Oct. 7, 1941. E. J. DOBERSTEIN 2,258,049

KERF-CUTTING MACHINE

Filed Feb. 23, 1940 3 Sheets-Sheet 1

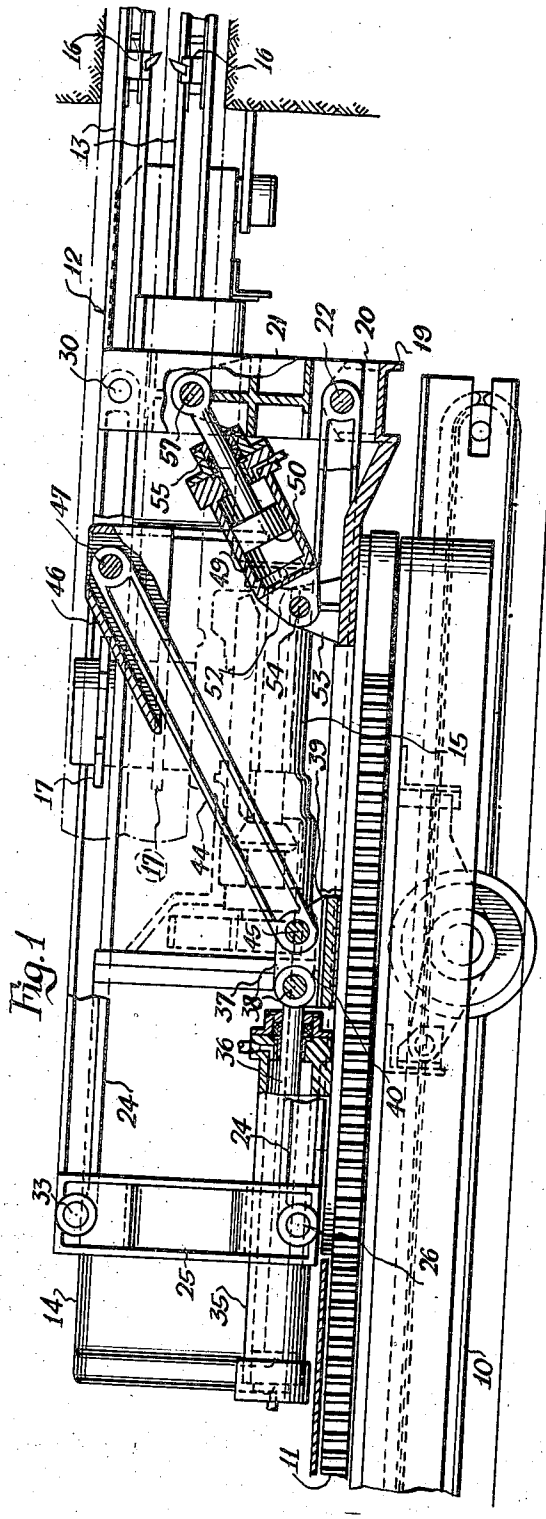


Fig. 1

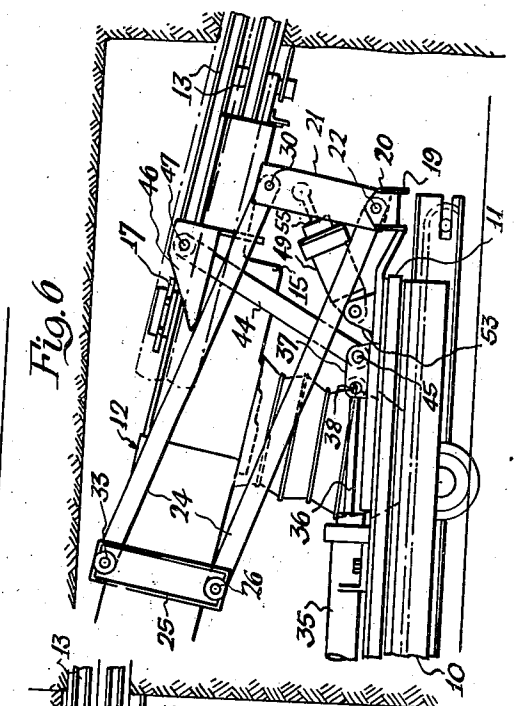


Fig. 6

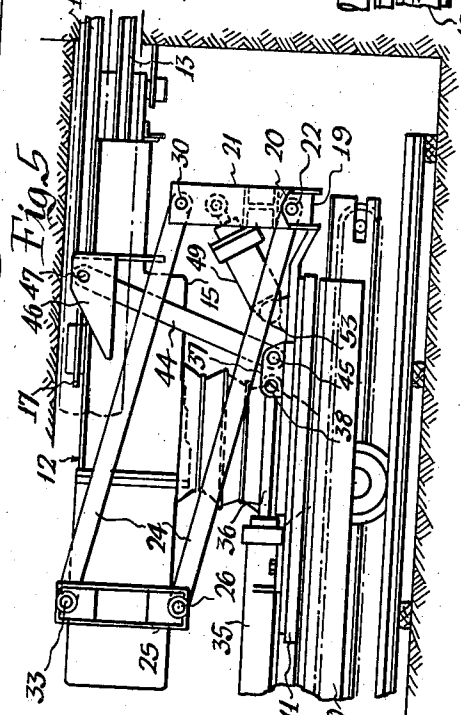


Fig. 5

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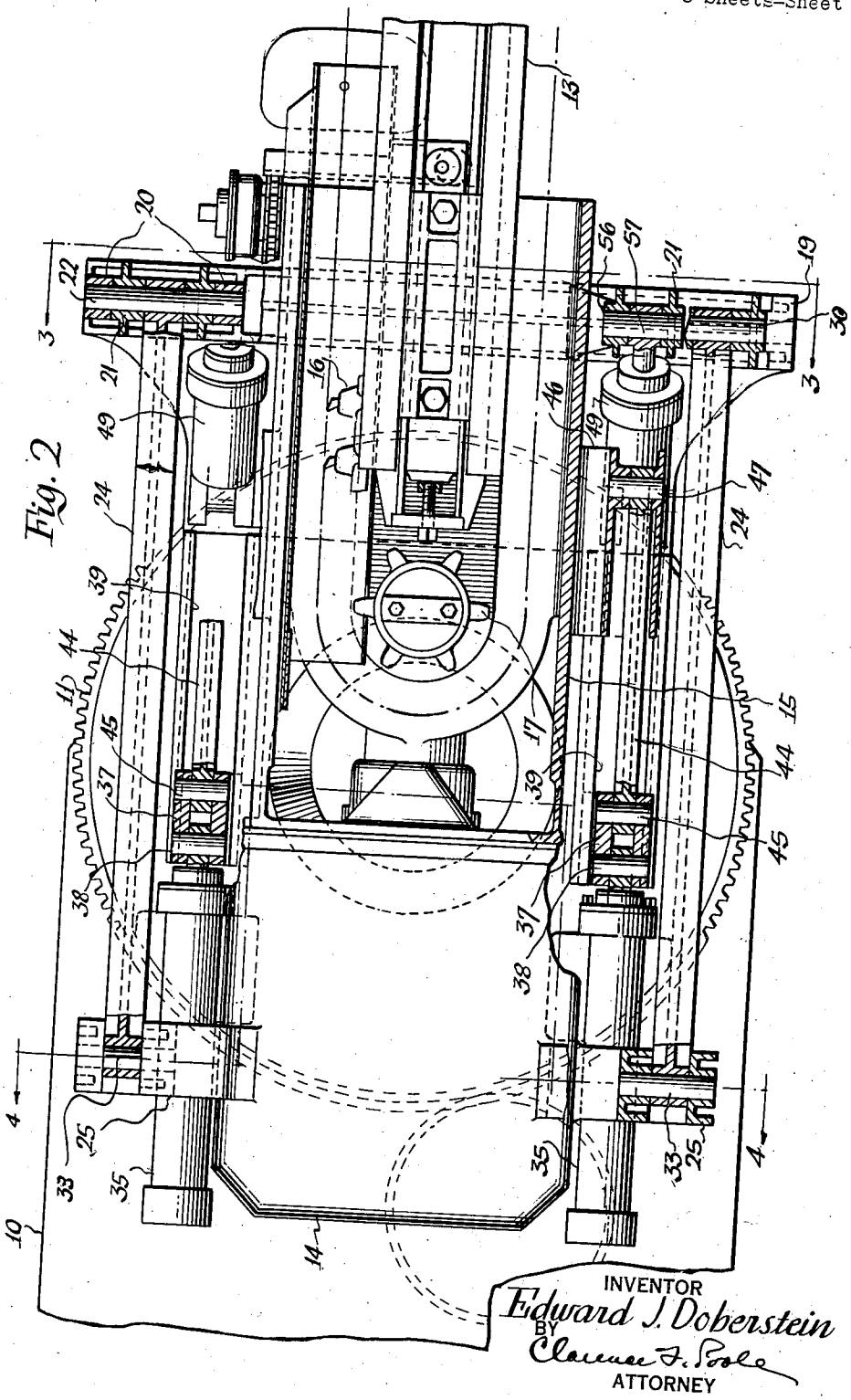
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KERF-CUTTING MACHINE

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Fig. 2



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KERF-CUTTING MACHINE

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Fig. 3

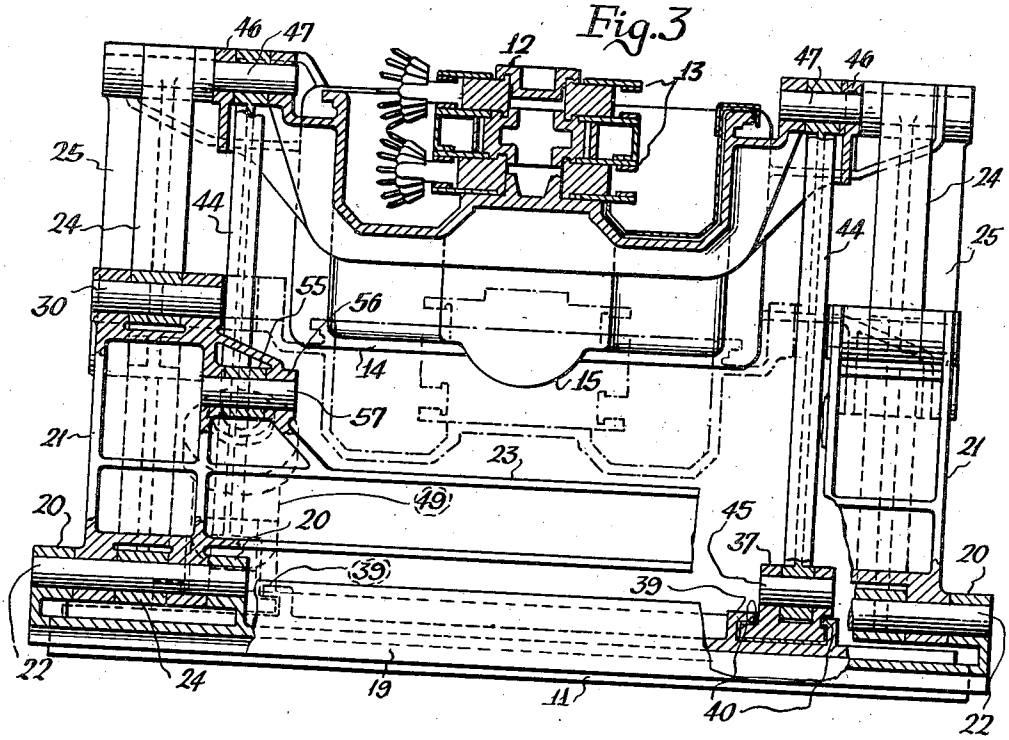
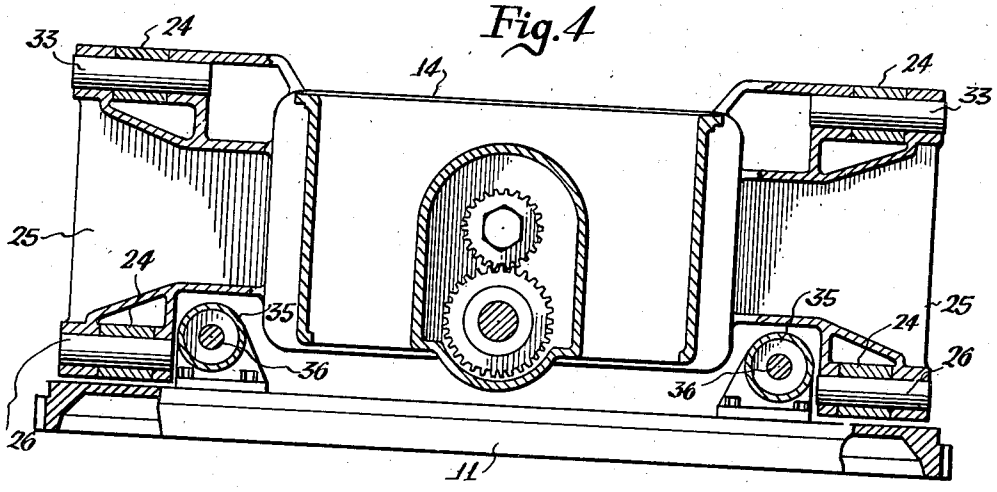


Fig. 4



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UNITED STATES PATENT OFFICE

2,258,049

KERF-CUTTING MACHINE

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15 Claims. (Cl. 262—28)

This invention relates to improvements in kerf-cutting machines adapted to cut a horizontal kerf in a mine wall at various intermediate positions between the roof and floor.

Among the objects of my invention are to provide a novel form of elevating and tilting support for the cutting element of a mining machine, arranged to eliminate the usual vertically extending guides on opposite sides of the cutting element, and to provide a simplified linkage arrangement to effect vertical adjustment and tilting movement of the cutting element.

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 fragmentary view in side elevation of the forward portion of a mining machine constructed in accordance with my invention, with certain parts broken away and certain other parts shown in longitudinal section;

Figure 2 is a fragmentary plan view of the device shown in Figure 1, with certain parts broken away and certain other parts shown in horizontal section;

Figure 3 is a partial fragmentary transverse sectional view taken substantially along line 3—3 of Figure 2;

Figure 4 is a partial fragmentary transverse sectional view taken substantially along line 4—4 of Figure 2;

Figure 5 is a diagrammatic view of the forward end of the machine, showing the cutting element in one extreme position of vertical adjustment; and

Figure 6 is a diagrammatic view of the front end of the machine, showing the cutting element in an extreme tilted position.

In the drawings, my invention is shown as being embodied in a mining machine of a track mounted type, arranged for cutting out a dirt band in the mine wall and for collecting the cuttings and conveying them away from the machine, such as is disclosed in the Pray Patent No. 2,082,119. Said machine, however, may be of any usual construction and will only be described in so far as is necessary to make my present invention readily understandable. As herein shown, said mining machine includes a track mounted truck 10 having a turntable 11 mounted adjacent the forward end thereof. Said turntable is adapted to form a support for a cutting element generally indicated by reference character 12, and to form a means for feeding a pair of parallel vertically spaced chain-carrying cutter bars 13, 13 in an arcuate path across a coal face.

The cutting element 12 includes a motor 14 having a frame 15 secured to the forward end thereof and extending forwardly therefrom. The forwardly projecting cutter bars 13, 13 are secured to said frame in the usual manner and said frame forms a housing and support means for suitable gearing, driven by said motor (not shown), which forms a means for driving cutter chains 16, 16 about said cutter bars by means of sprockets 17, 17 (see Figure 2).

With reference now in particular to the novel form of tilting and elevating mechanism for the cutter bars 13, 13, a bracket member 19 is herein shown as projecting forwardly from the turntable 11, adjacent opposite sides thereof. Said bracket member has a pair of spaced apart bearing support members 20, 20 projecting upwardly from opposite sides thereof, adjacent its forward end. Each pair of said bearing support members forms a mounting for a control link 21 on a shaft 22 (see Figures 1 and 2). Said control links may be individual independently operable links but, as herein shown, are connected together by an integrally formed cross member 23 (see Figure 3). Means which will hereinafter be more clearly described are provided for holding said control links in an upright position or in various desired positions of adjustment.

The control links 21, 21 are operatively connected with the cutting element by means of two pairs of parallel links 24, 24 which are adapted to maintain the cutting element in a position perpendicular to said control links. The lower parallel links 24 extend rearwardly of said control links, and the forward ends of said links extend within bifurcated lower ends of the links 21, 21 and are pivotally connected to the bearing brackets 20, 20 on the shafts 22, 22 (see Figures 2 and 3). The rear ends of said lower parallel links are pivotally connected to the lower ends of bracket members 25, 25 by means of pivotal pins 26, 26. Said bracket members are herein shown as projecting laterally from opposite sides of the casing of the motor 14 and are of the same length as the control links 21, 21, to maintain the parallel relationship of the parallel links 24, 24 (see Figures 1 and 4).

The upper parallel links 24, 24 are pivotally connected to the upper ends of the control links 21, 21 on pivotal pins 30, 30. The rear ends of said links are pivotally connected to the upper ends of the bracket members 25, 25 by means of pivotal pins 33, 33.

Elevation of the cutting element 12 is effected by means of a pair of spaced apart parallel longitudinally extending cylinders 35, 35 mounted on the turntable 11 and extending along opposite sides of the motor 14 (see Figures 2 and 4). Said cylinders may be of any fluid pressure type, and have suitable pistons (not shown) movable therein. Piston rods 36, 36 extend from said pistons. Each of said piston rods is connected at its forward end to a slidable block 37 by means of a pivotal pin 38. Said blocks are guided for movement longitudinally of the turntable in gibbed guides 39, 39, the gibbed portions of which extend inwardly and engage upper shouldered portions 40, 40 of said blocks, to hold said blocks from tipping and to permit sliding movement of said blocks along said turntable, in a plane parallel to the plane of said turntable (see Figures 1 and 3).

The connection from each of said blocks to the cutting element includes an elevating link 44. Said link is pivotally connected to the associated block 37 at its lower end by a pivotal pin 45, and is pivotally connected at its upper end to a bracket 46, projecting laterally from the frame 15, by means of a pivotal pin 47. Said bracket extends over and forms a shield for the upper end of said link. Said pivotal pins and brackets are located a substantial distance in advance of the blocks 37, 37, when the piston rods 36, 36 are in a retracted position (see Figures 1 and 2). Said piston rods may thus elevate said cutting element by moving the blocks 37, 37 and elevating links 44, 44 longitudinally along the turntable 11, said cutting element being held for movement in a plurality of parallel planes by means of the parallel links 24, 24.

A suitable fluid pressure system (not shown) is provided to admit fluid under pressure to or release it from the head or piston rod ends of the cylinders 35, 35, or to hold pressure in either ends of said cylinders, to hold the cutting element in various desired positions of vertical adjustment and to control raising or lowering thereof. Said fluid pressure system may be of any well known type and is no part of my present invention so will not herein be shown or described in detail.

Cylinders 49, 49 and pistons 50, 50 are provided to hold the control links 21, 21 in a vertical position, to position the cutter bars 13, 13 for horizontal cutting and to tilt said cutting element, by pivoting said control links in a forward or rearward direction about the axes of the shafts 22, 22 (see Figures 1, 2, 5 and 6). Said cylinders each have a rearwardly extending projecting portion 52, which is pivotally connected to an upright bracket 53, disposed adjacent the forward end of the turntable, by means of a pivotal pin 54 (see Figure 1). A piston rod 55 extends from the piston 50, and is pivotally connected at its free end to an inwardly extending projection 56 of the control link 21, intermediate the ends thereof, by means of a pivotal pin 57 (see Figures 2 and 3).

The admission of fluid under pressure to the head ends of said cylinders will thus tilt the control links 21, 21 in a forward direction, to pivot the brackets 25, 25 and the cutting element about the pivotal axes of the shafts 22, 22, in an obvious manner. The admission of fluid under pressure to the piston rod ends of said cylinders will return the cutting element to a position parallel with the turntable 11, or pivot it in an opposite direction about the axes of said shafts, in an obvious manner.

A suitable fluid pressure system (not shown) is provided to admit fluid under pressure to the head or piston rod ends of the cylinders 49, 49, or to hold pressure therein, to hold said control links in various desired positions of adjustment.

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 mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a pair of parallel links connected between said base and cutting element, means for tilting said parallel links as a unit for tilting said cutting element, extensible means mounted on said base for extensible movement therealong, and a connection between said extensible means and said cutting element for elevating or lowering said cutting element upon movement of said extensible means along said base.

2. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a control link pivoted on said base, a pair of parallel links connected between said control link and cutting element, extensible means mounted on said base for extensible movement therealong, a connection between said cutting element and said extensible means, for vertically moving said cutting element upon movement of said extensible means, and means for pivotally moving said control link or holding it in fixed relation with respect to said base, for tilting said cutting element and permitting vertical adjustment thereof in a plurality of parallel planes.

3. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a control link pivotally mounted adjacent one end of said base, a pair of bracket members projecting laterally from opposite sides of said cutting element, a pair of parallel links pivotally connected between said bracket members and control link, means for pivotally moving said control link or maintaining it in fixed relationship with respect to said cutting element, and a member extensible along said base by power, having operative connection with said cutting element, for elevating or lowering said cutting element while held for movement in a plurality of parallel planes, by said parallel links.

4. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a control link pivotally mounted on said base adjacent one end thereof, and a pair of parallel links pivotally connected to said control link adjacent opposite ends thereof and having pivotal connection with said cutting element, a member rectilinearly movable along said base, power means for moving said member, and an elevating link pivotally connected between said

rectilinearly movable member and cutting element, for moving said cutting element vertically in a plurality of parallel planes upon rectilinear movement of said rectilinearly movable member.

5. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a control link pivotally mounted on said base adjacent one end thereof, and a pair of parallel links pivotally connected to said control link adjacent opposite ends thereof and having pivotal connection with said cutting element, a member rectilinearly movable along said base, power means for moving said member, an elevating link pivotally connected between said rectilinearly movable member and cutting element for moving said cutting element vertically in a plurality of parallel planes upon rectilinear movement of said member, and means having connection with said control link, for tilting said control link and cutting element and holding said control link and cutting element in tilted relation with respect to said base.

6. In a mining machine, a base, a cutting element extending along said base, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a member mounted on said base for rectilinear movement therealong, means for rectilinearly moving said member along said base, a link pivotally connecting said rectilinearly movable member with said cutting element, and means for holding said cutting element so said link may cause vertical adjustment of said cutting element in a plurality of parallel planes, upon rectilinear movement of said member, including a parallel link connection between the rear end of said cutting element and the forward end of said base.

7. In a mining machine, a base, a cutting element extending along said base, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a member mounted on said base for rectilinear movement therealong, means for rectilinearly moving said member along said base, a link pivotally connecting said rectilinearly movable member with said cutting element, means for holding said cutting element so said link may cause vertical adjustment of said cutting element in a plurality of parallel planes upon rectilinear movement of said member including a parallel link connection between the rear end of said cutting element and the forward end of said base, and means for tilting said cutting element including means for tilting said parallel link connection as a unit.

8. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a member mounted on said base for rectilinear movement therealong, means for rectilinearly moving said member along said base, a link pivotally connecting said rectilinearly movable member with said cutting element, means for holding said cutting element so said link may cause vertical adjustment of said cutting element in a plurality of parallel planes upon rectilinear movement of said member including a parallel link connection between said cutting element and said base, a control link, pivotal connections between said parallel link connections and control link, and means for tilting said control link or holding it in fixed relation with respect to said base, for tilting said cutting element.

9. In a mining machine, a base, a cutting element extending along said base, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a pair of spaced apart members mounted on said base for rectilinear movement along opposite sides of said cutting element, a pair of links pivotally connecting said members with said cutting element, fluid pressure means for rectilinearly moving said members along said base, means for holding said cutting element for movement in a plurality of parallel planes upon rectilinear movement of said members including parallel link connections between opposite sides of the rear end of said cutting element and the forward end of said base, and means for tilting said cutting element including fluid pressure means for tilting said parallel link connections as a unit.

10. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a pair of spaced apart members mounted on said base for rectilinear movement along opposite sides of said cutting element, a pair of links pivotally connecting said members with said cutting element, means for rectilinearly moving said members along said base, and means for holding said cutting element for movement in a plurality of parallel planes upon rectilinear movement of said members including parallel link connections between opposite sides of said cutting element and said base, a pair of control links to which said parallel links are pivotally connected, and means for tilting said control links, for tilting said parallel link connections and cutting element as a unit or for holding said control links in fixed relation with respect to said base.

11. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a pair of spaced apart members mounted on said base for rectilinear movement along opposite sides of said cutting element, a pair of links pivotally connecting said members with said cutting element, means for rectilinearly moving said members along said base, and means for holding said cutting element for movement in a plurality of parallel planes upon rectilinear movement of said members including parallel link connections between opposite sides of said cutting element and said base, said parallel link connections including a pair of bracket members projecting laterally from opposite sides of said cutting element, a pair of control links pivotally mounted on said base, and parallel links pivotally connected between said members and said control links.

12. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a pair of spaced apart members mounted on said base for rectilinear movement along opposite sides of said cutting element, a pair of links pivotally connecting said members with said cutting element, means for rectilinearly moving said members along said base, and means for holding said cutting element for movement in a plurality of parallel planes upon rectilinear movement of said members including parallel link connections be-

tween opposite sides of said cutting element and said base, said parallel link connections including a pair of bracket members projecting laterally from opposite sides of said cutting element, a pair of control links pivotally mounted on said base, parallel links pivotally connected between said members and said control links, and means for tilting said cutting element or holding it for vertical adjustment in a plurality of parallel planes including extensible means connected between said base and control links.

13. In a mining machine, a base, a cutting element, and means for mounting said cutting element on said base for vertical adjustment and tilting movement with respect thereto including a pair of spaced apart members mounted on said base for rectilinear movement along opposite sides of said cutting element, a pair of links pivotally connecting said members with said cutting element, fluid pressure means for rectilinearly moving said members along said base, and means for holding said cutting element for movement in a plurality of parallel planes upon rectilinear movement of said members including parallel link connections between opposite sides of said cutting element and said base, said parallel link connections including a pair of bracket members projecting laterally from opposite sides of said cutting element, a pair of control links pivotally mounted on said base, parallel links pivotally connected between said members and said control links, and means for tilting said cutting element or holding it for vertical adjustment in a plurality of parallel planes including a pair of fluid pressure cylinders and pistons pivotally connected between said base and control links.

14. In a mining machine, a base, a cutting element including a chain carrying cutter bar, and means for supporting said cutting element on said base for vertical adjustment and endwise tilting movement with respect thereto including an upright control frame mounted on said base for rocking movement in a vertical plane generally perpendicular to said cutter bar, a pair of parallel links connected between said control frame and cutting element, means for rocking said control frame relative to said base for tilting said cutting element endwise, and means for adjusting said parallel links relative to said base, for vertically moving said cutting element in any one of its various tilted positions relative to said base.

15. In a kerf-cutting machine, a base, a frame having a cutter bar projecting therefrom, a support for said frame including an upright control frame pivotally mounted on said base on a transverse axis, two parallel links pivotally connected between said frame and said control frame, to permit vertical adjustment of said cutter bar in a plurality of substantially parallel planes perpendicular to said control frame, and means for tilting said control frame to effect tilting adjustment of the cutting planes of said cutter bar relative to said base.

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