J. VON SPARRE.
Improvement in Rock Drills.

No. 132,123. Patented Oct. 8, 1872.

Fig: 1

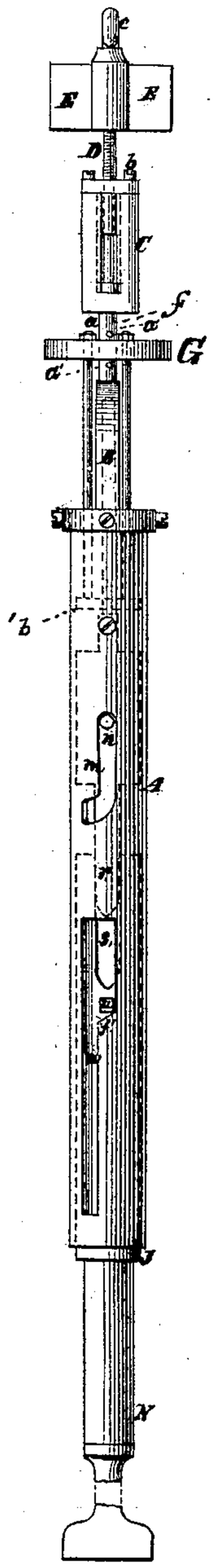
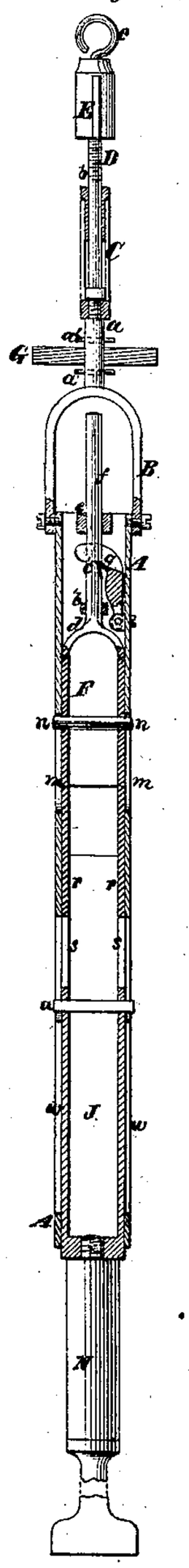


Fig: 2



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UNITED STATES PATENT OFFICE.

JULIUS VON SPARRE, OF OBERHAUSEN, PRUSSIA.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **132,123**, dated October 8, 1872.

To all whom it may concern:

Be it known that I, JULIUS VON SPARRE, of Oberhausen, in the Empire of Prussia, have invented certain Improvements in Rock-Drills, of which the following is a specification:

This invention is designed for rock-drilling or boring under water; and its object is to provide an efficient means of turning the chisel or boring-tool with reference to the rock or material to be drilled, as required in the operation of boring, and also to provide an efficient means whereby such turning of the tool shall not affect or require any twisting or axial movement of the rope by which, when in use, the apparatus is suspended. The invention consists in certain novel combinations of parts whereby the results specified are obtained.

Figure 1 is a side view of a boring apparatus constructed according to my invention. Fig. 2 is a central longitudinal section of the same.

A is the outer cylinder or shell of the apparatus, having fixed to its upper end the yoke B, terminating at top in a stem, *a*, arranged in the axial line of the cylinder A. To the top of this stem are fixed the guides C, through or with reference to which slides the lower part *b* of the suspension-bolt D, the same capable of turning within the guides which constitute a swivel-joint. The bolt D is formed with a loop, *c*, at its upper extremity, to which, when the apparatus is in use, is attached the wire rope, whereby the same is worked. Projecting laterally from opposite sides of the bolt D are wings E, the function of which will herein presently appear. Upon the stem *a* is placed the disk G, preferably of wood, and capable of an up-and-down movement on the stem between the stops *a'* provided on the latter. Arranged within the upper part of the outer cylinder A is a second cylinder, F, hollow, and connected by a yoke, *d*, with a central rod, *f*, working through a bearing provided at *e*, in the upper end of the cylinder A. Suspended from the disk G, by two rods, one on either side of the central rod or stem *f*, is a cross-piece, *b'*, that operates by the motion of the said disk between the stops *a' a'* on descent of the apparatus to disengage the pawl *g*, which is pivoted on the inner side of the cylinder A from the stem *f;* and on raising the said apparatus the resistance on the upper side of the disk G liberates and allows the pawl to re-engage for a repetition of the operation. Upon opposite sides of the cylinder F are radial studs or pins *n*, which pass into or through guide-slots *m* formed in the contiguous sides of the outer cylinder A. These guide-slots are straight and longitudinal with the cylinder for the greater portion of their length, but at their lower parts are curved in such wise as to operate the pins *n*, when the same descend or ascend to give an axial or partly rotating movement to the cylinder F. From opposite points at the lower end of the cylinder F extend spurs *r*, which fit into and are capable of longitudinal movement within slots *s* of corresponding shape formed in the adjoining upper end of a third hollow cylinder, J, occupying the lower part of the cylinder A, and carrying at its lower end the boring-tool or chisel N. From opposite sides of this stud or lower cylinder project studs *u*, working in slots *w* in the contiguous sides of the cylinder A, these slots *w* being largest at their upper portions and formed with shoulders *f'*, the position of which is more plainly indicated in Fig. 1.

In the operation of the apparatus for boring under water it is lowered by means of the wire-rope by which it is suspended, and the resistance afforded by the water to the descent of the disk G causes the latter, with reference to the outer cylinder A, to rise, and, bringing the shoulder *b'* against the pawl *g*, forces the latter from the notch *c'* in the rod *f*, and thereby disengages the said rod and allows of the sudden descent, by its own weight, of the cylinder F. During such descent of the cylinder F its pins *n* are brought in contact with the curved lower portions of the slots *m*, and partial revolution about its own axis is given to the cylinder, which movement, by means of the spurs *r* fitting into the slots *s* of the lower or chisel-carrying cylinder J, is communicated to the latter, and, of course, to the chisel, while the continued downward movement of the two cylinders F J bring the chisel in forcible contact with the rock or material to be drilled or bored. During the greater portion of the simultaneous descent of F and J, the studs *u* of the latter move down within the straight longitudinal portions of the slots *w*. When the chisel reaches the rock—or, in other words, the bottom of the bore-hole—its vertical

motion is corrected, and its contact with the rock prevents its further axial turning. The continued descent of the outer cylinder A brings the upper edges of the curved portions of the slots *m* in contact with the studs *u*, and thereby partially rotates the cylinder A, the wire-rope by which the same is raised and lowered being prevented from turning by means of the resistance offered by the water to any axial movement of the wings E of the suspension-bolt D, to which such rope is attached. In order to permit the turning movement of the cylinder A, as just described, the bolt D has a swivel movement at its junction with the guides C. The downward movement of the cylinder A having reached its limit, the pawl *g* is brought into position to catch in the notch *c'* of the rod *f*, the ports being thus brought into their original position with reference to the cylinder A, but the whole, including the cylinder A, being partly rotated upon the suspension-bolt D or axis of the apparatus while the position of the wire rope remains unchanged. By this means the simple up-and-down movement of the apparatus suffices to give to the chisel the intermittent rotating movement essential to its useful operation. It will be noticed that while the descent of the outer cylinder insures the turning thereof, as previously herein described, the slant of the curved parts of the slots *m* is such that a considerable portion of the weight of the cylinder is exerted upon the studs *u*, and consequently upon the chisel, to increase its frictional contact with the rock and its resistance to any tendency to axial movement. The turning of the cylinder A, moreover, suffices to bring the studs *u* of the chisel-carrying cylinder J over the shoulders *f'*, in order that when the apparatus is lifted bodily by the succeeding upward movement of the wire rope, the said shoulders may hold up the cylinder J in position until again turned and brought down by the movement, hereinbefore fully set forth, of the cylinder F.

What I claim as my invention is—

1. The combination of the three cylinders A F J, constructed, arranged, and operating in relation with each other, the pawl *g*, disk G, swiveled suspension-bolt D, and chisel or tool N, substantially in the manner herein set forth, for the purpose specified.

2. The combination, with a boring apparatus, constructed substantially as herein described, of the wings E provided upon the suspension-bolt, for the purpose of preventing the axial rotation of the latter, and consequently of the operating-rope, during the axial rotation of the apparatus when in use, substantially as herein set forth.

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