W. M. SMITH.

Excavator and Submarine Plow.

No. 204,387. Patented May 28, 1878.

*Fig. 1.*

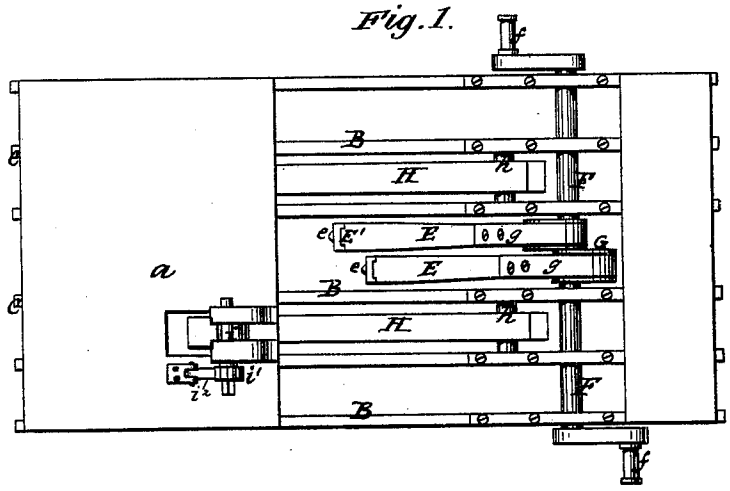



*Fig. 2.*

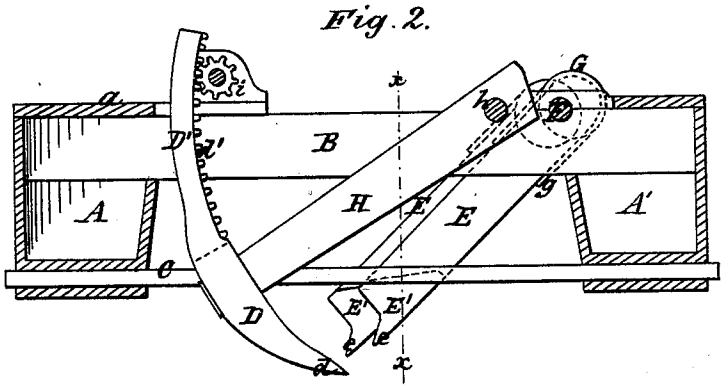
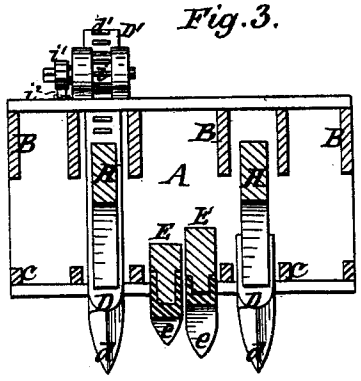



*Fig. 3.*




Witnesses

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# UNITED STATES PATENT OFFICE.

WILLIAM M. SMITH, OF AUGUSTA, GEORGIA.

## IMPROVEMENT IN EXCAVATORS AND SUBMARINE PLOWS.

Specification forming part of Letters Patent No. **204,387**, dated May 28, 1878; application filed November 19, 1877.

*To all whom it may concern:*

Be it known that I, WILLIAM M. SMITH, of Augusta, in the county of Richmond and State of Georgia, have invented certain new and useful Improvements in Excavators and Submarine Plows; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a top view of the excavator. Fig. 2 represents a longitudinal vertical section of the same. Fig. 3 represents a transverse vertical section of the same on line *x x* of Fig. 2.

The object of my invention is mainly to produce a machine by means of which various kinds of rocks and stone lying in strata in the beds of rivers can be excavated and broken by machinery ready for removal.

My invention consists in the combination of two floats, rigidly united by two courses of longitudinal beams and bolts with one or more submarine plows or excavators, and two or more push-bars connected to eccentrics operated by a steam-engine or other power.

My invention consists, also, in submarine plows pivoted to the forward end of a double float, and connected to the rear end, by means of a rack-extension gearing, with a pinion controlled by ratchet-wheels and pawls, or otherwise, mounted upon said float to raise the plow or hold it down, as will be more fully described.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A and A′ represent two floats firmly and rigidly united together at the top by a course of parallel beams, B, and at the bottom by a course of parallel beams or bolts, C, directly underneath the course of beams B, at such distance apart as to leave open spaces for the introduction and operation of two or more submarine plows, D, and push-bars E alternately arranged, as hereinafter described. These plows and push-bars are to be operated by a steam engine or engines located upon either of the floats, and connected, either directly or by means of the cranks *f*, with the crank-shaft F, or by means of gearing uniting said crank-shaft with the engine, or otherwise.

Upon the shaft F are placed two or more eccentrics, G, that are connected by means of the straps *g* with the push-bars E, and so arranged that one or more of said bars are in position to force the float forward or press upon and indent or perforate the top of the rock that is to be broken, while the plows are engaged on the under side. The point *d* of the plows being thus brought opposite the point or toe *e* of the push-bars, they act as gigantic and powerful nippers in breaking the rock to pieces. Two push-bars are placed side by side between the plows, with the full throw of their eccentrics G preferably on opposite sides of the shaft to advance the float and break the rock. The plows and push-bars are grouped together in the order mentioned and shown, in such number and distance apart as to suit the character and size of ledge of rock upon which they are to operate.

The plow-beams H have transverse shafts *h* near their forward end pivoted to the beams B. One of the plows is shown as having an extension, D′, provided with a rack, *d′*, that engages with a pinion, *i*, controlled by ratchet-wheels $i^1$ and pawls $i^2$, and mounted in suitable bearings upon the deck *a* of the float, by means of which the plow can be forced down against or under the rock while operating, or be raised while moving the excavator. The extension D′ is shown as forming a rigid extension of the plow, but it may be hinged to the head of the plow or its beam, and then be made either straight or curved, its action remaining the same. If the plow is not provided with any extension or rack it can be raised with a chain and windlass or otherwise while moving the excavator from place to place.

The push-bars E are preferably made of wood, with a metallic shoe, E′, inclosing the end of each bar, and having a point or a series of points, *e*, of hard and strong metal. The beams B and C unite the two floats firmly and rigidly together. The top course or beams B furnish bearings for the shafts *h* of the plows, and the bottom course of beams C form guides to hold the plows and push-bars in their respective tracks, and counteract the action of the currents of water and wind against the body of the floats.

Having thus fully described my invention, I claim—

1. In combination with floats rigidly united

by longitudinal beams and bolts, one or more submarine plows or excavators, pivoted at their forward end to said beams, and two or more push-bars, connected to eccentrics operated by steam-engines or other power, substantially as and for the purpose described.

2. In combination with a floating excavator, constructed substantially as described, the submarine plows pivoted to the forward end or float, and connected to the rear end by means of a rack extension and pinion controlled by ratchet-wheel and pawl mounted upon the deck of said float to raise and lower the plows or hold them down, substantially as described.

3. In combination with floats, push-bars, and plows, as described, the two courses of longitudinal beams B and C, substantially as and for the purpose described.

WILLIAM M. SMITH.

Witnesses:

JAMES A. LOFLIN,

W. D. SAVAGE.