Sept. 21, 1954 F. CARTLIDGE 2,689,720

MINING MACHINE WITH VERTICALLY SWINGING CUTTERHEAD

Filed Dec. 30, 1950

3 Sheets-Sheet 1

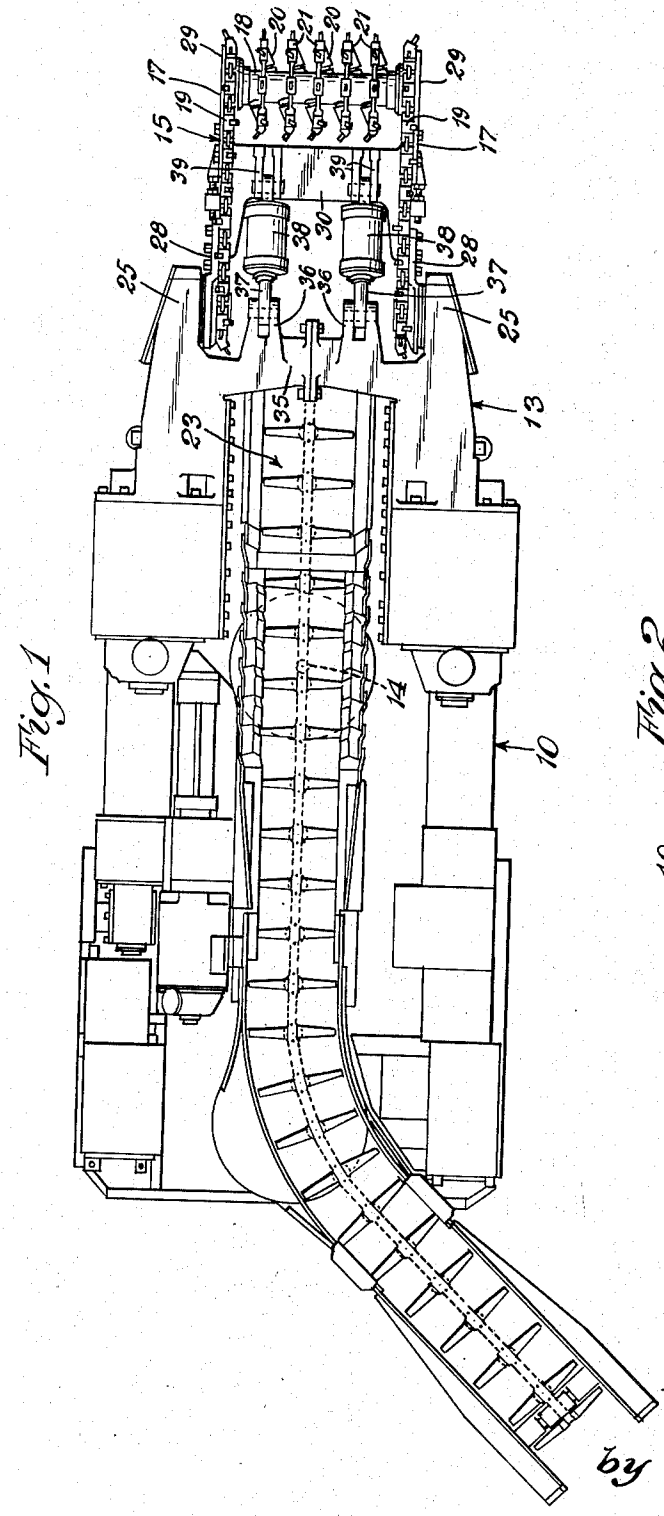


Fig. 1

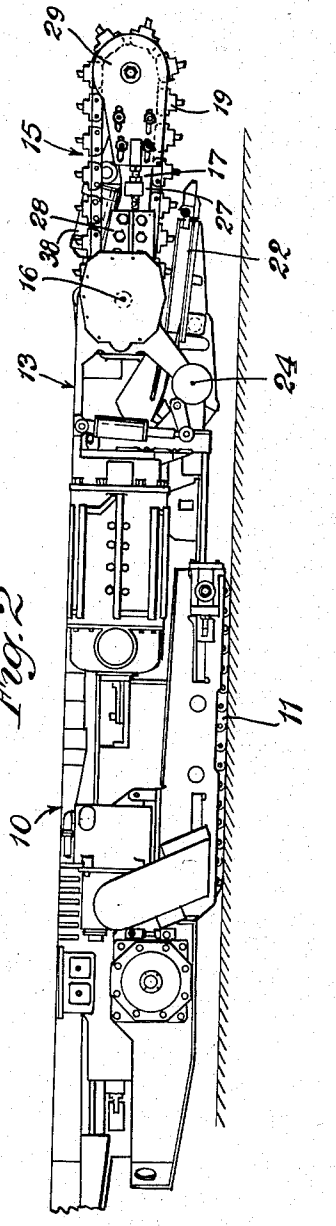


Fig. 2

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3 Sheets-Sheet 2

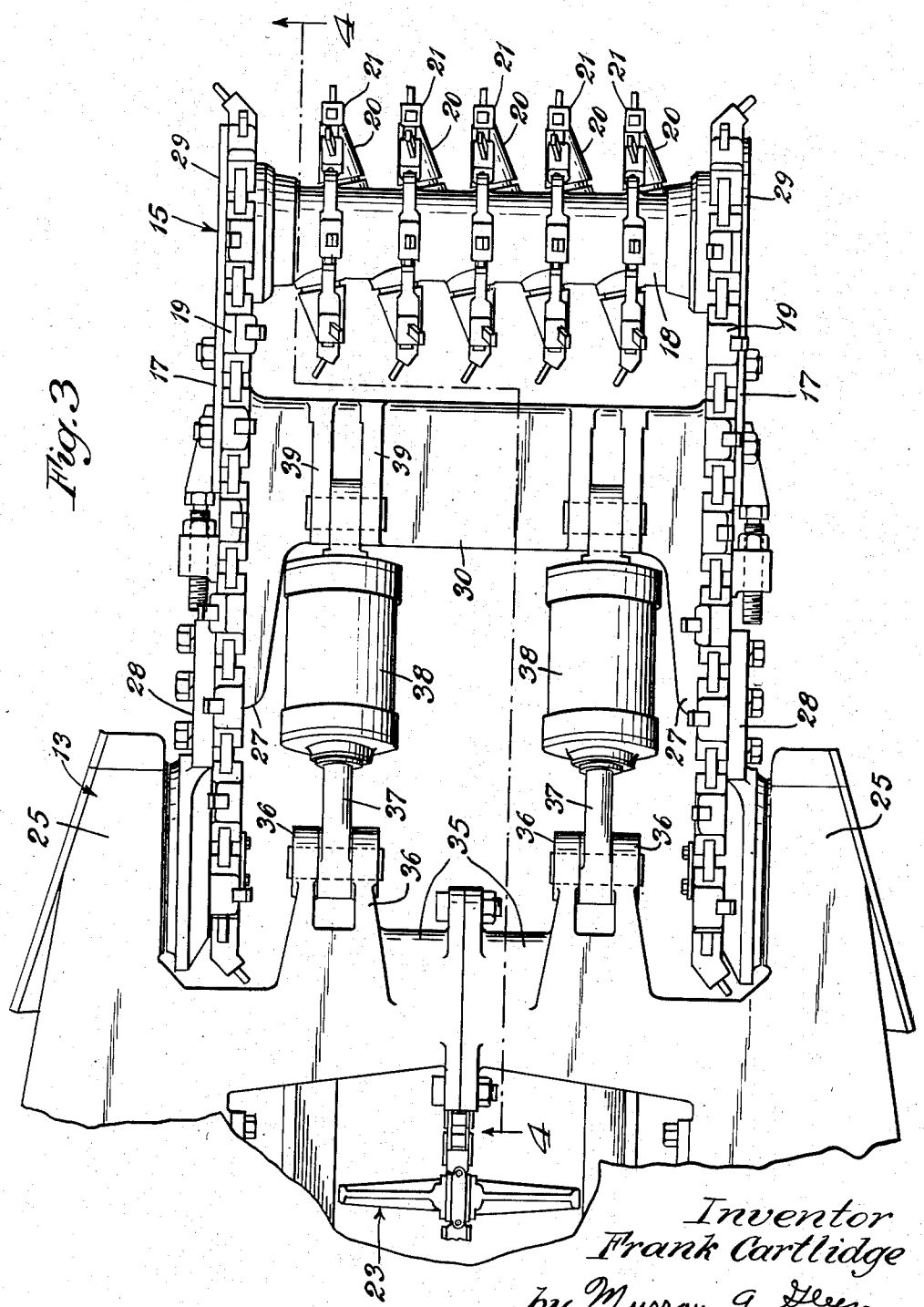


Fig. 3

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3 Sheets-Sheet 3

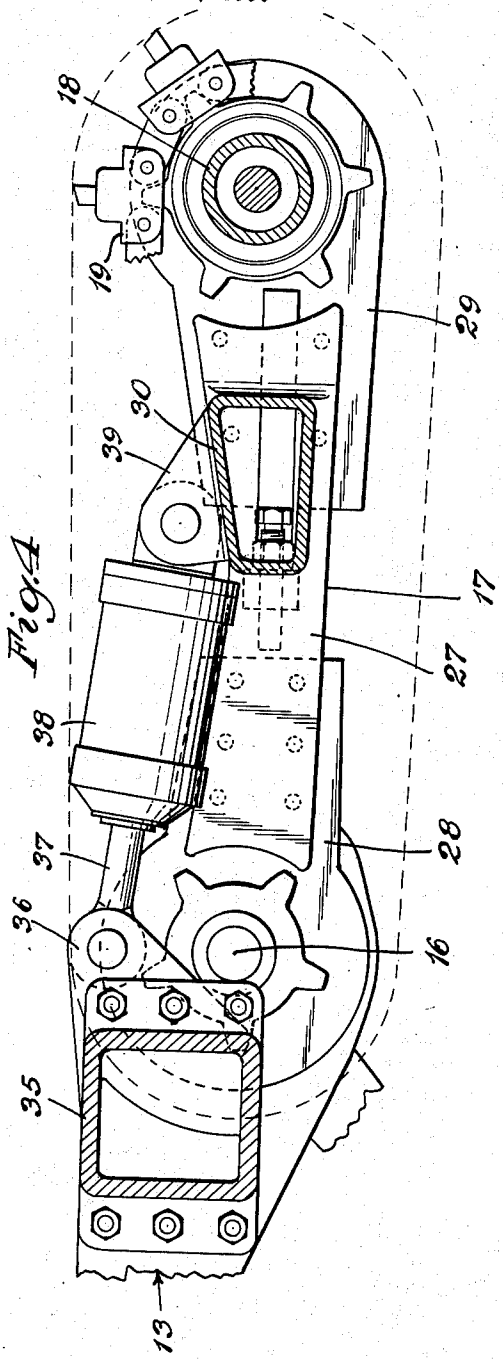


Fig. 4

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MINING MACHINE WITH VERTICALLY SWINGING CUTTERHEAD

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Application December 30, 1950, Serial No. 203,607

4 Claims. (Cl. 262—29)

1

This invention relates to improvements in coal mining machines which are particularly adapted for cutting and dislodging coal from the solid working face of a mine.

The principal object of the invention is to provide a novel form of cutter frame including a rotary cutter head for machines of the character above described, with an especially compact and efficient arrangement of hydraulic motor devices for swinging said cutter head by power about its horizontal axis during the cutting and dislodging operations.

Other objects of the invention will appear from time to time as the following description proceeds.

The invention may best be understood by reference to the accompanying drawings, in which:

Figure 1 is a top plan view of a coal mining machine constructed in accordance with my invention;

Figure 2 is a side view of the machine shown in Figure 1, with the rear portion of the machine omitted;

Figure 3 is an enlarged detailed plan view of the cutter head forming a part of the machine shown in the preceding figures;

Figure 4 is a detailed section taken on line 4—4 of Figure 3.

Referring now to the embodiment of my invention illustrated in the drawings, the same is shown as applied to a coal mining machine of the continuous type disclosed in my copending application bearing Serial Number 116,684, filed September 20, 1949, and in an application of Frank A. Lindgren and Richard C. Lundquist bearing Serial Number 186,326, filed September 23, 1950, (the Lindgren and Lundquist application and this application having a common assignee), which machines are especially adapted for the continuous cutting and removing of coal from the solid, without the usual undercutting, shooting and loading operations.

The mining machine shown in Figure 1 consists essentially of a mobile base or main frame 10, herein shown as mounted on endless treads 11, 11 and having an auxiliary frame 13 toward the front end of said base frame, mounted for lateral oscillation about a generally vertical axis 14, with a cutting and dislodging head indicated generally at 15 mounted on said auxiliary frame for up-and-down swinging movement about a generally horizontal axis 16.

The cutting head 15 includes a pair of horizontally spaced side frame members 17, 17 having a drum 18 extending across the forward ends

2

thereof and rotatable therebetween. The side frame members 17, 17 may as usual have cutter chains 19 mounted thereon and trained over the ends of the drum 18 for simultaneously rotating the drum and cutting parallel vertical kerfs along opposite sides of the cutter head. The drum 18 also has a plurality of cutting discs 21 spaced longitudinally thereof for cutting a plurality of kerfs in advance of the cutter head intermediate the side bars 17, 17. Breaker rollers 20 may also be mounted on the drum in laterally offset relation to the cutting discs for breaking out the cores formed between adjacent discs, as usual.

Suitable gathering means, indicated generally at 22, may be mounted below the cutter head, and bodily tiltable on a transverse axis 24 into suitable position to collect loose material as it is dislodged from the working face. A cutting conveyor, indicated generally at 23, is mounted centrally of the base frame 10, and extends from the rear end of the gathering mechanism and thence upwardly and rearwardly to the rear of the base frame 10 for discharging the material on coal cars or other transporting means in a well-known manner. Further details of the machine need not be described herein, excepting insofar as such details may be associated with the power means for raising and lowering said cutter head about its longitudinal axis 16, as will now be described.

The side frame members 17, 17 of the cutting head 15 are pivotally mounted at their rear ends on the transverse axis 16 defined by trunnion members 25, 25 forming part of the auxiliary frame 13. In the form shown herein, each side frame member consists of an elongated side bar 27 having its rear end fixed to a bearing plate 28 which forms part of the pivotal mounting for the cutter head. Each side bar 27 also has an extensible side plate 29 longitudinally adjustable thereon at its forward end to provide the usual tensioning adjustment for the cutter chain 19 which is guided for orbital movement around the end plate 29 and also around the bearing plate 28 at the rear end of the side frame.

The side bars 27 and drum 18 form an open generally rectangular space forwardly of the auxiliary frame 13 for discharge by gravity of the cuttings which are carried upwardly by the drum 18 and cutter chains during the operation of the machine.

The two side bars 27, 27 are cross-connected near their front ends by a cross piece or strut 30 spaced rearwardly of the cutter discs 21 of the rotary cutting head 18 to provide ample clear-

ance for said cutting discs, as shown in Figure 4. In the form shown herein and for the discharge of cuttings by gravity forwardly and rearwardly of said cross piece, the cross piece **30** is made in hollow, flattened tubular section and is disposed toward the front ends of the side frame members **17, 17.**

The auxiliary frame **13** has a frame portion **35,** with a pair of laterally spaced supporting brackets **36, 36** disposed toward opposite sides of the longitudinal axis of the cutter head, to which piston rods **37, 37** of hydraulic cylinders **38, 38** are pivotally connected. The brackets **36, 36** are disposed in spaced relation immediately above the axis **16.**

The forward ends of the hydraulic cylinders **38** are pivotally connected to upstanding brackets **39, 39** fixed to the upper face of the cross piece **30.**

Fluid under pressure may be supplied to opposite head ends of the cylinders **38, 38** under selective control of the operator for extending or retracting the piston rods relative to said cylinders, to raise or lower the cutter frame as a whole about its transverse axis **16.** Any fluid supply and control means of well-known form may be employed.

As will be seen from Figures 1 to 4, inclusive, the hydraulic cylinders **38, 38** and their pistons are compactly disposed within in the cuttings discharge space between the side frame members **17** and the cutter chains **19** mounted thereon. The cylinders themselves are nested closely to the cross piece **30,** with their front ends well below the upper level of the cutter chains **19,** and their rear ends substantially at the level of said chains where they do not interfere with nor encroach upon the regions toward the front end of the cutter frame, wherein the cutter chains **19** and the cutting discs **21** normally have operative engagement with the coal face.

Although I have shown and described certain embodiments of my invention, it will be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a cutting machine comprising a frame, a cutting and dislodging head mounted on said frame for up-and-down swinging movement about a horizontal axis, said head including a pair of horizontally spaced vertically disposed bars each having upper and lower edges and a rotatable cutter and dislodging element carried by said bars, said cutter and dislodging element, bars and frame defining an open space, a member rigidly secured to said head intermediate the upper and lower edges of said bars and disposed within said open space, extensible motor power means a major portion of which is disposed within said open space and pivotally secured to said frame and said head member about horizontal axes for swinging said head up and down to various cutting positions, said horizontal axes of the pivot points of said motor power means being located on lines passing through the bars intermediate said upper and lower edges thereof so that said motor power means is substantially confined within said open space in all of said cutting positions.

2. The structure defined in claim 1 wherein said motor power means comprises a fluid actuated piston and cylinder means having the piston rod pivotally secured to the frame and the cooperating cylinder pivotally connected to the head member.

3. The structure defined in claim 2 wherein said head member is a transversely extending reinforcing strut rigidly secured to each of said bars.

4. A cutting machine comprising a frame, a cutting and dislodging head mounted on said frame for up-and-down swinging movement about a horizontal axis, said head including a pair of horizontally spaced vertical disposed cutter bars each having upper and lower cutting edges and a rotatable cutter and dislodging element carried by said cutter bars, said cutter and dislodging element, cutter bars and frame defining an open space permitting the discharge of cuttings by gravity, a transversely extending reinforcing strut rigidly secured to each of said cutter bars intermediate the upper and lower cutting edges thereof and disposed within said open space, a motor power means comprising a fluid actuated piston and cylinder a major portion of which is disposed within said open space and having the piston rod pivotally secured to the frame and the cooperating cylinder pivotally secured to the strut about horizontal axes for swinging said head up and down to various cutting positions, said horizontal axes of the pivot points of said piston and cylinder being located on lines passing through the cutter bars intermediate the upper and lower cutting edges thereof so that said piston and cylinder is substantially confined within said open space in all of said cutting positions.

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