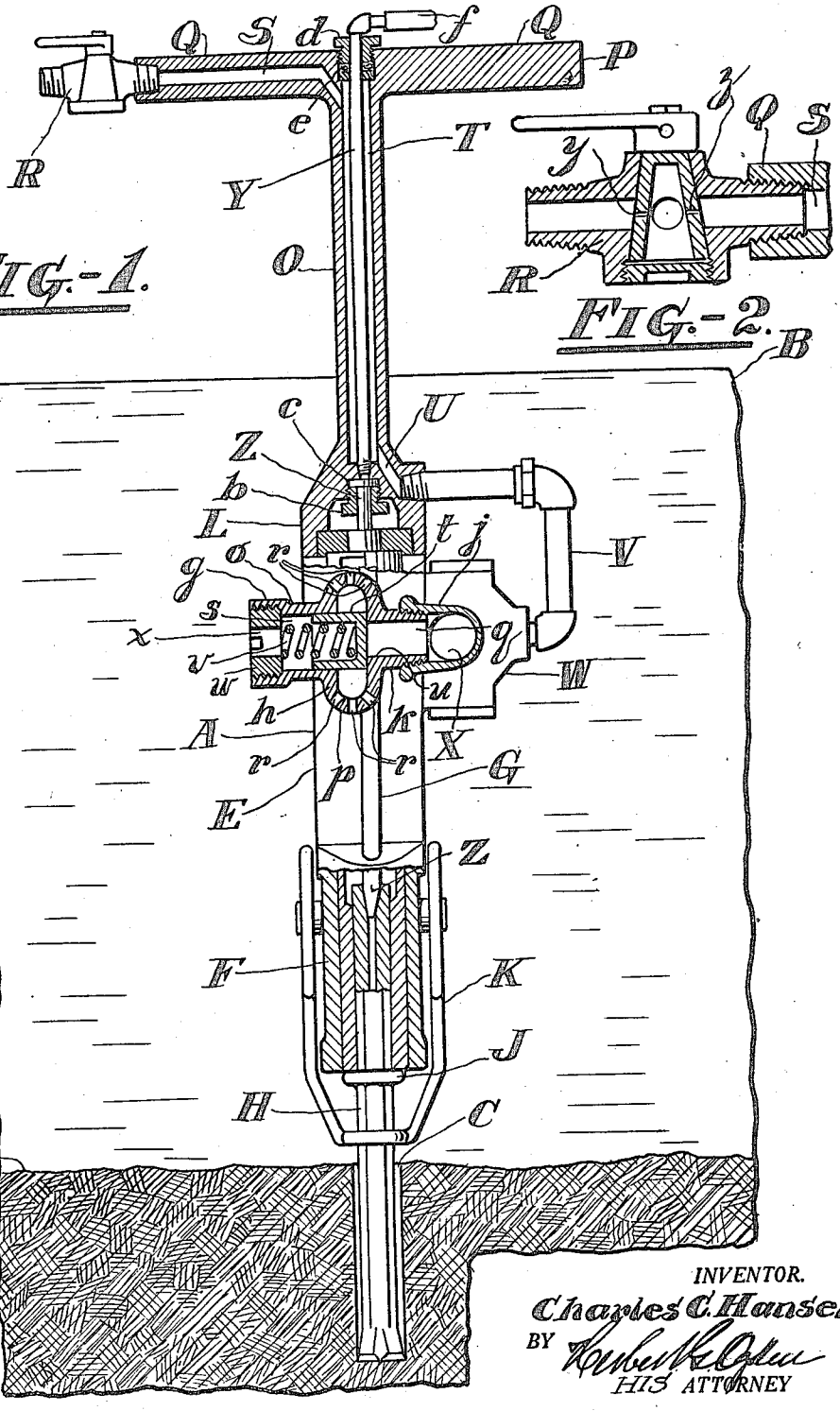
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SUBMARINE DRILL

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SUBMARINE DRILL.

Application filed August 18, 1927. Serial No. 213,816.

This invention relates to submarine drills, but more particularly to a hand held submarine drill in which the drill is provided with an extension to enable the manipulating handle to extend above the surface of the water in which the drill is submerged.

The objects of the invention are to enable a drill of the hand held type to be used for submarine drilling purposes and to seal the drill against the admission of water into the percussive element.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention consists of the combination of elements and arrangement of parts substantially as hereinafter described and claimed and illustrated in the accompanying drawing, in which

Figure 1 is an elevation partly in section of a submarine drill having the invention applied thereto, and

Figure 2 is an elevation, in section, of the throttle valve.

Referring to the drawings, A designates generally a rock drill submerged in a body of water B for drilling holes C in rock D. The drill A comprises a cylinder E and a front head F which may be connected to the cylinder by means of the usual spring pressed side bolts G.

In the front head F is disposed a drill steel H having a collar J to limit the distance which the drill steel H may extend into the front head and also to cooperate with a steel retainer K mounted on the front head and embracing the drill steel H at a suitable distance forwardly of the collar J to prevent ejection of the steel from the front head.

In accordance with the present invention, a back head L which forms a closure for the rearward end of the cylinder E is provided with a stem O connected rigidly thereto and which may be of sufficient length to enable a manipulating handle P whereby the drill is guided to extend above the surface of the water B. The handle P is provided with the usual grip portions Q and preferably in the end of one of these grip portions is threaded a throttle valve R which may also be connected to a suitable source of pressure fluid supply (not shown).

In that grip portion Q to which the throttle valve R is connected is formed a passage S which leads to a passage T formed through the stem O.

Pressure fluid admitted into the passages S and T passes through a passage U at the innermost ends of the passage T, thence through a connection V leading to a valve chest W wherein may be disposed a suitable distributing valve (not shown) for distributing the pressure fluid to the ends of the cylinder E. The distributing valve however, may be of that type which controls both the admission of pressure fluid into the cylinder and the exhaust of fluid therefrom, and the valve chest W is accordingly provided with an exhaust port X for this purpose.

In order to effect a thorough cleansing of the drill hole C and thus present a clean rock face for the working implement H, the drill is provided with means for introducing cleansing liquid into the drill hole. These means in the present instance comprise a tube Y disposed in the passage T to communicate with a water tube Z which may extend into the drill steel H in a well known manner. The water tube Z in this instance is held securely in position by means of a nut *b* screwed into the back head L and bearing against a flange *c* on the rearward end of the water tube.

Preferably a gland *d* and suitable packing *e* are disposed about the rearward end of the tube Y to seal the rearward end of the passage T. The water for cleansing the drill hole C may be conveyed to the tube Y through a pipe *f* leading from a pump or other means adapted to supply water under pressure to the drill steel H.

In order to enable the fluid from the cylinder E to be exhausted directly into the water in which the drill A may be submerged, said drill is provided with a check valve *g* connected to the exhaust port X and adapted to prevent the admission of water into the drill. The check valve in this instance comprises a casing *h* threaded to a connection *j* which in turn may be threaded to the valve chest W. The casing *h* in this instance comprises reduced end portions *k* and *o* and a central flared portion *p*. The end portion *k* in this instance is threaded into the connection *j* and has a passage *q* for conveying the exhaust fluid from the port X into the flared portion *p* from whence it may pass into the water B through ports *r*.

The outer end portion *o* of the casing is bored to form a valve chamber *s* in which is disposed a reciprocable valve *t* seating

against the outlet opening u of the passage q. The valve t may be of cup shaped form as illustrated in order to reduce its weight to a minimum and is normally held closed by a spring v which extends into the valve t at one end and is seated with its other end against a plug w screwed in the outer end of portion o. The spring v is preferably of such strength that it bears against the valve t with only sufficient force to hold said valve lightly to its seat.

To the end that the pressure of the spring may be augmented by the pressure of the water in which the drill A is submerged, the plug w is provided with a port x to permit the entrance of water into the valve chamber s to act against the outer end of the valve t.

Preferably, the throttle valve R, which may be of any suitable type, is provided with leak ports y and z to admit a small amount of pressure fluid into the drill when the throttle valve R is closed. The pressure fluid thus leaking into the drill will prevent the entrance of water into any portion of the drill A, either at the front end of the front head or any other place in which it might otherwise be possible for water to enter.

In practice, whenever the drill A is in operation, exhaust fluid passing from the cylinder E will flow through the exhaust port X and the passage q and unseat the valve t. The exhaust fluid will then pass through the flared portion p of the casing and through the ports r into the surrounding water B. Immediately upon the exhaust of fluid from the passage q the forces of the water B and the spring v acting against the valve t will close said valve and prevent the entrance of water into the interior of the drill at this point.

After the throttle valve R has been closed a suitable amount of pressure fluid will leak through the ports y and z into the drill to resist the entrance of water at all points where water might otherwise find its way into the drill.

As will be apparent, the present invention enables a drill of the hand held type to be used for submarine drilling in which it may be inconvenient or impractical to utilize the rather elaborate equipment usually provided for this purpose. A drill constructed as in the present instance is particularly applicable for use in flooded areas or in trenches in which the equipment for maintaining the water at a low level may be inadequate or in which the expense of pumping the water therefrom is prohibitive.

I claim:

1. In a submarine drill, the combination of a cylinder and back head, a handle for guiding the drill, a stem on the handle connected rigidly to the back head, said stem having a passage for conveying pressure fluid to the drill, a check valve controlling the flow of exhaust fluid from the drill into the water in which the drill is submerged, and means for insuring a constant supply of pressure fluid in the drill during the inoperative period of the drill for preventing the admission of water into any portion of the drill.

2. In a submarine drill, the combination of a cylinder and back head, a handle for guiding the drill, a stem on the handle connected rigidly to the back head, said stem having a passage for conveying pressure fluid to the drill, a check valve controlling the flow of exhaust fluid from the drill into the water in which the drill is submerged, a throttle valve controlling the admission of pressure fluid into the drill, and a leak port in the throttle valve constantly admitting pressure fluid into the drill when the throttle valve is closed to prevent the entrance of water into the drill.

In testimony whereof I have signed this specification.

CHARLES C. HANSEN.