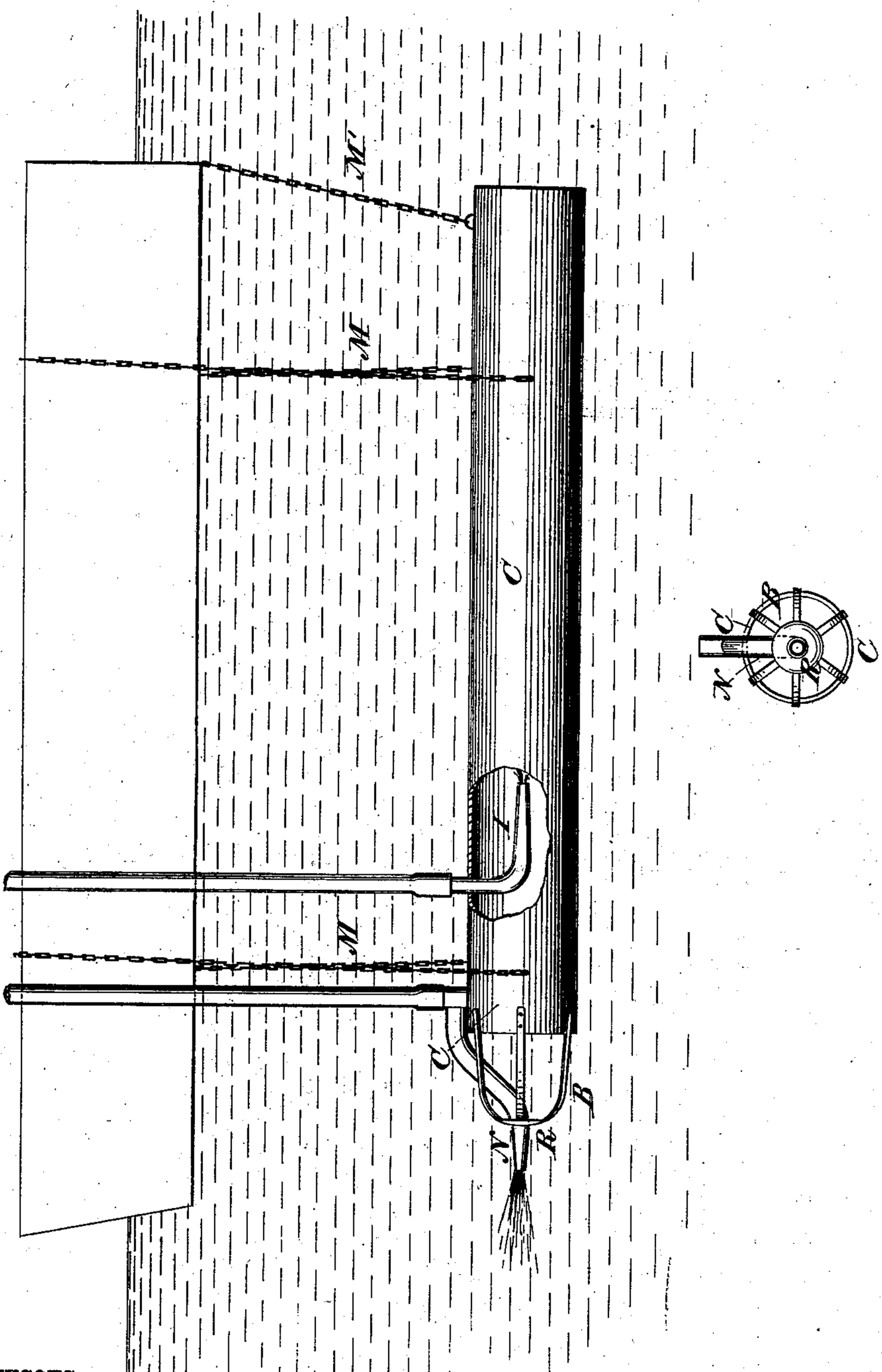
R. STONE.

Hydraulic Excavating.

No. 224,309. Patented Feb. 10, 1880.



WITNESSES:

Eugene Smith

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UNITED STATES PATENT OFFICE.

ROY STONE, OF NEW YORK, N. Y.

HYDRAULIC EXCAVATING.

SPECIFICATION forming part of Letters Patent No. 224,309, dated February 10, 1880.

Application filed September 16, 1879.

To all whom it may concern:

Be it known that I, ROY STONE, of the city, county, and State of New York, have invented a new and useful Improvement in Hydraulic Excavating, of which the following is a specification.

The invention consists, first, of an improved method of hydraulic excavating in which the earth is loosened by a stream of water under pressure and removed by an induced current formed by another stream discharged under water into a conducting-pipe; second, of the apparatus for such hydraulic excavating, comprising a conducting-pipe, a boring-nozzle for loosening the earth, an ejector-nozzle for creating the current, hose or connecting pipes for bringing the water from a pump or reservoir, with gates for regulating the flow of the same, suspending chains or ropes, and guys for holding the pipe against currents or moving it in any desired direction.

The following is a description of my apparatus and its method of operation, the letters referring to the accompanying diagram.

The conducting-pipe C has a projecting basket, of iron, B, converging and terminating in the central ring, R, through which the nozzle N of the boring-pipe projects. Backward from the ring this pipe bends upward through the bars of the basket, then downward for attachment to the conducting-pipe, then upward again for its hose-connection.

The ejector-nozzle I enters the conducting-pipe on top near the receiving end, curves toward the other end, and discharges in the axis of the pipe.

The apparatus is suspended by the chains M M from the deck of a scow, which carries the force-pump and suitable hoisting apparatus.

In operation, the stream from the ejector-nozzle tends to push the column of water out of the conducting-pipe, and the pressure of the atmosphere and of the superincumbent water forces a great volume of water through the basket to replace it. At the same time the boring-stream, discharged into the bank of earth, reacts from it and brings the loosened material within reach of the induced currents, by which it is carried through the conducting-pipe and discharged into deep water, or brought to the surface and thrown into a submerged tank, from which the water overflows, leaving the gravel and sand at the bottom.

In practice it is found that in a conducting-pipe fifteen inches in diameter and sixty-four feet long an ejected stream of one and one-quarter inch diameter, under pressure of one hundred and fifty pounds per square inch, and discharging about four hundred and twenty gallons per minute, causes a total discharge of five thousand six hundred gallons per minute, or an induced current of five thousand one hundred and eighty gallons, and the force of the current is sufficient to lift from the bottom, in thirty feet of water, and bring to the surface any stones that will pass the basket or the ejector-nozzle in the pipe.

What I claim, and desire to secure by Letters Patent, is—

1. An improved method of hydraulic excavating in the loosening of the earth by a stream of water under pressure and removing it by an induced current caused by another stream, also under pressure, substantially as shown and described.

2. An improved apparatus for hydraulic excavating, comprising a conducting-pipe, a boring-pipe to discharge a stream of water under pressure, and an ejector, substantially as shown and described.

ROY STONE.

Witnesses:
EUGENE SMITH,
J. W. WEST.