Dec. 27, 1927. 1,654,055

C. V. SHANABERGER

COAL MINING MACHINE

Filed July 3. 1924 3 Sheets-Sheet 1

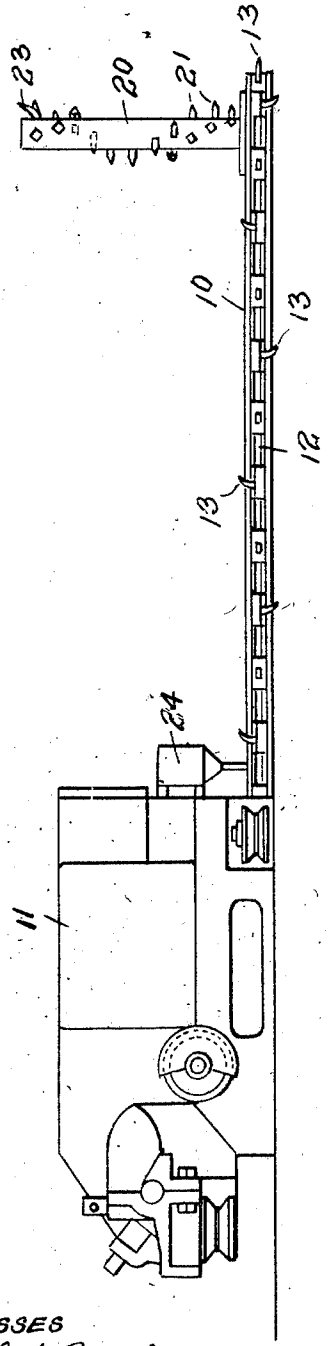


FIG. 1.

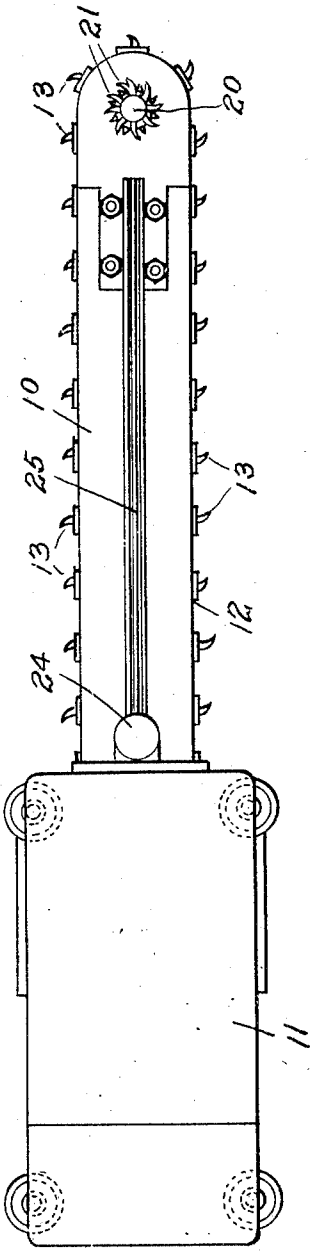


FIG. 2.

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Filed July 3. 1924 3 Sheets-Sheet 2

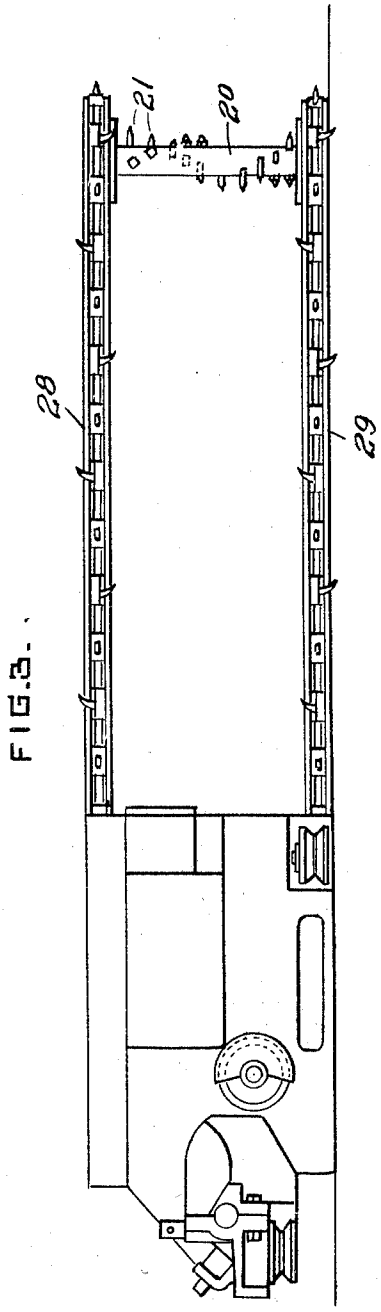


FIG. 3.

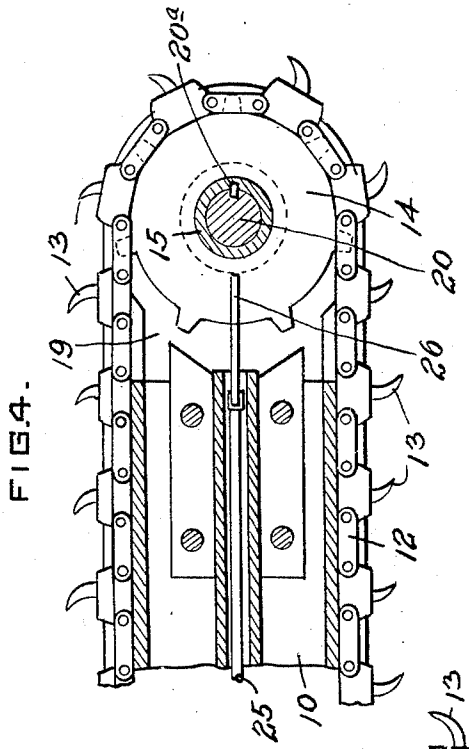


FIG. 4.

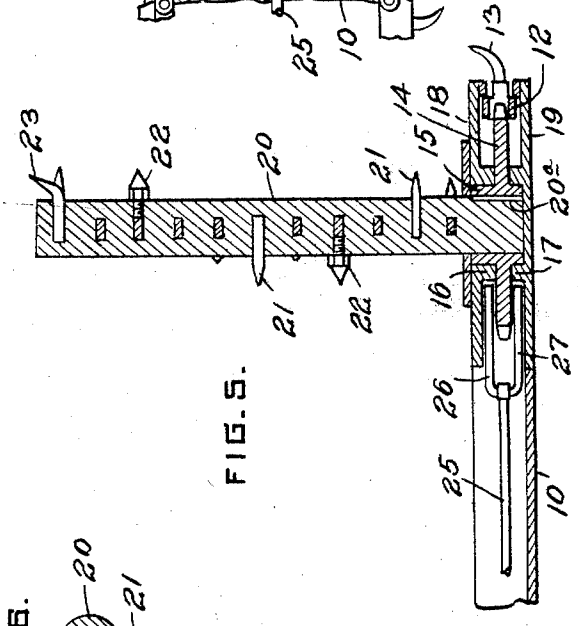


FIG. 5.



FIG. 6.

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COAL MINING MACHINE

Filed July 3. 1924 3 Sheets-Sheet 3

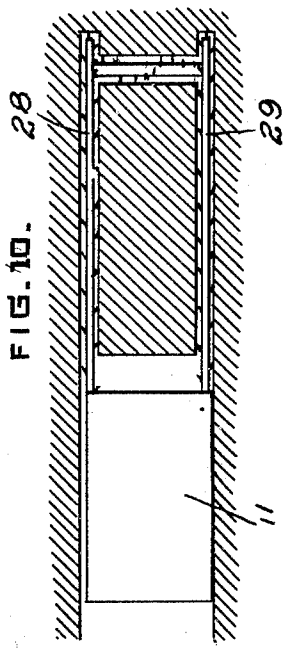


FIG. 10.

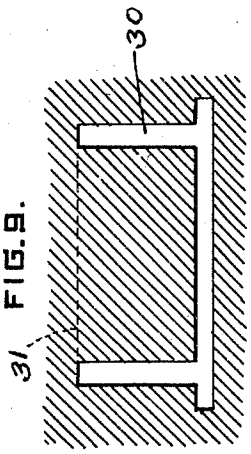


FIG. 9.

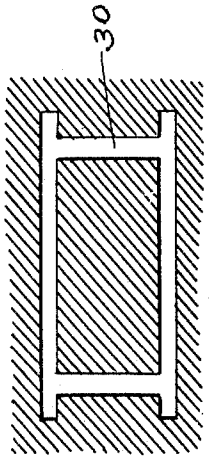


FIG. 11.

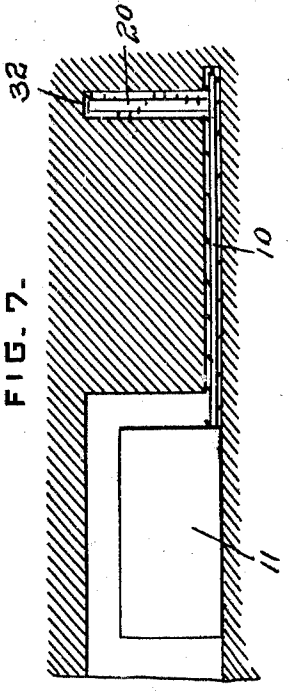


FIG. 7.

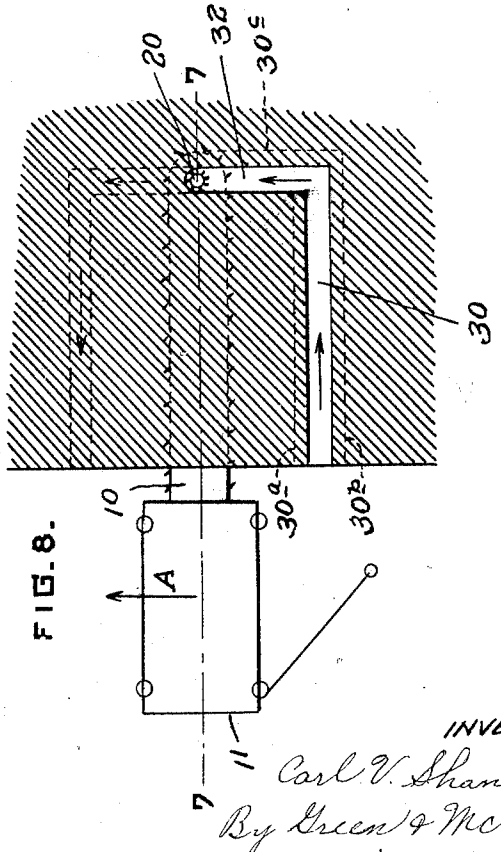


FIG. 8.

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UNITED STATES PATENT OFFICE.

CARL V. SHANABERGER, OF ROCKINGHAM, PENNSYLVANIA, ASSIGNOR TO MINE APPLIANCES COMPANY, A CORPORATION OF DELAWARE.

COAL-MINING MACHINE.

Application filed July 3, 1924. Serial No. 723,971.

This invention relates to mining machines and an object thereof is to produce a relatively simple machine and one, therefore, which is relatively cheap to manufacture and simple of operation, which is capable of severing or cutting complete blocks or sections of coal from the wall of a mine.

A further object of this invention is to produce a mining machine of relatively simple construction which is capable of cutting or severing complete blocks or sections from the wall of a mine, except for the top of such sections, which in some mines, will remain attached to the roof, and in others will separate therefrom to allow the severed section to fall.

A still further object is to provide means whereby most of the present standard short wall or side cutting machines may be cheaply and quickly converted into a machine capable of cutting or severing complete blocks or sections (except for the top) from the wall of a mine by cutting a vertically extending channel or kerf above the outer end of the cutter bar, while the undercutter is in operation during sumping cutting across the face and when backing out, thereby greatly increasing the capacity and efficiency of such standard machines.

These, as well as other objects which will readily appear to those skilled in the coal mining art, I attain by means of the device and the modification thereof described in the specification and illustrated in the drawings accompanying and forming part of this application.

In the drawings, which are more or less diagrammatic (since standard short wall or side cutting machines are now well known) Figure 1 is a side view in elevation of a standard type of short wall machine with my invention incorporated therein. Fig. 2 is a top plan view of the same. Fig. 3 is a view similar to Fig. 1 of a modified form of device which comprises an undercutter and an overcutter combined in one machine embodying my invention. Fig. 4 is an enlarged detail view of the end of one of the cutter bars and shows the cutter chain and the end sprocket for said chain located in the cutter head. Fig. 5 is a fragmentary view in sectional elevation of the head end of the cutter bar with the vertical cutter forming a part of my invention mounted thereon. Fig. 6 is a detail view in section of one of the picks or cutter teeth used in the vertical cutter of this invention and shows the preferred form of set screw for holding the pick or cutter tooth in place. Figs. 7, 8 and 9 graphically show the capabilities of the form of machine illustrated in Figs. 1 and 2; Fig. 7 being taken on line 7—7 of Fig. 8; Figs. 10 and 11 show the capabilities of the form of machine shown in Fig. 3.

In Figs. 1 and 2 of the drawings, 10 represents the cutter bar of any standard short wall or side cutting machine and 11 represents the housing for the motor and gears for driving the cutting chain 12 and the other mechanism entering into the make-up of the complete machine.

As shown in Fig. 4, the cutter chain is provided with cutter bits 13 and the outer end of the chain is supported upon and drives a sprocket 14. The sprocket hub 15 is journaled within upper and lower bearings respectively numbered 16 and 17 formed as part of the cutter head made up of plates 18 and 19. Hub 15 of the sprocket is formed with a central bore, within which a vertically extending cutter bar 20 is secured by means of a key 21. The vertical cutter bar is provided with a spirally arranged series of sockets or holes for the reception of cutter bits 21. The bits are secured in place by means of set screws 22, the heads of which are pointed to form picks or cutters which will come into play if some of the cutter bits are broken. The uppermost cutter bit is preferably forked and provided with one portion 23 which extends above the top of cutter bar 20 so as to cut a clearance for the top of the bar.

From this construction, it will be seen that as the chain is driven, the cutter bar 20 will likewise be driven and at a speed which will depend upon the speed of the chain.

For the purpose of lubricating the sprocket bearings, I provide a lubricant reservoir 24 from which lubricant in the form of oil may be fed through pipe 25 and branch pipes 26 and 27 to the bearings for the sprocket hub. In place of reservoir 24, any one of the well known force feed devices now on the market may be substituted for forcing lubricant to the bearings if desired.

In the form of machine illustrated in Fig. 3, I provide upper and lower cutter bars similar to the lower cutter bar of Figs. 1 and 2 and in this form of machine, vertical cut-

ter bar 20 is keyed into the sprockets for both the upper and lower cutter chains which in this form of machine are respectively numbered 28 and 29.

With the form of machine illustrated in Figs. 1 and 2, it will be seen that as the sump cut is made in the face of the coal, a shearing cut will be made simultaneously above the sump cut, and, when the cutter is moved across the face of the coal, a rear cut or channel will be made. As the machine is backed out the face will be sheared at that point. A section of coal will thus be cut away from the face and will be unsupported or unconnected with the face except at the top where it will be connected to the roof. With the machine shown in Fig. 3, a section will be completely severed or cut from the face and as the cutting progresses, the coal will either break and fall in sections or will fall at or near the end of the cut or when the machine is being backed out of the coal face.

This type of machine is particularly adapted for thin seam mines, but of course, can be utilized in thick seam mines, if desired.

Fig. 8 illustrates the operation of cutting across the coal face with the machine moving in the direction of the arrow A. 30 represents the sumping cut. In making this cut, the cutter chain will cut a wider channel (represented by side cuts 30^a and 30^b) than the vertical cutter bar 20. When the cut across the face is made, the undercut will extend a slight distance behind the kerf cut by the cutter bar 20 due to the fact that the cutter chain projects beyond the cutters or picks of cutter bar 20. This back cut is represented by 30^c.

Fig. 7 is taken on line 7—7 of Fig. 8. Fig. 9 represents the shearing cuts and the cut across the face made by the machine shown in Figs. 7 and 8. Dotted line 31 represents the top of the back channel which is shown at 32 in Figs. 7 and 8.

Fig. 10 represents the machine employing the double cutter chains as it would appear when in the position of the machine of Fig. 8 and Fig. 11 represents the cuts made by the double chain machine as they appear when looking toward the face of the coal.

Having thus described my invention, what I claim is:

1. A combination in a mining machine of a cutter bar having spaced bearings formed in the outer end thereof, a sprocket wheel mounted in said bearings and connected to the cutter chain of said machine, and a vertically extending cutter bar rigidly secured to said sprocket.

2. A combination in a mining machine of a cutter bar having spaced bearings formed in the outer end thereof, a sprocket wheel mounted in said bearings and provided with a hollow hub, a cutter chain co-operating with said sprocket and a vertically extending cutter bar keyed within the hub of said sprocket.

3. A cutter bar provided with a plurality of cutter bits removably mounted thereon and means for securing said bits in place, said securing means having cutting points formed thereon.

4. A cutter bar provided with a plurality of cutter bits removably mounted thereon, set screws for securing said bits in place and cutting points formed on the heads of said set screws.

In testimony whereof, I have hereunto subscribed my name this 28th day of June, 1924.

CARL V. SHANABERGER.