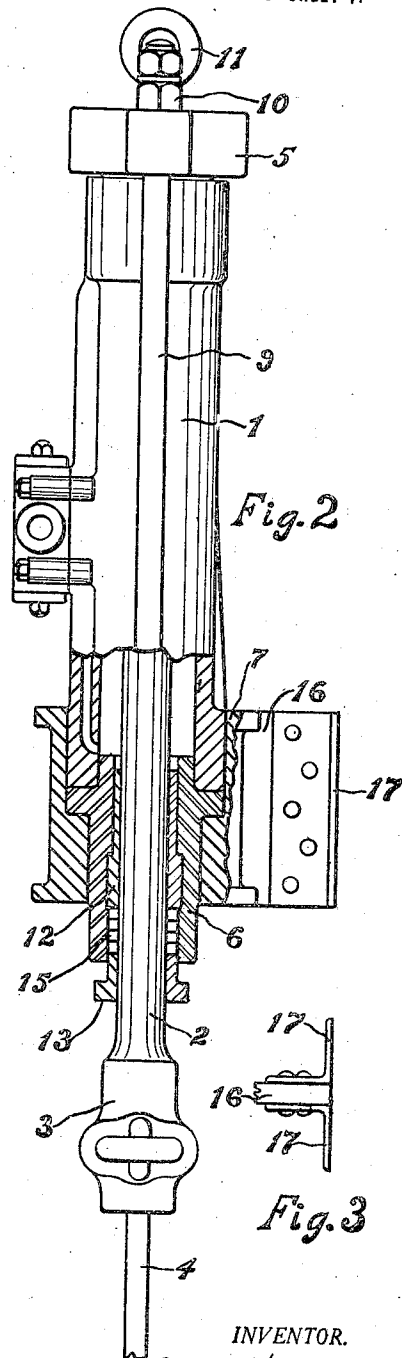
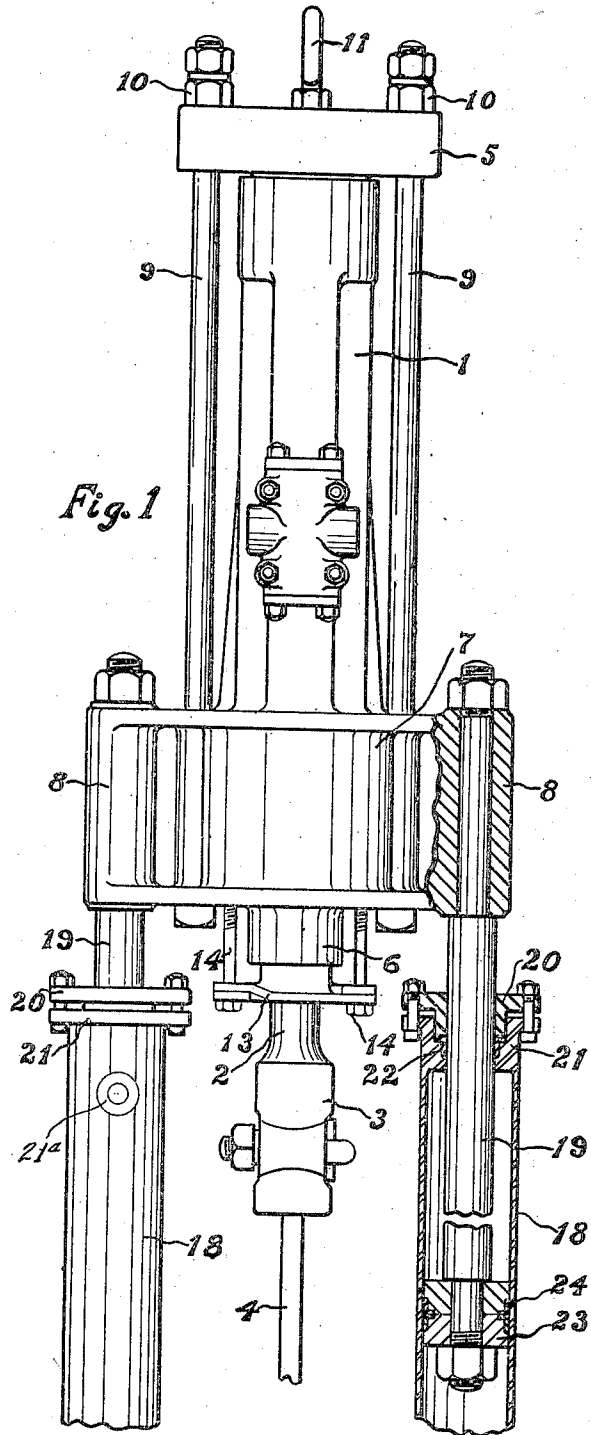


C. C. HANSEN.
SUBAQUEOUS ROCK DRILL.
APPLICATION FILED AUG. 22, 1919.

1,363,586.

Patented Dec. 28, 1920.
2 SHEETS—SHEET 1.

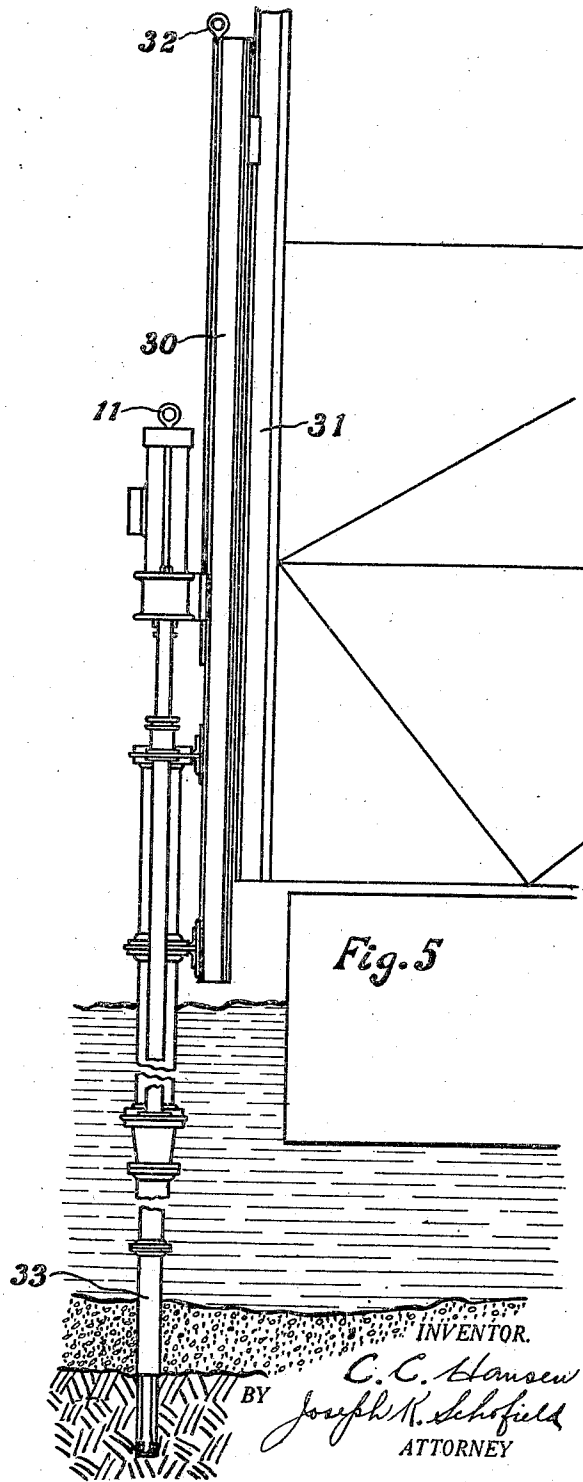
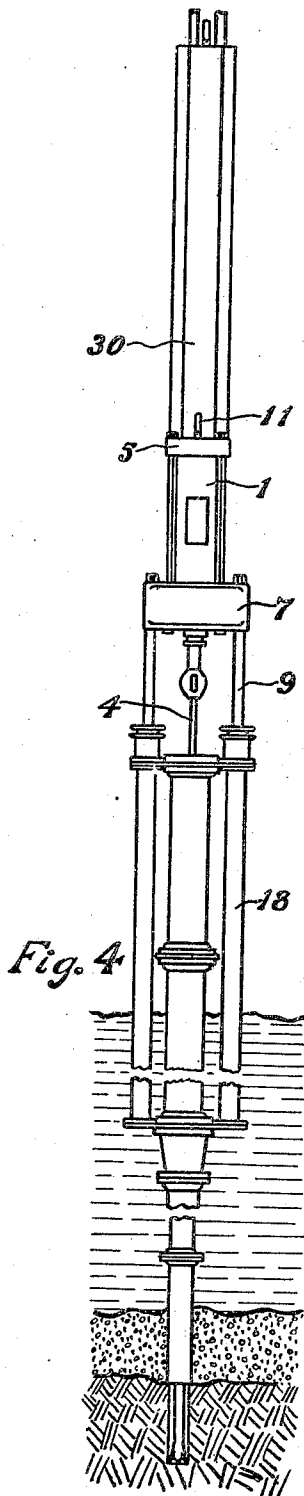


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SUBAQUEOUS ROCK-DRILL.

1,363,586.

Specification of Letters Patent. Patented Dec. 28, 1920.

Application filed August 22, 1919. Serial No. 319,138.

To all whom it may concern:

Be it known that I, CHARLES C. HANSEN, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented a certain new and useful Improvement in Subaqueous Rock-Drills, of which the following is a specification.

This invention relates to an improvement in rock drills and particularly to drills of the type adapted for subaqueous operation.

Drills of this kind are usually operated from a drill tower or derrick mounted upon a scow or other vessel or support, the rock drill itself being slidably secured in a saddle which is arranged to travel in longitudinal guides on the tower or derrick. To the lower end of this saddle there are commonly attached a pair of hydraulically operated cylinders in which rams or pistons are held by liquid pressure, these pistons being attached to the cylinder of the drill so that the drill is thus supported by the hydraulic cylinders and is arranged to be fed downwardly to its work by allowing a portion of the liquid in such cylinders to escape, this being accomplished by the gradual bleeding of the water underneath the rams or pistons. Such drills have in the past been supported by having the outer ends of the rams attached directly to the cylinder or body of the drill, there also being attached to the cylinder a guide arranged to slide in the saddle before mentioned. One of the chief defects inherent in such prior constructions lies in the fact that the cylinder of the drill is subject to continual vibration, so that the jars and strains react directly upon the cylinder of the drill with very deleterious effects, resulting in speedy shattering of the parts and the wearing out of the drill. Also, the fact that the cylinder, and generally the rearward portion of it, forms the means for supporting and connecting the drill with the guide, gives what may be considered a long axis of play or movement for the injurious vibrations and stresses. This causes frequent deviation in the alinement of the drill parts with the hole being drilled, a source of unending difficulty in drilling.

The objects of the present invention are to simplify and improve the general construction of drills of this type; to provide a mounting therefor which will impart greater durability and stability to the structure;

which will reduce to a minimum the transmission of wearing strains upon the cylinder and other working parts of the drill; which will eliminate the danger of deviation in alinement; and which will provide a longer feed for the drill in the hydraulic cylinders without increasing the length of the cylinders or feed piston rods. A further object of the invention is to devise a construction which will permit all of the strains of operation being taken up by the front head, which may be made of large diameter and of very tough and strong material, such as forged steel, and the cylinder, which is freed from excessive strains of operation, may be made of cast iron or any other material giving the best results for steam operation.

The above objects are attained by the construction a practical embodiment of which is represented in the accompanying drawings, in which—

Figure 1 illustrates a front elevation, partly in section, of so much of a subaqueous drill as is necessary to impart a clear understanding of the construction of the cylinder and supporting means;

Fig. 2, a side view of the same, partly in section;

Fig. 3, a plan view of the drill guide;

Fig. 4, a front elevation of a complete equipment provided with the present invention; and

Fig. 5, a side view of the same.

In the drawings attached hereto and forming a part hereof, 1 represents the cylinder of the drill, in which reciprocates a pressure fluid actuated piston the rod 2 of which is provided with a chuck 3 in which is secured the drill steel 4. The cylinder 1 is further provided with a back head 5, a split sleeve 6, and a front head 7, having offset portions 8—8 on either side. Through-bolts 9—9 connect the front and back heads, and suitable nuts 10—10 serve to hold the back head, cylinder, sleeve and front head tightly together. An eye-bolt 11 is provided for use in removing parts of the drill when necessary to disassemble it or for raising the drill cylinder and hydraulic pistons when it is desired to inspect or repack the latter. The sleeve 6 is provided with a two part bearing bushing 12 and a two part retaining ring or gland 13, secured to the front head 7 by means of bolts 14, which serve to maintain a suitable packing 15 around the piston rod 2.

In order to place the sleeve 6 and bearing bushing 12 around the piston rod 2 these parts as well as the gland 13 are each split in half as described. This is necessary for the reason that the piston head and chuck 3 formed on the piston rod 2 are made integral with the piston rod. To assemble these parts of the drill the piston rod 2 is passed upwardly through the front head 7 and then the bearing bushing 12 and sleeve 6 are placed about the piston rod 2 and slipped down into the recess formed in the cross-head 7. The cylinder 1 may then be dropped down over the piston 2 and made fast to the front head 7 by means of the bolts 9. The gland 13 is also made in two parts with overlapping portions as shown or of any suitable or usual construction, and may then be inserted with the packing 15 suitably wrapped about the rod 2 and tightened by means of the bolts 14.

For slidably mounting the drill in the saddle 30 which travels in ways on the drill tower 31 mounted on the scow or float 34, the construction of which parts is well known and commonly used in drills of this type, the front head 7 is provided with a longitudinal web 16 to each vertical side of which is attached an angle plate or flanged portion 17. The guide, composed of the parts 16 and 17, is slidably retained in the saddle, mentioned, as is usual, for guiding the drill upwardly and downwardly.

The mechanism for supporting the weight of the drill and feeding it downwardly to the work comprises a pair of hydraulically operated cylinders 18—18 secured to the slidable saddle, as shown in Fig. 5. In each of these cylinders slides a piston or ram, the upper end of the rod 19 of which is securely bolted to an offset portion 8 of the front head 7. Retaining glands 20—20 are bolted to the upper flanged ends 21—21 of the cylinders 18—18 and interposed between said glands and cylinder ends is suitable packing 22. The free end of each of the piston rods 19 is provided with a head or piston 23, packing 24 around the periphery of which insures a fluid tight fit within the cylinder 18. The cylinders 18 it will be understood are of considerable length, as shown in Figs. 4 and 5, and when in the operation of the drill the drill has been fed down until the heads 23 of the rams are at the bottom of the cylinders 18 and it is desired to insert a new length of drill steel in the chuck 3, water is pumped into the cylinders beneath the pistons 23 in any suitable manner and the fluid above the piston is allowed to escape from the opening 21^a. It will be seen that the drill at all times rests upon the water columns within the cylinders 18 and the gradual escape of water at a predetermined rate from the cylinders allows the drill to be fed downwardly as the drill-

ing of the hole progresses. The submerged tube 33, also attached to the saddle 30, is of usual construction, and is mounted in the usual manner. When a new hole is to be started, or when for any other reason it is desired to raise the entire drilling apparatus, hoisting means are attached to the eye-bolt 32 on the saddle. The saddle, on being raised, carries with it the hydraulic cylinders and submerged tube, as well as the drill proper.

A compact and stable arrangement is thus provided by having the supporting and guiding means close to the center of activity of the moving parts of the drill, which is made sufficiently massive and rugged to withstand the severest strain, and thus shifting of the parts out of the line of operation is prevented. By securing the supporting means to the front end of the drill a longer feed for the drill is obtained; or, on the other hand, a drill of this type giving the same length of feed as those of prior constructions could therefore be equipped with shorter cylinders, thus making for economy in construction also. Furthermore, the front-head 7 may be made of sufficient size and of suitable material such as steel so that the vibratory strains produced by operation of the piston while in operation are all taken up by this part, and the cylinder, which may then be of metals best suitable for drill operation, thus freed from rapid wear due to these vibrations.

Furthermore, the construction permits the drill cylinder to be disassembled from the supporting members if at any time an inspection should be desired without the removal of any other parts.

A mounting of this type is not limited to use with subaqueous rock drills but is applicable equally well to drills of any type, and it is to be understood that while in the present showing and description there is disclosed only one specific embodiment of the present invention, other forms and modifications are included within the spirit and scope of the invention, as expressed in the appended claims.

What I claim is:

1. In a subaqueous rock drill, a cylinder, a piston therein, a back head on said cylinder, a front head also on said cylinder, side rods securing said back head, cylinder and front head together, a plurality of hydraulic cylinders, a plurality of rams secured to said front head and working in said hydraulic cylinders to hold and feed the drill to its work, and a longitudinal web also on said front head having flanges forming a guide for longitudinally guiding the drill as it is fed by the hydraulic means.

2. In a subaqueous rock drill, a cylinder, a piston therein, a back head on said cylinder, a front head also on said cylinder,

side rods securing said back head, cylinder
and front head together, hydraulic means
including a cylinder and piston operatively
connected to said front head to advance and
5 recede the drill and hold it to its work, and
a longitudinal web also on said front head
having flanges forming a guide for longi-
tudinally guiding the drill as it is moved
by the hydraulic means.

3. A front head construction for the cyl- 10
inder of a subaqueous drill, having hy-
draulic feeding means connected directly to
the front head, said front head also being
provided with longitudinal guiding means
directly thereon. 15

In testimony whereof, I have hereunto set
my hand.

CHARLES C. HANSEN.