

W. S. Smith,
Pile Driver.

N^o 29,921.

Patented Sep. 4, 1860.

Fig. 1.

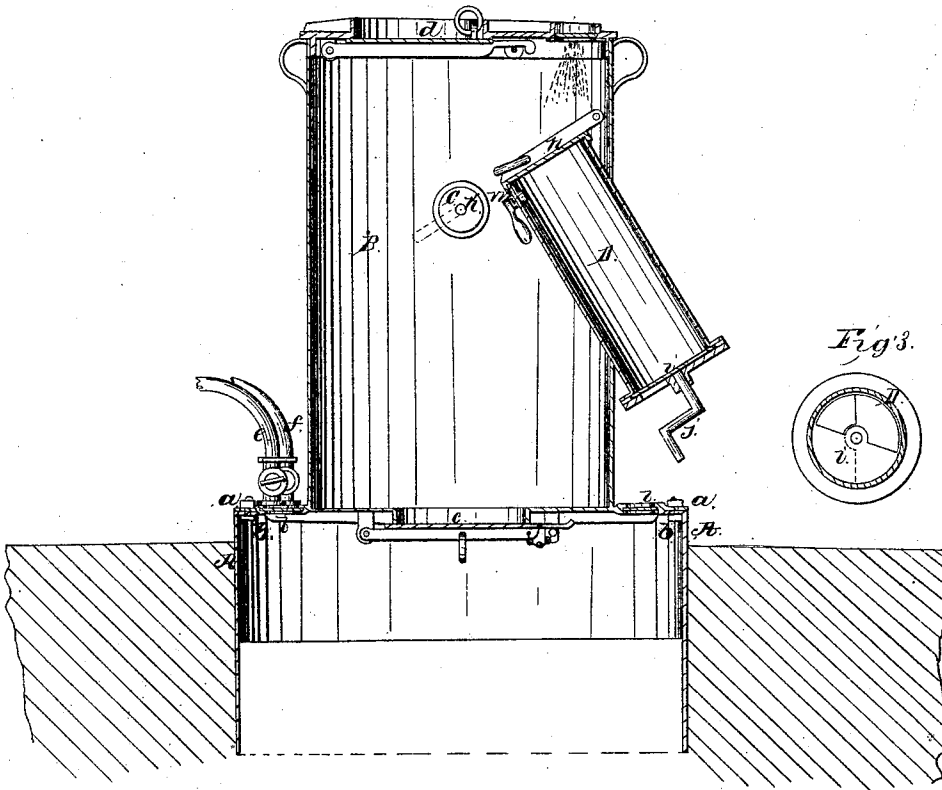


Fig. 3.

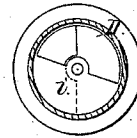
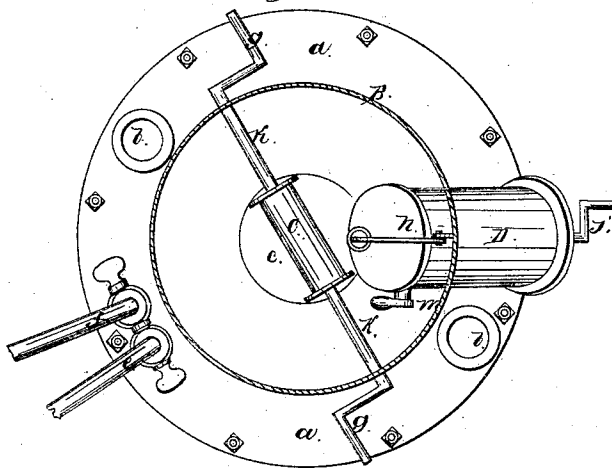


Fig. 2.



Witnesses:
Bliss
and
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Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM S. SMITH, OF TRENTON, NEW JERSEY.

DRIVING PILES BY ATMOSPHERIC PRESSURE.

Specification of Letters Patent No. 29,921, dated September 4, 1860.

To all whom it may concern:

Be it known that I, WILLIAM S. SMITH, of Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Driving Piles by Atmospheric Pressure; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical section of the air-lock and the upper part of the hollow pile. Fig. 2, is a horizontal section of the same. Fig. 3 is a plan of the lower valve of the discharging air-lock which constitutes the principal feature of my invention.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in furnishing the air-lock which is employed to form the cap of the pile in driving, with a supplementary air-lock so applied as to permit the discharge through it of solid matters which may have been taken from within the pile while the water is excluded by an artificial pressure of air, within the main air-lock and pile without the necessity of opening the main air-lock to the external atmosphere.

To enable others to make and use my invention I will proceed to describe its construction and operation.

A, represents the head of the pile.

B, is the main air-lock constituting the cap of the pile made with an external flange *a*, through which to insert the bolts to secure it to the internal flange *b*, provided around the interior of the open end of the pile, and provided with a man-hole *d*, in its head and another man-hole *c*, in its bottom like the air-locks heretofore used for such purposes, such man-holes being fitted with suitable doors furnished with proper fastenings and air-tight packing.

e, and *f*, are two pipes furnished with stop cocks and attached to the flange *a*, one of said pipes constituting the pipe by which the air is exhausted from the pile and by which also air is forced in to the pile and air-lock A, to expel and exclude the water from the pile when it becomes necessary to make examinations or excavate within it, and the other pipe which should be provided with a suitable connection of pipe to reach the bottom of the water, serving as the discharge pipe for the expelled water.

C, is the windlass for drawing up the solid matter from within the pile B, into the air-lock having its shaft *k*, passing through a stuffing box in one or in each of two opposite sides of the air lock and furnished with a crank or cranks *g, g*, outside of the air-lock to be worked by men standing on the platform constituted by the broad flange *a*.

D, is the supplementary air-lock which constitutes the principal feature of my invention, consisting of an air-tight trunk of cylindrical or other suitable form, extending through one side of the main air-lock B, and having an inclination downward in an outward direction from that air-lock. This supplementary air-lock D, is fitted at its upper end with a trap door *h*, furnished with a suitable fastening and with air tight packing, and is fitted at its lower end with a disk valve *i*, or with a trap door or shutter of other convenient construction which can be operated by a crank *j*, or opened and closed by other means by persons outside of the main air-lock. The said supplementary air-lock is also fitted with an air cock, *m*, for the purpose of forming a communication between it and the main air-lock for the establishment of an equilibrium of atmospheric pressure in the two air-locks before opening the upper door *h*.

l, l, are the glass "lights" provided in the flange *a*, of the main air lock for the admission of natural light to the interior of the pile.

The operation of the apparatus is as follows: When the water is being expelled from the interior of the pile by the artificial pressure of air produced by the pump and the earth or solid matter within the pile being brought to a condition to be removed, the lower man-hole *c*, may remain open (the upper one *d*, being of course closed) but the door *h*, of the supplementary air-lock must be closed, and the valve *i*, or its equivalent may be closed or open, but is better closed as it will require to be closed before *h*, can be opened. When the solid matter is in condition to be removed it is put into bags or other suitable receptacles which are attached to the rope of the windlass C, by the man or men within the pile and drawn up by the windlass on signal from the man within the main air-lock A, to the persons outside working the cranks *g, g*. When all is ready for drawing up the matter, the attendant within the air-lock B, opens the cock *m*, to estab-

lish an equilibrium of air pressure between the two air-locks, and when this is established he opens the trap door *h*, and takes the receptacles from the windlass and discharges them into the supplementary air-lock which remains closed at the bottom. When he has filled the supplementary air-lock in this way with solid matter, he closes the air-cock *m*, and the trap door *h*, and signals to an attendant outside to open the valve *i*, or its equivalent to permit the discharge of the matter from the supplementary air-lock and when this has been done, the valve *i*, or its equivalent is closed again and the cock *m*, and afterward the trap door *h*, opened and the filling of the supplementary air-lock proceeded with as before; and this operation may be repeated without opening the man hole *d*. The supplementary air-lock thus obviates the necessity of filling up the main air lock with solid matter as has been heretofore necessary, the only means of discharge having been by the man-hole *d*, and hence the main air-lock may be made of much smaller size than heretofore as it is merely required to be large enough to permit a man to work within it and not to constitute a temporary receptacle for the solid

matter drawn up from the pile. The main air lock being so much smaller is much lighter and can be more easily moved from place to place and raised to connect it with new sections of pile that are added as fast as the lower ones are sunk. The reduction of the size of the main air-lock also enables the flange *a*, to be made wide enough between its body and the head of the pile for the reception of the "lights" *l, l*, to supply natural light directly downward to the interior of the pile and thus dispense with the use of lamps which are often necessary when all the natural light admitted has to come through the main air lock, such use of lamps causing great inconvenience to the workmen within.

What I claim as my invention and desire to secure by Letters Patent is—

The supplementary air lock *D*, applied substantially as herein described in combination with the main air lock and serving the purpose herein specified.

W. S. SMITH.

Witnesses:

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