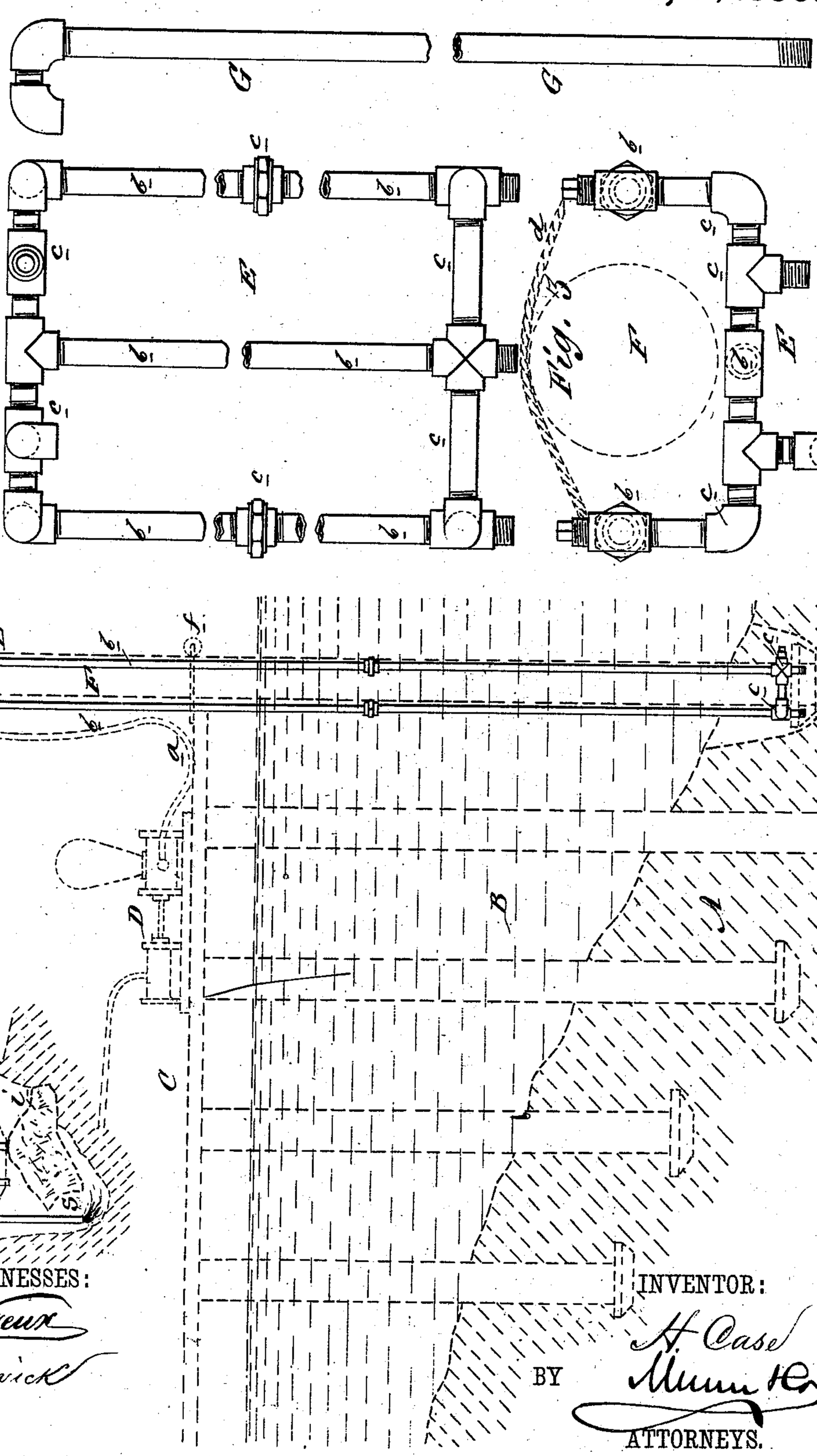
2 Sheets—Sheet 1.

H. CASE.

Apparatus for Sinking and Removing Piles.

No. 227,484. **Patented May 11, 1880.**



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2 Sheets—Sheet 2.

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Apparatus for Sinking and Removing Piles.

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Fig. 6

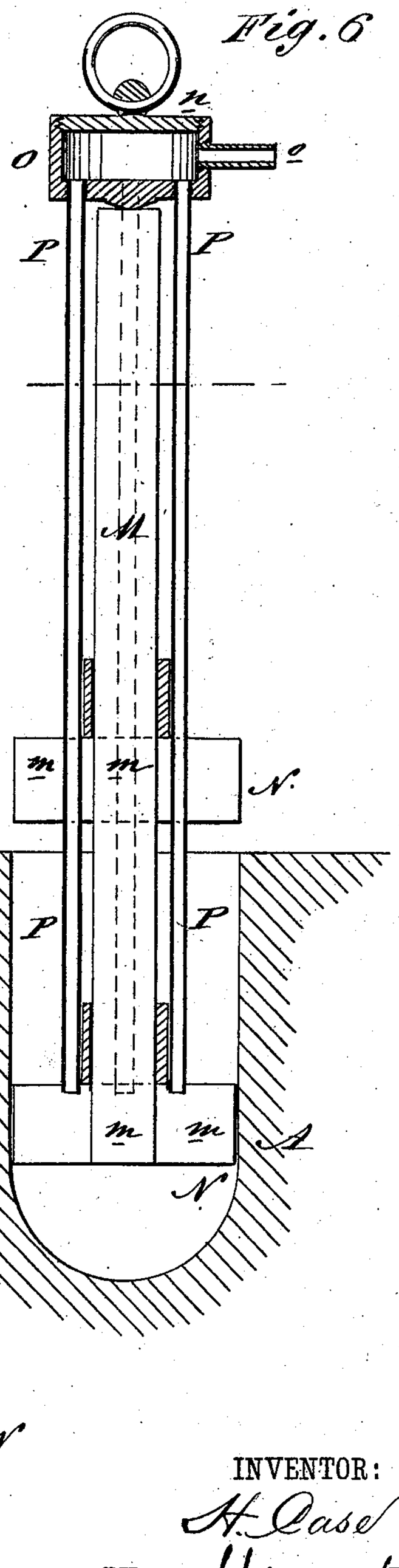
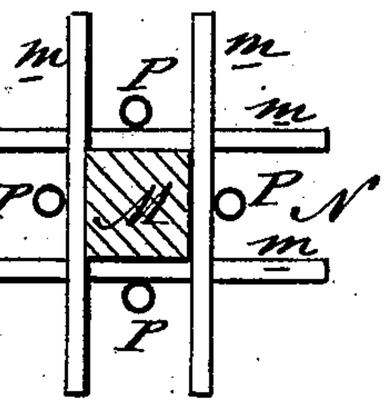


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY CASE, OF BROOKLYN, NEW YORK.

APPARATUS FOR SINKING AND REMOVING PILES.

SPECIFICATION forming part of Letters Patent No. 227,484, dated May 11, 1880.

Application filed January 6, 1880.

To all whom it may concern:

Be it known that I, HENRY CASE, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Apparatus for Sinking and Removing Piles and Submarine Obstructions, of which the following is a specification.

Figure 1 represents a reduced vertical side elevation of the apparatus in position for sinking a pile. Fig. 2 is a front elevation, enlarged, of the apparatus as used in Fig. 1. Fig. 3 represents a plan of the same apparatus in position for sinking a pile. Fig. 4 represents a vertical elevation of a single tube. Fig. 5 is a reduced representation, showing the method of sinking a submarine bowlder by means of the single tube. Fig. 6 is a vertical elevation of a wooden pile provided with shoes and surrounded with tubes, whereby the method of sinking the pile may be applied. Fig. 7 is a transverse section on line *z z*, Fig. 6.

Similar letters of reference indicate corresponding parts.

The object of this invention is to provide a novel and simple apparatus for sinking piles for submarine foundations and for removing sunken piles and other submarine obstructions.

This invention consists of devices composed of one or more tubes with suitable couplings, by means of which forced or induced currents of water may be made to create auxiliary currents to act directly upon the submarine bottom beneath and about piles or other objects, whereby the sand, mud, gravel, &c., are washed away, so that the pile or obstruction may be sunk, or so that it may be more readily raised, because of the removal from about it of the adhering mud, sand, gravel, &c.

In the drawings, A represents the river or harbor bed; B, the water, and C a pier, on which is a steam-pump, D, connected by a pipe, *a*, to the pile-sinking apparatus E, that is set about the pile F. Said pile-sinking apparatus E consists, in this instance, of three parallel upright tubes, *b b*, that extend the entire length of the pile F, and are connected at their tops and bottoms by suitable tubular couplings *c c*, as shown, said couplings serving to hold the tubes *b b* in position about the pile F, and at the same time to determine an equal flow of water through each of the said tubes *b b*.

A fourth tube and couplings may be connected with those herein shown in Figs. 1, 2, and 3, so that the pile F shall be inclosed on all sides by them; but the number herein shown is more convenient for their ready disengagement from about the pile, to which they are held by a yarn or rope, *d*, in the manner shown in Fig. 3.

The pile F, being set vertically, as shown in Fig. 1, with the tubes *b b* secured about it, is held in that position by the encircling half-grommet *f*, strung with balls to prevent friction, and on the head of the said pile F is placed a weight, (shown in dotted lines at *g*, Fig. 1,) whereby the said pile is forced downward as the soil is removed from beneath its lower end, and the soil is removed from below the said pile, as shown in Fig. 1, by the disturbing and washing action of currents of water, that are forced downward through the tubes *b b* by a force-pump, as indicated in Fig. 1, and by the auxiliary or co-operative currents that are thereby induced in the water about the said pile, or by the currents that are induced upward in the said tubes by the operation of a suction-pump applied to the said tubes *b b*. When the pile is sunk to its required depth the ropes or yarns *d* are removed and the whole sinking apparatus E is drawn up for further use, and the soil quickly settles about the foot of the pile and holds it in place.

In Fig. 5, *h h* represent pipes grouped about a pile whose downward progress is arrested by a bowlder, *i*, and in this Fig. 5 is also indicated the method employed of removing this bowlder obstruction. Herein is shown, on a reduced scale, the single tube G, (enlarged in Fig. 4,) through which a current of water, S, is flowing under pressure, and, in combination with the created co-operative currents, is washing the soil from beneath the said bowlder *i*, so that said bowlder may sink or fall still lower and out of the way of the piles *h h*.

In Figs. 6 and 7 are shown a wooden pile, M, provided with shoes N, made of strips of wood *m*, fastened in contact with each other across the faces of the pile. The reservoir O, set on top of this pile M, is provided with a movable screw-cover, *n*, and a connecting-pipe, *o*, so that with the cover secured in place this apparatus may be used for the application of

water under pressure from a force-pump, or for the upward induction of currents of water through the tubes P by means of a suction-pump, *p*, or, with the cover removed, it may be used for the application of water without pressure. From this reservoir O the tubes P extend downward on either side of the said pile M, as shown, to its point, or thereabout, and by means of currents of water induced in these tubes P by pressure or otherwise, and by means of the auxiliary currents induced by them in the surrounding water, the soil may be removed from beneath and about the foot of the pile M, so that the said pile will readily sink to position, and when the pile is in position the reservoir O and attached tubes P are removed, as are the reservoir and tubes from the hollow pile K, when that is, by like means, sunk to position.

In removing sunken piles, the single tube G may be used in the same manner in which it is shown in use in Fig. 5, whereby, by means of a current of water forced or induced through the said tube and creating co-operating currents, the soil may be removed from about the foot of the sunken pile, so that the said pile may readily be drawn up; or groups of tubes H or P, respectively, with their attached reservoirs, may be used for creating and applying the water-currents for the removal of the soil from about the piles.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

As a means of sinking or removing piles by the use of water, the pile sinking and removing apparatus E, consisting of the parallel tubes *b b* and couplings *c c*, substantially as herein shown and described.

HENRY CASE.

Witnesses:
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C. SEDGWICK.