machine shown in Figure 1, with certain parts broken away and certain other parts shown in substantially transverse section;

Figure 3 is a view in side elevation of the machine shown in Figure 1, drawn to a slightly larger scale than Figure 1;

Figure 4 is a fragmentary plan view of the machine with certain of the gearing removed and with certain other parts broken away and shown in horizontal section in order to more clearly show the mounting of the cutter bar on the machine and the details of the cuttings removing device;

Figure 5 is an enlarged fragmentary longitudinal sectional view taken substantially along line 5—5 of Figure 1;

Figure 6 is a transverse sectional view taken substantially along line 6—6 of Figure 4;

Figure 7 is a transverse sectional view taken substantially along line 7—7 of Figure 1;

Figure 8 is a partial fragmentary central longitudinal sectional view showing a modified form

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of clutch arrangement for selectively driving the cutter chain sprocket;

Figure 9 is a fragmentary transverse sectional view taken substantially along line 9—9 of Figure 4;

Figure 10 is an enlarged fragmentary horizontal sectional view taken through the gearing for driving the cuttings removing conveyer; and Figure 11 is a fragmentary sectional view taken substantially along line 11—11 of Figure 10.

In the drawings the embodiment of my invention illustrated includes generally a motor 10 having a cutter bar 11 mounted therebeneath and projecting forwardly therefrom and having a main frame 12, forming a housing for the feed and cutter chain drive gearing of the machine, secured to the rear end of said motor and projecting rearwardly therefrom. Said motor and main frame are spaced above the ground so as to permit the discharge of the cuttings beneath said motor and main frame beyond the rear end of the machine, as will hereinafter more clearly appear as this specification proceeds.

The motor 10 is spaced above the ground on two parallel laterally spaced side walls 13, 13, herein shown as depending from the main body of said motor and terminating into outwardly extending horizontal supporting shoes 14, 14. The bottoms of said supporting shoes are recessed to receive a bottom plate 15, which forms a slidable support for said motor on the ground and which is secured to said shoes by means of cap screws 16, 16 extending through said shoes from the upper sides thereof, and threaded in said bottom plate (see Figures 4 and 6).

The casing for the motor 10 is provided with a central portion 17 depending from the main body thereof, the inside of which portion forms a recess to receive a lower salient pole 18 of said motor (see Figure 6). The lower portion of the outside of said depending portion 17 has two longitudinally spaced inverted T-shaped guide members 21, 22, depending from its central portion and extending longitudinally thereof, which are adapted to extend within the slotted central portion of said cutter bar and form a slidable guide therefor. The crosses of the T's of said guide members abut the undersides of the flanges of supporting rails 23, 23 of said cutter bar. The bottoms of the crosses of the T's of said guides are abutted by longitudinally spaced plates 24, 25, herein shown as being welded to the top surface of the bottom plate 15. Nuts and bolts 19, 19 mounted in laterally spaced inwardly recessed portions 20, 20 of the forward end of said motor

casing and extending through the bottoms of said recessed portions and through said cutter bar, are provided to hold said cutter bar in position on said guides. The slotted central portion of said cutter bar also extends along opposite sides of a depending guide 26, depending from a central depending portion 27 of the main frame 12. A guide plate 28 extends rearwardly of said guide 26 along the insides of opposite runs of a cutter chain 29, which is guided for movement about said cutter bar in a well known manner. Said guide plate extends rearwardly from the rear end of said cutter bar to and adjacent a cutter chain drive sprocket 30, splined on the lower end of a vertical drive shaft 31, and forms bearing surfaces for the insides of the cutter chain, for guiding said cutter chain during its travel from said cutter bar onto said sprocket and back onto said cutter bar.

It should here be noted with reference to Figure 6 that the extreme up cutter chain blocks extend angularly upwardly along the inclined sides of the depending portion 17 so as to recess said motor casing well within the orbit of the top bits of said cutter chain, to permit the use of a motor of the requisite power for efficiently driving the operating parts of the machine and to maintain the height of the machine, to the low overall vertical dimensions requisite for operation in thin seams of coal, as has been disclosed in Patent No. 2,075,870, which issued to William W. Sloane April 6, 1937.

The main frame 12 is provided with a depending side wall 33 extending along one side thereof and spaced outwardly from the path of the cutter chain 29, but herein shown as being spaced inwardly from the lateral boundaries of said main frame (see Figure 2). Said side wall has an outwardly extending horizontal portion 34, the bottom of which is recessed to receive a bottom plate 35, which is secured thereto by cap screws 36, 36. The opposite side of said bottom plate is slightly upturned, to space the edge of said bottom plate opposite from the horizontal portion 34 above the ground, as is indicated by reference character 37. Said upturned edge is adapted to be slidably received by a channelled guide 38 open towards the inner side of the machine and formed in the lower end of a housing portion 39 of the main frame 12 for a cuttings discharge conveyer 40, for discharging the cuttings from the machine by power.

The depending central portion 27 of the main frame 12 is somewhat similar to the depending portion 17 of the casing for the motor 10 and is provided with laterally spaced inclined sides so arranged that the bits of the cutter chain 29 may extend upwardly along the side walls of said central portion and permit the feed and cutter chain drive gearing to extend within the recess formed in the inside of said depending portion and within the orbit of the top bits of the cutter chain, and thus conserve in vertical space and keep down the vertical dimensions of the machine to the low overall height requisite for operation in thin seams of coal.

A tilting shoe 45 extends across the bottom of the machine in the space between the rear end of the bottom plate 15 and the forward end of the bottom plate 35, and forms a means for elevating the rear end of the machine about the forward end of the bottom plate 15, or for tilting the machine about one side or the other. Said tilting shoe has a pair of longitudinally spaced bosses 46, 46 at each end thereof adapted to receive the lower ends of guide rods 47, 47 secured

to and projecting upwardly therefrom (see Figures 7 and 11).

The guide rods 47, 47 extend upwardly through retaining members 49, 49 threaded in the lower ends of cylindrical housings 50, 50, herein shown as being formed integrally with the side walls of the main frame 12. The openings in said retaining members, through which said guide rods extend, are of a larger diameter than said guide rods, so as to permit relatively free motion between said rods and said guide members and permit the machine to be tilted about its forward end or about one side or the other of said tilting shoe. Said retaining members 49 form seats for the lower ends of compression springs 51, 51, the upper ends of which springs are seated within retaining members 53, 53 threaded on the upper ends of said guide rods. Said compression springs urge said tilting shoe in engagement with the lower ends of pistons 54, 54 slidably mounted in cylinders 55, 55 herein shown as being formed integrally with the depending side walls of said main frame between said cylinders 50, 50. Fluid under pressure is admitted to each cylinder 55 to depress the piston 54 through a fitting 52, herein shown as being threaded in the upper end of said cylinder. Suitable valves and piping are provided to independently admit fluid under pressure to either one of said cylinders 55, 55 to extend the respective piston 54 and tilt the machine about either side thereof, or to both of said cylinders at the same time, to elevate the rear end of the machine about the front end of the bottom plate 15. Said valves and the fluid connections to said fittings are not herein shown or described since they form no part of my present invention.

The feeding mechanism includes generally two independently operable power driven winding drums 56, 56, one of which is mounted at each side of the main frame 12. Said winding drums have flexible cables 57, 57 wound thereon, which may be trained laterally from either the forward or rear end of the machine to fixed abutments remote from the machine in the usual manner, for feeding the cutter bar of the machine into the coal face and for controlling movement of the machine along the mine bottom, as is well known to those skilled in the art. The motor 10 has a longitudinally extending armature shaft 59 having an armature pinion 60 keyed on its rear end, which meshes with and drives a spur gear 61 (see Figure 5). Said spur gear is herein shown as being splined on the rear end of a longitudinally extending intermediate shaft 62 disposed beneath and extending parallel to said armature shaft. Said intermediate shaft is journaled adjacent its forward end in an anti-friction bearing 63 supported in the lower recessed part 27 of said main frame, and is journaled just rearwardly of said spur gear 61 in an anti-friction bearing 64 supported in said lower recessed part of said main frame so that said bearings and spur gear extend downwardly within the orbital path of the upper bits of said cutter chain, as is clearly shown in Figures 5 and 7. A worm 65 is herein shown as being cut integral with said intermediate shaft and meshes with and drives a worm gear 66 keyed on a transverse sleeve 67. Said sleeve is journaled in suitable anti-friction bearings mounted in bearing supports 69, 69, projecting upwardly from the bottom of the recessed portion of said housing, and forms a means for driving a pair of coaxial planetary gear reduction devices indicated gen-

erally by reference characters 70, 70 and arranged at opposite sides of said worm gear.

Each planetary gear reduction device 70 has driving connection with a winding drum 56, for independently driving said winding drums at high and low frictionally controlled speeds. Said planetary gear reduction devices may be of any well known form providing high and low frictionally controlled speeds, and are herein shown as being of a form similar to that shown and described in my prior Patent No. 2,006,399, which issued July 21, 1935, so need not herein be shown or described in detail, excepting to point out that each of said planetaries is controlled by two friction bands 71, 72, and that said planetaries are arranged to independently drive said winding drums through separate shafts 73, 73, which have their adjacent ends coaxially but independently mounted within the hubs 74, 74 of internal gears 75, 75 of said planetaries, as appears in Figure 7.

The drive to the cutter chain 29 includes a bevel pinion 76 keyed on the intermediate shaft 62 just forwardly of an anti-friction bearing 63 and meshing with and driving a bevel gear 77 mounted on the vertical shaft 31 for free rotation with respect thereto. Said bevel pinion extends within the recessed portion 27 of the main frame 12 and the teeth of said bevel gear face the ground. Said bevel gear is herein shown as being a bevel ring gear mounted on a spider 78 on the lower end of a hub or sleeve 79, suitably journaled adjacent its upper and lower ends on the vertical shaft 31 on spaced anti-friction bearings. The vertical shaft 31 is journaled adjacent its upper end in an anti-friction bearing 80 mounted in a bearing supporting bridge 81 extending across the upper end of said main frame. Said shaft is also journaled just above the cutter chain drive sprocket 30 in an anti-friction bearing 83 mounted in the lower depending portion 27 of said main frame.

The selective drive connection from the bevel gear 77 to the shaft 31 and cutter chain drive sprocket 30 includes a clutch member 84 splined on said shaft just beneath the spider 78 and having teeth 85, 85 formed integrally with an upper outer portion thereof. Said teeth are adapted to be selectively meshed with teeth 86, 86 cut internally of the spider 78. A clutch fork 87 is provided to move said externally splined clutch member 84 vertically along the shaft 31 to selectively connect said bevel gear with said shaft for driving said shaft from the motor 10. Said clutch fork may be operated in a suitable manner by any well known form of links and levers, which are not herein shown or described since they form no part of my present invention.

It should here be noted that as a novel feature of my invention the intermediate shaft 62 is disposed beneath the worm gear 66 in the recessed portion 27 of the main frame 12, and the bevel pinion 76 on the end of said intermediate shaft meshes with the downwardly facing teeth of the bevel gear 77 and extends well beneath the path of the upper bits of the cutter chain 29, thus permitting the planetaries 70, 70 to be within the vertical limits of the motor 10 without reducing the size of said planetaries over the planetaries heretofore used in kerf-cutting machines of the class described, as a standard part thereof. It should also be noted that the clutch member 84 is disposed beneath said bevel gear so as not to take up any more vertical space other than the distance from the center line of said bevel pinion to the spider of said bevel gear so as to reduce the height of the machine over former machines

of the same type, where the intermediate shaft and worm are disposed above the worm gear, without sacrificing strength of the drive gearing therefor.

A drive means is provided to supply a source of power on the kerf-cutting machine for driving a truck (not shown) on which the kerf-cutting machine may be mounted for transportation about the mine. Said drive means, as herein shown, includes a bevel gear 88 facing upwardly from and formed integrally with the spider 78, and meshing with a bevel pinion 89 on the forward end of a longitudinal stub shaft 90. Said longitudinal shaft is mounted within a sleeve 91 having an enlarged outer end, which forms a drive socket adapted to detachably receive a coupling connected with the truck drive gearing, in a manner well known to those skilled in the art, so not herein shown or described. Said sleeve is journaled adjacent its forward end in a depending rear end wall of the bridge 81 and is journaled adjacent its rear end in the rear end wall of said main frame, on suitable anti-friction bearings.

In the form of drive to the cutter chain shown in Figure 8, the power socket for driving the truck is absent and the clutch for selectively connecting the bevel gear 77 with the vertical shaft 31, for driving said shaft and the cutter chain 29, is disposed above said bevel gear so as to be readily accessible for repair. In this form of my invention the bevel ring gear 77 is mounted on the flange of a flanged sleeve 770, which is mounted on the shaft 31 for free rotation with respect thereto. The portion of said sleeve extending above said bevel gear is externally splined and has a clutch member 771 splined thereon. The splines of said clutch member are adapted to selectively mesh with the teeth of a gear 772 splined on the upper end of the vertical shaft 31. A clutch fork 773 is provided to move said clutch member vertically along said shaft, to selectively connect said bevel gear with said shaft, for driving said shaft from the motor 10. Said clutch fork is adapted to be operated by an operating lever 774 on a rock shaft 775, through a suitable system of links and levers, not herein shown or described in detail since it is no part of my present invention.

The means for discharging the cuttings from the rear end of the machine includes a rotary sweep or agitator 94 mounted on the lower end of the vertical shaft 31 just beneath the cutter chain drive sprocket 30 and secured thereto by means of a nut 95 threaded on the lower end of said shaft and suitably locked in position thereon (see Figure 5). Said sweep is somewhat similar to that shown and described in Patent No. 2,352,795, which issued to William T. McCullough, July 4, 1944, so will not herein be described excepting to state that it is provided with a plurality of impeller arms 96, 96 disposed at substantially retreating angles relative to the normal direction of rotation of said sweep so as to provide a positive propelling action for feeding the cuttings to a screw conveyer 97 of the slack removing device 40. Said slack removing device is herein shown as extending along the retreating side of the machine at a slight angle with respect thereto so that its rear end is inclined towards the longitudinal center of the machine, so as to position said slack removing device to efficiently collect the cuttings discharged by the impeller arms 96, 96 and the cutter chain 29.

It will here be understood that the kerf-cut-

ting machine illustrated herein is designed to cut from right to left, as is usually the case, so that the right side of the machine as seen in Figures 1 and 7 may be considered as its retreating side, and that the cutter chain sprocket is normally rotatable in a counterclockwise direction when cutting in this direction.

The screw conveyer 97 is mounted in the housing 39, formed integrally with the main frame 12 and depending from the main body thereof. Said housing has an inner open portion 99 positioned in the trajectory of the cuttings discharged by the impeller arms 96, 96 and the cutter chain 29, so that a maximum amount of cuttings will pass through the inner open portion of said housing into said screw conveyer (see Figure 4).

A cuttings deflecting means is provided to aid the impeller arms 96, 96 and cutter chain 29 to positively feed the cuttings into the screw conveyer 97. Said cuttings deflecting means, as shown in Figure 4, includes a vertical deflecting wall 100, herein shown as being formed integrally with the side wall 33 and extending rearwardly and angularly inwardly from the forward inner portion of said wall, so that its rear portion conforms substantially to the path of the impeller arms 96, 96. An arcuate closure member 101 for the rear end of the cuttings passageway beneath the motor 10 and main frame 12, forms a rearward continuation of said deflecting wall 100 and conforms substantially to the path of said impeller arms, to guide the cuttings to the open portion 99 of the housing 39.

The arcuate closure member 101 is detachably connected to the main frame 12 by means of a pin 107 extending through a ledge 106 at the rear end of said main frame and spaced above the bottom plate 35, and through a pair of vertically spaced ears 102, 103 projecting laterally from the end of said closure member adjacent the advance side of the machine. The ear 102 rests on the upper side of the bottom plate 35 and is disposed just beneath an ear 105 extending inwardly from the side wall 33. The upper of said ears extends just beneath the horizontally extending ledge 106. The opposite end of said closure member is provided with a pair of similar ears 108, 109 projecting laterally therefrom, which are adapted to be detachably secured to the opposite side of said main frame by means of a pin 110 extending through said ears and through the ledge 106 and an ear 111 extending inwardly from said housing 39. Thus, when either pin 107 or 110 is removed, said deflecting member may pivot about the opposite pin to provide access to the cutter chain 29, sweep 94, and screw conveyer 97.

The housing 39 has an inwardly and angularly rearwardly extending deflecting portion 112 forming a continuation of the closure member 101 and leading to the opening 99 of said housing. Said deflecting portion, with the deflecting wall 100 and arcuate closure member 101, thus forms a smooth arcuate deflector extending from the advance to the retreating side of the machine, and substantially conforming to the path of the cutter chain and the impeller arms 96, 96, so as to cause said cutter chain and impeller arms to positively convey the cuttings into the screw conveyer 97.

The screw conveyer 97 is mounted on a shaft 113 which projects inwardly or forwardly therefrom and is journaled in an anti-friction bearing 114 which is mounted in a bearing support member 115 (see Figures 4 and 10). Said bearing

support member is mounted in the housing 39, at the inner or forward end of the open portion 99 thereof, and forms a closure means for the inner end of said housing, to prevent dirt from getting into the drive gearing for said screw conveyer. A spur gear 116, freely mounted on said shaft 113, is provided to drive said shaft and screw conveyer through a friction disk slip clutch 117 (see Figure 10). Said friction clutch may be of any well known construction and, as herein shown, includes a plurality of interengaging friction disks 118, 118 interposed between a rear face of said gear and a clutch member 119 feathered on said shaft. Alternate of said disks are splined on the hub of said gear and the other of said disks are splined on the inside of said engaging member. Said disks are yieldably engaged with each other by a compression spring 121, interposed between said engaging member and a spring seat 122, herein shown as being threaded on said shaft. Said spring may be so loaded that said clutch will slip upon overload, as when a cutter chain bit or other foreign matter might foul said screw conveyer.

The teeth of the spur gear 116 are slightly chamfered so as to mesh with and be driven from slightly chamfered teeth of a spur gear 123, splined on the rear end of a longitudinal shaft 124. Said shaft is journaled adjacent the inner end of said spur gear in the rear end portion of the housing 39 on an anti-friction bearing 125. A spur gear 126 is keyed on a sleeve 127 coaxial with said shaft and journaled in a forward end wall 129 of the main frame 12, which is spaced rearwardly from the rear end wall of the casing for the motor 10. A suitable clutch is provided to selectively connect said spur gear with the longitudinal shaft 124 for selectively driving said shaft from said spur gear, which as herein shown, includes a clutch member 130 feathered on said shaft and having an externally splined portion 131 engageable with an internally splined portion 132 of the sleeve 127. A suitable clutch fork and system of links and levers (not shown) may be provided to engage said externally splined portion with or disengage said splined portion from said internally splined portion of said sleeve, to selectively connect said spur gear with said shaft 124. The spur gear 126 meshes with and is driven from an idler gear 133 journaled on a shaft 134 on ball bearings 135, 135 (see Figure 4). Said shaft is mounted on and projects forwardly from the end wall 129 of the main frame 12. Said last mentioned spur gear meshes with and is driven from the armature pinion 60.

It may be seen from the foregoing that a compact device for removing the cuttings from the underframe of the machine and preventing said cuttings from being carried back into the kerf by the cutter chain, has been provided, which is located in the trajectory of the cuttings discharged from the impeller arms 96, 96 and cutter chain 29, and is so arranged as to receive and convey said cuttings beyond the rear end of the machine, and that said cuttings removing means is within the lateral and longitudinal limits of the machine and is arranged to efficiently collect and discharge the cuttings from the machine without increasing the size thereof.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be

construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame mounted on and spaced vertically from said base plate and extending rearwardly of said motor, a cuttings passageway extending beneath said motor and frame, a horizontal cutter bar of substantially uniform width throughout its length extending beneath said motor and projecting beyond the forward end thereof, a cutter chain orbitally movable about said cutter bar and adapted to discharge its cuttings beneath said motor along said cuttings passageway to the rear of said frame, said frame having a longitudinally extending recessed portion depending beneath the upper margins of said cutter bar, feed operating mechanism mounted on said frame and including two feed drums adapted to have flexible feeding members wound thereon, gear reduction mechanism for driving said feed drums including a planetary gear reduction device and a coaxial worm gear for driving said planetary gear reduction device, and means for driving said worm gear and said cutter chain from said motor including a longitudinal shaft, a geared drive connection from said shaft to said cutter chain, and a worm on said shaft meshing with said worm gear, said shaft being disposed beneath said worm gear and the gearing on said shaft extending downwardly within said central depending portion of said frame and the orbital path of said cutter chain and beneath the upper margins of said cutter bar.

2. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar of substantially uniform width throughout its length extending beneath said motor and projecting beyond the forward end thereof, a cutter chain orbitally movable about said cutter bar and adapted to discharge its cuttings beneath said motor to the rear of said frame, feed operating mechanism mounted on said frame and including two feed drums adapted to have flexible feeding members wound thereon, gear reduction mechanism for driving said feed drums including a planetary gear reduction device and a coaxial worm gear for driving said planetary gear reduction device, and means for driving said worm gear and said cutter chain from said motor including a motor pinion, a longitudinal shaft, a worm on said shaft meshing with said worm gear, a gear on one end of said shaft meshing with said motor pinion, a bevel pinion on the opposite end of said shaft, a vertical shaft, a cutter chain drive sprocket on the lower end of said vertical shaft, a bevel gear freely mounted on said shaft, clutch means selectively connecting said bevel gear with said shaft, said bevel gear being disposed above said bevel pinion and driven therefrom, and said bevel pinion and gear on said longitudinal shaft extending downwardly within the orbital path of said cutter chain and beneath the upper margins of said cutter bar.

3. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar of substantially uniform width throughout its length extending beneath said motor and projecting beyond the forward end there-

of, a cutter chain orbitally movable about said cutter bar and adapted to discharge its cuttings beneath said motor to the rear of said frame, feed operating mechanism mounted on said frame and including two feed drums adapted to have flexible feeding members wound thereon, gear reduction mechanism for driving said feed drums including a planetary gear reduction device and a coaxial worm gear for driving said planetary gear reduction device, means for driving said cutter chain including a vertical shaft having a cutter chain drive sprocket thereon, a bevel gear freely mounted on said shaft, and a longitudinal shaft disposed beneath said worm gear and having a worm thereon meshing therewith, a drive connection from said motor to said shaft, a bevel pinion on said shaft meshing with said bevel gear, clutch means coaxial with and disposed above said bevel gear, for selectively connecting said bevel gear to said vertical shaft, and said bevel pinion extending beneath the upper margins of said cutter bar.

4. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar of substantially uniform width throughout its length extending beneath said motor and projecting beyond the forward end of the machine, a cutter chain orbitally movable about said cutter bar and adapted to discharge its cuttings to the rear of said frame, feed operating mechanism mounted on said frame and including two feed drums adapted to have flexible feeding members wound thereon, gear reduction mechanism for driving said feed drums including two coaxial planetary gear reduction devices each of which has driving connection with one of said feed drums, a worm gear coaxial with and disposed between said planetary gear reduction devices, for driving said planetary gear reduction devices, and means for driving said worm gear and said cutter chain from said motor including a longitudinal shaft disposed beneath said worm gear and having a worm thereon meshing with said worm gear, a spur gear for driving said shaft, a vertical shaft disposed rearwardly of said planetaries and having a cutter chain drive sprocket on the lower end thereof, a bevel gear selectively connectible with said vertical shaft for driving said shaft, the teeth of said bevel gear facing the ground, and a bevel pinion on said longitudinal shaft meshing with said bevel gear, said spur gear and bevel pinion extending downwardly within the orbital path of said cutter chain.

5. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutting bar extending beneath said motor and projecting beyond the forward end of the machine, a cutter chain orbitally movable about said cutter bar and adapted to discharge its cuttings to the rear of said frame, feed operating mechanism mounted on said frame and including two feed drums adapted to have flexible feeding members wound thereon, gear reduction mechanism for driving said feed drums including two coaxial planetary gear reduction devices each of which has driving connection with one of said feed drums, a worm gear coaxial with and disposed between said planetary gear reduction devices, for driving said planetary gear reduction devices, and means for driving said worm gear and said cutter chain from said motor including a longitudinal shaft disposed beneath

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said worm gear and having a worm thereon meshing with said worm gear, a spur gear for driving said shaft, a vertical shaft disposed rearwardly of said planetaries and having a cutter chain drive sprocket on the lower end thereof, a bevel gear selectively connectible with said vertical shaft for driving said shaft, the teeth of said bevel gear facing the ground, and a bevel pinion on said longitudinal shaft meshing with said bevel gear, said spur gear and bevel pinion extending beneath a plane parallel with and extending across the upper portion of said cutter chain, and clutch means coaxial with and disposed above said bevel gear, for selectively connecting said bevel gear to said vertical shaft.

6. In a kerf-cutting machine, a base plate slidable along a mine bottom, a gear housing spaced vertically of said base plate, a motor mounted forwardly of said housing and also spaced vertically of said base plate, a forwardly projecting cutter bar of substantially uniform width throughout its length extending beneath said motor and said housing, said housing having a longitudinally disposed recessed portion projecting downwardly from said housing into said cutter bar adjacent the rear end thereof, a cutter chain orbitally movable about said cutter bar, flexible feeding mechanism on said gear housing including a rotatable drum, and drive mechanism for said chain at the rear end of said cutter bar, and a longitudinally extending drive shaft journaled in said gear housing and driven from the rear end of said motor and having geared connection with said feeding mechanism and said chain drive mechanism, respectively, said drive shaft extending within and having bearing support in said recessed portion of said housing and the gears on said shaft for driving said cutter chain drive and flexible feeding mechanisms extending downwardly within the orbit of said cutter chain.

7. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar and in said cuttings passageway, for discharging its cuttings through said passageway to the rear end of said frame, deflecting means in the rear end of said passageway substantially conforming to the path of said cutter chain and closing the rear end of said passageway, for deflecting the cuttings to the retreating side of said frame, and a screw conveyor extending longitudinally along the retreating side of said frame within the limits of the machine and in cuttings receiving relation with respect to said deflecting means, for removing the cuttings to the rear end of said frame.

8. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar and in said cuttings passageway, for discharging its cuttings through said passageway to the rear end of said frame, deflecting means in the rear end of said passageway substantially conforming to the path of said

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cutter chain and closing the rear end of said passageway, for deflecting the cuttings to the retreating side of said frame, a screw conveyor including a casing having a screw element mounted therein, extending along the retreating side of said frame within the limits of the machine, a selective geared drive connection from said motor to said screw element, and said casing having an inner open portion opening into said frame in cuttings receiving relation with respect to said deflecting means and a rear open end for the discharge of the cuttings therefrom.

9. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar and in said cuttings passageway for discharging its cuttings through said passageway to the rear end of said frame, a screw conveyor extending along the retreating side of said frame and recessed therein within the lateral limits of the machine and including a casing extending along and closing the retreating side of the machine and opening to discharge the cuttings to the rear end of the machine adjacent the retreating side thereof, said casing having a screw element rotatably mounted therein and the inner portion of said casing opening into said cuttings passageway in cuttings receiving relation with respect thereto.

10. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar and in said cuttings passageway, for discharging its cuttings through said passageway to the rear end of said frame, a screw conveyor extending along the retreating side of said frame and recessed therein within the lateral limits of the machine and including a casing extending along and closing the retreating side of the machine and opening to discharge the cuttings to the rear end of the machine adjacent the retreating side thereof, said casing having a screw element rotatably mounted therein and the inner portion of said casing opening into said cuttings passageway in cuttings receiving relation with respect thereto, a selective drive connection from said motor to said screw element, and deflecting means extending across the rear end of said passageway and substantially conforming to the path of said cutter chain, and leading to said inner open portion of said casing, for deflecting the cuttings into said casing and screw element.

11. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar and in said cuttings passageway, for discharging its cuttings through said passageway to the rear end of said frame, a screw conveyor extending along the retreating

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side of said frame and recessed therein, within the lateral limits of the machine and including a casing extending along and closing the retreating side of the machine and opening to discharge the cuttings to the rear end of the machine adjacent the retreating side thereof, said casing having a screw element rotatably mounted therein and the inner portion of said casing opening into said cuttings passageway in cuttings receiving relation with respect thereto, a selective drive connection from said motor to said screw element, and deflecting means extending across the rear end of said passageway and substantially conforming to the path of said cutter chain, and leading to said inner open portion of said casing, for deflecting the cuttings into said casing and screw element, said deflecting means including a hinged closure member arranged to open to permit accessibility to said screw element.

12. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar, a drive sprocket for said chain adjacent the rear end of said passage, a rotary sweep mounted beneath said drive sprocket for rotation therewith, a screw conveyor extending longitudinally along one side of said frame and including a casing extending along and closing the retreating side of the machine and having a discharge opening at the rear of the machine, said casing having an inner receiving opening and having a screw element rotatably mounted therein, a selective drive connection from said motor to said screw element, and deflecting means extending across the rear end of said passageway and conforming substantially to the path of travel of said sweep element, for guiding the cuttings into said screw conveyor.

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13. In a kerf-cutting machine, a base plate slidable along a mine bottom, a motor mounted on and spaced vertically from said base plate, a frame extending rearwardly of said motor, a horizontal cutter bar extending beneath and projecting beyond the forward end of said motor, a cuttings passageway extending along and beneath said frame and motor, a cutter chain movable about said cutter bar, a drive sprocket for said chain adjacent the rear end of said passage, a rotary sweep mounted beneath said drive sprocket for rotation therewith, a screw conveyor extending longitudinally along one side of said frame and including a casing extending along and closing the retreating side of the machine and having a discharge opening at the rear of the machine, said casing having an inner receiving opening and having a screw element rotatably mounted therein, a selective drive connection from said motor to said screw element, and deflecting means extending across the rear end of said passageway and conforming substantially to the path of travel of said sweep element, for guiding the cuttings into said screw conveyor, said deflecting means including a rear hinged closure member adapted to be opened to provide access to said sweep and screw element.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

35	Number	Name	Date
	1,632,810	Vodoz	June 21, 1927
	1,742,178	Maxson	Dec. 31, 1929
	2,075,870	Sloane	Apr. 6, 1937
	2,268,260	Mavor	Dec. 30, 1941
40	2,283,376	Lindgren	May 19, 1942
	2,320,004	McCullough	May 25, 1943
	2,349,311	Simmons	May 23, 1944
	2,359,422	Jeffrey	Oct. 3, 1944