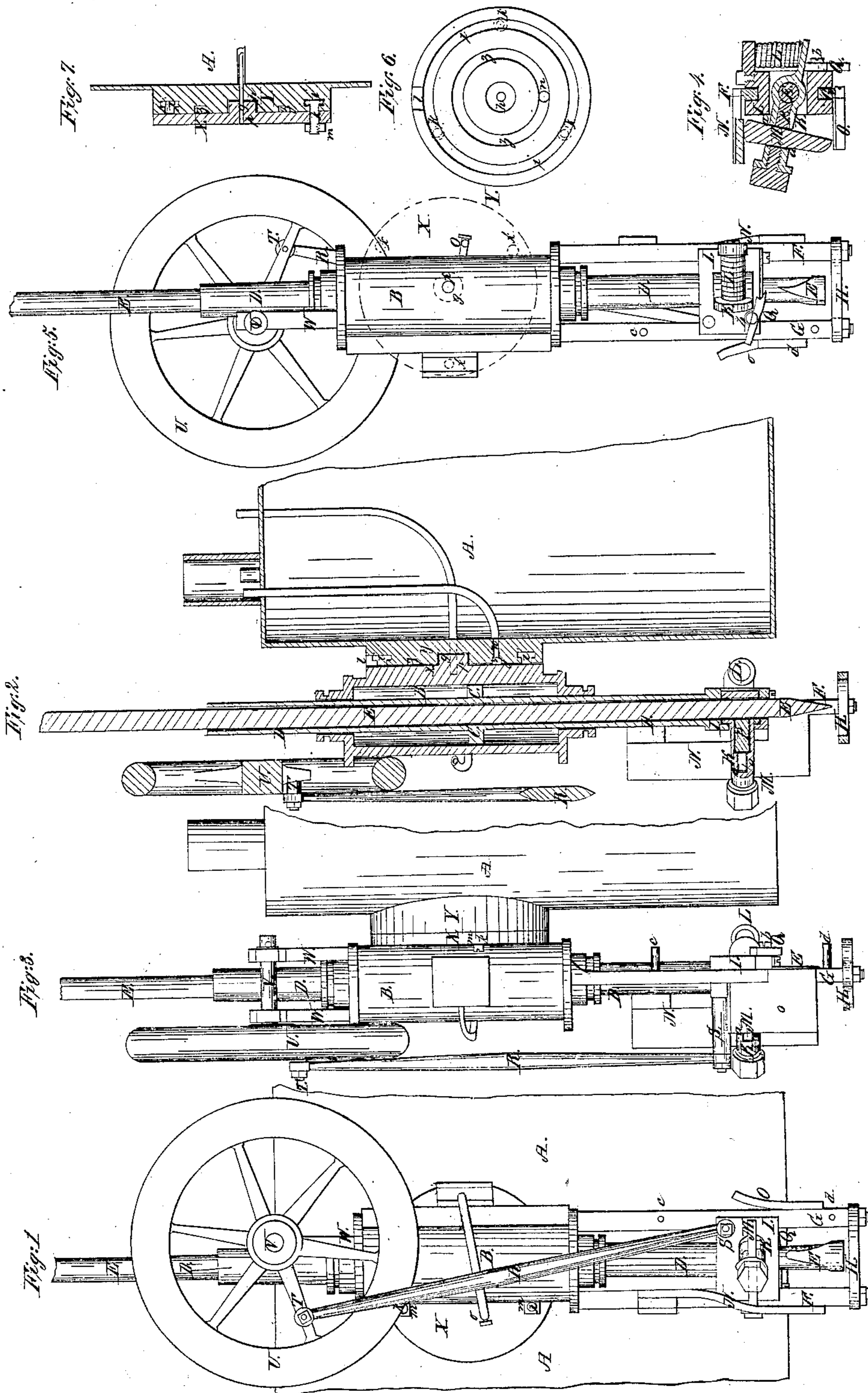


*J. J. Couch,*  
*Steam Rock-Drill.*

*N<sup>o</sup> 9,415.*

*Patented Nov. 23, 1852.*



# UNITED STATES PATENT OFFICE.

JOSEPH J. COUCH, OF PHILADELPHIA, PENNSYLVANIA.

## MACHINE FOR DRILLING STONE.

Specification of Letters Patent No. 9,415, dated November 23, 1852.

*To all whom it may concern:*

Be it known that I, JOSEPH J. COUCH, late of North Bridgewater, in the State of Massachusetts, but now a resident in Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Machinery for Drilling Rocks, &c., in Tunnels or Excavations or in other Places Where the Same May Be Advantageously Employed; and I do hereby declare that the same are fully set forth and described in the following specification and the accompanying drawings, letters, figures, and references thereof.

Of the said drawings Figure 1 represents an elevation of my steam drilling engine. Fig. 2 is a vertical and central section of it, in which the cylinder of the engine and the drill rod are represented in a vertical position. Fig. 3 is a side elevation of it. Fig. 4 is a transverse section of the drill rod and the mechanism by which said drill rod is clamped to and released from the mechanism by which it is thrown forward and drawn backward previous and subsequent to a blow.

In the said drawings A represents a steam boiler of the upright kind made in any suitable manner.

B is a steam cylinder which is applied to the side of the boiler in a manner which I shall hereinafter describe. This cylinder has a piston C whose rod D is made to extend on opposite sides of it and work through both heads or ends of the cylinder, such cylinder heads being provided with suitable stuffing boxes for the piston rod to play through. The piston is placed about in the middle of the piston rod and the piston rod is made in length somewhat more than double or about double that of the steam cylinder. The piston rod is made hollow or tubular from end to end and so as to receive a long cylindrical drill rod E and permit said drill rod to slide freely through it. The piston head slides F and G are made to extend from one head of the cylinder parallel to one another, and to be united together at their outer ends by an open cross piece or tie H. Between these rods and supported by them is the cross-head or block I of the piston, said cross-head being attached to the piston rod and made to slide upon the two bars or slides F, G. This slide or carriage I carries a rocker lever K which extends transversely through it and has its fulcrum within the carriage, the drill rod

being made to pass through the fulcrum of the lever. The short arm of this lever is pressed upward by a strong helical spring L arranged as seen in the drawings. The other arm of the lever is made hollow or tubular throughout its length, and has a slot or mortise *a* extended through it in a direction at right angles to the piston rod as seen in Fig. 4. There is a wedge M that passes through such slot or mortise, the larger end of which wedge rests and moves against the inner surface of a cam plate N that is permanently affixed to the lower slide rod of the cylinder and is shaped as seen in Fig. 1. There is also another cam plate O that is made to project from the opposite slide bar and be formed as seen in Fig. 1. Between the wedge M and the drill rod there is a small slide or bolt P which is placed and slides freely in the long arm of the rocker lever, and is so made that when the wedge is moved close up into the hole or mortise through which it works, it shall force such bolt forward against the drill rod and lock or clamp it to the rocker lever rod.

Fig. 5 represents a rear view of the steam cylinder, its piston, piston head, and other mechanism connected therewith. By inspection of this figure it will be seen that there is a small catch lever Q applied to the rear side of the slide block I, the same being made to work on a fulcrum or pin *b* and to operate in connection with two studs or pins *c*, *d*, that project from the rear side of one of the slide bars of the piston head as seen in the drawings. A connecting rod R is at one end jointed to and extends down from an arm S that projects from the carriage or slide block I. At the opposite end of the connecting rod the said rod is jointed to or takes hold of a crank pin T that projects from the side of a fly wheel U, whose shaft V is supported on struts W, W, extended from the steam cylinder.

The steam cylinder is affixed or fastened to a circular metallic plate X which rests with its side against a similar bearing plate Y affixed to the side of the boiler. From the middle of the bearing plate X a short journal *g* is made to project and extend into a corresponding box, bearing, or recess *p* made in the circular plate Y. Fig. 6 represents a front view of the circular bearing plate Y, and Fig. 7 a cross section of it taken through one of the screws by which the plate X is confined to it. The said cir-

cular bearing plate Y is provided with a circular groove *i* that is made on its inner surface and next to the plate X. This groove has a dovetail shape in cross section, or is made wider at its bottom than at its top, and so as to hold the heads of any suitable number of screws *k*, *k*, that may be placed therein. There is an opening *l* made into this groove by which the screw heads may be inserted in it. Such screws pass through the plate X and have nuts *l l l* on their ends as seen in Fig. 1, so as to confine the plate X to the plate Y and at the same time permit such plate X to have a free rotation on its axis, so as to enable the steam cylinder, piston and drill rod to be arranged so that the drill rod shall stand vertically or make any desirable inclination to the horizon.

Between the dovetail groove of the plate Y and the journal of the plate X, and concentric with them there is another circular groove Z cut around within the plate Y. This groove has a passage or hole *n* leading from it directly into the boiler or a pipe made to communicate therewith, so that steam may be made to pass from the boiler through such pipe or passage and into the circular groove Z. Through the plate X there is a hole or passage *o* which is made through the plate at a mean distance from its center equal to the mean radius of the circular groove Z. There is also another hole or passage *p* made through the center of the journal of the plate X. I connect the exhaust of the steam chest of the cylinder with the hole or passage *p* through the journal, and I also connect the steam chest above the valve with the passage through the plate X that leads into the groove Z, so that the steam from the boiler which fills the circular groove Z shall supply the cylinder in whatever position it may be. The exhaust steam under such a state of things will always be through the center of the journal of the plate X from whence it may be conveyed either into a water tank or into the chimney of the boiler as circumstances may require.

When the piston rod moves backward in the cylinder it carries its slide head I with it and causes the wedge M to move against

the cam surface of the cam plate N so as to cause the rocker lever to turn the drill rod while the carriage I is moved backward. Just previous to the carriage or block I reaching the extent of its retrograde movement, the small spring lever catch on the back of it is brought in contact with the back pin *c* and so as to cause the catch to lock on the small arm of the rocker lever and thereby hold the said rocker lever up while the slide or block I is next moved forward and the upper or small end of the wedge strikes against the cam surface of the cam plate O. In moving against such cam surface the wedge will be depressed or so moved through its slot as to unclamp the drill rod from the carriage I and allow said drill rod to move forward with all the momentum generated in it by the forward movement of it in connection with the piston rod. When the carriage I reaches to or about the extent of its forward motion the arm of the spring lever Q strikes the pin *d* and is so moved thereby as to release the rocker lever and allow it through the action of its spring to be moved toward the cam plate N so as to be ready to turn the drill rod when the piston rod next recedes. It also drives the wedge key into its mortise thereby gripping the drill.

What I claim as my invention is as follows:

1. I claim the improvement of making the drill rod to slide through the piston rod, substantially in manner as above set forth.

2. And I also claim the combination of the rocker lever K, the wedge M, the bolt P within the lever, the two cam plates N, O, the spring catch Q, the spring and the two projection *c*, *d*, as applied to the drill shaft, the carriage or block I, and the slide ways thereof, and made to operate together and to actuate the drill, substantially in manner as hereinbefore set forth.

In testimony whereof I have hereto set my signature, this eighteenth day of August, 1852.

J. J. COUCH.

Witnesses:

R. H. EDDY,  
CHARLES WILSON.