

May 19, 1942.

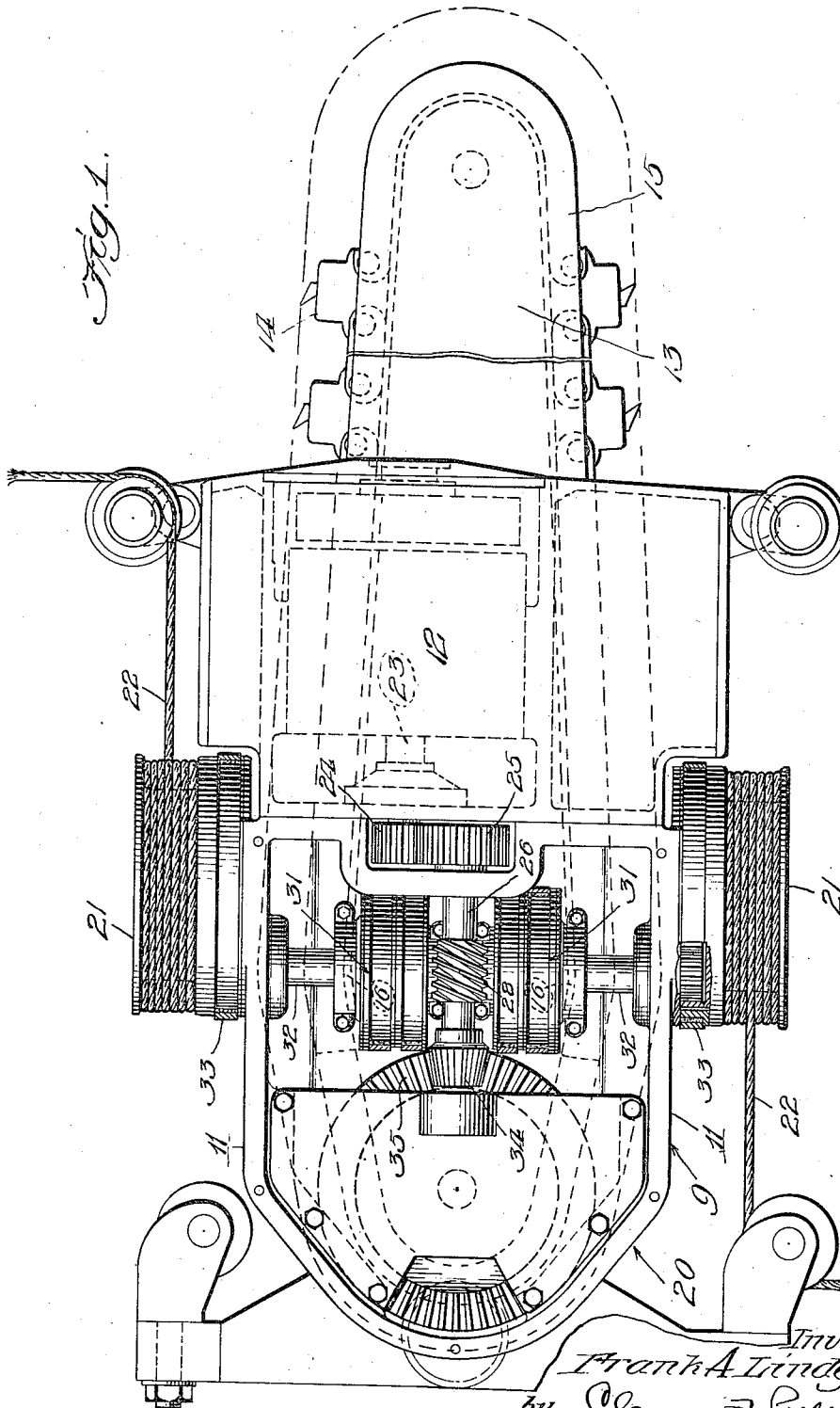
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2,283,376

KERF-CUTTING MINING MACHINE

Filed Sept. 11, 1940

3 Sheets-Sheet 1



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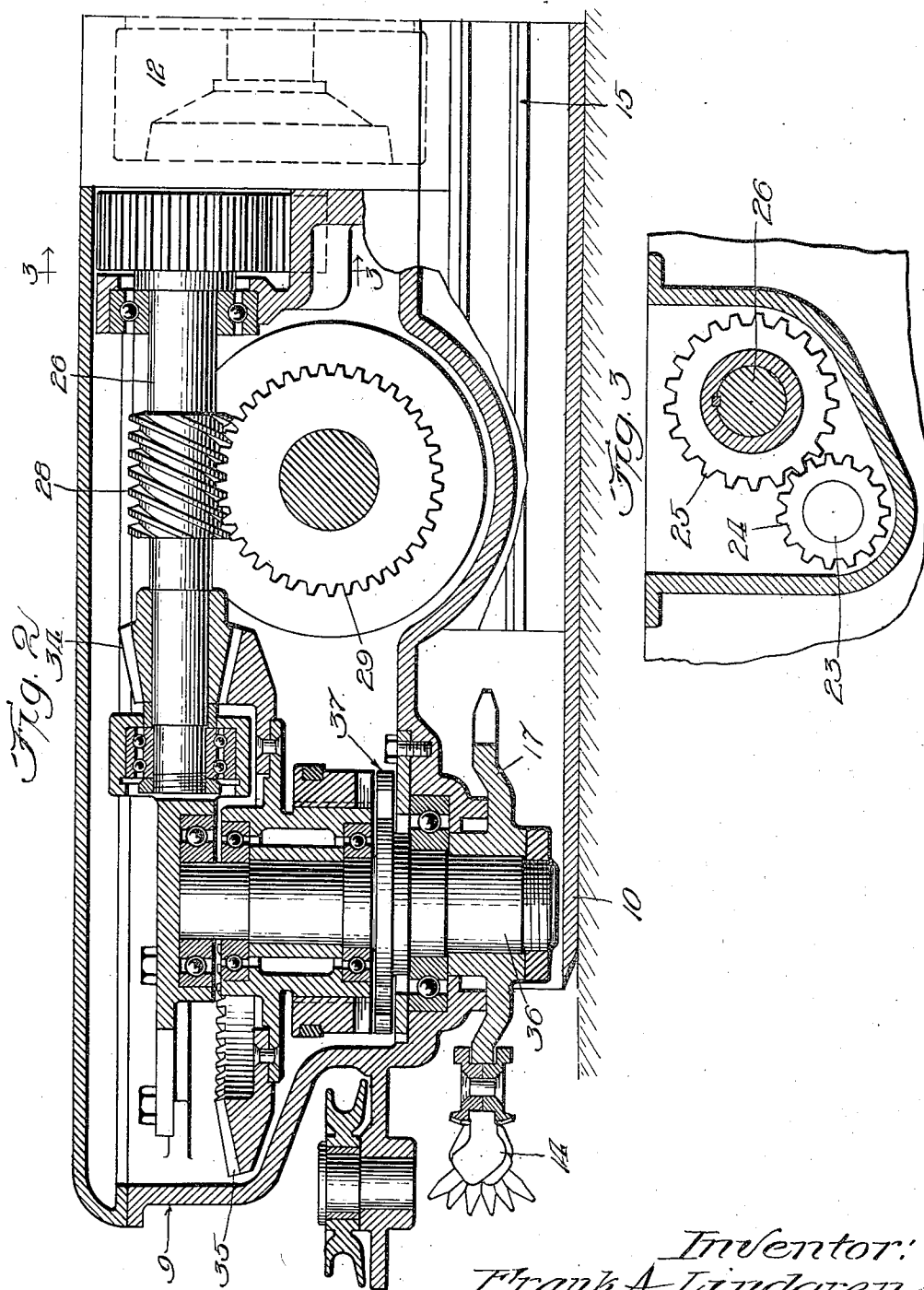
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3 Sheets-Sheet 2



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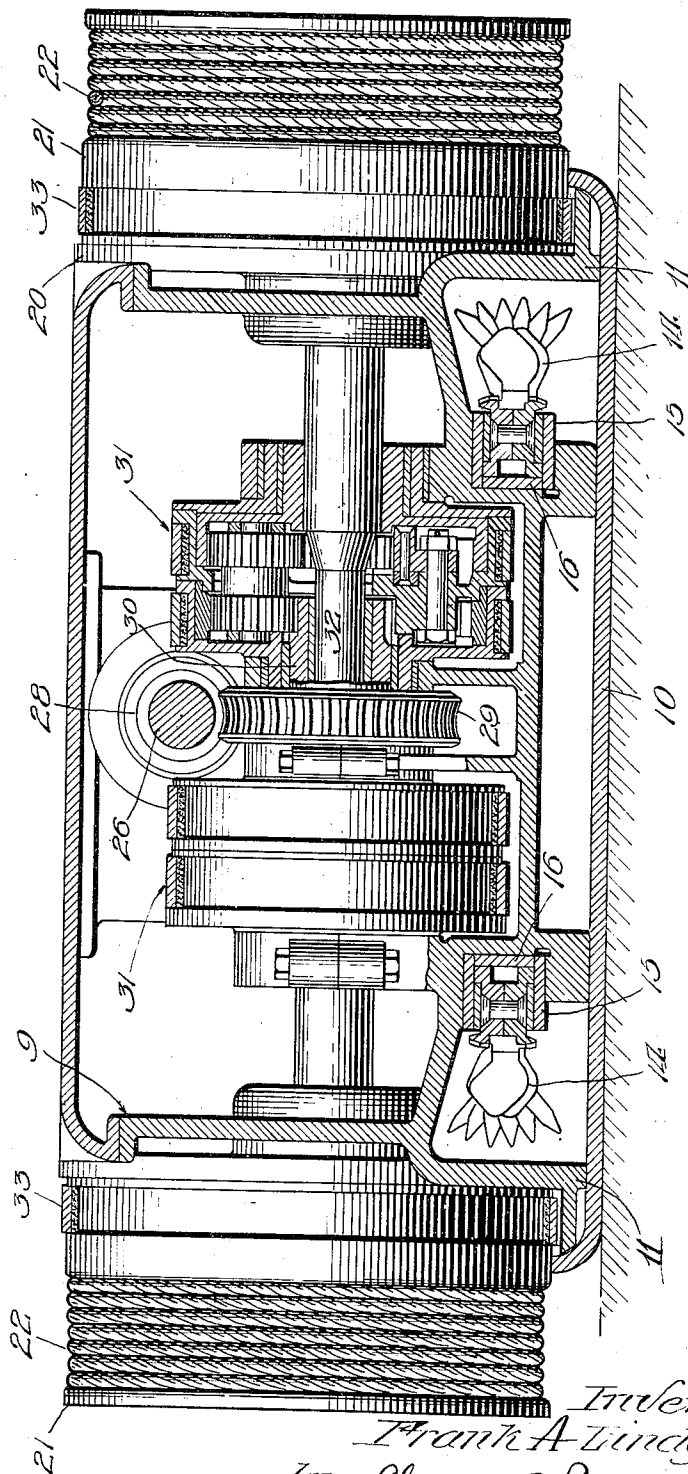
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Fig. 4.



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UNITED STATES PATENT OFFICE

2,283,376

KERF-CUTTING MINING MACHINE

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Application September 11, 1940, Serial No. 356,284

5 Claims. (Cl. 262—30)

This invention relates to improvements in kerf-cutting mining machines of the room and pillar type particularly adapted for use in thin seams of coal. Among the objects of my invention are to provide a new and improved mining machine of the general type above referred to which is adapted to discharge the cuttings beneath the motor and from the rear of the machine, and has its gearing mechanism compactly arranged in lateral, longitudinal, and vertical dimensions.

Heretofore many mining machines of the general type above referred to have been so designed that the total overall height of the machine was determined by the height of the feed and cutter chain drive mechanism required, and the cuttings discharge passage way which extends generally beneath said mechanism. Apparently, gear reduction mechanism for driving the feeding mechanism and the cutter chain sprocket of modern machines cannot be substantially reduced, especially in vertical height, without a corresponding loss in strength and efficiency.

The device of my invention is designed to afford a reduction in overall height of a machine including a passageway for the discharge of the cuttings from the rear of the machine, together with gear reduction mechanism of standard size and efficiency, by widening the bar adjacent the rear end of the machine to provide a recess for a substantial portion of the gear reduction mechanism associated with the feeding drums of the machine. Moreover, this reduction in overall height may be accomplished without increasing either the longitudinal or the lateral dimensions of the machine as a whole.

My invention may be more clearly understood with reference to the accompanying drawings, wherein:

Figure 1 is a top plan view of one embodiment of my invention with certain parts broken away, and others shown in horizontal section;

Figure 2 is an enlarged fragmentary sectional view of the rear end of the machine shown in Figure 1, taken substantially on a central longitudinal axis of the machine.

Figure 3 is a detail section taken on line 3—3 of Figure 2; and

Figure 4 is a transverse section taken substantially on line 4—4 of Figure 1.

In the drawings, the embodiment of the mining machine illustrated includes a main frame 9 having a bottom plate 10 and side plates 11. Said main frame extends along the entire body of the machine and forms the support for a

motor 12 at the front, and a housing 20 at the rear thereof. Said housing contains the feed gearing and cutter chain drive mechanism driven by said motor, as will hereinafter be more fully described.

A cutter bar indicated generally at 13 projects from the forward end of the machine and includes guiding means 15 commonly referred to as a gib, extending around its front end and along opposite sides thereof, and an endless cutter chain 14 movably supported in said guiding means in the usual manner so that the front end of said cutter bar may be inserted in and moved along the working face of the mine to cut a kerf therein, in the usual manner.

In the novel arrangement herein disclosed, two lateral sections 16, 16 forming the side portions of the cutter chain guiding means 15 are spread apart a substantial distance in a zone immediately adjacent the rear end of the motor where the major portion of the feed gearing mechanism is located, so as to provide additional space therefor, as will hereinafter more fully appear. In the form shown, these guide sections 16, 16 converge forwardly so that the front or cutting end of the cutter bar may be of substantially the same width as cutter bars now employed in mining machines of this kind. As is well known, excessive width of the cutter bar is undesirable. The rear ends of the cutter chain guide sections 16, 16 may also converge rearwardly toward a cutter chain sprocket 17 at the rear end of the machine, but terminating short of said sprocket, as indicated in Figures 1 and 2.

The arrangement of the main frame 9 with its upright side walls 11 and the cutter chain guide sections 16, 16 is such that the cutter chain 14 moves through passageways formed along both sides of the machine, and open at the forward and rearward ends thereof so as to permit the clear passage of cuttings through the machine for discharge at the rear end thereof.

Referring now to the feeding and cutter chain drive mechanism shown herein, a pair of independently rotatable winding drums 21, 21 are arranged at opposite sides of the housing 20. Said winding drums are adapted to have flexible cables 22, 22 wound thereon which may be trained laterally from either forward or rearward end of the machine in the usual manner for feeding and controlling movement of the machine along the mine bottom. The motor 12 has an armature shaft 23 which drives the cutting and feeding mechanism in the following manner:

An armature pinion 24 is keyed on the rear-

ward end of the armature shaft and meshes with and drives a spur gear 25 keyed on the forward end of a longitudinally extending shaft 26. Said shaft is journaled in suitable anti-friction bearings supported in the upper portion of the housing 20. A worm 28 is keyed to said shaft at an intermediate portion thereof and meshes with and drives the worm gear 29 keyed on a sleeve 30. The sleeve 30 forms a means for driving a pair of coaxial planetary gear reduction devices indicated generally at 31, 31 arranged on opposite sides thereof. Such planetaries are generally recognized to constitute one of the most compact and efficient types of gear reduction mechanisms, and are widely employed in mining machines for this reason. The specific form of planetaries illustrated herein are shown and described in Patent No. 2,075,870 dated April 6, 1937, to William W. Sloane, so need not be herein described in detail, excepting to state that said planetaries are arranged to provide an independent drive for each of the winding drums 21, 21 through separate shafts 32, 32 which have their adjacent ends coaxially but independently mounted within the opposite ends of the sleeve 30, as appears in Figure 4. Thus either winding drum 21 can be driven from the motor at either a high frictionally controlled positioning speed or a low frictionally controlled feeding speed, or be disconnected therefrom so as to be rotated under control of a friction band 33 mounted on each of the drums in the usual manner, to retard the unwinding of said drum.

The drive connection to the cutter chain sprocket 17 consists of a bevel pinion 34 keyed on the rear end of the shaft 26 and meshed with a bevel gear 35 rotatably mounted on an upright shaft 36 suitably journaled within the housing 20. Suitable jaw clutch means generally indicated by the reference character 37, are provided for selectively driving said shaft from said bevel gear. The sprocket 17 is keyed on the lower end of shaft 36 and meshes with and drives the cutter chain 14 in the usual manner. As will be seen from Figure 2, the rear portion of the cutter chain sprocket 17 is disposed adjacent the rear open end of the bottom of the frame 9 so that the cutter chain 14 where it passes about the drive sprocket is projecting beyond the bottom plate 10 to permit the cuttings to be discharged on the mine floor at the rear of the machine.

It will be seen from the foregoing that the arrangement of the cutter bar, and particularly the widened chain guide sections 16, 16, is such that the two planetary gear reduction devices 31, 31 have their lower portions extending downwardly or recessed substantially below the orbital path of the cutter chain and within a horizontal plane including the guide sections 16, 16, as clearly shown in Figure 4. This makes it possible to reduce the overall height of the machine without reducing the vertical dimensions of the plan-

etaries, which must be made of sufficient size and ruggedness to perform their required functions. It will be observed further that by lowering the planetaries bodily in this manner, it is also possible to lower the axis of the main longitudinal drive shaft 26, thereby making a more compact arrangement for the feeding and cutter chain drive mechanism as a whole.

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 mining machine, a frame having a base plate slidable along the mine bottom, a motor mounted on said frame spaced vertically from said base plate, a horizontally disposed cutter bar having a cutter chain movable orbitally thereabout, said cutter bar having a relatively widened rearward portion extending between the side walls of said frame in spaced relation therewith to form a cuttings passageway opening to the rear end of the frame, and the sides of said cutter bar converging toward a relatively narrow portion extending beneath said motor and projecting toward the front end of the machine, means operatively connecting said motor with said cutter chain, and feeding mechanism for said machine driven from the rear end of said motor including gear reduction mechanism having a portion thereof recessed in the widened rear end portion of said cutter bar.

2. A mining machine in accordance with claim 1 wherein the gear reduction mechanism recessed within the cutter bar consists of a planetary gear.

3. A mining machine in accordance with claim 1 wherein the gear reduction mechanism recessed within the cutter bar consists of two planetary gears mounted coaxially on a horizontal axis and each having connection with a winding drum.

4. A mining machine in accordance with claim 1 wherein the gear reduction mechanism recessed within the cutter bar consists of a planetary gear mounted on a horizontal axis and driven by said motor through a longitudinal, horizontally disposed shaft, and a worm and worm gear.

5. A mining machine in accordance with claim 1 wherein the gear reduction mechanism recessed within the cutter bar consists of two planetary gears mounted coaxially on a horizontal axis, each having operative connection with a winding drum and both of said planetaries driven from said motor by a single longitudinally disposed shaft, and a worm and worm gear disposed between said planetary gears.

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