

J. G. LEYNER.
 FLEXIBLE FOOT SUPPORTING COLUMN FOR ROCK DRILLING ENGINES.
 APPLICATION FILED DEC. 12, 1911.

1,065,060.

Patented June 17, 1913.

2 SHEETS-SHEET 1.

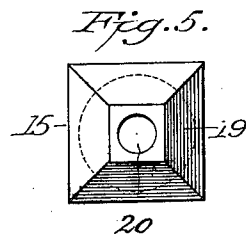
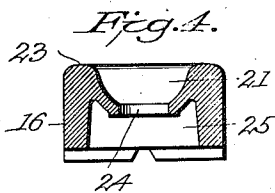
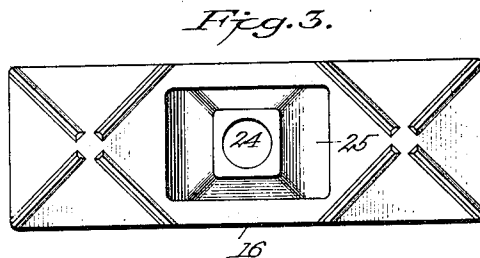
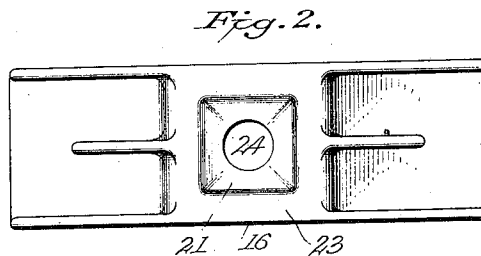
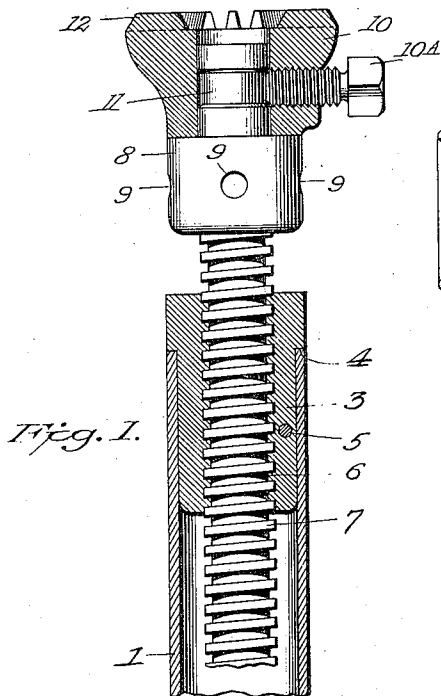


Fig. 7.

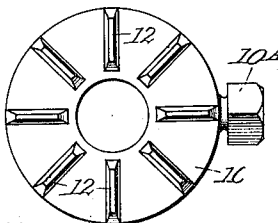
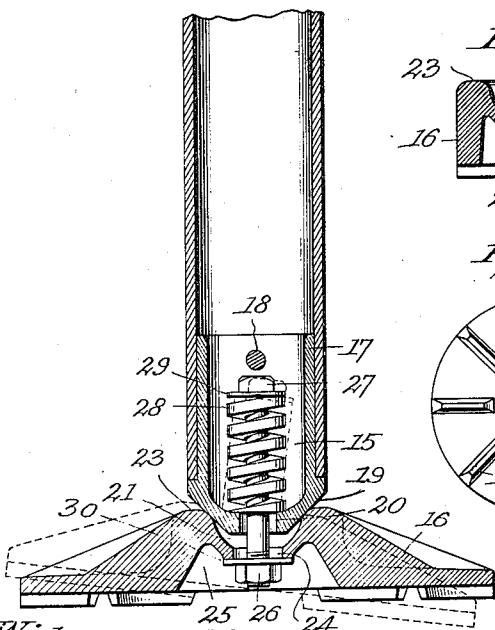
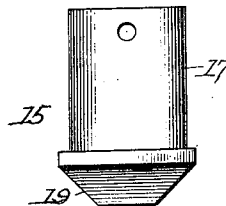


Fig. 6.



Witnesses:

G. Sargent Elliott
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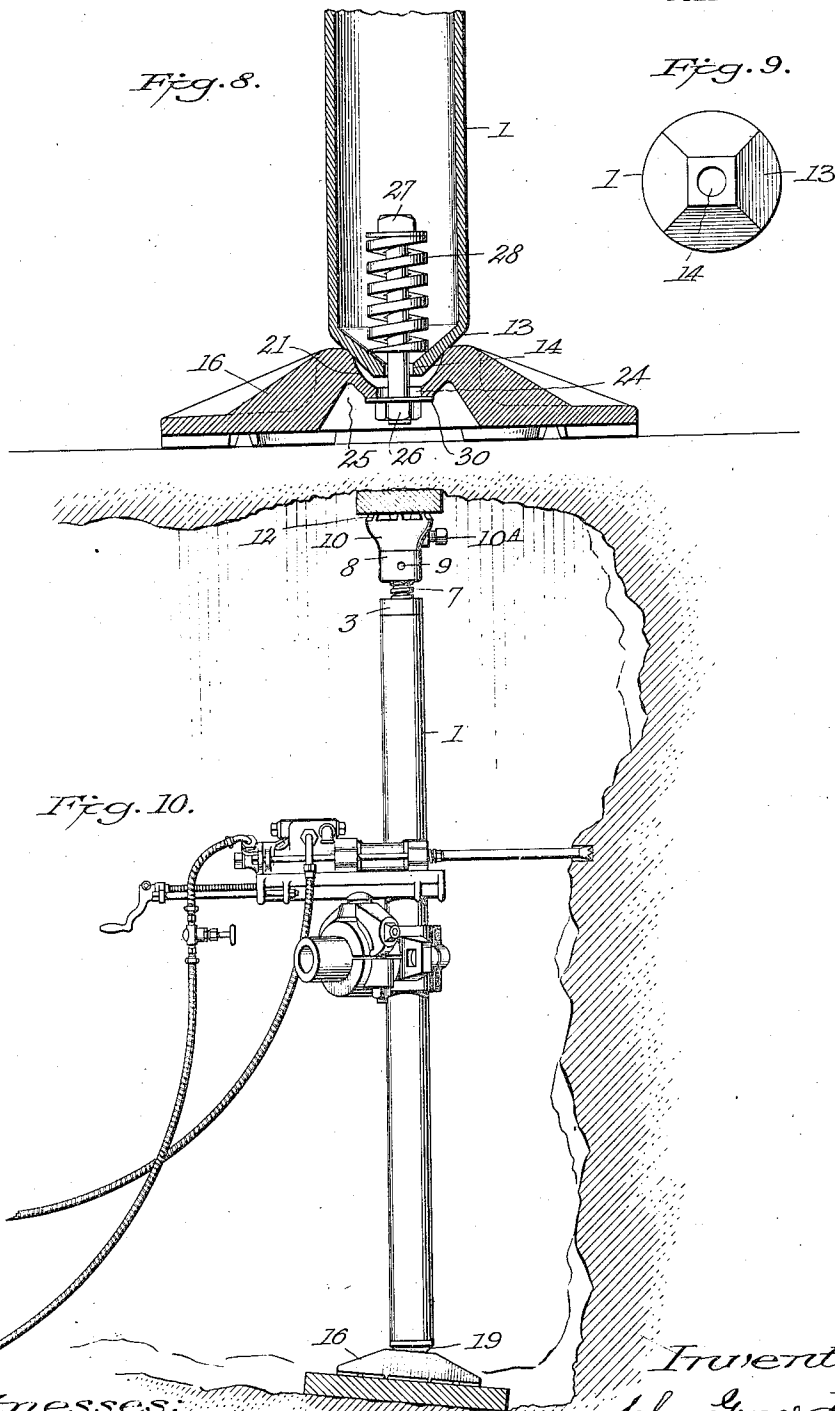
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UNITED STATES PATENT OFFICE.

JOHN GEORGE LEYNER, OF DENVER, COLORADO.

FLEXIBLE-FOOT SUPPORTING-COLUMN FOR ROCK-DRILLING ENGINES.

1,065,060.

Specification of Letters Patent.

Patented June 17, 1913.

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To all whom it may concern:

Be it known that I, JOHN GEORGE LEYNER, a citizen of the United States of America, residing at the city and county of Denver and State of Colorado, have invented a new and useful Flexible-Foot Supporting-Column for Rock-Drilling Engines, of which the following is a specification.

My invention relates to improvements in flexible foot supporting columns for rock drilling engines, and the objects of my invention are: first, to provide a flexible foot column for supporting rock drilling engines in rock tunnels and in the shafts, stopes, drifts, and other workings of mines. Second, to provide a supporting column for rock drilling engines, that is provided with an automatically tilting and an angular uneven surface engaging foot portion that is removably secured to the column by a resiliently yielding connection. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view of the improved column, Fig. 2 is a top view of the adjustable foot, detached, Fig. 3 is a bottom view of the same, Fig. 4 is a transverse vertical sectional view of the foot, Fig. 5 is a bottom view of the plug in the lower end of the column, which is adapted to rest in the adjustable foot, Fig. 6 is a side elevation thereof, Fig. 7 is a top plan view of the abutment nut at the upper end of the column, Fig. 8 is a vertical sectional view illustrating the lower end of a modification in the form of column, the plug being dispensed with and the lower end of the column being pyramidal in form, Fig. 9 is a bottom view of an end of the column shown in Fig. 8; and Fig. 10 is a view showing an improved column in position with rock drilling engine mounted thereon in operative position.

Referring to the accompanying drawings, the numeral 1 designates a piece of pipe or tubing, preferably a piece of thick wrought iron piping. One end of this pipe is squared and a plug nut 3, which is provided with an enlarged shouldered portion 4, extends into the pipe a short distance, with its shoulder against the end of the pipe, and is secured to the pipe by any suitable means, prefer-

ably by a pin 5, which is extended through the pipe and plug nut and is riveted to the pipe. This plug nut is provided with an axial threaded aperture 6, in which one end of a threaded rod 7 fits and extends through the nut into the pipe a short distance. This threaded rod I term the extension adjustment screw. The opposite end of this threaded rod is provided with an enlarged collar portion 8, through which right-angled apertures 9 are formed, that are adapted to receive loosely a lever pin, by which the threaded rod may be turned to screw it into or out of the pipe. This apertured turning lever receiving collar portion is formed adjacent to the extreme adjacent end of the threaded rod, which is of smaller diameter than the collar, the adjacent side of which forms a shoulder, and on this extreme end of the threaded rod a flat faced pivotal abutment engaging point 10 is placed, and is secured thereon by a set-screw 10^A, which extends through the flat point into a circumferential recess 11, formed in the end of the threaded rod, which permits the flat head to turn rotatably on the end of the adjustable screw. The flat end of this flat point is provided with a plurality of chisel-shaped teeth 12, to enable the end to be indented in walls or other abutment surfaces, and thus secure and prevent the end against slipping movement when screwed tightly against the wall or an abutment surface and under the weight and jar of a drilling engine in operation. The opposite end of this column pipe is convergingly pointed, enough to form a chamfered portion 13, which terminates in a closed flat faced end, in which an axial bolt receiving aperture 14 extends. This chamfered bolt receiving end of the column's pipe member may be formed on the end of the pipe member as an integral part of it, as shown in Fig. 8, or it may be, and preferably is made in the form of an attachable and detachable steel end piece 15, which is preferably made of cast steel, but which may be of any hard metal adapted to take the wear of the flexible foot 16, if desired, as will be hereinafter described. This removable end piece comprises a plug having a hollow or tubular reduced and shouldered end 17, that fits the inside end of the

pipe and extends into it up against its shoulder, and is secured to the pipe by any suitable means, preferably by a pin 18, which is extended through the reduced end portion 5 of the plug and the pipe and is riveted to the pipe. The outer end of this plug end piece is provided with a convergingly solid and closed tapered or chamfered end portion 19, which terminates in a flat face end, in which 10 an axial bolt receiving aperture 20 is formed. The reduced end portion of this plug end piece being hollow and chambered out down into the chamfered and tapered end thereof, this axial aperture 20 opens into the chamber and hollow end portion of the end piece. 15 It is essential that this column pipe be held fixed and rigid, and against any turning or rotation movement; consequently this end piece is preferably made square in cross-section, although it may be of any other 20 polygonal form in cross section. This square tapered end of the column is arranged to be connected by a flexible connection to the foot plate 16, which is preferably formed and arranged as follows: The taper end of the 25 pipe extends into a square recess 21, the top sides of which are convergingly beveled to form a bearing for the sides of the taper point of the pipe, while the bottom portion 30 of said recess is enlarged to form a clearance space for the extreme end of the pipe when the foot plate is tilted or rocked on the taper end of the pipe. This foot plate comprises a plate or block of any desired shape or 35 form, but I preferably make it of a parallelogram or oblong square form, and of a sufficient width and length to provide a good bearing surface against a floor or wall or other abutment, and taper its sides and ends 40 up to a central flat portion 23, in which the recess 21 is formed.

Through the foot plate a bolt receiving aperture 24 is formed, which extends through it from the center of the recess 21. A recess 45 25 is also formed in the bottom of the foot plate concentric with the aperture 24, which is made deep enough to inclose a nut 26, below the bottom surface of the foot. A bolt 27 is extended from the inside of the 50 adjacent end of the pipe loosely through its aperture 20, and through the aperture 24 of the foot plate, and the nut 26 is threaded to its end. This bolt 27 is made long enough to receive an expansion spring 28, of ample 55 length and resiliency to permit the foot plate to tilt by sliding up on one side of the tapered end of the pipe and down on its opposite side without disengagement from the end of the pipe, and the spring automatically returns the foot plate to its central and right-angled position on the end of the pipe 60 when the foot plate is released from any angular position which it assumes relative to the position of the pipe when set in an oper-

ative position in a tunnel, shaft, drift, or other 65 stone workings. I preferably use for this purpose a square wire form of spring, one end of which bears against a washer 29, that is placed on the bolt below its head, and the other end of the spring bears against the end 70 of pipe or of its removable end piece. A washer 30 is also preferably placed on the bolt between the nut and the foot plate. The expansive force of the spring draws the 75 nut 26 up against the bottom of the foot plate, and forces the tapered end of the pipe down into and against the top edge sides of the recess in the foot plate, and at the same time clamps the foot plate with a resilient yielding pressure against and to the tapered 80 end of the pipe. The bottom surface of the foot plate is provided with any suitable arrangement of projecting chisel-shaped lugs or teeth, which are arranged to be indented 85 into the rock and are adapted to hold the foot plate from slipping from set positions.

The operation of my flexible foot columns for supporting rock drilling engines is as follows: The column is adapted to be set in horizontal or vertical or horizontally or vertically 90 disposed or angular positions in tunnels, shafts, drifts, or other rock working openings of mines, railroad, or irrigation rock-work tunnels, and the foot plate is first placed in position where desired, against a 95 block of wood, and owing to its flexible connection with the end of the pipe, it automatically adjusts itself to the uneven surface of the floor or roof or wall of the working against which it is placed. The operator 100 then directs and centers the abutment point of the adjustable screw at the opposite end of the pipe, also against a block of wood, and screws it with a lever rod inserted in the apertures of the screw tightly against 105 the opposing surface of the workings, in the position he desires to set the column, and thus braces and secures it rigidly. He then mounts on it a rock drilling engine, by means of a chuck which is illustrated in Fig. 110 10 and which is attached to the rock drilling engine and is adapted to be clamped around the pipe of the column, and as the pipe is round and is held against rotary movement by its square end being inserted in the square 115 aperture of the foot plate, it cannot turn, and it permits the drilling engine to be clamped to it in any desired position. To loosen the column it is only necessary to unscrew the threaded rod. The flexible foot 120 plate, owing to its automatic action in finding a bearing for itself, enables the column to be quickly and very firmly and rigidly set up by operators in rock workings the surfaces of which, owing to the rock being 125 blasted out, are rough, jagged, and uneven.

While I have illustrated and described the preferred construction and arrangement of

my improved flexible foot column, I do not wish to be confined to the construction and arrangement shown, as many changes might be made without departing from the spirit of my invention.

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

1. A column for supporting rock drilling engines, comprising a piece of pipe, and an abutment engaging portion adjustably secured within one end of said pipe, said pipe having its opposite end provided with a convergingly tapering polygonal form of end terminating in a flat faced end provided with an axial aperture, a bolt within the tapered end of said pipe extending through and beyond the aperture in the end of said pipe, and an expansive spring mounted on said bolt within the end of said pipe and with a foot plate provided with a polygonal recess and a clearance space and arranged to fit slidably over and against the sides of the polygonal shaped end of said pipe and to tilt and rock thereon, and provided with an aperture extending through the bottom of said foot plate from the bottom of said recess and extending over the projecting end of said bolt, and a nut threaded to the end of said bolt and arranged to bolt said foot plate under an expansive tension pressure of said spring against the end of said pipe.

2. In a column for supporting rock drilling engines, a supporting bar, having an adjustable abutment engaging portion at one end, said bar being provided with a convergingly tapering polygonal shaped end portion at its opposite end, a bolt within said polygonal shaped end projecting loosely through said end, and an expansion spring mounted on said bolt, with an abutment engaging foot plate provided with a polygonal recess and a clearance space, the upper edges of the side walls of said recess adapted to engage the sides of the convergingly tapering polygonal end of said bar in such a manner as to tilt or rock thereon, said foot plate being bolted by said bolt to said bar in such a manner that the expansive force of the spring on said bolt holds said foot plate against the end of said bar and permits it to automatically tilt when it is placed against abutment surfaces that are at an angle to the direction of said bar.

3. In a column for supporting rock drilling engines, the combination of a pipe bar provided with an adjustable abutment engaging portion at one end, said pipe bar being provided with a four sided square convergingly tapering hollow end portion at its opposite end from said screw, having a flat terminal end provided with an aperture through it into its interior, a bolt with-

in said tapering hollow end arranged to extend through and beyond the same, and an expansive spring on said bolt between said hollow end and the head of said bolt, an abutment engaging foot-plate, a nut threaded to the bolt beyond said abutment engaging foot plate, said foot-plate being provided with a socket recess and a clearance space in which said pipe-bar is tiltably seated.

4. A column for rock-drilling engines, comprising a supporting tube having a converging lower portion, a foot-plate having a converging recess into which the converging portion of said tube is seated, said lower portion consisting of angularly arranged sides and the walls of said recess being correspondingly shaped to prevent axial rotation of the tube, and resilient means for maintaining said tube in engagement with said foot-plate.

5. A column for rock-drilling engines, comprising a supporting tube having a converging lower portion, a foot-plate having a converging recess into which the converging portion of said tube extends and along the upper edge of which said tube is seated, said recess being enlarged beneath the seat to allow movement of the end of the tube and thus permit tilting of said tube, and resilient means for maintaining said tube in engagement with said foot-plate.

6. A column for rock-drilling engines, comprising a supporting tube having a converging squared lower portion apertured at its end, a foot-plate having a converging recess into which the converging portion of said tube is seated, said recess having sufficient diameter below its upper edge to permit the movement of said squared lower portion during tilting of the tube, a bolt connecting said foot-plate and said tube through said aperture and recess, and a coiled spring interposed between the upper end of said bolt and the apertured portion of the tube for yieldingly maintaining said tube in engagement with said foot-plate.

7. A column for rock-drilling engines, comprising a supporting tube having a lower portion approximating an inverted truncated pyramid in shape, a foot-plate having a converging recess forming a seat along its upper edge for the lower portion of said tube, the walls of said recess being outwardly curved in the portion of their length opposite the end of the lower portion of said tube, and means for yieldingly maintaining said tube in engagement with said foot-plate.

8. A column for rock-drilling engines, comprising a supporting tube having a lower portion approximating an inverted truncated pyramid in shape, and apertured at its end, a foot-plate having a converging

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and the apertured portion of the tube for
yieldingly maintaining said tube in engage-
ment with said foot-plate.

In testimony whereof I affix my signa-
ture in presence of two witnesses.

JOHN GEORGE LEYNER.

Witnesses:

G. SARGENT ELLIOTT,
JESSE DITSON.