May 11, 1937. G. D. MILLER 2,080,181

COAL UNDERCUTTING MACHINE

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Fig.1.

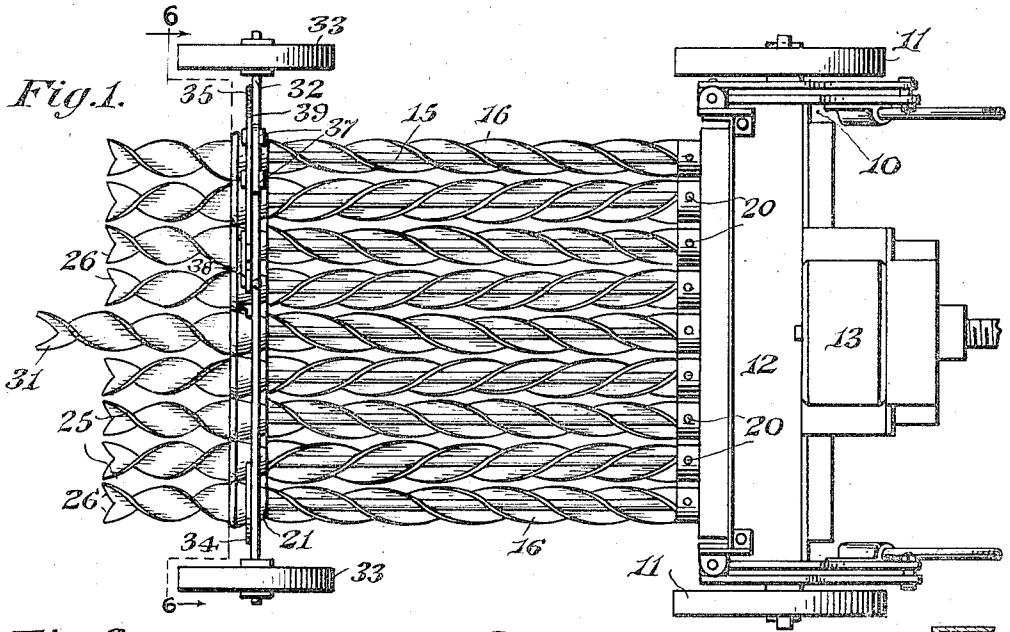


Fig.2.

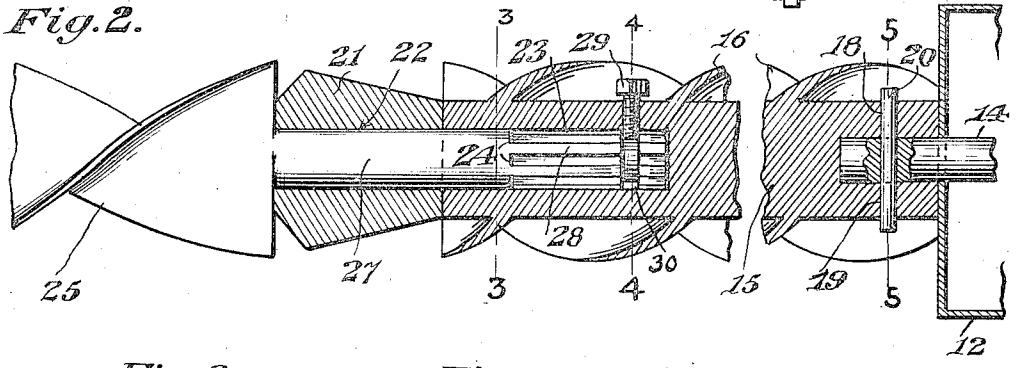


Fig.3.

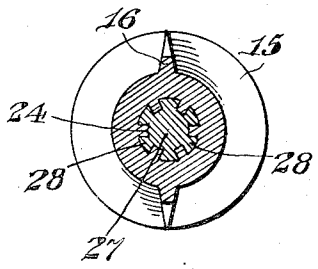


Fig.4.

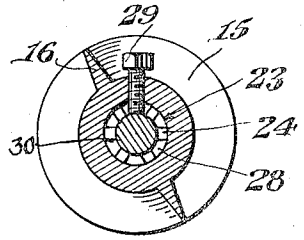


Fig.5.

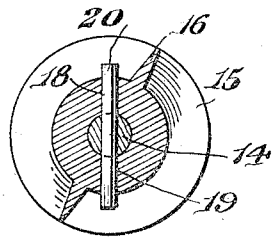
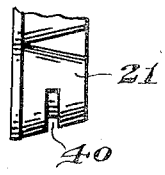


Fig.10.



Inventor

Gideon D. Miller;

By

Attorney

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Fig. 6.

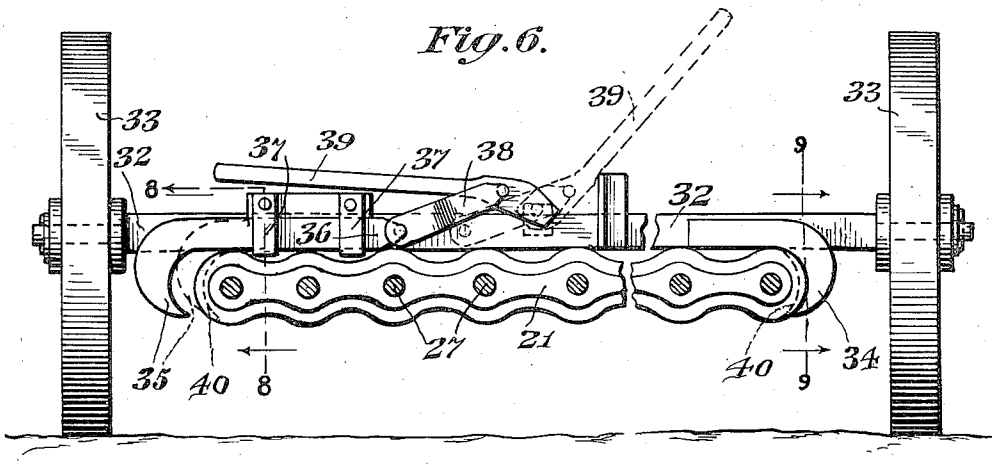


Fig. 7.

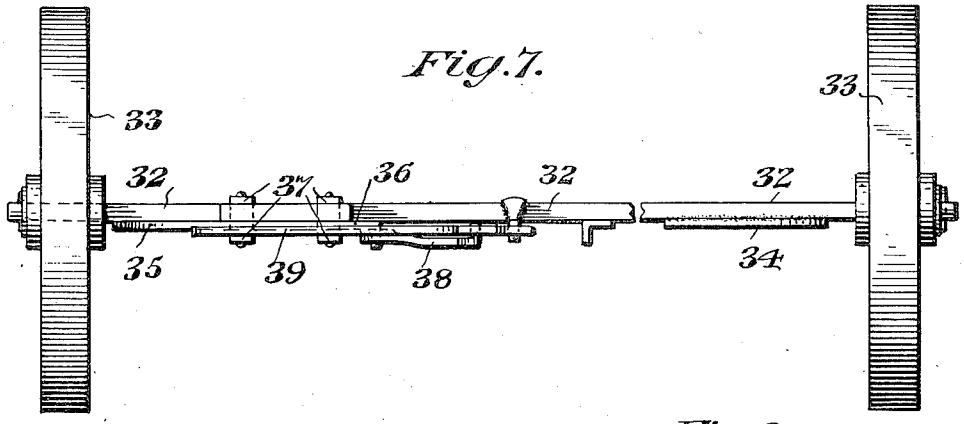


Fig. 8.

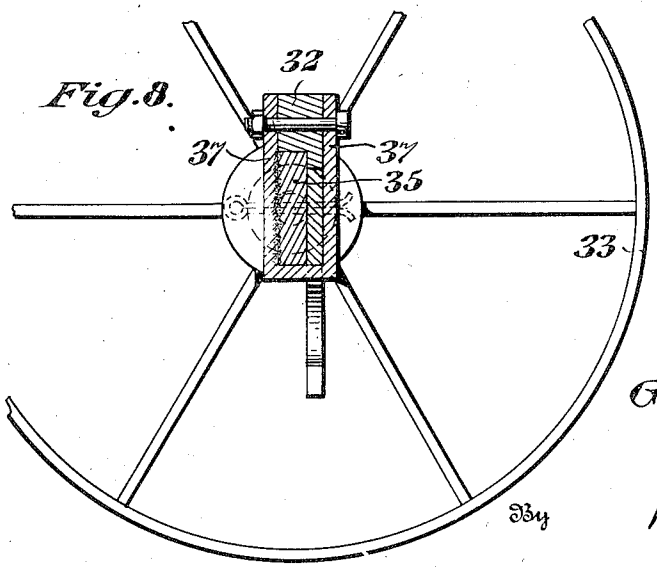
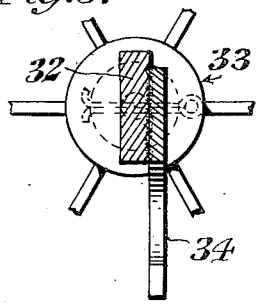


Fig. 9.



Inventor

Gideon D. Miller;

By

Attorney

Patented May 11, 1937 2,080,181

UNITED STATES PATENT OFFICE

2,080,181

COAL UNDERCUTTING MACHINE

Gideon D. Miller, Springs, Pa.

Application April 2, 1935, Serial No. 14,323

6 Claims. (Cl. 262—22)

The present invention relates to coal undercutting machines of the type having a bank of augers extending forwardly for the purpose of drilling a row of holes or kerf under the coal which is to be removed from the mine.

One object of the invention is to provide an improved type of auger for such a machine, such augers being made in two parts and permitting an improved type of bearing for the front portions thereof.

Another object is to provide means for automatically disconnecting the auger from the driving mechanism in case an unusually severe strain is put on the auger, thus protecting both the auger and the driving mechanism.

Another object is to provide a machine in which one of the augers extends to a point in advance of the other to provide a means for guiding the rest of the augers as a cut in the coal is started.

Still another object is to provide wheeled supporting means for the front part of the augers in order that the machine may be wheeled from place to place and wheeled into position before the face of the mine, such support being easily detachable from the machine to permit the augers to enter the coal.

In the accompanying drawings:

Figure 1 is a plan view of a coal cutting machine constructed in accordance with this invention.

Figure 2 is a sectional view of one of the augers and a portion of the machine.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view on the line 4—4 of Figure 2.

Figure 5 is a sectional view on the line 5—5 of Figure 2.

Figure 6 is a front elevation showing the device for supporting the front portions of the augers.

Figure 7 is a plan view of the device.

Figure 8 is a sectional view on the line 8—8 of Figure 6.

Figure 9 is a sectional view on the line 9—9 of Figure 6.

Figure 10 is a plan view of one end of the yoke bar showing the hook-receiving groove.

In the preferred embodiment of the invention, as shown in the drawings, the machine includes a frame 10 mounted on wheels 11 and supporting a gear casing 12 containing a system of gears through which the motor 13 drives spindles 14 that project through the front wall of the casing.

Associated with each of the spindles 14 is an auger 15 comprising an elongated cylindrical body having spiral flights 16. The spirals 16 are preferably reversed in adjacent augers and the adjacent augers are driven in opposite directions. Each of the augers 15 has in the rear portion of its body a socket 17 adapted to snugly receive within it one of the spindles 14. The augers and spindles respectively have registering transverse openings 18 and 19, into which a pin 20 may be driven to key the two together. The pin 20 is of such material and size that in case of an excessive strain, caused for example by the cutter running into abnormally hard material, the pin will be sheared off, allowing the spindle to turn relatively to the auger before the auger or driving mechanism can be injured.

Inasmuch as the augers must be held in parallel relation, their forward portions are held by a yoke 21 which runs transversely to the augers at their outer extremities. The yoke 21 has a plurality of bearing openings 22 therein, corresponding in number and position to the augers 15.

Each of the augers 15 has a socket 23 in its front end, these sockets registering with the bearing openings 22 of the yoke. The sockets 23 are splined as at 24.

Cutter bits 25 are attached to the augers for the purpose of boring into the mine face. These cutter bits are spirally formed and have front cutting faces as at 26, and cylindrical studs 27 extending rearwardly for a distance substantially as great as the total of the depth of the sockets 23 and the width of the yoke 21. The studs 27 are of suitable diameter to turn in the bearing openings 22 of the yoke 21 and their end portions bear splines 28 to engage with the splines 24 of the sockets. The studs may be held in the sockets 23, as by set screws 29 engaging in channels 30 cut into the studs.

It has been found that there is considerable difficulty involved in starting an entire bank of augers into the face of a mine at one time, since revolving cutter bits bearing against the wall tend to move the machine about. This difficulty has been overcome by making the bank of augers of an odd number of augers and by providing the central auger with a cutter bit 31 substantially longer than those applied to the others.

Inasmuch as one auger may be started in with comparative ease, this overcomes the difficulty, since by the time the short cutter bits come into contact with the material of the face, the central bit will have entered the material to a sufficient distance to prevent any lateral movement of the machine.

In order to allow the machine to be easily moved from place to place in a mine or to be easily advanced to position against the face where it is desired to make a cut, a wheeled support for the front portion of the augers is provided. Since this would prevent the advance of the augers into the coal, if permanently secured to the machine, it is constructed in such a manner as to be easily and instantaneously detached.

The support includes a cross bar or axle **32** having a wheel **33** mounted upon each of its ends. At a proper point near one end of the axle is permanently mounted a hook **34** having its hooked end turned inwardly toward the longitudinal center of the axle. A cooperating hook **35** is movably mounted near the other end of the axle, the shank portion **36** being slidable in clips **37** suitably secured to the axle **32**. The movement of the hook **35** may be effected by a link **38** pivoted to the shank **36** and a lever **39** pivoted to the link **38** and to the axle **33** in such a manner that as the lever is swung in one direction, the hook is moved outwardly and when the lever is swung oppositely the hook moves inwardly, approaching the hook **34**. Preferably the yoke **21** has a groove **40** in each of its ends to engage the ends of the hooks.

It is thought that from the above the many advantages of this mining machine will be apparent. The construction of the augers in three parts allows the easy and quick exchange of cutter bits, provides for efficient bearings in the yoke, and because of the frangible connections between the augers and the driving spindles, prevents the gearing and motor of the machine being damaged by shocks due to the augers striking unusually hard substances.

The longer cutter bit of the central auger provides for easier starting of the cut into the face of the mine, and allows the gang of augers to be started in the correct position.

The detachable wheeled support for the augers allows the machine to be wheeled from place to place and support the augers at the proper height for undercutting the coal. The link and lever arrangement controlling the attachment of the support to the yoke permits quick and easy attachment to or detachment from the machine.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim, is:

1. In a coal undercutting machine, in combination, a plurality of forwardly extending auger elements having sockets in their forward ends, a yoke abutting the forward ends of the auger elements, and having bearing openings registering with the sockets in the auger elements, and a cutter bit for each auger element, the said bits having each a spiral bearing portion larger in diameter than the thickness of the yoke, and a stud extending rearwardly from the spiral bearing portion through one of the bearing openings in the yoke and engaged in the socket of an auger element.

2. In a coal undercutting machine, the combination with a plurality of auger elements bearing cutter bits of substantially the same length and a yoke supported at the front ends of the augers and behind the bits, of an auger element bearing a cutter bit of greater length than those borne by the other augers.

3. In combination with a coal undercutting machine of the type having a forwardly extending bank of augers, a detachable wheeled support for the forward portion of the bank of augers.

4. In a coal undercutting machine of the type having a plurality of forwardly extending augers and a yoke for the forward ends of the augers, a detachable support for the forward portion of the augers including a wheeled axle, and means movable longitudinally of the axle into and out of engagement with the ends of the yoke.

5. In a coal undercutting machine of the type having a plurality of forwardly extending augers and a yoke for the forward ends of the augers, a detachable support for the forward portion of the augers including a wheeled axle, means movable longitudinally of the axle into and out of engagement with the ends of the yoke, and means mounted on the axle for effecting movement of yoke-engaging means.

6. In a coal undercutting machine of the type having a plurality of forwardly extending augers and a yoke for the forward ends of the augers, a detachable support for the forward portions of the augers including a cross bar, and means movably mounted on the cross bar for engaging the ends of the yoke.

GIDEON D. MILLER.