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DRILL COLUMN

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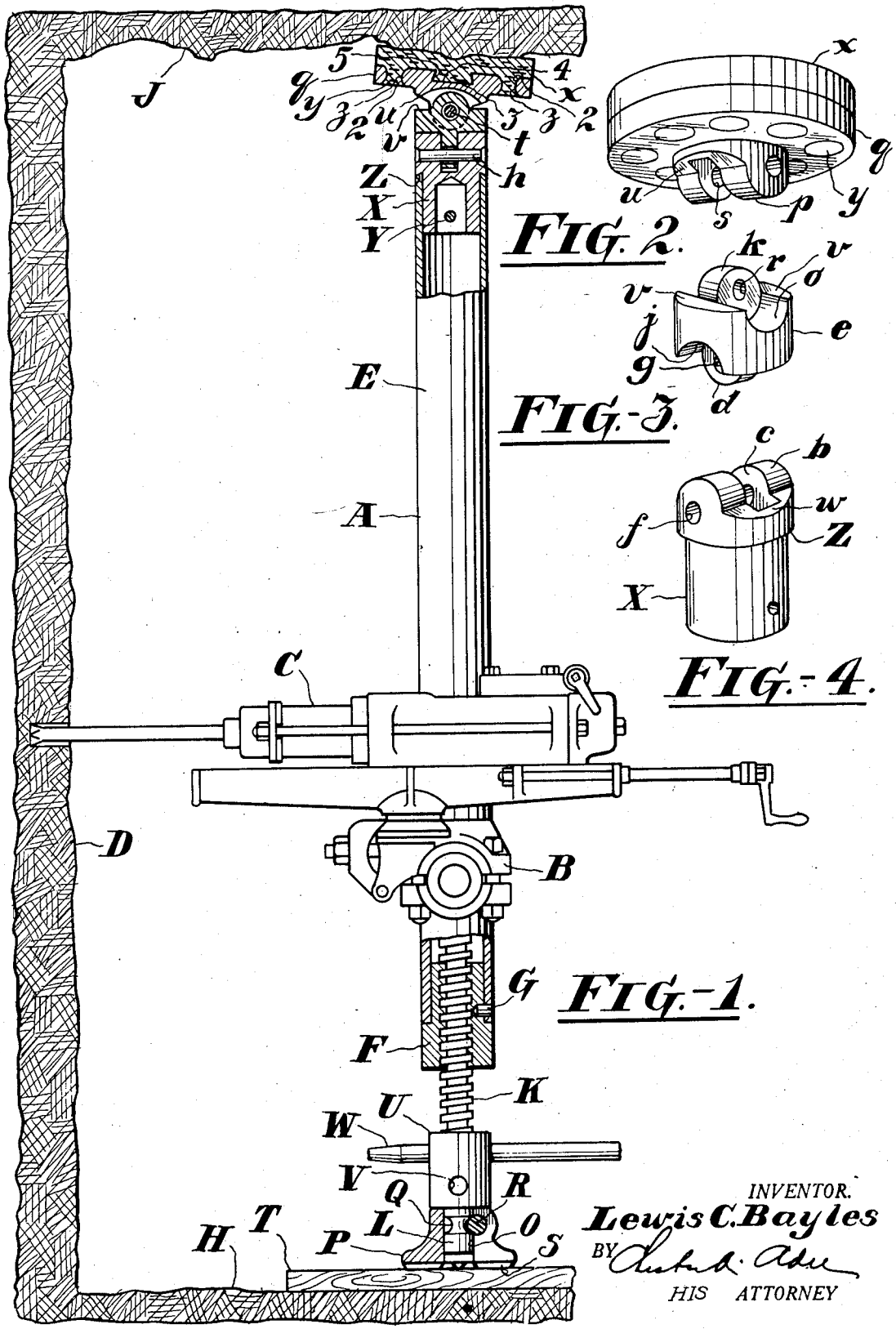


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

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DRILL COLUMN

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This invention relates to rock drills, but more particularly to a drill column of the type commonly used for supporting a rock drill relatively to the work.

The objects of the invention are to facilitate the operation of setting-up the column and to eliminate frequent interruptions in the drilling operation for the purpose of maintaining the terminals of the column in rigid engagement with the abutments whereby the column is supported.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawings accompanying the specification and in which similar reference characters refer to similar parts,

Figure 1 is an elevation partly broken away of a drill column illustrating a practical application of the invention, and

Figures 2, 3 and 4 are perspective views of details of the invention.

Referring to the drawings and at first more particularly to Figure 1, A generally designates a drill column to which is secured a suitable clamping device B for supporting a rock drill C relatively to the work, such as the rock D. The column A in this instance comprises a tube E in the lowermost end of which is disposed a nut F preferably held stationary with respect to the tube E by a pin G.

The column A is illustrated in the operative position in a tunnel or drift having a floor H and a roof J forming abutments for the column. It is between these two portions of the drift that the column is usually extended to maintain it in the operative position. The column is therefore provided with the usual screw K which is threaded into the nut F and has an unthreaded cylindrical portion L which extends into a bore O in a foot piece P.

The unthreaded portion L of the screw is adapted to rotate freely in the foot piece P and has an annular groove Q to engage a pin R in the foot piece P for securing the foot piece to the screw. The foot piece may be provided with the usual serrations S on its lowermost surface adapted to be pressed into the floor H or, as illustrated, into a plank T interposed between the foot piece and the floor H.

Between the threaded and unthreaded portions of the screw K is an enlarged cylindrical portion U which may be an integral portion of the screw or may be suitably secured thereto. In this cylindrical portion U are formed apertures V for the insertion of a bar W whereby the screw K may be rotated for extending the column A.

A difficulty frequently encountered in the operation of setting up a drill column of the type to which the present invention pertains in locations where the walls of the drift or tunnel, such as the floor H and the roof J, have very irregular surfaces is that of maintaining the uppermost portion of the column in engagement with the roof of the drift.

Various means have heretofore been employed for preventing slipping of the column at this point. One means intended to accomplish this result is the well known pointer adapted to be pressed into the roof the drift. Another is to employ a head piece similar in some respects to the foot piece P and to interpose compressible material, such as wood, between the head piece and the roof. When power is then applied for extending the column the wood or plank against which the head piece acts is pressed into the depressions in the roof as are also the serrations on the head piece into the wood.

In columns of this type, however, a tremendous pressure is required to hold the column immovable and unaffected by the vibrations incident to drilling. The application of the necessary power therefore frequently results in the breakage of the planks or other material possessing similar properties, with the result that during drilling the broken portions of the planks are vibrated out of position, thus necessitating an interruption in the drilling operation for the purpose of stabilizing the column.

The present invention contemplates the elimination of these objectionable features and to this end a bearing X is inserted in the upper end of the tube E to which it may be secured by means of a pin Y. The bearing X consists of a generally cylindrical piece

and has a shoulder Z adapted to rest on the end of the tube E.

At the uppermost end of the bearing X is formed a semi-cylindrical surface *b* interrupted intermediate its ends by a slot *c* into which extends a tongue *d* of a link *e*. The bearing X and the tongue *d* are provided with holes *f* and *g* respectively for the reception of a pin *h* which acts as a pivot for the link.

On opposite sides of the tongue *d* are formed concave recesses *j* which conform to the cylindrical surface *b* upon which they are adapted to rest so that any pressure applied to the link *e* will be transmitted to the bearing X rather than to the pin *h*. For the sake of symmetry the link *e* is preferably also of generally cylindrical form and of substantially the same diameter as the bearing X.

At the opposite end of the link *e* is formed a tongue *k*, in all essential respects similar to that of the tongue *d* and on opposite sides of the tongue *k* are formed concave surfaces *o* shaped to conform to convex surfaces *p* of a head *q* for which they form a bearing.

The tongue *k* is disposed at right angles with respect to the tongue *d* and has an aperture *r* adapted to register with apertures *s* in the head *q* for the reception of a pivot pin *t* whereby the head *q* is connected to the link *e*.

It will thus be observed that the pivots *h* and *t* are disposed perpendicularly with respect to each other. Due to this arrangement the head *q* is capable of universal pivotal movement and at the same time is held against rotative movement relatively to the tube E. In order to maintain all portions of the head *q* within the range of the line of force applied to the screw K for extending the tube, the head *q* is provided on opposite sides of the curved surface *p* with inclined surfaces *u* adapted to bear against surfaces *v* of the link *e* for limiting the range of oscillatory movement of the head *q*. Similarly the bearing X is provided with inclined surfaces *w* to limit the degree of oscillatory movement of the link *e* with respect to the bearing X.

In order to at all times assure a suitable yieldable surface on the head *q* for frictional engagement with the abutment, such as the roof J against which the head is pressed, said head is provided with a pad *x* of resilient material, as for instance, rubber. The pad preferably overlies the entire upper surface of the head Q to which it may be agglutinated by means of any suitable substance, such as cement, for the purpose of maintaining it in position on the head *q*.

Additional means are provided however, for securing the pad *x* to the head *q*. These means consist of integral projections *y* of the pad *x* which extend into apertures *z* in the head *q*. The apertures *z* are preferably flared at both ends and therefore have restricted portions 2 which constrict the projections *y* intermediate their ends, and the outer ends of the projections expand to conform to the flared end of the apertures *z*. This is the manner in which the pad *x* may be secured to the head *q* in case the pad is preformed and afterwards attached to the head *q*. When the pad is vulcanized to the head *q* however, the material of which the pad is composed will of course conform directly to the contour of the apertures *z*, with the result that there will be flared ends on the projections *y* to engage the flared ends of the apertures *z*. Preferably the central portion of the pad *x* is also anchored to the head *q* and the pad *x* accordingly has a central projection 3 which extends into a recess 4 in the head and engages with its sides the inclined surface 5 of the recess 4.

In setting up the column A said column may first be placed in substantially the desired position, it being understood of course that the column is contracted to permit of it being readily placed between the floor and the roof of the drift. The screw K may then be rotated by means of the bar W to extend the column and press its extremities, such as the foot piece P and the head *q* firmly against the surfaces of the abutments which serve to maintain the column in the operative position.

The setting up of the column may be accomplished with a minimum expenditure of time since the pad *x* will readily conform to the contour of the surface against which it bears, irrespective of any irregularities in such surface or of the degree of inclination of the abutments relatively to the column. After such drilling as may be accomplished within the range of the column is completed the column may again be contracted by means of the screw K and conveyed to another drilling site.

Due to the present invention a great saving in time is realized in the operation of setting up the column since, owing to the universal tilting action of the head *q*, the column may be conveniently placed and maintained in position even though it is not exactly perpendicular with respect to the abutments.

For the sake of simplicity of illustration a pad *x* is shown at only one extremity of the column. It is however, to be understood that a similar pad may be provided for the foot piece P, thus entirely eliminating the necessity of maintaining material, such as the planks T, on hand for the purpose of preventing slipping of the column on the surfaces whereby it is supported.

I claim:

A device of the character described comprising a support, a bearing secured to the

support, a head, a link interposed between the bearing and the head, tongues on opposite ends of the link, slots in the head and the bearing to receive the tongues, circular apertures in the head, the bearing and the tongues, said apertures in the tongues being larger than the apertures in the head and bearing, pins extending through the head, the bearing and the tongues to pivotally connect the link to the bearing and the head, said pins being disposed perpendicularly with respect to each other to permit of universal pivotal movement of the head relatively to the support, inclined surfaces on the head and the bearing adapted to cooperate with surfaces on the link for limiting the range of oscillatory movement of the head and the link, concave surfaces on each end of the link, and convex surfaces on the bearing and the head bearing against the concave surfaces on each end of the link whereby pressure applied to the device in any position of the head and link will be received by the bearing surfaces and not by the pins.

In testimony whereof I have signed this specification.

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