(No Model.)

2 Sheets—Sheet 1.

A. W. PALMER.

MEANS FOR MAKING BORINGS AT BOTTOM OF DEEP WATERS AND IN TIDEWAYS.

No. 525,795. Patented Sept. 11, 1894.

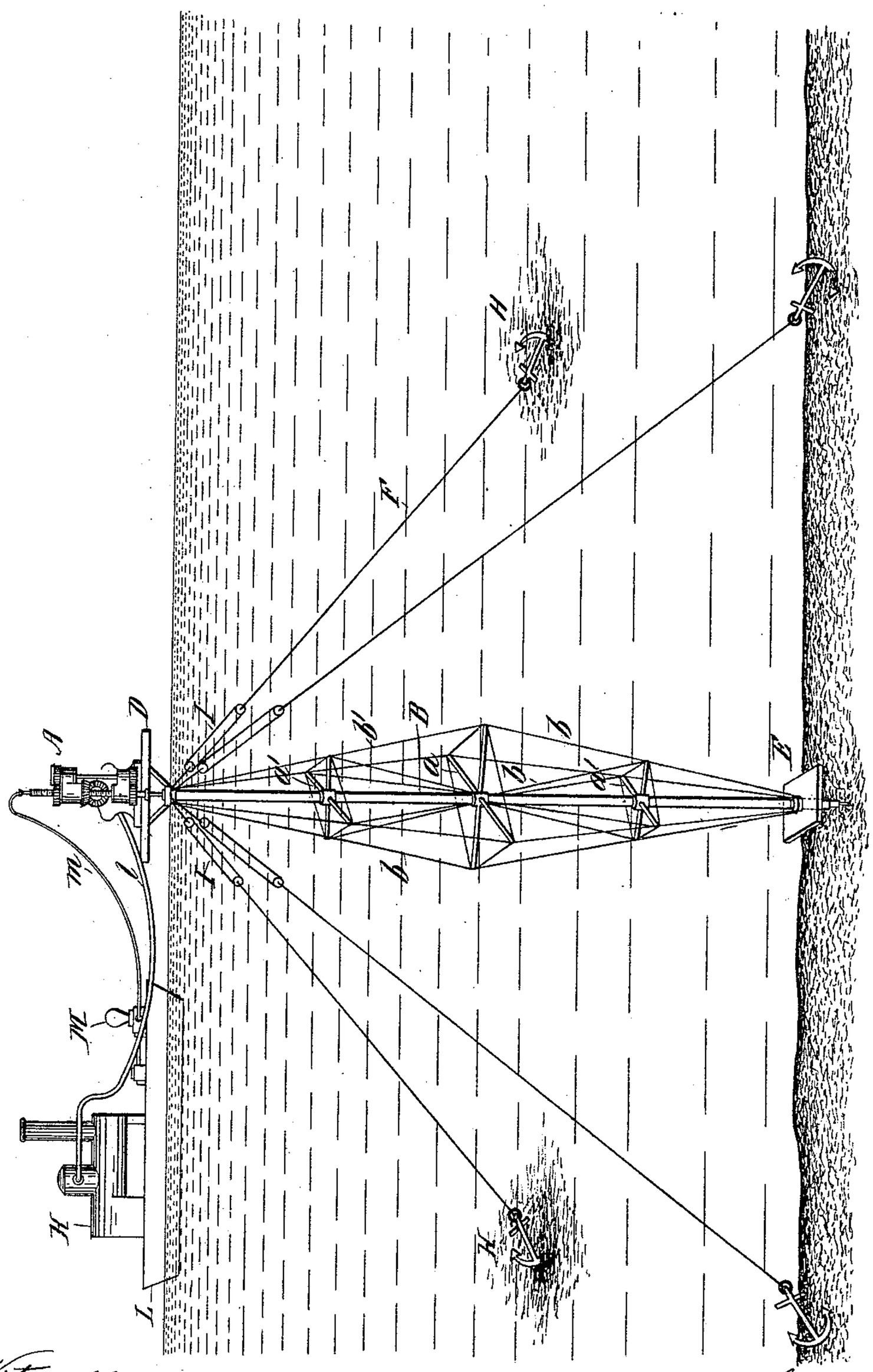

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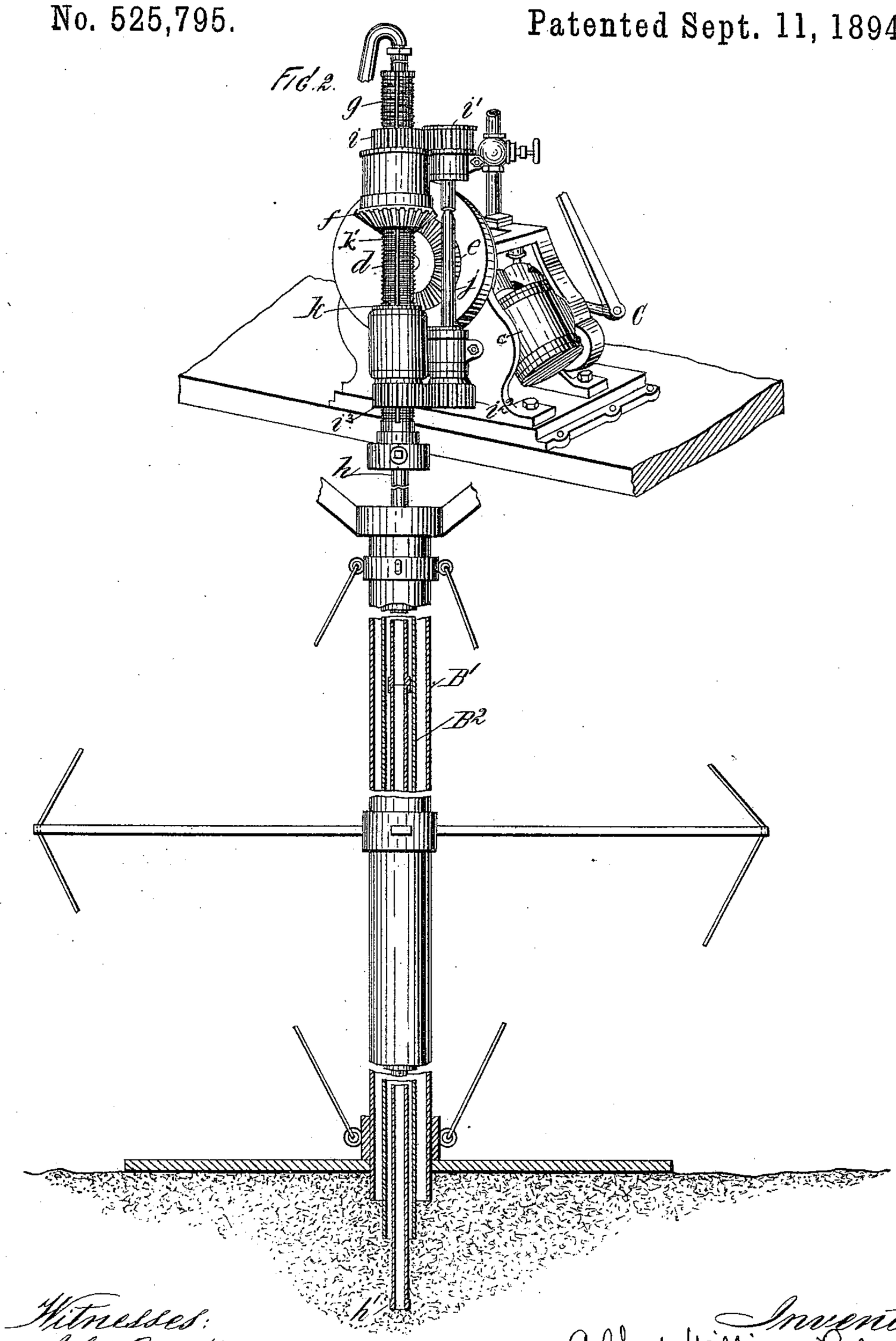
FIG. 2.



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UNITED STATES PATENT OFFICE.

ALFRED WILLIAM PALMER, OF NEW YORK, N. Y., ASSIGNOR TO CHARLES H. TOMPKINS, OF SAME PLACE.

MEANS FOR MAKING BORINGS AT BOTTOM OF DEEP WATERS AND IN TIDEWAYS.

SPECIFICATION forming part of Letters Patent No. 525,795, dated September 11, 1894.

Application filed July 8, 1893. Serial No. 479,909. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WILLIAM PALMER, a subject of the Queen of Great Britain, and a resident of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Means for Making Borings at the Bottom of Deep Waters and in Tideways, of which the following is a specification.

My invention relates to the means made use of for supporting steam and other power operated rock drilling machines which are employed for making borings in the earth to ascertain its geological formation prior to the driving of tunnels, the construction of foundations, or the building of heavy and massive structures, where a knowledge of such formation, if not absolutely essential, is at least desirable. The drilling machine usually employed in making these borings are of that form in which the head or cutting portion is made in the form of an annulus, with its lower side or face studded with diamonds, and is carried at the end of a tubular rod which is rotated by the engine or other source of power. As thus constructed, the head or cutting portion, during the boring operation, is held pressed against the substance in which the hole is to be made, and the cutting or boring is effected by the abrading or plowing action of the diamonds as they are carried around by the head in its rotation, forming thereby an annular orifice, with a central core which, in the boring operation, extends as it is formed, upwardly into the head and into the tubular supporting rod, and is afterward broken off and removed to serve as a means to illustrate the formation through which the boring has been carried. The cutting of the drill being thus effected by the abrading or plowing action of the diamonds as they are carried around by the head in which they are secured, it is obvious that not only is the most efficient operation effected when the diamonds are held constantly pressed against the surface that is to be cut away, but that when the head is in a state of repeated reciprocation toward and away from such surface, as by the action of the waves when the drill is mounted upon a scow, the boring is less satisfactory, and the danger of breaking or removing the diamonds from their seats by the repeated impacts against the surface being cut away, as such diamonds are carried violently against it, is greatly enhanced, not to mention the liability to breakage and rupture of the other parts of the drill.

When the boring is being accomplished either upon land or in shallow water, the mounting of the drilling machine can be such as to prevent the objectionable back and forth reciprocatory movements of its drill or cutting portion, since in the one case the machine can be supported upon a carriage, a tripod, or other stationary stand, while in the other it can be mounted upon a scow or upon a platform secured to the top of piles or other supporting structures resting upon the bottom of the water in which the boring is to be effected. When, on the other hand, it is the desire to make the borings where the water is so disturbed by tides, the undulations of waves or otherwise, then a scow cannot be employed in consequence of the rising and falling motions thereof, or is of such a depth that piles, or the other structures mentioned cannot be availed of in consequence of the failure to secure piles of the proper lengths, or structures of the requisite heights, then the borings of the character specified have had to be dispensed with, or if employed at all have been conducted under such disadvantages as to render them highly unsatisfactory if not altogether worthless. I have discovered, however, that by dispensing with the usual scow and piles and mounting the entire drilling apparatus upon a single post extending upward from the bottom of the water, if properly stiffened and guyed, the disadvantages heretofore experienced in making borings in deep or turbulent water may be obviated, and such operation carried on with approximately the same facility and satisfaction as when carried on upon the land or in shallow water.

The object of my invention is therefore to provide suitable means for supporting a steam or other power operated rock drilling machine whereby the making of borings in deep or troubled water may be facilitated and rendered practicable; and to this end the in-

vention consists, first, in the means whereby this boring in the bottom of deep waters is effected, and, second, in various other constructions and combinations of parts entering into such means, all as will hereinafter more fully appear.

Referring to the accompanying drawings, which form a part of this specification, Figure 1, is a perspective view, showing the scow and a steam rock drilling machine mounted in accordance with my invention, and Fig. 2, a partial sectional view of a steam rock drilling machine and its supporting structure, parts being broken out for convenience of illustration.

In all the figures, like letters of reference are employed to designate corresponding parts.

A indicates a steam or other power operated rock drilling machine, and B the post or column upon which it is mounted. The drilling machine A, may be any of the ordinary or well known forms of power rock drilling machines now in use. I prefer however to employ that form in which the boring is effected by an annular head studded with diamonds and known in the art as the diamond drill. As shown in the drawings, it consists of a framework or housing, C, in which is mounted an oscillating steam cylinder, *c*, the piston-rod of which is connected to a crank on the horizontal shaft *d*, and imparts thereto a rotary motion. This shaft, *d*, is provided on its end with a beveled gear, *e*, which meshes with a second beveled gear, *f*, secured by a suitable feather to the sleeve *g*, in which is supported the tubular boring rod *h*, that carries at its forward end the head *h'*. Through the gearing and parts thus described, rotary motion is communicated to the head *h'* from the shaft *d*, and the feeding of the boring head to the material to be cut away is effected through the intermediary of the gears *i*, *i'* i^2 i^3, and the shaft *j*, the gear *i* of which series is mounted upon the hub of the beveled gear *f*, while the gear i^3 thereof is fixedly secured to the lower end of the interiorly screw threaded sleeve *k* which engages with a screw thread, *k'*, formed on the outer surface of the sleeve *g*, all as is common in this class of drilling machines and require no further description herein.

In the construction of the supporting post or column B, any appropriate materials may be employed. I prefer, however, to make use of metal tubing for the purpose, and to form it in sections of convenient lengths, which are united end to end by suitable union joints or otherwise. As thus constructed, it carries at its upper end a platform, D, upon which is supported the drilling machine A, while at its lower end is secured a flange or plate, E, whereby to prevent it from unduly sinking into the earth through the action of gravity upon the parts above.

In some cases I find it desirable to form the post or column of a single tube *b'*, which is made of the proper cross-section to sustain the weight that is to be put upon it. I prefer, however, in most cases, to construct it with an exterior tube, B', and an interior tube B^2, as shown more particularly in Fig. 2 of the drawings, since a firmer and more rigid support for the drill is afforded thereby. When thus constructed, the flange or plate E on the exterior tube B' resting upon the earth at the bottom of the water, serves to support the parts against the action of gravity, while the interior tube B^2 extending down through any silt or sand at the bottom of the water, enters an orifice made in the rock for the purpose by a drill or otherwise, and not only protects the boring rod from any lateral flexure, but also acts as a guide for the same.

The post or column B being constructed in either of the ways before specified, is held supported in a vertical position, with the drilling machine upon its upper end, by suitable guys, F, with the boring rod *h* extending downward through the center of same, for cutting away the rock or stone, as shown in Fig. 2.

The guys F may be provided at their lower ends with anchors, H, or other suitable appliances by means of which they may be secured to the bottom of the water, and are equipped at their upper ends with suitable blocks and tackle L, whereby to put the proper strain upon them to hold the post or column in a rigid upright position.

When the drilling machine is used in drilling under shallow water, the post B, in most instances, will be rigid enough without the aid of other appliances. When, on the other hand, it is to be employed in drilling under water of considerable depth it may be found necessary to truss the same, in which case I make use of the truss rods or wire *b*, which, secured near the upper and lower ends, respectively, of the post or column, are held under strain and taut by struts, *a*, extending outwardly from such post or column, and engaging at their outer ends therewith. In most cases a single set of trusses will suffice for the purpose. When, however, a single set is not sufficient, an intermediate set between the middle and each end thereof may be employed, in which case a series of rods, or wires *b'*, secured at one of their ends near the middle of the post or column, and attached at their other to the upper or lower end thereof, respectively, may be employed with struts, *a'*, co-operating therewith in the same manner as with the first mentioned set of trusses, and as shown in Fig. 1 of the drawings.

For supplying the necessary steam for operating the drilling machine, I employ the boiler K which is or may be supported upon a scow, L, and is connected to the drilling machine through the flexible tube *l*. Similarly with respect to the supply of water to the interior of the boring rod *h*, to lubricate the interior of the same where in contact with

the rock or other substance, and for washing out the detritus made by the drill in cutting it away, I employ an ordinary donkey pump, M, which is likewise carried on the scow L, and is connected with the upper end of the boring rod by a flexible tube, *m*.

By the construction and arrangement of parts above described, I provide, as will be seen, means for mounting a steam or other power operated drilling machine in such a manner as to permit of its efficient operation in boring, not only under water which is of great depth, but also in locations where there are violent wave motions, or strong currents, or both, as the structure, while of such dimensions as to afford the necessary rigidity of support for the drilling machine, at the same time offers but little cross-section to the action of the water as it is moved around and about the same by the waves or currents.

The mounting of the boiler and the pumps on a scow or supports separate and apart from the drilling machine, and connecting it therewith by a flexible tubing also conduces to the efficient operation of the device, since any motion that may be communicated thereto by the waves or otherwise is not transmitted to the drilling machine or its support.

For feeding the drill to the stone or other substances to be cut away, I have shown the means usually employed in the diamond drilling machine as ordinarily constructed, but it is obvious that I may employ any other well known means for this purpose, or may dispense with such parts altogether, and provide for the feeding of the drill thereto by the weight of a person or any other body applied to the upper end of the boring rod.

While, in the above description, I have had reference more particularly to what is known in the art as the diamond drilling machine, it is to be understood that I do not confine myself thereto, but reserve to myself the right to make use of any of the other well known forms of power operated rock drilling machine, and still be within the scope of my invention. Again, in the foregoing I have described the best means contemplated by me for carrying my invention into practice, but I wish it distinctly understood that I do not limit myself strictly thereto, as it is obvious that I may modify the same in various ways without departing from the spirit thereof.

Having now described my invention and disclosed certain of the ways in which it is or may be carried into effect, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a tubular post or column provided with a platform at its upper end, a flange or plate at its lower end, and a set of trusses for preventing it from lateral flexure, of a rock drilling machine mounted upon said platform, with its drill or cutting portion extending down through the center of said post or column and series of guys for maintaining such post or column in an upright position, substantially as described.

2. The combination, with a tubular post or column provided with a platform at its upper end, and a flange or plate at its lower end, and trusses for preventing it from lateral flexure, of a rock drilling machine mounted upon said platform, with its drill or cutting portion extending down through the center of such post or column and a series of guys provided with blocks and tackle, substantially as described.

3. The combination, with a tubular post or column provided with a flange or plate at its lower end, a rock drilling machine mounted upon its upper end, with its drill working through the center thereof, and means for holding such post or column in a vertical position, of a scow, a boiler and pump mounted thereon, and flexible tubular connections between such boiler and pump and the drilling machine, substantially as described.

4. The combination, with a post or column composed of an exterior tube B′, provided with a platform D, and a flange or plate E, and an interior tube B^2, and trusses for said exterior tube whereby to prevent it from lateral flexure of means for maintaining said post or column in a vertical position, and a rock drilling machine mounted upon said platform with its boring rod extending through and working in the tube B^2, substantially as described.

5. The combination, with a post or column composed of an exterior tube and an interior tube, a platform secured to the exterior tube near its upper end and supported thereby, and trusses for preventing the lateral flexure of the post or column, of means for anchoring and maintaining such post or column in a vertical position, and a rock drilling machine mounted upon said platform, with its boring rod extending through, and working in, the interior tube, substantially as described.

In testimony whereof I have hereunto set my hand this 30th day of June, 1893.

ALFRED WILLIAM PALMER.

Witnesses:
JOSEPH J. SULLIVAN,
WM. E. TREFCER.