Aug. 16, 1932. F. W. VODOZ 1,871,638

DRILLING MECHANISM

Filed July 29, 1929

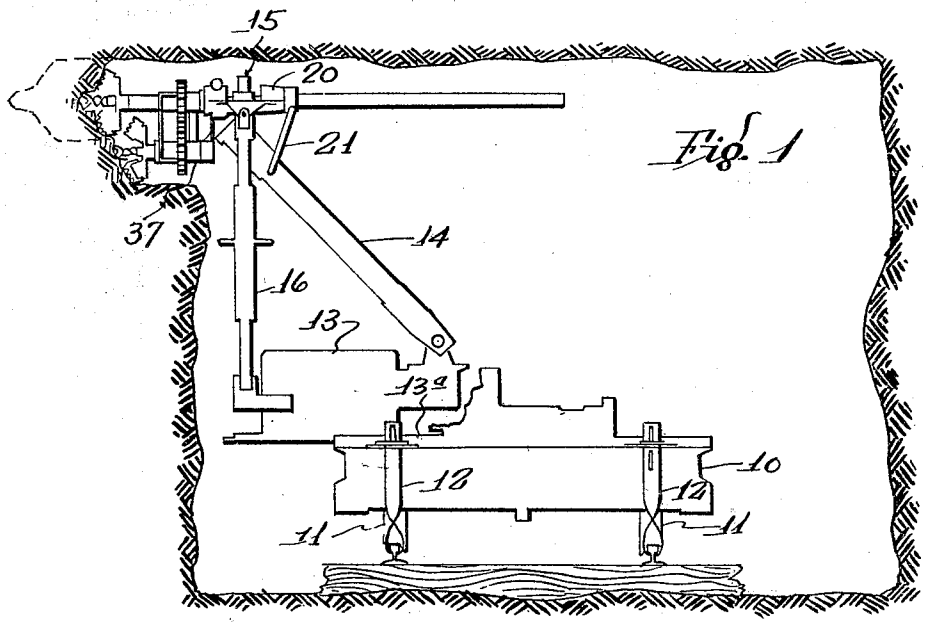

Fig. 1

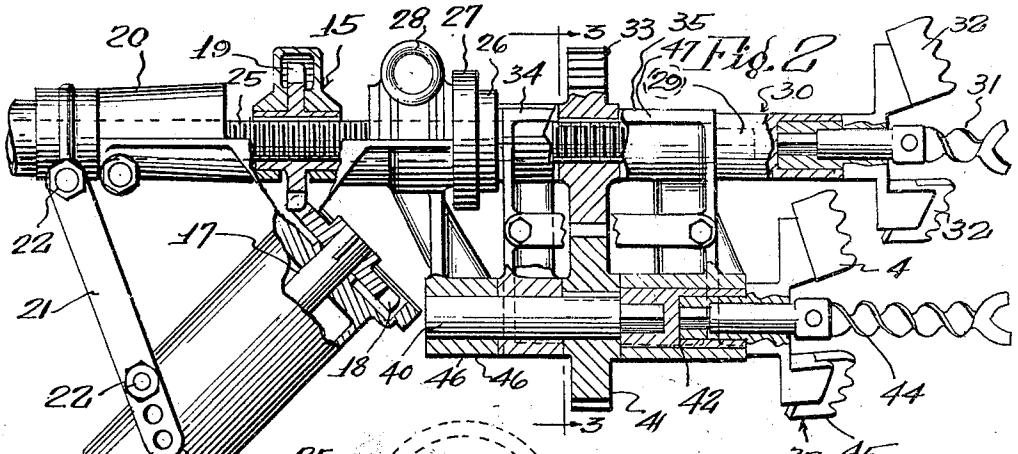

Fig. 2

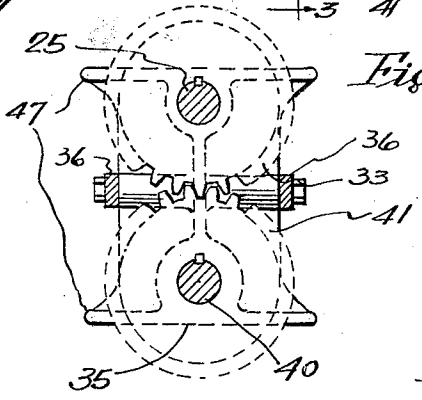

Fig. 3

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UNITED STATES PATENT OFFICE

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DRILLING MECHANISM

Application filed July 29, 1929. Serial No. 381,732.

This invention relates to improvements in drilling mechanisms particularly adapted for use in coal mines, and has for its principal object to provide a new and improved drilling mechanism for cutting holes in a mine wall for receiving roof supporting means.

A prior application bearing Serial Number 328,901, filed December 28, 1929, discloses a drilling mechanism for cutting holes in a mine wall for receiving roof supporting means. My present invention relates in particular to the drilling mechanism or mechanisms for cutting holes in the mine wall for receiving roof supporting timbers or other roof supporting means, and has among other objects to provide a new and improved drilling mechanism for cutting said aforementioned holes in a mine wall of a longer vertical cross section than horizontal cross section to enable timbers to be more readily inserted in said holes than formerly and to provide ample space for blocking up said timbers within the hole to more readily adjust the height of the timber with respect to the mine roof.

My invention may be more readily understood with reference to the accompanying drawing, wherein:

Figure 1 is a vertical cross sectional view of a mine entry with the device embodying my invention cutting a hole in the mine wall;

Figure 2 is an enlarged side elevation of the drilling mechanism shown in Figure 1 with parts broken away and in section to more clearly show the details of my invention; and

Figure 3 is a cross-sectional view taken on line 3—3 of Figure 2.

Like numerals refer to like parts throughout the several figures.

In the drawing, one embodiment of my invention is illustrated as mounted on a truck 10 movable about the mine rails on wheels 11, 11, and held in a stationary position on the rails when drilling by means of clamping devices 12, 12, which clamp on to the mine rail. The truck 10 is shown and described in detail in my prior application, Serial Number 328,901, previously mentioned, so will not be described in detail excepting in so far as is necessary to illustrate the features of my present invention.

A motor 13 is mounted on a turntable 13*a* on said truck which turntable is movable transversely of said truck to adjust the position of the drilling mechanism with respect to the mine wall. A drill supporting arm 14 is supported at one end of said motor for pivotal movement with respect thereto and supports a drilling mechanism generally indicated at 15 at its outer end. Adjustable supporting means 16 are provided to support the drilling mechanism in various positions with respect to the mine wall. A shaft 17 is journaled within the drill supporting arm 14 and is driven from the motor 13 by a suitable gear reduction (not herein shown since it is no part of my present invention) and has a spur gear 18 on its outer end which meshes with and drives a spur gear 19 journaled within a drilling head 20 for driving the drilling mechanisms.

The drilling head is trunnioned on the outer end of the drill supporting arm 14 for vertical pivotal movement with respect thereto and is held in its several permissible positions of adjustment with respect to the drill supporting arm 14 in a usual manner by means of a spacing link 21 and nuts and bolts 22, 22.

The drilling mechanism 15 is similar to that described in a prior application bearing Serial Number 268,733, filed by me April 9, 1928, so will only be described in so far as is necessary to disclose my present invention.

A threaded shaft 25 passes through the hub of the gear 19 and is feathered therein so said shaft may move through said drill for substantially its entire length. Threaded jaws, not shown in detail, but generally indicated by reference numeral 26 are provided on the forward portion of the drilling head 20 to engage the threaded shaft 25 to move said shaft through the gear 19 as said gear is rotating said shaft in a usual manner. The threaded jaws generally indicated at 26 are engaged or disengaged with the threaded shaft 25 by means of a hand operated disc 27 in a usual manner, not herein shown or described since it is no part of my invention.

Suitable frictional means (not shown) controlled by a hand wheel 28 in a usual manner are also provided to stop feeding or translational movement of the threaded shaft 25 on overload of the drilling mechanism.

The threaded shaft 25 has a squared end 29 adaptable to fit in a socket of a cutter and drill holding member 30 for driving said cutter and drill holding member. A twist drill 31 of an ordinary fish tail type is held in the forward end of the cutter and drill holding member 30, and a plurality of cutters 32, 32, project radially and forwardly from the drill holding member 30 for drilling a hole in a mine wall of a larger diameter than can be obtained from the ordinary fish-tail type of twist drill as is fully described in my prior application, Serial Number 296,917, hereinbefore mentioned.

Referring now in particular to the novel features of my invention whereby a hole of longer vertical dimensions than horizontal dimensions is drilled in a mine wall, I employ an auxiliary drilling mechanism 37 in connection with the ordinary drilling mechanism used for drilling circular holes, as already described. This auxiliary drill is driven by a gear 33 keyed near the forward portion of the threaded shaft 25. A member 34 abuts the rearward end of the gear 33 and is suspended from the threaded shaft 25. Similarly a member 35 abuts the forward end of the gear 33 and is suspended from the threaded shaft 25. The members 34 and 35 are held together so as to move with the threaded shaft 25 as said shaft is moved translationally with respect to the drilling head 20 by means of links 36, 36, connected at their ends to the members 34 and 35. A shaft 40 is journaled in the lower portion of the member 34 and has a spur gear 41 keyed thereon which gear meshes with and is driven by the spur gear 33.

The forward end of the shaft 40 is of a squared cross-section and fits in a squared portion of a socket 42 for driving said socket which socket is in turn journaled in the lower portion of the member 35. A cutter and drill holding member 43 has a squared end and is inserted in the forward end of the socket 42 and driven thereby. The cutter and drill holding member 43 is similar to the cutter and drill holding member 30 and has a fish-tail type of twist drill 44 held in its forward end and has a plurality of cutters projecting radially therefrom. It may be here noted that the twist drill 44 is longer than the twist drill 31 and that the point of said drill extends forwardly so as to be in line with the point of the twist drill 31 so that both drills will enter the coal simultaneously to serve as a guide for the cutter and drill holding member 43 and counteract the tendency of said member to rotate around the gear 33. It may also be noted that the rearward end of the shaft 40 is journaled in a member 46 for slidable and rotatable movement therein to prevent rotation of the gear 41 around the gear 33 until the drill 44 has entered the coal a sufficient depth to hold said gear from rotation around the gear 33. Flanges 47, 47, project outwardly from each side of the top and bottom portions of the member 35 to guide the cutter and drill holding member 43 when said member has advanced into the hole to a great enough depth so that the flanges 47, 47, may engage the sides of the hole.

It may now be seen that I have provided a new and improved drilling mechanism for drilling a hole in a mine wall of larger vertical dimensions than horizontal dimensions and that such a hole is drilled by means of connecting two drills together so that the auxiliary or second drill is simultaneously rotated and fed into the material with the primary or leading drill, and thus provide a new and improved drilling device for cutting holes in a mine wall for receiving the mine timbers, which timbers may be more easily inserted than formerly due to the elongated shape of the hole, or any other supporting means for supporting the mine roof.

While I only show my device as being adaptable to cut a hole of larger vertical than horizontal dimensions, it may readily be understood that my device may be easily adaptable to cut a hole of larger horizontal than vertical dimensions for receiving a plurality of timbers in the mine wall.

Although I have 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 or scope of the invention. Furthermore, I do not wish to be construed as limiting myself to the particular embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In combination with a drilling mechanism, a plurality of drills, a single member detachably connected to one of said drills for rotating and feeding said drill, and means connectible with said single member for rotating and feeding another of said drills simultaneously with said first mentioned drill comprising a gear fixed to said single drill rotating and feeding member and a drill supporting member journaled on said single drill rotating and feeding member and having bearing engagement with one face of said gear for moving said drill supporting member translationally with said single drill rotating and feeding member.

2. In combination with a drilling mechanism, a plurality of drills, a single member detachably connected to one of said drills for rotating and feeding said drill, and means

connectible with said single member for rotating and feeding another of said drills simultaneously with said first mentioned drill comprising a gear fixed to said single drill rotating and feeding member, a drill supporting member journaled on said single drill rotating and feeding member and having bearing engagement with one face of said gear for moving said drill supporting means translationally with said single drill rotating and feeding member, a drill journaled in said drill supporting member, and a gear operatively connected with said first mentioned gear for rotating said drill.

3. In combination with a drilling mechanism, a drill, a single threaded shaft for rotating and feeding said drill, a second drill parallel with said first mentioned drill, and means for rotating and feeding said second drill simultaneously with said first mentioned drill comprising a drill supporting member journaled on and depending from said threaded shaft and having said second mentioned drill supported for rotatable movement therein, and a gear fixed on said threaded shaft and driven thereby having bearing engagement with said drill supporting member for moving said drill supporting member as said shaft moves translationally.

4. In combination with a drilling mechanism, a drill, a single threaded shaft for rotating and feeding said drill, a second drill parallel with said first mentioned drill, and means for rotating and feeding said second drill simultaneously with said first mentioned drill comprising a drill supporting member journaled on and depending from said threaded shaft and having said second mentioned drill supported for rotatable movement therein, a gear fixed on said threaded shaft and driven thereby having bearing engagement with said drill supporting member for moving said drill supporting member as said threaded shaft moves translationally, and a spur gear mounted on said drill supporting member and driven by said first mentioned gear for rotating said last mentioned drill.

5. In an apparatus of the class described, a feeding and rotating member, cutting mechanism on the forward end of said feeding and rotating member, a second cutting mechanism supported by said feeding and rotating member and driven therefrom, and means to prevent rotation of said second cutting mechanism about said feeding and rotating member comprising guide means effective during the initial drilling operation but releasable when said second cutting mechanism has advanced into the material being drilled to a sufficient depth to hold said second cutting mechanism from rotation about said feeding and rotating member.

6. In an apparatus of the class described, a feeding and rotating member, cutting mechanism on the forward end of said feeding and rotating member, a second cutting mechanism supported by said feeding and rotating member and driven therefrom, and means to prevent rotation of said second cutting mechanism about said feeding and rotating member comprising a pilot drill and guide means effective during the initial drilling operation but releasable when said pilot has obtained sufficient grip in the material being drilled to hold said second cutting mechanism from rotation about said feeding and rotating member.

7. In an apparatus of the class described, a feeding and rotating member, cutting mechanism on the forward end of said feeding and rotating member, a second cutting mechanism supported by said feeding and rotating member and driven therefrom, and means to prevent rotation of said second cutting mechanism about said feeding and rotating member comprising a pilot drill and guide means effective during the initial drilling operation but releasable when said pilot has obtained sufficient grip in the material being drilled to hold said second cutting mechanism from rotation about said feeding and rotating member, and guide means releasable when said pilot drill has penetrated the material being drilled to a sufficient depth to hold said second cutting mechanism from rotation about said feeding and rotating member.

Signed at Chicago, in the county of Cook and State of Illinois, this 27th day of July, A. D. 1929.

FREDERICK W. VODOZ.