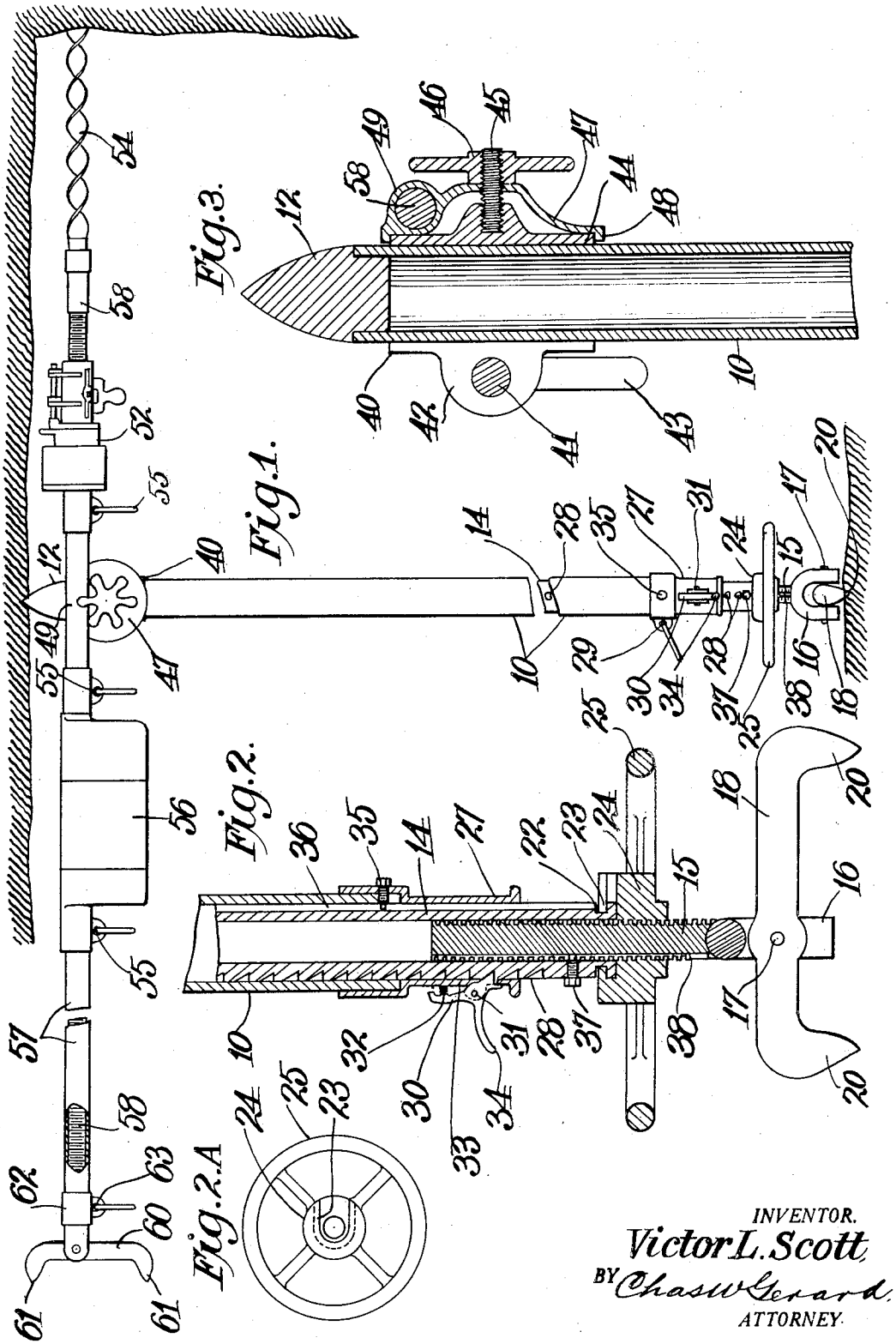
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DRILLING MACHINE

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DRILLING MACHINE

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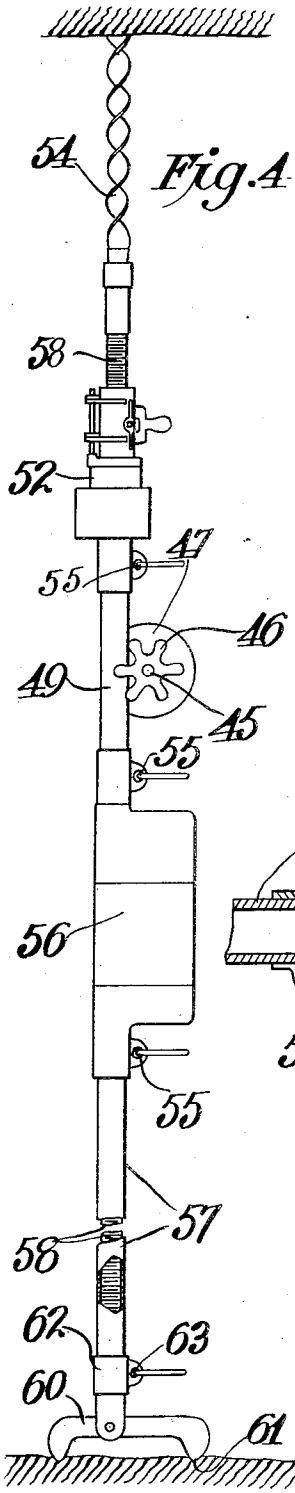


Fig.4

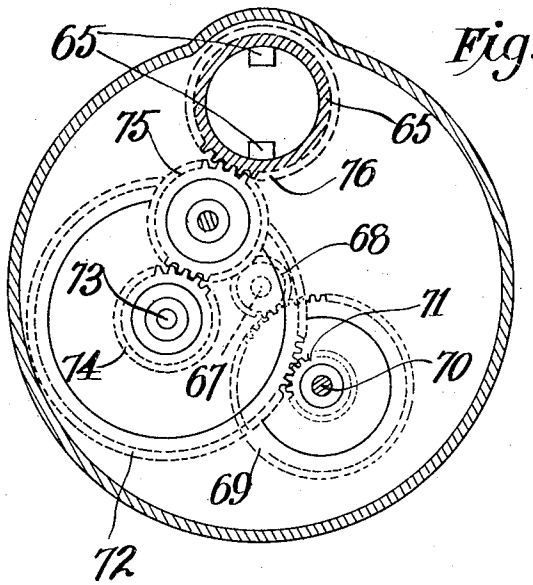


Fig.6.

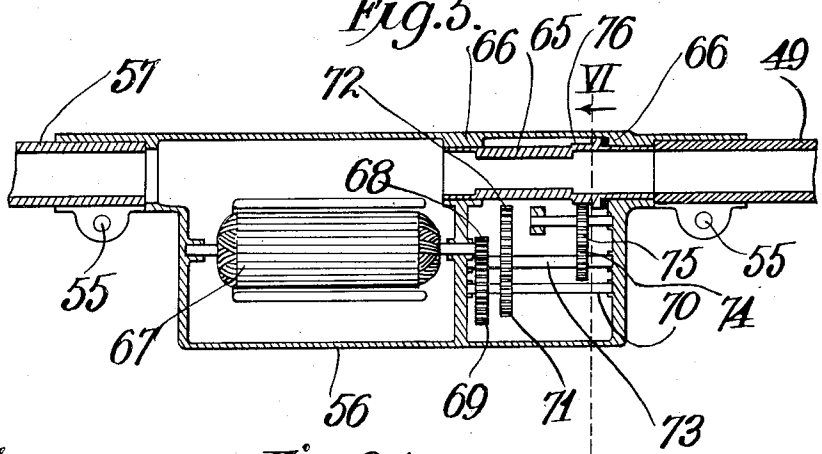


Fig.5.

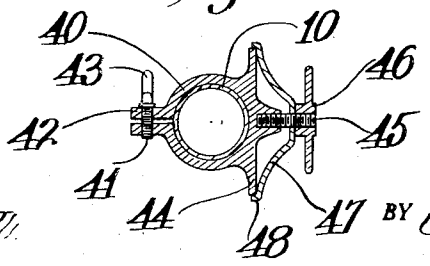


Fig.3.A

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DRILLING MACHINE

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6 Claims. (Cl. 255—53)

This invention relates to drilling apparatus, and aims to devise various improvements in both the supporting structure and also the method of mounting the driving unit for the drill.

The primary purpose of the invention is to provide a completely flexible drilling apparatus having all necessary means of adjustment for adapting the drill to be supported in practically any operative position, accommodating the supporting elements readily for the usual irregularities in the supporting surface, and for presenting the drilling tool proper in any of the operating positions that may be required in such work, as particularly encountered in coal mining operations.

With these general objects in view, as well as various other minor objects as will appear in the course of the detailed specification, the invention will now be described more specifically and in detail by reference to the accompanying drawings illustrating one form of embodiment of the improvements, after which those features and combinations deemed to be novel will be set forth and claimed.

In the drawings—

Figure 1 is an elevation illustrating the use of the apparatus for a horizontal drilling operation, and next to a roof or ceiling;

Figure 2 is an enlarged detail sectional view of the base portion of the supporting column or post;

Figure 2A is a detail on a smaller scale, showing the adjusting hand wheel for said base portion;

Figure 3 is an enlarged detail sectional view showing the upper portion of the supporting column or post;

Figure 3A is a horizontal sectional detail of the same, on a reduced scale;

Figure 4 is an elevation illustrating another operative position of the apparatus;

Figure 5 is an enlarged detail section taken on the line V—V of Figure 4; and

Figure 6 is a similar sectional view taken on the line VI—VI of Figure 5.

Referring now to the drawings in detail, these illustrate the improved apparatus as comprising a supporting leg or column including a tubular member 10 having its upper end fitted with a pointed stud 12, and its lower end with a telescoping sleeve 14 within which is also telescopingly mounted a rod 15 having a fork 16 and horizontal pivot 17 at its lower end for the swivel mounting of a foot piece 18 carrying the spurs or prongs 20. The lower end of the sleeve 14 is provided with an external groove or channel 22 into which is fitted the U-shaped collar formed as an integral flange 23 on the central hub portion 24 of an adjusting hand wheel 25 having said hub portion 24 internally threaded for cooperation with an external thread formed on the rod 15, whereby the latter may be adjusted relatively to the sleeve 14. The lower end of the tubular member 10 also carries a sleeve 27 of the same internal diameter as said member 10, for fitting the sleeve 14, one side of which is formed with a series of ratchet teeth 28 for engagement by a locking pawl 30 mounted on a pivot 31 carried by said sleeve 27.

The pawl is actuated by a spring 32 for projecting its lower end through a slot 33 in the sleeve 27 and normally into locking engagement with the teeth 28, which construction permits quick raising or lowering of the sleeve 14 within the tubular member 10, the pawl being released for this purpose by pressure applied to the foot or finger-engaging arm 34.

In addition to a clamping screw 29, the enlarged upper end of the sleeve 27 is provided with a cap screw 35, the inner end of which projects into a key-way 36 in the sleeve 14, and the latter is provided with a screw 37 projecting into a similar key-way 38 in the rod 15, whereby any relative turning movement of said sleeves and rod is prevented.

The tubular member 10 carries a split clamping sleeve 40 adapted to be adjusted to any position along the member 10 and secured in any adjusted position by means of a clamping screw 41 carried by a pair of ears 42 formed on the sleeve, and threadedly engaging one of the ears, the screw being provided with a suitable operating handle 43. One side of the sleeve 40 is formed with a substantially circular disk 44 and a centrally mounted screw 45 carrying a clamping element 46 whereby a bracket piece 47, also fitting over the screw 45, may be secured frictionally to the outer face of the disk 44, with the outer edge of which is engaged an inwardly projecting flange 48 formed on the outer margin of the bracket 47. This bracket 47 is formed with an elongated sleeve 49 which serves as a supporting arm, to one end of which may be secured, as by a clamping sleeve and screw 55, the clutch and feed mechanism assembly indicated generally by the reference numeral 52, for the auger or drill 54 and its feed screw 58. To the other end of the arm 49, a similar detachable connection is provided, as by a clamping sleeve and screw 55, with one end of the motor case or housing 56, the opposite end of which is provided with a similar detachable clamping sleeve and screw connection 55 to one end of a tubular bar 57 adapted to serve both as a housing for the drill feed screw 58 and also as a supporting arm or post (as illustrated in Fig. 4) for which purpose its free end is fitted with a swivel foot piece 60 having spurs 61, similar to the member 18 already described.

A clamping sleeve 62 and screw 63 may be used for removably attaching the foot piece 60 to the sleeve 57.

The method of mounting the motor case is such

that the key driving socket or journal 65 for the drill feed bar is carried in bearings 66 located eccentrically within the motor case 56 and entirely to one side of the shaft of the armature 67, as clearly illustrated in Figure 5, in which view is also outlined the driving connections between the motor and the driving journal 65. This driving mechanism comprises a pinion 68 on the armature shaft, meshing with a gear 69 on a countershaft 70 carrying a pinion 71, which meshes with a gear 72 on a countershaft 73 carrying a pinion 74, which meshes with an idler gear 75, this latter gear in turn meshing with the external gear teeth 76 formed on the drive socket or journal 65.

Figure 1 of the drawings illustrates the use of the apparatus with the supporting leg or column 10 and the swivel foot piece 18 engaging the floor, and as this foot piece has a pivotal connection with the post and provides two points of support by means of the spurs 20, it is evident that the foot piece will automatically adjust itself to any irregularity in the floor surface, while allowing the post to be set at any angle. The ratchet construction between the tubular member 10 and sleeve 14 affords a quick adjustment of the supporting column as to height, and a finer and further adjustment of the height is obtained by means of the hand wheel 25 and operation of the screw 15. This means of support also relieves the drilling mechanism of any side twisting strain because the post or column is held against turning. Again, the double telescoping character of the lower end of the supporting post or column eliminates the necessity of two or more different lengths of extension members, and the telescoping construction is such as to offer no interference with the sliding sleeve 40 carrying the drilling mechanism.

The turn table supporting disk 44 and its swivel bracket 47 carrying the bearing 49 for the drill feed bar and other connections enables the operation of drilling to be carried out at any angle that may be required in such work, either horizontally at any level, i. e., next to the ceiling or roof as shown in Figure 1 or next to the floor or any intermediate position, horizontal or inclined, and the eccentric relation of the drill feed bar with reference to the motor case 56 enables the drill feed bar to be operated parallel and almost directly against the surface of the floor or ceiling or side walls, as the case may be. Thus a "shot" hole may be drilled on the parting between the coal and roof or sides or bottom, as has not been practicable with the common form of apparatus.

Again, the tubular member 57 serves the double purpose of a protective sleeve for the projecting end of the drill feed screw or bar 58 and also as a supporting leg in lieu of the column or post 10; for example, in drilling in the floor, or roof, as illustrated in Figure 4, or wherever a suitable supporting surface may be had for the swivel member 60. In this use, the drill feed screw or bar 58 operates in line with the line of support, and of course keeps a proper tension upon the supporting leg.

The driving mechanism is comprised within a compact unit of lightweight construction, and is made detachable the same as the unit for the feeding mechanism 52, by means of the clamping sleeves and screws 55. In this connection it may also be pointed out that the motor is readily adaptable for other uses simply by providing tools with a chuck having a shank adapted to fit the drive journal or socket 65, as will be readily understood.

It will therefore be apparent that I have devised a simple, practical and efficient construction for carrying out the various objects of my invention, and while I have illustrated and described what I now regard as the preferred form of embodiment of the same I desire to be understood as reserving the right to make all such changes or modifications as may fairly fall within the scope of the following claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A drilling apparatus comprising a supporting column, an adjustable supporting element mounted on said column, an arm provided with a feed bar passage carried by said supporting element, and drilling mechanism including a feed device and an operating motor detachably connected with the opposite ends of said arm, respectifiely in counterbalancing relation.

2. A drilling apparatus comprising a supporting column, an adjustable supporting element mounted on said column, an arm provided with a feed bar passage carried by said supporting element, a motor having a drive journal substantially in alinement with one side of the motor case, and means for detachably connecting said motor to one end of said arm with said drive journal and feed bar passage in alinement.

3. A drilling apparatus comprising a supporting column, an adjustable supporting element mounted on said column, an arm provided with a feed bar passage carried by said supporting element, a motor having a casing formed with a feed screw passage extending longitudinally therethrough, means for detachably securing one end of the motor casing to said arm with said passages in alinement, and a tubular member adapted to form a combination protective feed screw sleeve and supporting post detachably connected with the other end of said motor casing in alinement with said passages.

4. In drilling apparatus, a motor having a casing formed with a feed screw passage extending through the casing, a tubular member connected with one end of the motor casing in alinement with said passage, and a foot piece connected with one end of said tubular member for enabling the same to serve as a supporting leg.

5. In drilling apparatus, a motor having a casing formed with a feed screw passage extending through the casing, a tubular member detachably connected with each end of the motor casing in alinement with said feed screw passage, and a foot piece connected with the free end of one of said tubular members to enable the same to function as a supporting leg.

6. In drilling apparatus, a motor having a casing formed with a feed screw passage extending through the casing, a tubular member detachably connected with each end of the motor casing in alinement with said feed screw passage, a foot piece connected with the free end of one of said tubular members to enable the same to function as a supporting leg, and a column provided with means for adjustable connection with the other tubular member intermediate the ends thereof.

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