

(No Model.)

T. ENGLISH.

APPARATUS FOR SUBAQUEOUS BORING.

No. 256,658.

Patented Apr. 18, 1882.

FIG:1

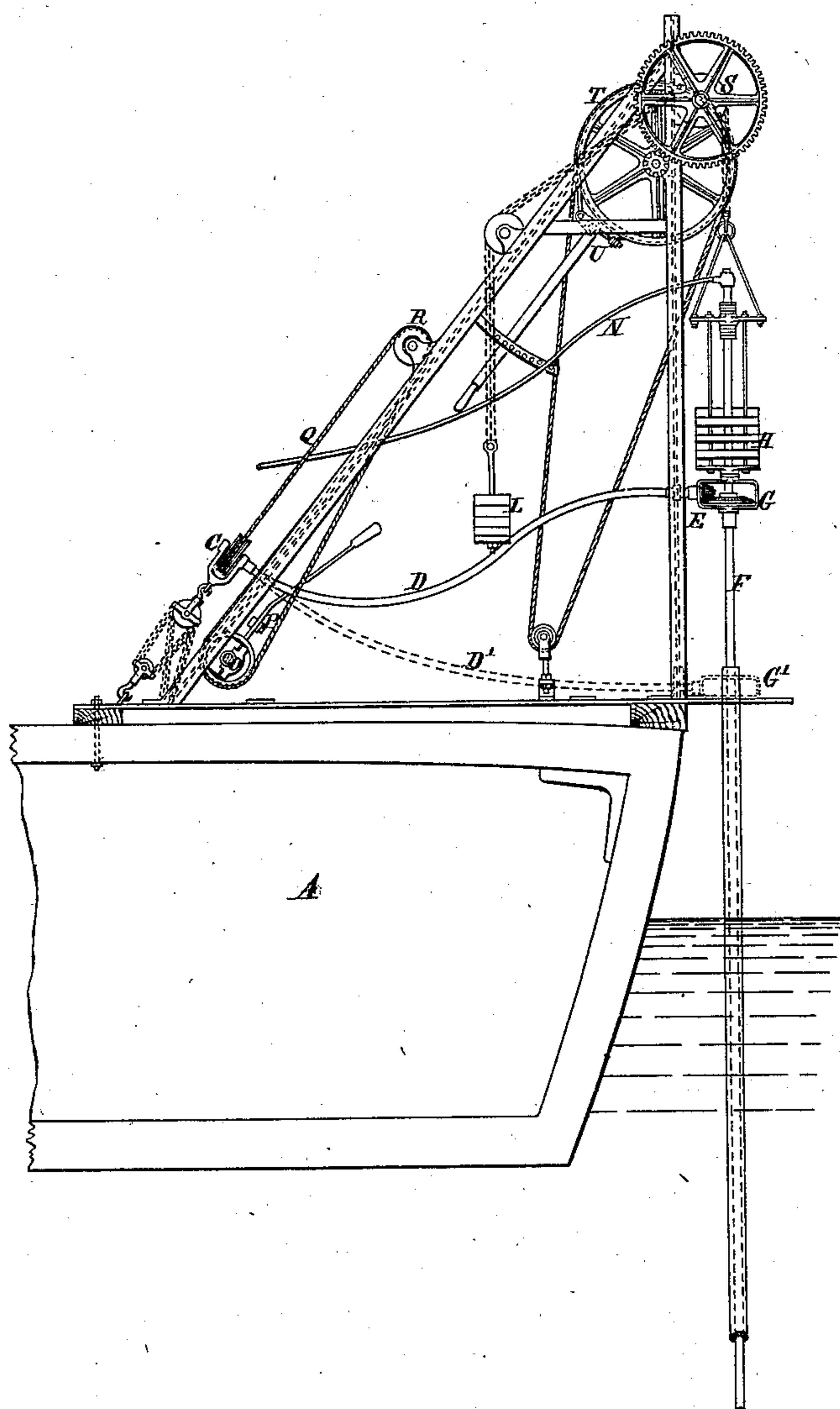
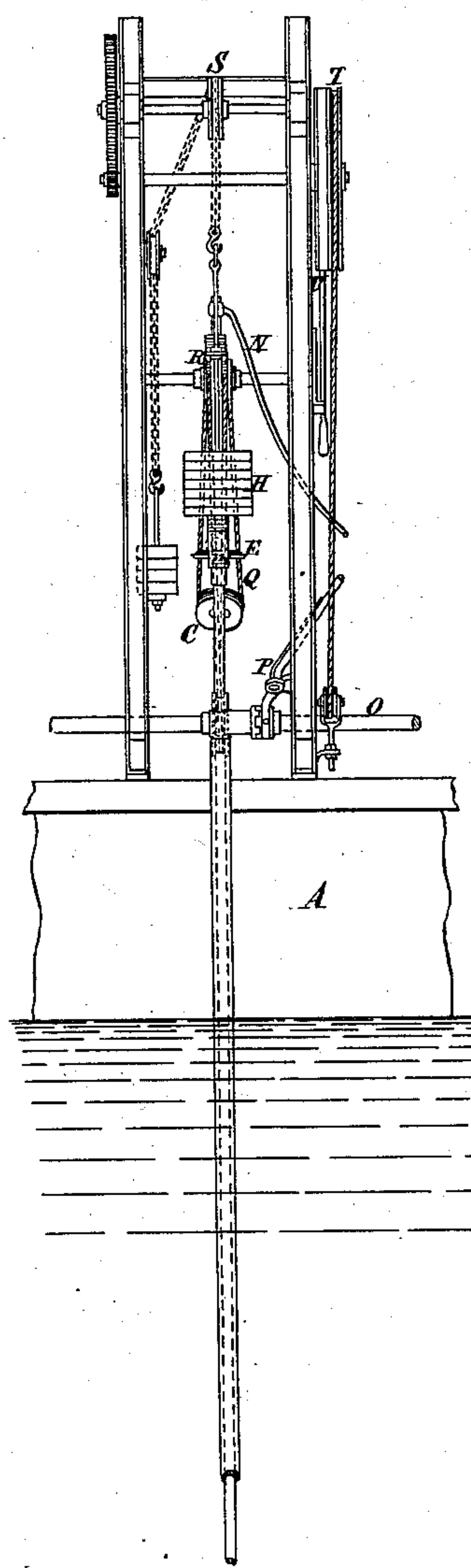


FIG:2



Witnesses.

J. A. Rutherford  
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# UNITED STATES PATENT OFFICE.

THOMAS ENGLISH, OF HAWLEY, DARTFORD, COUNTY OF KENT, ENGLAND.

## APPARATUS FOR SUBAQUEOUS BORING.

SPECIFICATION forming part of Letters Patent No. 256,658, dated April 18, 1882.

Application filed February 2, 1882. (No model.) Patented in England April 5, 1881, and in France October 4, 1881.

*To all whom it may concern:*

Be it known that I, THOMAS ENGLISH, a citizen of England, residing at Hawley, Dartford, in the county of Kent, England, have invented a new and useful Improved Apparatus for Subaqueous Boring, (for which I have obtained a patent in Great Britain, No. 1,482, bearing date April 5, 1881, and in France, No. 145,142, bearing date October 4, 1881,) of which the following is a specification.

My invention relates to apparatus for boring under water, arranged in such a manner as to permit boring operations to be continued notwithstanding tidal or other currents or changes of the water-level or movements of the barge or other vessel from which the apparatus is worked. For this purpose I employ a rotating boring-tube having at its end suitable cutters, which, when hard rock has to be bored, may be arranged as in diamond rock-drills.

At the upper end of the tube, which extends some distance above the water, I provide bearings for it in a framing, in which there is also a bearing for a short shaft at about right angles to the tube and connected to it by bevel-gearing. The framing also carries a weight, the effect of which in pressing down the tube may be varied according to the nature of the work by means of a counterweight connected to the framing by a chain passing over pulleys on a derrick, which is mounted on a barge or other suitable vessel moored in the required position. On board of this vessel I provide an engine or other suitable motor, and I connect a revolving shaft worked by this motor to the short shaft that is geared to the drill-tube by means of a flexible twisted wire shaft, such as is frequently employed for working drills in various positions and attitudes, this flexible connection allowing the drill-tube to be raised or lowered or changed in its direction within certain limits. I also connect a swivel joint on the top of the drill-tube by flexible hose to a pump, by which water can be forced down the drill-tube.

The apparatus is worked as follows: The barge or vessel, which may have several sets of the apparatus arranged along its side, is moored over the place where the boring is to be effected. Each drill-tube is lowered and has its counterweight adjusted according to

the nature of the material to be bored. It is then by means of the flexible shaft and gearing caused to revolve, while water is forced through it to scour out the borings, and it descends as the hole becomes deepened. When it has descended a certain distance the gearing and its framing are detached, an additional length of tube is added, and the boring is continued.

Figure 1 of the accompanying drawings is a side view, and Fig. 2 is a front view, of one set of the apparatus, as above described, mounted on board a barge, part of which is shown at A.

On board this barge is the revolving shaft O, which is driven by an engine or other motor. On this shaft, for each boring apparatus there is a rope-pulley, which can be thrown into or out of action by a clutch worked by a lever, P. The rope Q passes over guide-pulleys R and round another rope-pulley, C, which is in a frame that can be hauled by tackle, so as to tighten, as required, the rope Q. The axis of the pulley C is connected by the flexible shaft D to the axis of the bevel-pinion E, which is mounted in a bearing in the framing G, in which also is mounted the boring-tube F, having on it a bevel-wheel gearing with the pinion E. On the framing G rest the weights H, which aid in pressing down the boring-tube, but which can be more or less relieved by counterweights L, connected to the frame, which carries the weights H by a chain passing over the pulley S. This pulley can be turned by a hand-rope passing round a rope-wheel, T, and this wheel can be retarded or arrested by a brake, U. A flexible hose, N, communicates from a force-pump situated in any convenient part of the barge to a swivel union on the top of the boring-tube. When in boring the tube F has descended till the frame G reaches a stop projecting from the side of the barge in the position indicated by the dotted lines G' in Fig. 1, the flexible shaft D being then in the position D', the rope-pulley on the shaft O is unclutched by moving the lever P, and by working the rope-wheel T the framing G is raised a sufficient height to introduce a fresh length of boring-tube between it and the tube F, whereupon the boring is continued, as already described. It is obvious that for the flexible twisted wire shaft D a rigid shaft connected by universal

joints at its ends to the pulley C and the bevel-  
pinion E, and having a sliding socket to allow  
for variation of its length, might be substituted.

Having thus described the nature of my in-  
5 vention, and the best way I know of carrying  
it into practical operation, I claim—

10 In apparatus for subaqueous boring, the com-  
bination of a barge or floating vessel, a bor-  
ing-tube loaded with adjustable weights and  
suspended from a framing on the vessel, a driv-  
ing-shaft worked by an engine or other motor  
on board of the vessel, and a flexible or jointed

shaft and gearing connecting the said driving-  
shaft to the boring-tube, substantially as and  
for the purposes set forth. 15

In testimony whereof I have signed my name  
to this specification, in the presence of two  
subscribing witnesses, this 12th day of Janu-  
ary, A. D. 1882.

THOMAS ENGLISH.

Witnesses:

OLIVER IMRAY,  
CHAS. BERKLEY HARRIS.