

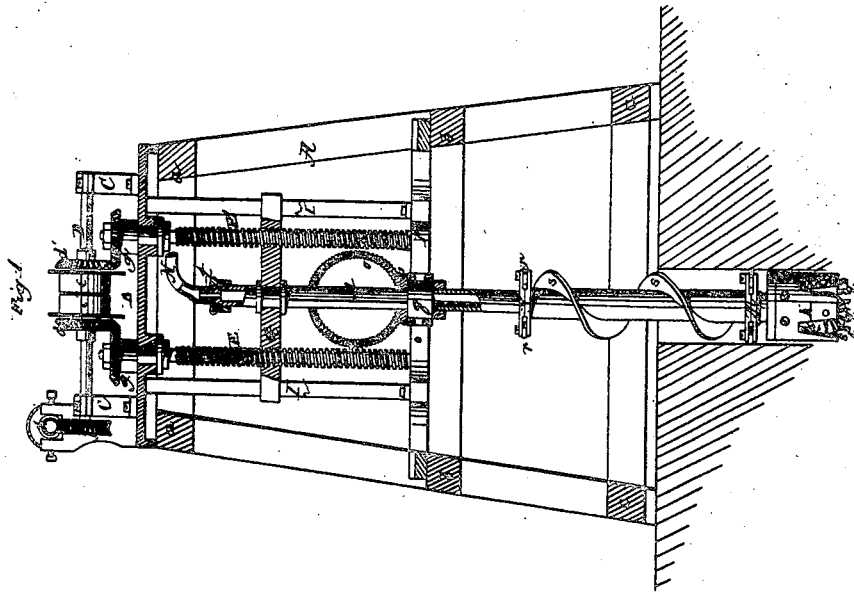
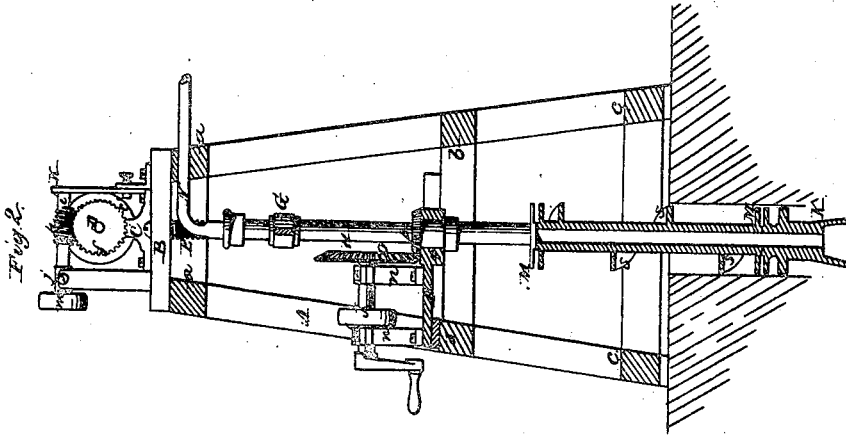
*P. Sweeney.*

*2 Sheets Sheet 1.*

*Stone Drill.*

*N<sup>o</sup> 51,902.*

*Patented Jan. 2, 1866.*



*Witnesses:*  
*Mellington*  
*W. Brown*

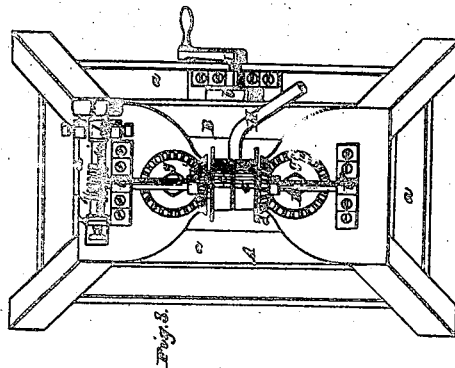
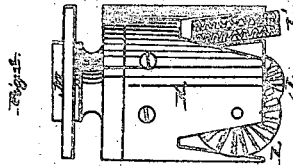
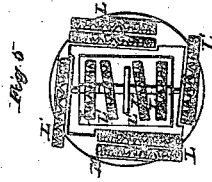
*Inventor:*  
*P. Sweeney*

2 Sheets, Sheet 2.

*P. Sweeney,*  
*Stone Drill.*

*N<sup>o</sup> 51,902.*

*Patented Jan. 2, 1866.*



*Witnesses:*  
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# UNITED STATES PATENT OFFICE.

PETER SWEENEY, OF NEW YORK, N. Y., ASSIGNOR TO JOHN J. FLANNAGAN,  
OF JERSEY CITY, N. J., AND JOSIAH OAKES, OF NEW YORK CITY, N. Y.

## IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. 51,902, dated January 2, 1866.

### *To all whom it may concern:*

Be it known that I, PETER SWEENEY, of No. 383 East Ninth street, in the city, county, and State of New York, have invented a new and Improved Rotary Rock-Boring Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention, the line *x x*, Fig. 2, indicating the plane of section. Fig. 2 is a transverse vertical section of the same, taken in the plane indicated by the line *y y*, Fig. 1. Fig. 3 is a plan or top view of the same. Fig. 4 is a detached side elevation of the drill, detached, in a larger scale than the previous figures. Fig. 5 is an inverted plan of the same.

Similar letters of reference indicate like parts.

This invention consists in a drill composed of a number of scalloped cutting-wheels, which are arranged in a common head on axles passing through wheels, partially at right angles and partially in oblique directions, in such a manner that by giving to the head a rapid rotary motion the wheels cut into the ground or rock and a clean hole is produced. The dirt or dust produced by the operation of the cutting-wheels at the bottom of the hole is raised by the action of a spiral flange secured to the outside of the drill-rod, and said rod is guided by a series of friction-rollers arranged in suitable heads secured to the drill-rod. The drill-rod is hollow, and it connects with a hose through which a current of steam or water can be introduced in such a manner that the discharge of the dirt and dust from the bottom of the hole is facilitated. Said drill-rod is suspended from a cross-head which moves up and down in suitable guides, and to which a rising and falling motion can be imparted by means of two screw-spindles, which revolve between suitable stationary bearings, and to which motion is imparted by bevel-gears or any other desirable mechanism. By imparting to these spindles a slow rotary motion the requisite feed of the drill is effected.

A represents a frame, made of wood or any

other suitable material, of sufficient height for the occasion. Said frame may be made slightly tapering, as shown in Figs. 1, 2, and 3 of the drawings, and it is provided with three sets of cross-bars, *a b c*, which serve the double purpose of strengthening the frame and also of supporting the mechanism for operating the drill. The top cross-bars, *a*, support the bed-plate B, from which rise two pillow-blocks, C, which form the bearings for the shaft D. On this shaft are mounted two bevel-wheels, *d d'*, a fast and loose pulley, *e e'*, and a worm-wheel, *f*. The bevel-wheels *d d'* gear into corresponding bevel-wheels *g g'*, mounted on the upper ends of screw-spindles E E', which pass through the upper plate, B, and are stopped in suitable sockets in the lower plate, F. These screw-spindles are tapped into a cross-head, G, from the center of which the drill-rod H is suspended, and they are secured between the two plates B F in such a manner that they are allowed to turn freely, but not permitted to move in a longitudinal direction. By imparting to the shaft D a rotary motion the cross-head G is caused to travel up and down, and the drill-rod is raised or lowered. The ends of the cross-head extend between upright guides I, which keep the same square while moving up and down by the action of the screw-spindles.

When it is desired to raise the drill the belt running on the pulleys *e e'* is thrown on the fast pulley, and thereby a quick rotary motion is imparted to the screw-spindle in such a direction that the cross-head, together with the drill-rod, rise at a pretty quick rate.

For the purpose of feeding the drill down while drilling a worm, *h*, is employed, which is mounted on a shaft, *i*, that has its bearings on one end in a swivel-box, *j*, and on the opposite end in a vertically-adjustable plate, *k*. By depressing this plate the worm is thrown in gear with the worm-wheel *f*, and if a rotary motion is imparted to the shaft *i* the shaft D revolves slowly, and the desired feed-motion is produced. The shaft *i* receives the desired motion by means of a belt which is stretched from a pulley, *l*, on the driving-shaft over a pulley, *m*, mounted on the end of the shaft *i*. This pulley is secured to that end of said shaft next the swivel-box *j*, so that the belt does not

interfere with the operation of throwing the worm *h* in or out of gear with the worm-wheel *f*.

The driving-shaft *J* has its bearings in two pillow-blocks, *n*, which are secured to the lower plate, *F*, and on its inner end is mounted a bevel-wheel, *o*, which gears in a pinion, *p*, the hub of which is fitted into a box, *q*, secured to the edge of the plate *F* in such a manner that the pinion is free to revolve, but not allowed to move in a longitudinal direction. This pinion is bored out to receive the drill-rod *H*, and it is provided with a feather-key that fits into a groove in the rod, so that said rod is allowed to slide through the pinion in a longitudinal direction, but compelled to rotate with the same.

*K* is the cutter-head, which is mounted on the extreme end of the drill-rod. This head is furnished with a series of scalloped cutter-wheels, *L L'*, arranged in relation to each other and to the head, as clearly shown in Figs. 3, 4, and 5. Some of these wheels are mounted on their axles square and others oblique, and by the oblique position of the center wheels, *L'*, the core of the hole is reached and a clean hole is bored. The cutter-wheels may be made of cast-iron or any other suitable material, and the cutter-head is so constructed that the axles of the cutter-wheels can be readily removed, and that new cutter-wheels can be introduced whenever it should become desirable.

In order to steady the drill-rod, as the same revolves in the hole, it is provided at suitable intervals with heads *M*, which are furnished with friction-rollers *r*, so that the same rotate in the hole with the least possible loss by friction.

In practice the drill-rod will be made in a number of sections, and whenever the depth of the hole requires it a new section is added, until the requisite depth is reached.

A spiral flange, *s*, rising from the exterior surface of the drill-rod, serves to carry up from the bottom of the hole the dirt and dust created by the action of the disk. This flange is cast solid with the drill-rod, or it may be otherwise secured to the sections of the same; and in practice it will be made of a steep pitch, so that the dirt is carried up as fast as it forms.

The discharge of the dirt and dust is still further facilitated by a current of compressed air, steam, or water forced down through the interior of the drill-rod. In order to effect this purpose it is necessary to make said drill-rod hollow. The liquid or fluid is introduced through a hose, *N*, which connects with a nipple, *t*, secured to the upper end of the drill-rod, as shown in Fig. 1 of the drawings. This nipple is held in position by a cap, *u*, which screws to the upper end of the drill-rod, and which is so arranged that it allows the nipple to remain stationary while the drill-rod revolves.

This apparatus may be used with advantage for boring wells, or for drilling holes in rock in a horizontal, oblique, or vertical direction; but by its peculiar construction it is particularly adapted for boring deep wells. The operation of boring can be continued without interruption, with the exception of the time required for adding new sections to the drill-rod as the depth of the hole increases. The dirt is discharged during the operation of boring, and a clean hole is obtained, into which the tubing can be introduced without difficulty.

This apparatus can also be used with advantage for submarine operations.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A drill composed of a number of scalloped wheels arranged in a common head, substantially as and for the purpose set forth.

2. Placing two or more of the cutting-wheels in oblique positions toward their axles, substantially as and for the purpose described.

3. The combination and arrangement of the screw-spindles *E E'*, cross-head *G*, bevel-cog wheels *d d' g g'*, and loose pulley *ee'*, when employed in connection with the drill-rod *H*, in the manner and for the purpose explained.

4. The worm *h*, mounted on the adjustable shaft *i*, in combination with the worm-wheel *f* and screw-spindles *E E'*, cross-head *G*, and drill-rod *H*, constructed and operating substantially as and for the purpose described.

PETER SWEENEY.

Witnesses:

M. M. LIVINGSTON,  
C. L. TOPLIFF.