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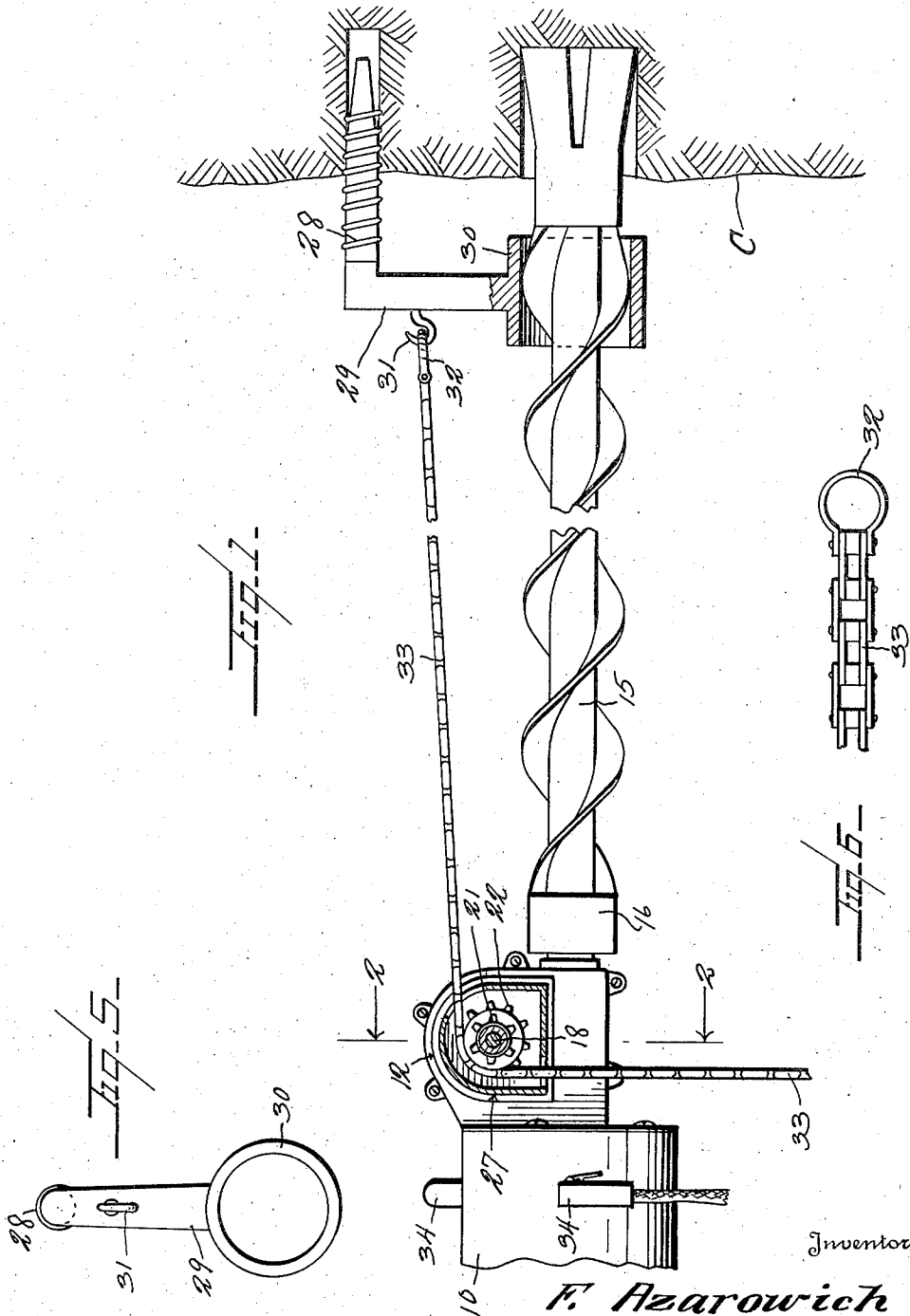
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ELECTRIC COAL MINING MACHINE

Filed March 17, 1938

2 Sheets-Sheet 1



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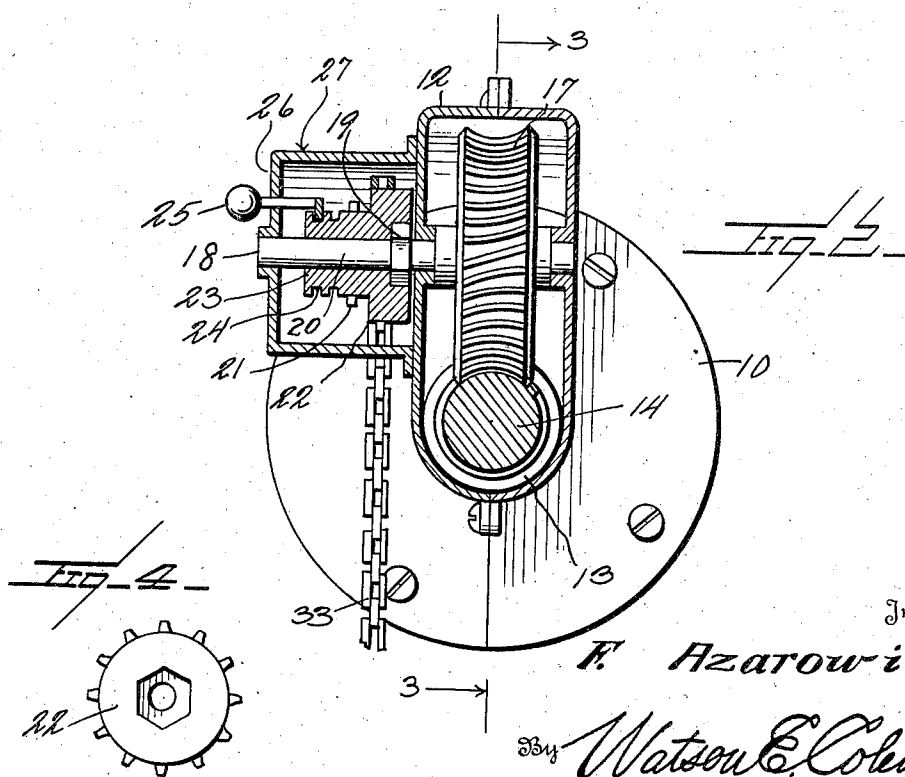
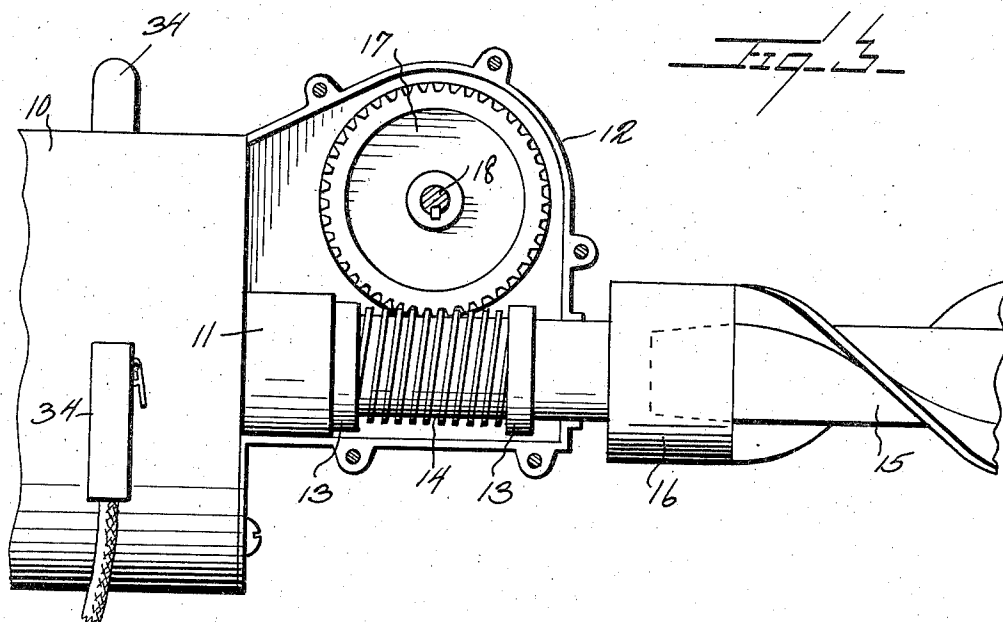
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## UNITED STATES PATENT OFFICE

2,143,752

## ELECTRIC COAL MINING MACHINE

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Application March 17, 1938, Serial No. 196,492

4 Claims. (Cl. 255—52)

This invention relates to drills and particularly to an electrically operated drill designed for the purpose of mining coal.

The general object of the invention is to provide an electric drill with power operated means whereby the drill may be fed into the coal without the necessity of the drilling machine being supported and the drill forced into the coal by manual power, machines of the present day of this type requiring two or three men to hold the machine and push the drill into the coal.

Another object is to provide a mechanism of this character which includes the drill, an electric motor for the drill, one or more sprocket wheels operated by the motor and a chain having means whereby it may be anchored in the coal, this chain passing over one of the sprocket wheels and the sprocket wheel acting to pull the drill into the coal.

A further object is to provide a structure of this character having means for supporting the forward end of the drill just in advance of the coal breast and provide means whereby the sprocket chain may be readily engaged with any one of a plurality of sprocket wheels of different sizes and whereby the sprocket wheels may turn freely when the drill is taken out of the coal.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:—

Fig. 1 is a side elevation of a drilling machine constructed in accordance with my invention, the housing for the sprocket wheels and the sleeve for supporting the drill bit being in section;

Fig. 2 is a section on the line 2—2 of Fig. 5 on an enlarged scale;

Fig. 3 is an enlarged side elevation of the drill and the means for rotating the sprocket wheels;

Fig. 4 is an inside face view of a sprocket wheel unit;

Fig. 5 is an elevation of the drill support shown in Fig. 1;

Fig. 6 is a fragmentary top plan view of the free end of the sprocket chain.

Referring to these drawings, 10 designates a casing within which is disposed an electric motor, the motor not being shown. This motor has its shaft 11 extending out through the end of the casing and through a housing 12 having ball bearings 13 for supporting the motor shaft. Between the bearings 13, the motor shaft is provided with a worm 14. Adapted to be operatively connected to the end of the shaft 11 is a drill 15 shown as a screw drill of ordinary type. This drill is

detachable from the shaft, the shaft having a squared portion as, for instance, a square socket 16 for the reception of the squared end or shank of the bit 15.

Mounted within the housing 12 and shown as mounted above the worm 14 is a worm wheel 17 mounted upon a transverse shaft 18 extending through the housing. This shaft has a square or many-sided portion 19 and a cylindrical portion 20. Mounted upon the shaft 18 and normally engaged with the squared portion 19 are a pair of connected sprocket wheels 21 and 22, these sprocket wheels being of different diameters. Also formed with the sprocket wheel 21 is a collar 23 having a circumferential groove 24. A finger 25 extends through the front wall 26 of a housing 27 which encloses the sprocket wheels, this finger engaging the groove in the collar 24. When the sprocket wheels are engaged with the many-sided portion 19 of the shaft 18, the wheels will, of course, be rotated by the shaft and when the finger 25 is pulled outward, the sprocket wheels will be shifted onto the cylindrical portion 20 of the shaft and thus be free to rotate independently of the shaft 18.

For the purpose of supporting the drill or bit 15 adjacent the wall of the coal C, I provide the screw 28 which is adapted to be forced into a bore previously made in the face of the coal and this screw is mounted in the upper end of a depending arm 29 which carries at its lower end a sleeve 30 having an internal diameter slightly larger than the external diameter of the threads of the bit 15. Mounted on this arm 29 is a hook 31 and engageable with this hook is an eye 32 on a sprocket chain 33. This sprocket chain is adapted to pass over either one of the sprocket wheels 21 or 22, as shown in Fig. 1. Assuming that the screw 28 is engaged with the face of the coal and the sprocket chain engaged with the hook 31, then it will be obvious that when the motor is started, the bit 15 will be rotated and simultaneously the sprocket wheels will be rotated at a relatively slow speed and the sprocket wheel acting on the chain 33 will cause the drill to be drawn into the coal.

In the operation of this device and before it is placed in position for drilling, a 6" or 7" hole is drilled into the coal. The screw 28 is then turned into the hole thus drilled and the chain 33 is attached to the hook 31. The forward end of the drill is then raised upward, the motor remaining on the bottom of the tunnel. The drill is inserted in the sleeve 30 and then the motor is raised into drilling position, that is, in the po-

sition shown in Fig. 1. The sleeve 30 will now guide the drill while the miner holds the machine up by the handles 34 on the motor casing. After the drill has been continued as long as desired and it is necessary to take the drill out of the drilled hole, the sprocket wheel or wheels 21 and 22 must be disconnected from the squared portion 19 of the shaft 18. This is accomplished as before stated, by pulling out on the finger 25. This disconnects the sprockets from the squared portion of the shaft and allows the sprockets to rotate freely on the shaft 18. As the machine with the drill is pulled away from the coal, the chain will be pulled out to its initial or starting position. By having a plurality of sprocket wheels 21 and 22 of different sizes, the speed of the feed may be increased or decreased by pulling the chain off one sprocket and placing it upon another.

It will be seen that the chain 33 not only acts to feed the drill into the coal but that the chain helps to hold the machine up in the air while the drilling is progressing.

While I have illustrated the provision of two sprockets for the purpose of securing a variation in the speed of the feed, I do not wish to be limited to this as more sprockets might be used, if desired, or a gear reduction mechanism could be used to give a variation in the speeds.

It will be seen that this machine eliminates the use of a thread bar and thread box and which are ordinarily used to feed a drill into the coal. It also reduces the weight which has to be supported by the miner when drilling into the coal. The machine speeds up the drilling of holes and the construction prevents the machine from kicking all the way around. By providing an automatic feed of the character shown, this machine will not take a sudden big cut into the coal when it hits a soft spot in the coal.

What is claimed is:—

1. A mine drilling machine, including a rotary drill, a motor having a shaft with which the drill has operative driving connection, a worm on the motor shaft, a worm wheel driven by the worm and having a shaft, one portion of the shaft being many-sided and an adjacent portion being cylindrical, a sprocket wheel mounted on said worm wheel shaft and longitudinally shiftable therealong to engage the sprocket wheel either with the many-sided portion or the cylindrical portion of said shaft, means for shifting the sprocket wheel onto either

selected portion of the shaft, a sprocket chain engaging over the sprocket wheel, and means at one end of the sprocket chain whereby this end of the chain may be engaged with the work.

2. A mine drilling machine, including a rotary drill, a motor having a shaft disposed in alinement with the drill and with which the drill has operative driving connection, a worm wheel driven by the worm, a shaft for the worm wheel, a sprocket wheel loosely mounted upon said worm wheel shaft, means for operatively engaging the sprocket wheel with said shaft for rotation therewith or disconnecting it therefrom for independent rotation, a sprocket chain passing over the sprocket wheel and an element having means whereby it may be engaged with the breast of the work, the element having a depending portion provided with a sleeve for supporting the drill adjacent the breast of the work, said sprocket chain having operative connection with said element and being disposed above the drill whereby the sprocket chain acts to assist in supporting the rear portion of the drilling machine.

3. A mine drilling machine, including a rotary drill, a motor having a shaft with which the drill has operative driving connection, a sprocket wheel, means for operatively engaging the sprocket wheel with the motor or disengaging it therefrom to permit the free rotation of the sprocket wheel independently of the motor, an element having means whereby it may be engaged with the breast of the work, said element having a depending sleeve for supporting the drill adjacent the breast of the work, and a sprocket chain passing over the sprocket wheel and disposed above the drill and detachably engaged with said element.

4. A mine drilling machine, including a rotary drill, a motor having a shaft disposed in alinement with the drill and with which the drill has operative driving connection, a worm carried by the motor shaft, a worm wheel engaged by said worm and having a shaft, a sprocket wheel mounted for free rotation on the shaft, means for rotatably engaging the sprocket wheel with the worm wheel shaft for unitary rotation therewith or disengagement therefrom, and a sprocket chain passing over the sprocket wheel and extending at an upward inclination above the drill and at its free end having means whereby it may be engaged with the breast of the work.

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