

Oct. 18, 1927.

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1,645,989

MUD GUARD FOR SUBMARINE DRILLS

Original Filed June 25, 1926 2 Sheets-Sheet 1

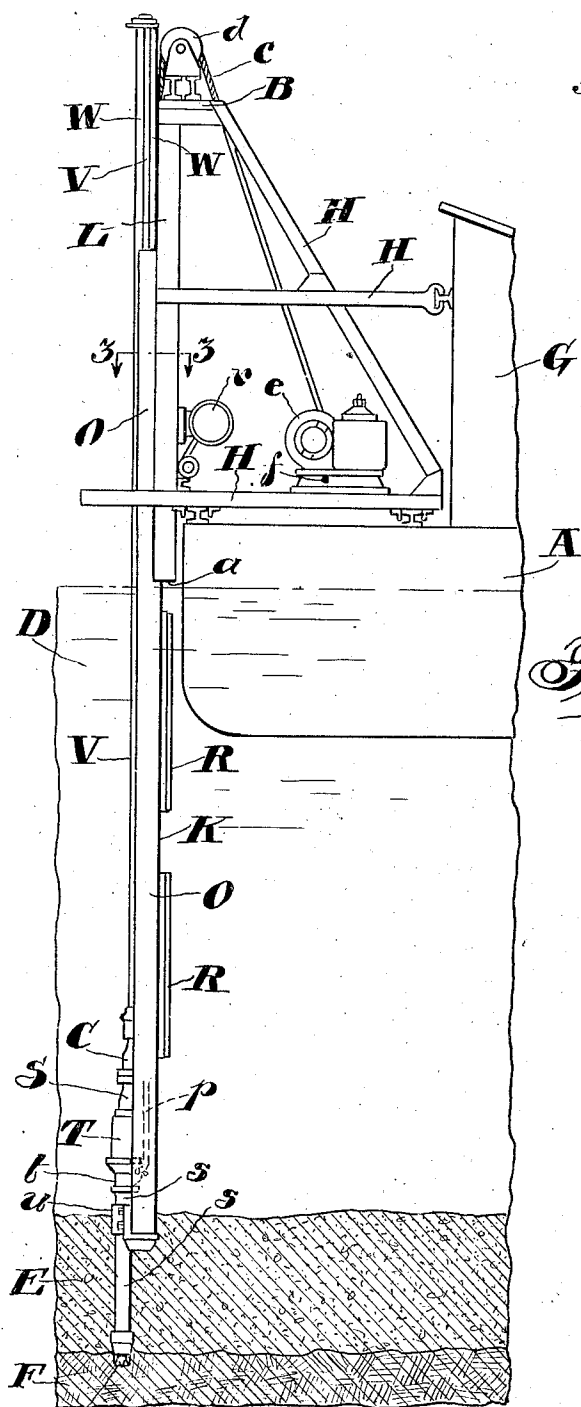


Fig. 1.

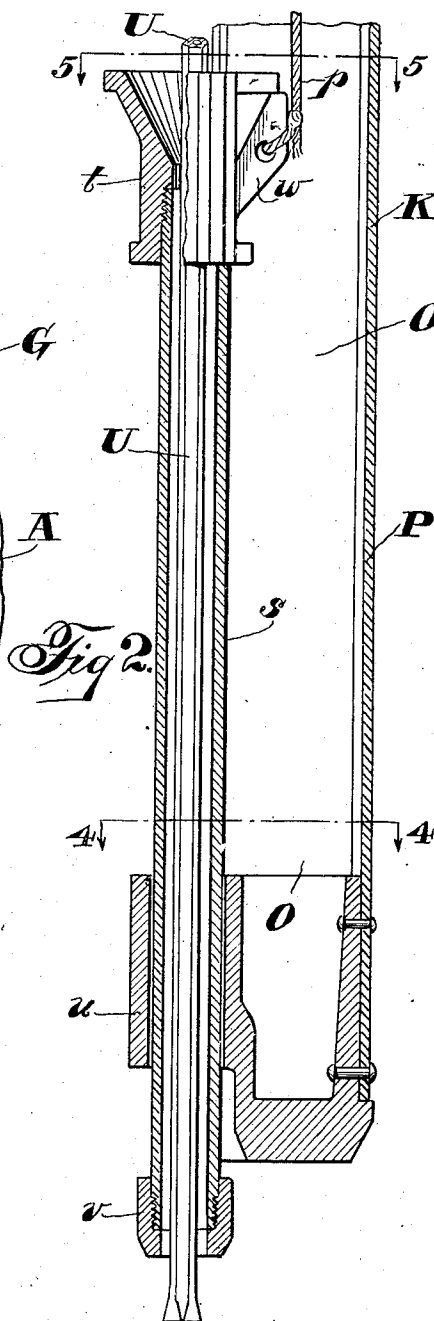


Fig 2.

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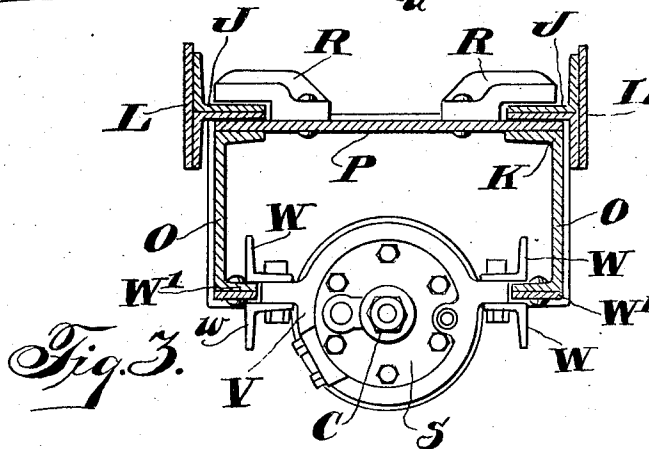
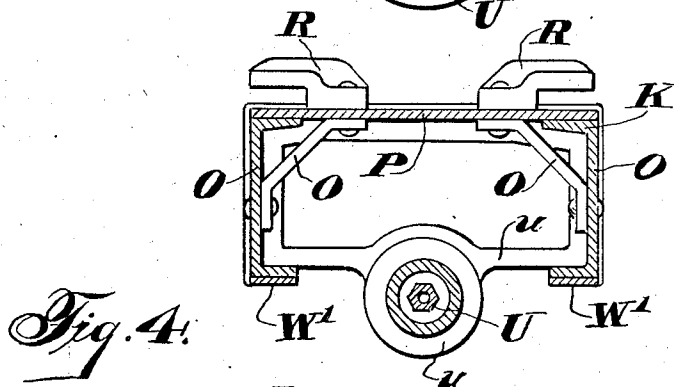
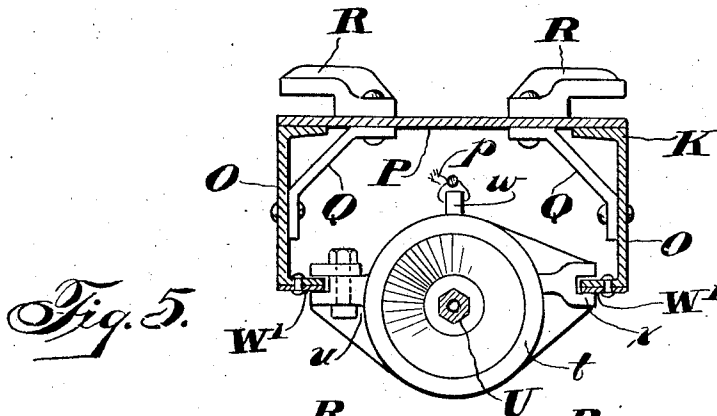
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MUD GUARD FOR SUBMARINE DRILLS

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UNITED STATES PATENT OFFICE.

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MUD GUARD FOR SUBMARINE DRILLS.

Application filed June 25, 1926, Serial No. 118,489. Renewed June 23, 1927.

This invention relates to submarine drills, but more particularly to an adjustable mud guard or protective shield for the hollow drill steel of a submarine hammer drill unit.

5 The type of hammer drill unit to which the invention relates is like that disclosed in my Patent No. 1,610,372 dated December 4, 1926, for Submarine hammer drill unit. In that case the mud guard is secured to a supple-
10 mental frame guided on the main frame which carries the drilling element or drilling frame provided with the hammer drill. The whole weight of the drilling element is located upon the mud guard to force it
15 through the loose material down to the rock to be drilled. This mode of operation is also carried out in accordance with the present construction, but in the present instance, the mud guard is slidably supported at the lower
20 end of a spud or guide frame which is movable vertically in the main frame. The drilling element or drilling frame carrying the hammer drill is slidably supported and guided in the spud or guide frame, so that
25 any one of these three movable elements may be adjustable relatively to the other two and all three elements are adjustable relatively to each other.

30 The object of thus making the elements relatively adjustable is to afford greater facility in protecting the drill steel and in carrying out the drilling operations. Another object of the invention is to provide means in connection with the mud guard to
35 center the drill steel as well as guide and support the mud guard close to the rock to be drilled.

40 The invention is shown in one of its preferred forms in the accompanying drawings, in which

Figure 1 is a diagrammatic side elevation partly broken away showing a portion of a barge and one drilling unit,

45 Figure 2 is an enlarged detail vertical sectional view of the mud guard, and

Figures 3, 4 and 5 are enlarged detail transverse sectional views taken respectively on the line 3—3 of Figure 1, and the lines 4—4 and 5—5 of Figure 2 looking downwardly in the direction of the arrows.

50 Referring to the drawings, the barge A, only a portion of which is shown, may be of any suitable or usual construction for submarine drilling and is adapted to have
55 mounted thereon one or more submarine

drilling units B, only one unit being shown in Figure 1, and each unit is provided with a submarine rock drill C of the hammer type adapted to be submerged in the water D during the operation of drilling. The loose
60 material and broken rock usually lying in the bed of a river or on the bed of any body of water, is represented at E and the rock or hard material to be drilled is represented at F.

65 The barge A may be provided with the usual shed or housing or several sheds or housings G for sheltering the usual compressors, engines, pumps, implements and tools required for submarine drilling, al-
70 though, for purposes of simplicity, these particular machines and engines are not shown, it being understood that the rock drill C or drills, forming a part of the drilling unit,
75 are preferably adapted to be operated by motive fluid, as for instance compressed air, in which case a compressor or compressors would be required.

Each submarine drilling unit of the hammer type as shown, is provided with a main
80 frame H of any suitable construction preferably in the form of a tower of moderate height, and having guides J which may be in the form of angle irons secured to the
85 plates L and extending downwardly a sufficient distance to the points a for instance, to guide and support a spud or guide frame K which is vertically movable on the guides J and is of sufficient length to extend down-
90 wardly in the water to the bottom or to a point in the loose material on the bottom adjacent the rock to be drilled.

The guide frame K may be of any suitable construction, but in this instance, comprises the channel irons O secured to the plates P
95 as by means of the braces Q at one side, the opposite side of the plates P being provided with the guide lugs or jaws R so that the guides J extend between the guide frame plates P and the guide jaws R.

100 The guide frame K is itself provided with the guides W' and the movable drilling element or drilling frame V which carries the hammer drill C is provided with the guide plates in the form of angle irons W so that
105 the drilling element is guided as it is moved vertically on the spud or guide frame K. The hammer drill C having a cylinder S and the bell T may be suitably secured to the drilling frame V and any suitable means as
110

for instance, a cable or rope (not shown) may be provided for lifting or lowering the drilling element. The guide frame K is lifted and lowered by means of the cable *c* passing through the sheave *d* at the top of the housing and from thence over a winding drum on the motor *e* supported on the frame *f* and if desired, the drilling element or drilling frame V could be operated from a second winding drum operated by the motor *e*.

The hammer drill C is provided with a hollow drill steel U adapted to extend through the tubular mud guard *s* slidably supported and guided in the shoe *u* secured at the lower end of the guide frame K. The mud guard *s* is provided with a flared upper end *t* having the guide flanges *x* guided on the guides W' of the guide frame K. A rope or cable *p* is secured to the flange *w* at the upper end of the mud guard for adjusting the mud guard in the shoe or guide member *u*. The lower end of the mud guard *s* is preferably provided with a renewable cap *v*.

In the operation of the apparatus, the spud or guide frame K is first lowered into the water and then the mud guard is adjusted as desired in or upon the loose material at the bottom. The drilling element or drilling frame carrying the rock drill is then lowered upon the mud guard and the drill steel passes through the tubular mud guard ready for the commencement of the drilling operation. The weight of the drilling element together with the vibration due to the operation of the hammer drill forces the mud guard down through the loose material at the same time that the drill steel is penetrating said material, until the mud guard is seated firmly upon the solid rock. The drilling element may then be raised and a longer steel inserted and since the mud guard is guided securely in the guide frame K and centered therein, no trouble will be experienced in inserting a new drill steel in the mud guard. Furthermore, the mud guard will not be displaced or deranged due to tide waters or to currents in the water at the point of drilling.

I claim:

1. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided on said guide frame, and a tubular mud guard or protective shield slidably supported at the lower end of said guide frame below the drilling element whereby the weight of the drilling element may rest upon the mud guard to force it down to the rock to be drilled.

2. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by

and guided upon said guide frame, and a tubular mud guard or protective shield vertically adjustable relatively to the guide frame and guided in said frame below the lower end of the drilling element, said mud guard having a flaring upper end to receive a drill steel.

3. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided on said guide frame, a tubular mud guard or protective shield slidably supported at the lower end of said guide frame below the drilling element, whereby the weight of the drilling element may rest upon the mud guard to force it down to the rock to be drilled, and separate means for vertically adjusting the guide frame and mud guard.

4. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided upon said guide frame, a tubular mud guard or protective shield vertically adjustable relatively to the guide frame and guided in said frame below the lower end of the drilling element, said mud guard having a flaring upper end to receive a drill steel, and means for independently adjusting the guide frame and mud guard.

5. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided on said guide frame, a tubular mud guard or protective shield slidably supported at the lower end of said guide frame below the drilling element, whereby the weight of the drilling element may rest upon the mud guard to force it down to the rock to be drilled, and means for independently vertically adjusting the guide frame, mud guard and drilling element.

6. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided upon said guide frame, a tubular mud guard or protective shield vertically adjustable relatively to the guide frame and guided in said frame below the lower end of the drilling element, said mud guard having a flaring upper end to receive a drill steel, and means for independently adjusting the guide frame, mud guard and drilling element relatively to each other.

7. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided on said guide frame, a tubular mud guard or protective shield slidably supported at the lower end of said guide frame

below the drilling element, whereby the weight of the drilling element may rest upon the mud guard to force it down to the rock to be drilled, and means for adjusting any one of the said three movable elements relatively to the other two.

8. In a submarine hammer drill unit, the combination of a main frame having guides, a vertically movable guide frame on said guides, a drilling element slidably carried by and guided upon said guide frame, a tubular mud guard or protective shield ver-

15 tically adjustable relatively to the guide frame and guided in said frame below the lower end of the drilling element, said mud guard having a flaring upper end to receive a drill steel, and means for adjusting any two of the said three movable elements relatively to the third movable element or relatively to each other.

20 In testimony whereof I have signed this specification.

CHARLES C. HANSEN.