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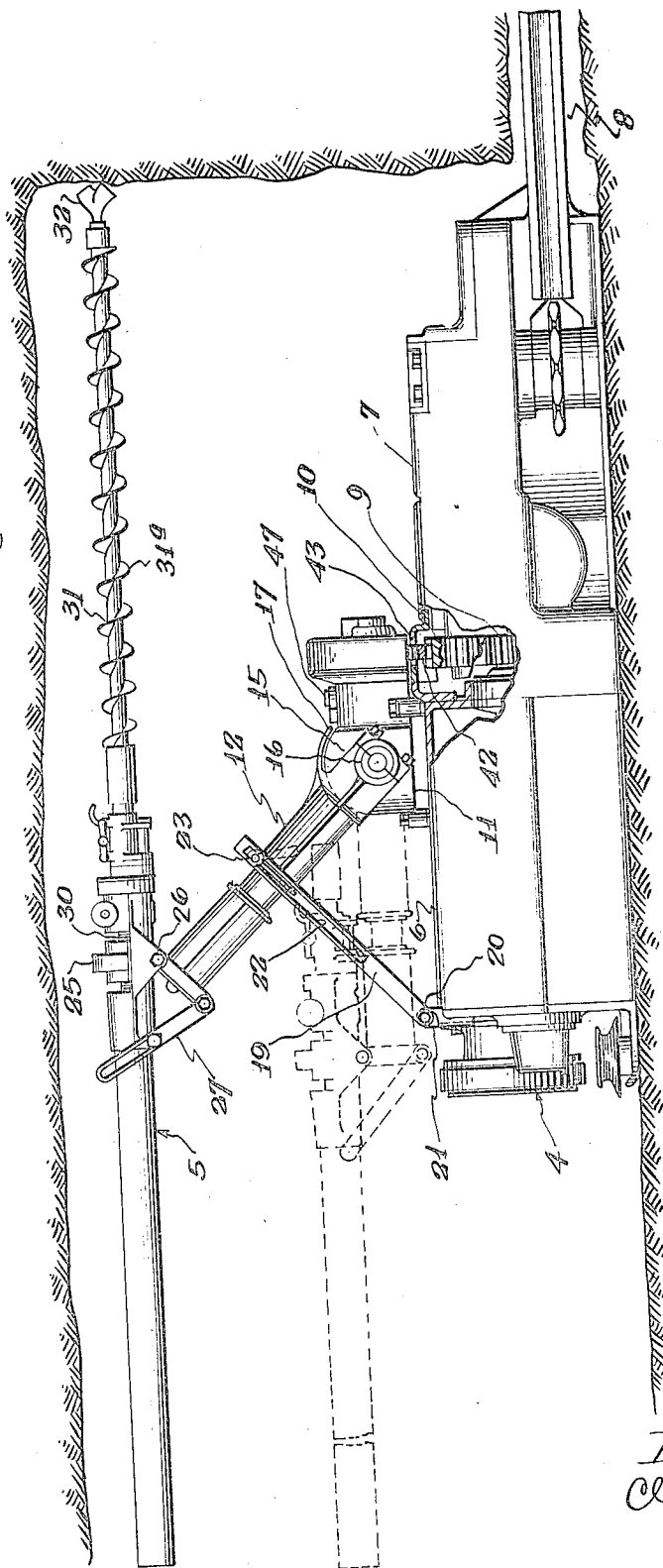
F. W. VODOZ

MINING MACHINE

1,920,450

Filed Sept. 10, 1930

2 Sheets-Sheet 1



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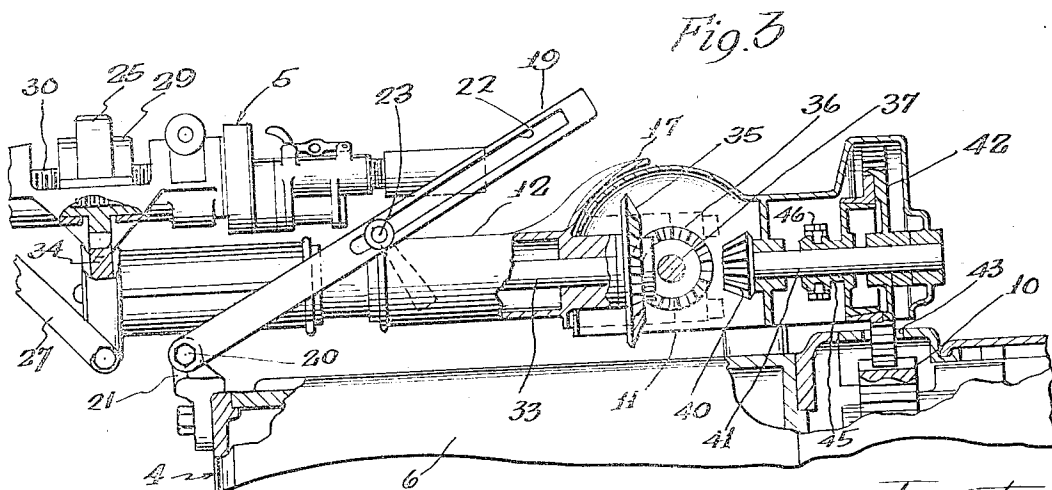
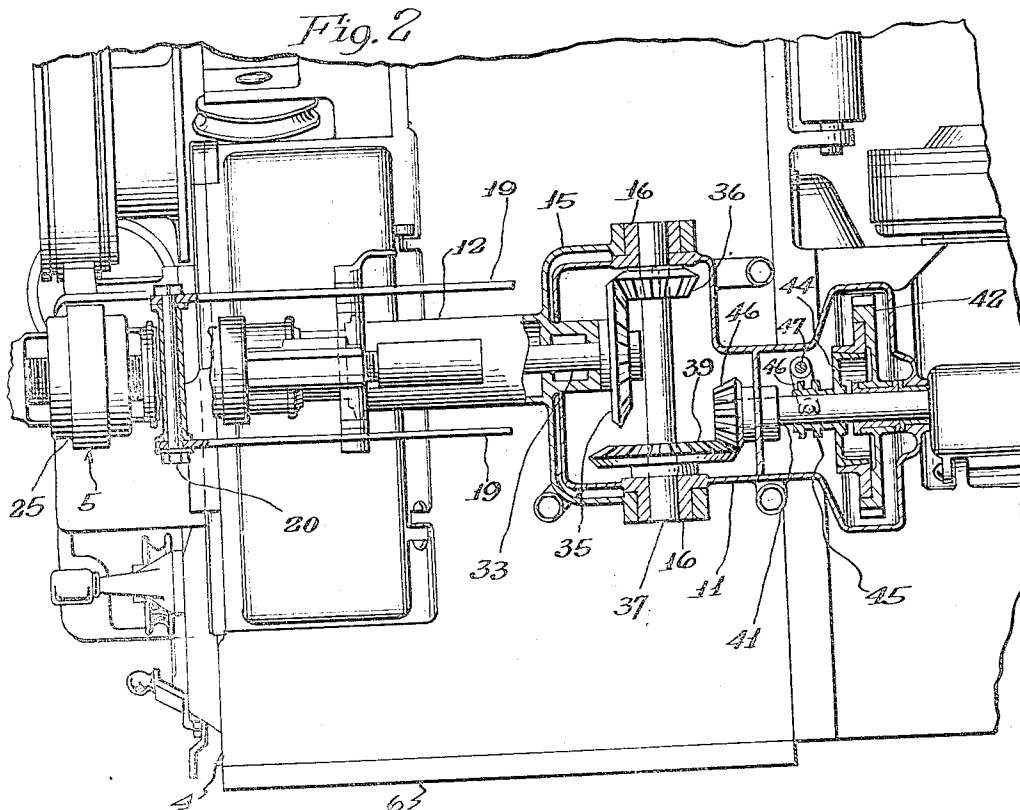
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UNITED STATES PATENT OFFICE

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MINING MACHINE

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Application September 10, 1930
Serial No. 480,885

5 Claims. (Cl. 262—9)

This invention relates to improvements in mining machines of the shortwall type adapted to be moved on its bottom along the mine bottom, and has among other objects to provide a new and improved mining machine having a drilling mechanism attached thereto for drilling in the mine wall at various elevations and angles with respect thereto.

A prior application, Serial No. 263,402, filed by me March 21, 1928, and entitled Improvements in drilling mechanisms, shows a mining machine having a drilling mechanism attached thereto. While the device of my present invention shows a drilling mechanism attached to a mining machine, said present invention differs from my prior invention in that an improved means is provided for mounting the drilling mechanism on a mining machine which takes up a minimum amount of head room and permits a maximum amount of vertical adjustment of the drilling mechanism and in that an improved means is provided for positively driving the drilling mechanism from the mining machine motor.

Other objects of my invention will appear from time to time as this specification proceeds. My invention may be more clearly understood with reference to the accompanying drawings wherein:

Figure 1 is a side elevation of the device embodying my invention with parts broken away and in section;

Figure 2 is an enlarged partial fragmentary plan view of the device shown in Figure 1 with parts broken away and in section, and with the drilling mechanism in the position shown by dotted lines in Figure 1; and

Figure 3 is an enlarged partial fragmentary side elevation of the drilling mechanism as shown in Figure 2 with parts broken away and in section to more clearly show the details of my invention.

Referring now in particular to the drawings, the device embodying my invention includes a mining machine 4 of the low vein shortwall type having a drilling mechanism 5 mounted thereon. The mining machine 4 is of a well known type having a motor 6 at the rearward end thereof and a cutting and feeding element 7 forwardly of said motor and actuated thereby in a well known manner. The motor 6 is herein preferably shown as being an electric motor which is slidable on its bottom on the mine bottom so as to provide a mining machine of mini-

imum vertical dimensions commonly known as a mining machine of the low vein type.

The mining machine 4 has a cutter bar 8 projecting forwardly therefrom for cutting a kerf in the mine wall and has feeding mechanism thereon for moving the mining machine along the mine wall as the cutter bar is sumped therein in a usual manner which is no part of my invention so will not herein be described in detail.

The feeding and cutting mechanism is driven from the forward end of the motor 6 by means of a motor pinion 9 and intermediate gear 10 in a usual manner which will not herein be described in detail since it is no part of my invention.

Referring now in particular to the novel features of my invention, the drilling mechanism 5 has been mounted on the mining machine 4 so as to provide a mining machine and drilling mechanism of minimum height for drilling at various elevations and angles with respect to the mine wall, and so that said drilling mechanism may be driven by the mining machine motor 6 in all positions of adjustment of said drilling mechanism with respect to said mining machine.

A supporting frame 11 is mounted on the top portion of the mining machine 4 adjacent the longitudinal central axis thereof and extends from the forward portion of the motor 6 forwardly along the cutting and feeding element 7 beyond the intermediate gear 10. The supporting frame 11 serves as a housing for the reduction gear mechanism for driving the drilling mechanism 5 from the mining machine motor 6 and also serves as a supporting means for a supporting arm 12 for said drilling mechanism and is fixed to the top portion of the motor by means of suitable cap screws in a usual manner.

The supporting arm 12 is pivotally mounted on the supporting frame 11 for pivotal movement with respect to the mining machine 4 about a transverse axis, and has a forked portion 15 journaled on bosses 16 extending outwardly from each side of the supporting frame 11. The supporting arm 12 extends rearwardly from the supporting frame 11 along the motor 6 and has a member 17 extending forwardly therefrom between the forked portion 15 to engage the supporting frame 11 and form a stop to prevent said supporting arm from being moved about its pivotal axis beyond a certain predetermined point and thus prevent said support-

ing arm from being extended forwardly along said mining machine.

Means are provided to hold the supporting arm 12 at various angular positions with respect to the mining machine motor 6, which means herein comprise a plurality of straps 19 pivotally supported at the rearward end of the mining machine motor 6 at opposite ends of a pin 20 supported on a supporting member 21 which in turn is fixed to the rearward top portion of said mining machine motor. A slot 22 extends longitudinally of each strap 19 for a portion of the length thereof and each slot 22 is engageable with opposite ends of a bolt 23, which bolt has connection with the supporting arm 12 so that tightening of the nut on said bolt against the straps 19 holds said supporting arm in a fixed position with respect to the mining machine motor 6.

The rearward end of the supporting arm 12 has a drilling head 25 pivotally mounted thereon on pins 26 extending outwardly from each side of said supporting arm in a usual manner so said drilling head may be angularly moved with respect to said supporting arm. Straps 27 are pivotally connected to each side of the supporting arm 12 and have connection with the drilling head 25 rearwardly of the point of pivotal connection of said drilling head with the supporting arm 12 to hold said drilling head in various angular positions with respect to said supporting arm in a manner similar to which said supporting arm is held in various angular positions with respect to the motor 6.

The drilling head 25 is of an ordinary construction so will only be described insofar as is necessary to fully disclose my present invention. A spur gear 29 is journaled on its hub within the drilling head 25 and has driving connection with a thread bar 30 for rotating said thread bar and translationally moving said thread bar with respect to said spur gear and drilling head. A suitable drilling means is adapted to be connected to the forward end of the thread bar 30. The drilling means may be of any type well known to the art but is herein shown as a drill 31 having an ordinary type of fish tail bit 32 at its forward end and conveying means 31a extending therealong to remove the cuttings from said bit during the drilling operation and guide the drill within the hole.

Means are provided for driving the spur gear 29 from the motor 6 in all positions of adjustment of the drilling head 25 and supporting arm 12 with respect to the mining machine, which means herein comprise a shaft 33 journaled within the supporting arm 12 and having a spur gear 34 fixed to its rearward end, which spur gear has driving connection with the spur gear 29. The spur gears 29 and 34 are provided with relatively deep teeth chamfered at their edges so that the gear 34 may drive the gear 29 in all positions of adjustment of the drilling head 25 with respect to the supporting arm 12 in a usual manner as has been more fully described in my prior application, Serial No. 263,402, hereinbefore mentioned in this specification.

A bevel gear 35 is fixed on the forward end of the shaft 33 and is driven by a bevel pinion 36 on a transverse shaft 37 journaled within the bosses 16 for pivotally supporting the supporting arm 12 on the supporting frame 11. A bevel gear 39 is fixed on the transverse shaft 37 opposite from the bevel pinion 36 and is driven by a bevel pinion 40 fixed on a longitudinal

shaft 41 journaled within the supporting frame 11. A spur gear 42 is freely mounted on the longitudinal shaft 41 and meshes with and is driven by the intermediate gear 10 for driving the mining machine cutting and feeding mechanism. It may be noted that an aperture 43 is provided in the cover for the mining machine gearing to allow the spur gear 42 to be driven from the intermediate gear 10.

Suitable clutch means are provided for operatively connecting the spur gear 42 with the longitudinal shaft 41 for driving said shaft, which means herein comprises a friction clutch 44 of an ordinary construction. The friction clutch 44 is herein shown as a cone clutch but may be of any other form and is moved along the longitudinal shaft 41 to engage or disengage said clutch with the spur gear 42 by means of a clutch collar 45, clutch yoke 46 and a suitable system of levers indicated at 47, having engagement with said clutch yoke.

It may now be seen that the drill 31 may be driven from the mining machine motor 6 in all positions of the supporting arm 12 and drilling head 25 with respect to said mining machine motor and that a new and novel means has been provided for driving said drill from said mining machine motor which means is selectively connectible therewith and is of a simple and rugged construction. It may also be seen that since the supporting arm 12 extends rearwardly along the mining machine 4 and that since means are provided to prevent said supporting arm from extending forwardly along said mining machine, that a standard length of drill and feed bar may be utilized for drilling and that a hole of the depth desired may be drilled in one operation without stopping the drilling mechanism to reset the bit or thread bar as is usual in drilling mechanisms mounted on mining machines.

It may thus be seen that a mining machine has been provided having a new and novel drilling mechanism supported thereon, which drilling mechanism is moved along the face with the mining machine as a kerf is being cut thereunder so that holes may be drilled in the mine wall at various positions therein during the undercutting operation without removing the mining machine from the coal and that this drilling mechanism is so constructed that it takes up a minimum amount of head room and permits the use of a standard length drill and thread bar, thus eliminating the necessity of frequent adjustment of said drill and thread bar during the drilling operation.

Although I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction and arrangement of the various parts may be altered or changed without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting myself to the particular form illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In combination with a mining machine, a motor, and drilling mechanism supported on said mining machine comprising a supporting arm having one end supported on said mining machine for pivotal movement about a transverse axis and having its opposite end extending towards the rearward end of said mining machine and having a drilling head supported on said opposite end for adjustable movement with

respect thereto about an axis extending transversely of the longitudinal axis of said arm and extending towards the forward end of said mining machine, said drilling head having a drill thereon for drilling in the mine wall forwardly of said mining machine, and power transmission means carried within said supporting arm for operatively connecting said drilling head with said motor.

said mining machine and having a drilling head supported on said rearward end of said supporting arm extending towards the forward end of said mining machine, said drilling head supporting a drill at the forward end thereof for drilling a hole in the mine wall forwardly of said mining machine and being supported on said supporting arm for pivotal movement with respect thereto about an axis disposed transversely of said mining machine for forming an adjustable connection with said mining machine for drilling a plurality of horizontal or angularly disposed holes in the mine wall at various elevations and angles with respect thereto, and power transmission means carried within said drilling arm connectible with said intermediate gear.

2. In combination with a mining machine, a motor, cutting and feeding mechanism supported forwardly of said motor, drive means for operatively connecting said cutting and feeding mechanism with said mining machine motor including a motor pinion and an intermediate gear driven therefrom, drilling mechanism supported on said mining machine comprising a supporting arm supported at one end on said mining machine for pivotal movement about a transverse axis having its opposite end extending towards the rearward end of said mining machine and having a drilling head supported on said opposite end of said supporting arm extending towards the forward end of said mining machine and supporting a drill at the forward end thereof for drilling a hole in the mine wall forwardly of said mining machine, said drilling head being supported on said supporting arm for pivotal movement with respect thereto about an axis disposed transversely of said mining machine for forming an adjustable connection with said mining machine for drilling a plurality of horizontal or angularly disposed holes in the mine wall at various elevations and angles with respect thereto and means for driving said drilling mechanism from said motor comprising a spur gear meshing with and driven from said intermediate gear.

4. In a drilling apparatus, a support comprising a mining machine, said mining machine including a motor, a supporting arm extending in a rearward direction along said mining machine and pivotally connected therewith for movement about a transverse axis, a drilling head supported on the rearward end of said drilling arm for pivotal movement with respect to said drilling arm about a transverse axis, means for supporting said drilling arm in various positions of adjustment with respect to said mining machine, and means for limiting the pivotal movement of said supporting arm to prevent said supporting arm from extending forwardly of said mining machine.

3. In combination with a mining machine, a motor, cutting and feeding mechanism supported forwardly of said motor, drive means for operatively connecting said cutting and feeding mechanism with said mining machine motor including a motor pinion and an intermediate gear driven therefrom, and drilling mechanism supported on said mining machine and having operative connection with said intermediate gear comprising a supporting arm supported at one end on said mining machine for pivotal movement about a transverse axis having its opposite end extending towards the rearward end of

5. In a drilling apparatus, a support comprising a mining machine, said mining machine including a motor, a supporting arm extending in a rearward direction along said mining machine and pivotally connected therewith for movement about a transverse axis, a drilling head supported on the rearward end of said drilling arm for pivotal movement with respect to said drilling arm about a transverse axis, means for supporting said drilling arm in various positions of adjustment with respect to said mining machine, said means also limiting the pivotal movement of said supporting arm to prevent said supporting arm from extending forwardly of said mining machine, and power transmission means carried within said supporting arm for operatively connecting said drilling head with said motor.

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