June 12, 1951 J. C. BALDWIN 2,556,357

COMBINED MINE DRILL, TIMBER JACK, AND MINE POST

Filed Oct. 29, 1948 4 Sheets-Sheet 1

FIG. 1.

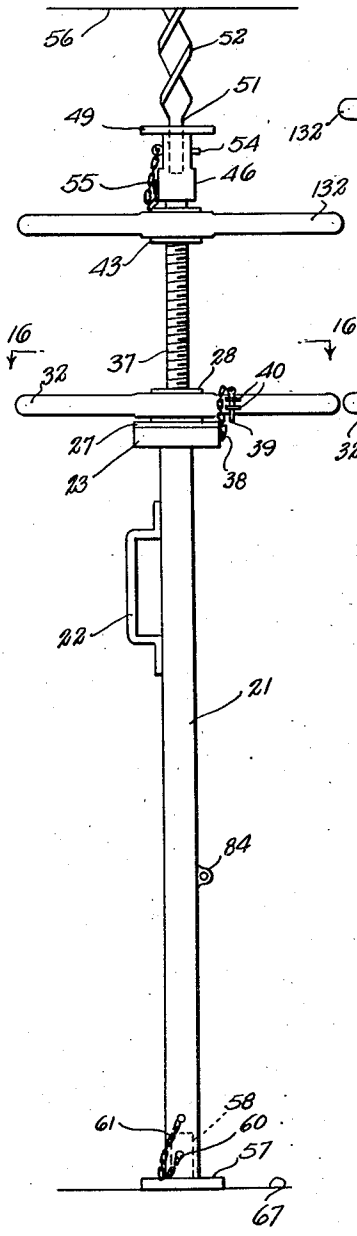


FIG. 2.

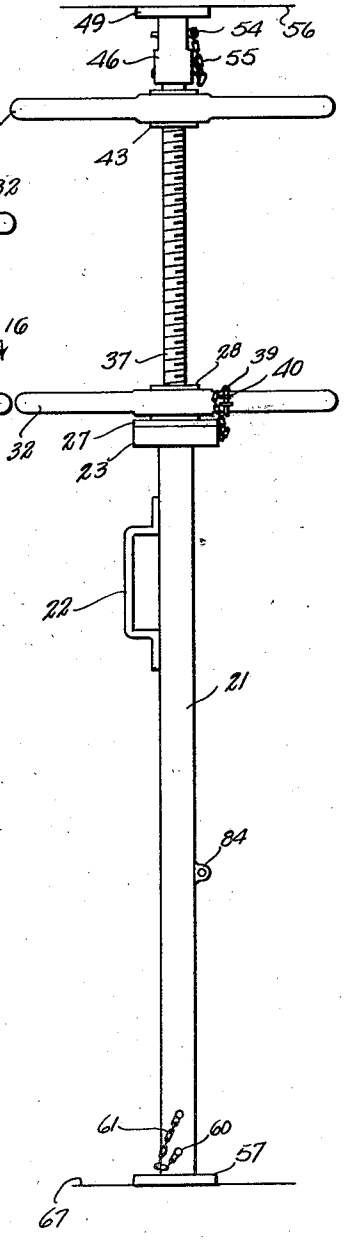
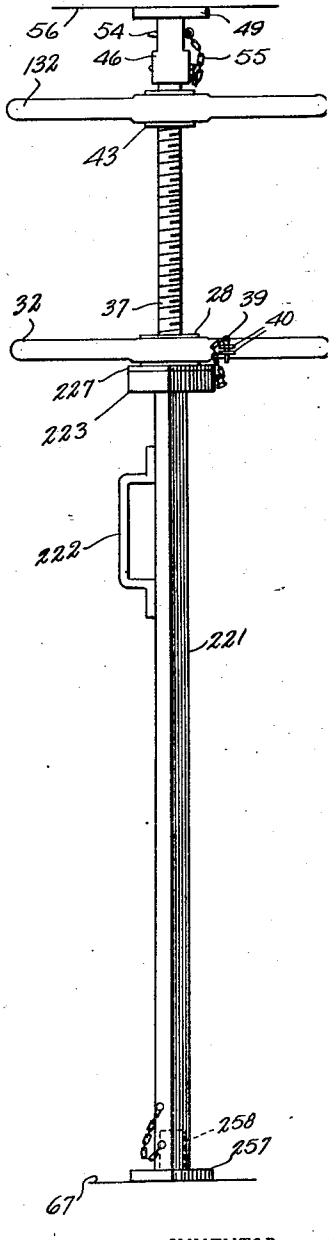


FIG. 3.



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Filed Oct. 29, 1948 4 Sheets-Sheet 2

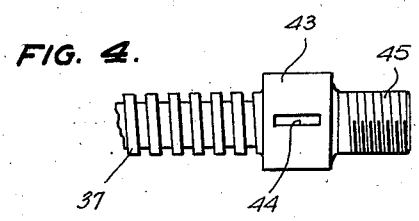


FIG. 4.

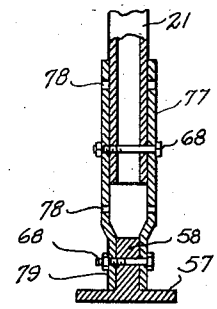


FIG. 8.

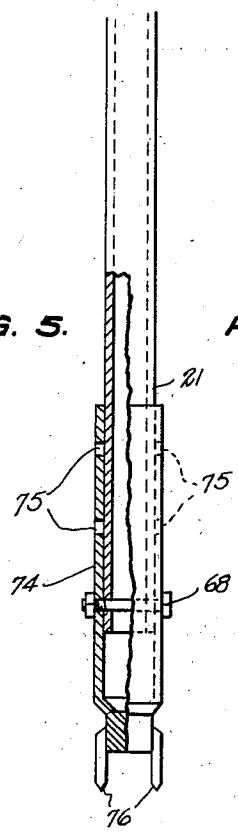


FIG. 5.

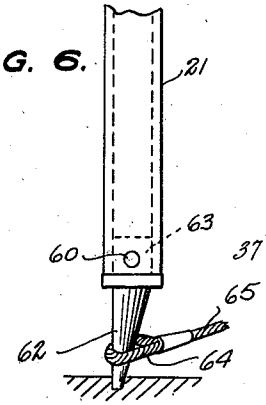


FIG. 6.



FIG. 7.

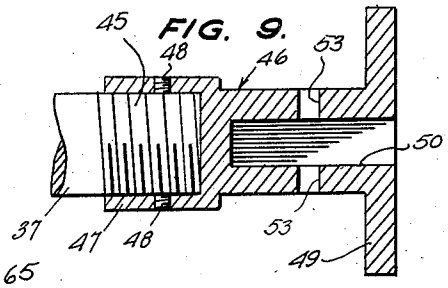


FIG. 9.

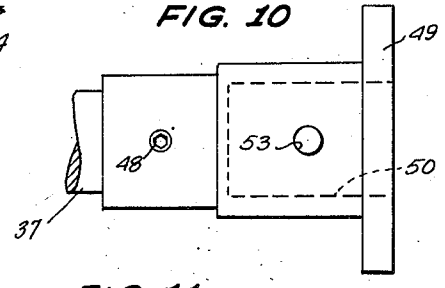


FIG. 10

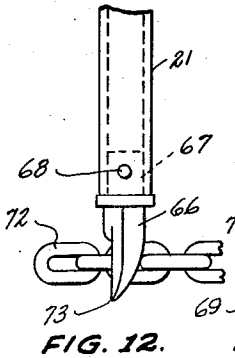


FIG. 12.

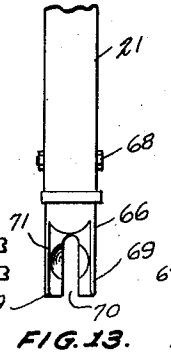


FIG. 13.

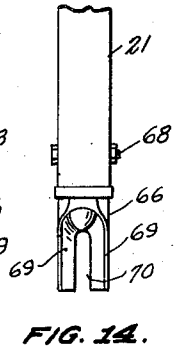


FIG. 14.

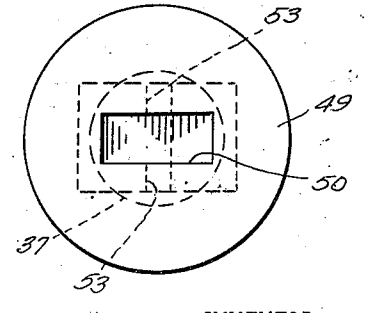


FIG. 11.

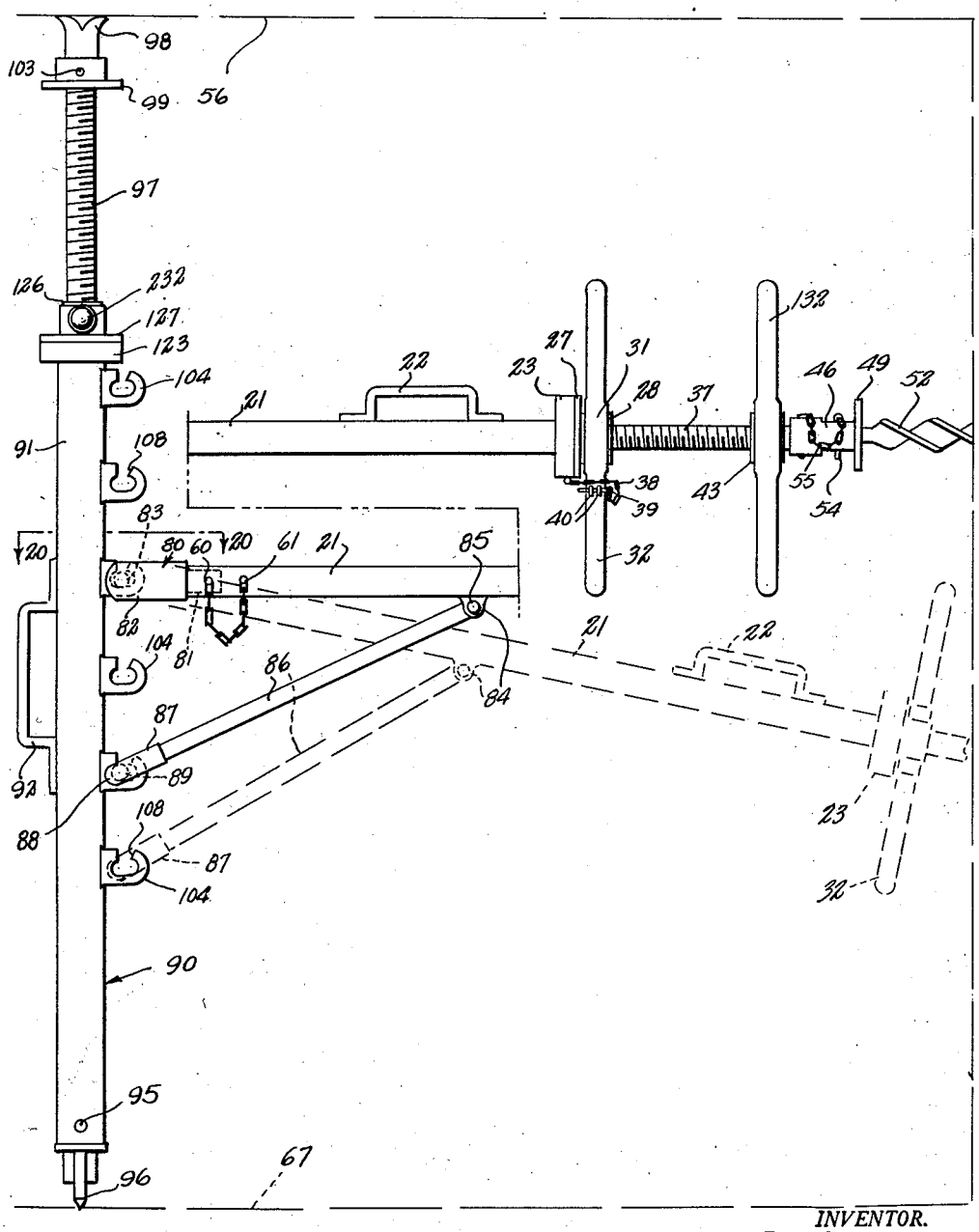
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June 12, 1951 J. C. BALDWIN 2,556,357

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Filed Oct. 29, 1948 4 Sheets-Sheet 3

FIG. 15.



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Filed Oct. 29, 1948 4 Sheets-Sheet 4

FIG. 16.

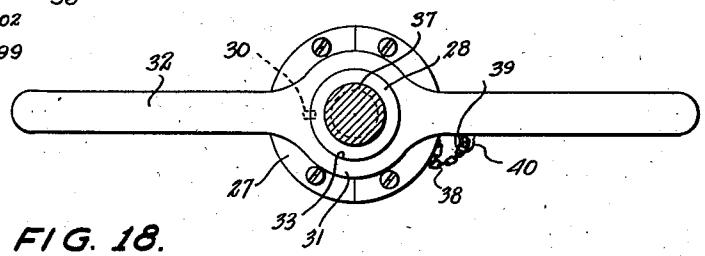


FIG. 18.

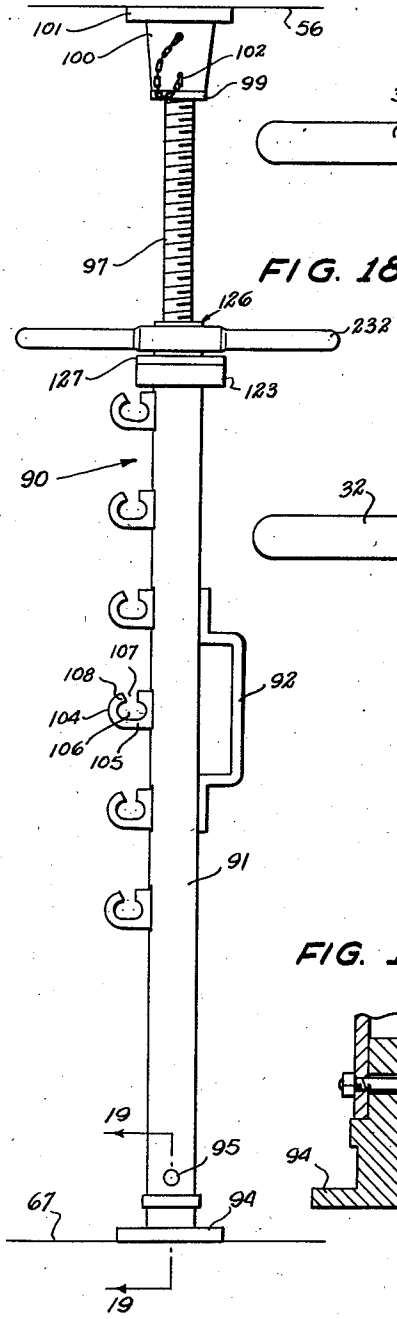


FIG. 17.

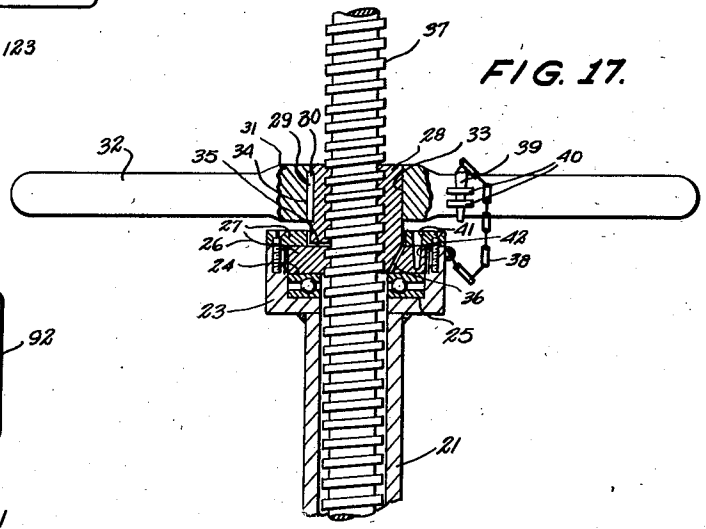
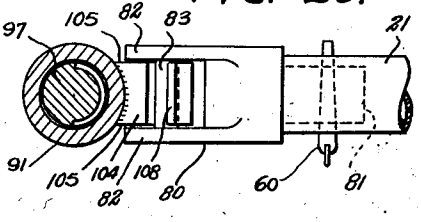


FIG. 19.

FIG. 20.



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Patented June 12, 1951 2,556,357

UNITED STATES PATENT OFFICE

2,556,357

COMBINED MINE DRILL, TIMBER JACK, AND MINE POST

John C. Baldwin, Bluefield, Va.

Application October 29, 1948, Serial No. 57,258

1 Claim. (Cl. 255—53)

1

My invention relates to coal mining apparatus, and more particularly to a combined tool for drilling slate or rock, and which tool is susceptible also of being used as a timber jack and as a safety post. In coal mining it is customary to provide a drill standard comprising a pair of extensible members including upper and lower ends engageable respectively with the roof and floor of a mine tunnel or drift. Such standards usually include means for connecting a drill thereto whereby the standard provides a firm base for the drill.

With the foregoing in view, it is an object of my invention to provide an improved mine drill.

A further object is to provide an improved standard for a mine drill.

A further object is to provide an improved means for operatively connecting a mine drill to a standard.

A further object is to provide an improved mine drill comprising a pair of extensible members, one of said members including an upper end formed to provide a jack head, said head being formed to provide means providing a drill chuck and means for selectively utilizing said drill either as a drill, a timber jack, or as a mine post.

A further object is to provide an improved standard for a mine drill, and means for readily converting said standard to provide a timber jack or a mine post.

A further object is to provide an improved mine drill including a base, a nut carried by said base for rotation relative thereto, a jack screw threaded in said nut, said screw including an upper end providing a drill chuck, means for preventing translational movement of said nut on said screw, means for selectively rotating either said nut or said screw relative to each other, and means for releasably locking said nut to said base.

Other objects and advantages reside in the particular structure of the invention, combination and arrangement of the several parts, all of which will be readily understood by those skilled in the art upon reference to the attached drawings in connection with the following specification, wherein the invention is shown, described and claimed.

In the drawings:

Figure 1 is an elevational view of the improved mine drill showing the same in use as a drill;

Figure 2 is a like view of the mine drill according to the invention showing the same being used as a timber jack or mine post;

Figure 3 is a view like Figures 1 and 2, but showing a modification;

2

Figure 4 is an enlarged elevational view showing a detail of the drill;

Figure 5 is an enlarged fragmentary elevational view showing an attachment for the drill, parts being broken away and shown in longitudinal section;

Figure 6 is a fragmentary elevational view on a slightly enlarged scale showing the attachment of Figure 3;

Figure 7 is a bottom plan view of the attachment of Figure 6;

Figure 8 is a fragmentary longitudinal sectional view of the lower end of the drill showing a further attachment therefor;

Figure 9 is a longitudinal sectional view through the upper end of the drill showing a combined screw jack and drill chuck;

Figure 10 is a fragmentary elevational view of the structure of Figure 9;

Figure 11 is a plan view of the structure of Figure 10 looking from the right thereof;

Figure 12 is an elevational view of a further attachment for the drill;

Figure 13 is a front view thereof looking from the left of Figure 12;

Figure 14 is a rear view of the attachment of Figure 12 looking from the right thereof;

Figure 15 is an elevational view of a drill standard according to the invention showing the drill attached thereto;

Figure 16 is an enlarged horizontal sectional view taken substantially on the plane of the line 16—16 of Figure 1;

Figure 17 is an enlarged longitudinal sectional view showing the structure of Figure 16;

Figure 18 is an elevational view of a drill standard for use with the drill according to the invention:

Figure 19 is a fragmentary longitudinal section view taken substantially on the plane of the line 19—19 of Figure 18;

Figure 20 is a fragmentary horizontal sectional view taken substantially on the line 20—20 of Figure 15.

Referring specifically to the drawings, wherein like reference characters have been used throughout the several views to designate like parts, and referring at first to the drill according to the invention, 21 designates any suitable base for the drill which in the form illustrated comprises a tubular sleeve of rigid metallic construction and which is preferably provided with any suitable handle 22 intermediate the ends of the sleeve to facilitate the transportation thereof. As best seen in Figure 17, the sleeve 22 has a cup-shaped collar 23 secured to the upper end thereof to provide a counterbore 24. Any suitable thrust bearing 25 is seated in the counterbore 24 and in

the form illustrated comprises an anti-friction thrust bearing. However, it should be understood that other forms of thrust bearings may be substituted if desired. A circular nut 26 including a base portion which is freely rotatable in the counterbore 24 atop the bearing 25. A cap member or washer 27 overlies marginal portions of the base portion of the nut 26 to maintain the same in the counterbore against axial movement relative to the sleeve 21. The washer 27 is secured in position atop the collar 23 in any suitable manner, as by the machine screws shown. The nut 26 includes an upstanding sleeve 28 internally threaded and of a diameter less than the base portion of such nut. Such sleeve 28 is provided with a longitudinally-extending keyway 29 seating a key 30 therein. The hub 31 of a handle 32 is formed with a bore 33 complementary to the periphery of the hub 28 and is slidable thereon. The bore 33 is provided with a keyway 34 which is preferably open at the bottom so as to be slidable over the key 30 when the same is seated in the keyway 29 of the hub. Thus, upon rotation of the handle 32, the nut 26 is rotated therewith. The nut may be provided with a plurality of lubricating openings, such as the radially-disposed opening 35 and the diagonally-disposed opening 36. Thus, lubrication is readily supplied to the bearing 25 through the lubricating channel 36, while the interiorly-threaded bore of the nut is lubricated through the channel 35. A jack screw 37 is threaded through the nut 26 in telescopic relation to the sleeve 21. At times, it is desirable to lock the nut 26 against rotation relative to the sleeve 21 and this may be accomplished in two ways. Thus, a securing element or chain or the like 38 is fixed to the collar 23 and has a tapered pin 39 fixed on the free end of the chain. The handle 32 may be provided with a pair of vertically-spaced ears 40 which are apertured to receive the pin 39 therein. This arrangement permits limited rotation of the nut and handle in one direction relative to the sleeve 21, but the nut and sleeve are thereafter locked together upon continued rotation. Reversed rotation of the handle and nut relative to the sleeve is permitted to a limited extent and thereafter prevented. Alternatively, the washer 27 and base portion of the nut 26 may be provided with aligned and complementary tapered apertures 41 and 42 adapted to receive a removable pin means or pin 39 therein whereby to lock the sleeve 21 and nut 26 together against any rotation in either direction. The purpose of this arrangement will be apparent later.

As best seen in Figure 4, the upper end of the jack screw 37 has fixed thereon a circumferential flange 43 slightly inwardly of the free upper end of the screw. The flange 43 is formed with a keyway 44 therein for the reception of a key, not shown, substantially identical to the key 30 of the hub 28 of the nut. Likewise, it should be noted that the periphery of the flange 43 is similar to that of the hub 28 of the nut, whereby the wrench or handle 32 is selectively engageable either with the hub 28 of the nut or the flange 43, whereby to provide means for selectively rotating either the nut 26 relative to the screw 37, or the screw 37 relative to the nut 26. In the latter instance, of course, the nut and sleeve 21 are locked together by the pin 39 in either of the two manners indicated aforesaid. However, at times, it may be desirable to rotate both the nut 26 and the screw 37 simultaneously in opposite directions to provide rapid translational movement of the screw 37 relative to the sleeve 21. With this in view, it is desirable to have an additional handle 132 of the same structure as handle 32 for application to the flange 43. Likewise, in view of the fact that the drill is frequently disposed adjacent the face of a wall or walls, wherein it would be impossible to rotate a handle such as handle 32, I prefer that the handle 132 be formed with any suitable and/or well known ratchet mechanism which is reversible in the well known manner whereby to permit the ratchet engagement with the key 30 in a well known manner. Thus, the drill is readily adaptable for work in close quarters. Of course, the handle 132 of the type including ratchet mechanism may be substituted for either the handle 132 of the structure of handle 32 or handle 32 if desired, where the situation will not permit the latter type handles to be rotated. The other or free end of the jack screw 37 has a surface engaging element secured thereto, such element being either a flanged foot 49, Figures 1 and 2, or a drill 52, Figure 1. Specifically, the free end of the jack screw 37 axially outwardly of the flange 43 is formed with any suitable threads 45 for threaded engagement with the interiorly-threaded socket 47 of a head 46. As best seen in Figures 9 to 11, inclusive, any suitable means, such as the set screws 48, may be passed through the socket 47 for engagement with the threads 45 and lock the head 46 against rotation relative to the jack screw 37. The free end of the head 46 is formed with an annular flange 49 providing a jack head. An axial portion of a jack head 49 is formed with any suitable chuck socket 50 for receiving the shank 51, Figure 1, of any suitable drilling tool 52. Aligned transverse bores 53 are formed laterally through the head 46 and intersect the chuck socket 50. Any suitable means, such as the pin 54, is insertible through the bores 53 and through a similar aperture formed in the shank 51 of the drill 52, whereby to lock the drill in the socket 50 against rotation relative thereto. The pin 54 is preferably secured against loss by a chain 55 attached to the head 46.

As is readily apparent from Figures 1 and 2, when the device is used as a drill, a tool 51 is inserted in the chuck socket 50 of the head 46. Thereafter, by rotating the handle 32 relative to the jack screw 37, the latter may be projected upwardly until the point of the tool 52 engages a wall 56 of the mine. This movement may be expedited by simultaneously rotating the handles 32 and 132 in opposite directions. When the point of the tool 52 is in operative engagement with the wall 56, the handle 32, together with the nut 26, may be locked to the sleeve 21 in either of the two ways previously described. Thereafter, rotation of the handle 132 will rotate the jack screw 37 relative to the nut 26 and will likewise rotate the drilling tool 52 so as to drill a hole in the wall 56. At the same time, the flange 49 being relatively broad permits the device to be used as a timber jack or as a mine post. Thus, in Figure 2, the tool 52 has been removed and the jack head has been projected against the wall 56 by one or both of the handles 32 or 132. To add to the number of uses of the device, the lower end of the sleeve 21 may be provided with any of a plurality of feet now to be described. The other or lower end of the sleeve 21 has a surface supporting element secured thereto, such element being either a flanged foot 57, Figures 1 and 2, a pointed foot 62, Figure 6, a pointed foot 66, Figures 12, 13 and 14, or an eye 80,

Figure 20. When the device is being used as in Figures 1 and 2, it may be desired to provide a radially outwardly-flanged foot 57 including a stud 58 which is insertible in the open lower end of the sleeve 21. The lower end of the sleeve 21 is provided with laterally-aligned, transverse bores for the reception of a locking pin 60 which likewise extends through the stud 58 whereby to lock the stud in position. It is preferred that the pin 60 be secured to the sleeve 21 permanently, as by the chain 61. When the device is to be used for other purposes, the flanged foot 57 may be readily removed and an additional foot substituted according to the purpose for which the tool is to be used. Thus, in Figure 6, the device is being used as an anchor for a rope pull cutting machine, not shown. As best seen in Figures 6 and 7, there has been provided a pointed foot 62 formed with a stud 63 insertible in the open end of the sleeve 21. As before, the stud 63 is locked in position by the pin 60. As shown in Figure 6, the pointed foot 62 is insertible through the eye 64 of the rope pull 65 and is thereafter embedded in the floor 67 of the mine. Meanwhile, of course, the head 46 of the jack screw 37 has been jacked into firm engagement with the roof or opposite wall 56 of the mine. Thus, the device provides a firm anchor for the cutting machine.

In some instances, this type of cutting machine is actuated by a chain pull for which purpose I have provided the foot disclosed in Figures 12, 13 and 14.

As there shown, the foot 66 is provided with a stud 67 insertible in the sleeve 21 and secured therein either by the pin 60, or, as shown, by a bolt 68. The foot proper comprises a pair of laterally-spaced, depending arms 69 providing a slot 70 therebetween. One surface of the arms 69 is concaved rearwardly, as at 71, to provide a seat for a link 72 of the chain. In use, the free ends of the arms 69 are pointed, as at 73, whereby to dig into the floor of the mine in the manner shown in Figure 6. Thus, a firm anchor for a chain pull cutting machine is provided by this particular form of foot.

At times, the sleeve 21 is of insufficient length, even when the jack screw 37 is fully extended. To extend the length of the sleeve 21, there have been provided the means disclosed in Figures 5 and 8, and now to be described. Thus, in Figure 5, there is provided an extension member 74 which is telescopically associated with the lower end of the sleeve 21. In the form shown, the member 74 comprises a sleeve slidable on the sleeve 21, but could obviously comprise an elongated stud slidable inwardly of the sleeve. The member 74 is provided with a longitudinal series of spaced transverse apertures 75 therethrough to receive the bolt 68, as shown, or the pin 60, whereby the member 74 is readily connected to the sleeve 21 in longitudinally-adjusted relation thereto. Likewise, it should be noted that in Figure 5 the lower end of the member 74 is provided with a pair of downwardly-directed points 76 on its lower end. The points 76 are laterally spaced and are fixed to the lower end of the member 74. Such points are adapted to dig into the floor or wall 67 of the mine to lock the sleeve 21 against rotation relative to the associated parts. This situation may be desirable at times when the device is used as a drill, as in Figure 1, whereby to drill certain types of material.

In Figure 8, there is disclosed a more flexible type of extension which comprises an extension

member 77 which again may comprise a sleeve slidable on the lower end of the sleeve 21. The member 77 is provided with a plurality of longitudinally-spaced, transverse apertures 78 which function to provide means for adjustably connecting the member 77 to the sleeve 21 by means of the pin, such as the pin 60, or as shown, the bolt 68. In this form of the invention, the lower end of the member 77 is of reduced configuration, as at 79, so as to provide an interior bore substantially identical to the interior bore of the sleeve 21, whereby to permit the application to the extension member of any of the feet 57, 62 or 66, aforesaid. Of course, the reduced end 79 is transversely bored to receive the pin or bolt 68, whereby to lock the stud of the foot to the extension member.

At times, it is desired to hook the drill to a drill standard to be described later, and with this in view, means now to be described may be provided and which are best seen in Figures 15 and 20. Thus, in Figure 20, a foot has been provided which comprises an eye 80. The eye 80 is provided with a stud insertible in the open lower end of the sleeve 21 and secured therein, as by the pin 60. The free end of the eye 80 comprises a pair of laterally-spaced plates 82 connected together by a cross-piece 83 inwardly of the free ends of the plates. Likewise, and as best seen in Figures 1, and 15, an intermediate portion of the sleeve 21 is provided with any suitable pivot, such as the ear 84, to which is pivoted by any suitable pivot 85 the upper end of a strut 86. The strut 86 is substantially longer than the distance from the pivot 85 to the lower end of the sleeve 21. Likewise, the free end of the strut 86 is provided with an eye 87 comprising a pair of laterally-spaced plates 88 spanned by a cross-piece 89 inwardly of the free ends of the plates. Thus, the eye 87 is substantially the same as the eye 80 for the sleeve 21. As best shown in Figures 15 and 20, the eyes 80 and 87 are adapted to rigidly support the drill on a standard 90 now to be described and best seen in Figures 15, 18, 19 and 20.

The standard 90 may comprise a sleeve 91 which is preferably provided with a carrying handle 92 intermediate its length. As clearly shown in Figure 19, the lower end of the sleeve 91 is adapted to detachably receive the stud 93 of any suitable foot 94. The stud 93 may be secured in the sleeve 91 by a cross-pin 95, as previously described. If desired, other forms of feet may be provided, such as the pointed foot 96 shown in Figure 15, which corresponds to the foot 76 shown in Figure 5. Likewise, all of the various forms of feet usable with the drill are adapted to be used with the standard when and if desired. The same is true of the extension shown in Figures 5 and 8. The upper end of the sleeve 91 is provided with an enlarged collar 123 corresponding to the collar 23 of the drill and which is enclosed by a washer 127 whereby a nut 126 is rotatably mounted in the counterbore provided by the collar 123. Inasmuch as this structure is similar to the collar 23, nut 26 and the associated structure of the first-described form of the invention, additional description thereof is unnecessary at this time. In any event, a jack screw 97 is threaded in the nut 126 and is projectible and retractible upon rotation of the nut 126 in opposite directions by means of the handle 232. As best seen in Figure 15, the upper end of the jack screw 97 is preferably formed with a fishtail point 98 for engagement with the roof 56 of the mine. Thus,

with the arrangement shown in Figure 15, when the screw 97 has been projected to a maximum degree, the fishtail point 98 will dig into the roof 56 of the mine and the points 96 will dig into the floor 67 of the mine, whereby the standard 90 is firmly anchored in a vertical position relative to the drift or mine passage. As shown in Figure 18, at times it is desirable to convert the standard 90 into a timber jack or mine post. At this time, the foot 94 is substituted for the pointed foot 96 and means now to be described are applied to the fishtail head 98.

Thus, the head 98 includes an annular flange 99 inwardly of the free end thereof and providing a seat for a housing 100 which is hollow and fits over the fishtail point 98 to seat atop the flange 99. The housing 100 is provided with an outwardly-flanged top 101 adapted to flatly engage the roof 56. The housing 100 may be rotatable relative to the point 98 or may be locked for rigid engagement with the jack screw 97 by means of a pin 102 insertible through the housing 100 and a hole 103 formed in the head. Thus, the standard 90, as is the case of the drill, is versatile in use. However, when used as a standard for supporting the drill, means now to be described are utilized, but may be omitted if desired.

Thus, and as seen in Figures 15 and 18 and 20, the sleeve 91 is provided with a longitudinal series of spaced hooks 104 which project radially of the sleeve 91, and are provided with flat parallel sides 105. Each hook is provided with a recess 106 access to which is provided by a slot 107 opening upwardly. The bill 108 of the hook is substantially rearwardly directed so as to overlie forward portions of the recess 106. As best seen in Figure 15, the cross-pieces 83 and 89 of the eyes 80 and 87 are inserted in separate hooks 104. The side plates 82 and 86 slidably engage the parallel sides 105 of the hooks, whereby to prevent lateral movement or twisting of the sleeve 21 or strut 86 relative to the standard 90. At the same time, and as clearly shown in Figure 15, by positioning the strut eye 87 in various ones of the hooks 104, the sleeve 21 may be disposed in a plurality of selected angular relations relative to the standard 90. Thus, a rigid setting of the drill relative to the standard 90 may be readily achieved. Likewise, the structure described substantially eliminates lateral or twisting play of the parts.

The modification of Figure 3 is essentially the same as Figure 1, except that the base 221 is of square cross-section with rounded corners. The foot attachments will correspond to those previously described except that they will be provided with square studs for fitting the square bore of the base 221. For example, the foot 257 may be square, as shown, or circular, but the stud 253 is square in cross-section. Likewise, the cup 223 will be square and secured to the base 221 in any suitable and well known manner. The washer 227 may likewise be square, but is, of course, formed with a circular axial hole for hub 31 of nut 26. Likewise, the cup 223 is formed with a cylindrical counterbore for the nut 26. However, except as just described, this form of the invention is the same and is capable of the same uses as the first-described form of drill. Thus, if the device is to be used as in Figure 15, an ear corresponding to the ear 84 may be added for the attachment of strut 86.

As is obvious from the foregoing, both the drill and the standard are very flexible in use and each is susceptible of a multitude of various uses in a mine. Likewise, they cooperate together to provide a drill and standard therefor. Moreover, while I have shown and described what are now thought to be the preferred embodiments of my invention, it is to be understood that the same is susceptible of other forms and expressions. Consequently, I do not limit myself to the precise structures shown and described hereinabove except as hereinafter claimed.

I claim:

A mine tool comprising a tubular sleeve, a cup-shaped collar projecting from one end of said sleeve and fixedly secured to the latter, an anti-friction thrust bearing positioned within and resting loosely in said collar, a threaded nut positioned within said collar and rotatably supported in the latter and resting on said bearing, said nut comprising a base portion and an upstanding sleeve internally threaded of a diameter less than the base portion, a cap member secured to said collar and extending over the base portion of said nut to maintain the base portion of the nut within the collar, said base portion of the nut and cap member being each provided with alignable apertures, removable pin means insertable in said apertures for preventing relative rotation between said nut and cup-shaped collar, a jackscrew arranged in end to end relation with respect to the tubular sleeve and having one end extending through the upstanding sleeve of said nut and in threaded engagement with the latter, a handle arranged exteriorly of said collar and fixedly secured to said nut for rotating the nut relative to the jackscrew, a flange arranged on said jackscrew adjacent to and spaced from the other end thereof and fixedly secured to said jackscrew, a second handle fixedly secured to said flange for rotating said jackscrew relative to said nut, a surface supporting element positioned adjacent the other end of said sleeve and secured to said sleeve, and a surface engaging element embodying a drill positioned adjacent the other end of said jackscrew and secured thereto.

JOHN C. BALDWIN.

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The following references are of record in the file of this patent:

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Number	Name	Date
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