

Oct. 14, 1930.

C. C. HANSEN

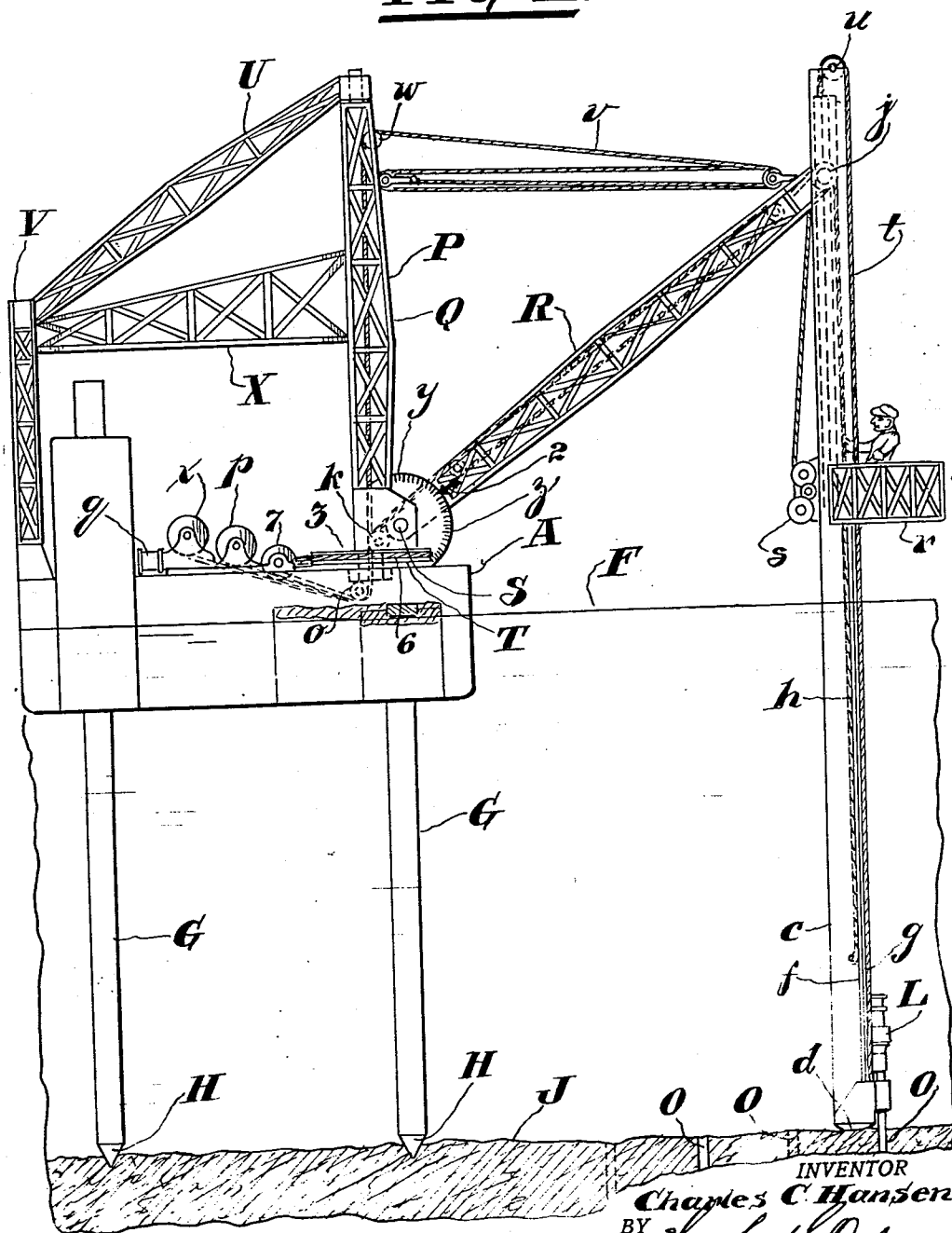
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LOCATING DEVICE FOR SUBMARINE DRILLS

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2 Sheets-Sheet 1

FIG-1.



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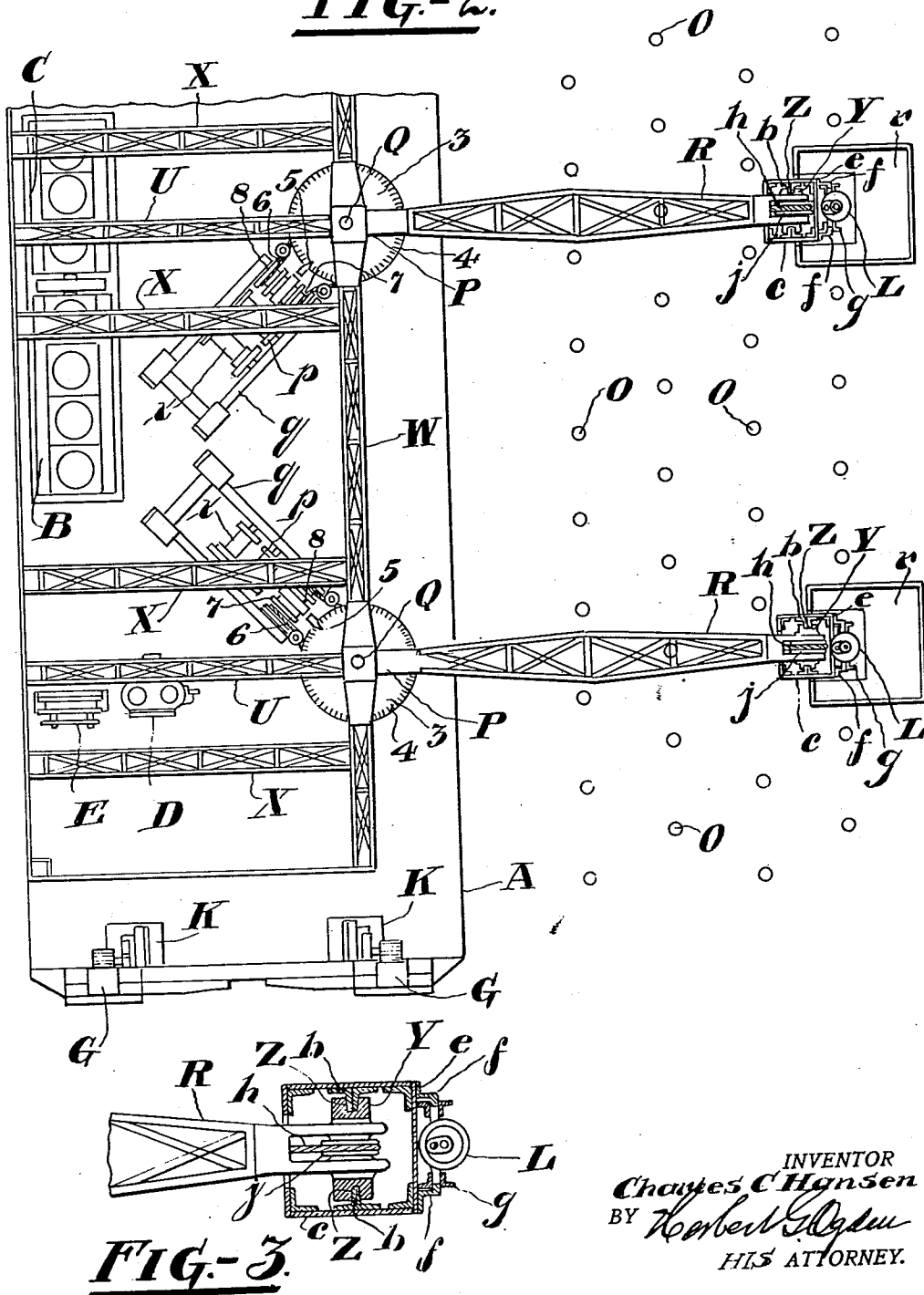
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2 Sheets-Sheet 2

FIG.-2.



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LOCATING DEVICE FOR SUBMARINE DRILLS

Application filed November 5, 1927. Serial No. 231,379.

This invention relates to fluid actuated rock drills, but more particularly to a locating device for submarine drills of the fluid actuated type employed for drilling holes in submerged material.

The object of the invention is to enable the rock drill to be accurately located on the material intended to be drilled and in predetermined positions relatively to a barge or such other support on which the device may be mounted.

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 having the general mode of operation substantially as hereinafter described and claimed and illustrated in the accompanying drawings, in which

Figure 1 is an end elevation of a drilling barge equipped with a device constructed in accordance with the practice of the invention,

Figure 2 is a plan view of the device, and

Figure 3 is an enlarged detail plan view partly in section illustrating the connection between the boom and the guide column.

Referring more particularly to the drawings, A designates a barge on which may be mounted in convenient positions the usual equipment used in submarine drilling, such as an oil engine B, compressor C, a drill sharpener D and a furnace E.

Preferably the barge is suitably anchored to insure against such movement thereof as might otherwise be caused by the action of the surrounding water F. These means consist in the present instance of rigid columnar anchors G having pointed ends H to engage the bottom J of the stream, and which bottom may also be the material intended to be drilled.

The anchors G may be of a well known type adapted to be operated by suitable raising and lowering devices K mounted on the deck of the barge for raising the barge A somewhat and thus transfer substantially the entire weight of the barge from the water F to the anchors G.

In accordance with the present invention, means are provided for accurately locating

the rock drill, such as a submarine drill L on the material intended to be drilled and in accordance with a predetermined plan, both with respect to relative spacing of the drill holes O and for spacing such drill holes with respect to the barge. These means in the present instance consist of a derrick generally designated by P and comprising the usual mast Q and a boom R pivoted to the mast by means of a pin S. The derrick P is supported by a turning wheel T to which it may be secured in the usual manner and is pivoted at its uppermost end in a brace U. The brace U in this instance occupies an inclined position and is secured at its opposite end to a column V mounted on the barge A.

As may be observed by referring to Figure 2, a plurality of derricks P may be mounted on a barge A and in such case braces W disposed between the derricks P may be attached in any suitable manner to the pivot end of the braces U for preventing side sway of the masts Q. In the present instance trusses X spanning the barge A add rigidity to the structure for supporting the masts Q. The trusses X may be secured to the braces W in any suitable manner at one end and at their other ends to the columns V. In addition to the bracing effect described, the trusses X may also be utilized for supporting a roof or covering for the barge A.

The outermost or free end of the boom R carries a shaft Y rotatable in the end of the boom and projecting with its ends on opposite sides thereof. Guideways Z are formed in the projecting ends of the shaft Y to slidably receive guides b disposed in this instance on the inside of a guide column c. The guides b may be located near the upper end of the guide column c so the guide column will at all times assume a vertical position. The guide column c is preferably of substantially rectangular form and of a length to enable its lowermost end d to rest on the material intended to be drilled.

On the forward face e of the guide column c are secured suitable guide members f preferably in the form of Z-bars which act as

guides for a ladder *g* slidable thereon and to which ladder is secured the rock drill L.

As will be observed the guide column *c* is suspended from the free end of the boom R and is adapted to be raised and lowered by a cable *h* secured at one end to the guide column *c*. The cable *h* overruns a sheave *j* in the free end of the boom and sheaves *k* and *a* at the foot of the mast Q and is wound on a drum *p* of a hoisting engine *q* mounted on the deck of the barge A.

In order to enable the operator of the rock drill L to be in close proximity to the work a cage *r* is attached fixedly to the guide column *c* at a suitable height depending upon the depth of the water, as may be also a hoist *s* which is preferably located adjacent the cage. A cable *t* connected to the hoist *s* overruns a sheave *u* at the uppermost end of the guide column *c* and may be attached to the lowermost end of the ladder *g* for the purpose of raising and lowering the rock drill L on the guide column *c*.

The derrick P is provided with the usual cable *v* strung between the boom R and the mast Q. The cable *v* overruns sheaves *w* and *o* at the uppermost and lowermost ends respectively of the mast Q and is wound on a drum *x* of the hoisting engine *q* for actuating the boom R.

From the foregoing it will be seen that the rock drill L may be readily placed in any desired position on the rock J and at points remote from the support or barge A. Suitable means are provided however to enable said rock drill L to be located on the work in accordance with a predetermined plan so that a series of drill holes may be drilled without necessitating the use of markers for indicating the position of the drill holes for the subsequent charging operation. These means consist of a plate *y* mounted in this instance in a vertical position on the turning wheel T of the derrick P. The plate *y* has graduations *z* which may indicate the degree of inclination of the boom R necessary for locating the rock drill L in the desired position. An indicator 2 carried by the boom R cooperates with the graduations *z* for this purpose.

Similar means are provided for indicating the obliquity of the boom R in a horizontal direction. To this end a plate 3 may be mounted on the top of the turning wheel T and has suitable graduations 4 which cooperate with a pointer 5 on the deck of the barge.

As is customary in devices of this character a cable 6 is disposed on the turning wheel T and has its ends wound on drum 7 and 8 of the engine *q* for oscillating the derrick P.

The operation of the device is as follows:—
Let it be assumed that it be desired to drill a series of rows of drill holes O in parallelism

with the side of the barge A, and in accordance with a predetermined plan. In such case the position of the indicators 2 and 5 on the respective graduated plates wherewith they cooperate may be previously determined by calculation. The boom R may then be raised and lowered as may be required to turn the indicator 2 into coincidence with the proper graduation *z* on the plate *y*. After the boom R has been thus moved to the proper degree of inclination one or the other of the drums 7 and 8 may be rotated to turn the boom R in a horizontal direction until the indicator 5 coincides with the graduation 4 on the plate 3 corresponding to the calculated position. The foregoing operations will serve to carry the rock drill L to the desired position on the material intended to be drilled. Thereafter the guide column *c* may be lowered until it rests on the work and the rock drill L may then be lowered on the guide column *c* for drilling the holes O.

After a row of holes have been drilled in line a new row may be started in parallelism with the preceding row. This operation may be continued for any succeeding number of rows of holes within the range of the boom R.

From the foregoing it will be seen that the drill holes O may be readily located with precision at the most desirable locations on the work, both in close proximity to or at points remote from the barge. After the holes have been drilled they may be immediately charged for the subsequent blasting operation and the wires leading to the charges may be anchored at one end on the barge until all of the holes have been drilled and charged. The barge may then be removed from the drilling site and the holes may all be blasted simultaneously. This is a favorable feature and effects a considerable saving in the matter of time since it eliminates the necessity of re-locating the barge after each row of holes has been drilled as is the usual custom.

Another desirable feature of the present invention is that owing to the wide area which may be covered thereby the outermost rows of holes may, if desired, be blasted in successive steps immediately upon drilling without causing injury to the barge or to the equipment installed thereon.

I claim:

1. In a locating device for submarine drills, the combination of a support, means mounted thereon and overhanging the support, said means being pivoted for vertical and horizontal movement relatively to the support, pivot means carried by the first mentioned means, guide means slidable on the pivot means and being adapted to assume a vertical position due to its own weight, a fluid actuated rock drill mounted on the guide means, and means for actuating the first said means to selectively locate the rock drill on the work

at points closely to the support and at points remote therefrom.

2. In a locating device for submarine drills the combination of a support, means mounted thereon and overhanging the support, said means being pivoted for vertical and horizontal movement relatively to the support, a guide means carried by the said means, said guide means being pivotally connected near its uppermost end to said means to enable said guide means to assume a vertical position of its own weight at points remote from the support, a fluid actuated rock drill mounted on the guide means, and means for imparting oscillatory movement to the first said means to locate the rock drill in a plurality of positions on the work at points remote from the support.

3. In a locating device for submarine drills, the combination of a support, a derrick comprising a mast and a boom mounted pivotally thereon, said boom overhanging the support, a guide column suspended from the boom and adapted to rest with one end on the material being drilled, a shaft in the boom forming a pivot for the guide column to enable the guide column to assume a vertical position with respect to the work, said shaft being in slidable engagement with the guide column, a fluid actuated rock drill mounted slidably on the guide column, means for slidably actuating the rock drill on the guide column, and an engine for moving the guide column relatively to the boom and for rotating the boom to locate the rock drill in a desired position on the material intended to be drilled.

4. In a locating device for submarine drills, the combination of a support, a derrick mounted pivotally thereon and overhanging the support, a guide column carried by the derrick and adapted to rest with one end on the material being drilled, said guide column being connected pivotally to the derrick to enable the guide column to assume a vertical position with respect to the work, a fluid actuated rock drill mounted slidably on the guide column, a cage secured to the guide column, means on the guide column for slidably actuating the rock drill on the guide column, said means being accessible from the cage, and an engine for raising the guide column on the derrick and for rotating the derrick to locate the rock drill in a desired position on the material intended to be drilled.

5. In a locating device for submarine drills, the combination of a support, a swinging wheel on the support, a boom pivoted on the swinging wheel, a guide column connected pivotally to the boom and adapted to rest with one end on the material being drilled, a fluid actuated rock drill mounted slidably on the guide column, a hoist for raising and lowering the rock drill on the guide column, and relatively movable means com-

prising a graduated plate and an indicator carried by the swinging wheel and the boom for indicating the required degree of inclination of the boom to locate the drill in a predetermined position on the material intended to be drilled.

6. In a locating device for submarine drills, the combination of a support, a swinging wheel on the support, a boom pivoted on the swinging wheel, a guide column connected pivotally to the boom and adapted to rest with one end on the material being drilled, a fluid actuated rock drill mounted slidably on the guide column, a hoist for raising and lowering the rock drill on the guide column, a pair of graduated plates by the swinging wheel, and indicators on the boom and the support cooperating with the graduated plates for indicating the required degree of inclination and deviation of the boom with respect to the support to locate the rock drill in a predetermined position on the material intended to be drilled.

7. In a locating device for submarine drills, the combination of a support, a swinging wheel on the support, a boom pivoted on the swinging wheel, a guide column connected pivotally to the boom and adapted to rest with one end on the material being drill, a fluid actuated rock drill mounted slidably on the guide column, a hoist for raising and lowering the rock drill on the guide column, a graduated plate disposed vertically on the swinging wheel, an indicator on the boom cooperating with the graduated plate to indicate the vertical inclination of the boom, a second graduated plate disposed on the swinging wheel, and an indicator on the support cooperating with said second graduated plate to indicate the required obliquity of the boom with respect to the support for locating the rock drill in a predetermined position on the material intended to be drilled.

8. In a locating device for submarine drills, the combination of a support, a boom on the support adapted to swing horizontally and vertically with respect thereto, a guide column pivoted on the boom, a fluid actuated rock drill slidable on the guide column, a hoist on the column for slidably actuating the rock drill on the guide column, a cage on the guide column adjacent the hoist, means including graduated plates and indicators associated with the boom for indicating the required obliquity of the boom to locate the drill in a predetermined position on the material intended to be drilled, and means for actuating the boom and the guide column.

9. In a locating device for submarine drills, the combination of a stationary support, a guide column, a fluid actuated rock drill mounted slidably on said guide column, means pivotally mounted on the support for supporting the guide column in a vertical position and for disposing said guide column in

a plurality of relatively spaced positions remote from the support, means secured to the guide column for slidably actuating the drill on the guide column, and a cage secured
5 fixedly to the guide column adjacent the last said means.

In testimony whereof I have signed this specification.

CHARLES C. HANSEN.

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