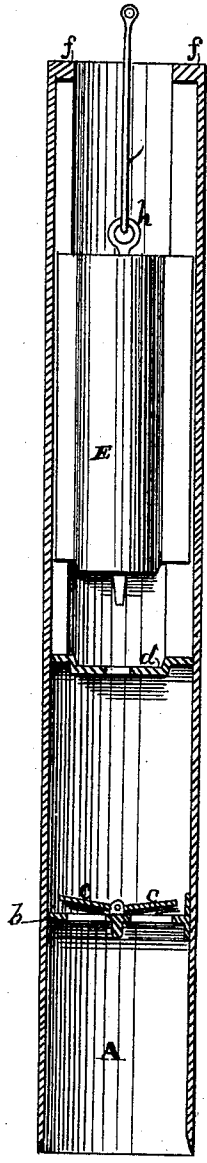
J. HAAS & J. MANNING.

Boring and Excavating Apparatus.

No. 212,218. Patented Feb. 11, 1879.



Witnesses

Geo. H. Strong

Jno. L. Boone

Inventors

Jerome Haas

and James Manning

By Dewey & Co.

Attys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JEROME HAAS AND JAMES MANNING, OF STOCKTON, CALIFORNIA.

IMPROVEMENT IN BORING AND EXCAVATING APPARATUS.

Specification forming part of Letters Patent No. **212,218**, dated February 11, 1879; application filed June 18, 1877.

To all whom it may concern:

Be it known that we, JEROME HAAS and JAMES MANNING, of Stockton, county of San Joaquin, and State of California, have invented an Improved Boring and Excavating Apparatus; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing.

Our invention relates to an improved method and apparatus for boring wells, excavating, and dredging.

Referring to the accompanying drawing, the figure is a vertical section of my apparatus.

Let A represent a tube or cylinder, of any desired diameter and length. The bottom or lower end of this cylinder is open, and its edge may be sharpened to facilitate its operation. A short distance above the bottom of the cylinder we divide it by a diaphragm, *b*, in which is an upward-lifting valve, C.

At a short distance above the diaphragm *b* is a solid diaphragm, *d*, and in the upper part of the cylinder, above this diaphragm, is a weight or hammer, E, which has a length of stroke in the upper part of the cylinder, so that it can be raised and allowed to drop upon the diaphragm *d*, for sinking it into the earth.

The hammer or weight E is guided in the upper part of the cylinder, and stops *f f* prevent it from coming entirely out of the cylinder when it is hoisted.

In operation, this apparatus is suspended by a rope from the end of a derrick or other hoisting apparatus, the rope being attached to an eye, *h*, on the upper end of the weight or hammer. The sharpened lower end of the cylinder is then allowed to rest on the ground, and the weight or hammer E is raised and allowed to drop suddenly, and thus, by a succession of blows, drives the open-ended cylinder into the earth.

The valve C allows the air and water to pass above the diaphragm *b* as the cylinder is driven into the earth, so that when the lower or earth chamber has been filled the entire cylinder can be hoisted out of the hole or excavation and emptied, the water above the valve serving as a packing to keep the valve tight, and the consequent vacuum above the earth in the cylinder serving to retain the load until it has been hoisted to the surface.

If the hole or excavation does not contain a sufficient quantity of water we supply it from the surface; and for this purpose we make a hole in the diaphragm *d*, as represented, so that when water is poured into the upper end of the cylinder it will pass down and rest upon the valve. After the cylinder has been filled the hammer is hoisted up against the stops *f f*, when a further hauling upon the rope hoists the entire cylinder, with its load, out of the hole or excavation.

The hammer might be dispensed with, and the tube filled by dropping it so as to cause it to force itself into the ground.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

The open-ended cylinder A, with its partition *b* and upward-lifting valve C, and provided with the partition *d* and weight or hammer E, substantially as and for the purpose described.

In witness whereof we have hereunto set our hands and seals.

JEROME HAAS. [L. S.]
JAMES MANNING. [L. S.]

Witnesses:
PHILIP B. FRASER,
FRANK A. STEWART.